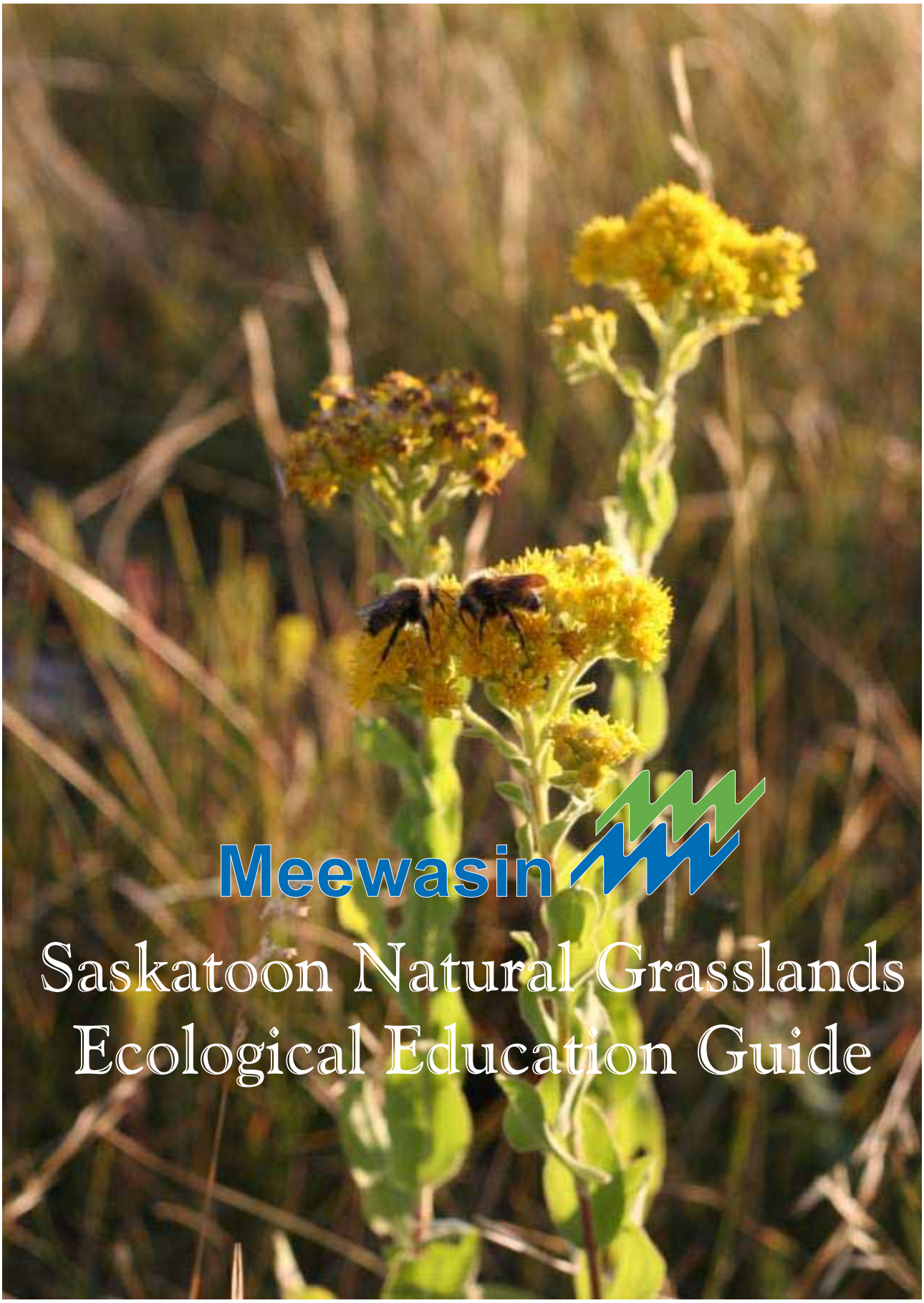

Meewasin

Saskatoon Natural Grasslands Ecological Education Guide

Welcome to the Saskatoon Natural Grasslands Ecological Education Guide, published by Meewasin Valley Authority. The Meewasin Valley Authority is an organization dedicated to protecting the natural and cultural heritage resources of the South Saskatchewan River Valley. This educational resource has been produced with the financial assistance of the following sponsors:

Saskatoon Nature Society

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Animal Graphics for "Prairie Creature Features" and "Web Creations" lessons: Paulo Flieg
Additional editors: Samantha Adkins and Loretta Gerhardt

Editor's Note: The original writer of this document had relocated by the time I began editing, therefore, I did not have the advantage of conferring with the author during the extensive editing process. Consequently, my objective during editing has been to maintain the integrity of the document while making necessary changes. The format and design remain true to the original draft. In addition to the technical aspects of editing, I have stated educational objectives at the beginning of each activity, rearranged the order of some activities, clarified directions, refined content, alphabetized reference lists, and completed according to the availability of information. It has been a pleasure to have had the opportunity to be involved in this creative document.

Judith Hill Benson

In Memorium

This Saskatoon Natural Grasslands Ecological Education Guide is dedicated to past Beaver Creek Conservation Area Interpreter Kyla Fennig who passed away February 2004. Kyla's spirit will continue to radiate through those who have been touched by her reverence for nature and through the work she contributed to the creation of this teacher's guide.

In Memorium

This Saskatoon Natural Grasslands Ecological Education Guide is also dedicated to Gordon Silversides (1927-1994). Gordon, a teacher from a family of teachers, would have been pleased with the development of this guide. After retirement he dedicated his life to establishing as a nature preserve the thirty-acre segment of virgin land, then known as Silverspring Prairie. Gordon played a key role in organizing the interpretive center and its team of volunteers. He acknowledged the historical, cultural, environmental, educational and aesthetic value of the Saskatoon Natural Grasslands and brought it alive for all ages. The "grasslanders" who were privileged to have walked with Gordon feel his presence with every return visit.

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Acknowledgements

I would like to acknowledge the many people that have contributed to the creation of this ecological education guide and kit.

First and foremost I would like to acknowledge my husband, Perry, and my boys, Jonathon and Joshua, who have patiently put up with my absence at home during this project. Their understanding, encouragement, and love is like the sunshine on the prairies - nourishing, energizing, and even when not visible, dependable.

Next, I would like to thank Doug Porteous and the Meewasin Valley Authority management for giving me this opportunity to coordinate the Saskatoon Natural Grassland educational project. The support of the Beaver Creek Staff (Jamie McMillan, Michelle Volk, Andrew Whiting, Brenda Kramarchuk, Paulo Flieg, and Lis Mack) is also appreciated. Brenda Kramarchuk, Paulo Flieg, and Rebecca and Glen Grambo generously donated their photos for posters and other educational materials. I am also indebted to Samantha Adkins and my mother, Loretta Gerhardt, for their many hours of editing.

My appreciation is also extended to Dick Nieman and Freda Trew, superintendents of the Catholic and Public School Boards, for extending my contract for another four months and for financing much of the materials for the education kits. Financial support is also gratefully acknowledged from TD Friends of the Environment Foundation, Superstore, Nature Saskatchewan, and Saskatoon Nature Society.

Working with the principals, Brendan Bitz and Max Abraham, and the staff of the two schools, Mother Teresa and Silverspring, that border the Saskatoon Natural Grasslands has been a pleasure. I commend the teachers and environmental educators that made time in their busy lives to contribute to this project. Many thanks to the following for attending the two afternoon workshops and sharing their ideas on curriculum connections and topics for the manual:

Public School Teachers: Donna Nazar, Heather Muirhead, Cindy Zintel (and Janet Edwards), Bruce Arthur, Reg Wihak, and Jodie Habicht (all from Silverspring School)

Catholic School Teachers: Roy Sondershausen, Shawn Lorenz, Rhonda Morari, Garth Olver, Alandina LaPlante, and Mary Wood.

Environmental Educators: Tim Haughian, Melanie Elliott, Greg Fenty, Paul Trottier, Louise Jones

I also had the pleasure of working with some very wonderful, talented people who have not only assisted me in the production of this ecological guide but have nurtured and inspired me. Kyla Fennig and Adriana Bacheschi are two angels that flew upon my doorstep at a time when I was in desperate need of assistance. Having fully realized what an immense task this educational venture was, I was delighted when they offered to assist with the writing of the manual.

Having worked with Kyla in the past at Beaver Creek Conservation Area, I knew she would whole-heartedly invest her talents, experience, dedication, and commitment to instilling a love for nature. Her superb writing skills, extensive knowledge of the natural environment, and the reverence for nature that radiates from her very presence are all special blessings that I and this project benefit from.

Adriana's request to be involved was in part to complete her internship for CERTEE (Certificate in Ecological Education) so I had the luxury of having her work with me every day for the month of April. Her wise soul and zest for life was a constant source of sustenance and vitality. In addition, I was amazed at the quality of her writing, for someone who claims that English is her second language, and the fact that someone from Brazil shared a similar eco-philosophy and love for the prairie.

The following are letters from each of these dedicated prairie people to give you a peek at who has helped bring life to the words written in this manual. So it is with great pride that I present to you a production that is the conglomeration of many minds, souls, and bodies - in many ways it represents how all beings in life are interconnected and interdependent - a foundational concept of this ecological guide. May we all as prairie people continue to journey forward with reverence for that which shapes us - the prairie - the essence of our being.

Kindest thoughts,
Marie Stradeski

Dear Teacher:

One day, a little boy saw a lady bug crawling on the floor. He climbed off of his chair, and ran quickly to get his shoe. He returned with shoe in hand and raised his arm to strike the insect dead, as he had always seen adults do before.

Later, that same little boy stood barefoot and delighted on the sidewalk as ants teemed tickling over his feet. He ran across the grass shouting to the bees to follow him, as he would lead them to the flowers. He thought potato bugs were the most beautiful creatures he had ever seen! It was important to him now to gently move ladybugs out of harm's way.

The little boy acted on what he saw being modeled around him. He watched. He learned. He participated. At first his actions towards his fellow insect creatures were negative and uncaring. Insects were unwelcome intruders into his world. But then he was given choices. He understood that he was part of a larger community and it was good to learn and care.

Somebody is watching. Somebody is always learning whether we think we are teaching or not. Every natural thing deserves to be treated with respect and understanding for being. Life is about interactions and connections. Life is a community. The respect and honour we show each other and the earth will resonate strongly in our students' feelings, thoughts and actions and throughout the greater community at large.

You are about to undertake a journey with your students of appreciation, discovery, understanding, respect and honour for the Saskatoon Natural Grasslands community. There is much joy to be had in this journey.

Fare thee well,
Kyla Fennig

Dear Grassland Teacher,

I was asked to write this letter a long time ago, but because of reasons beyond my comprehension, time seemed to have disappeared at a rate much faster than expected . . . strange how that goes.

So here I am, nearing my deadline, scrambling with words trying to say so much more than words can handle. I know I could try to explain what the project meant to me and how much I am thankful to have been part of it. Or how much I enjoyed working with such wonderful people like Marie or Kyla...Or how much fun we had playing with puppets. Somehow, though, no matter how many times I repeat all that or how much I try to emphasize it, it is just not enough. I guess, then, I will have to take you through the long route.

The day I was going to actually start writing I went for a walk in the Saskatoon Natural Grasslands. I had never been there and I did not feel I could write about a place I had never experienced. It was a beautiful morning, cool, bright and sharp. The sun had just risen and there was not much happening around yet. It was early in spring and few birds were around, but making sure they were noticed. Everything seemed in a balmy peaceful state. I walked. The grasslands were not very different than so many other patches of prairie that I have learned to love so much. It had the same subtle beauty and peace, that delicate and raw feeling that conquered the heart of this humble tropical girl (mine) a long time ago. There was one difference though, and it saddened me. The sky was smaller there. Being so encroached by new developments, the prairie seemed to ache, maybe without vastness and endless skies, the prairie is not all it is meant to be.

Nonetheless, at the same time, that small piece of land, so stubbornly still there, moved me. It also, through one of those quaint mind movements, so many times outside our grasp, took me to another place. This other place could not be more different. It was a small island in the coast of Brazil where I spent parts of my summers as a child. It was not your typical tropical island, with coconut trees and transparent turquoise waters. It was much more unassuming than that. A humble strip of land, between a mangrove channel and an angry, but beautiful ocean. There were no cars there, no electricity, not many people. It was a fishermen's village and "my island" for many years. In time, my parents stopped going there, and I was never back until I was a teenager. When I finally went back on my own, things were different. There were many people camped there. The place had become well known and attracted tourists from all over. There was a lot more noise, and a lot more garbage. I remember walking around that first returning evening there, with a plastic bag, collecting garbage and crying. "How could they do that to my island?" I kept thinking.

I come from a family - like most Brazilians - of not environmentally concerned people. My parents never recycled, were always very consumeristic, very unaware of their environment or its concerns. Unwillingly, though, they taught me the greatest environmental/ecological lesson I could have ever learned. They gave me a place to love. That shaped forever my relationship to places, land, animals and the sky.

Maybe what my mind was trying to do, by taking me back to my island on a cool spring prairie morning, was to tell me that this is what I should help you to do: Give the children a place to love.

I know the Grasslands is not exactly a tropical island, but it is beautiful, diverse, rare and right there. It is also in desperate need of love and protection. I did my best to try to help you in this process and enjoyed every minute of it. I hope you do as well.

Have fun!
Adriana

Introduction

This ecological education guide for the Saskatoon Natural Grasslands (SNG) was born from the desire of the Meewasin Valley Authority and numerous partners to provide educational support for instilling reverence for the grasslands so that this endangered space and all that depends on the grasslands for survival will be conserved for the benefit of future generations. It is hoped that the two elementary schools that border the Saskatoon Natural Grasslands, Mother Teresa School and Silverspring School, will embrace the grasslands as their primary curriculum to develop an ecological ethic of care for this diverse ecosystem.

SNG Objectives and Themes

The lessons in the guide were created with the following objectives in mind:

- To display positive behavior while on site, understanding the effects of human impact
- To walk the trails and have a direct experience of the prairie
- To understand that the SNG is a diverse native grassland ecosystem
- To learn that a number of rocks on site were removed to use as construction materials for some of Saskatoon's heritage buildings
- To appreciate the value of the grasslands for future generations
- To respect the SNG as a unique and fragile natural resource within an urban environment

Each of this guide's four themes is represented in a separate section:

- Awaken to Diversity
- Appreciate Nature's Symphony
- Experience the Mystery
- Tread Softly

Design and Layout

There are four sets of lessons available at each grade level (one under each theme). Teachers may use the lessons in any order and are encouraged to read the background information and adapt lessons at any grade level. Students benefit from repetition and each teacher will interpret the lessons in his or her own unique way.

Within each of the four sections are three main parts: a philosophical essay, a curriculum cross-reference chart and a lessons section. The philosophical essays introduce the theme and provide an understanding of diversity, ecology, experiential learning, reverence, and conservation. Following each essay are the lessons for that theme which are organized by grade level from Kindergarten to Grade Eight. Each lesson includes background information, objectives, materials, resources, and activities. The activities do not always indicate length, as that will be determined by the teacher as a result of student response and interest. The activities for each lesson are divided into three pedagogical sections: **Rouse Interest**, **Relate**, and **Reflect**.

How to Use this Guide

Rouse Interest activities engage students in the theme and awaken enthusiasm for each grassland topic. These pre-visit activities help focus students for their on-site visit, and promote a quality experience in nature.

The '**Relate**' activities promote interaction with nature during on-site visits and facilitate the development of relationships between students and nature, between students and other students, between students and the teacher, and/or between students and the community. Groups should be kept small to ensure quality experiences on-site. Thus, one or more of the activities listed in this section may be for half of the students to do in the classroom or schoolyard while the other half are participating in an activity in the Saskatoon Natural Grasslands. The groups would then switch so that each group will benefit from both activities.

Activities in the '**Reflect**' section allow students ample time to look back and think about their experiences by giving them opportunities to creatively express their feelings and the connections they have made while bonding with the Grasslands.

Ecological Pedagogy

This ecological guide has a pedagogy that focuses on the above three Rs (Rouse Interest, Relate, and Reflect) rather than the traditional three Rs (Reduce, Reuse, and Recycle). Focusing on the traditional three Rs and environmental disasters before instilling a reverence for nature may develop a sense of guilt. Once a love for nature has been established and fostered, students will appreciate opportunities to heal nature's wounds and develop a desire to become stewards of the earth. Just as in any relationship, developing a close relationship with nature takes time. The first five years of education should focus on developing that loving relationship through direct experiences in the Saskatoon Natural Grasslands to study the local flora and fauna. Responsible stewardship activities in this guide have therefore been reserved for the older grades.

Guiding Philosophy while Visiting the Grasslands

- Make sure the students understand behavior **expectations** and boundaries while on site.
- Encourage **self-discovery** by providing questions rather than answers.
- Strive to incorporate all the **senses** when outdoors. **Hands-on** props such as a fur sample or a feather focus attention.
- **Model respect, love, curiosity and enthusiasm for nature**. Emphasize the importance of children listening to and learning from one another.
- Minimize impact on the grasslands by **being quiet**, staying on the trail, leaving natural settings and creatures undisturbed, and having only one person at a time leave the trail to pick up litter.

- Do not worry about not being able to identify the plants and animals on the grasslands – just **celebrate the diversity** by pointing out differences among species. Encourage students to make observations that will help them identify a species on their own with the help of a guide book, if they so choose. Names are often only remembered after a **personal connection** has been made.
- Be willing to admit when you do not know the answers to questions and encourage students to do some **research on their own** and **share** findings with the class.
- Bring your **sense of humor** for any unexpected occurrences – laughter is good for the soul as well as the brain.
- **Be adaptable** – be prepared for the lesson but be willing to let it go if nature decides to present something totally off topic. Animal sightings have first dibs over the best-laid plans. With a bit of **creativity,** one can usually tie the sighting into the lesson for the day.
- Include an experience of **complete silence** as a criterion whether it is a solo reflection time or a **sensory experience**. Students' multi-media world gives them rare opportunities to listen to their own heartbeat or to the soothing sounds of nature. Injecting a little serenity will **help them reflect on who they are** and how they fit into this world.

Monitoring Site Impact and Resource Materials

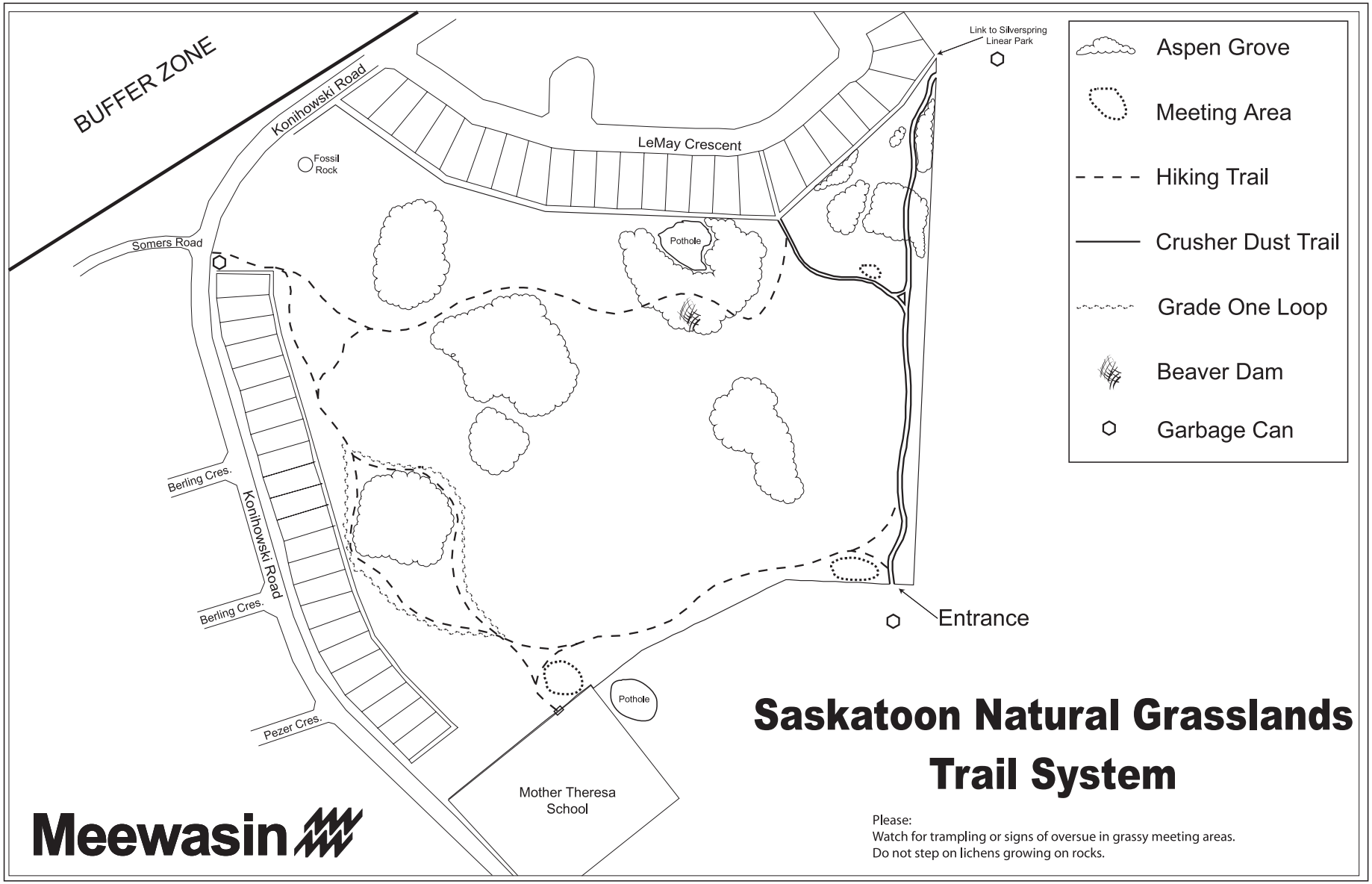
The education kit (Edu-kit) materials and teacher guide will need to be scheduled and monitored by the teacher-librarian or teacher-volunteer to maintain materials and to ensure that every teacher has equal opportunity to use the resources. Proper labeling should discourage loss of items from the kit.

Grasslands visits will also have to be coordinated between the two schools to limit the site to one classroom plus grade two groups at one time. The teacher log will provide user information which will be useful for future planning and analyzing human impact..

Site Map and Trail Use Guidelines

The SNG map displays the interpretive trail and possible spots for veering off the trail to participate in a sharing circle or to lay down in the grass and have a more intimate interaction with the grasslands. These are areas of Kentucky Blue Grass, an invasive species that needs to be kept in check. "Trail closed" signs have been put up on site to lessen the confusion as to which trail can be used for educational purposes. The resource management goal is to preserve the middle area of the grasslands for wildlife habitat and focus human impact on the perimeter.

The primary trail which provides linkage between neighborhood and schools is also displayed on the map. Students should be encouraged to use this trail for getting to and from school. Other trails are off limits during school hours unless a teacher or guide is leading a group. The primary trail will accomodate bicycles, but please educate students not to bike anywhere else on the grasslands.


BUFFER ZONE
Konihowski Road
LeMay Crescent
Link to Silverspring Linear Park
Fossil Rock
Somers Road
Pothole
Berling Cres.
Konihowski Road
Berling Cres.
Pezer Cres.
Pothole
Mother Theresa School
Entrance
Aspen Grove
Meeting Area
Hiking Trail
Crusher Dust Trail
Grade One Loop
Beaver Dam
Garbage Can
Saskatoon Natural Grasslands Trail System
Meewasin
Please:
Watch for trampling or signs of oversue in grassy meeting areas.
Do not step on lichens growing on rocks.

Inventory List for Edu-kits

Container of Puppets

Bluebirds in Nest
Red Fox
Brown Hare
White Hare
Bluebird
Raccoon
Ground Hog
Bee Finger Puppet x 3
Fairy
Skunk
Ladybug Finger Puppet x 3
Mouse Finger Puppet x 3
Dragonfly Finger Puppet x 3
Spider Finger Puppet
Monarch Finger Puppet x 3
Bat Finger Puppet x 3 (May have a mosquito replacing one bat)
Beetle Finger Puppet x 2
Chipmunk Finger Puppet x 2
Worm in Apple Finger Puppet x3
Painted Lady Butterfly Life Cycle Models

Container of Hands-On Materials

G.H. Owl Feather
Coyote Claw Replica
Badger Front Claw Replica
Coyote Mandible Replica
Fur
Bug Quest Bingo Scarf (6)
Ball of String
Fossil Rock
Duck, Owl and Hawk Wing Teeth
Swainson's Hawk foot
Fossil Collection
Nature Quest Bingo Scarf
Blue Bag ('Mystery Bag')
Twigs chewed by Snowshoe Hare
Twig – not browsed
Bison Wool
Deer Antler
Rocks and Mineral Kit
Specimen jars (5)
Thermometer

Track Molds

Deer (hind and front)
Coyote (hind and front) x 2
Burrowing Owl
Snowshoe Hare (hind and front)
Red Fox (hind and front)
Badger (hind and front)
Northern Flicker
13-lined Ground Squirrel
Striped Skunk (hind and front)
Weasel (hind and front)

Container of Visual Aids

Binoculars x 10
Bug Box x 23
Magnifying Glass x 23
Rubbing Plate Kits - Fossils
Rubbing Plate Kits – Animal Tracks

Inventory List for Edu-kits (cont.)

Games, Audio-visuals, Posters and Wildlife Cards (in largest kit)

Games
The Bug Game, Compost Gin, The Wild Seed Game, Plant Cards

Audio Visuals
Jewels of the Sky (CDROM)
Tread Softly (Video)
Microcosmos (Video)
In Tune With all Species (Cassette)
All One Earth (Cassette)
Grassland Bird Bingo (Cassette)
Sun up, Sun Down (CD)
Birding by Ear (CD)
Prairie Spring (CD)

Posters
White-tailed Deer
Snowy Owl
Rabbit
Coyote
Red Fox
Life Cycle of a Butterfly
What is an Insect?
What is a spider?
Facts About Insects

"Who Am I" Wildlife Cards

Badger	Flower	Mouse	Snake
Bat	Fox	Owl (young)	Spider (2)
Berries (Saskatoons)	Frog	Owl (Great Horned)	Sun
Bison	Grass (Grama)	Owl (Snowy)	Sunflower
Bluebird	Grass	Partridge	Towhee
Butterfly (2)	Grasshopper	Prairie Lily	Tree
Caterpillar	Ground Squirrel	Porcupine	Vesper Sparrow
Chickadee	Grouse	Rabbit	Vole
Chipmunk	Hare	Raccoon	Waxwing
Coyote	Humans	Redpoll	Weasel
Crocus	Lichen	Seeds	
Deer	Meadowlark	Skunk	

Ethnobotany Kit
36 Plant Pieces in one envelope
18 Problem Cards and 18 Solution Cards in the other envelope

Plants included:

Silverberry, Prairie Sage, Pasture Sage, Chokecherry, Saskatoon, Western Snowberry, Willow, Thorny Buffaloberry, Hawthorn, Trembling Aspen, Rose, Creeping Juniper, White Birch, Balsam Poplar, Bearberry, Scouring Rush, High Bush Cranberry, Wild Licorice

Books & Other Printed Material (in largest container)

Student Resources

Briggs, Virginia Morris. *The Nest: A Magical Tale.* Arrowood Books, Inc.: Santa Monica, CA. 2000

Bunting, Eve. *Butterfly House.* Scholastic Press: New York, NY. 1999

Dale Seymour Publications; Orangeburg, NY. *Habitat and Biodiversity: Student Edition.* 1998

Evert, Laura. *Whitetail Deer.* Northwood Press: MN. 2000

Funston, Sylvia. *Peregrine Falcon.* Greey de Pencier Books: Toronto, ON. 1992

Green, Jen. *Under a Stone.* Crabtree Publishing Co.: NY. 1999

Himmelman, J. *A Hummingbird's Life.* Childrens Press: Chicago, IL. 2000

Ibid. *A Ladybug's Life.* Childrens Press: Chicago IL. 1998

Howe, James. *I Wish I Were a Butterfly.* Gulliver Books: San Diego, CA. 1987

Johnson, Rebecca L. *A Walk in the Prairie.* Carolrhoda Books, Inc.: MN. 2001

Johnson, Sylvia A. *How Leaves Change.* Lerner Publications Company: MN. 1986

Jones, Jennifer Berry. *Who Lives in the Snow?* The Court Wayne Press: Colorado. 2001

Kalman, B., Ed. *In Fields and Meadows: Be an Animal Detective.* Crabtree Publishing Co.: NY. 1997

Everts and Kalman. Animal Homes. Crabtree Publishing Co.: NY. 1994

Ibid. *Bugs and Other Insects.*

Kalman, Bobbie and Langille, Jacqueline. *What are Food Chains and Webs?* Crabtree Publishing Co.: NY. 1998

Ibid. *What is Hibernation?* 1999

Ibid. *What is a Life Cycle?* 1998

Ibid. *What is a Living Thing?* 1999

Ibid. *What is Migration?*

Larson, Gary. *There's a Hair in My Dirt!: A Worm's Story.* Harper Collins: NY. 1998

London, Jonathan. *Dream Weaver.* Silver Whistle, Harcourt Brace & Company: CA. 1998

Maclay, Elise. *Reading the Wild.* The Greenwich Workshop Press: Shelton, CT. 2001

McKinney Shaw, Barbara. *Pass the Energy Please.* Dawn Publications: CA. 1999

Overbeck, Cynthia. *How Seeds Travel.* Lerner Publications Company: MN. 1982

Plumb, Sally. *The Hole Story.* Badlands Natural History Assoc.: SD. 2000

Pyle and Kest. *Insects - Colouring Book.* Houghton Mifflin Company: Boston, NY. 1993

Spickert, Diane. Earthsteps: *A Rock's Journey Through Time.* Fulcrum Publishing: CO. 2000

Tagholm, Sally. *Animal Lives: The Rabbit.* Kingfisher Publishers: NY. 2000

Taylor, Dave. *Endangered Grassland Animals.* Crabtree Publishing Co.: NY. 1992

Wallace, Marianne D. *America's Prairies and Grasslands: Guide to Plants and Animals.* Fulcrum Publishing: CO. 2001

Walton and Morrison. *Endangered Wildlife Colouring Book.* Houghton Mifflin: NY. 1991

Winer, Yvonne. *Spiders Spin Webs.* Charlesbridge Publishing: MA. 1996

Teacher Resources (in largest container)

Teacher Manuals

Barden, Cindy. *Discover! Ecology: Reproducible Pages plus Teacher's Guide.* Milliken Publishing Co. 2000

Blobaum, Cindy. *Geology Rocks!: 50 Hands-On Activities to Explore the Earth.* Williamson Publishing: Charlotte, VT. 1999

Carreiro, Carolyn. *Hand-Print Animal Art.* Williamson Publishing: Charlotte, VT. 1997

Habitat and Biodiversity: Teacher Resource Guide. Dale Seymour Publications: Orangeburg, NY. 1998

Harrington, Sheila, Editor. *Giving the Land A Voice: Mapping our Home Places.* LTA, The Land Trust Alliance of British Columbia. 2002

Lingelbach and Purcell, Editors. *Hands-On Nature: Information and Activities for Exploring the Environment with Children.* Vermont Institute of Natural Science. 2000

National Wildlife Federation. *Ranger Rick's Nature Scope: Wild and Crafty.* Learning Triangle Press. 1998

Stradeski, Marie. *Saskatoon Natural Grasslands Ecological Education Guide.* Meewasin Valley Authority: Saskatoon, SK. 2005 (This Guide)

University of Saskatchewan Extension Division. *Saskatoon Natural Grasslands Grade 2 Field Trip.* Saskatoon, SK

Willson, Kay. *Exploring the Grasslands: Understanding an Ecosystem.* Saskatchewan Environmental Society: Saskatoon, SK. 1994

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A Golden Guide: Flowers. St. Martin's Press: NY. (distributed in Canada by H.P. Fenn and Co. Ltd.)

Klein, Marcia. *Prairie Plants.*

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Saskatchewan Environment and Resource Management. *Natural Neighbours: Selected Mammals of Saskatchewan.* Canadian Plains Research Center: University of Regina. 2001

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Saskatchewan Wetland Conservation Corporation. *Songbirds of Saskatchewan.* Regina, SK

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Smith, Al. *Saskatchewan Birds.* Lone Pine Publishing: Edmonton, AB. 2000

Trottier, Gerry. *A Landowner's Guide: Conservation of Canadian Prairie Grasslands.* Minister of Supply and Services Canada. 1992

Vance, Jowsey, McLean and Switzer. Wildflowers Across the Prairies. Greystone Books: BC. 1999

Other Resources

Saskatchewan Wetland Conservation Corporation. *Managing Your Native Prairie Parcels.* Regina, SK Spring 2002. *Nature Canada Magazine,* Spring 2002

Awaken to Diversity

Awaken to Diversity

Just as the rich variety of plants, animals, and nonliving elements of the grasslands interact to create a biologically diverse ecosystem, so too must ecological education be a dynamic, organic, interactive process, requiring a vital environment, diverse surroundings, and enriching life experiences.

"It is important that you know you are planting seeds even if you don't see them bloom."

V.Verdon-Roe

Most schools are limited to the monoculture of their schoolyards for spur of the moment outdoor education. Being next door to the Saskatoon Natural Grasslands is a special gift of diversity that teachers and students can benefit from. All that is required is some enthusiasm and facilitation from the teacher to allow the students to interact with this diverse habitat.

Lessons in this section will strive to awaken students to the diversity of colors, insects, birds, flowers, rocks, plants, animals, and grasses of the Saskatoon Natural Grasslands by incorporating different ways of knowing and learning. Hands-on experiences, drama and role-playing, art, physical games, poetry, sensory experiences and reflective activities all strive to sow a variety of seeds in students' fertile brains. Edu-kit materials, such as the puppets, rock and fossil kits, and other hands-on materials are available to awaken your students' curiosity about the diversity of the grassland habitat and the community that depends on it for survival.

Another goal of this section is to instill in students an appreciation for their own uniqueness and the special role each being, human and non-human, plays to create a beautiful, healthy world.

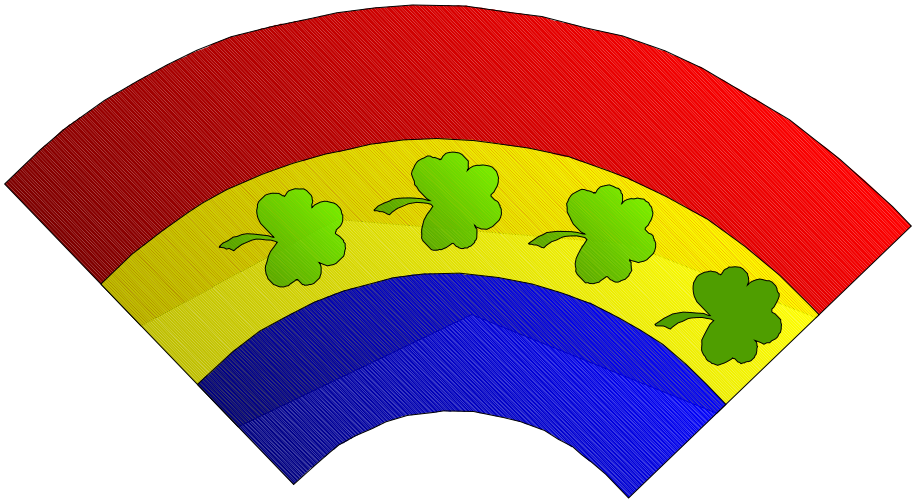
Colour Me a Rainbow

Background Information

These lessons emphasize the role of colour in nature and how colour variety creates a more interesting world.

Colour plays a vital role in the survival of many plants and animals. Flowers depend on their bright colours to **attract** insects and birds, which pollinate flowers while gathering nectar. This interdependency is also apparent in an animal blending with its surroundings to provide **camouflage**. Birds, most often the males, use colour to **attract a mate** or to **steer predators away** from their eggs or young. The Monarch Butterfly's orange and black wings alert predators of this butterfly's nasty taste. Other butterflies have coloured patterns on their wings resembling large eyes to keep predators at bay.

"Colour Me a Rainbow" strives to instill in children an appreciation of the importance of nature's colours and each living thing, including themselves, to create harmony and beauty in the world.



Lesson Information

Grade Level: K
Season: Fall

Objectives

To awaken to the diversity of colours in nature

To understand the important role colour plays in nature

To appreciate the uniqueness of all beings

Resources

Hand-Print Animal Art (In edu-kit)

Colour Me a Rainbow

Rouse Interest

Materials
Ribbons of different colours

Rainbow Roleplay

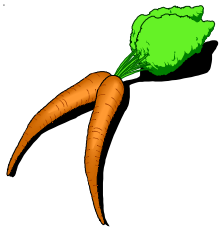
The following roleplay can be done as the teacher reads the *Story of the Rainbow* while the students dance around on cue with coloured ribbons. Their older care partners could act out the colour characters while kindergarten students dance.

Once upon a time, all the colours in the world started to quarrel; each claiming they were the most important the most useful or the favourite.

Green said: *"Clearly I am the most important. I am the sign of life and hope. Nature chose me to be grass, trees, and leaves. Without me all the animals would die of starvation and lack of oxygen and shelter. Look out over the grasslands and you will see that I am in the majority."*

Blue interrupted: *"You only think about the earth, but consider the blue sky and the river that flows to the sea. Water is the basis of life. It is drawn up by the clouds from the blue sea. The sky gives space and peace and serenity. Without my peace you would all be nothing but busybodies!"*

Yellow chuckled: *"You are all so serious. I bring laughter, gaiety, and warmth into the world. The sun is yellow, the moon is yellow, the stars are yellow and many flowers are yellow. Every time you look at a sunflower the whole world smiles. Without me there would be no fun!"*



Orange started to blow her own trumpet*: "I am the colour of health, strength, and beauty. I may be scarce, but I am precious, for I serve the inner needs of human life. I carry all the most important vitamins. Think of carrots, pumpkins, and melons. I don't hang around all the time, but when you see me fleetingly on the wing of a butterfly or bird, or when I fill the sky at sunrise or sunset, my beauty is so striking that no one gives another thought to the rest of you."*

Red could stand it no longer. He shouted out: *"I am the ruler of you all! I am the colour of fire and the blood of life! I represent danger, bravery, and passion. I am willing to fight for a cause! I am also the colour of love - the rose and poppy proudly proclaim forth my radiance."*

Purple rose up to her full height. She was very tall and she spoke with great pomp: *"I am the colour of royalty and power. Kings, chiefs, and bishops have always chosen me, for I am a sign of authority and wisdom. People do not question me - they listen and obey."*

Colour Me a Rainbow

Indigo spoke much more quietly than the others, but just as forcefully: *"Think of me. I am the colour of silence. You hardly notice me, but without me, you all become superficial. I represent thought and reflection, twilight and deep waters. You need me for balance and contrast, for prayer, and inner peace."*

And so the colours went on boasting, each convinced that it was the best. Their quarrelling became louder and louder. Suddenly there was a flash of brilliant lightning; thunder rolled and boomed. Rain poured down. The colours all crouched in fear, drawing close to one another for comfort.

Then Rain spoke: *"You foolish colours, fighting amongst yourselves, each trying to dominate the rest. Do you not know that each of you were created for a special purpose and are each unique? You are all important! Now join hands with one another and come with me. Stretch across the sky in a great bow of colour to remind everyone that each of us is special. When we combine our beauty we achieve the power to represent peace, love, and hope."*

Based on an Indian legend

Relate

A Trail of Ribbons

Students share what they liked best about the rainbow story. Then each tells the others his or her favourite colour. Anticipate in what form each colour might be represented in the grassland habitat. Discuss why colour is important in nature (see teacher background). Distribute one ribbon to each student, using the ribbons from the rainbow story and other colours of ribbons, give one to each student to carry along the interpretive trail. The students try to match the colour of their ribbon to the colours in nature. Students will enjoy letting the ribbon dance in the breeze. At the end of the hike, form a sharing circle. Students describe what they saw on the hike that matched their colour. Lay long ribbons side by side in the middle of the circle to form a rainbow. Reinforce the fact that that each colour is important in the web of life, even if it is not very common, just as each of us is special. Have students share what they liked best about the rainbow story.

Materials
Ribbons of different colours

Painting a Prairie Collage

Students sit in a circle near some bushes in the schoolyard to play *Eye Spy*. Based on what they saw in the game and what they experienced on the 'trail of ribbons' hike, students fingerpaint or sponge paint a collage of colour.

Materials
Paper on clipboard
Fingerpaint

Colour Me a Rainbow

Reflect

Materials
Shelf paper
Fingerpaint of all colours of the rainbow

Handprint Rainbow

The teacher lightly sketches the outline of a giant rainbow. Every group of 3-4 students will compare the colour differences in nature with the differences in their own handprints. Use fingerpaint on shelf or roll paper for a bulletin board display. The small groups of 3-4 all use the same colour for comparison purposes.

Handprint Animal Art

Students will create pictures of animals using their handprints. For ideas and instructions see Carreiro, Carolyn. *Handprint Animal Art.* Williamson Publ.: Charlotte, VT. 1997.

Bountiful Bugs

Background Information

Bugs everywhere: crawling up blades of grass, burrowing underground, swimming in rivers and oceans, and living in our houses! We share the Earth with approximately thirty million different kinds of insects of every shape, size, and colour. From bees that provide us with honey to the cockroaches that share our crumbs, bugs amaze us, pester us, and help us to survive.

We tend to give the name "bug" to all creepy, crawly, critters; but what does it mean to be an insect? Insects are arthropods, so they are related to spiders, crabs, lobsters, millipedes, and centipedes. They all have segmented bodies with jointed legs and an exterior skeleton. What differentiates the insect are its three main body parts: the head, abdomen, and thorax; two antennae on its head and six legs attached to its thorax. Most adult insects have wings, which are attached to the thorax. Although each species of insect is adapted to meet the demands of its habitat, all insects have the same body structure.

The science of studying insects is called **Entomology**. Insects have been around for about 350 million years and in that time have settled into nearly every environment on the planet. Scientists have described and studied one million different kinds, or species, of insects. New insects await to be discovered. The success of insects as a group is due to their flight, adaptability, external skeleton, small size, metamorphosis (stages of life cycle), and the ability to produce multiple offspring rapidly.

Insects are fun to study and exciting to watch. Although we cannot identify them all, a close look reveals their common characteristics and a variety of adaptations.

Resources

Hands On Nature. Lingelback and Purcell,Vermont Institute of Natural Science. 2000. pages 12-13

Hand-Print Animal Art. Carolyn Carreiro. Williamson Publishing, Charlotte,VT. 1997.

RangerRick's NatureScope: Wild and Crafty. National Wildlife Federation. Learning Triangle Press. 1998.

Audubon Grasslands Nature Guide

Insects – Colouring Book. Pyle and Kest. Houghton Mifflin Company, Boston, NY. 1993.

A Ladybug's Life. J. HImmelman, Childrens Press. 1998.

Bugs and other Insects. Kalman & Everts. Crabtree Publishing Co. 1994.

Lesson Information

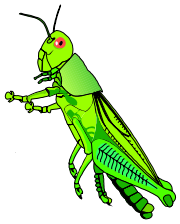
Grade One

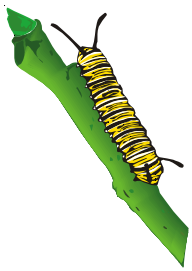
Season: Fall or Spring

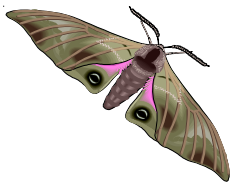
Objectives

Students will become aware of the diversity of life within the insect world

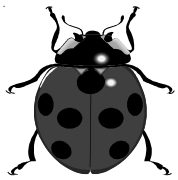
Students will learn the basic parts of an insect and some of their adaptations







Bountiful Bugs

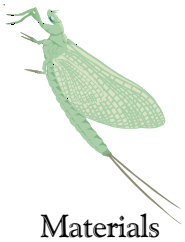


Ladybird Beetle

Rouse Interest

What Insects Have You Seen?

Students will dictate names of insects they have seen to teacher who lists them on board. Discuss why they are important. Read *Bugs and Other Insects* (in Edu-Kit) and continue discussion.

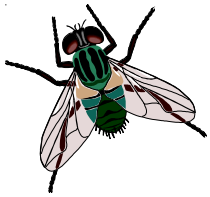


Materials

2 large sheets of unlined white paper

Insectigate

Students will describe the characteristics of insects as they know them and then compare their conception to a realistic image. The teacher translates class descriptions onto unlined chart paper using these prompts: Does it have a head? Is it shaped like a square, circle, rectangle, or oval? What shape is the body? Does it have a tail? Does it have eyes? How many? What about a nose? Does it have ears? After you finish drawing the insect ask if it looks like an insect they have seen before.

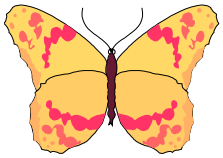


Bluebottle Fly

The teacher draws on chart paper a proper insect with its defining characteristics (Choose an ant or grasshopper; see sidebar, p. 9). It must have three body parts: a head, a thorax (a middle section), and an abdomen (rear section). All insects have two antennae on their heads and six legs attached to their bodies. They have exoskeletons, hard skins on the outside of their bodies. Compare this drawing to the class version. (Adapted from *Hands-On-Nature*, pp.14-15 in Eco-kit)

Song: Head and Thorax, Abdomen...

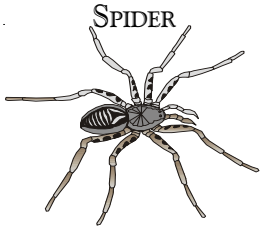
Students will reinforce knowledge of their vocabulary and location of insect parts as they sing to the tune of "Head and Shoulders, Knees and Toes".



Sulphur Butterfly

Head and thorax, abdomen...abdomen...abdomen
(point to head, stomach, rear)
Head and thorax, abdomen...Six legs and two antennae
(show 3 fingers on each hand; rest hands on temples and wiggle index fingers over eyebrows)
Head and thorax, abdomen...abdomen...abdomen
Head and thorax abdomen
And two big compound eyes *(cup hands in "c" around eyes)*
Don't forget the ones with wings...ones with wings...ones with wings
(interlock hands at thumbs and wiggle fingers)
Don't forget the ones with wings
And they all have exoskeletons *(stand tall arms at sides)*

Common Garden Spider



CD Available in Edu-kit

Bountiful Bugs

Relate

Source: http://entowww.tamu.edu/academic/ucourses/ento489/lessons/lesson47.html

What Insect Am I?

Students will listen to the description of a particular insect and put up their hand when they have identified it. They keep quiet (secret) with hands up until all of each riddle is read, so those who need extra time to catch on will have a chance to participate. Then call on the first child who raised his/her hand. If unsuccessful, show a picture of the insect and reread the riddle.

Example: (more on p. 12)

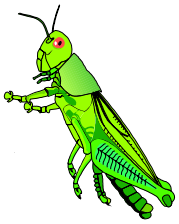
My mate sucks up nectar
But I go for blood.
I'll get you in swamps
When you are hiking in mud.

My mouth's like a needle
As sharp as a pin
And I'll suck up your blood
Through a hole in your skin.

Red Ant

Inspect an Insect

In small supervised groups, students will explore insect life first-hand. While the whole class sits in a quiet circle in a designated area in the SNG buffer zone, they listen for insect noises. The teacher explains how insects' compound eyes allow them to see in all directions at once and that their antennae allow them to detect movement, thus the class must be very still. If someone hears a sound, they should silently point in its direction. The teacher inspects the location. If an insect ensues, all slowly encircle it for a look.

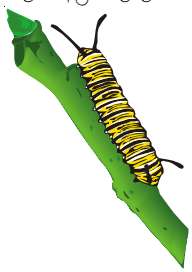


Grasshopper

Break into small groups. Use the same techniques as above to develop respect for insects. The supervisor may lift a rock or log for children to peek under. Verbalize the importance of replacing the rock or log in its original place. Allow children time to tiptoe around to look for insects flying, feeding on flowers, or walking on the ground. Reinforce the pointing stance for communicating a "find" so others can gather round to see it too.

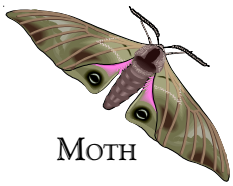
Materials

White or light-coloured sheet or table cloth, bug jars or boxes, magnifying glasses



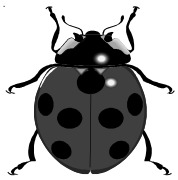
Caterpillar

The whole class reconvenes in a quiet circle in a designated area. The teacher spreads a white cloth onto a stand of undisturbed grass. The children walk toward the cloth and circle around it as they watch insects hop onto it. Group leaders collect insects in bug jars or boxes for children to examine at close range. Encourage them to look for and name insect parts by their proper names and to share discoveries.



Moth

Bountiful Bugs

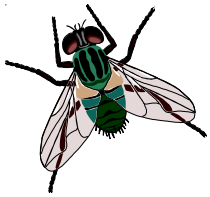


As students release the insects back into their home, or habitat, invite them to echo the teacher, line by line, as he/she reads the following verse:

Fly away, crawl away, run away, hop
You're free to go,
I'm not going to stop you from living your life.
You deserve to be free.
Thank you for sharing this time with me.
Fly away, crawl away, run away, hop
You're free to go. Goodbye!

Source: *Hands on Nature*, page 15.

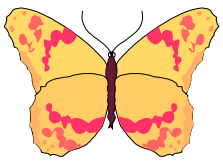
Insect Relay



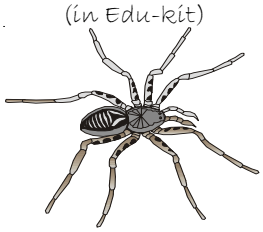
Students will learn the order of insect parts and how to work in teams as they combine to look and move like insects during a walking race for food (pollen). They will incidentally learn about pollination. The teacher lays out a play area in gym or playground with two hula hoops to represent insect homes and two more hula hoops twenty metres away with pollen pieces inside.

Materials
20 foam pieces to represent pollen
2 plastic shopping bags

Two groups of three play while the rest of the class watches. One person is the head, one the thorax, and the other the abdomen. The abdomen gets the shopping bag. Place each threesome inside their hula hoop home and point out "flower patches" and "pollen'. The threesomes hang on to one anothers' waists to await the teacher's signal. The two insects then race to one or the other of the "flower" patches to collect "pollen". The head of the insect picks up two pieces and passes them to the thorax, who then passes them to the abdomen, who puts them in the bag. The insect goes to the other flower patch, drops off one pollen piece and picks up two new ones. The insect then returns to its home, drops off the pollen and returns for more until the pollen is gone. After the game, discuss briefly with students the concept of pollination and how they, as "insects", have just spread pollen from flower to flower. Switch groups until all have had a turn.



Materials
Bug bingo scarves (in Edu-kit)



Bug Bingo

Students will work in groups of 3 to reinforce the order of animal parts, the pollination process and teamwork as they race for food. Let them use Bug Bingo scarves from the Edu-Kit during exploration along the trails in the Saskatoon Natural Grasslands.

Bountiful Bugs

Reflect

Create an Insect

Students will review the basic body structure of insects as they create their own insects from three-part sections of egg cartons, pipe cleaners, and various other art materials. Children may add extra parts to help their insects survive in their habitats. After completion, students give their insects names, introduce them to the class, and explain any special adaptations.

Materials

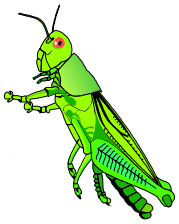
Styrefoam egg cartons cut into sections of three
pipe cleaners, paint, glue, googly eyes, toothpicks, cloth scraps, sequins, etc.

Bug Charades

Students will role play insects based upon the picture card they draw from a box while the others guess the insect's identity. Students can make finger movements like a butterfly, noises like a buzzing like a bee, etc. The teacher cuts up copies of the reproduced Bug-go page for cards.

Materials

Cut up bug cards (p.13)

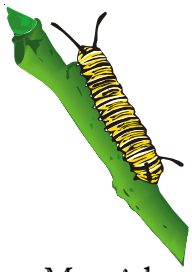


A Bug's Life

Students will listen to a story, *A Ladybug's Life,* (in Edu-kit) to gain inspiration for writing a class story about one of the bugs they learned about. Tell them to get into the mood to create the class story by making themselves as small as insects and exploring the room while imagining what life would be like if they were very small. Where would they live? What would they eat? Where would they hide?

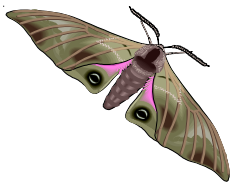
Bug-go

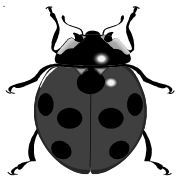
Students will listen carefully to insect descriptions in order to match them with pictures on their bingo cards, which the teacher has reproduced from p. 13. Reuse cut up cards from the charades game for the draw box. Place containers of bingo chips handy to every 3 or 4 children. Teacher randomly draws a bug card and describes it. To build visual memory, flash the picture for two seconds and omit the description. Give insect stickers as prizes.



Materials

Bug bingo cards and chips

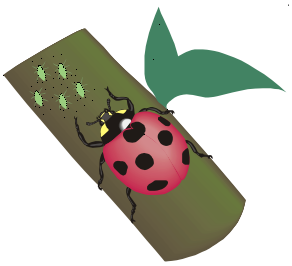




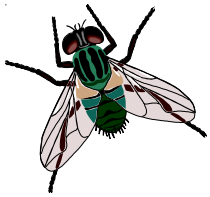
Bountiful Bugs

Insect Riddle Cards

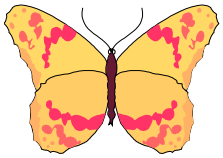
You may call me BEETLE, bug or bird
which may seem to be absurd.
But give me "LADY" as title of address,
then that will help clear up the mess.

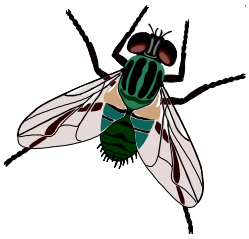


I fly in the day
unlike my moth kin.
My mouth's like a straw:
Round, long and thin
I unroll this neat "tongue"
from under my chin.
Then I suck up some nectar
and roll it back in.

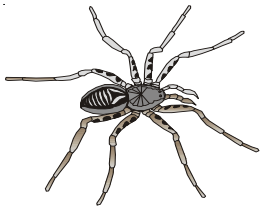


I'm busy, as busy as can BEE,
making HONEY for you and me.
My bumbling cousin is very busy too,
but she won't make honey to give to you.

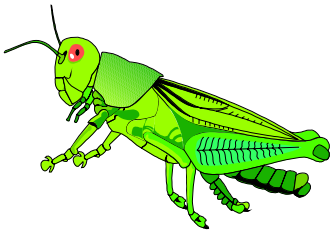


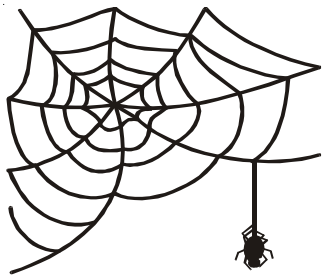


On two wings I fly
to find something to eat.
I zoom in and land
on your plate with my feet.
Then I walk all around
till I find something sweet,
and I mop it all up
with my special sponge "beak".

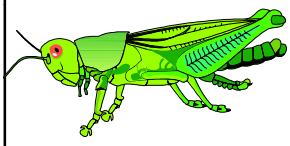
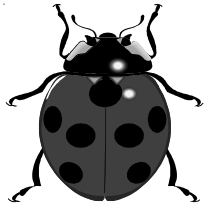
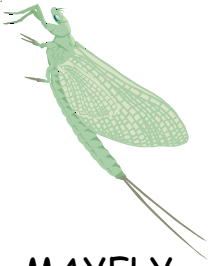
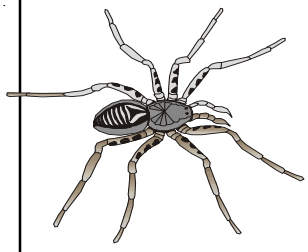
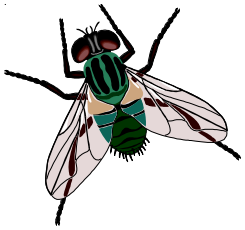
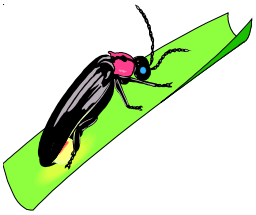
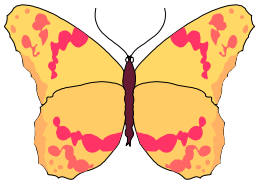
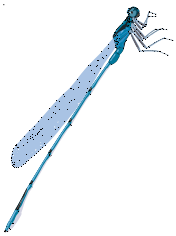
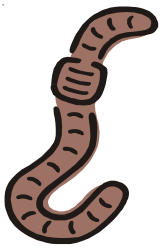
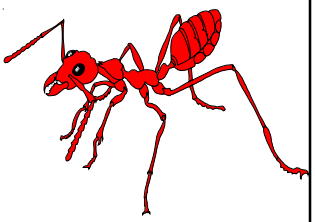
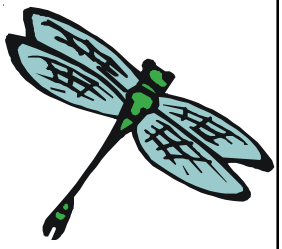
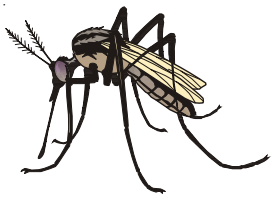
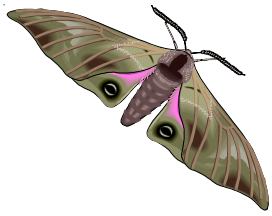
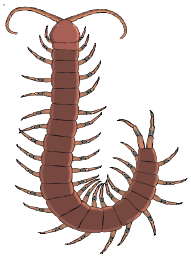


From small in size
to as big as WHOPPERS
we hop in the GRASS
so we are called _____.





BUG-GO

 GRASSHOPPER	 LADYBUG	 MAYFLY	 SPIDER
 FLY	 FIREFLY	 BUTTERFLY	 DAMSELFLY
 WORM	 BEE	 ANT	 DRAGONFLY
 MOSQUITO	 CATERPILLAR	 MOTH	 CENTIPEDE

Prairie Travelers

Lesson Information

Grade Two

Season: Fall

Objectives

Students will understand from where seeds originate and how they are dispersed

Students will collect seeds in the Grasslands

Students will appreciate the diversity of plants on the grasslands

Background Information

Just imagine…what would our world be like without seeds? There would be no trees to give animals shelter, no shrubs to produce delicious berries, and no wildflowers to brighten the prairie. Every plant that grows begins as a seed. With sufficient water, sun, nourishing soil, and clean air, it will grow, mature, and produce its own seeds. Since plants sustain planet Earth, seeds are our lifeline.

Seeds don't grow unless they are transported to a place that meets the above requirements. Most seed dispersal occurs during late summer and fall. Seeds have special adaptations and are distributed in a variety of ways.

Hitchhikers - have tiny hooks, which allow them to stick to people and other animals. Eventually, the seeds fall, germinate, and grow. Burdock and Bluebur are hitchhikers.

Tummytravellers – are undigested seeds of fruits eaten by animals. When an animal eats the fruit it may spit them out, swallow them whole, or expell them in droppings. The seeds are replanted by Nature. Rose Hips are an example.

Explosives – are seeds that disperse when their seed pod opens quickly. Cow-cockle, Bladder Campion, and Touch-Me-Not are examples.

Tumblers – get blown by the wind, and the seeds fall out as it's parent plant tumbles along. An example is Tumbleweed.

Flyers - are seeds carried by the wind. Dandelion seeds drift like parachutes; Maple Trees produce seeds with wings that propel like helicopters.

Borers – have bristles. Foxtail seeds work their way into animals' fur. As they move from place to place or groom, the seeds fall to the ground.

Hot Potatoes – are seeds within the cones of some pine species that do not release their seeds until they become very hot, such as during a forest fire.

Seeds deserve our respect and appreciation. If given time, space, and nourishment, one little seed has the potential to spread beauty across the prairie and into our lives.

Resources

Wishart, Pat & Hayley, Diane; *Knee High Nature FALL*. Lone Pine Publishing; 1994; pp. 88-91.

Prairie Travelers

Rouse Interest

All about Seeds

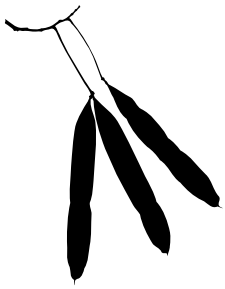
Students will develop a curiosity about seeds as they participate in the following activities:

1. Listening to the teacher read *How Seeds Travel* by Cynthia Overbeck (in Edu-kit).
2. Looking at seed types as projected on overhead.
3. Dissecting fruits to find seeds, then labeling and planting them in a classroom garden.
4. Watching "The Magic School Bus Goes to Seed" video (from Frances Morrison Library).
5. Playing the Wlild Seed Game (in Edu-kit).

Materials

How Seeds Travel

Seeds, Overhead



Relate

Seed Scavenger Hunt

Students will work in groups of two and three to explore the world of seeds as they engage in a series of activities within the SNG buffer zone where they are allowed to walk off-trail. The teacher will need to visit the Grasslands to photograph items children will look for during their hike, duplicate and laminate them, or place into individual sandwich bags for protection. Allow time for class to examine these before going on hunt.

Pass out odd socks, one for each child to pull on over his/her shoe or boot. Divide the class into two supervised groups. Each supervisor gets a bundle of duplicated activity cards. When the small groups complete a task, they return to the leader to show their findings before proceeding with another activity card. Supervisors may collect the items in a box or bag.

Examples of items to photograph and describe on activity cards:

- Find two different seed pods.
- Find two seeds that fly away when you blow on them (illustrate this one).
- Find two different seeds with little hooks or burrs, which may hook onto an animal's fur (examine socks).
- Find a seed on the ground under a tree.

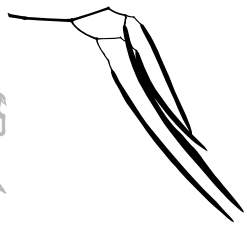
The whole class gathers in a sharing circle in a designated area to report findings before dispersing seeds (or they may be taken back to classroom for further examination before returning them to Nature).

Materials

Plastic container with lid (in Edu-kit)

sandwich bags,

odd socks



Materials

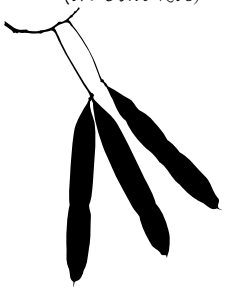
Wool socks

Prairie Travelers

Materials

Seeds

Laminated seed cards (in Edu-kit)



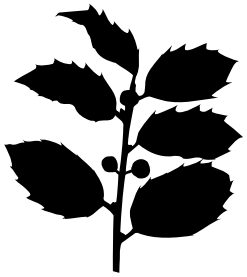
Matching Game

Students will match seeds to its parent plant by playing a matching game. Use the laminated seed/flora cards in the Edu-kit. The teacher introduces the native plants of the grasslands and their seeds by showing class the full-length laminated cards (in Edu-kit). Give each student a card. Some will have a seed card and some will have the parent plant card. Students circulate to match their cards. Tell them to take a mental picture of the plants on their cards in hopes of finding the same plants during another hike.

Reflect

Prairie Travelers

Students visualize themselves as seeds and in story, cartoon, or picture form, they describe their travels from the mother plant to the place where they might land and grow. Include sights and experiences along the way.



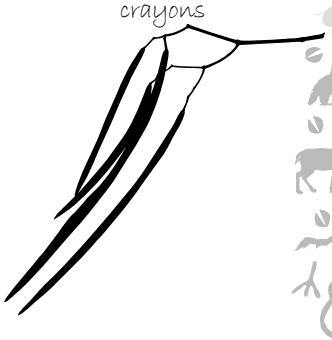
Materials

field guides, seeds, 3x5 recipe cards, tape, writing materials, crayons

Creating a Seed Field Guide

Students learn to use plant field guides. Each chooses a wild seed from a class collection or from home, tapes it to a 3x5 recipe card and then identifies it using a plant field guide. Create a spiral-bound Class Seed Field Guide booklet from the combined cards.

Students continue the Prairie Travelers activity above, using their "adopted" seed as an additional character.



Flower Power

Background Information

When students become cognizant of the role of plants in the continuation of both plant and animal species, they gain a new respect for plant life. A picked or damaged wildflower cannot produce seeds necessary for its reproduction because the reproductive parts are in the flower.

Flowers have three basic parts. The male part is called the **stamen,** which is divided into **anthers** and **filaments**. Anthers produce the powder-like **pollen**, which is usually yellow. Anthers are held up by a thread-like part called the **filament**. The female part of the flower is the **pistil.** The pistil has three parts: **stigma, style,** and **ovary**. The **stigma** is the sticky surface at the top of the pistil; it traps and holds the pollen. The **style** is the tube-like structure that holds up the stigma and through which the pollen travels down to the **ovary** that contains the ovules, or egg cells. Other parts of the flower that are important are the **petals** and **sepals**. **Petals,** the largest and most colourful parts of the flower, attract pollinators. The **sepals** are the green petal-like parts at the base of the flower that protect the developing bud. Flowers can have either all male parts, all female parts, or a combination. Flowers with all male or all female parts are called imperfect (cucumbers, pumpkin and melons). Flowers that have both male and female parts are called perfect (roses, lilies, dandelion).

When **pollination** occurs, pollen moves from the male parts to the female parts. Sperm cells from the pollen grains land on the stigma and travel down the style to unite with an egg cell in the ovule. The fertilized ovule becomes the seed, and the ovary becomes the fruit. Since flowers cannot move, they have to attract pollinators or rely on wind or human beings for pollination. Pollinators, such as bees, other insects and birds are attracted to flowers' sweet nectar, bright colours, unique shapes, and structures. When their body parts brush against the pollen, it sticks and then falls onto the next flower visited. Some flowers open at night to attract nocturnal pollinators such as moths or bats.

(For additional background, see *Hands-On Nature* p. 171-172)

Lesson Information

Grade: Three
Seasons: Spring or Fall

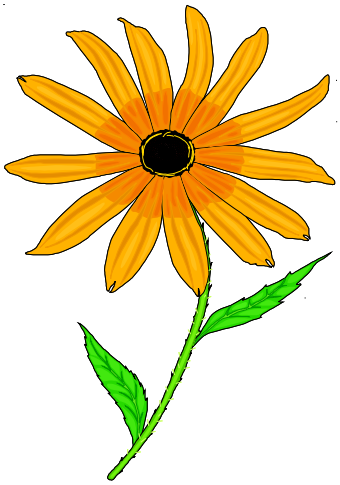
Objectives

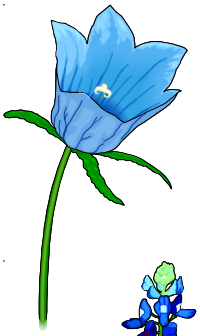
To understand that flowers produce seeds

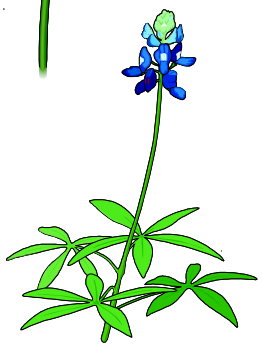
To understand the pollination process

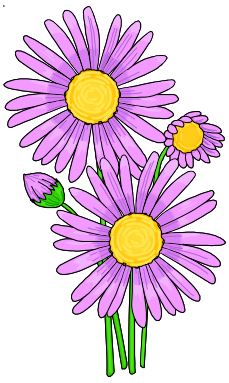
To appreciate the structure and fragilility of wild-flowers

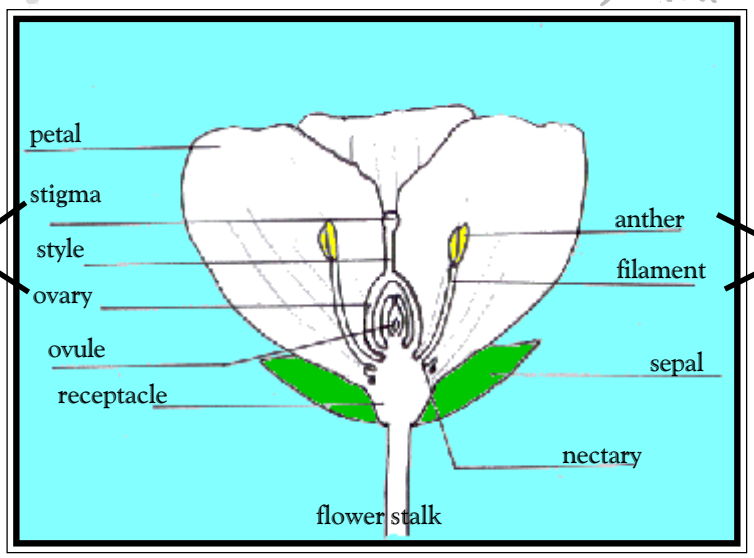
Flower Power











Flower Part	Part Function
Petal	colour attracts insects to enter the flower.
Stigma	top portion of pistil to which pollen grains stick
Style	raises the stigma away from the ovary to avoid pollen contamination
Ovary	contains and protects the ovules, or eggs
Ovule	after fertilication the ovules, or eggs, become seeds.
Receptacle	expanded top of flower stalk that attaches stalk to the other flower parts. In some cases it becomes part of the fruit (strawberry)
Flower stalk	supports the flower and elevates it for insect entry
Nectary	holds the sugary solution called nectar which attracts insects for feeding and incidental pollination
Sepals	protect the bud of the young flower
Filament	thin stalk that supports the anther
Anther	contains pollen sacs. Sacs release pollen that brushes against insects upon entering the flower. Once deposited on the insect, pollen is transferred to the stigma of another flower or the same flower, enabling the ovule, or egg, to be fertilized.

Flower Power

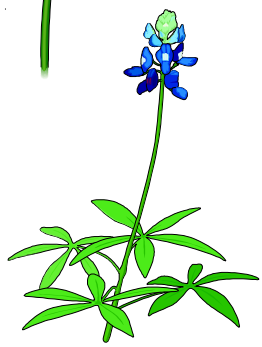
Rouse Interest

Build a Flower

Practice this activity inside; then repeat outside.

With teacher's assistance and on-going dialogue re: flower parts and functions (pp. 17-18), students will build a human flower. Invite the tallest female student to be the pistil. Another student sits at her feet to be the ovule. Four male students stand in a small circle around the pistil to be the stamens. Six students with brightly coloured shirts stand in a circle around the stamens to be the petals. Five more students each stand between petals to be the sepals (supporting the petals). The teacher uses a bee finger puppet to fly and buzz around the bright petals and to crawl over the stamen to obtain nectar. In the process the bee picks up pollen and then walks across the pistil's sticky head leaving pollen behind. Ask students who do not have a role to name other insects that might pollinate the flower. They choose finger puppets to roleplay other insects and animals that are attracted to the flowers and the seeds they create. As fall approaches the petals and stamens shrivel up and fall off ("petals and stamens" fall to floor/ground). The pistil and ovule are exposed to reveal seeds, which the stamens now support instead of petals. Discuss how seeds are disbursed. Give each of the remaining students an object to represent a seed and to demonstrate how it leaves the parent flower to plant itself elsewhere.

Materials
insect finger puppet, other puppets



Flower Field Guide

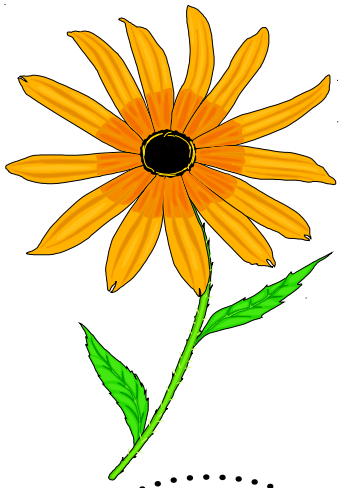
Students will combine drawings to create a Flower Field Guide. The teacher enlarges and duplicates line drawings of Grassland flowers for students to colour. (See *Wildflowers Across the Prairies* in Edu-kit and SNG self-guiding brochures for drawings and colour descriptions).

Materials
field guides (Edu-kit) and brochures from SNG interpretive centre

Common spring flowers: Golden Bean, Moss Phlox, Crocus, Vetch, Three-flowered Avens, Locoweed; **flowering shrubs:** Saskatoon, Silverberry, Chokecherry, Hawthorn, Prairie Rose. **Summer:** Goatsbeard, Yarrow, Meadowsweet, Harebell, Beardtongue, Fleabane, Silverleaf Psoralea, Evening Primrose, Gumweed, Asters, Thistles, Prairie Cinquefoil. **Fall flowers:** Goldenrod, Blue Lettuce, Purple Prairie Clover, Tansy, Blazingstar, Prairie Coneflower, Prairie Sunflower, Aster.

If spring is early and warm, summer flowers may bloom early.

Flower Power



Relate

Grassland Flower Creations

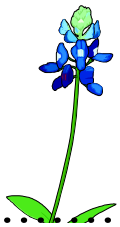
Students will learn to step with care on Grassland paths as they search for wildflowers to sketch, colour and later identify.

Materials
digital cameras

Supervisors take digital pictures of the flowers for identification, matching to flowers in the class Flower Field Guide and a bulletin board display.

Flower Friends Hike

NOTE: If students can practice braiding before the hike, the final activity will need less supervision.



Materials
12" strands of yarn in purple, yellow, orange, blue, white, orange and green, digital cameras

During a guided hike (teacher and volunteers), students will be rewarded (with craft materials) for stating reasons for not picking or stepping on flowers and for naming flower parts. When students spot a flower, ask who would like to locate and name its parts. Volunteers take close-up digital photos of found flowers. If students do not remember plant names, they invent a name based on colour or structure (eg, The Five-petaled Yellow). The student who "names" the flower gets to use a field guide to find its proper name. Each time a student spots a flower give him/her a twelve-inch strand of yarn of a similar colour to the found flower. Continue hiking until each student collects at least three strands, and/or hand out green strands (to represent leaves) for a total of three each.

Sitting in a circle in a designated area, discuss why more flowers grow on the grasslands than in the schoolyard. Invite students to become friends of the flowers as they create braided friendship bracelets as reminders to conserve wildflowers.

Students work in pairs to create bracelets. Even up yarn ends and tie them together in a double knot at one end. One student holds onto the knot. The other divides the strands into three sections, braids them, wraps the braid around the wrist of the partner and ties the ends together in another double knot. Switch places and repeat. Challenge students to show commitment as friends of the flowers by wearing their bracelets all summer long or until they fall off.

Flower Power

Puppet Play "Inside a Flower"
Students will reinforce their knowledge of flower parts and processes as they practice and perform a puppet play. (*Hands-On Nature,* p.175)

Reflect

Flora Art Display
Students will write a short story, poem, or song about a flower they discovered while out on the grasslands.

Create a bulletin board display in the hallway using the digital photos and the students' drawings and writings. They may invite care partners or another class to view the display as they, the student experts, point out their work and explain the bracelets and how their guests can become friends of the flowers.

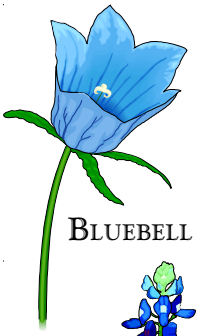
Flower Garden Stewards
During the autumn, students will collect wildflower seeds, plant them, and monitor their growth in preparation for planting a school wildlife garden. The teacher may invite Meewasin's Resource Conservation Officer to lead the class in collecting native seeds from the Grasslands buffer zone. During a post-hike classroom visit, he/she will explain how to plant and take care of native plants. Students plant native seeds in peat pots and record observations over the winter months. Draw, measure, and chart observations. Transplant as needed into larger containers. Ask the principal and caretaker for permission to transplant seedlings in a designated location at the school. In spring, prepare a section of the garden plot, plant seedlings and label. Invite the principal, caretaker, and community to celebrate the planting.

Flower Part Quiz and Flower Wordfind
Students will work together to review plant vocabulary. The teacher photocopies and reproduces the quiz (p.23) and wordfind (p.24) for students to do with partners or individually.

Answers:

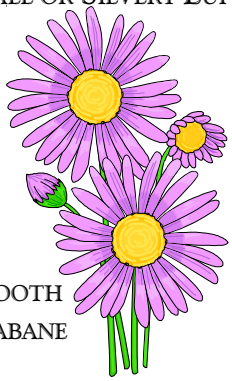
1. stigma	2. style	3. ovary	4. ovule
5. pistil	6. anther	7. filament	8. stamen
9. petal	10. receptacle	11. sepal	

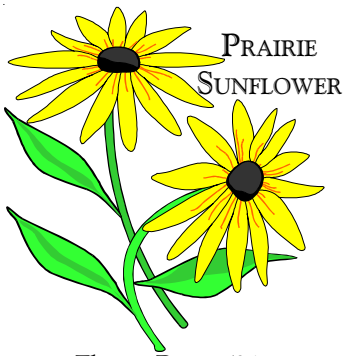

Black-eyed Susan


Bluebell

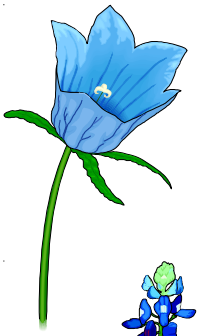

Materials:
baggies, soil mix, peat, pots

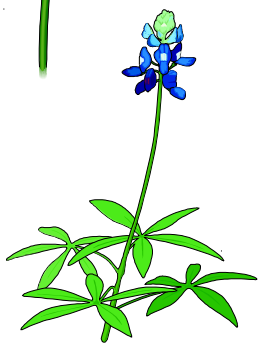
Small or Silvery Lupine

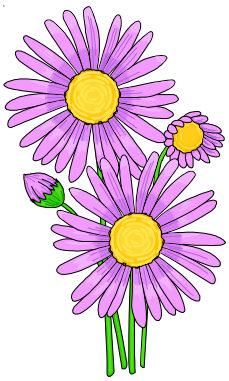

Smooth Fleabane


Prairie Sunflower

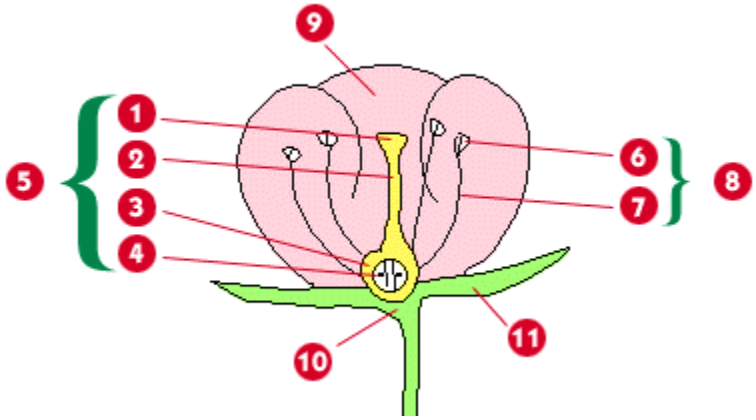
Flower Power







What Are the Parts of a Flower?



Circle the best answer.

Part 1 is the sticky part of the pistil to which pollen sticks. Is it the anther, ovule, or stigma?

Part 2 is a long stalk that grows between the ovary and the anther. Is it the pistil, style, or filament?

Part 3 is the base part of the pistil that holds the ovules. Is it the ovary, petal, or stamen?

Part 4 is the unfertilized seed of the plant. Is it the receptacle, ovule, or pistil?

Part 5 is the female part of the flower that contains the stigma, style, ovary, and ovules. Is it the stamen, pistil, or sepal?

Part 6 is the part of the flower that holds the pollen. Is it the anther, filament, or stamen?

Part 7 is the long thread-like stalk that holds the anthers out so insects can get to the pollen. Is it the receptacle, filament, or stamen?

Part 8 is the male part of the flower that contains the anthers and filaments. Is it the receptacle, petal, or stamen?

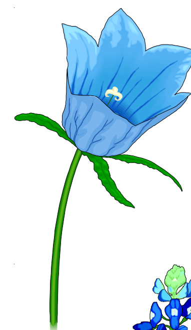
Part 9 is the colourful part of the flower that protects its inside parts and attracts insects and other pollinators. Is it the receptacle, petal, or sepal?

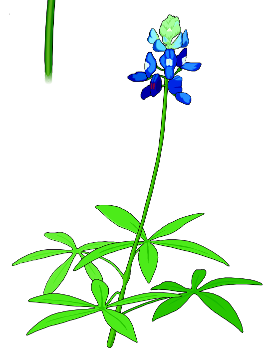
Part 10 is at the top of the flower stalk and connects the stalk to the other flower parts. Is it the receptacle or sepal?

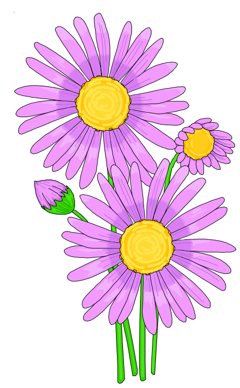
Part 11 is the part that covers the outside of a flower bud to protect the flower before it opens. What is it called?

Flower Power

Flower Part Wordfind







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S B E A F L O W E R F R I E N D F G S C E C R P H L N C C M
W U A Z K V K E Y A O Y E D B V G L Z M L W G T A Z O F P X
E R N M C Q R X Q Z C J L G E R A R N F T P N N Z T I Z Y N
A S U F A U H Z M Q M R C X U P W F I R S I B L K J L P I P
L M O S L I X D B B P L A W E J O A B M I S N R U J E S S C
P W T R B O V E F C X U T S Z D Y H Y W H T W J M L D B L M
T E B P Z X W Y Q W J I P J E B U Z B U T I S T Y Y N O L W
R N B A Z Y B E K N D C E V C K V K E Y B L D X R E A J R L
M Z E L L R D E R Z J L C I N W P E K D H W G A A M D U Y V
X H N M R O O T B O M R E L W L J E V O K K K D T S D I N S
B W W T A A I W N X H G R D I O E I F W Q B R T C L M J A W
V S G R G L D Z E U E R W U J U J A Y N F P Y R E T F P N A
I U O H S O I Q M U A E H W Z Z F E F D F B D Z N G N H C R
D E L H A S M F A Y F P E V S R G W A V V H Q N K C X V K M
O O Q B T O P Y T E H M K Q Q N E T D N Z F N P L V Q K T C
S T R I M G M Z S Y W H Y F C S Q K U A W O Y Y B O H R D K
S E G N U Y Y P B V R R F H O J C V S S U A X J J I E B B N
C M V Z E G Z Q Y C N E C K P B E E J V R C F M D J Y R S L
A Q E A R D N U P Y I S T Z E O O G P R Y A E O K T W H E M
R E U H E P L K F S M U Y M Z T O U O S P M A X H Q W R E Q
F A I T L L S O J Q B C I R H W N W N R K D F L R D E V B J
J V O P V L A V G S F O K P A T G A K M R C F N L C J O D E
G B J I L A T E P K X R B R E V T M Z M U F F C M B H D S N
P I X U Q A R F J B Y C E L L V O G E Y Y X R Y J M P S U P
L N L J B M O J E V Q H U C H S N D P T D M P F F R H W M Q
M L S I I D W F P S T V I R G Z D O R O S A G Z Y C O Q S F
I C A I B D N F Q N O B E L Q E Q Q P T X T T V M I B C R E
T W B E K S Z E A L Z Q J P M J O C Y Y G I U E Y O P S S E
E X U G X T B G F Q P J S Q C O H L R Y K U M Y J H C B J O
M M P U K B H O M T J Z U Q P B E I S O S Y M Q K M M G L F
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Find the following words in the above puzzle:

ANTHER ASTER CROCUS DANDELION FILAMENT GOLDENROD TANSY LEAVES NECTARY OVARY OVULE PETAL PISTIL RECEPTACLE ROOT ROSE SEPAL STAMEN STEM STIGMA STYLE SUNFLOWER THISTLE YARROW

Find the hidden message in the puzzle with the left over letters:

_ _   _   _ _ _ _ _ _   _ _ _ _ _ _

Fabulous Fossils

Background Information

Fossils are the hardened remains of animals that lived long ago. They take many thousands or even millions of years to form. The numerous species alive today are only a fraction of the total number of species that the Earth has seen. Many became extinct long ago. Fossils offer a window into the past that shows us what life was like at certain times and how plants and animals have evolved. New fossils are being discovered all the time to help unravel the mysteries of Earth's past.

Most fossils are formed from the hard but porous parts of animals such as bones, teeth, and shells. When mud, sand, and other sediments are washed downstream, they bury organisms. The tiny holes in bones, teeth, and shells may fill with minerals from the sediment as the animals decay. Sometimes the bony armor of an animal's body, rather then its skeleton, is preseved in a fossil. After remains of plants and animals dissolve inside the hardened sediment and minerals, an **impression** called the **mold** is left. As the mold fills with minerals from more sediment and hardens into stone, it forms the **cast**. Some fossils are traces of animals, such as footprints or droppings. These **trace fossils** tell about the lives of ancient animals and what they looked like when they were alive.

Fossils of the Saskatoon Natural Grasslands were once live organisms that lived in a shallow inland ocean more than 200 million years ago. Ten thousand years ago, Ice Age glaciers passed over the area, turning it into a rocky **morraine**. Some of the larger rocks were quarried for use in building the University of Saskatchewan greystone buildings and the rest remain in the ground. A close look at weathered limestone **outcroppings** reveals **fossilized sponges** (types of filter-feeder animals unique for their absence of true organs); **brachiopods** (clam-like with two armlike structures that sweep food particles into the mouth); **crinoids** (echinoderms, like the starfish, that capture food particles with feathery radiating arms); **horned corals** (extinct since the Permian Period, they affix their external skeletons of calcium carbonate naturally occuring as chalk, limestone and marble to one place); and **nautiloids** (their pearly-lined shells contain a series of air-filled chambers. Like squids and octopi, they squirted jets of water to propel themselves through the water).

Lesson Information

Grade 4
Any Season

Objectives

Students will be able to explain fossil formation.

Students will experience the paleontological heritage of the Grasslands as they find fossils in its rocks.

Students will create their own fossils and imagine the physical characteristics and habitats of fossilized creatures.

Students will create a Powerpoint presentation on fossil formation and preservation.

Resources

Saskatoon Natural Grasslands, Teachers Reference Package, 1999-2000

Fabulous Fossils

Rouse Interest

A Rock's Journey through Time

Students will better understand the processes under which the earth is constantly changing after a reading of *Earthsteps, A Rock's Journey Through Time* (in Edu-kit).

Comparing Rocks and Fossils

Students will: define igneous, metamorphic, and sedimentary rock formation (see sidebar); compare rocks with fossils from Edu-kit collections; and enter findings into fossil scrapbooks. Which type of rock most likely contains fossils?

The teacher introduces the four types of fossils and how they are created. Record their similarities and differences in a T-chart to glue into fossil scrapbooks.

1. Mold Fossils--fossilized impressions of the organism
2. Cast Fossils--formed when the mold is filled in
3. Trace Fossils-fossilized nests, footprints and droppings
4. True Form Fossils-fossilized whole or parts of animals

Fossil Scavenger Hunt

Students will discover specific fossils (see list above) in Silverspring School's Tyndall Stone foundation and make modeling clay impressions of the fossils they find.

Relate

River Ramble

Students will sift through riverbank sand to better understand its role in fossil formation. The teacher may collect sand ahead of time for classroom use or plan a field trip when students may collect and explore on site. Use screens, sieves, and pails to separate sand into rock particles, animal particles, and plant particles. Old window frames with screens work well for shaking out different sized particles. Magnifying glasses and microscopes will help students differentiate the matter. With supervision, students can take digital pictures of their findings.

Experience the process of sedimentation

Collect small shells, gravel, sand, dust, and soil in a large jar. Add river water, screw on lid, shake, and allow to settle. Observe and record findings in scrapbooks along with drawings of layers formed in the sediment.

Sedimentary rocks are formed by deposition of sediment (limestone).

Igneous rock forms when molten rock cools and hardens (granite).

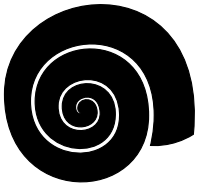
Metamorphic rock is rock that has changed in structure and composition over time (slate).

Materials

Rock and Fossil kits,
modelling clay

Materials

Magnifying glasses
microscopes
screens
scrapbooks
pencils
glass or plastic jars
with lids



Fabulous Fossils

Fossil Rubbings

Materials
Fossil Rubbing Kit, pencil crayons, paper

Students will further hone their fossil-finding skills as they use coloured pencils to make rubbings of fossils found on Grassland outcrops, the school foundation, and Edu-kit specimens. In small groups, identify, label, and glue fossil rubbings to create collages or scrapbook covers.

Creating Cast and Mold Fossils

Materials
Modelling clay
Plaster of Paris, sterilized bones, seashells, scrapbooks, glue, pencil crayons, pencils

Students will differentiate between cast and mold fossils as they create both from well-worked modelling clay. Shape clay around a seashell or sterilized bone. Gently peel off clay. The impression formed represents a mold fossil. Pour Plaster of Paris into the modeling clay impression and allow to harden. The artifact formed by the plaster represents a cast fossil.

Geology Rocks!

Students will further understand geology after engaging in some teacher-selected activities from the book *Geology Rocks* (in Edu-kit).

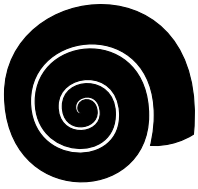
Reflect

Creatures of the Past

Students will imagine how fossilized creatures appeared when alive and reproduce them within their imagined habitats in drawings and paintings. Use fossils in the Edu-kit and the fossils created above for inspiration. Label and glue artwork to fossil scrapbooks.

Please Conserve the Fossils

Students, with the aid of knowledgeable adults, will transfer their ideas for saving and preserving Grasslands fossils into a PowerPoint production.



Sun Lovers

Background Information

Plants are called primary producers because they are the beginning link in the food chain. Plants are the only organisms that can make their own food. Animals, lacking this ability, depend directly or indirectly on plants for their supply of food.

The sun provides almost all the heat and light Earth receives, in addition to our sources of fuel, such as coal, oil, and gas. Unfortunately these sources of fuel release pollution into our air when they are burned. **Solar power**, on the other hand, concentrates the sun's rays to heat water or generate electricity, which creates a clean energy source.

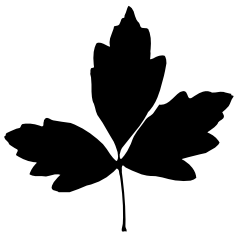
Plants take energy from the sun to make their own food through a process called **photosynthesis**. In return, they give off water and oxygen. Leaves capture energy from sunlight and turn water and carbon dioxide into sugar and starch. The sugar and starch provide plants with the nourishment to grow and to produce flowers and seeds.

Different shapes and sizes of leaves help contribute to the efficiency of the photosynthetic process. These differences depend on environmental conditions. The prairie habitat offers a surplus of sunlight. For example, Prairie and Pasture Sage have leaves that are silver-grey in colour to reflect some of the excess sunlight.

Prairie plants have adapted to retain water. Crocus have hairy stems to capture spring snow as it melts. Gramma Grass has a fibrous root system near the earth's surface to quickly absorb moisture. The Prickly Pear Cactus, which is not found at SNG, has a waxy cuticle on its stems and spines to store moisture. Many prairie plants have small narrow leaves that slow down evaporation, as well as deep tap roots to secure the plants and to reach down to the water table.

Lesson Information

Grade 5
Fall or Spring

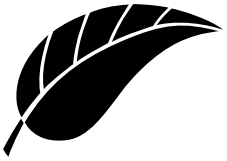


Objectives

To understand how plants survive the harsh conditions on the prairie

To increase awareness of the diversity of plant life on the grasslands

To develop observation skills, to determine useful characteristics to include in descriptions of leaves, to learn some standard botanical vocabulary



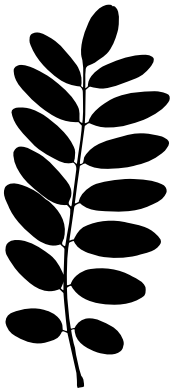
Sun Lovers

Prairie plants have also adapted to wind exposure. Special parts of the flower hold the pollen and seed heads upright so the wind can blow the seeds to locations where pollination or germination can take place. Flexible stems prevent breakage; short stems protect prairie plants from harsh weather and enable them to absorb dew, an important source of moisture. Perennial life cycles allow quick regrowth each spring and after fires occur. Deep roots enable prairie plants to survive severe frost as well as fire.

Related Resources

Budd's Flora of the Canadian Prairie Provinces
Research Branch
Agriculture Canada, 1979

Weeds of Canada and the Northern States
Dickson and Royer
Lone Pine Publishing, 1999



Ed & May Scissons Environmental Centre
Saskatoon Catholic Board of Education

Education Goes Outdoors
Addison Wesley Publishing Company

Hands-On Nature
Lingelback, Jennifer and Purcell, Lisa
Vermont Institute of Natural Science; 2000

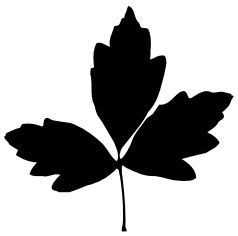
Silver-Burdet – Science Series
Grade 5

Wildflowers Across the Prairies
Vance, Jowsey, McLean, Switzer
Greystone Books, 1999

Sun Lovers

Sun Lovers

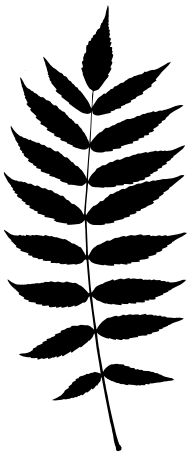
Students will learn the adaptations of prairie plants to survive hot, dry sunny conditions by identifying with SNG plants as depicted in cartoon format.



Fur Coat Fran – Crocus
Keeps from losing water by:
Being low to the ground for shortened water transport
Having a thick taproot to store water
Having silvery-hairy leaves to reflect sunlight
Having hairs on stems which trap snow, dew and rain

Dangerous Dan – Spear Grass
Keeps from losing water by:
Having flexible stems to resist wind breakage
Having shallow roots to reach water over a wide area
Having bristled blades which deter animals from eating it

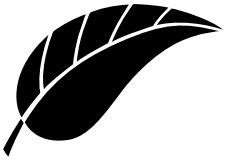
Bad Breath Bob – Wild Onion
Keeps from losing water by:
Having tiny flowers and narrow leaves to retain moisture
Having a thick bulb to store water
Having leaves that smell and taste bad which deters animals



Eyelash Emma – Blue Grama Grass
Keeps from losing water by:
Having fibrous roots to reach underground water
Having flexible stems to resist breakage

Silver Coat Sam – Sage
Keeps from losing water by:
Having small leaves to retain moisture
Having silvery hairy leaves to reflect sunlight and trap moisture from snow, dew, and rain

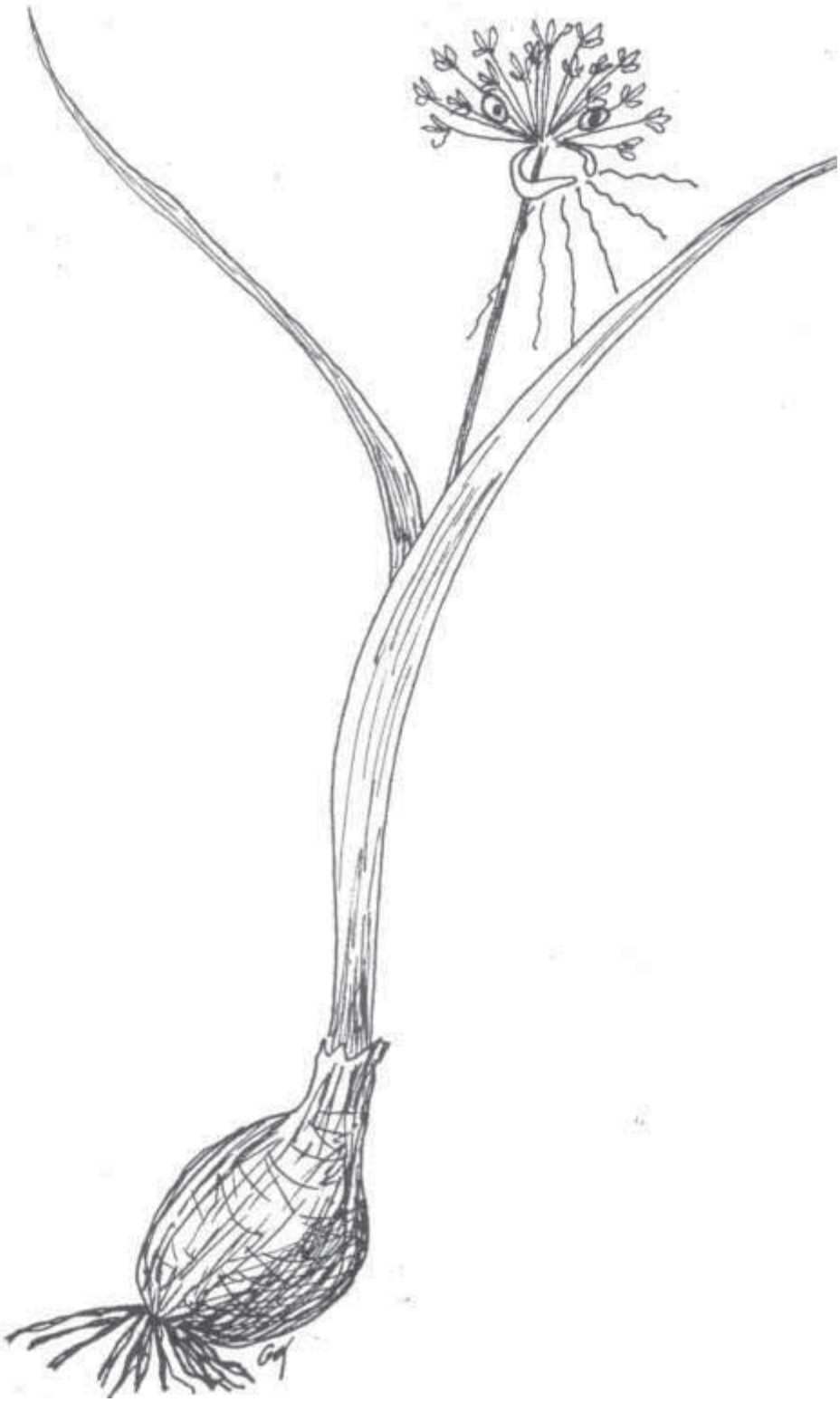
Skeletonweed Shelley – Skeletonweed
Keeps from losing water by:
Having narrow leaves to retain moisture
Having deep roots to reach down for groundwater
Having tough stems to resist breakage from wind



(Characters created and drawn by Glenn Gustafson)

Fur Coat Fran

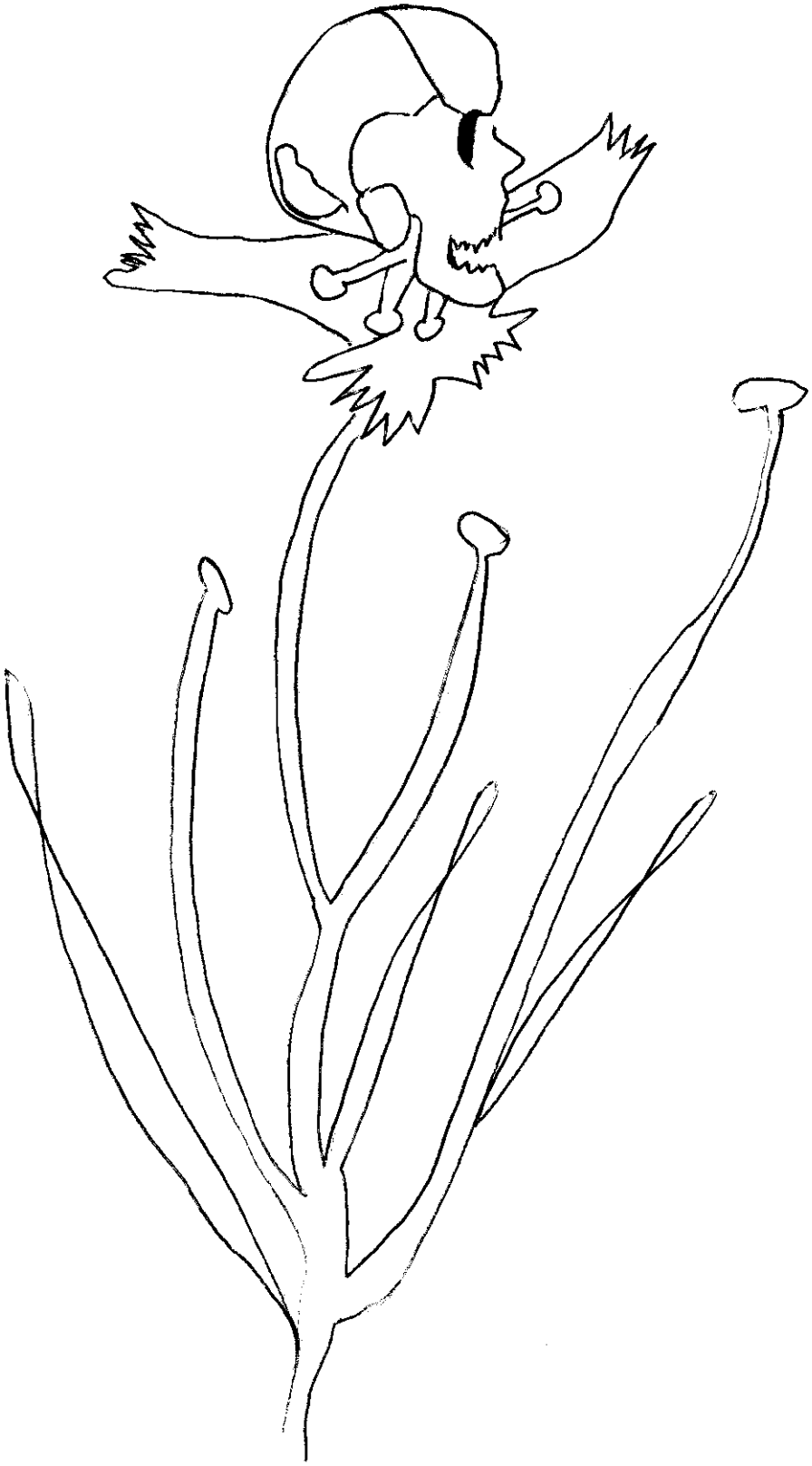
Dangerous Dan



Bad Breath Bob

Eyelash Emma

Silver Coat Sam



Skeletonweed Shelley

Sun Lovers

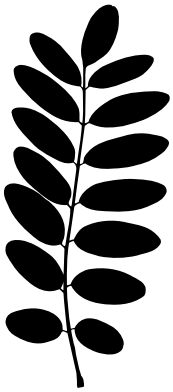
Materials
Sunlover cards from Sunlover posters, drawing materials, clipboards

Relate

Sun Lover Scavenger Hunt

Students will zero in on plant differences and adaptations as they hike in the SNG to look for plants on cartoon posters (p.30-35) and other plants which they will sketch as cartoon characters.

The teacher prepares Sunlover cards by reducing the posters (p.30-35) by 50% and photocopying along with plant descriptions (p.29) one reusable set per student. The teacher demonstrates how to design and add adaptive parts. Students add three to their drawings and highlight, then invent names for their plant and introduce to the class. Display on class bulletin board.



Stop, Look and Leaf

Students will imagine themselves as members of a task force of scientists in search of a planet that will support the kind of vegetation found on earth. Divide class into four groups. Using the Grasslands buffer zone as the unknown planet, each task force collects samples of 6-8 different kinds of leaves, notes plant habitats, and records specific information (location, exposure, etc). Assign each task force an area to examine within a set time frame.

After returning to the classroom, each task force combines their notes and writes descriptions of their samples. Emphasize the importance of accurate descriptions. Post the following two rules: (1) all descriptions must be written (*no drawings*); and (2) correct plant names cannot be used, even if they are known.

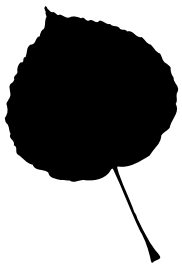
Materials
envelopes for leaf samples, notebooks and pencils

To ensure that students work successfully with these ideas, present an example to the class. You may use the following list of definitions as a guide:

Types of Leaves

Simple leaf – one blade (of grass) or leaflet per stem
Compound leaf – two or more leaflets per stem
Opposite leaves – leaves opposite one another along stem
Alternate leaves – leaves alternated along stem
Palmately compound – leaves radiate from a central point on stem

Students will become familiar with leaf characteristics by copying drawings that the teacher draws and labels on chart paper.



Venation (vein pattern)
Pinnate venation – all main leaf veins arise from the central shaft or midrib
Netted veins – three or more veins radiate from the midrib
Parallel veins – all veins run from stalk attachment to leaf tip

Base of leaf
S*ymmetrical* – base of leaf looks the same on each side of midrib
Assymmetrical – base of leaf differs from one side of the midrib
Wedge-shaped – base of leaf appears triangular or straight across

Leaf arrangement
Opposite – leaves arise opposite each other on stem
Alternate – leaves arise alternately from each other on stem
Whorled – several leaves arise from nearly the same point on a stem

Options and Extensions

* The task force may wish to make a master or corrected Extension descriptions of samples to be sent back to earth (this could be put on a bulletin board or given to another class for their own excursion).
* Tree and shrub guides can be used to illustrate botanical nomenclature and scientifically name the plants.
* Pair up students and have one describe a leaf using their newly acquired language. Have the other student draw the leaf. Partners switch roles and repeat the process using a different leaf.

(Science Beyond the Classroom. P. 120-121.)

Leafy Fact Scavenger Hunt

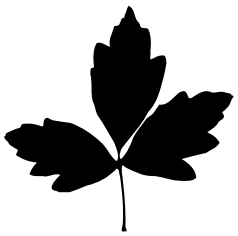
Give each student a copy of the leaf sheet (p. 38). Students provide the clues by sketching and colouring a leaf of choice, which they then post somewhere in the room. Using the Leafy Fact Scavenger Hunt activity sheet, they must find and sketch each leaf listed on the sheet.

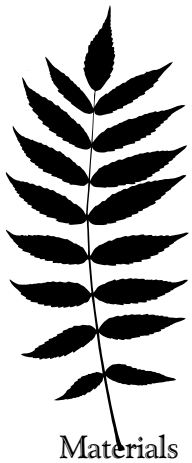
Reflect

See *Outdoor Language Adventures*, p. 34.

Puppet Play - Variations on a Leaf

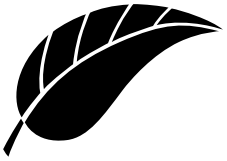
Hands-On Nature in Edu-kit, p.196



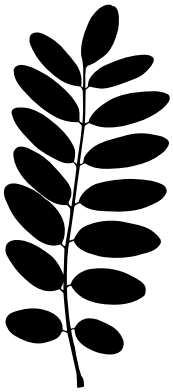


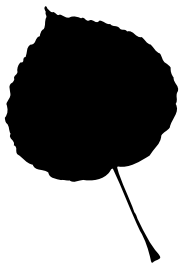
Materials

Pencils, eraser, Art paper, Clipboard, Tape measures, Plant identification books, push pins or gluetack



LEAFY FACTS SCAVENGER HUNT





Find and sketch the following leaves:

Simple leaf

Compound leaf

Parallel veined leaf

Pinnate-veined leaf

Palmate-compound leaf

Leaf with smooth edge

Leaf with toothed edge

Round leaf

Wedge-shaped leaf

Leaves opposite along stem

Leaves alternate along stem

Leaves whorled along stem

Prairie Creature Features

Background Information

The North American prairie ecosystem is vast, diverse, and unique. It can be life-threatening for its inhabitants. Droughts and semi-arid conditions are common; temperatures vary from extreme cold to intense heat; winds can be brutally strong; and food can be scarce for wildlife. Animals that thrive in this environment have adapted to these harsh conditions. Adaptation is the "hereditary alteration in an organism that facilitates its survival and reproduction" (Nelson Canadian Dictionary).

Prairie dogs, ground squirrels, small rodents, burrowing owls, snakes, badgers, weasels, ferrets, and foxes have body parts that enable them to burrow into the earth. Life underground offers more subdued temperatures, nesting areas, and protective shelter from enemies and acts of nature such as prairie fires.

Another adaption is speed. Many of the animals we recognize as grassland inhabitants have speed in their favour. The Pronghorn Antelope is the fastest animal in the Western Hemisphere; many prairie birds, such as the sage grouse and prairie chicken, can run almost as well as they can fly; the jackrabbit and coyote are capable runners. In a reasonably flat landscape with limited hiding places, speed is a key to survival.

Other animals adapt by living in groups. One lonely bison cannot do much against a pack of wolves, but a herd of bison is intimidating. A prairie dog or ground squirrel alerts its companions of danger by serving as sentinels, or watchkeepers, for their groups.

Camouflage is an adaptation familiar to us all. We can often hear a bird's song or a hare's movement in shrubs, but cannot see them due to their blending into the vegetation around them.

A less discussed adaptation is that of adapting to change (See background information, *Winter Dilemmas,* p. 119).

Lesson Information

Grade Level: Grade 6
Seasons: Spring, Fall, Winter

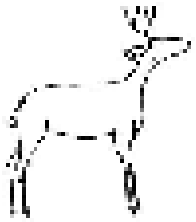
Objectives

To become familiar with some prairie mammals

To learn how animals have adapted to the prairies

To understand that adaptation is natural and necessary for survival, humans included

To find clues to the kind of prairie mammals found at SNG and measure the community's knowledge of them



Prairie Creature Features

Over the last two hundred years, the prairies have seen numerous changes as a result of human impact. Mammals, birds, insects, plants, soil, and micro-organisms have either adapted or become extinct. Deer, skunks, and ground squirrels have adapted with relative ease. Wolves, Grizzly Bears, Elk, and Bison have been more sensitive to habitat disruption.

The Saskatoon Natural Grassland's few mammal species have adapted well to life in a small area. Sightings and observations of the White-tailed Deer, Red Fox, Striped Skunk, White-tailed Jack Rabbit, Richardson's Ground Squirrel, Vole, Thirteen-lined Ground Squirrel, and Least Chipmunk have been reported along with the occassional Coyote.

Resources for this section:

Brown, Lauren. *Grasslands*. National Audubon Society. New York: Alfred A. Knopf Inc. 1998

Caduto, Michael J and Bruchac, Joseph. *Keepers of the Animals*. Saskatoon, SK: Fifth House Publishers. 1991

Holley, Dennis. *Animals Alive!* Roberts Rinehart Publishers: Niwot, CO. 1997

Stradeski, Marie. *Who am I ?* cards. Meewasin Valley Authority: Saskatoon, SK. 2002

Glossary on page 41 from World Wildlife Fund brochure, "Endangered Species in Canada." 1989

Prairie Creature Features

Rouse Interest

Prairie Animal Match up Game

In groups or three or four, students will research characteristics of prairie animals and then quiz other groups in a game show format. The teacher gives each group 5-10 sheets (p.43) labeled with insects, birds and mammals. Each group creates a list of characteristics for each of the animals: colour(s), diurnal (active during day) or nocturnal, number of legs, whether social (lives in groups) or solitary (lives alone except during mating season), nester, burrower, its diet and what eats it, adaptations (camouflage, keen hearing, eyesight, speed), sounds it makes, etc., and records information on each sheet. Teacher checks accuracy of clues before the game proceeds. (See example, p. 42). Provide ample time and information for groups to do research in separate locations (to keep lists secret).

Groups take turns reading clues to others. Students raise hands to guess the animal and earn five points for their group for each correct guess. For incorrect guesses, subtract one point. Set a time limit. (Adapted from *Animals Alive!*)

Bison

Vole

Snowshoe Hare

Racoon

Richardson's Ground Squirrel

GLOSSARY OF TERMS INDICATING STATUS OF CANADIAN WILDLIFE

For Grades 3-5 Any indigenous species of fauna or flora. . .

Extinct: formerly indiginous to Canada. No longer known to exist elsewhere

Extirpated: no longer known to exist in the wild in Canada but existing elsewhere.

Endangered: threatened with imminent extirpation or extinction throughout all or a significant portion of its Canadian range owing to human action

Threatened: likely to become endangered in Canada if the factors affecting its vulnerability are not reversed.

For grades 6-8 (plus the above list)

Vulnerable: particularly at risk because of low or declining numbers, occurance at the fringe of its range or in restricted areas, or for some other reason, but is not a threatened species.

Rare: any indigenous species of fauna or flora that, because of its biological characteristics, or because it occurs at the fringe of its range, or for some other reason exists in low numbers or in very restricted areas in Canada, is vulnerable, but not a threatened species.

De-Listed: a species previously designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) whose national status is no longer vulnerable, threatened, endangered, or extirpated. e.g. The American White Pelican designated as threatened from 1976-86 was delisted in 1987.

Downlisted: a species previously designated by COSEWIC whose national status moved from one category to a less-vulnerable category. e.g., Wood Bison designated as endangered from 1977-87 was downlisted in 1988.

Prairie Creature Features

Examples of Clues for
RICHARDSON'S GROUND SQUIRREL

- considered agricultural pest by some farmers
- aerate soil
- manage to survive where other mammals have disappeared
- one of main prey species for many grassland predators

- light-coloured fur reflects heat
- are diurnal (active during the day)
- shade of brown fur blends in well with dry soil and grasses to provide camouflage

- have acute vision
- eyes set high on their heads, rather than low and in front, to see predators above and behind

- teeth always growing
- special front teeth for biting into hard seeds, --ridged back teeth help grind rough grasses and stems
- have large gap in skulls between front and back teeth (the diastema) to accumulate large amounts of grasses and food at one time
- have cheek pouches for accumulating large amounts of grasses and foods for storage or use for nest building
- obtain water from insects and plants

- have claws to dig out burrows
- use burrows for shelter from predators, for nesting, and for food storage
- prevent overheating by lying just below burrow opening and sleeping during hottest part of day
- hibernate to save energy in winter

- sit up on hind legs to be seen by others and give shrill whistle; flick tails in direction of enemy

Prairie Creature Features

INSECT, BIRD OR MAMMAL NAME:_____

Prairie Creature Features

Relate

City Animal Survey

Students will survey community surrounding Saskatoon Natural Grasslands residents to discover incidence of wildlife sitings.

An example of the questions could be:

Name:
Address:

1. Have you seen or heard mammals, birds, butterflies, and/or other species while in your own yard or in the SNG?

   ( ) Yes ( ) No

   If yes, list the animals you have seen, numbers and time of day sited.

   _____ _____

   _____ _____

   _____ _____ over

2. Have you tried to attract SNG animals to your yard?

   ( ) Yes ( ) No

   If your answer was 'Yes', What has worked for you?

over

Surveying could be done with family, neighbours and friends. Before conducting a neighbourhood-wide survey, be sure to include dates and details in a class, school, or community association newsletter well in advance.

Once the survey is complete, students can poll their findings and present a report to the Saskatoon Nature Society, the MVA, local schools, and/or community.

Adapted from *Keepers of the Animals.*

Prairie Creature Features

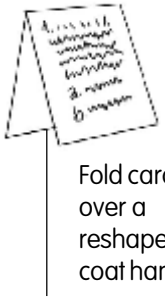
Adapt and Survive

Students will discover whether they are as adaptable as the red fox. They hike the trail, read clue cards, and make decisions which lead either to survival or death. The teacher sets a trail ahead of time and leaves clues mounted on well-secured cards in six stations. See text on Adapt and Survive cards, p. 46 and pp.49-50.

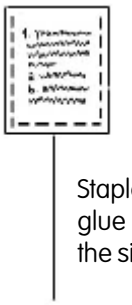
Materials
posterboard,
paper,
& wire coat hangers,
stapler / glue,
clipboard for each student

Example:

Photocopy questions and mount on bright posterboard



Fold card over a reshaped coat hanger



Staple or glue the sides.

If you laminate the cards, they could become a permanent part of the Edu-kit

Make up this form for students' clipboards.

Circle the choice you would make to survive:

1.	A	B	
2.	A	B	
3.	A	B	C
4.	A	B	
5.	A	B	
6.	A	B	

Supervised groups of 4-5 students progress from station to station in clockwise order at 6-7 minute intervals. Encourage them to collaborate but to make their final desicions individually before marking their answers on the above form.

Prairie Creature Features

Read and Decide answers for Adapt and Survive

1. You are a fox pup snoozing in your burrow while your mother searches for food. You hear a shuffling noise. You expect it to be your mother, but you see instead a wire loop just outside the burrow opening. You:

   A. draw back and retreat deep within your burrow so the wire will not touch you.
   B. sniff it and paw it to investigate, then pounce..

2. Your mother has provided food for you, but by now you have learned hunting skills. She nudges you away from the burrow, encouraging you to hunt on your own.

   You smell a dead animal. You are hungry and it smells good, but there is another different smell lingering in the air. You crouch and observe from a safe hiding place. There is no movement and everything looks calm and peaceful, so you:

   A. come forward and eat the meat while remaining on guard for danger.
   B. walk away and hunt for food elsewhere.

3. You are now on your own. Spring has been dry and hot. The grass is still brown. You are old enough to find food and water, but the longer you walk, the weaker you feel. You:

   A. keep going even though it takes precious energy.
   B. return to your old burrow, sleep and wait for a food supply to come along.
   C. return to your old burrow and wait until nightfall when you will not have to expend as much energy to hunt. Then go out.

4. You continue your journey. You hear mooing and clucking sounds in an open area ahead. You:

   A. move away and look for food elsewhere.
   B. explore the open area, hunt when all is safe and eat until you are completely satisfied.

5. You have had a good sleep and are getting used to being on your own. You further explore the open area. A group of large animals stare at you with glazed eyes. You want to get closer to check them out, but to do so you have to dig under a fence. Once on the other side, you smell and then see a freshly killed rabbit, but another smell alerts you to danger. A foreign mechanism encircles the fresh meat. You:

   A. pounce.
   B. move on.

6. You are fully grown now. Rains have come and the earth is finally covered with green. You feel the need to establish your own territory. You come upon an area overgrown with vegetation. You sniff around and discover a large burrow. You explore its opening and detect familiar smells, smells that you know are safe. You:

   A. enter with caution, find it empty and inviting, so you stay.
   B. move on to seek shelter elsewhere.

Prairie Creature Features

Once the students finish their adapt and survive hike, they return to a designated spot in the playground or classroom to discuss their choices.

* Ask all students who chose A on question one to move to one side of the classroom; those who chose B move to the opposite side.

* Those who chose A survived and those who chose B were caught by a snare and taken away by a hunter. Consider the odds of either choice happening in real life. Continue, using the following guide.

1. a. You survived
   b. You were snared by a hunter who took you away

2. a. The meat was poisoned, it was a trap set by a hunter. You did not survive
   b. You made the right choice and survived

3. a. Because you wasted energy and became dehydrated while hunting in the heat, a predator had no trouble capturing you. You did not survive.
   b. As time passed you became so weak that you could not leave your burrow. You did not survive.
   c. In the coolness of the night you were able to find food while expending minimal energy. In the darkness, you had less chance of being seen by predators. You survived.

4. a. You spent what was left of your energy looking for food in other places and did not survive.
   b. You hunted and ate safely in the dark and survived.

5. a. Immediately after you pounced you heard a terrible noise and your leg caught in something stronger than you. You were trapped and did not survive.
   b. You survived.

6. a. You got a lot of rest sleeping in an abandoned fox hole, which also attracted a young vixen. You not only survived, but eventually mated and raised your own family.
   b. You walked away and eventually found a dead hollowed tree and used it for shelter. You survived.

Red Fox

Prairie Creature Features

Materials

large art paper, charcoal, conte, earth coloured crayons and pastels, gluetac

Materials

large chart or art paper, pencils, pencil crayons

Review the importance of adaptation in the lives of all living things. Explain that animals rely on skills they have learned from their parents and experience, as well as on instinct. Instinct is an inborn pattern of behavious that is characteristic of a species and is often a response to powerful motivation or impulse (Nelson Canadian Dictionary).

Reflect

Modern Prairie Pictographs (Pre-historic Paintings)

Students will discover that humans have depicted animal behavious and adaptation in art since early times. World wide, ancient cultures drew and painted on rock faces representations of animals and their interactions with humans. The teacher allows time for students to observe pictographs found in Saskatchewan and other parts of Western North America using the following websites:

http://www.lights.com/waterways/arch/rockart.htm
http://emuseum.mnsu.edu/prehistory/northamerica/linked/rockart.html
http://www.asu.edu/clas/anthropology/dvrac/resources/locality1.html
http://aztec.asu.edu/aznha/vbarv/vbarv.html
http://www.pictographcave.org/educate/activities.html

Students will work in pairs to draw pictographs of themselves interacting with Grassland wildlife. The teacher or student volunteers draw examples on the art paper and then ask class for interpretations. Many pictographs showed animals being hunted with bow and arrow. In a modern version, a deer could be running from a car. Some animals were worshipped, others feared or disliked, such as the skunk. After completion, students post work around the room and lead the class in its interpretation.

Adopt and Adapt an Animal

Students work individually, in twos or threes to create and name animals perfectly adapted to their environments as expressed in pictorial and written form. Artists/writers challenge the class to identify the adaptations they have given their animals and to relate them to adaptations developed by real-life prairie animals. For example, develop Ssssnowshadesquirrel, an animal which has has an extra membrane around its eyes to shade them (a garter snake), huge feet to walk over snow in winter (like the snowshoe hare) and becomes invisible because its fur turns the colour of the grass in summer and fall (Richardson's Ground Squirrel).

Prairie Creature Features

Adapt and Survive
Decision Cards

1. You are a fox pup snoozing in your burrow while your mother searches for food. You hear a shuffling noise. You expect it to be your mother, but you see instead a wire loop just outside the burrow opening. You:

a. Draw back and retreat deep within your burrow, so the wire will not touch you.

b. Sniff it and paw it to investigate, then pounce.

2. Your mother has provided food for you, but by now you have learned hunting skills. She nudges you away from the burrow, encouraging you to hunt on your own.

You smell a dead animal. You are hungry and it smells good, but there is another different smell lingering i the air. You crouch and observe from a safe hiding place. There is no movement and everythink looks calm and peaceful, so you:

a. Come forward and eat the meat while remaining on guard for danger.

b. Walk away and hunt for food elsewhere.

Prairie Creature Features

Adapt and Survive
Decision Cards

3. You are now on your own. Spring has been dry and hot. The grass is still brown. You are old enough to find food and water, but the longer you walk, the weaker you feel. You:

A. keep going even though it takes precious energy

B. return to your old burrow, sleep and wait for a food supply to come along.

C. return to your old burrow and wait until nightfall when you will have have to expend as much energy to hunt. Then go out.

4. You continue your journey. You hear mooing and clucking sounds in an open area ahead. You:

A. move away and look for food elsewhere.

B. explore the open area, hunt when all is safe and eat until you are completely satisfied.

Prairie Creature Features

Adapt and Survive Decision Cards

5. You have had a good sleep and are getting used to being on your own. You further explore the open area. A group of large animals stare at you with glazed eyes. You want to get closer to check them out, but to do so you have to dig under a fence. Once on the other side, you smell and then see a freshly killed rabbit, but another smell alerts you to danger. A foreign mechanism encircles the fresh meat. You:

A. pounce

B. move on.

6. You are full-grown now. Rains have come and the earth is finally covered with green. You feel the need to establish your own territory.

You come upon an area overgrown with vegetation. You sniff around and discover a large burrow. You explore its opening and detect familiar smells, smells that you know are safe. You:

A. enter with caution, find it empty and inviting, so you stay.

B. move on to seek shelter elsewhere.

Prairie Portraits

Lesson Information
Grade 7
Spring, Fall

Objectives
Students will appreciate the diversity of a natural landscape

Students will want to assist in the conservation of the grasslands

Background Information

Strangers to the prairie see it only as earth and sky. If they take a closer look at natural grasslands within the prairie, however, they will discover a variety of micro-environments within a dynamic ecosystem. The prairie holds a web of plants and animals that interact with one another under the influence of continual change.

Many of these changes are not natural. Unfortunately, industry, agriculture and urban development have destroyed all but about 2% of the northern grasslands. The Saskatoon Natural Grasslands is a small remnant. It is in the transition zone between the parkland ecoregion to the north and the mixed-grass ecoregion to the south. The University of Saskatchewan, City of Saskatoon, and Meewasin Valley Authority (MVA) have preserved the thirty acres of unique habitat we know as the SNG for the benefit of generations to come.

Rouse Interest

Materials
graph paper, clipboards, metre sticks, string, garden stakes, digital cameras, magnifiers, notebooks, pencils

Adopt-A-Spot Monitoring

In small groups, students will choose one-metre square plots of the Grassland to map out on graph paper and adopt for monitoring purposes. Each square will become the site of an intense study of plant and insect populations, identifications of both, and notations of seasonal changes. Supervised groups begin visits in the fall and return to the SWG monthly to take digital photos of their plots and record changes. Invite the MVA's Resource Conservation Officer to give a pre-hike talk about how to lay out plots and to focus on and record changes that would be most useful within the MVA's Resource Management Plan for the Grasslands. Share data with the MVA.

Materials
Tread Softly Video (in Edukit)
Who Am I? cards (in EduKit)

Tread Softly Video

Students will view the "Tread Softly" video with critical eyes and express their opinions in the form of newspaper articles. The teacher alerts students to pay close attention to video subtitles and how they relate to the visual elements. After the video, the teacher lists the recalled subtitles on the blackboard (Awaken to Diversity, Appreciate the Symphony, Experience the Mystery, and Tread Softly) and leads discussion of the significance of each subtitle and how it relates to the conservation of the Grasslands. Students choose one of the subtitles as a heading for a newspaper article in which they emphasize the importance of treating the Grasslands with respect, followed by ways the public can foster preservation during their visits.

Prairie Portraits

Mystery Photos

Students will realize the intricacies of their residential community as well as the Grasslands community when they try to identify mystery photographs. The teacher or an adult volunteer photographs both natural and human-made features and scenes within the Silverspring community.

Materials
digital camera

The teacher projects images on a screen for the whole class to peruse or arranges copies of photos into packets for small groups to examine. Compare presumed locations as a group before disclosing actual site identifications.

Relate

Treasure Hunt

As students simulate a wildlife hunt, they will realize the diversity of the SNG's animals and plants. Ahead of time the teacher and a volunteer hide the laminated wildlife cards around the school grounds, noting locations on a mapped out plan. Within a specified time frame students work in pairs to find the most "treasure". Cards that are not found have survived the hunt. Discuss how adaptations of prairie animals help them to survive harsh conditions on the Grasslands. See pp. 39-40 for background on adaptations.

Materials
wildlife cards
in Edukit

Cartoon Creations

Students will test their knowledge of the features of Grasslands flora and fauna as they circulate to ask each other yes/no questions about the wildlife pictured on cards the teacher has fastened to their backs. Once they have discovered who they are, students develop cartoon characters of the species on their cards and group themselves to form food chains (3 or 4 students each). For example, one group could be grass, grasshopper, meadowlark, hawk. Each group then works together to create a cartoon strip using their cartoon characters.

Materials
wildlife cards
in Edukit,
tape or safety pins

Source: *A Sense of Place* p. 16
Edu-kit

Prairie Portraits

Grassland Mural

Materials
paper for mural, glue, pencil crayons, mystery photos, sketching materials, wildlife books and magazines

Students will realize the total landscape of residential and Grassland communities as they create a group mural. The teacher arranges for students to combine a study of the mystery photos, onsite sketches, and pictures in books about wildlife to develop an overall plan of the Grasslands and surrounding residences. Sketch onto sections of roll paper and colour with pencil crayons. Include habitats and food sources. Students use wildlife cards from Eco-kit and illustrations in wildlife books as models for their own animal drawings to colour, cut out and fasten to mural.

Leftover drawings may be used to create a food pyramid by placing the various plants and animals onto posterboard cut into a triangle.

Do You See What I See?

Materials
paper
pencil
clipboards

Students test their listening and questioning skills and visual memories of the Grasslands as they sketch with a partner. Pairs of students sit back to back on a designated area of the SNG that can be used off the trail or in the buffer zone. One student chooses an item in front of him/her to describe in detail to the other student, who sketches the item. He/She may ask questions. They switch roles and then reveal to one another the described items, which they compare with the sketches. The teacher sets a time frame for the activity.

Guided Visualization

See *Exploring the Grasslands,* p.68 in Edu-kit.

Reflect

Prairie Protectors

Materials
posterboard
photographs, glue, writing paper, pencil crayons

Review the results of the adopt-a-spot monitoring (p.52) and how their findings will help them understand Grassland diversity. Students will create "Prairie Poster Portraits" of grassland species in which they draw close-up pictures and write captions underneath on behalf of the species, explaining why the Grasslands needs protecting. A school photo or digital photo glued to a top corner of the poster will identify the artist/conservationist. They write a paragraph on the topic: Why the Grasslands are important to me and what I would like to do to ensure the survival of my wildlife choice. Mount the paragraph under the poster caption.

Create a bulletin board display with the theme "Prairie Portraits - Protecting the Grasslands".

The Gift of Grass

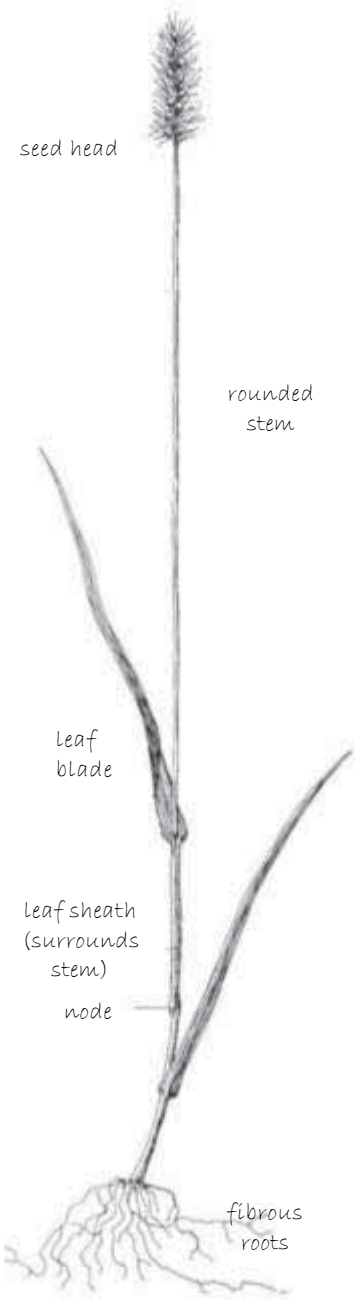
Background Information

A grassland is an area of grass or grasslike vegetation, such as a prairie or meadow. This definition sounds simple enough, but when one takes a closer look, surprises are in store.

The family of grasses comprises the most successful family of flowering plants in the world. There are almost eight thousand species of grasses, covering almost one third of land on the planet. In the Saskatoon Natural Grasslands alone, there are 31 grass species.

Throughout our history mankind has relied heavily on grasses as a food source (eating its seeds, planting them, or feeding them to animals). A few examples are cereals, rice, and sugar cane. We have relied on grasses for building materials such as bamboo, roof thatching, sod blocks, and insulation. As a groundcover grasses provide beauty, softness, and erosion control. When grasses die, they nourish the soil with leftover nutrients during the process of decomposition. Of course, herbivores and omnivores depend upon grasses for food.

Grass is distinctive from other plants in its three main features: it flowers; it has a round, hollow and jointed stem; and it has leaves which are long, narrow and parallel-veined. The base of the leaf is called a sheath, which wraps around the stem and originates at the nodes (solid 'swollen joints'). There are other important characteristics of many grasses, as well, such as the rhizomes, or underground stems, which help grasses propagate and hold on to the soil.



Lesson Information

Grade Level: 8
Season: Spring, Fall

Objectives

To become familiar with basic structure of grasses

To learn how to recognize and differentiate some species of plants

To understand the importance of grass diversity and the need to protect native grasses from invasive and aggressive exotic species

The Gift of Grass

For centuries, grasses have been responsible for supporting herds of grazing animals, such as bison, and for influencing the effects of wind, fire, and weather over a great expanse of North America. Grasses have helped to sustain the great diversity of flowers, shrubs, and other plants, as well as animals. A hundred years of breaking the land into cropland, controlling the level of grazing, and introducing exotic species have taken their toll on native grasses. Many native species became extinct; others have become rare. The diversity of the prairie grasses, though still considerable, has decreased and thus needs protection.

In a small area like the Saskatoon Natural Grasslands, native grasses struggle to sustain themselves within a circle of foreign plant species introduced by human beings. Many of the introduced plants are grasses "needed" by homeowners to enhance their property. Others enter the country, some unintentially, with imports of Asian and European goods. The "new" plants often become over-competitive and aggressive within the prairie ecosystem. The plant photographs on page 63 exemplify some of the important native grasses that we find at SNG, such as fescue and native wheatgrass, as well as some invasive plants in need of control.

Rough Fescue Grass

Resources

Brown, Lauren. *Grasslands*. Alfred A. Knopf Inc.: New York, NY. National Audubon Society, 1998

Calgary Board of Education. Prairie Grasslands. Calgary, AB. 1992

Lingelbach, Purcell and Sawyer. *Hands-On Nature*. Vermont Institute of Natural Science: Woodstock, VT. 2000 (Page 19)

Willson, Kay and Muth, Elaine. *Exploring the Grasslands.* Saskatchewan Environmental Society: Saskatoon, SK. 1994

The Gift of Grass

Rouse Interest

Build a Recycled Grass Plant

Students will familiarize themselves with differentiating features of grasses. Distribute Grasslands brochures and/or field guides with sketches of grasses. If possible, bring different actual specimens so students can look and examine them carefully. After brainstorming differences, students create a grass with as many of these characteristics as they remember. Assist to assure that all basic plant parts are included.

Materials

Some innocuous junk,
tape, glue,
scissors,
string

Divide the class in pairs or small groups to create a three-dimensional grass plant made from recycled materials brought previously by teacher or students (newspaper, cardboard, plastic, tin cans, straws, rubber bands, containers, dowels, wires, leaves from discarded artificial plants, etc).

Just for fun challenge students to make connections between scrap materials and actual grasses. For example, one artificial leaf was made from a paper cookie bag; the cookie was made with flour, which comes from wheat, which was the seed of a grass. Display the creations in the school showcase.

Exotics Vs. Natives

Students will understand how weeds and introduced plants invade native grasses. Play this fast, noisy game in a gym or outside in a field.

Materials

Grass cards,
Exotic cards,
Washable coloured
markers,
Team bibs,
Hat, jerseys, touques,
or bandanas

Six student volunteers represent the needs of grasses**:** sun, soil, water, light grazing, air, and fire. Each has a washable marker of a related colour. For example, sun – red; soil- brown, etc. Two more volunteers become predators, ie. the animals who include particular grasses in their diets. Predators wear bandanas, touques, or team jerseys.

The rest of the class forms three groups to take the roles of plants illustrated on plant cards on page 63. Each member of group one chooses a card and becomes a species of **native** grasses. Each member of group two chooses a card and becomes an **exotic** or **introduced** species. They might be selected and differentiated by a colour they are wearing that day. Members of group three become the **plants-to-be** and do not need cards.

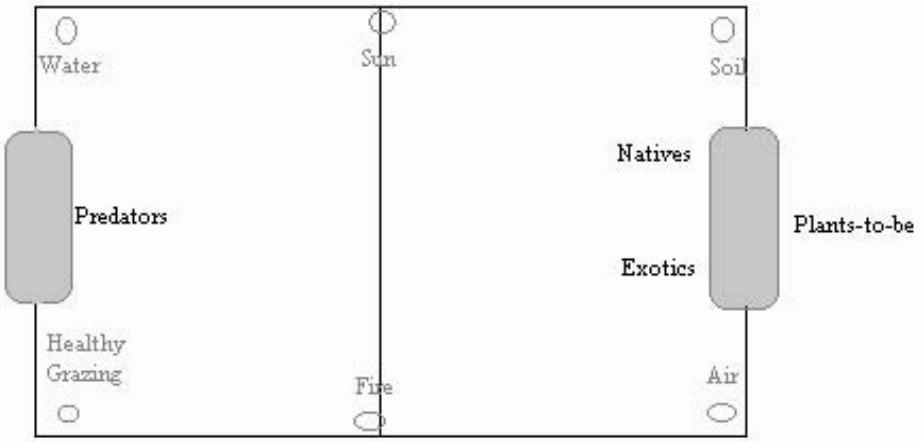
If the game is played in a gym, tape signs designating the **needs** along 2 parallel walls. On a playing field, needs spread out along the outside lines.

Blue Grama Grass

The Gift of Grass

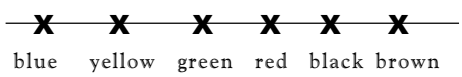
Awned Wheatgrass

Place the **predators** on one end of the gym and the **natives,** the **exotics** and the **plants-to-be** on the other end, facing each other. The teacher or teacher associate should stay with this last group to assist.



The rules are as follows:
Native and **exotic** plants need basically the same things to survive. Their goal is to run to each **need** who will mark an X on their hands. Each plant should end up with six X's, one of each colour. If they can achieve this without being caught by a predator, they can return to their end to "reproduce". Reproducing means to transform one of the **plants-to-be** into a **native** or **exotic** plant like them. The native or exotic plant will then present each plant-to-be with a native grass or exotic card. Both the original and the original's assignees can return to the game to secure all of their **needs** again. There is one difference, however, between how **exotic** and **native** plants reproduce. When an **exotic** reproduces, it has the right to take two plants-to-be with it; the **native** plant can take only one at a time. To release a **plant-to-be,** the teacher associate checks for all six colours and draws a line through them with a black marker.

Hands should look like a colourful set of X's crossed with black after a native or an exotic plant transforms a plant or plants into new plants.



The native and exotic plants start simultaneously with the predators. The predators can only get one plant at a time and bring it back to their end. Every plant touched must come back with the predator to his/her end (emphasize no fighting). The predators have one important rule they must follow: they have to catch two native plants before they can catch one exotic plant.

Continue playing the game until the **plants-to-be** all become **natives** or **exotics**. Count the number of native and exotic plants at the end and announce the winner.

If the game ends too quickly, repeat. Always count the species at the end and note who won.

Discuss the results as a class. Why do exotics tend to win? (spread quickly and are less palatable to animals than native species). Does that happen in real life? (yes) Explain that these are only a few examples of what can make exotics thrive in real life. What other situations might lead invasive species to overcome native species? (hikers stepping on and digging up native species; seeds blowing from residential gardens to grasslands).

Relate

Grass Circles Observations

Students will compare grasses from an undisturbed setting (SNG) with grasses from a domestic setting. This activity will need two supervisors. Divide the class in half. Each student brings a notebook and pencil and joins his/her group in a discussion circle. Groups alternate staying in the school grounds and visiting the Grasslands. The school grounds group pairs up and receives a metre-length of string and a copy of the grassland/exotic species chart (p. 62-63). They select a location within a designated area, sit down, and shape the string into a circle on the ground. They carefully examine their piece of lawn, sketch and write their observations. Note differences in the grasses by their appearance, texture and smell. If digital cameras are available, students may photograph their circle. In the meantime, the second group takes their strings to the Grasslands and follows the same procedure in the buffer zone or other designated seating area.

Back in the classroom, students prepare their findings to present to the class. Chart likenesses, differences, and unusual sightings.

Materials

a metre of string per student, notebooks, pencils, digital camera, large chart paper

Slender Wheat Grass

The Gift of Grass

Build a Prairie

Small groups of students will plant native and exotic grass seeds in separate pie plates; vary the soil composition, moisture, and light; and monitor daily. They will record progress in journals.

Materials
Pie plates,
a variety of planting mediums,
and grass seeds

* Which grasses take longer to grow, need most or least water, sunlight, etc.?
* Examine the grazing effects on both by clipping some of the grasses on each plate.
* Plant only one type of grass in some plates and mixed grasses in others.
* To simulate drought conditions, withhold water in some plates.

This website lists local native seed suppliers: http://www.npss.sk.ca.

Reflect

Find Your Prairie

Students will test their visual memory of the contents of grass circles photographed in the activity on p.59. Reproduce two copies of each photo. Cut off student IDs on one copy and label with a code, such as a number or letter, on the back. Reserve the second set to reveal the photographers' names later. Students close eyes while teacher relates what might have been in the circles: types of grasses, pebbles, soil, other plants. Spread the photos on a table or on the floor and challenge each student to identify his/her own prairie circle and to record the code. Check accuracy by comparing with the master photo set. A follow-up activity is for students to return to the Grasslands to find the former locations of their circles. Use the photos for reference.

Needle and Thread Grass

Materials
Grassland photos

The Gift of Grass

Song of the Grass

Students will create a play using the grass, the rain, the prairie dog, the bison, etc., based on a song you have taught them, "Song of the Grass" (p.15, Exploring the Grasslands - Understanding an Ecosystem).

Materials

Copies of the "Song of the Grass"

Life of a Grass

Students will create a story of a grass in a similar format to the song. Sit in a circle. Start with "At the beginning I was a needle and thread seed caught on a deer..." Each student adds to the story, while someone writes it down.

Northern Wheat Grass

Extension Activity:

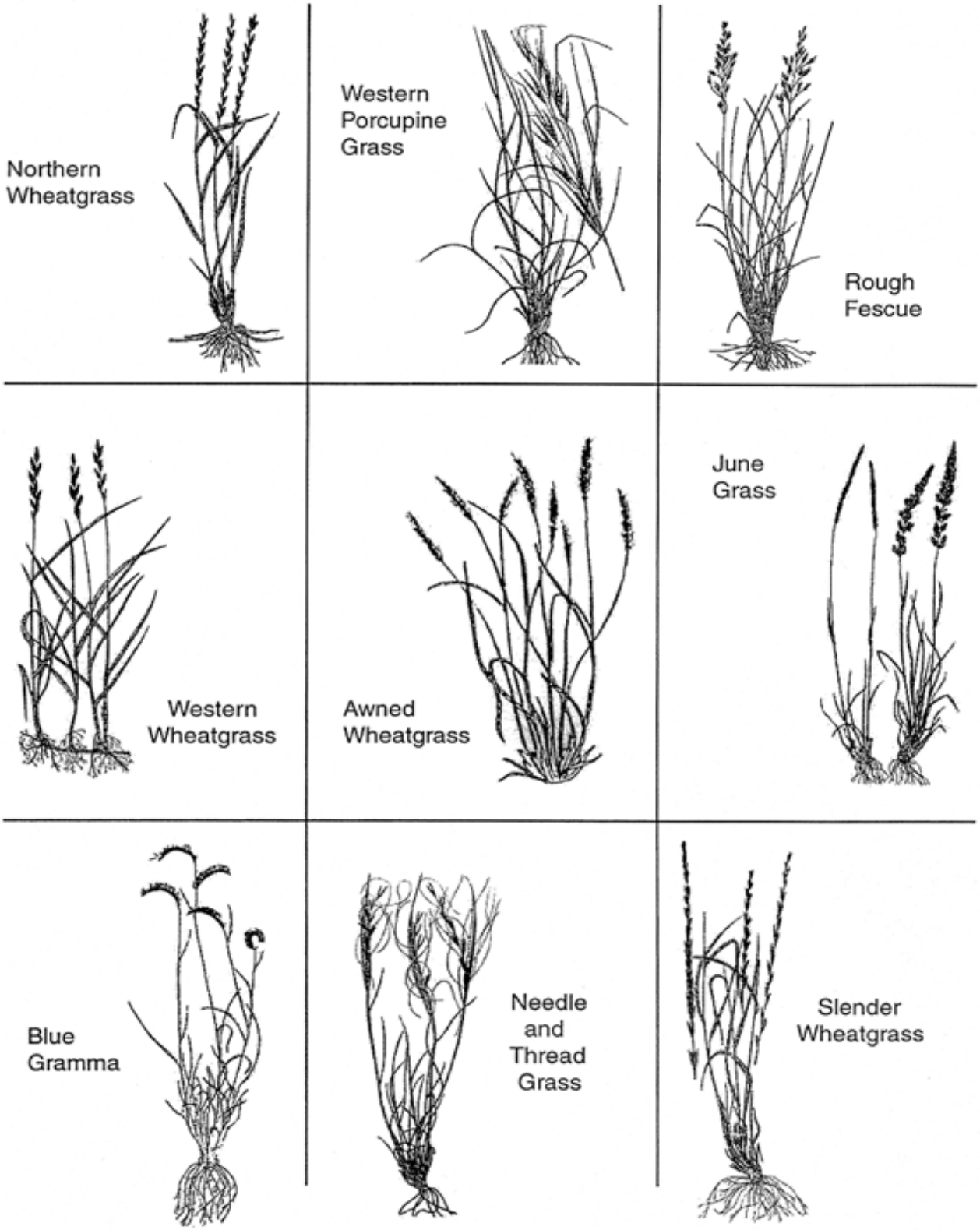
Weed Control with Meewasin

The class may wish to work with a conservation officer on the MVA management plan for exotic species control in the SNG. Students would regularly monitor and record the different types of grasses found in an assigned area, or remove designated weeds. For more information, contact Meewasin Valley at 665-6887.

June Grass

Western Porcupine Grass

SNG Native Grasses



Exotic Species of the SNG Cards

Kentucky Bluegrass

Crested Wheatgrass

Smooth Brome Grass

Russian Pigweed

This page is set up with the most serious invasive species at the top and the least invasive at the bottom. The three grasses above have increased their numbers considerably over the last seven years and need to be controlled.

Lamb's Quarter

Dandelion

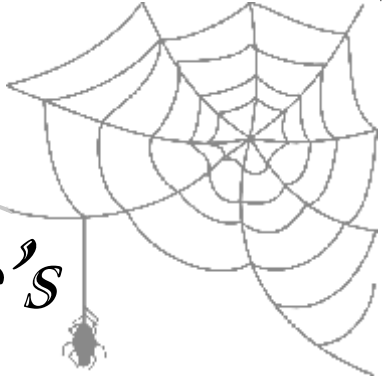
Canada Thistle

Common Tansy

Gift of Grass/63

Notes

Appreciate Nature's Symphony



Appreciate Nature's Symphony

This section focuses on the ecology of the grasslands and our role in maintaining its biodiversity. Just as members of an orchestra achieve success through the harmony and synchronization of their diverse instruments, members of the grassland ecosystem achieve survival through their interdependence in nature. We know we have succeeded as environmental educators when we witness our students interacting positively with the natural world and one another.

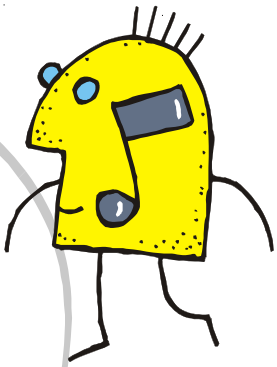
"We are but a mere strand within the web of life..."

Adapted from Chief Seattle

Ecological education involves an evocation of home, namely an attachment to place. The Saskatoon Natural Grasslands is home to a variety of plants and animals, as well as to the human members of the Silverspring community. Education should include opportunities for students to develop an attachment to the ecosystem that is located on their doorstep.

The traditional view of ecology, as a branch of biology, deals with how members of an ecosystem/community are connected and dependent upon one another. The new paradigm of ecology includes our attempt to develop an integral understanding of things. Ecological connections are not only scientific connections in the web of life but also historical, cultural, emotional and spiritual. Ecology addresses how the embeddedness of nature sustains the well-being of ourselves and the earth living harmoniously. Ecology becomes the context of education, not just a segment of the science curriculum.

Grassland Groupies



Background

The natural world stimulates all of our senses. As we listen to nature we hear a symphony of sounds.

Sound is created when vibrations are transmitted through an elastic material--solid, liquid or gas--with varying frequencies that can or cannot be detected by the human ear. A sound wave is the vibration of compressed and expanded air. In fact, a sound wave is able to travel faster through liquids and solids because their molecules are closer together than those in air. As sound waves travel they encounter obstacles which they must go around, travel through, be absorbed by, or be reflected from. In our homes, carpet is an example of a material that absorbs sound. In nature, lush foliage and dense leaf litter absorbs sound.

Sound is an effective way for animals (including humans) to communicate. Animals that live under water or leaf litter, as well as those that are nocturnal or travel over long distances, use sound to attract mates and to warn one another of danger. Predators rely on sound to locate prey. Likewise, prey uses sound to detect the predators' presence. The use of sound is imperative for the survival of all species.

Different animals are able to receive and produce sounds in different ways. Mosquitoes, for example, have plumes on their antennae that receive sound waves, while grasshoppers have a tympanum (like an eardrum) on their front legs. Fruitflies send messages through the air by vibrating their wings, and elephants rumble their stomachs. Bats use echolocation calls to locate food and to avoid running into objects and other bats.

If we use all of our senses to explore nature, we will appreciate that we are part of it. When we open our ears to the rhythm of the planet we realize the interdependence of its parts.

This lesson will encourage students to pay more attention to their surroundings, both at home and at school, and thus become more in tune with nature.

Resource: Lingelbach, Purcell and Sawyer. *Hands-On Nature*. Vermont Institute of Natural Science: Woodstock, VT. 2000

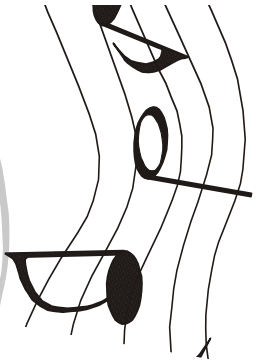
Lesson Information

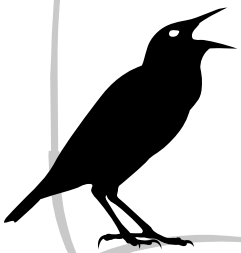
Kindergarten
Season: Spring

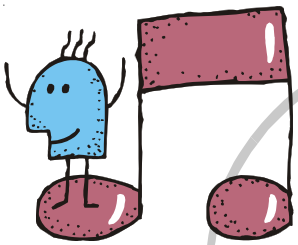
Objectives

Students will become aware of the symphony of sound in nature

Students will understand that animals make sounds to communicate







Grassland Groupies

Rouse Interest

Materials
Screen,
Animal sounds tape

Bird Songs Puppet Show

Students will understand why birds create songs unique to their species and will attend more carefully to backyard bird sounds, as they assume the roles of different animals in a puppet play. See *Hands on Nature,* pp. 169-179.

Sound Pantomime

Students will use their sense of hearing to identify five to ten everyday sounds the teacher makes behind a screen. These might be the sound of a stapler in use, the pressing of computer keys, a whistle, knocking on wood, etc. Students should close their eyes while listening. The teacher then plays a tape of animal sounds for students to identify and leads a discussion as to why animals might use sounds to communicate.

Adapted from *Hands on Nature,* p. 275.

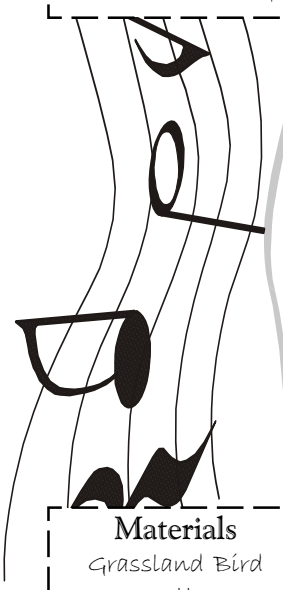
Material
Animal sounds tape

Sound Off

Students will identify with animals by taking their roles and responding to their sounds. The teacher alerts students to animal sounds by playing a tape several times. After assigning each group of five students a common animal, he/she plays the second tape that has short segments of different animal sounds. Group members stand up when they hear their animal's call and then sit back down again. Switch the animals assigned to each group and repeat this exercise.

Deer Ears

Students will better understand the meaning of animal adaptation as they imitate them. To hear like a deer, for example, cup hands around the backs of the ears. To test this adaptation, half the class cups their ears while the other half rub their feet on the floor. At teacher's signal, students put on their "deer ears" or take their hands down and listen for the difference. Switch sides.

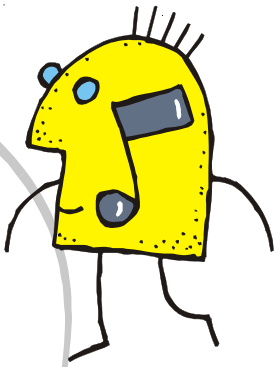


Materials
Grassland Bird
cassette or
Prairie Spring CD

Musical Chairs

Students will train their ears to listen for a particular bird song as they play musical chairs. The teacher plays the Grassland Bird cassette from the Eco-kit for the class several times emphazising bird names as children hear their calls. After reviewing the rules for playing musical chairs, he/she specifies which bird songs to listen for as a signal to sit down during numerous replayings of the tape.

Grassland Groupies



Relate

Do You Hear What I Hear?

Students will spread out in a designated area of the Grasslands, find their own space spot for lying down and tune into specific sounds. Ask them to listen for:

- ❑ the loudest sound you can hear
- ❑ the softest sound you can hear
- ❑ a high sound
- ❑ a low sound
- ❑ a sound from far away
- ❑ a nearby sound

Students sit up and share their observations.

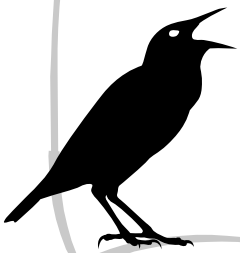
The teacher then challenges them to lie down again, close their eyes and listen for one particular sound, for example, the aspen leaves moving in the breeze, insects, or sand blown by the wind.

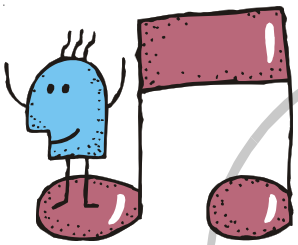
Bat/Moth Game

Students will realize how animals use sound for survival as they play a few rounds of bat/moth. The teacher blindfolds a volunteer "bat" and gives him/her a few sheets of post-it notes. Three students become moths. Remaining students form a large "habitat" circle around the bat and moths. The habitat students choose to become a tree, a rock or other element of the habitat. The teacher signals for the bat to move. When it nears a part of its habitat, students say aloud "tree" or "rock" to help the bat stay within the circle. Meanwhile, the bat at anytime may say its name -bat- at which time moths must respond immediately by saying -moth-. The bat relies on its sense of hearing to find and tag the moths. If a moth is tagged, it becomes part of the habitat circle. Play until everyone has a chance to be a bat or moth.

Materials

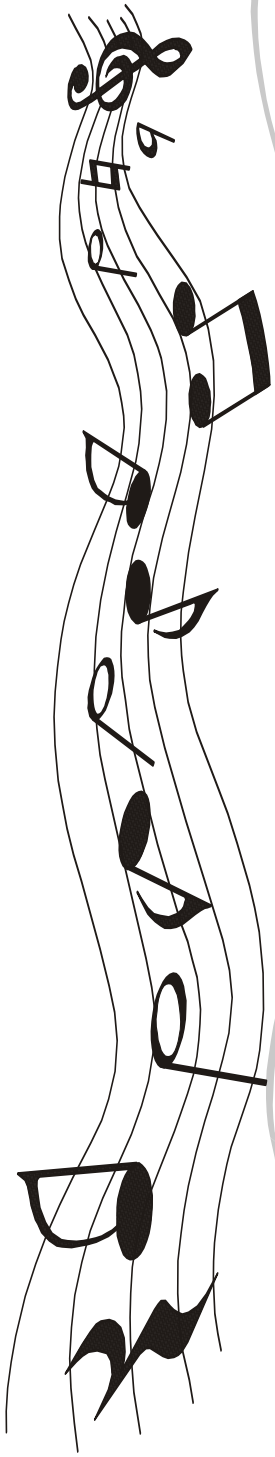
Blindfold,
post-it notes





Grassland Groupies

Reflect



Sharing Circle

Students will take turns telling the class their favourite sounds and why they like them.

Sound Charades

Students will recall nature sounds as they play sound charades. Replay the bird song cassettes and the Prairie Spring CD. Tell them to focus on a sound they like as they listen, because afterwards they will be acting out the sounds. Some choices might be:

- ❑ bee buzzing
- ❑ coyote howling
- ❑ tree leaves trembling in the wind
- ❑ a bird singing
- ❑ particular bird singing
- ❑ crickets chirping
- ❑ an owl hooting
- ❑ rain falling

Adapted from *A Sense of Place* by Daniel Kriesberg, p. 27.

Sound List

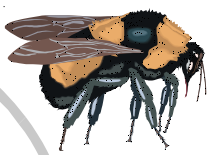
Students will realize the vast number of sounds they can identify. The teacher posts an ongoing list of all the interesting natural sounds the students hear throughout the year. Refer to it often and keep count.

Hand Print Art

Students will transfer sounds into art as they create a picture of their favorite sound from their handprints and fingerprints.

See *Handprint Art* book in Edu-kit.

Prairie Pollinators



Background Information

All life on Earth depends on plants, thus plant reproduction is vital. The first step of this delicate process is pollination. Depending upon the species of plant, a flower may contain either male or female reproductive parts, or it may have both. The male pollen producing part is called the **anther**, held up by a stalk called a **filament**. Collectively the anther and the filament make up the **stamen**. The female part of the flower is the **pistil**, composed of three parts. The **stigma** is the sticky part that traps the pollen at the top of a stalk called the **style**, which leads to an **ovary** at the base.

Pollination occurs when pollen grains at the top of the stamens are transfered to the pistil. At the bottom of the pistil are some ovules, or underdeveloped seeds. The pollen joins with the ovule to make a seed. Most flowering plants depend on animals to deliver pollen. Plants that lack this dependence rely on less efficient sources--wind or raindrops to transfer the pollen. The pollination partnership offers mutual benefit. Plants have their pollen transferred for reproduction, and the pollinating animals secure food, most commonly in the form of nectar. While looking for nectar the pollinator rubs against grains of pollen on the stamens, which become attached to different parts of the pollinator's body. When the pollinator visits another flower it transfers the pollen grains to the stigma of the other flower. The pollen grains fall into the pistil and join with the ovule to make a seed.

In North America the most common pollinators are insects like bees, butterflies, and beetles or vertebrates like hummingbirds and bats. Each pollinator carries the pollen in a different manner. Pollen brushes onto the hummingbird's feathers or onto the bat's fur. Invertebrates such as bees have bristles on their legs, head, and other body parts to which the pollen sticks. Honeybees store collected pollen in tiny basket-like parts on their legs. Butterflies have a straw-like appendage called a proboscis that enables the butterfly to sip nectar from tube-shaped flowers. In the process, pollen sticks to their heads and rubs off onto the next flower.

Plants use several techniques to attract pollinators. When birds and insects spot brightly coloured flower petals, they zoom in for the nectar. The hummingbird is attracted to red flowers. From an insect's perspective, colour is different than what humans see because insects are sensitive to UV light. Certain petals form a landing platform for visiting insects. Many petals have lines or other marks that guide the pollinator to the center of the flower, which houses the nectar. Another lure is aroma. The scent must appeal to its pollinator and is not necessarily pleasant to humans.

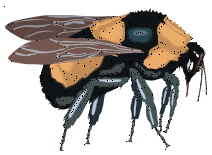
Lesson Information

Grade One
Season: Spring

Objectives

Students will understand the concept of pollination

Students will appreciate the important role that insects have in the production of food



Prairie Pollinators

Pollination exemplifies the interconnectedness of nature and can be observed every time one sees an insect probe a flower for pollen. Plants are vital to all living things, so while observing pollination remember not to pick the flowers.

Resources

Lingelback, Jennifer and Purcell, Lisa. *Hands-On Nature*; Vermont Institute of Natural Science. 2000; pp. 171-172.
Partners in Pollination, http://educate.si.edu/resources/lessons/siyc/pollen/start.html

Rouse Interest

Materials
SunUp SunDown CD
(in Edu-kit)

Attention Seekers

Students will identify with flowers by imagining they are standing in the middle of a field trying to get someone's attention. They are not allowed to use their voices. Brainstorm and record ideas for attracting attention, For example, wearing brightly coloured clothing, holding up a sign, or spraying perfume. Flowers do the same thing. They can't talk, so they use colours and smells to attract the attention of insects. Students draw and display colourful flowers that would attract insects and birds. Play Billy B.'s "SunUp SunDown" CD called "Yo I'm a Flower" in Eco-kit.

Puppet Show: Inside a Flower

From *Hands on Nature*, p.175.

Peter Pollen Grain:
You know, Paul, it's pretty boring being a pollen grain. I mean, all we do is sit here on the end of this stem coming out of this flower.

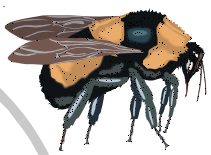
Paul Pollen Grain:
Peter, I've told you a million times – we're not sitting on the end of a stem. The stem is what the flower's sitting on. We're on top of the stamen.

Peter:
Okay, the stamen. What's the difference? It's still boring. And I feel awfully small and unimportant next to these big, colourful petals.

Paul:
I know what you mean. These petals are very attractive, Peter.

(Tiny pollen grains float by.)

Prairie Pollinators



Peter:
Hey, Paul, how come those little pollen grains can just fly like that when we're still sitting here?

Paul:
Oh, aren't they silly? I hear they're from the birch tree. They look as if they're having fun, but they don't know where they're going, and they could land anywhere.

Peter:
Oh dear. Where do they want to go?

Paul:
To the flowers on another birch tree, of course. A few of them will make it. I've heard we're going on a trip, too, Peter. But we're too big to float like the birch pollen. We have to get a ride.

Peter:
You mean I won't be sitting on top of this stamen all my life?

Paul:
No, no! We pollen grains are really very important. We help make seeds for new plants. I'm not sure how, but I know it means traveling to new places.

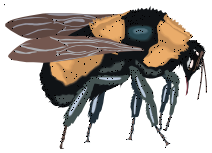
Peter:
Wow, I can help make a seed? I can't wait. There's sure not much to do around here.

(Move attention to Flower #2 – with Esther inside the ovary.)

Esther Egg:
Oh gosh, I'm so lonely. Here I sit, day in and day out, at the bottom of this dark flower pistil. Of all the wonderful parts of a flower, I had to be the little egg that sits by itself at the bottom of the pistil. I have a feeling that some day, someone will come down here and visit me. But meanwhile, I'm so lonely, I wonder if anyone even knows I'm here.

(Move attention to Flower #1 Honeybee enters and buzzes around.)

Peter:
Oh no, Paul, what's that coming over here?



Prairie Pollinators

Paul:
It's a bee. I told you those petals were attractive. They've attracted the attention of that bee! She's coming to get the sweet nectar from this flower.

(Bee lifts up Peter and flies toward Flower #2)

Peter:
Oooh no, what's to become of me now? I'm getting airsick. (Bee lands on flower #2) Ooof! That was rough landing! Oh my, I'm caught on this sticky thing and there's a tube growing out of it! I'm going down it! Yikes! (Peter slowly goes down the pistil until he's next to Esther.)

Esther:
Who are you?

Peter:
I'm Peter Pollen Grain.

Esther Egg:
I'm Esther Egg. I think maybe I've been waiting for you a long time.

(From Flower #1)

Paul:
(says to audience) So Peter Pollen joins Esther egg, and together they become a very important part of the plant : the seed! That's what flowers are for, to make seeds for more plants to grow. It's all part of our life cycle. And speaking of cycling, we'd better get going. I mean, get growing! Goodbye!

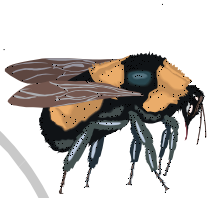
Relate

Pollination Partnership

Students will engage in role plays to better understand the process of pollination. The teacher splits class into the flower team and the pollinator team. Divide each team into groups of three. Give each small group from the "flower" team five nectar cards all of the same colour, which they spread out in front of them in the gym or schoolyard. Give each pollinator five nectar cards, each of a different colour. The purpose of this activity is for each small pollinator group to visit five different flowers in order to exchange that flower group's card for the matching pollinator card. For example, a pollinator group trades their red nectar card for the flower group's red nectar card.

Materials
Nectar cards in five different colours, Pollen cards in bunches of matching colours that correspond with the flower colours.

Prairie Pollinators



The game is over when each pollinator group has traded all of their cards. After the game review the partnership between flowers and pollinators.

Busy as a Bee

Students will identify their jobs at home with the teamwork practiced by bees. Bees are social insects, which means that they live in groups. Each member of the colony has a special job that benefits the entire colony. Students list some of the things they do at home to benefit their families.

Pollination in Action!

Students will reinforce their understanding of pollination as they play a game. The teacher takes the class outside to a safe open area and divides them into bees and coloured flowers. Each of the flowers sits or squats down and holds a Q-tip that has been dipped in coloured chalk dust "pollen". Place dishes or bags of chalkdust near the flowers for reapplication. Since the bees need pollen to eat and to make honey, they have to find a flower and rub their clean Q-tip against the coloured Q-tip to simulate collecting pollen. They can visit as many flowers as they like and then carry their coloured Q-tips back to the "hive" and collect a clean Q-tip to start again. Students change roles.

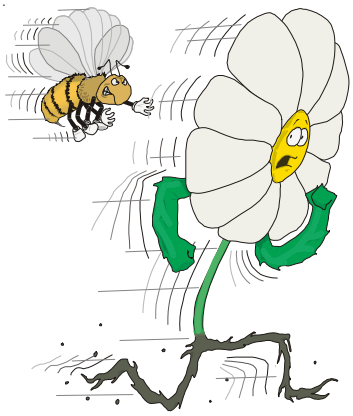
Materials

Chalk dust collected from chalkboards or shaved by hand into zip-lock bags, Q-tips

From http://www.web2.airmail.net/kboyle/Pollenat.htm

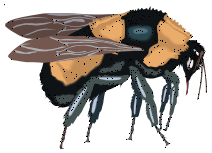
"Bee" a Pollinator

Students will pretend they are insects in search of Grassland flowers. In small supervised groups, students hike along the Saskatoon Natural Grassland trail. Be sure to review the importance of staying on the trail. Study any real insects seen on the flowers with magnifiers and share observations with the group.



Materials

magnifying glasses



Prairie Pollinators

Reflect

Bee-Free Barbecue

Students will realize the relationship between pollination and the foods we eat, as they play a barbeque game. The teacher explains that different species of bees pollinate many of the plants that make up our food supply.

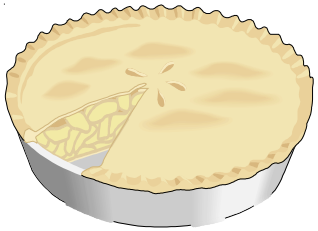
Adapted from Partners in Pollination, http://educate.si.edu/RESOURCES/LESSONS.SIYC/POLLEN/page08.html

Invite students to a Bee-Free Barbecue to discover what foods they will not be able to have as part of the menu. Duplicate and hand out the Bee-Free worksheets, p. 77, and ask students to cross off the foods that would not grow for us to eat if bees did not pollinate their flowers first. The list is as follows: tomatoes, onions, lettuce, potatoes, lemons, limes, mustard seed, cacao bean (used in making chocolate), vanilla, sugar, almonds, watermelon and apples. What is left? A pretty dull barbecue!

Thankful Flowers

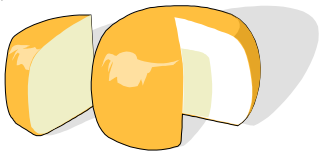
Students pretend they are flowers and write thank you letters to their pollinators.

You are having a “Bee-Free” Barbecue, cross off the foods that you will not be able to have at your barbecue!

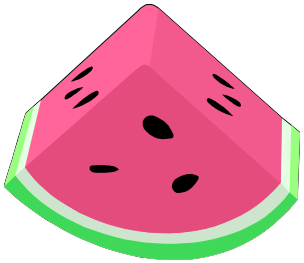


Apple Pie

Onion

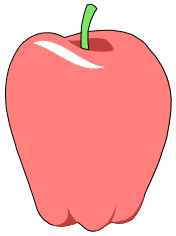


Cheese

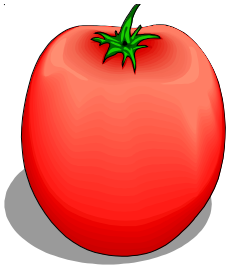


Watermelon

Potato



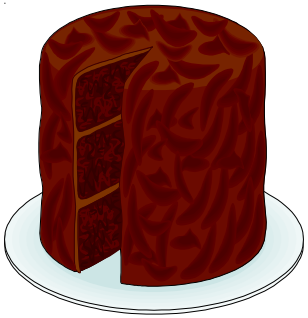
Apple



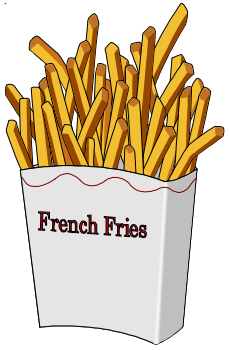
Tomato

Mustard

Lemonade



Chocolate Cake



French Fries

What are you left with?

Nests are Neat

Background Information

Birds build nests to provide protection for their precious eggs during incubation and newborn young. Birds build nests in trees, on the ground, underground, in trees, in riverbanks, in buildings, and in farm equipment. Birds even construct floating nests.

Some nests are intricately built; others are simply a scraped hollow on the ground. Some birds use abandoned nests, some return to reuse the same nest every year, and others build a new one each year. Instead of building its own nest, the Brown-headed Cowbird (which is thought to nest at the Saskatoon Natural Grasslands) lays its eggs in other birds' nests, thus reducing the population of the original species. Cowbirds remove one of the eggs already in the nest (host eggs) and lays one of its own in its place. The Cowbird egg hatches 1-3 days earlier than the host eggs. The bigger and faster-growing hatchlings receive the majority of food and parental care from the foster parents.

Location is an important factor in nest building due to the constant threat of predation. As a result, birds have adapted remarkable strategies to protect both eggs and nests. One such strategy is camouflage. For example, ground nesters such as the Meadowlark build with grasses to match the nest's surroundings. Tree nesters such as the Robin cement twigs together with mud to construct a cup-shaped nest. Birds may hide their nests by covering them with mosses or lichens. Common construction materials are grasses, twigs, leaves, mosses, feathers, and sticks, supplemented by hair, spider silk, and pieces of string. The American Goldfinch nests only after the Canada Thistle, Cottonwood Tree, and dandilion have matured so they can feed the young the seeds and use their soft silky materials to line the nest. The Chipping Sparrow prefers hair for building its small, intricate nest. Nesting birds provide endless hours of observing nature in action. Please note the importance of watching from a distance and not interrupting the nesting process. Some birds will abandon their nest and even their nestlings if disturbed by humans, whom their instinct tells them are potential predators.

Lesson Information

Grade 2
Season: Spring

Objectives

To understand the importance of watching and listening in solitude as a way to better observe nature

To heighten sensory awareness and enhance self-knowledge

To develop a relationship with a special place in nature and practice giving to and receiving from that place

Nests are Neat

Related Resources

I. Books

1. Hackman, Pamela. *The Kids Canadian Bird Book*. KidsCan Press. 1995
2. Hayley, Dianne and Wishart, Pat. *Knee High Nature*: *Spring in Alberta* and *Knee High Nature: Fall in Alberta*. Lone Pine Publ., Sherwood Park: AB. 1989
3. Saskatchewan Wetland Conservation Corporation. *Songbirds of Saskatchewan*
4. Smith, Alan R. *Atlas of Saskatchewan Birds*. Nature Saskatchewan. 1996
5. Smith, Alan. *Saskatchewan Birds*. Lone Pine Publishers: Edmonton, AB. 2001
6. WeidensaulScott. *Birds, A First Field Guide*. National Audubon Society. 1998

II. Children's Literature

1. Arnosky, Jim. *Crinkleroot's Guide to Knowing the Birds*
2. Calder, S.J. *If You Were a Bird*
3. Ehlert, Lois. *Feathers for Lunch*
4. Hawley, Kelvin, Illus. *Birds.* Stage 3 Set D Literacy 2000
5. Irwin, Joan M. and Thorn, Elizabeth A. *"* Colours*"* *Expressways Reading Series*
6. Kuchalla, Susan. *Now I Know Birds.* Troll Associates
7. Lawrence, Lucy. *What Can Fly?* Stage 2 Set A Literacy 2000
8. Martin, Kene. *Busy Birds*. Nelson Language Arts Series
9. Mastin, Colleayn O. *Canadian Birds A-Z*
10. Mazzola, Frank, Jr. *Counting is for the Birds*
11. Meadows, Graham. *Nests* Stage 2 Set C Literacy 2000
12. Noonan, Dianna. *My Nest* Celebration Press
13. Rockwell, Anne. *Our Yard is Full of Birds*
14. Stanley, Diane. *Birdsong Lullaby.* William Morrow & Company. 1988
15. Wildsmith, Brian. *The Nest*

II. Websites

1. www.simplyscience.com
2. www.proteacher.com
3. www.cprc.uregina.ca/pecos/wildlife
4. www.nornet.on.ca/~bsc/pfw.htm

Nests are Neat

Rouse Interest

SASKATOON NATURAL GRASSLANDS

Nesting
Black-capped Chickadee
Brown Thrasher
Black-billed Magpie
Cedar Waxwing
Gray Catbird
House Wren
Least Flycatcher
Mourning Dove
Northern Oriole
Warbling Vireo
Yellow Warbler
American Robin
American Goldfinch

Probably Nesting
Eastern Kingbird
Brewer's Blackbird
Brown-headed Cowbird
Clay-coloured Sparrow
Vesper Sparrow
Western Meadowlark
Swainson's Hawk
Marsh Hawk

Storytelling: Baby Bird Story

While listening to a story, students will visualize the birth of baby birds. Ahead of time, teacher prepares paper (8 1/2x 11"), scissors, black marker, and a baby bird puppet or toy.

(Sit with baby bird model concealed in folds of clothing or within a cloth on lap.) One spring day a female bird and a male bird built a nest. They spent hours carrying nest materials--grasses, string, and twigs--high up into the branch of a tree. The finished nest looked like this. (Fold paper lengthwise and cut a semi-circle.) The female sat down on the nest and laid a beautiful egg. The egg was shaped like this. (Unfold nest and draw large egg shape inside bottom fold). The egg was far down inside the nest where it would be hidden from enemies. (Fold back into nest shape again.) Now the mother bird had to sit on the egg to keep it warm. She had to incubate the egg during hot days, cold days, and rainy days. Two little black bugs came along and helped her to pass the time. (Draw two black dots, one on either side of the nest, near the top.) The bugs talked with mother bird and made the days more pleasant. At last the mother bird heard a tapping noise. She looked down and saw cracks in the egg. (Cut zig-zags across bottom of nest to coincide with egg shape within.) The cracks got bigger and bigger. (Open nest to show cracks.) Finally (set nest in lap) the egg broke and out came--guess what? (Pause here.) A baby bird!

Create Bird Nesting Bags

Students will help nesting birds by providing materials. Ahead of time, collect mesh fruit and vegetable bags, along with pieces of yarn, thread, string, pet hair, hair from hairbrushes, fabric scraps, cotton balls, bits of facial tissue. Cut bags into lengths so each pair of students has one. Students loosely stuff materials into bags. They use rubber bands to secure both ends. Bend paperclip to hook through band and hang over twigs as high as possible in trees, shrubs and hedges. Birds will pull out nesting materials through mesh openings. Students may photograph the bags and then check a week later to determine whether the materials have been removed.

Nests are Neat

Relate

Bird Nesting Hike

Students will look for Grassland nests and record locations as they hike the trails. Look in trees, shrubs and on the ground. Take along a few "bird nesting" bags as gifts for the birds.

Perch of Perception

(See *Keepers of the Animals*, pp. 56-147.)

During the course of two field trips, students will realize the value of perching places as they "borrow" bird habitat and thank birds for the priviledge of using their space.

The teacher needs to take a preparatory site visit to find a vegetated area in school grounds, nearby park or in the Grasslands buffer zone that will accommodate the class and volunteers to ensure a 1:3 ratio. Have ready a bird call to later use for signaling students. For the second visit have ready a collection of small stones, pinecones, shells, leaves, and twigs for students who forget their own "gifts".

Trip 1.

As students are seated in a circle in the selected area, tell them that in a few minutes they will find a dry, comfortable place to sit with two other students and one adult. Once settled, they are to imagine themselves as birds perched in a tree, shrub, or on the ground watching and listening closely to everything that is happening around them. Demonstrate the bird call you will use to signal them to return to the circle to share their experiences. Advise them that they will return to their "perches" another day at which time they will leave a thank you gift. Back in the classroom, students write notes home or in planners to bring a natural object in a bag labeled with their name: a pinecone, a stone, a leaf, a shell, etc.

Trip 2.

Repeat activity as in Trip 1. This time, ask students to ask permission of the perching spots before sitting down. Advise them that after this second watching and listening time, you will signal for them leave their gift at their places to say "thank you" for the solitude and the experience the perches have given them. Share thoughts and feelings within the sharing circle.

Materials

camera, nesting material bags, natural objects: small stones, twigs, pinecones, shells

Visitors

Barn Swallow

Northern Flicker

Northern Harrier

Purple Martin

Red-tailed Hawk

Tree Swallow

Cooper's Hawk

Western Kingbird

Nests are Neat

Conduct a variety of directed activities with students during each return visit. Suggested activities are:

1. To draw pictures of their "Perches of Perception" including themselves and their group.

2. To draw pictures of other natural things they see, such as ants crawling up a tree or trees in the distance.

3. To make models of the birds and animals (using natural objects) that they hear and see at their perches. Hang them from ceiling strings in the classroom.

4. To keep a journal of events at "Perches of Perception". Write or draw a little in this journal during each visit. Read or look over journal entries in class or at home and add reflected thoughts.

5. During the spring and early summer, bring pieces of yarn to arrange around perches or push into cracks and crevices of loose bark and branches. During the next visit, note whether these "gifts" are still there. Later, search for nests in the area and look for string and yarn in them.

6. To leave sunflower seeds, unsalted nut pieces, or chunks of soft fruit at perch sites. (Emphasize that this is a one-time gift for the animals and is not meant to supplement their diets).

7. To get into a comfortable position and sit perfectly still and silent for one entire visit. When shifting position is necessary, move *very* slowly so that a watching animal would not notice. The reward for "naturalizing", or becoming part of nature, is that birds, insects and other animals will accept visitors as part of their surroundings. Watch the ground around the perch during this time to notice any animals passing by. Tell students to imagine themselves as perching birds. What do they see? What do they hear? Allow time for recording experiences in journals.

Nests are Neat

Wingspan Wonders

Students will compare their "armspans" to the wingspan of a Swainson's Hawk. Divide the group into four teams and give each team a roll of masking tape and a metre stick. Assign each team a different wall on which to mark the hawk's wingspan: 2.1 metres (7 feet). Students mark the span with two small pieces of tape, one at each "wing tip". One by one, students compare their armspans to the hawk's as they hold their outstretched arms between the tape markers.

Materials
Masking tape,
Metre stick

Measurements of other birds students may sight on land or in flight over Grasslands:

American White Pelican	2.8 m wingspan (approx 108")
Canada Goose	up to 178 cm wingspan (25-45")
Franklin's Gull	91 cm wingspan (36")
Common Mallard	58 cm long body (23")
Western Meadowlark	24 cm long body (9.5")
Clay-coloured Sparrow	13-14 cm long body (5.5")

Reflect

Make "Home Tweet Home"

Students will construct bird nests to accommodate one of the birds listed on p. 80. Allow two to three hours to complete his composition activity. To set the mood, read P.D. Eastman's, *The Best Nest* (Randon House, Inc.) which brings home the old adage that "home is where the heart is". Students make their bird first, using field guides and other sources of pictures and descriptions, and then construct nests from a variety of materials.

Materials
foolscap, pencils, paper and fabric scraps, strawberry baskets, feathers, small boxes, yarn, ribbon, string, clay, cotton, dried grasses, bird books, glue, scissors.

Perch Adventures

Students will combine journal entries, artwork, and recordings of memorable events to compose and/or illustrate a story of their perch adventures.

Prairie Grandparents

Background Information

This lesson is about rocks, the old ones, the grandparents of us all. It focuses on the formation of the Grasslands, the passage of the glaciers and the rocks themselves.

To read more about the different types of rocks and how they were formed, read "Pebbles and Rocks", *Hands-on-Nature*, P.258.

Lesson Information

Grade 3
Seasons: Spring, Fall

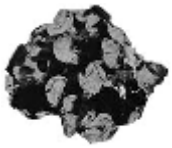
Since our focus group is grade 3, activities will focus on creating interest and care for rocks while understanding how they came to be. Rocks predate humans and form "the foundation, both literally and figuratively, of our entire civilization and of all life on Earth". (Hands-On-Nature, p.259)

> "The Lakota (Sioux) people say that in the beginning everything was in the mind of Wakan-Tanka. All things which were to be, existed only as spirits. Those spirits moved about in space seeking a place to manifest themselves. They traveled until they reached the sun, but it was not a good place for creation to begin because it was too hot. Finally they came to the Earth, which was without life and covered with the great waters. There was no dry land at all for life to begin upon. But then, out of the waters, a great burning rock rose up. It made the dry land appear, and the clouds formed from the steam it created. Then the life on Earth could begin. So it is that the rock is called Tunka-shila, "Grandfather Rock", for it is the oldest one. Because of that, the rocks must be respected. In the sweat lodge, when the water strikes the heated stones and that mist rises once again, it brings back the moment of creation as the people in the lodge sing to Tunka-shila, the Grandfather, the old one."
>
> From *Keepers of the Earth,* page 57

Objectives

To arouse interest in rocks through piquing curiosity and teaching how to care for rocks

To learn about glaciers and how they affected prairie formation



Note the parallels between the Lakota's old myth of creation and basic scientific geological concepts. As the story in *Keepers of the Earth* tells us, Grandfather Rock is burning when he rises from the ocean, the same way rocks from the center of the Earth rise in the form of lava, cooling off and hardening at the surface. Science reinforces the theory that over four billion years ago the hot liquefied rock of the Earth's crust emitted water vapor that formed the clouds and eventually fell to earth as rain. In rocks we can see the origin of the water cycle.

Prairie Grandparents

The formation of the prairies, though, is an event more recent than the one above. Prairies are actually one of the most recently developed ecosystems in North America, formed after the period of Pleistocene glaciation.

The Ice Age began 2.5 million years ago and ended approximately 10,000 years ago. During this period, major glaciers covered the upper part of North America. Massive walls of ice pushed and flattened the Earth's surface, moving south under the impetus of their own weight.

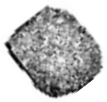
As the glaciers moved southward they accumulated large amounts of debris such as rocks, trees, and other organic materials. Glacial action crushed and ground these materials, and in the process created soil. Much of the topsoil that once covered the Canadian Shield area was transported south into southern Canada and the United States.

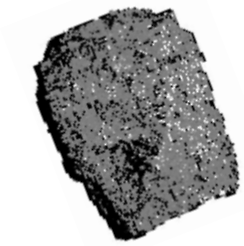
As the climate warmed, the glaciers began to melt. The resulting force of flowing water carved today's river valleys. The waters also carried vast amounts of sand and gravel, which settled into the river floor when the river current slowed. As the glaciers produced less water, rivers became smaller and some even dried up, leaving debris exposed to the elements. This process formed a mixture of rich and sandy soils, including those in the Saskatoon Natural Grasslands area.

Eventually the climate warmed. Through a delicate and continuous evolutionary process (which you can read more about in "A Grassland Story", pp.86-87 of this guide), grasses began to grow in the fertile soil.

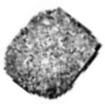
Then prairies were born.

For more detailed information about glaciation in Saskatchewan, read "Glacial and Post-Glacial History near Saskatoon" by Stan Rowe, which is printed in the *Saskatoon Natural Grasslands – Field Trip – Teacher's Reference Package* in the SNG kit, prepared by Dee Cole, Extension Division, University of Saskatchewan.





Prairie Grandparents



Materials

Grassland Story to read to children, Rocks and Minerals Kit to show the students, different types of rocks before you start the story

Resources:

Caduto, Michael J. and Bruchac, Joseph. *Keepers of the Earth*. Saskatoon, SK: Fifth House Publishers, 1991

Lingelbach, Purcell and Sawyer. *Hands-On Nature*. Woodstock,Vermont: Vermont Institute of Natural Science, 2000

Montana State University, *Project Wet – Curriculum & Activity Guide,* Bozeman, Montana:, 1995

http://www.inhs.uiuc.edu/~kenr/prairieformation.html

http://volcano.und.nodak.edu/vwdocs/vwlessons/lessons/Slideshow/Slideindex.html

http://www.atozteacherstuff.com/lessons/RocksUnit.shtml

Saskatoon Natural Grasslands – Field Trip – Teacher's Reference Package, 2000

Rocks and Minerals Kit

Rouse Interest

Grassland Story ***(continued on p. 87)***

Students will identify with the formation of the Grasslands. The teacher sits in a circle with the class and passes around rock and mineral samples from the Eco-kit as he/she reads this story about the role of glaciers from the last Ice Age and how they carried and created rocks that the students will experience in the Grasslands.

About twelve thousand years ago, an ice cube as big as a mountain began to move towards Saskatchewan. What do we call an ice cube as big as a mountain? Oh yes, a glacier. A glacier moved down from the north. Along the way, it carried and pushed and shoved many rocks all the way to the Saskatoon Natural Grassland. The glacier ground the rocks into different sizes: a fine powder, pebbles small enough to hold in your hand and some the size of stepping stones. It also left some that were so large that they formed deep depressions when removed. The fine powder became the first soil for plants, but more soil was needed. Wind, frost, air, and water all helped to break the rocks into soil. Tiny growths called lichens produced mild acids that broke down more rock into soil. After hundreds of years there was enough soil for other plants to grow. As plants grew, died, and decayed, they formed more soil, which enabled grasses, shrubs and even trees to take root. When the class visits the Grasslands, we will see rock, lichens, depressions, and examples of rock breaking up to form soil.

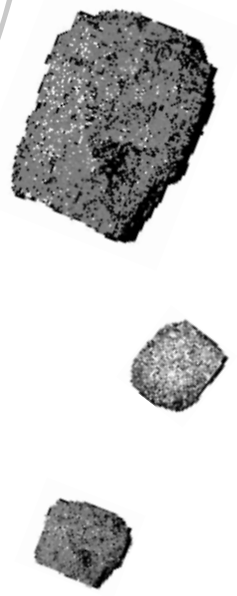
Prairie Grandparents

Plants need food and energy to grow. They get the food from soil and water and their energy from the sun. Plants attract insects, which eat the plants to get energy. Insects attract birds, which eat the insects to get their energy. Birds become food for other animals. Food and energy chains are formed, with energy going from the sun to plants to insects to birds and to mammals. As human animals, we get our energy from plants that we eat, such as beans, peas, and carrots. We also eat meat from plant-eating animals such as pigs and chickens.

Picture the prairie as a big energy factory, depended upon by all the plants and animals that live there. Although it took hundreds of years for nature to build this factory, it could be destroyed in a very short time if we do not preserve and care for it.

From *Saskatoon Natural Grasslands Field Trip Teachers' Reference Package.* Apapted from Gordon Silversides' story.

(This story goes well beyond the geological formation of the prairies, but it is important for students to understand how the rock and soil story eventually gets connected to the animals, plants and us.)



A Rock's Journey

Students will learn about how rocks change and age. Read *Earthsteps – A Rock's Journey through Time*, by Diane Spickert (in Edu-kit). This ties in well with the Relate activity, "Being a Rock".

Materials
The Earthsteps book from Edu-kit

Build a Glacier

In four small groups, students will simulate glaciers in action. The day before this activity, fill four one-liter milk cartons with water and freeze. Fill four large cake pans with soil and sand. Students may create individual glaciers by freezing half-cups of water in paper cups.

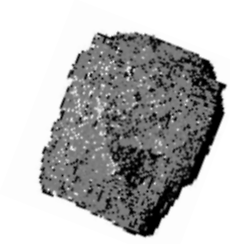
Materials
Large cake pans, soil, sand, milk cartons, paper cups, water

The next day, students push soil and sand to one end of the pan to represent the land before the glaciers arrived. After peeling cups and cartons to expose ice blocks, students press the ice into the mounds of soil and sand. Prop up the soil/ice end of the pan slightly. Check periodically the changes caused by the melting ice. Pay attention to soil movement, the formation of lakes and rivers, etc.

Prairie Grandparents

Relate

Finding your rock



Materials

As many different rocks as there are students, preferably of varying sizes, shapes, textures, and colours

Students will identify a rock by its weight and texture, not by its appearance. This activity can be done on the playground or in the SNG buffer zone. The teacher provides rocks of different shapes and textures, one per student. Students sit in a circle and close their eyes. Give each student a rock to examine carefully. Pass all rocks around the circle while everyone keeps their eyes closed. Ask class to examine each rock as it passes through their hands and advise them when to pass the rock on to the next person. The passing stops when students recognize their own rock by its texture and size. Students raise hands when they recognize their original rocks.

Discuss what makes each rock unique.

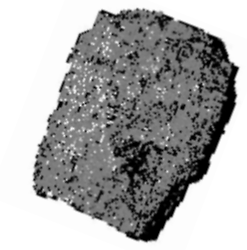
(If rocks are labeled, students can use their rocks again during the Reflect activity, *Pet Rock Promises*.)

Being a rock

Students will improve their visual memories and powers of concentration as they pay close attention to rocks during a Grasslands hike and as they listen to a story. As they walk, they are to keep a mental count and also remember characteristics of the rocks they see. In one of the designated areas, sit in a circle to tally up the numbers and characteristics. The teacher challenges students to guess the age of the rocks and then share the fact that their age exceeds that of any living being. Remind them that native groups in North America often call rocks "grandfather" and "grandmother".

Materials

Copy of 'Being a Rock' story to take with you to the grasslands



Students then sit or lay down comfortably in the way they imagine a rock would if it knew it would be on the same spot for thousands of years. Tell them to close their eyes and pay attention to what you will tell them. This is an imagination game and they must follow the instructions for it to work.

First, tell them to imagine they are rocks and that this is a warm day in fall (or cool spring day, depending upon the season and the weather). Tell the rocks what they are seeing, feeling, hearing, and smelling:

You are enjoying a quiet day with breezes blowing over you and the sun warming you. Suddenly a noise like thunder startles you. The ground shakes. You are not afraid because you are a rock, and rocks are strong.

Prairie Grandparents

Soon the Grasslands and the sky are flooded with sound. You know from experience that a herd of bison makes the noise. Thousands of big and small hooves run past. Flashes of dark brown and cinnamon-coloured fur mix with clouds of dust, which tickle you. Gradually the bison slow down. They stop just ahead of you and after the dust settles, you see them clearly--giant horned beasts of the prairie.

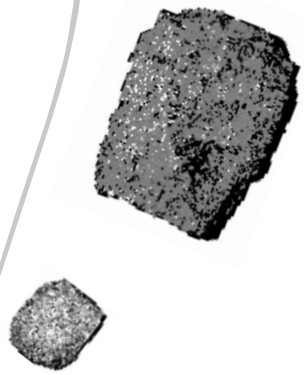
You are a rock so you can look in every direction, like any other rock. Rocks do not have eyes, but they can sense what they see.

Some members of the herd graze nearby. Others feel itchy and find a big rock to rub against. Your friends, the biggest rocks, like the feeling of the powerful animals rubbing against them. Their fur is soft and the animals are warm. After they have all rubbed, they walk away, slowly now, always grazing. You see that the side of the rubbing rock is shiny from being rubbed against by so many bison for so many years.

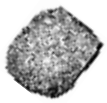
You love the feel of the sun on you and the breezes wafting by. Other animals appear and you wonder if they are following the herd of bison, but at a distance. Proghorn antelope jump over you. Wolves, coyotes, and big prairie grizzlies have paraded in front of you for so many years that they have scraped a path--a path that other animals will use for years to come. You watch the sunset and feel the coolness of the evening settle in.

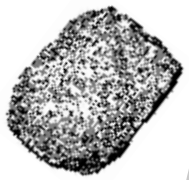
Many years pass, and while you are again enjoying the warm sun, you suddenly hear laughter. Two children with long shinny black braids run along the path in front of you. Just behind them many more people come. It is early spring and you know that people come from the valleys to spend warm, breezy summers here in the Grasslands. As the people set up camp, you watch the adults loosen some of your rock friends from the soil and place them around the edges of their teepi skins to hold them in place. Your friends are happy to be arranged in a circle, which will remain after the campers leave. The adults prepare the bedding and dig fire pits which they line with small rocks and pile with buffalo chips and dead twigs. Fires are lit from the sparks of your flint friends, and water boils for cooking stew in pottery bowls. Hmmmm. It smells good. The children help and then play. They draw designs in the sandy soil and find strips of leather string to play string games like cat's cradle. So much to watch! In the cool evening, the adults transfer your still-warm rock friends from the fire pits to heat up their sweat lodge. The next day some adults teach the children to carve pieces of your friends into arrowheads and other tools. You are not afraid if they use you because you know the campers will thank you for making their lives easier.

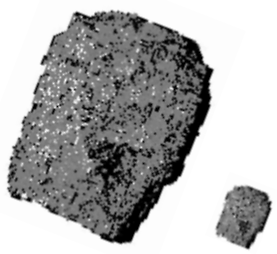
(Ask all students to sit up and open eyes.)



Prairie Grandparents







A few hundred years later, many seasons have passed and you sit in the same spot. You miss feeling the vibrations from the thundering bison hooves and you wonder where they have gone. You also don't see the people anymore, and you wonder where they have gone. When you hear voices in the distance your heart fills with joy. As they get closer, you see they are different.

Their skin is lighter, their hair is of many colours, and they travel on animals. These animals are similar to bison but much smaller. The new people set up camp. They also use many of your friends, but they do not ask for permission and do not say thank you, but you are not afraid. You are the same, and they are different and do not know the old ways. You do not mind when one man sits on you to rest. He is heavy, but you are strong.

(All students lay down and close eyes again.)

Another hundred years pass, and they have been the busiest of your life. As a rock you have seen your share of change, but never this fast. The new people build permanent camps, pick rocks, plow the land, and raise strange animals. The land changes from grassy treed slopes to flat fields planted with grain. You are thinking and watching--rocks think and watch a lot, since they have little else to do--and are enjoying the sun, when a group of men in funny round hats arrive. They talk about taking your largest rock friends away to build a university, a place for learning. You have a funny feeling…but you are not afraid. You are a rock, right? But this time it's different. The people use big machines to dig up and haul away your friends. For days, weeks and months you watch, but never hear anyone say please or thank you. You feel sad.

Years pass and the changes never stop. You learned to feel afraid even though you are a rock. Workers have taken many of your friends and have blown up others with dynamite. They have built shelters that shade you from the loving sun. You watch and feel sad.

Then one day a group of people walk out of their shelter towards you. You are a rock, but you shiver. You wish you were not a rock and had eyes that could close. As they come closer, you notice that they look different from the workers. They don't wear funny round hats. Three are children and two are adults. They stop just in front of you and an adult says in a soft voice, "Children, we have now entered a protected area called the Saskatoon Natural Grasslands. This is a grandmother rock. It has been here much longer than any of us. It has seen much more than what we could ever imagine…" The children kneel down and touch you and gently stroke the lichens that grow on you. The warmth of the children's fingers matches the warmth in their eyes. Your heart fills with joy as they treat you like an object of value. At last you are living again amongst beings that love you. You are sure that if you had human eyes, that tears would be rolling down your sides and soaking into the earth.

Reflect

Rock petroglyphs and pictographs

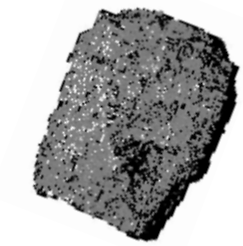
Students will draw on paper their own story in the form of petroglyphs and pictographs. If flat rocks are available, they can transfer the drawings to the rocks and paint them. Their subject might be an experience they had during the guided "Being a rock" activity. Offer students charcoal and conte crayon, natural materials for drawing. Keep drawings simple as in real pictographs. Include an element of the SNG.

Materials

Pictograph pictures, flat rocks, non-toxic water based paints, charcoal, conté crayons, or coloured pastels

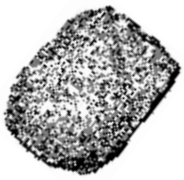
Send a note home to parents to ask whether they have flagstones in their gardens which their children may paint at school.

Show information from the following websites as examples of petroglyphs and pictographs found in Saskatchewan or in Western North America.
http://www.lights.com/waterways/arch/rockart.htm
http://emuseum.mnsu.edu/prehistory/northamerica/linked/rockart.html
http://www.asu.edu/clas/anthropology/dvrac/resources/locality1.html
http://aztec.asu.edu/aznha/vbarv/vbarv.html
http://www.pictographcave.org/educate/activities.html



After printing out pictures from websites, file them in this guide for future reference.

All over the world drawings of ancient cultures represent the interaction of animals with human beings and the elements (water, earth, sunshine, air). The earliest petroglyphs were carved into steep rock cliffsides. After cultures discovered that they could create coloured mixtures from clay and plants (pigments), they painted them.



Pet Rock Promises

Students will find stability in the symbol of the rock. Students name their rocks, take care of them and treat them like special friends. Use labeled rocks from the *Finding Your rock* activity, or allow them to find a rock they like from the buffer zone near the SNG (not from the Grasslands).

Materials

Rocks from Finding your rock or rocks that students bring

The rock is a little piece of the Grasslands that they will have with them always to remind them to take care of everything on the planet, because all natural things are connected. In return, the rock will be there for them when they need it. It is strong and will always keep them company, a reminder that they are also strong and part of the rock's natural world.

Prairie Symphony Webquest

Lesson Information

Grade 4

Lessons for this section will soon be found online as Webquest, Grassland food webs. In the meantime check out the *Endangered Animals Webquest* on the Saskatoon Public School Board website, created by Judy Byers.

Model the drawing of a food web for students. Copy it below and transfer to an overhead transparency or large chart paper. If the website lessons are not yet available, repeat selected lessons from Prairie Grandparents, pp.84-91 in this guide.

Natural Soundscapes

Background Information

Humans have five senses: sight, hearing, taste, touch, and smell. We depend mostly upon sight and sound. Dogs rely primarily on their sense of smell for identification of people and places in their lives.

Sound is crucial to many animals. For example, the bat depends on its excellent hearing to locate its prey through echolocation. Birdsongs attract mates and establish territory. Insects use sound to attract, locate, and identify other members of their species. Other animals, such as the Richardson's Ground Squirrel, use sound for alerting each other to danger and to keep in touch with members of their family group. Begging for food is done by sound production as well as behavior. Coyotes and other members of the dog family growl and snarl to communicate anger and superiority.

When one takes the opportunity to be silent for a whole minute, one will be surprised at the myriad sounds one can hear. Nature not only blesses us with beautiful sights, but the natural world is filled with a symphony of sounds. By commiting ourselves to being still and listening we become more in tune with the natural rhythms around us as well as to our own heartbeat. Maybe then we can make the connection between a healthy heartbeat and the wellness of the planet.

Lesson Information

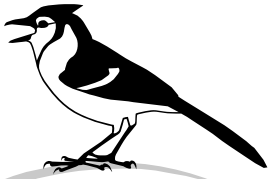
Grade 5
Season: Spring

Objectives

To appreciate the sounds of nature

To understand ways that animals communicate

To identify birds by their sounds



Natural Soundscapes

Rouse Interest

Song of the Grass

Students will memorize the poem, "Song of the Grass" from *Exploring the Grasslands - Understanding an Ecosystem*, p. 15 (in Edu-kit) and build upon it to create an art piece. Invite students to: dramatize the poem; revise the words to create song lyrics and set them to a familiar melody; write their own score and/or perform, using instruments and sound effects.

"Calling all Mates"

Materials

Bird song tape, Birding By Ear CD

Students will role play to better understand animal communication. Discuss how and why animals communicate. For example, in spring Robins need to communicate to attract a mate and to mark their territory. Students partner up as Grassland birds, mammals, and insects. The object of the game is for one partner to make the characteristic sound while the other tries to find that partner by listening only. The "silent" partner will be blindfolded. After students and teacher research field guides and recordings to determine the sounds various creatures make, students are ready for the game.

Divide the class into two teams, half are participants and half are observers. Each consists of pairs of Grassland birds, mammals, and insects. One team blindfolds members of the other team and carefully distributes them around the playing area (gym, playground or buffer zone), and then sits quietly to observe. "Silent" partners must focus on one sound in the midst of many, as animals in nature must do. Teacher signals when half of the "verbal" partnership should begin making their sounds. After their "silent" partners move toward the sound that identifies their "mate" and thier mate confirms this, they sit down together until all are paired up. After observers share their comments, and participants their experiences, switch groups. If there is time to repeat this activity, the teacher may wish to time each group. Many animals return to the same location each year, restablish their territory, and once again communicate with their individual voices.

Bird Song Bingo

Materials

Bird Bingo sheets, scissors, bristol board or cardboard, glue, plastic containers, oil sunflower seeds, empty yogurt containers, Bird song tape, Birding By Ear CD

Students will learn bird calls as they play Bingo. In preparation, the teacher tapes the CD, "Birding by Ear," (songs of common grassland birds, in Edu-kit) and cuts out the narration or uses the Edu-kit tape.

First students make "Bird Song Bingo" cards. Photocopy in colour five copies of the bingo bird card on page 96 of this guide and post around the room. Give each student a copy of the Bird Song Bingo activity sheet (reproducible sheet available in the appendix), which they colour according to each bird's picture on the posted guide sheets. After colouring, students cut along the lines to separate the bird pictures and paste them onto a sheet of bristol board or cardboard in random order, using the same square arrangement of four across and four up and down. They should paste the bird name

and song list at the bottom of their cards for reference during the game. An alternative is to use the five reproduced Bird Bingo Cards and have students play in groups. Pass out (unsalted) oil sunflower seeds for markers.

Play the tape of bird songs, pausing after each. Students place a sunflower seed on the bird they think is singing. (For reference, use p. 97 to keep a master list of bird names that matches the order of the songs played when a student 'bingos'.)

When students successfully fill a row up or down, across or diagonally, they receive a handful of sunflower seeds to add to their seed container. When class hikes in the grasslands they scatter them for the birds).

Once students are familiar with bird songs, ask for volunteers to be bingo callers by mimicing each bird song, rather than playing the tape.

Adapted from *Keepers of the Animals* by M. Caduto and J. Bruchac

NOTE:
Oil sunflower seeds are the most popular choice for a number of birds. They are available in the pet department of grocery and nursery stores.

Materials
Rope, blindfolds

Relate

Hey...Be Quiet Already!

Students will participate in a silent, guided, trust walk for the purpose of tuning into Nature's symphony. To be effective this listening activity requires sustained silence. Allow time to practice on a level area of schoolgrounds first so students can become comfortable with the situation. Review birdsong recordings before going into Grasslands.

Teacher leads blindfolded students along a Grasslands or buffer zone trail as they hold onto a common rope (or hold hands in a single line) to a designated spot where they can lay down in the grass. Still blindfolded, students lie still and remain quiet as they listen for Nature's sounds. After a designated length of time, tell students to remove blindfolds, sit in a circle and share their experiences. Why do blindfolds help everyone to focus?

Materials
digital cameras, video cameras, bird song tape and CD

Reflect

Nature Music Video

Students take digital photos and/or videos during a Grasslands walk and then combine with the bird song tape or CD to create a Power Point presentation or sound video.

Bird Bingo Card

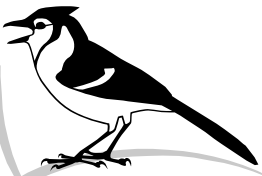
Bird	Song
Black-Capped Chickadee	"Chick-a-dee-dee-dee"
Grey Catbird	"mew, mew, mew"
Duck	"quack, quack, quack"
Yellow Warbler	"sweet sweet SWEET I'm so SWEEET"
Robin	"cheerily, cheer-UP-CHEERIO"
Killdeer	"killdeer, killdeer"
Blue Jay	"JAY, JAY, JAY"
Swainson's Hawk	"keeeeer, keeeeer"
Crow	"Caw, Caw, Caw"
Magpie	"Mag!" or "Chuck"
Mourning Dove	"oowoo-woo-woo-woo"

Bird	Song
Spotted Towhee	"drink-drink-your-tea-ee-ee-ee"
Great Horned Owl	"hoo, hoohoo, hoo, hoo"
Meadowlark	7-10 gurgling flute-like notes
Common Redpoll	a rattling "chut-chut-chut-chut"
Bohemian Waxwing	a high thin lisp "zee, zee, zee"
Mountain Bluebird	"tru-lee, tru-lee"
Vesper Sparrow	"baa baa black sheep have you any wool" 4 long 4 quick notes
Yellow-shafted Flicker	loud, rapid "wik-wik-wik-wik" and wick-er, wick-er, wick-er
American Goldfinch	"per-chik-o-ree"
Eastern Kingbird	"dzeet, dzeet, dzeet"
Clay-coloured sparrow	"bzzz, bzzzz, bzzzz"

Natural Soundscapes

Bird Bingo Game
Teacher's Master List
Order of Bird Songs on Cassette

1	Black-Capped Chickadee	"Chick-a-dee-dee-dee"
2	Canada Goose	"Honk, Honk, Honk"
3	Common Mallard Duck	"Quack, quack, quack"
4	Yellow Warbler	"Sweet sweet SWEET, I'm so SWEET"
5	American Robin	"cheerily, cheer-up- CHEERIO"
6	Blue Jay	"Jay, Jay, Jay"
7	Swainson's Hawk	"keeeeer, keeeeer"
8	Spotted Towhee	"drink-drink-your-tea-ee-ee-ee"
9	Great Horned Owl	"hoo, hoohoo, hoo,hoo"
10	Meadowlark	7-10 gurgling flute-like notes
11	Common Redpoll	a rattling "chut-chut-chut-chut"
12	Bohemian Waxwing	a high thin lisp "zee, zee, zee"
13	Yellow-shafted flicker	"Kee Kee Kee Kee Kee"
14	Eastern Kingbird	"dzeet, dzeet, dzeet"
15	American Goldfinch	"per-chik--o-ree" and "swee" notes
16	Brown Headed Cowbird	squeaky hinge "glup, glup zing"
17	Vesper Sparrow	"baa baa black sheep have you any wool" 4 long, 4 short
18	Mourning Dove	"oowoo-woo-woo-woo"
19	Killdeer	"killdeer, killdeer, killdeer, killdeer"



Web Creations

Lesson Information
Grade Six
Season: Fall or Spring

Background Information

Web Creations deals with the interconnectedness of life in the Grasslands. The Edu-kit contains the following valuable resources to peruse for detailed background information: *America's Prairies and Grasslands - Guide to Plants and Animals, The Grasslands Fieldguide* and *Natural Neighbours.*

The activities in this lesson strive to awaken an appreciation for the interdependency of the diverse life forms on the Grasslands and the importance of our role in habitat protection. For background information on biodiversity, human impact, and conservation, see *Habitat and Biodiversity.*

Student Objectives

1. To become familiar with a variety of grassland plants and animals.
2. To understand the importance of adequate habitat for survival.
3. To understand the concepts of the food chain and the food web.
4. To appreciate how all things in nature are interconnected.
5. To foster a desire to protect and care for the grasslands and its wildlife.

Rouse Interest

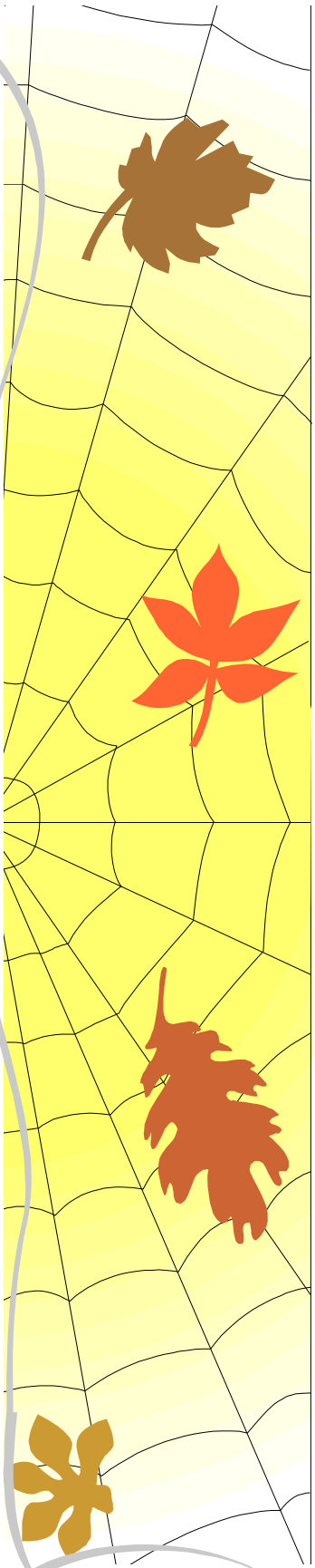
Students will familiarize themselves with four members of the group of Grassland mammals as they complete a predator/prey maze (p.98b).

Help "Richard" the ground squirrel through the maze to find food. Watch out for predators!

Congratulations! You helped "Richard" the ground squirrel escape from the predators!

Notes

Web Creations



Grasslands "Who am I?"

Students will identify a mystery plant or animal that has been pinned to their backs without their knowing its identity. Attach a grassland flora or fauna card (in Edu-kit) to each student's back. Model the procedure. Ask a student to attach a card to your back and coach students to ask first if you are a plant or an animal, followed by specific yes/no questions about diet, mobility (legs, wings), size, habitat, etc.

Once students guess their own plant or animal, they return to their desks with their cards as they watch the following video and do the "Weaving a Grassland Web" activity.

Tread Softly Video

Students will be introduced to the many species that choose to live in the Grasslands habitat as they watch the "Tread Softly" video (in Edu-kit). Alert students to watch for the plant or animal that was pictured on their Who am I? cards as well as for other animals that depend upon that plant or animal.

The following are some questions to follow up the video:

How many of you saw the plant or animal you used in the game?

What elements of the Grasslands habitat contribute to your plant or animal's survival? In what ways?

Cite examples of predator/prey relationships you saw.

Would you expect to see all of these plants and animals on one hike? Why or why not?

Wildlife Research

Students research the above plant or animal or another of their choice. From their notes they write and illustrate a picture book to read to care partners. Use books from the Edu-kit, Internet, and school resource centre.

Web Creations

Relate

Materials
Grassland postcards from Edu-kit, long length of yarn rolled into a ball

Weaving a Grassland Web Story

Students will create a web of life as they listen to a story. Each chooses one of the 33 Grassland characters typed in bold print within the story below (see corresponding postcards in Edu-kit). Give the sun or spider character a ball of yarn. Students form a circle around him or her, who passes the ball to each of the other characters as its name is read by the teacher in the following story. Some characters are mentioned more than once.

*The **sun** rises on the prairie horizon. At first light, its rays reflect dew on the **grass**. A **Meadowlark** sings from a lichen-covered rock. A **Ruffed Grouse** makes a clucking sound among the rosehips, where it feeds on buds and **berries**. A **Red Fox** moves down the path towards the sound. A **Meadow Vole** scurries across the path into a tuft of thick **fescue grass**. The **fox** pounces in hopes of a quick snack, but misses. A **White Sulpher Butterfly** lands on a **Prairie Cone Flower**, but is soon displaced by a **Honeybee** that buzzes in to sip nectar. Pollen, which sticks to the bee's legs, drops off into its next flower, pollinating it and and readying it to make **seeds**. A **Black-capped Chickadee** sings cheerily from a thistle and feeds on its seeds. A **Field Mouse** snatches up seeds that fall from the chickadee's perch. A **Weasel** seizes the opportunity and snatches the mouse before scurrying into an abandoned burrow. A **Richardson's Ground Squirrel** peaks out of its own burrow and races to another. A soaring **Swainson's hawk** swoops down, talons outstretched, to grab the ground squirrel, which barely reaches its burrow. As the **hawk** lands, it spies a **Garter Snake** slithering through the **Grama Grass**. The **hawk** grabs the **snake** and flies off to a nearby **Poplar Tree** for lunch. The hawk's flight startles a **White-tailed Deer** that has been eating **grass** and twigs. **Grasshoppers** scatter and many are snatched by **Meadowlarks**. A **Coyote** lurks in the shadow of a clump of **Silverberry Bushes**, preparing to stalk a **Jackrabbit**. A **Skunk** scratches in the soil for grubs and insects. A **Chipmunk** paces back and forth on a **Poplar** branch, chattering warnings to the other animals who are about to infringe upon its territory. A flock of **Cedar Waxwings** lands in a **Saskatoonberry bush**. **Children** hiking along the path stop to view them through binoculars. The **Waxwings** take flight, so the children sample the **berries**. A **Tent Caterpillar** is eating the leaves. The children quietly move back to allow another song-bird, an **Ovenbird**, to pick up the **caterpillar** and fly off to its*

Web Creations

*nest in the **grass**. A **raccoon** waddles away after a meal of birds **eggs**. A **badger** emerges from its burrow to chase the **raccoon** but the raccoon takes refuge in a **tree**. It startles a **Great-horned Owl**, but the owl doesn't give a hoot about eating the raccoon. Through the tall **grasses** the owl spots a **hare** leaping away from the **coyote**. The **owl** silently swoops down and catches the **hare**. As the **coyote** trots off, she passes the **badger** digging into **a ground squirrel** burrow. The squirrel, unaware of the predator, munches on **sunflower seeds**. The sun sets. A **bat** darts across the night sky to snatch up **moths** and **mosquitoes**. A **spider** moves outside of the circle to admire the web you student plants and animals have just spun.*

Students stay in place to discuss the following questions: Which animals depend on the grass, on trees, on flowers, seeds, and berries? As the teacher continues the story, students let go of their part of the web when they hear a scenario that negatively affects its character.

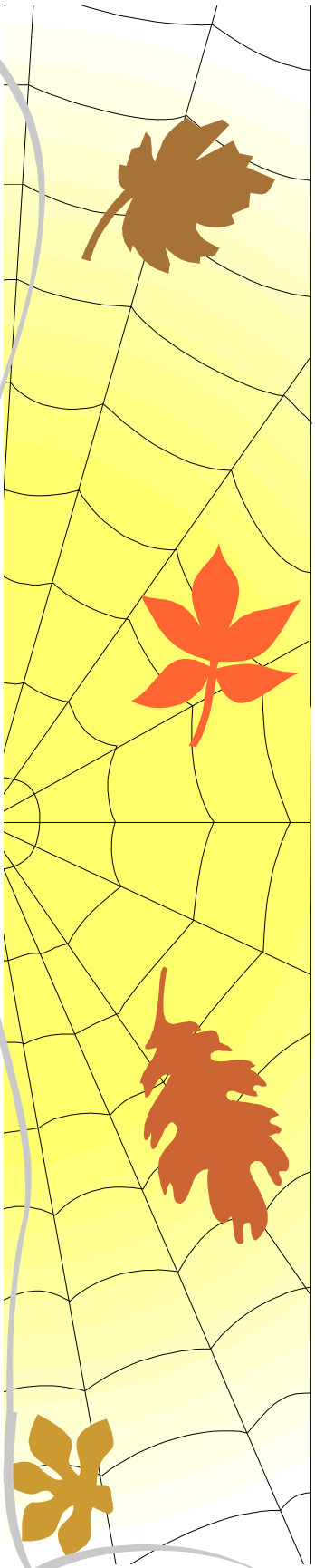
- Drought has caused the prairie to become overpopulated with grasshoppers, which are spilling over to eat nearby garden plants. To kill the hoppers, homeowners spray pesticides, which the wind blows into the Grasslands. The poison kills all crawling and flying insects (pause) and then all animals that depend on them for food.

- The Grasslands and surrounding neighbourhood have become overpopulated with 'gophers' (ground squirrels). Community members hold a gopher derby and give prizes to the person who collects the most 'gopher' tails from the buffer zone. The procedure kills all animals that prey on squirrels.

- The city decides that they need more park space for sports fields, so they plough up the Grassland buffer zone to plant Kentucky Blue Grass. All animals who use the grass for food and shelter move away.

- Because of pressure from dog owners, a new rule is passed that allows dogs to be off their leashes when taken to the grasslands. Mammals must move on to safer territory. Serious hikers take their children to other locations to avoid stepping in dog droppings and to increase their chances of seeing wildlife.

- An obstacle course is created in the Grasslands for a school fun day. Any remaining birds abandon their nests. Remaining mammals abandon their young or take them to another location. Trampled plants and grasses and broken tree branches delay further growth until they have time and conditions in which to recover.



Web Creations

Sound Map

Materials
5x7 file cards,
Pencils,
Clipboards

Students will test their attention spans, increase their auditory awareness and realize a sense of calm as they listen for Nature's sounds and translate their experiences in the form of sound maps. (Consult the following website for a detailed lesson plan: www.sharingnature.com) Students lie down for five minutes in a designated grassy area in the SNG. After the teacher signals, students sit up and silently draw sound maps of what they heard. Regroup into a circle to share maps. Discuss similarities and differences in "data" and modes of expressing sound on paper.

Predator Prey Games

Students will simulate predator/prey games in the school yard to reinforce the concept of interdependence. Review the "Weaving of a Grasslands Web" story. See "Hunter-Hunted" in *Hands-on Nature* for ideas.

Energy Cycle Bingo

Materials
Grassland Bingo Cards
(p.106), pebbles,
rhyming paragraphs
(here and in Edu-kit)

Students work in teams to listen to animal clues and relate them to their researched wildlife. In preparation for this activity, color photocopy the Grassland Bingo Card, p106. Provide one card for each group of 5-6 students. Students make bingo cards as follows: cut along the lines to separate the pictures; paste them onto a sheet of bristol board in random order, but use the same arrangement of four horizontal and four vertical. Within their groups students discuss which wildlife on the bingo squares correspond with the rhyming clues and mark with pebbles. The teacher reads aloud the rhyming paragraphs below (from "Pass the Energy, Please" (in Edu-kit).

(Fox)
Cunning and smart I wait for food to harass.
It could be a vole running under the grass.
After my lunch I'll pace back to the den
to comb my red coat again and again.

(Snake)
Try to find me. I'm hidden in the grass
waiting for mice and insects to pass.
I must shed my skin in order to grow bigger.
Some of my friends are three feet long, I figure!

Web Creations

(Weasel)
My body is skinny, agile and long.
I'm curious, wise, and for my size I'm strong.
I'm not afraid to attack something bigger than me--
a fat gopher, a hare, or even a porcupine in a tree.

To challenge one another, students may create additional rhyming paragraphs based on predator/prey relationships.

Reflect

Spaghetti Tangle

Students will practice problem solving and group communication. Groups of six students stand in a circle facing each other. They reach out and grasp the hands of two different persons. Their goal is to untangle themselves and regain the original circle without letting go of hands. Afterwards, students diiscuss how they might apply their problem-solving experience to conserving the grasslands. One example would be to stay on the trails in respect for wildlife that lives along the edges, such as spiders who build funnel webs among the grass and emerging wildflowers.

Dreamweaver Creations

Students work in pairs to create food webs, using photocopies of the Grassland Food Web on the next page as a guide. They discuss possibilities and draw as many different lines as possible from the sun, to a plant, a herbivore, and then to a carnivore or omnivore. The use of a ruler keeps the web easier to interpret afterwards. An example is shown on p.105. Students reflect on their dreams for the future of the grasslands. (See *Exploring the Grasslands,* pp.114-117 in Edu-kit.) Students construct dreamcatchers using colors and objects that symbolize aspects of their dreams and then write short poems to hang from them. (www.nativetech.org has detailed instructions for this craft.)

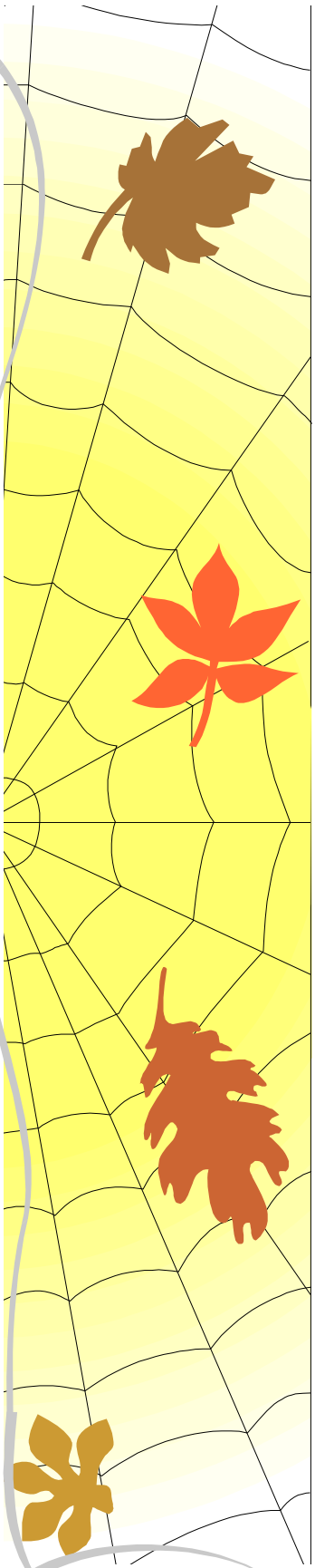
Related Resources

Graves, Eleanor, ed. *Wild, Wild World of Animals: Insects & Spiders.* Time-Life Films. 1977

Habitat and Biodiversity: Teacher Resource Guide, Dale Seymour Publications, Orangeburg, NY. 1998

McKinney, B.S. *Pass the Energy, Please.* Dawn Publications, Nevada City, CA. 1999

World Wildlife Fund. *Windows on the Wild: Biodiversity Basics: An Educator's Guide to Exploring the Web of Life.* Washington, DC. 1997



Web Creations

Grassland Food Web

Grassland Food Web

(possible connections)

Grassland Bingo Card

Endangered Animals

Background Information

Read to class: Populations of many native species suffered greatly during the settlement of the prairies. Over 75% of the prairie biome has been altered from its original state, a fact that puts all remaining species **at risk.** Loss of habitat from human practices is the single largest factor influencing the status of species. Grizzly Bears, Prairie Chickens, and Black-footed Ferrets were forced from Saskatchewan grasslands province-wide. The Canadian Wildlife Federation lists the Plains Bison and Sprague's Pipit as **threatened** (species likely to become endangered if limiting factors are not reversed); the Burrowing Owl, Whooping Crane and Swift Fox as **endangered** (species facing imminent extirpation or extinction); the Black-tailed Prairie Dog and the Ferruginous Hawk of **special concern status**. **Vulnerable** refers to species **particularly at risk** due to low or declining numbers or range or for some other reason, but *not* threatened. **Extirpated** refers to species no longer existing in the wild in Canada, but occurring elsewhere. **Extinct** refers to a species formerly indigenous to Canada that no longer exists anywhere.

Cultural bias led to deliberate extermination programs for species reviled as agricultural pests. Results have directly or indirectly affected the the Burrowing Owl, Ferruginous Hawk, Swift Fox, and Black-footed Ferret. Secondary poisoning, which results from predators eating poisoned prey, and habitat loss due to human impact increase the designation of **species at risk.** COSEWIC (Committee on the Status of Endangered Wildlife in Canada) is a committee of experts that assesses and designates which Canadian species are in danger of disappearing.

The Richardson's Ground Squirrel is an animal branded a "pest" when natural grasslands were converted to farming and grazing. These squirrels burrow into the soil, making it uneven. They eat crops that replaced the plants from their previous, native prairie habitat. The Richardson's Ground Squirrel is actually a **keystone species** in the grassland community. Its burrows create essential nesting habitat for the Burrowing Owl and shelter for the Prairie Rattlesnake. It provides a food source for carnivores such as Badgers, Foxes, Long-tailed Weasels, Coyotes, Ferruginous Hawks, Swainson's Hawks and Red-tailed Hawks. Ground squirrels' burrowing actually aerates farmland, allowing moisture to enter the soil instead of evaporating during our dry, windy weather. The grassland ecosystem needs ground squirrels. If natural predators, such as Red-tailed Hawks, share the same habitat, they will prevent the overpopulation of Ground Squirrels that threatens crops.

Lesson Information

Grade Level: 7
Season: Spring/Fall for trail activities
Group Size: For trail activities keep group size small (8-10)

Objectives

To become familiar with the grassland animals that are at risk

To understand that humans have a direct impact on the health of other species and ecosystems

To become familiar with various organizations/ individuals and terminology involved with species-at-risk

"We shall require a substantially new way of thinking if mankind is to survive."
Albert Einstein

Endangered Animals

Biodiversity refers to the variety of plant and animal life in an area. In order to make informed choices, humans must develop a better understanding of the interconnections that exist between themselves and the prairie ecosystem. The ecological biodiversity of an ecosystem determines its integrity. Species loss creates an imbalance in the web of life. Unhealthy ecosystems for other species eventually reflect on the quality of human life.

The SNG's limited size precludes its being listed on national websites as a significant expanse of native prairie. Thus our small **remnant** of grassland is our treasure to protect, restore and celebrate.

For additional information see the Canadian Wildlife Service (CWS) *Endangered Species* brochure.

"When you try to change any single thing, you find it hitched to everything else in the universe." John Muir

Suggested Internet Resources

Committee on the Status of Endangered Wildlife in Canada, www.cosewic.gc.ca
"Species at Risk", www.speciesatrisk.gc.ca
Wild Species 2000: A General Status of Species in Canada, www.wildspecies.ca
Nature Saskatchewan, www.naturesask.com
Convention on International Trade of Endangered Species, www.cites.ec.gc.ca
Terrestrial Ecoregions. www.worldwildlife.org

Edu-Kit Resources

Plumb, Sally. *The Hole Story*
Taylor, Dave. *Engangered Grassland Animals*
Walton, Rich K. & Morrison, Gordon. *Endangered Wildlife*

Rouse Interest

Getting to Know Endangered Animals of the Grasslands

Students will become familiar with species-at-risk as they complete and then discuss the "Getting to Know Endangered Animals" sheet. Use the sheets to determine student understanding of this topic. As a class, discuss each category as necessary depending upon students' prior knowledge.

Materials
Getting to Know Endangered Animals sheet

Getting to Know Endangered Animals of the Grasslands

Instructions: Get your classmates to sign their name and write the answers to any questions asked in the boxes below. Try to get one signature in each box with as many **different names** as possible.

Someone who would like to see Swift Foxes in the wild	Someone who can name an extinct animal	Someone who can identify one reason that species become "at risk"
Someone who would like to see a Plains Bison in the wild	Someone who wants to see a Black-footed Ferret in the wild	Someone who can define "biodiversity"
Someone who can name a "keystone" species that lives in the Grasslands	Someone who can define "extirpated"	Someone who knows what COSEWIC stands for
Someone who knows what percentage of the grasslands has been altered	Someone who can give a reason why it's important to care for the Earth	Someone who knows what preys upon Richardsons Ground Squirrels
Someone who can name an endangered grasslands animal	Someone who has seen a raptor, or bird of prey	Someone who can define "habitat"

Endangered Animals

Species Specifics

Materials
Writing & drawing materials, posterboard, slips of paper, containers to hold them, Internet access

Students will research individually or in small groups for grassland animals that have been affected by habitat disturbance and express findings in poster form. Sub-topics are animal's risk classification, physical description, habitat needs, current range map, historic range, restoration measures being taken, and factors contributing to decline. In addition to animals listed in Background Information, students may research the Gray Wolf, Cougar, Loggerhead Shrike, Short-eared Owl, Monarch Butterfly or any other prairie animal they discover during their research. Encourage use of websites listed on page 108. Display reports and illustrations on a classroom bulletin board. Students present their animal and accompanying information to the class while using a pointer at the bulletin board. After completion, the class will be ready to test their memories as they play Species Specifics Charades.

The teacher reviews charade gestures for sounds like, looks like, number of words, letter of the alphabet, etc. and models an example for whole class response. Explain that each group of four or five will work independently from other groups. Write names of prairie animals that students researched on slips of paper. Place slips into containers--one complete set of animals for each group. Students alternate having a turn to pull out a name and act out the animal for their group. They may use the bulletin board as a reference.

Word Wizard (see example on p. 118)

Students create word find puzzles on vocabulary that relates to grassland animals. As a class, brainstorm a partial list. After completing answer sheets corresponding to their puzzles, students trade with classmates and check.

Friend or Foe?

Materials
graph paper or other form for wordfinds

Students will reinforce their understanding of the consequences of human use of pest control on grassland animals by expressing their knowledge in cartoon form. The Richardson's Ground Squirrel, the much maligned but vitally important member of the grassland community, is the main character. Its predators, its burrowing activity, habits and human attempts at pest control may all become part of the "plot."

Relate

Habitat Heroes and Heroines

Materials
Writing materials, telephone directory, access to telephones, Internet access

Students will identify and appreciate local people who have made or are making a significant contribution to the conservation or preservation of prairie species-at-risk and the grassland habitat. As a class or in small groups, brainstorm the possible sources of information that could be used to find out about people involved in this field. Examples include the presidents of local environmental clubs (e.g. Saskatoon Nature Society), city hall, library, and government pages of the phone book. Compile a list of people.

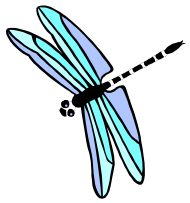
Endangered Animals

In small groups students will compile eight interview questions before contacting the interviewee. Advise students that volunteer heroes and heroines will be busy people who are volunteering their time if they agree to be interviewed. In their initial contact, students should advise the interviewee how he/she was selected to be interviewed and also to explain their objectives (to better understand the impact of grassland habitat disturbance on prairie wildlife and to practice interviewing skills). Offer the choice of coming to the school for the interview, or for conducting a telephone or email interview in the near future. Set a date. Record the following teacher-approved questions for students to use as a basis for their interview:

1. If you are interested in grassland habitat/species conservation, what motivated your interest?
2. What actions have you taken?
3. How did you decide on your course of action?
4. Who inspired you along the way?
5. What difficulties did you encounter and how did you overcome them?
6. What do you think is the biggest threat to the grassland ecosystem?
7. What do you think your main contribution has been?
8. What are your personal dreams and goals for grassland habitat/species conservation?
9. What are your words of wisdom for others who want to conserve the Grassland community?

Questions should reflect the personal interests of the students and the particular circumstances of the individuals being interviewed. Once interviews are complete, each group writes a short biographical report on the person they interviewed to present to the class. Send a copy of the biography along with a letter of thanks to interviewees. Send thank-you letters to anyone else who was of assistance during this activity.

"Never doubt that a small group of committed citizens can change the world. Indeed it is the only thing that ever has."
Margaret Mead



Past, Present & Future

With eyes closed students will listen to the teacher reading the "Future Scenario: Year 2099", pp.116-117 in *Exploring the Grasslands: Understanding an Ecosystem* and share their thoughts and feelings afterwards. Invite students to reflect on their personal vision for the future of the SNG. This activity may be done in a quiet area of the school, in the school grounds, or in a designated area at the Grasslands.

Materials
Exploring the Grasslands: Understanding an Ecosystem (in Eco-kit)

Ground Squirrel Bingo

After carefully and quietly observing a colony of Richardson's Ground Squirrels, play Ground Squirrel Bingo. A colony exists at St. Theresa School.

Materials
Ground Squirrel Bingo

Ground Squirrel Bingo

Test your observation skills by capturing the ground squirrels doing all sorts of activities. Three across, down or diagonally makes a bingo! Try to get a blackout bingo by observing them all. Go-pher it and have fun!

Hear a squeal that serves as a warning signal.	**Find a mound of soil that is used as a "lookout post."**	**See a ground squirrel quickly scamper down a hole.**
See two young ground squirrels playing.	**Observe one having a tasty snack. Yum yum…prairie grass!!**	**See the flick of a tail.**
Observe one standing on its hind feet.	**See one that is protecting its territory by chasing others away.**	**Spot or name one of its predators (fox, hawk).**

Endangered Animals

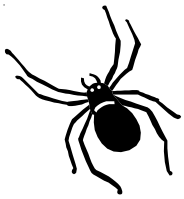
Reflect

Dilemma Daze

Students will analyze a dilemma presented to them and present a case for their solutions to that dilemma. The teacher reads to the class or shows a video about the burrowing owl. Each group of five students gets a set of dilemma cards. Students choose one and study the situations on their cards, decide how they would solve the problems and devise reasons to support their decisions. When the group is ready, each student presents his/her dilemma and solutions to the rest of the group, which then offers comments. Students may opt to reach a consensus for chosen solutions, but must keep in mind the right of their peers to have their own opinions.

Materials

Burrowing Owl references



Dilemma #1

You are the head of a task force created to select the best course of action for saving the Burrowing Owl. Some members of your task force would like you to authorize the capture of some of the owls to send to a zoo for breeding in captivity. Here are examples of possible solutions. You must support the solution you choose with reasons why you chose it.

- ❑ Leave them in their natural environment
- ❑ Capture some for a zoo
- ❑ Launch an education campaign about causes of endangerment of species and focus specifically on the Burrowing Owl
- ❑ Other

COSEWIC (Committee on the Status of Endangered Wildlife in Canada) is the committee of experts that assesses and designates which wild species are in danger of disappearing from Canada.

Dilemma #2

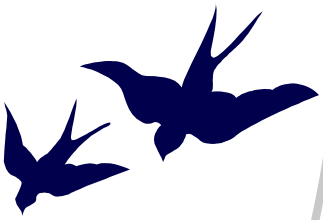
You are a farmer struggling to make a living. In your pasture, you have a pair of nesting Burrowing Owls. You know they are endangered, but if you plow the area where they are nesting, you will have more room to plant crops and thus make more money. You are the only individual aware of these particular owls. What should you do?

Dilemma #3

You own a large section of pristine native prairie that borders an expanding city. Selling your land is the only way you can finance your life-long dream of travelling the world. A real estate agency wants to buy your land for residential development. At the same time, a conservation group approaches you about their purchasing the land to create a protected area. The developer is offering you ten times the money the conservation group can pay. To which group will you sell the land?

Endangered Animals

"I am part of the world. I am able to change my life for the better. Therefore I am able to change the world for the better."
Helen and David Dufty



Dilemma #4

You are visiting a friend in the country when you spot a Short-eared Owl perched on a fence post. Before you know what is happening, your friend shoots the owl. An hour later a game warden comes to your friend's house, tells you that he found a Short-eared Owl that had been illegally shot and asks if you know anything about it. Here are examples of solutions to the dilemma. You must justify your decision with reasons as you see fit.

- ❑ Deny any knowledge of the incident
- ❑ Admit your friend did it
- ❑ Make up a story implicating someone else
- ❑ Say nothing, but call later with an anonymous phone tip
- ❑ Other

Dilemma #5

You have a neighbor who is a respected taxidermist. You find out that she is illegally obtaining endangered species to stuff and sell on the profitable black market. She has a very large family and uses the extra money she gets from this to support her family. Examples of desicisions you make are:

- ❑ Report her to the authorities
- ❑ Pretend you do not know what she is doing
- ❑ Tell her you know and help her
- ❑ Other

Dilemma #6

You live on the border of a very large grassland park surrounded by ranches. The Plains Grizzly bear historically lived in this area, and park biologists want to reintroduce it to the area in order to restore the ecological balance. Grizzly bears can be dangerous if not treated with respect and may kill the rancher's sheep and calves. Options for your decision are:

- ❑ Support the park biologists in their decision
- ❑ Form a protest to stop the park biologists
- ❑ Move from the area and let other people worry about it
- ❑ Other

Endangered Animals

Dilemma #7

You live in an area that has several pairs of nesting Ferruginous Hawks, which rely mainly on Richardson's Ground Squirrels for prey. Many people in your community think Richardson's Ground Squirrels are pests. Although they come into conflict with human activities sometimes, you remember reading that ground squirrels are significant members of the prairie community. A local group announces that they will hold a contest and award valuable prizes to the killer of the most ground squirrels. Some of your options for arriving at a solution are:

- ❑ to participate in the contest in hopes of winning a prize
- ❑ to learn more about Richardson's Ground Squirrels and present a talk to your school and parent council on their importance
- ❑ to write a petition and get signatures in support of canceling the contest
- ❑ to do nothing
- ❑ other

Richardson's Ground Squirrels are an essential component of the grasslands ecosystem.

Dilemma #8

You are out with a group of friends at the Saskatoon Natural Grasslands. Several of your friends stumble on the nest of a Sprague's Pipit hidden in the grass. They want to break the eggs for fun and dare you to join in. Examples of the decision you may make are:

- ❑ Join in breaking the eggs so your friends think you're cool
- ❑ Refuse to break the eggs and threaten to tell your teacher or Grasslands authorities
- ❑ Try to convince your friends not to break the eggs
- ❑ Other

Book Marks

Students will create awareness of grassland wildlife by making informational bookmarks about a prairie animal whose habitat is in danger. After laminating, students may keep their bookmarks or give them to others as informative and inspiring gifts. On one side include a drawing of the animal, its common and scientific names, and status (e.g. extirpated). On the other side include one reason why conserving this animal is important and how a member of the public might help, or write a short poem (e.g. haiku) about the animal.

Materials

Writing materials, bristol board strips, paint, pencil crayons, markers, laminator

Endangered Animals

Reflective Reasoning

Students will write a reflective response to one of the following questions:

1. What does biodiversity mean to you?

2. Why are you glad that there are people dedicated to the preservation of species and habitat?

3. If you had the opportunity to observe any grassland species in the wild, which one would you choose, and why?

4. Why are you concerned about people who have made or are making conscious choices that have a negative impact on the natural grassland community? What can you do about this situation?

5. If you could talk to a world expert on grasslands animal species, what would you ask him or her?

6. What personal changes in your life would you like to make or have already made that would help support the health of the natural grassland community?

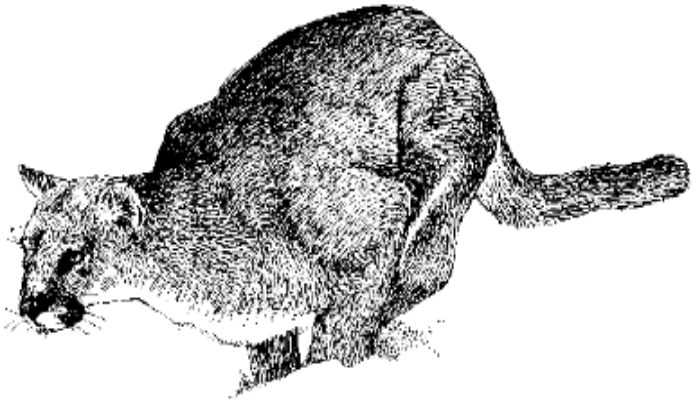
7. Which members of the natural grassland community would like to learn more about? Why?

Materials

Writing materials

Over 75% of the prairie biome has been altered from its original state.

Biodiversity is the variety of life.



Endangered Animals

Find each of the following words.

ECOSYSTEM	HABITAT	GRASSLANDS	ENVIRONMENT
POPULATION	SUSTAINABLE	PESTICIDES	EXTIRPATED
COMMUNITY	CONSERVATION	MIGRATE	VULNERABLE
ENDANGERED	SPECIES	STEWARDSHIP	EXTINCT
BIODIVERSITY	COSEWIC	WILDLIFE	THREATENED

P B S V S E P S P E S T I C I D E S S R T I L
A N F G T S I N N L E G D E N E T A E R H T X
C D S T T E D X T B I I S N T E S W N T U P T
S M S X L A C D S A C S R O S Y E S V B E I N
D U E N D A N G E R E D T I V L E I I E F H O
V E S E S Y N E I E P D N T H P A O D S G S A
N A F T A V E A E N S M E A U R D D E S E D N
S T I I A E T D B L C E M V N I U H T D P R U
O G L E L I A H G U E T N R V B I Y A N S A N
L N I H T D N H N V N S O E E S D S P A C W E
D O S B T A L A A E I Y R S T T O D R L I E R
I O R N D E R I B O G S I N S R O A I S W T U
P O D S T G T G W L I O V O W I S M T S E S I
H A B I T A T I I T E C N C R R C S X A S I N
E X T I N C T L Y M V E E D T T N L E R O H R
N U O N B D C O M M U N I T Y G E A N G C A S
T G A S S O A S P O P U L A T I O N C S I N S
U I L E W S U L A C R R O R B C L O E E N P X

Notes

Winter Dilemmas

Background Information

The prairie's harsh climactic conditions challenge the survival of all wildlife. During winter, daylight hours are limited and lower temperatures result as the angle of radiation received from the sun decreases. Precipitation in the form of snow is less efficient than in the form of rain. Winter air masses bring strong winds. Food sources are not only in short supply, but are concealed by snow. All of these factors force wildlife to expend higher levels of energy than normal. These conditions or vectors, of winter - **C**old, **R**adiation, **E**nergy, **W**ind, and **S**now - can be expressed by the acronym, **CREWS.**

Strategies for Coping

Organisms respond differently to the SCREW factor, as reflected in their life processes. Some migrate. **Migration**, the seasonal mass movement of animals, is feasible for birds and some insects like the Monarch Butterfly, which can travel efficiently by flying. Large mammals, such as the barren-ground caribou, also manage to migrate as they have the necessary energy resources to cover large distances. Most tiny organisms from one-celled organisms to insects can make short **vertical migrations** to protect themselves against the full force of the SCREW factor by taking shelter beneath the snow, in leaf litter, water, soil, or under tree bark.

Some tiny organisms continue to actively function, but many go into **dormancy**. Insects may overwinter as eggs, larvae, nymphs, pupae, or adults, depending upon the species. To cope with below-freezing temperatures, these life forms produce a natural antifreeze that prevents tissue damage.

Some mammals, reptiles, and amphibians cope with winter by entering an **inactive state** which can range from periods of cold-induced torpor to hibernation. **Torpor,** the slight lowering body temperature and drop in metabolism, conserves energy during periods of intense cold. During milder days, they become active again. The normally winter-active badger, for example, goes into short periods of torpor when temperatures remain low for an extended period of time, as do skunks and racoons.

Lesson Information

Grade Level: 8
Season: Winter

Objectives

To appreciate wildlife's built-in responses to winter

To understand the different states that organisms may enter to survive low temperatures

To explore the winter environment at SNG

To respect the survival mechanisms of plants and animals

Winter Dilemmas

Background Information *(continued)*

Hibernation, the state in which an animal's body temperature, heart rate and breathing decrease dramatically, is more complex. The Richardson's Ground Squirrel and Red-sided Garter Snake hibernate until stirred by mild spring temperatures. The body temperatures of reptiles and amphibians adjust to match that of their environments. Many **reptiles and amphibians** hibernate in micro-climates, such as pond bottoms or deep underground where freezing does not occur. The Wood Frog, an exception, produces a natural antifreeze that allows it to bury itself more shallowly under matter that does freeze in winter!

Animals may encounter winter in an active or inactive state.

Animals exhibit **behavioral adaptations** for winter survival. The Least Chipmunk and Beaver collect and store food supplies in late summer and fall. The Richardson's Ground Squirrel prepares for winter by building stores of body fat to supply energy needed during hibernation. Small birds fluff their feathers, which traps the air warmed by their bodies in the same way that wearing down jackets insulates humans. To reduce heat loss and retain energy the Red Rox and Red Squirrel curl up to reduce body surface and wind their fluffy tails around their bodies. Small birds and mammals huddle together with other members of their species for the same effect.

Did You Know?

A wood frog in winter looks like a lump of coloured ice!

Medium to large mammals lose less body heat because their internal "furnace" is larger in ratio to their surface area, which makes it much easier to retain heat. While active or in an inactive state such as hibernation, their bodies store and use fat as their main energy source. Fur and fat combine to create substantial insulation. They may also find shelter in microhabitats that lessen the effect of the CREWS factor. Many of the largest mammals stay warm by remaining active, bears being an exception.

Survival of the fittest individuals insures the perpetuation of a species.

Prairie hibernators include the Red-sided Garter Snake and the Richardson's Ground Squirrel.

Winter Dilemmas

Background Information *(continued)*

Plants

Dormancy is the common winter state for plants in prairie grasslands. Other mature plants die but have produced seeds that overwinter and germinate as the weather warms. Many plants die back, but their roots remain vital, bringing new growth in spring. Others remain green under the snow pack. Woody shrubs and trees stand open to the harshness of winter. They undergo a process of "hardening off" in order to become tolerant to fluctions in temperatures (continued on p. 125).

Classifications

Three classifications (chionophiles, chioneuphores, and chionophobes) describe as organism's relationship with the winter. Chion (pronounced kie-on) is the Greek word for snow. Each category generally describes the adaptation levels of organisms living in winter conditions.

Chionophobe is literally translated as "snow fearer." Animals in this category do not adapt to winter. Meadowlarks and Red-tailed hawks migrate before the onset of winter.

The second category, **chioneuphore,** translates as "snow tolerator." These organisms do not possess specific adaptions to winter but are able to take advantage of conditions in their environment for survival in diverse climates. They may live under the snow or find another suitable microhabitat to protect them from the rigors of winter. Humans, Voles, Shrews, Red Foxes, and White-tailed Deer are chioneuphores.

The last category, **chionophile,** translates as "snow lover." Chionophiles have specific adaptations for survival, and their distribution is usually limited to winter-dominated regions. The Snowshoe Hare's large hind paws enable it to move over the snow pack without sinking, as its weight is evenly distributed across a large surface area. Both Snowshoe Hares and Weasels turn white in winter, an obvious adaptation for winter survival.

Chionophiles are snow lovers.

Chioneuphores are snow tolerators.

Chionophpobes are snow fearers.

Additional References

Animals in Winter, p. 87; Galls, p. 150, Winter Twigs, p. 157 in Hands-on Nature

Winter Dilemmas

Rouse Interest

Materials
Paper,
Coloured Pencils,
Markers,
Scissors

Acronym Action

As a class, brainstorm a list of the conditions that characterize winter. Introduce the CREWS factor acronym as a way to remember the vectors of winter that every living thing has to successfully cope with if they are to survive. Practice it as a cheer to help the students remember (e.g. Give me a S - "S", and what do you got – "snow"!) Ask the students to choose a word related to an aspect of winter and create their own decorated acronym about winter. Use the decorated acronyms as part of a display on winter.

Materials
Who Am I? Cards

Critter Classification

Introduce the terms chionophile, chioneuphore, and chionophobe. Play "Who Am I?" as a class with the animal cards only. After the students have figured out their identity, ask them to decide which category their animal fits into and why, based on the characteristics of each category (chionophile, chioneuphore, and chionophobe). Have them present their animal and their reasons for their category choice in small groups or to the class.

Materials
Bingo Instructions,
Bingo Sheets,
Tokens or Chips

Winter Wonders Bingo

Divide the students into groups to play Winter Wonders Bingo. Instructions are at the end of this lesson and bingo cards are available in protective sheets at the back of the manual. Offer fun prizes like free tickets to shovel the school walk or all the snow they can eat!

Relate

Materials
Mystery Bag,
Biofacts,
Observation Sheet,
Clipboards,
Pencils,
Binoculars,
Magnifying Glasses,
Thermometer,
Ruler,
Field Guides

Winter Walk

Take the students on a guided walk through the SNG to look for evidence of plants and animals and to discuss the unique ways they survive winter conditions. Prepare for the walk ahead of time by choosing appropriate stops along the trail. Use the list of suggested stop topic ideas to help you plan your walk. Be sure to take advantage of unplanned teachable moments while on-site! At the start of the walk, provide each pair of students a clip-board with an observation sheet to work on.

Stop Topic Ideas:

Chickadee Fluff & Huddle - discuss the habit of Chickadees fluffing their feathers in cold weather and huddling together to conserve heat. Gather the students in a loose huddle and get them to "fluff" (move their arms up and down while jumping on the spot). This warms cold students up nicely!

Winter Dilemmas

You've Got Some Gall! - introduce galls with the mystery bag and discuss.

Be My Bud - discuss plant adaptations to winter including "hardening off". Explore the characteristics of different winter buds.

Snack Attack! - introduce evidence of browse with the mystery bag. Discuss and try to locate some available food sources in the winter time. Search for any signs of animals having eaten.

Shelter Search - discuss available shelter options. What factors contribute to a good shelter? Where can animals seek shelter at SNG?

Sunscreen Anyone? - examine the bark of the Aspen poplar. Rub a bit of the powder off of the bark. The powder acts just like sunscreen to protect the plant from warming up too quickly in the early spring. The light colored bark is also a preventive measure to protect the plant from warming up too early. If the plant warmed before the danger of frost was gone, it would risk frost damage.

Animal Activity - some animals are active in winter. What evidence of activity can be found? Is it possible to determine what the animal was doing?

A Game of Life

There are many influences on the life history of an animal. When one of these (e.g. climate, shortage of food) exceeds the limits of tolerance of that animal, it becomes a limiting factor. Winter puts constraints on an animal's ability to survive (e.g. snow can be a limiting factor for mice and voles who need the snow cover for an insulative blanket against the cold). The following activity simulates the predator - prey relationship between foxes and voles and how winter can influence this relationship. This game is best played with at least 10 students.

Materials

8 hula hoops,
food tokens
(e.g. popsicle sticks
or pieces of cardboard),
bibs/vests

Identify students as either a predator (fox) or prey (vole). There should be one predator for every four to six prey. Clearly identify the predators. Using an area in the schoolyard, identify one end as the "food source" and the other end as the primary "shelter". Randomly place 4 hoops in between the zones. The hoops represent additional cover for the prey. Scatter food tokens on the ground in the "food source" zone. Allow three food tokens for each prey animal.

Use a pre-arranged signal to start each five minute round. The task of the prey animals is to move from their primary shelter to the food source, collecting one food token each trip, and to return safely to primary shelter.

Winter Dilemmas

To survive, prey have to obtain three food tokens and avoid being tagged by a predator. Prey have two ways to prevent themselves from being caught by predators; they may "freeze" any time a predator is within two metres of them; or they may run for cover (at least one foot placed within a hoop). Captured prey are taken to the sidelines by the predator who captured them. Start the game with predators randomly distributed in the open area between the zones. Predators attempt to capture prey by tagging them. They must capture at least two prey in order to survive. Play two rounds, allowing predators to become prey and vice versa. Discuss what happened.

Tell the students that winter has now come and conditions are worsening. It is bitterly cold and there is very little snow cover. As a result there is less available shelter for the voles and they need more energy to stay warm. Remove half of the hoops and inform the prey that they need four tokens to survive now, but no extra tokens will be added. Play one round. Compare the results to the first two rounds. How much harder was it for the prey to find enough to eat and avoid their predators?

Play a fourth round, but this time only the prey that were successful in the preceding round participate. Where the predators able to find enough to eat? Did they exhaust their food source? How many predators starved?

Start a new round with a different scenario. This time there is a great deal of snow, which provides much protection in the form of shelter for the voles. In addition, the depth of snow makes it difficult for the predators to travel. For additional shelter, add more hula hoops. To make travel more difficult for the predators, they have to hop with two feet together. Play a round. How much more energy did the predators have to expend to move around compared to earlier rounds? How did their reduced mobility and the additional shelter for the voles impact their success at hunting?

Foxes and voles are both chioneuphores. How did their lack of specific adaptations to winter impact their success during the game? What examples of adaptations to winter could have been useful to them? Discuss with the students other ways winter conditions may impact the balance between predator and prey. Through the basic premise of this game, enact any suggestions the students might have. Discuss the results.

CREWS Factor

Cold
Radiation
Energy
Wind
Snow

Winter Dilemmas

Reflect

A Day in the Life

Through poetry, an illustrated story, a "dear diary" entry, or a poster, have each student describe a day in the life of a grassland plant or animal as it tries to find food and shelter in the harsh winter environment. Allow them time to research their plant or animal, so they have a better understanding of its particular habitat needs and adaptations.

Materials
Writing materials,
Access to library

Additional Resources

Marchand, Peter J. *Life in the Cold: An Introduction to Winter Ecology*. University of New England Press. 1996.
Stokes, Donald W. *Stokes Guide to Nature in Winter*. Little, Brown and Company. 1979.
www.blackfootedferret.org/prairie
www.worldwildlife.org/wildworld/profiles

Additional Information On Plants (p.121)

The SNG is a shortgrass prairie, dominated by plants that grow to be only 15-30 cm high (6-12"). By growing thickly these short plants shade one another from intense summer sun and leave little room for the growth of non-native plants sprouting from seeds blown or carried to the grasslands. Prairie grasses and wildflowers grow in a rich topsoil mixture of sediment washed down from the Rocky Mountains, rubble from glaciers and windblown sand, silt, and clay. Prairie grass grows from its base, emerging from a bud at, or just under, the soil level where the sensitive growth tissues remain protected from the elements. By becoming dormant in extreme cold or hot periods, like the prairie animals, they conserve energy. Some roots extend 3-5 metres (10-15 feet) deep into the soil, at which point they extract moisture during dry periods. Plant roots bind the soil tightly to the Earth, preventing erosion. The resulting tough prairie sod acts like a sponge to catch and hold rainwater.

Since wildflowers must share the same space as grasses, they have adapted ways to insure their share of moisture and sunlight. They send their roots deeper, tapping water the grass cannot reach. The shortest wildflowers bloom before grasses grow tall enough to overshadow them. During summer and fall, flowers appear that grow taller than the grasses.

Winter Dilemmas

Winter Wonders Bingo

Materials
Copy of Grassland Bingo Card for each student (appendix), Bingo markers

1) Divide class into groups of 4 or 5. Provide each student with a photocopied Grasslands Bingo Card. Students cut out 16 of the 20 pictures and paste them in a random order onto bristol board to make their individual bingo cards. Give each group a container of markers (stones, seeds, etc.). Explain the object of the game and procedures.

2) The object of the game is to mark a complete horizontal or vertical line of pictures that match the given clues.

3) When an individual within a group calls bingo, the teacher checks the card for accuracy. If squares correspond with clues given, the individual earns a point for his/her group. If some squares do not correspond to the clues read,the student removes those markers and the game resumes.

4) Teacher reads the clues in any order. Students may discuss within their small group which wildlife the clue matches. Those who can make a match, mark their square.

Winter Wonder Clues

Deer
I brouse on buds and twigs all winter long, and when the snow is deep, I "yard" up with my companions in an Aspen grove.

Blue Jay
Winter winds may sway my perch in the tree tops, but I'll stay to view of all that goes on below. I'll set up a noisy alarm if a predator comes into sight!

Kestrel
As a small falcon, I eat a lot of grasshoppers, so when winter winds blow and food supplies diminish, I migrate.

Robin
The cold is coming but cheer-up cheerio, you'll hear me sing! Winter's coming, but it's not a problem, as I shall take to the wing.

Fox
Straight as an arrow, my neat tracks cross a snow-covered field, but they may show signs of a scuffle where I stop to catch a mouse or vole. When I need to rest I curl up in a sunny spot next to a big rock.

Snowshoe Hare
Winter finds me snug and warm, hidden in the tangled undergrowth of shrubs. I'm camouflaged in my soft fur coat, so I can venture out to feed on twigs whenever I feel hungry.

Winter Dilemmas

Richardson's Ground Squirrel
Winter winds, snow, and cold don't bother me! Last fall I fattened up with my rodent friends and hibernated.

Weasel
I'm long, slender, and winter-white; a keen predator with a hearty appetite.

Meadow Vole
Some say I'm a mouse but look closely and you will see that's not so. In the wintertime, underneath the snow is where I prefer to go.

Ruffed Grouse
I'm the provincial bird, an important part of prairie natural history. During cold winter nights I disappear into a snow hole - a real mystery.

Monarch Butterfly
Delicate beauty and grace are my summertime traits, but I overwinter in an altogether different state.

Garter Snake
I rarely make social calls, except in winter when I slither into sheltered hollows with others of my kind where we hibernate together.

Wood Frog
My natural antifreeze protects me from winter's cold temperatures. I wait for warmer days so I can hop about.

Herbaceous Plant
Stiff and stark, I stick out of the snow. My seeds sustain birds that overwinter on the prairie.

Grasshopper
I die but my eggs survive the winter season. I cannot survive the cold, while my eggs in their protective covering can - that's the reason.

Rose Hips
Hip, hip, hooray! I'll provide a nutritious snack for someone today!

Porcupine
High in a tree you might find me, eating a lunch of bark. If I come down to the ground, and a predator is around, that's okay because I am not an easy mark.

Caterpillar
In winter, I lie under the bark of a rotting log or a warm blanket of leaf litter, curled up in a tight fuzzy ball.

Winter Dilemmas

Gall
I am an interesting growth that looks out of place, but that is simply not the case. I am an important shelter and food source for a variety of insects.

Chickadee
Black and white, I'm a lively sprite that has to eat all day just to survive the cold winter night.

Geese
When winter approaches, my flock and I flee south in the shape of a "V".

Bee
In the fall, my nest mates and I make our home safe and warm for winter by chinking all the cracks and storing plenty of sweet golden food to eat.

Badger
I'm a powerful prairie predator that passes the coldest winter days asleep in my brown and white pajamas.

Mouse
I always seem to be in a hurry as I scurry around, but you will not notice me as I move through tunnels underneath the blanket of snow.

Meadowlark
My song is part of the prairie spring, but winter finds me miles away in meadows I find warm and sunny.

Owl
A visitor from the tundra, snowy white, strong, and light; soundless flight, what a special sight!

Notes

Notes

Experience the Mystery

Experience the Mystery

Being so close to the Saskatoon Natural Grasslands gives students the unique opportunity for direct experiences in nature. Learning literally comes to life! When students feel, taste, hear, smell, and see creatures and plants in nature, they make personal connections. Learning becomes rich, meaningful, and memorable. All school subjects are related to the study of the diversity of life.

"Come forth into the light of things. Let nature be your guide."

William Wordsworth

'Experience the Mystery' invites students to participate in sensory experiences, to observe the miracles of life, to explore the mysteries of nature, to embrace the secrets and unknowns of nature, to imagine and dream of possibilities, and to create meaning in their lives. These authentic experiences engage students' interests and develop a passion for learning more.

Students who are given many opportunities to spend time in nature will develop a source of strength and nourishment. Urbanization and media-overload compete for time children would otherwise spend on the land. Daytime hours in class followed by hours in the gym/rink or in front of the TV increase the need for educators to take a more active role in getting children outdoors and facilitating meaningful experiences in nature.

Developing a relationship with the Grasslands will give students a healthy self-identity and a sense of place. This will hopefully lead to a reverence for the Grasslands that will empower them to defend it and liberate it when society threatens or abuses it.

Stirring the Senses

Background Information

From an early age, children use all of their senses to explore the world. As time passes they learn to depend upon sight as their dominant sense. To connect with the natural world, children must know what is there. Too often children look, but do not see. Children need to use more than their eyes. Using all their senses helps them make more observations, see changes, and learn patterns. Using all their senses helps them learn more and remember more. "If a child knows what a white pine tree looks like and how the bark feels, he or she will know more and remember more. Children who only use their sense of sight limit the wonders they can find." (Kriesberg, A Sense of Place, 1999).

Animals rely heavily on all senses. Humans rely mainly on their sense of sight. By understanding and mimicking animals in the use of their other senses, humans can better understand wildlife.

When we offer our students outdoor classroom opportunities within the Saskatoon Natural Grasslands, we nurture their natural instinct to connect physically with nature. In the process, they develop an intellectual, spiritual, ethical, and cultural awareness of their role in sustaining Earth.

Resources

Caduto, Michael J. and Bruchac. Joseph. *Keepers of the Animals*. Fifth House Publishers, Saskatoon, SK, 1991.

Henley, Thom. *Rediscovery - Ancient Pathways,* New Directions. Lone Pine Publishing, Edmonton, AB, 1989.

Kriesberg, Daniel A. *A Sense of Place – Teaching Children About the Environment with Picture Books*. Teacher Ideas Press, Englewood,CO, 1999.

Williams, R. Rockwell and Sherwood, E. *Mudpies to Magnets - A Preschool Science Curriculum.* Gryphon House, Mt. Rainier, Maryland, 1987.

Lesson Information

Grade Level: K

Seasons: Spring, Fall, Winter

Objectives

Children use all of their senses

How different animals use their senses differently

Stirring the Senses

Resources from Edu-kit

Blue mystery bag
Biofacts
Vance, Jowsey & McLean. *Wildflowers Across the Prairies*. Western Producer Prairie Books. Saskatoon, SK. 1999.

Rouse Interest

Are you paying attention?

Students will pay greater attention to their surroundings after engaging in two exercises.

Materials
A sheet or blanket, an object foreign to the classroom, wire or string to tie it up

1. The teacher gives a parent or volunteer a day's notice before helping with this acivity. On the day of the activity, the volunteer adresses the class, makes eye contact with students and then signals the teacher, who throws a blanket over him/her or sends him/ her out of the classroom. Ask the children what he or she was carrying, wearing (colours, patterns, etc.), hair colour, number of pockets, glasses, rings, hat, etc.
2. While students are out of the room for recess or other activity, change their surroundings. Let them know how long it takes before someone makes the observation. For example, suspend something (eg. a stuffed animal) from the ceiling.

Explain to children that if they were animals, they would notice even small changes to their environment. If the foreign object had been a predator, and they not noticed it, they would probably have been eaten. Animals need to be attentive and aware in order to survive.

Touchy Feely Box (or Bag)

Students will rely on their sense of touch to identify objects. Either use the mystery bag from the Edu-kit, or build a box like the one in the illustration.

Stirring the Senses

Choose a box large enough to allow two children to work simultaneously. Cut an opening at each end.

Secretly place four items in the box, two of which are duplicates. One child reaches into one end and describes the tactile characteristics of the object he or she has found but does not name it. The child reaching into the other end has to find the matching object, based on the oral clues. Once he or she finds it, both pull out their objects. Discuss the similarities and/or differences between the two objects if they are not the same. Do it again with different students. Discuss how important the sense of touch would be if you could not see. Note animals that depend upon their sense of touch to survive: insects, bats, moles. A variation is to put an object on top of the box and invite a student detective to find its twin inside.

Materials

Mystery bag or box
pairs of mystery objects
(all in Edu-kit)

Who is the animal?

Students will further develop their listening skills in this indoor or outdoor activity. Review the sounds of prairie animals and practice as a group (field mouse's sqeak, a magpie's cry, a meadowlark's whistle, a coyote's call). The teacher randomly chooses a volunteer (eg. someone born in March). Position the volunteer with his/her back to the group and tell the group that you will point at someone in class. This person makes the sound of an animal (preferably a prairie animal, if they know their sounds). The volunteer will have to guess the identity of the person who made the sound. A correct guess earns that child a turn being the "guesser."

Prairie Taste and Smell

Students will use descriptive words to identify plants which they taste and smell: "like a berry" or "tastes sweet" or "like a juice or tea." Send a note home well before this activity to alert parents. Invite them to the classroom to experience this act along with the children.

Materials

List of Edible Plants
Wildflowers Across the Prairies field guide,
teaspoons, blindfolds,
Tea pots, small cups
fruits, jams, hot water.

Arrange a smorgasbord of prairie teas, served cold or warm (rosehip, cranberry, Saskatoon berry, mint) and berries (whole fresh and in jams and sauces), rubbed sage and mint leaves, spring onions. Similar grassland edibles are listed on the following pages, along with the different ways native people prepared them. An elder or herbal expert may prepare some of these plants at the teacher's invitation to add to the menu. Blindfold student volunteers who would like to pretend they are prairie animals and guess what they smell and then taste.

Reproduce pictures of plants, included in the class menu from *Wildflowers Across the Prairies* field guide in Edu-kit. Mount the pictures and cite them as examples of plants found in the Saskatoon Natural Grasslands. Explain that you bought and prepared your menu items because plant collection is not permitted in the Grasslands.

Stirring the Senses

Edible Plants of the Saskatoon Natural Grasslands

The class will view pictures and listen as the teacher reads wild plant uses. Students raise hands when they detect those they might have smelled and/or tasted in Prairie Tastes and Smells. They may generalize on berries. They may raise hands for many of these.

Indian Breadroot – Psoralea esculenta- Root
Edible raw or cooked.
Eaten or roasted; dried and preserved for winter use.
Root contains large percentage of starch and sugar: they are dug up in late summer and eaten raw, boiled, roasted, or dried in the sun and ground between stones for flour to mix with soup.
Wildflowers Across the Prairies - page 148

Snowberry – Symphoricarpos occidentalis – berry
Famine food.
Page 263

Buffalo Berry (Canadian and Silver) – Shepherdia canadensis/ argentea – berry
Whipped with sugar for dessert dish, fresh, or dried. Garnish for bison meat.
Page 177

Choke Cherry – Prunus Virginiana – berry
Dried, bruised, and added to pemmican, soups, and stews; boiled and made into juice or jelly.
Page 120

Wild Black Currant – Ribes Americanus – berry
Eaten raw or cooked; made into jelly or jam.
Page 102

Northern Gooseberry – Ribes oxyacanthoides - berry
Ripe berries boiled in animal blood to make soup. Boiled with sugar and eaten.
Page 102

Hawthorn – Crataegus chrysocarpa – berry
Eaten fresh or dried for winter use.
Page 107

Fireweed – Epilobium angustifolium – leaves and flowers
Leaves rich in vitamin A and C and made into tea. Flowers used in salads.
Page 179

Stirring the Senses

Wild Mint - Mentha arvensis – entire plant
Used for tea; for flavouring in candy canes.
Page 235

Prairie Onion - Allium textile – entire plant
Boiled with meat, eaten fresh, or preserved for cooking at a later date.
Page 24

Common plantain – Plantago major – seeds
Pounded into flour and used for making breads.

Aspen Poplar – Populus tremuloides – inner bark
Soft inner bark eaten raw or roasted as a famine food.
Page 52

Yellow evening primrose – Oenothera biennis
Dried and used for food during winter.
Page 182

Wild Red Raspberry – Rubus Strigosus – fruit, leaves
Berries are eaten; made into juice, jam or jelly. Leaves are made into tea.
Page 123

Rose – Rosa sp. – fruit
Fruits are eaten fresh or roasted, boiled, or made into jelly. In winter dried fruits still on trees are used as famine food. Mixed with lard or fat and eaten with dried meat. Boiled when ripened, then thickened with flour and eaten.
Page 121

Pasture/Prairie Sage – Artemisia frigida/ ludoviciana – leaves
Used as seasoning for meats (especially turkey); dried and crushed for tea.
Pages 280-281

Saskatoon Berry – Amelanchier alnifolia – fruit
Eaten fresh and dried for tea, added to pemmican. Added to soups, stews, and meats; dried for winter use. Berry soup eaten on special occasions. Boiled and made into jam or jelly.
Page 105

Stirring the Senses

Skeleton Weed – Lygodesmia juncea – stems and leaves
Stems chopped and brewed into tea. Juice from broken stems permitted to harden and then chewed.
Leaves made into tea.
Page 272

Prairie Sunflower/stiff – Helianthys petiolaris/rigidus – seeds
Eaten raw or cooked.
Pages 299-300

Milk Vetch – Astragalus sp. – roots
Eaten raw or dried as a vegetable. Boiled in blood during winter or boiled to make broth.
Page 126-132

Willow – Salix sp. – bark and catkins
Bark made into tea.
Catkins chewed like gum
Page 53

Wolf Willow – Elaegnus communata – fruit
Mixed with blood or sugar and cooked for food; tastes sweeter in winter.
Skins mixed with lard or fat and eaten, or frozen and eaten as ice cream.
Brewed as tea.
Page 176

Sources:

Budd, A.C., *Budd's Flora of the Canadian Prairie Provinces,* Agriculture Canada.
Kerik, Joan. *Living with the Land: Use of Plants by the Native People of Alberta*. Alberta Culture – Circulating Exhibits Program. National Museums of Canada Fund. Provincial Museum of Alberta.
Native Plant Society of Saskatchewan - call (306) 668-3940 for brochures, posters and information on recommendations for the collection and use of native plants.
http://www.sis.ec.gc.ca/msapps/ec_species/htdocs/ec_species_e.phtml

Stirring the Senses

Relate

Go Find It!

While hiking the Grasslands, students will work in pairs to identify prairie plants by using their senses. The teacher may want to divide the class so one half does this activity and the other half does the "Trust Walk." Color photocopy one set of scavenger hunt sheets and stickers (p.143) for each pair. Before leaving, students cut stickers apart and put into envelopes. Bring tape or glue along on hike.

Materials
:Go find it!: sheets, stickers (p. 142-143), envelopes, glue or tape

Students will look, listen, smell, and feel for food, enemies and shelter along the trail, just like deer, coyotes, and foxes must do. As they find the eight plants and animals on their sheets, they glue a sticker on them.

Ear – Auditory. They have to **listen** for a bird sound (bird icon) and an insect sound (insect icon).

Eye – Visual. They have to **look** for something bright (light bulb icon) and something round (ball shape).

Fingers - Tactile. They have to **feel** something soft (pillow icon) and something pointy (hook icon).

Nose - Olfactory. They have to **smell** something good (flower icon) and something bad (garbage icon).

Grassland Trust Walk

Students will develop trusting peer relationships. Clear instructions, a trial run, and careful monitoring are imperative. An adult assistant may lead the trust walk with half the class on the schoolgrounds while the teacher takes the others to the Grasslands for the "Go Find It" activity. Alternate activities.

Materials
Blindfolds

One child is blindfolded and the other is the guide. The guide takes the blindfolded child to three different locations and either hands the blindfolded person an object or places his/her hands on something for their partner to feel. The blindfolded child describes how the object feels and guesses its identity. After three stops the children switch roles.

Stirring the Senses

Materials
Blindfolds

Deer Ears

Students will realize the importance of animals' sense of hearing. Discuss the predator/prey relationship. Explain that some prairie animals, such as deer, do not see very well, so they need to hear well to survive and not get eaten. Blindfold a volunteer "deer" and arrange the others, the coyotes, around him/her. The coyotes quietly sneak up on the deer (no running) but only when the teacher says, "hunt." The deer shouts, "coyote!" when he/she hears a coyote moving. Everyone stops when the deer shouts and they can only resume moving when the teacher says, "hunt." When the deer points to a coyote, that coyote is out of the game. The first coyote to touch the deer before the deer shouts or points gets to be the next deer.

Reflect

Sound List

Students will recall how a deer relies on its hearing for protection and will further develop their own listening skills. As part of the morning routine, ask students to talk about a new sound they heard on the way to school and to illustrate that sound. The teacher writes in the sounds (screech, peep-peep, toot-toot, ring-ring, etc.) For those without a sound, play Prairie Spring or Birding by Ear (in Edu-kit) for selection. Add pictures, drawings, and related crafts to a classroom bulletin board.

Materials
Paper,
Crayons, paints, etc.,
CD's from the Edu-kit

Purr-fect Smell

Plan this activity for 1/2 hour before a recess break.
Notify parents ahead of time of its date and content.

Students will realize the importance of animals' sense of smell. Recall the "Deer Ears" activity in which they played the role of deer who had to listen for coyotes. Today they will be cats who use their sense of smell to explore their surroundings.

Students practice by crawling and sniffing about the room, pretending they are kittens. They then sit in a circle at least two metres away from a paper plate that the teacher has placed in the center.

Stirring the Senses

Kittens close their eyes and imagine themselves growing into adult cats during which time the teacher puts a secret scent on the plate. He/She tells students to open their eyes and crawl slowly towards the plate. As soon as they notice the smell, they stop, roll over and purr. Cats must freeze in place until teacher marks their spot with a piece of masking tape.

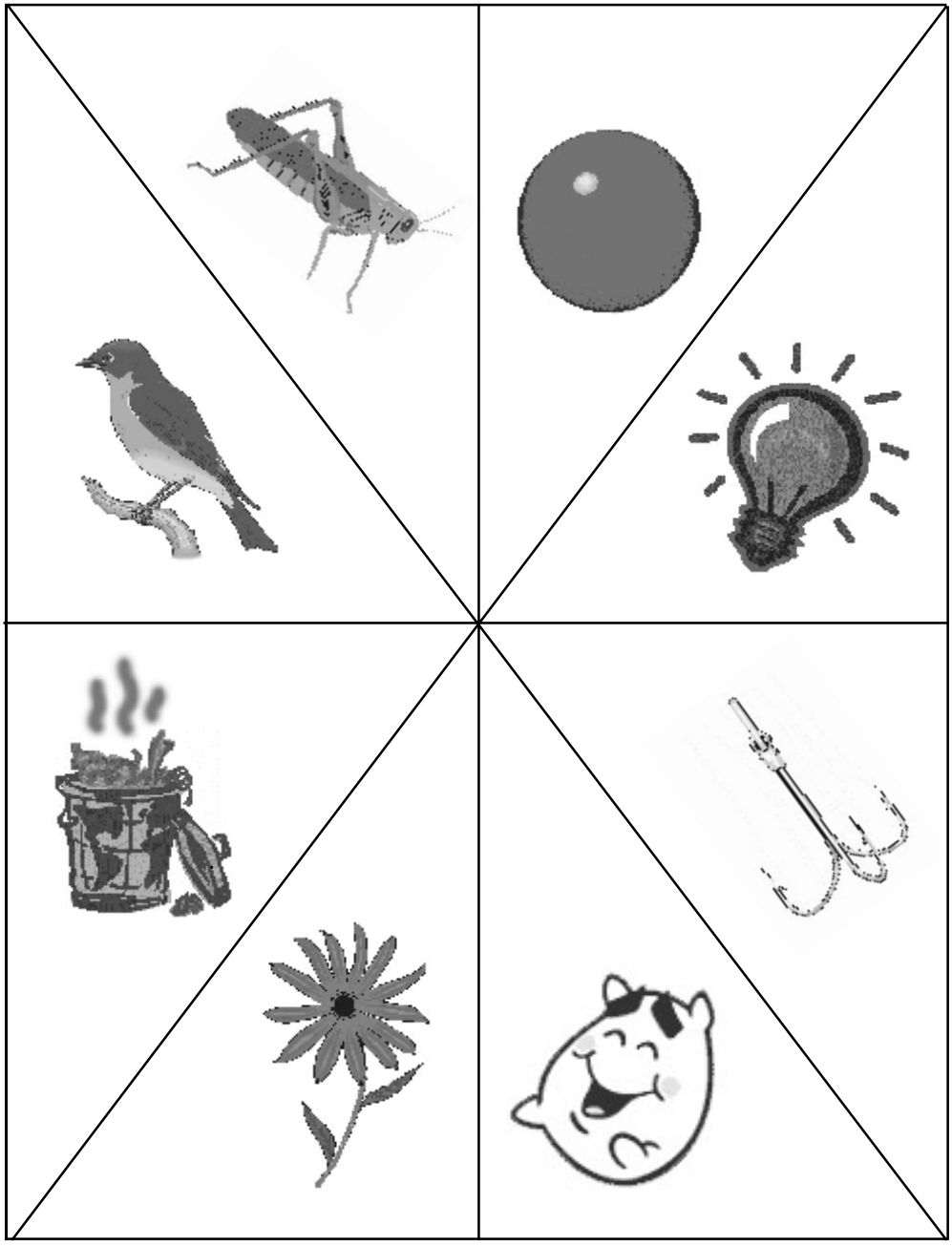
Students return to the circle. Discuss the variations in distance. Note that a dog has 44 times more smell receptor cells than a human, so dogs can smell 44 times better. Estimate for the students from what distance a dog could smell the scent on the plate. Discuss the odor. Was the smell good or bad? Strong or weak? Sour or sweet?

Open the window (or turn on a fan) to disperse the odors during recess.

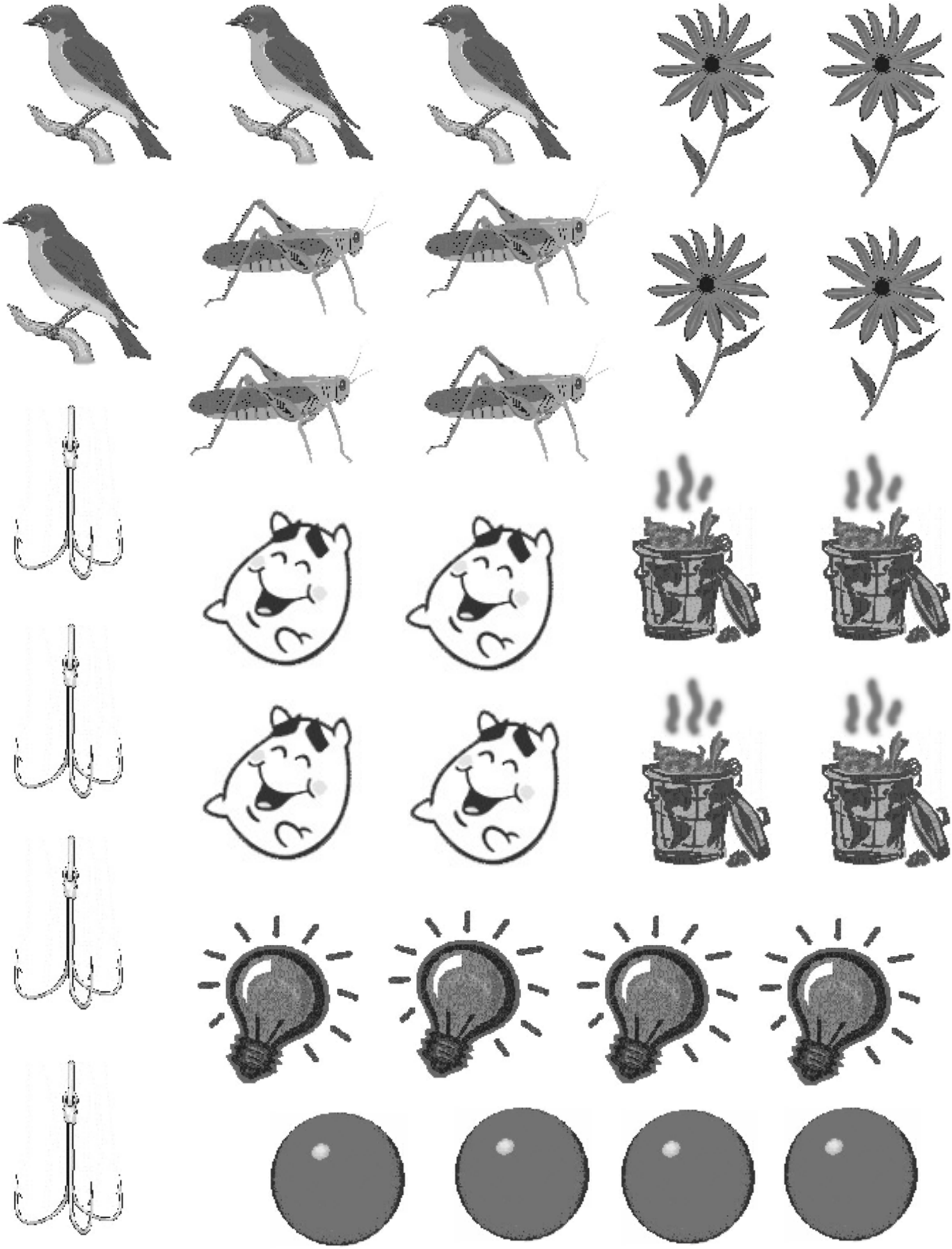
Materials

Various scents such as peppermint or vanilla extract, lemon oil, eucalyptus oil, spiced tea, damp bar of pine scented soap, coffee, measuring tape, marking devices, such as masking tape or blocks, Paper Plate, Fan

Go Find it!



Go Find it Stickers



Butterflies are Free!

Lesson Information

Grade Level: Grade 1
Season: Spring

Objectives

Understand the life-cycle of butterflies

Learn to recognize characteristics of butterflies

Learn about the habitats of butterflies

Have fun

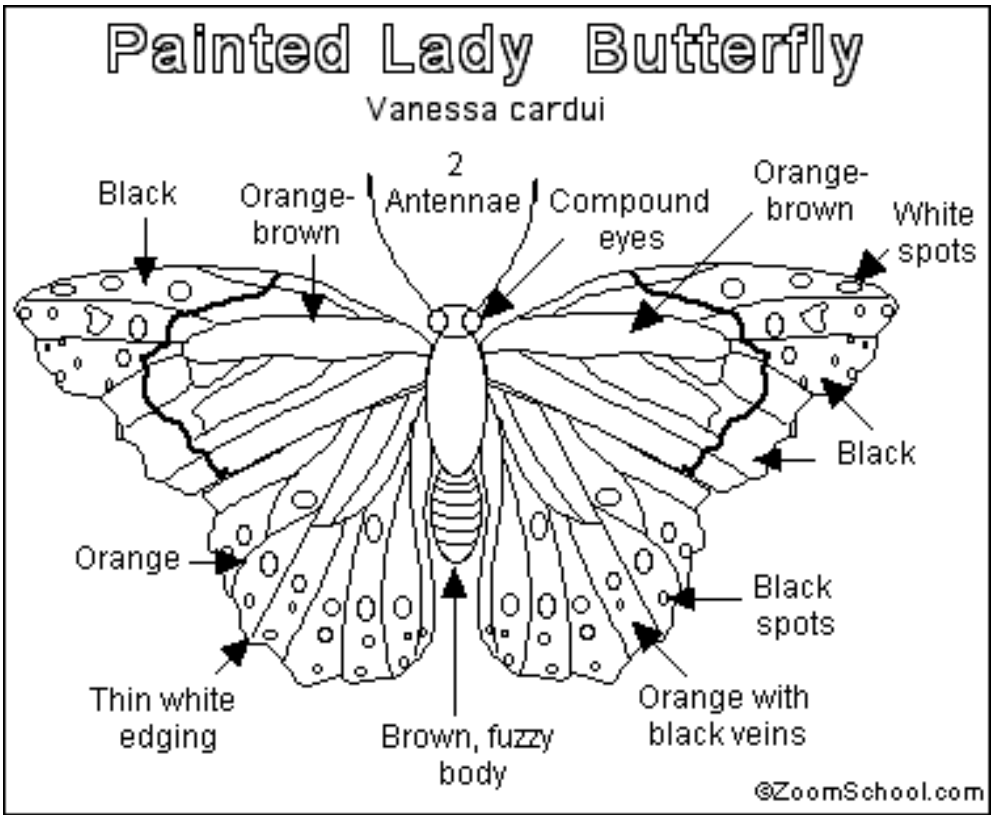
Background Information

Butterflies… flutters of colour that paint the skies. People can often be fearful or not particularly fond of insects in general, but who can dislike butterflies? They are colorful, pretty, and a wonderful tool to teach children about insects, life cycles, and the mysteries of nature.

Butterflies and moths are insects, which means they share the essential characteristics of all insects: they have six legs and three body segments. They also have a visual and well-defined life cycle that goes through four stages: egg, larvae, pupa, and adult. These two last stages have very specific and different functions; the pupa has to eat and grow, and the adult has to mate and reproduce.

Moths and butterflies are an important source of food for many other animals, which can be noticed by the mortality rate of butterflies in the wild - 98%! This is why so many of the butterfly's adaptations are based on protection from predators.

In the SNG, about 23 species of butterflies have been documented. The one that we are going to take a closer look at is the Painted Lady *(Vanessa cardui).*



Butterflies are Free!

Painted Ladies are probably the world's most widely distributed butterflies, occurring in all continents except Australia and Antarctica. It is often called the "cosmopolitan", because it is so widespread around the world. It does not over-winter in Saskatchewan, but migrates from the Southern US and Mexico.

The Painted Lady begins its life cycle as a pale green egg the size of a pinhead. Eggs are laid on thistle, mallow, or hollyhock leaves. The incubation period is 3 to 5 days.

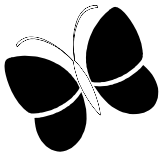
The caterpillar eats continuously for 5 to 10 days before it pupates. It builds a silky, webbed nest after feeding on thistle, mallow, malva, hollyhock, sunflower, canola, nettle, mint, or legume plants like peas or beans. As the larva grows, it sheds its skin. The time between moltings is called an instar.

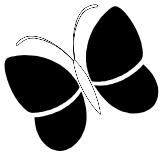
When the caterpillar has grown to the right size, it pupates. It hangs upside-down from a leaf or branch and attaches itself with a single silken string. An adult forms from the caterpillar, whose internal structure changes completely. The chrysalis becomes almost transparent when the butterfly is about to emerge. An adult will emerge about 7 to 10 days after the chrysalis has formed.

When an adult emerges from the split chrysalis, it hangs upside down and pumps blood into its four wings, inflating them. Then it waits for its delicate wings to dry. It can fly a few hours after emerging. The adult Painted Lady is mostly black, brown, and orange with some white spots; the underside is gray with white with red markings. Adults only live about 2 weeks.

The adult feeds on many of the native and non-native species of flowers found in the Saskatoon Natural Grasslands: native thistles, Russian thistle, asters, blazing star, and clover.

Butterflies are Free!





Materials

Butterfly House book (in kit)

Materials

Hungry caterpillar sheet, ethnobotany cards and/or butterfly garden plants list in kit, crayons, pens or coloring pencils, scissors, stapler

Materials

Plastic butterfly cycle kit reproductions, Living Changes excercise sheet

Resources

Bunting, E. and Shed,G. *Butterfly House*. New York, NY: Scholastic Press. 1999.
Scott, J. A. *The Butterflies of North America*. Stanford, CA: Stanford University Press, 1986.
Tilden, J. W. *A Field Guide to Western Butterflies*. Boston, MA: Houghton-Mifflin Co., 1986.
Butterfly and caterpillar songs and poems: http://www.track0.com/canteach/elementary/songspoems26.html
Interactive butterfly life cycle for children: http://butterflywebsite.com/Articles/ShowArticle.cfm?ID=483
Other print-outs: http://www.enchantedlearning.com/subjects/butterfly/
Butterfly Interactive CDROM – Marie Stradeski

Rouse Interest

Butterfly House

Read the SNG kit book *Butterfly House* to the children. What did they think about it? Would they like to try to raise a butterfly themselves? Where would they keep it? What would they do with it when the adult emerged?

The Prairie Hungry Caterpillar

Using the hungry caterpillar activity sheet, have students cut and colour the pictures. Staple the pictures together to make a book. Show children some different prairie flowers and berries (you can use the ethnobotany cards from the kit or the butterfly garden plants list) and ask them to draw which one they think the caterpillar would like to eat, on the blank card. Staple the pictures in the correct order to make a book.

Living Changes

Use the Painted Lady Butterfly Life Cycle Stages plastic reproductions from the kit and show the students the life cycle of the Painted Lady. You can start with the egg and go on from there, explaining the life cycle. To make the activity easier for the children, place some emphasis on what things eat on the different stages and where they would be found. For example: The egg is laid on an edible plant, then when the caterpillar emerges he will eat and eat and eat. After you have finished, you should scramble the reproductions and get four volunteers to get a reprodution each and place themselves in the correct cycle order in front of the class.

Copy **The Living Changes** exercise sheet and hand them out to the children. Explain to them what they have to do in the exercise: cut out the pictures at the bottom of the page, glue the pictures to the right spot, and label each picture with the right word.

Butterflies are Free!

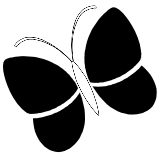
Relate

Materials

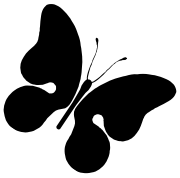
Painted Lady Larvae, container or terrarium to house caterpillars, plants or bought food

Raising Friends

The first step in this activity it is to order the butterfly larvae. Some good ordering sources are:

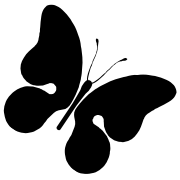


Northwest Scientific Supply ltd.
301,3060 Cedar Hill Road
PO Box 6100, LCD 1
Victoria, BC V8P 5L4
Toll Free phone: 1-800- 663-5890 Toll Free fax: 1-800-797-5773
Phone: (250) 592-2438 Fax: (250) 592-1341
E-mail: service@nwscience.com
Website: www.nwscience.com

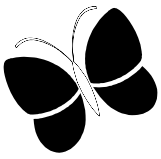


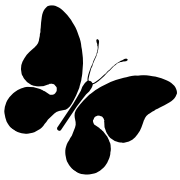
Impeco Educ. Res.
30, Theodore Drive
Mississauga, Ontario
L5M 1E4
Phone: (416) 826-7735

It is important to take into consideration your timing when ordering, especially if you are intending to release the butterflies into the Grasslands. The time of delivery of the larvae, added to the time they take to complete their life cycle (usually 14 to 26 days) have to correspond to a suitable time of the year to release the adult butterflies. If you are in Saskatchewan, you probably should not be ordering larvae before May, unless you want butterfly popsicles.



Once you order your wiggly friends, you have to decide on a suitable place to put them when they arrive. This will have to be decided according to your resources. It can be anything as simple as a glass jar covered with gauze, to a flight cage ordered from the supplier, to a terrarium. I would suggest having a natural setting terrarium and planting some native flowers and plants in it that could feed your caterpillar. Some nice little branches for the pupae to hang on to are also aesthetically pleasing. You can look at the native flowers for butterflies section following this lesson to get ideas of plants to grow. You can also look at the Native Plants Society of Saskatchewan web-site: http://www.npss.sk.ca/ to find suppliers of native seeds. If you plant flowers or plants that are edible for your larvae, you may not have to feed them soybean-wheatgerm insect diet. Furthermore, the experience of actually seeing the larvae eat live plants that can be seen in the grasslands may be a very rewarding lesson to the students. The larvae or butterfly kits usually come with detailed instructions on what to do once your larvae arrive.



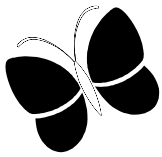


Butterflies are Free!

Butterfly Board and Journal

Materials
Construction Paper, crayons, pencils, pens, small notebooks to use as journals

Students will observe and record the life cycle in a "butterfly board" or journal. Start with handmade or painted caterpillars followed by drawings of crysalis; adult butterflies. **The Life of My Painted Lady**, and a nice butterfly collage could be done on the cover.



Fly, Fly, Butterfly!

Once the adults emerge, it is recommended that you release them within three days. This is an important part of the activity, and should be handled with care. Put all of your butterflies in a box or something you can carry to the trail. Choose a trail that has a designated grass sitting spot and take your students out. Have them all sit at the resting spot in a circle and talk about the butterflies and how they are feeling, how they think the butterflies are feeling and what they think the butterflies will do when they get out.

When you are ready to release them, sing with the students *Fly, Fly, Butterfly* to the tune of *Baa Baa Black Sheep* which they should have memorized and practiced earlier. Open the box and let them go.

Materials
Butterflies, A musical instrument that can be carried

Fly, fly butterfly go where you will
from flower to flower eat your fill
Nectar for you, beauty for me
what a great gift you've turned out to be
Fly fly butterfly go where you will
from flower to flower eat your fill

Butterfly Garden

Materials
A garden spot, seeds, planting tools, Native Flower Poster

Students will create a native plant and flower garden. The editor of this guide has published *Butterfly Gardens,* an early chapter book that tells the story of students who plan and plant a native garden. It is available in every school resource center or from the author, Judith Benson, jg.benson@shaw.ca. Also see the Native Plant Society of Saskatchewan web-site: http://www.npss.sk.ca/.

Butterflies are Free!

Reflect

Paint the Lady

Materials
Copy of the Painted Lady picture

Students will learn to identify the Painted Lady as they colour their own picture (photocopied and enlarged picture on p.144) in its natural colors. Display the pictures on a bulletin board and make realistic looking replicas of plants the larvae eat. Add plants artwork which students completed during the Butterflies Are Free activities.

Looking for Friends

Materials
Binoculars, walking shoes, and desire to find butterflies

Students will return to the Grasslands a short time after releasing their butterflies to observe them in nature. Walk along the same trail and sit in the same area where butterflies were released. Observe other butterflies and familiar "butterfly plants".

Back in the classroom, discuss findings. Review the fact that most adult butterflies have a short life. They live to eat and lay their eggs and the cycle continues.

Materials
Finger Puppets, plastic butterfly cycle reproductions

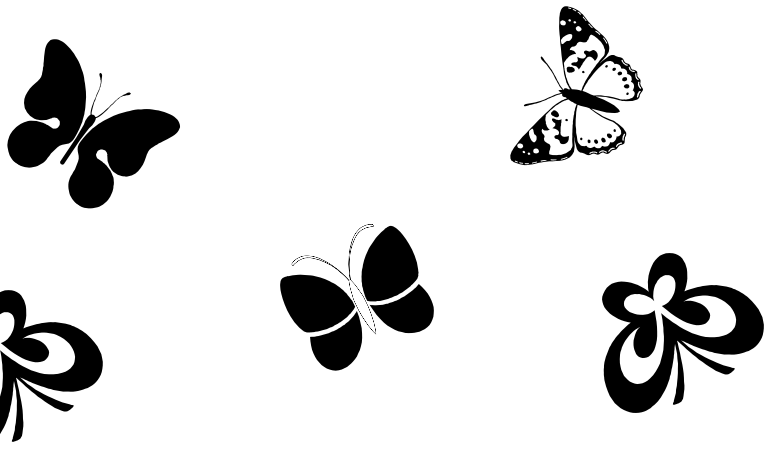
Insect Lives Puppet Show

Materials
Variety of materials and creative butterflying ideas

Students will use insect finger puppets and plastic butterfly models to tell stories or plan a play that depicts the life cycle of the Painted Lady. Use the example in *Hands-On-Nature* p.127.

Butterflying

Students will plan a butterfly festival with butterfly kites, balloons, mobiles, cookies, their stories and plays and other fun forms of expression to honor butterflies. Invite parents and share a snack outside, preferably near a flower bed or school butterfly garden.



Living Changes

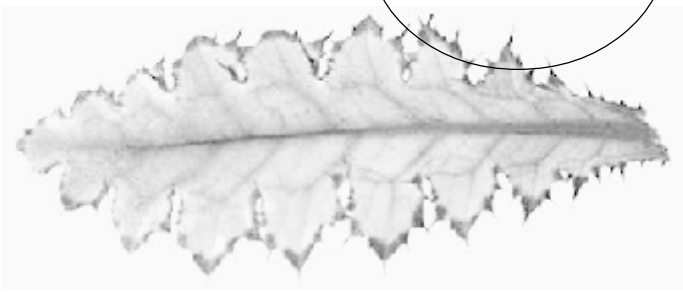
Complete the Life Cycle of this Painted Lady...

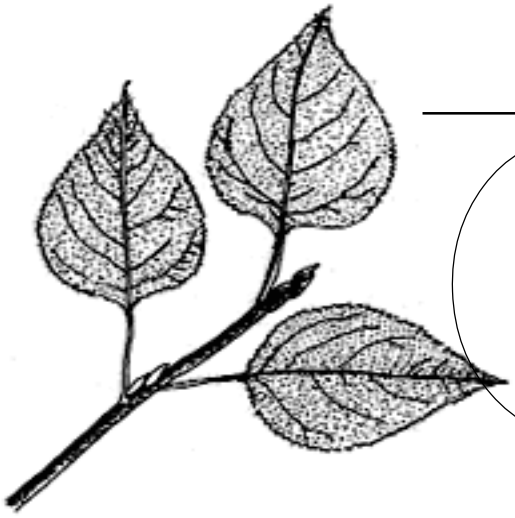
1. Cut out the pictures at the bottom of the page.

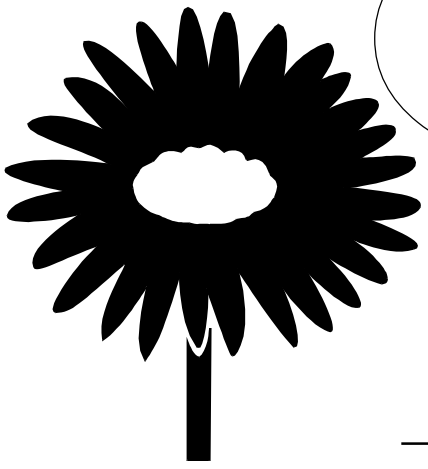
2. Paste the pictures in the correct order.

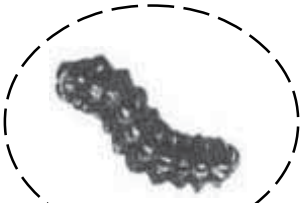
3. Label each picture with one of these words:

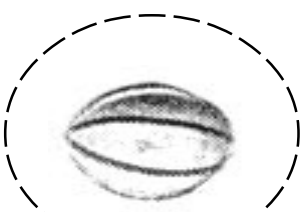
EGG CATERPILLAR CHRYSALIS BUTTERFLY











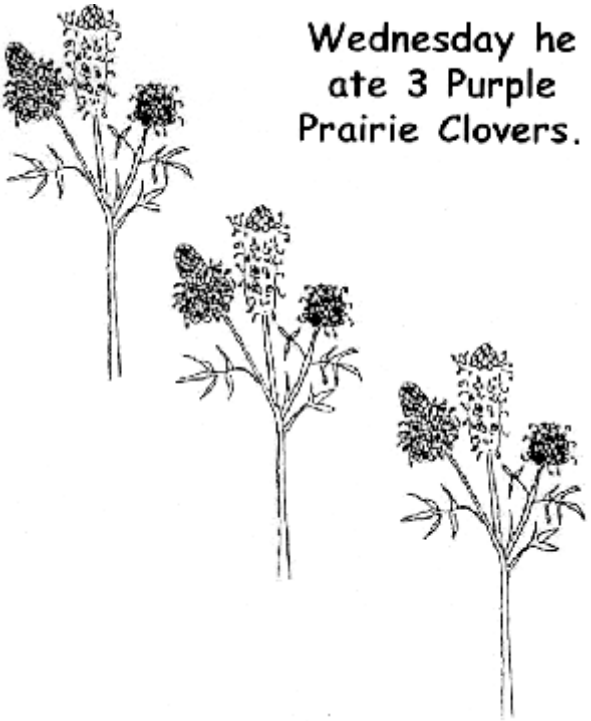
The Prairie Hungry Caterpillar Book

My Prairie Caterpillar Book

The Caterpillar was hungry.
Monday he ate one thistle leaf.

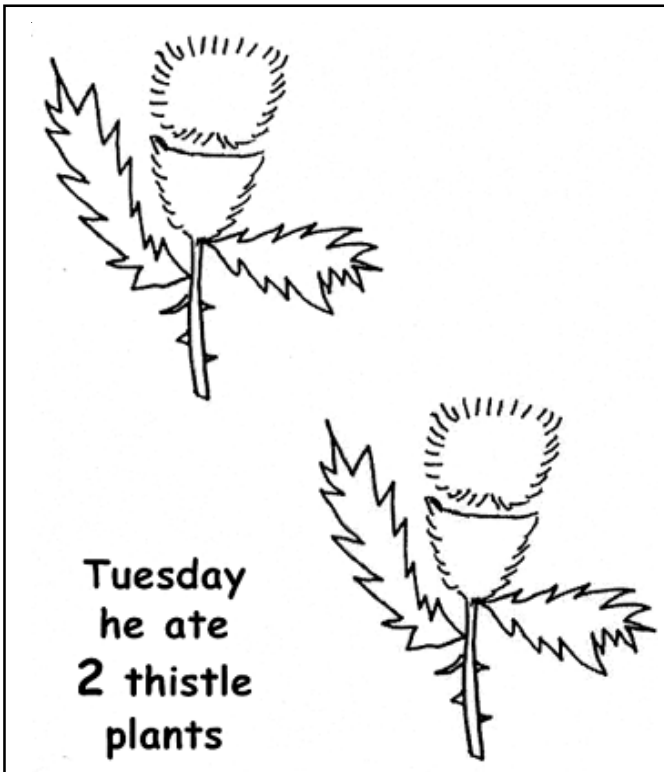
That night he had a stomachache

Thursday he ate four **Gallardias**

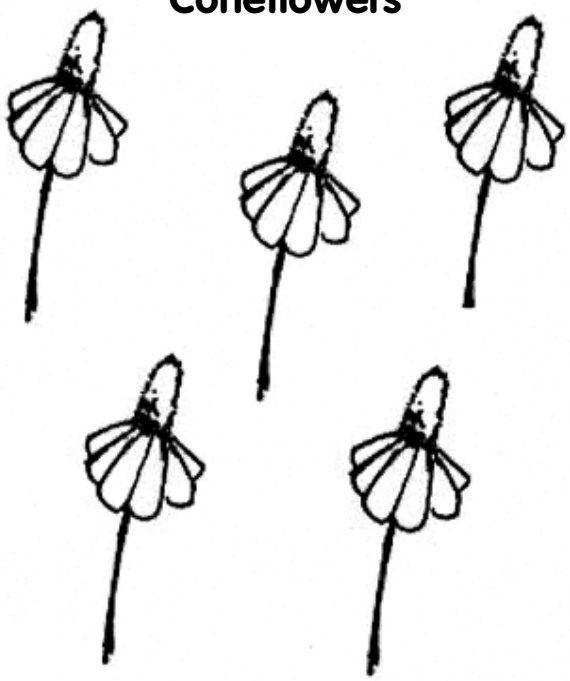


Wednesday he ate 3 Purple Prairie Clovers.

The Prairie Flower Caterpillar Book



Friday he ate 5 Prairie Coneflowers



The caterpillar might like my favorite native flower too!

Example of Prairie Butterfly Flowers

Golden Bean

Silverleaf Psoralea

Aster

Blazing Star

Flodman's Thistle

Brown-eyed Susan

Goldenrod

Yarrow

Purple Prairie-Clover

Butterflies are Free /153

Migration Mysteries

Background Information

Approximately one third of bird species migrate. Migration allows birds to find food for survival and habitat for mating and nesting. Although we revere in our observations of migrating flocks in spring and fall, we must appreciate the dangers involved – and the mysteries. How do these small animals manage?

Nightflight lessens the hazard of predators. Tall buildings, fog, freezing rain, snow, airplanes, and light pollution present obstacles for nocturnal flyers. Most of these dangers deter diurnal (daytime) migratory birds as well, including larger birds and predatory species. To improve survival, birds gather to migrate in flocks, even those who ordinarily spend the rest of their lives as solitary beings.

Dwindling food supplies, changes in the amount and angle of daylight, and low barometric pressure signal birds to gather and migrate south. Conversely, high pressure and an increasing amount of daylight signal northward migration in spring. Nesting, availability of habitat, and sufficient food supplies for young press migration northward.

Migratory flightpaths usually remain consistent from year to year as do resting and feeding grounds en route. The replacement of natural habitat by human development further increases migratory birds' struggle to reach both northern and southern destinations.

(For more information, see *Hands-On Nature*, p.141-142 and www.inhs.uiuc.edu/chf/pub/virtualbird/teacher/lespl8.html)

Rouse Interest

Puppet Show: Fly Away or Stay?

Use or adapt the puppet show on migration in *Hands-On Nature*, p.148-149.

Migration Obstacle Course

Students will simulate bird migration by setting up an obstacle course (p.157) and "flying" through it. Mark a rectangular area as a migration flyway, noting one end as north and the opposite end as south. Ask children to name obstacles that birds might encounter during migration. The teacher records answers on cards that have a neck string attached.

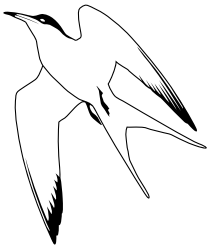
Lesson Information

Grade: Two
Season: Fall/Spring

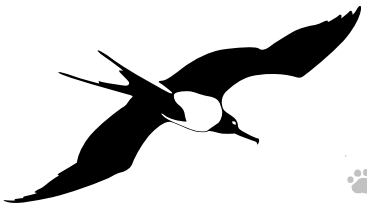
Objectives

To experience the many hazards of migration and thus understand why many birds do not survive the trip

Students simulate migration and relate habitat events to population size



The students will be able to understand the use of wetlands by migrating birds



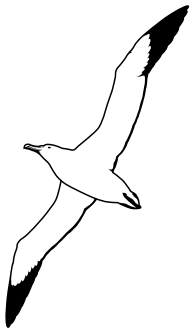
Migration Mysteries

Materials

Cones or flags for boundary markers
Obstacle neck signs (with string for hanging around neck) depicting fog, high wind, towers, lack of food, cold rain, filled in marsh, new building, lots of cats, trees cut down at resting spot, electrical wires, plus student ideas.

Give one-quarter of students the obstacle name tags. The other three-quarters are migrating birds. "Obstacles" place themselves within the boundaries and must keep their left foot stationary as they attempt to tag birds in flight and render them out of the game. They decide how to imitate the obstacle, e.g., a building would stand tall and rigid. When teacher signals "Go!" birds attempt to fly south without being tagged by an obstacle. If tagged, the bird "dies" and falls dramatically to the ground and moves just outside the boundary. Play continues until all birds have either safely migrated or been waylaid by obstacles. Play the game several times, changing roles.

Sit in a circle to discuss how humans could eliminate certain obstacles or make them less harmful in consideration of bird migration. Repeat the game with alterations and eliminated obstacles (e.g. kneel to shorten buildings, remove above-ground electricity wires, office buildings turn off lights, eliminate mirrored windows, etc.). Play again and compare migration success rates. (From *Hands-On Nature*, p. 144.)



Migration Activation!

Students learn the promises and pitfalls of annual migration in this dynamic, action-packed game! The teacher prepares and copies 10 sets of the following Good News/Bad News cards. (Print one message per card.)

Materials

140 - 3" x 5" note cards (punched with neck strings), chalk (for marking boundary), two shoe boxes
five labeled envelopes (for Years 1-5)
large playing field or gym

Wintering Habitat cards

- ☐ hunting kills 4 ducks
- ☐ wetlands drained-- remove one "X," 4 ducks die
- ☐ habitat improved--survive and thrive!
- ☐ extra food--survive and thrive!
- ☐ plenty of rain:--survive and thrive!
- ☐ cholera kills 4 ducks
- ☐ exhaustion kills 4 ducks

Nesting Habitat cards

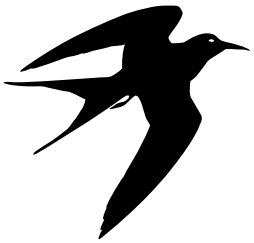
- ☐ botulism kills 4 ducks
- ☐ raccoon steals eggs-- no new ducklings
- ☐ nestland protected-- add 2 ducklings
- ☐ mild weather-- add 2 ducklings
- ☐ good ground cover-- add 3 ducklings
- ☐ severe drought-- 4 ducks die
- ☐ nests disturbed-- remove one "X," no new ducklings

Fold Wintering Habitat cards and place into labeled shoebox. Repeat with Nesting Habitat cards in separate box.

Migration Mysteries

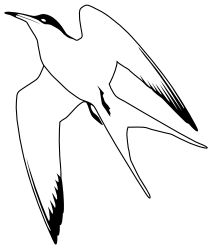
Mark "Xs" (one for every four students) on the playing field or gym floor with tape or chalk as shown below.

	X X	X X	
Wintering	X X	X X	Nesting
	X X	X X	
	X X	X X	



One student is a biologist who collects the cards at the end of each season and places them in an envelope. One nesting and one winter habitat season should go in each envelope. At the end of each nesting season he/she counts the surviors and records this on the envelope.

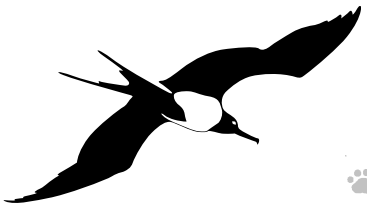
Explain to students that they will all begin the activity as hatchlings in the nesting grounds up north. Each habitat houses only 4 "birds" who must keep one foot on the "X". If a student can't locate an "X" with fewer than four students on it, he/she is considered a dead duck and must stand on the sidelines and wait for an opportunity to return to the flock. To control the excitement of the game, announce that anyone who wastes energy roughhousing or running perishes from exhaustion and must leave the game.



To migrate, students wait for teacher's signal and then walk quickly to an "X" at the other end of the gym.

Once settled on their "Xs," one student from each "X" draws a card from one of the habitat boxes. If a student draws a Bad News card, his/her group will be considered dead ducks and must watch from the sidelines. Students can re-enter the flock only when cards are drawn that call for new ducklings. In some cases, "Xs" may be eliminated due to habitat loss, making survival even more competitive upon the return trip. Ducks complete five full migration cycles, and end up in the nesting grounds on the fifth year.

Ask students the following questions:
What happened during the game? (consult Biologist)
What sorts of things resulted in good news for the birds? Bad news?
What can we do to prevent bad events or promote good events?



Migration Mysteries

Extension

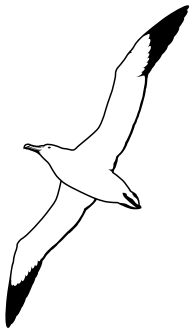
For a Math Activity:

Graph the results of the biologist's duck counts. Were there trends or cycles? Why does the number of animals in a population fluctuate over time?

Council for Environmental Education. Adapted with permission from Project WILD, 1987, 1992.

Hopskotch Migration

Students will simulate birds who stop to rest and feed in wetlands during northern migration within the United States. (Teacher can identify specific migration patterns and bird species from a bird field guide.)



This activity works best on a sandy section of playground or asphalt area. The teacher draws a large hopscotch-like course (3'x3' squares, in a line twelve squares long) in the sand with a stick or on hard surface with chalk.

Students line up at start line. Explain that each square represents a wetland between Texas and Montana, or another northern state. Challenge birds to migrate northward on the course one at a time. They do not have to step in every square, however, they must not go outside the lines.

Materials

pavement chalk or sand and a stick

All students should achieve success during the first migration. Then teacher becomes a developer who will destroy 2 wetland areas to build a subdivision. Draw an "X" on two of the squares. Students fly north once again, without stepping in destroyed wetland squares. I f they do, they die and must sit well behind the sidelines. After all students have migrated, destroy two more and repeat the procedure. Repeat this until all students fail to make the migration. Try to "X" off the squares in such a way that not all are destroyed but are so far apart students cannot make the jump. This will help with the debriefing.

Questions for discussion:

Why did some birds die sooner than others?
Why did all of the birds eventually die?
How does this game represent migration?
Why did the birds die even though some wetlands remained at the end of the game?

Migration Mysteries

Why must we save wetlands?
How do migrating birds depend on wetlands during migration?

Source: http://www.tnrcc.state.tx.us/exec/sbea/tes/lessons99/hopskotch.html.
Submitted by: Marie Marks, Texas Lutheran University. 1999.

Relate

Birdwatching

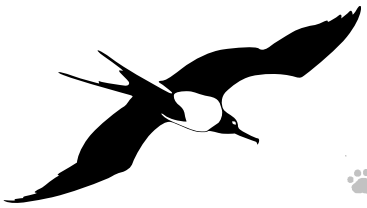
- Students will learn the art of birdwatching, or "birding" as the experts call it. Birding is one of the fastest growing pastimes in North America. Viewing videos and audio tapes will help prepare students. Plan a route within the Grasslands and buffer zone *en route.* Prepare students with the following information. Birds have keen vision, especially for color. A red jacket or a yellow tuque become alarm signals, thus, students should wear neutral colors that blend with their surroundings. Birds also have keen hearing, thus students should walk lightly along the path and refrain from chatting. When they site a bird (or insect or mammal) they need to freeze in place and point. Model this. Other students should be aware that a classmate might signal at any time and deserves their mutual respect. Each student or pair of students needs binoculars, a clipboard with pencil attached, bird checklist, and bird guide. Dividing the class into groups of ten or less, each with an adult leader, insures more sightings.
- Students check off birds they see and/or hear.
- Back in the classroom students research a Grasslands bird, including its migratory path.
- On a large world map, chart the migratory route of each bird studied, using a different color of yarn for each bird. Create a legend using yarn and bird names (see National Geographic website for maps).
- If you take the students on a bird walk in fall, you may take them again in the winter to check off birds that migrated to the Grasslands from the north and in the spring to check off the southern migrants.

Materials

Binoculars, Clipboards, pencils, Copies of bird checklist, Large world map or map of the Americas, Multicolored yarn

Birds you might look for

- Ruby-throated Hummingbird
- Yellow-Rumped Warbler
- Oven Bird
- Black-billed Magpie
- Western Meadowlark
- Black-capped Chicadee
- Grackle
- Red-winged Blackbird
- Mourning Dove
- Gulls
- Clay-colored Sparrow
- Blue Jay
- Gray Catbird
- Veery
- Wood Thrush
- Red-eyed Vireo
- Robin
- Wrens
- Orioles
- Swainson's Hawk



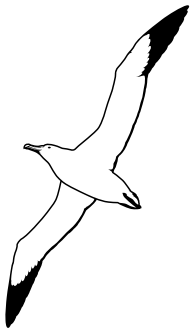
Migration Mysteries

Pelican Watch

Take part in the annual Meewasin Realty Executives Pelican Watch Contest. Every March, Meewasin invites entries from the public to guess the time and date of the return of the pelicans to the weir. Student entries are welcome by mail, fax or email to Meewasin Valley Authority. See www.meewasin.com for details.

Bird Garden

Plant shrubs, trees, and flowering plants to attract birds to the school yard or home. Choose native plants that produce bright flowers, seed pods and/or berries. Consult the phone book for nurseries that stock native plants. Photograph or video tape the process of establishing your bird garden and share it with The Wild Ones at http://www.thewildones.org/Curric/migration.html).



The editor of this guide has published a short novel that follows a grade four/five class through the step by step process of planning and planting a wildlife garden. *Butterfly Gardens* can be found in school resource centers, public libraries or ordered directly from the author, Judith Benson, at jg.benson@shaw.ca.

Reflect

Migration Story

Students will complete a bird migration story as introduced by the teacher. Read the story on the following page aloud to your class as they read along on their individual copies. Students use their accumulated knowledge to complete the story in the space allowed. After illustrating their stories, students read them in a sharing circle in the classroom or in a designated area of the Grasslands.

Migration Diary

Refer to Hands-on Nature, p. 143-146.

NOTE: For a booklet that includes a Shorebird Migration Routes map--*Beyond Borders: Shorebirds of the Western Hemisphere*-- (p. 5), write to The Saskatchewan Wetland Conservation Corporation, Room 101, 2022 Cornwall Street, Regina, SK, S4P 2K5, for a free copy. This publication is written in both English and Spanish.

Migration Mysteries

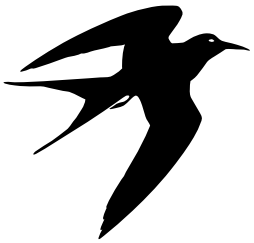
Harriet Harrier's Big Trip

Date: September 30

Harriet Harrier soars through the air, higher than she has ever been, with her sister Henrietta within calling distance.

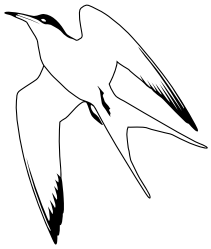
"I can't wait to see our new home in Mexico," calls Harriet.

" I can't believe we are flying tomorrow. I'm going to miss our home in Saskatoon and the ground nest where we were born," replied Henrietta sadly.



"But it's getting cold here at night and the darkness comes earlier and earlier," said Harriet. "Mom says it's warm in Mexico and that we can find lots of food there."

"I'm still scared. Remember Mom told us of the dangers for young birds who fly that far? She said her cousin's young one crashed into a tall building one night when he saw his reflection in a window. She also had a friend who choked on bad air from those people-mobiles."



"We'll survive, Sis. I know it. Mom will stay with us the whole time. Plus will be with a whole flock of other harriers. Hey! Look at that succulent vole down there! I'm going for it! Just watch me!"

Harriet swoops down, circles her prey and snatches it in her talons for a mid-afternoon snack. Henrietta spots a songbird and takes off.

Activity: Your turn to finish the story!

Harriet and Henrietta are five months old and ready for their first big trip south. They are going with their mother, two brothers and one other sister. Mother has taught them hunting skills and the importance of staying in the harrier flock. On their own, inexperienced hawks can be easy targets for predators.

What do Harriet and her family see after they take off on October 1? Are they distracted and lose sight of their flock? What dangers do they encounter? Write down your ending for this story on the back of this page. Then draw a picture.

Earthworm Ecology

Background Information

The earthworm aerates and enriches soil needed for growing healthy food-producing plants. Aeration increases the amount of air and water entering the soil. Worms break down leaves, grasses and other organic matter into nutrients for future plant growth. As worms eat, their excrement, or castings, fertilize the soil. As they burrow into the ground, they bring organic matter from the surface and mix it with the soil below.

Worms have a mouth through which they ingest their food. They coat the food with saliva, which softens it for easier digestion. The swallowed food passes through the esophagus to the crop and then to the gizzard where small stones grind it up as the worm tenses and relaxes its muscles. Food then passes through the intestine, which extends through most of the body. At the end of their intestine an opening allows for the passage of castings.

Worms do not have lungs; they breathe through their skin. The oxygen absorbed through their skin quickly enters the bloodstream. The skin must remain moist to enable oxygen to pass through. Excess water is detrimental, however, because worms will drown.

Earthworms use muscles and setae, or bristles, to move. Some muscles encircle the body and others run along its length. When the circular muscles tighten up, the body becomes thinner and longer. This movement squeezes the front end forward. As the long muscles squeeze together they move the rear end of the body towards the front end. The setae also aid in moving. The worm anchors itself with its rear bristles and stretches forward. Then it holds on with the front bristles and moves the rear of its body forward. Bristles are also used for protection from predators. As a robin tries to pull an earthworm from the soil, the worm uses its bristles for resistance.

Earthworms do not have eyes or ears, yet are sensitive to light and noise. They react to the vibrations of ground squirrels digging into the earth, which warns worms to move over. Human footfalls cause the same reaction. If you look closely, you may notice earthworms crawling quickly into their holes in response to your footsteps.

Lesson Information

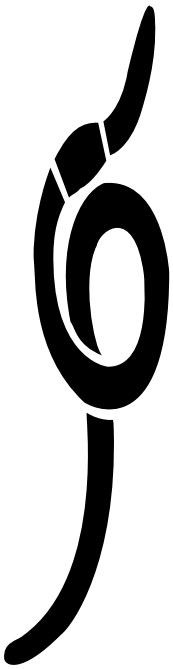
Grade Three
Spring or Fall

Objectives

Students will observe worms to enter into the mystery of their life cycle

Students will participate in a volunteer monitoring program for worms

Earthworm Ecology



Earthworms are hermaphrodites; they have both male and female reproductive parts. They mate by joining together with other worms and exchanging sperm, which is then stored in sacs. A cocoon forms and within about three weeks, baby worms hatch. In about six weeks they produce offspring. The cycle continues.

Earthworms always leave their environment in a far better state than they find it--a good lesson for humans. Worms eat potato and banana peelings, carrots, lettuce, cabbage, celery, apples, grapefruit and orange rind, tea leaves, and coffee grounds if composted. Earthworms live in soil that will provide nutrients. If a person notices worms in their garden, they know they have healthy soil.

Rouse Interest

How Ernie and I Met... (Cynthia Carbiere)
Source: http://www.naturewatch.ca/english/wormwatch

Students will learn about earthworms and learn new vocabulary through poetry. An Ernie the Earthworm sock puppet might "read" the poem, or students may alternate reading verses. First explain words, such as "drawl".

As I was walking home one day,
I heard a voice call and say,

Thank you ma'am for the apple peel,
You provided me with a delicious meal,

Where the voice came from, I did not know,
I looked forwards, backwards, high and low.

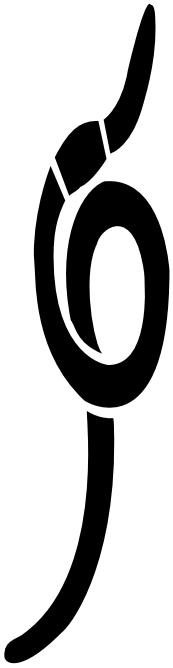
And way down yonder, next to my feet,
Was the friendliest earthworm I ever did meet.

Ernie the Earthworm, so he was called,
The southern worm, with the southern drawl.

Why hello Ernie, what do worms do?
They eat decaying leaves and fungi too.

We burrow through the ground at lightening speeds,
But if a gopher finds us, we're as good as feed.

The burrows we make lets rain water percolate down,
Bringing water to the roots of the plants in the ground.



Earthworm Ecology

Too much rain causes our burrows to flood,
And if we don't leave, we'll be covered in mud.

On the soil surface, several dangers lie,
Sunlight, footsteps and birds in the sky.

If the soil's too dry, it makes my skin ache,
So I curl up in a knot and aestivate.

Thank you Ernie for this enlightening talk,
The tales you've shared sure mean a lot.

Do you think we could hang out again,
I'd like you to be my lifetime earthworm friend.

With a smile on his face, Ernie did say,
That sounds like the best plan I've heard all day.

Though I don't have an address, I'm easily found,
Just look for the castings I leave on the ground.

So we exchanged our good-byes as the sun set,
And that is the story of how Ernie and I met.

Poetry in Motion

Students will compare earthworm requirements for survival to human requirements. After reading "How Ernie and I Met", hand out copies of the Poetry in Motion sheet on p. 169. As a class, answer the questions on the sheet, using the information from the poem.

Relate

Worm Wonders

Materials
Live earthworms, plates, water, measuring cup, short rulers, magnifying glasses

Students will observe earthworms and begin to explore their form and function. Demonstrate proper handling of worms. Give each group of two or three a plate with a thin film of water in it (about ¼ cup) to serve as a moist surface on which to rest during observation.

Ask:
1. How many segments or rings do you see?
2. Whose worm has the most segments?

Earthworm Ecology

3. How long is each worm?
4. Whose worm is the longest? Shortest?
5. Are the worms' bodies perfectly smooth?
6. At which end is the earthworm's head?
7. Can you find the bristles (like tiny whiskers) on the worms' bodies? When you touch the worms, what happens? What enables them to move?

Constructing an Earthworm Ecosystem

Students will construct a pop bottle ecosystem.

Prepare materials for the class. Soak off the label on a thoroughly rinsed two litre pop bottle. Using an exacto knife, cut off the top 1/4 of the bottle. (After filling the bottle, you will put it back together with tape.) Drill three or four small holes in the bottle cap, four to six drainage holes in the bottom of the bottle and ten to twelve holes in the top 1/4. Students add clean, washed gravel to the bottom of the bottle and layer with moist bedding material, dark potting soil, moist sand and more dark potting soil, topped with a thin layer of organic matter (fruit and vegetable scraps). Drop three or four earthworms on top of the food. Tape the cut portion onto the bottom portion of the bottle using clear duct tape. Wrap aluminum foil around it to limit the invasion of daylight, but expose holes so air can circulate through the unfilled section of the bottle. Check every day, moisten soil when it dries out and add moist food as needed. Observe and record progress from day to day.

1. What happens to the organic matter on the surface of the ecosystem?
2. Describe what earthworms do to the soil.
3. Why are earthworms classified as decomposers?
4. Based on your observations, what benefits do earthworms have on a soil ecosystem?

Materials

At least one clear 2-litre pop bottle, Exacto knife, drill, washed gravel, moist bedding material such as paper towels or newspaper, potting soil, sand, organic matter, earthworms, clear duct tape, scissors, old spoons, notebooks or journals

Worm Watch

Students will volunteer in the national Worm Watch program to monitor ecological changes that may be affecting the environment. Arrange with the school caretaker locations where students can dig for worms. Teach the easy-to-use national protocol, record observations and send findings to Environment Canada. For details, consult: Environment Canada, Worm Watch: http://www.naturewatch.ca/english/wormwatch/activities/bottle.html

Earthworm Ecology

Reflect

Ernie's Spring Adventure

Students will write a story about Ernie Earthworm by filling in the blanks below.

It was a sunny Spring day and the grass was especially moist and green. Ernie was _____ and wanted to _____. He noticed lots of his cousins _____in the grass. On his way over to join them, he saw Mr. Jones coming with a _____. As he slithered towards the cover of the garden he saw a _____. His luck had turned. He trembled with _____ so decided to go underground. Once he got underground he found _____ and _____. He was hungry for lunch. He discovered some _____ and _____to eat. For dessert he had _____. Then he _____ _____ and dreamed about _____.

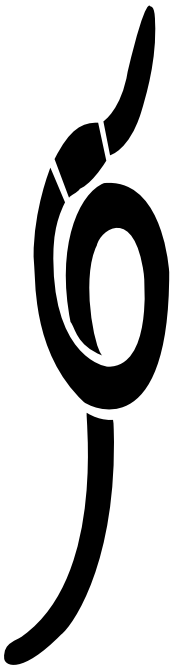
Source: http://www.urbanext.uiuc.edu/worms/funplace/adventure.html

Ode to the Earthworm

Students will write their own poem after reading the following "Ode to the Earthworm".

A pause to thank this worm of earth
Through which some of life's nutrients come to birth
The butt of many jokes and hurt
Tunneler through tons and tons of dirt
The leaves that fall from autumn trees
Ingested in part by worms like these
Mixed in the soil, so new plants thrive
Earthworm labour keeps people alive
Small pinkish thing of so much worth
We thank you gently worm of earth.

Earthworm Ecology



My Day as a Worm

Source: Appelhof, Mary; *Worms Eat Our Garbage*, Flower Press, 1993

Students will imagine they are worms and express their feelings in writing. On reproduced copies of the sentence starters below, complete an original story.

One night I went to sleep and awoke the next morning as a worm. I didn't know which end was my head, so I

_____

Before going to school, I needed a hearty breakfast. I had a special craving for

_____

When I got to school no one recognised me because

_____

The teacher saw me wriggling in my seat and said,
"_____"

After school, it was raining so I

_____

When I awoke the next morning I was a child again. Whenever I see a worm I will

_____

Dirt Cake

Source: Appelhof, Mary, *Worms Eat Our Garbage,* Flower Press, 1993.

Make a delicious dirt cake with your class!

Ingredients:
1 lb. package chocolate sandwich cookies
Two 8-ounce packages cream cheese
¼ cup margarine or butter
1 cup powdered sugar
1 5.9 oz packages of instant chocolate pudding
3 cups milk
1 8-oz non-dairy whipped topping
1 package of candy worms

Materials
Clean plastic flower pot,
Three mixing bowls,
Mixer,
Cake ingredients

Earthworm Ecology

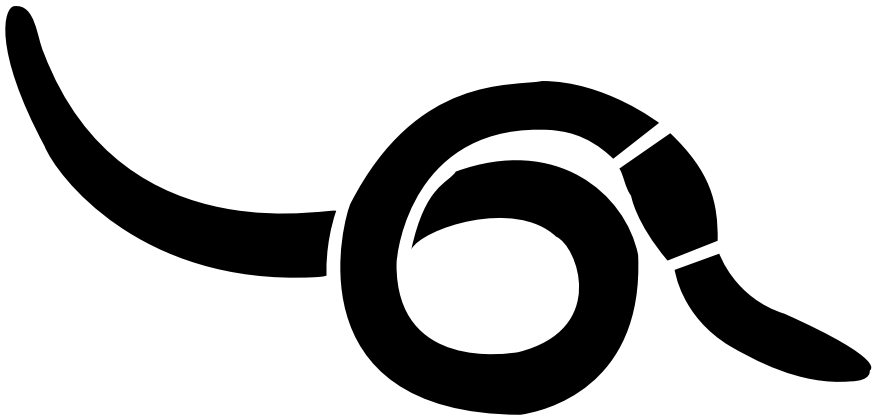
Directions:

1. Place cookies in double plastic bag and crush. Pour into bowl #1.
2. Mix cream cheese, butter, and powdered sugar in bowl #2. (Hint: allow ingredients to warm up to room temperature.)
3. Make chocolate pudding with milk in bowl #3. (Hint: Follow directions on package.)
4. Fold whipped topping into pudding in bowl #3.
5. Mix ingredients in bowl #3 with those in bowl #2. Blend well.
6. In a clean, plastic flowerpot, layer the crushed cookies with creamed ingredients beginning and ending with a layer of crushed cookies.
7. Decorate the cake with gummy worms! Eat immediately or refrigerate.

Additional Resources

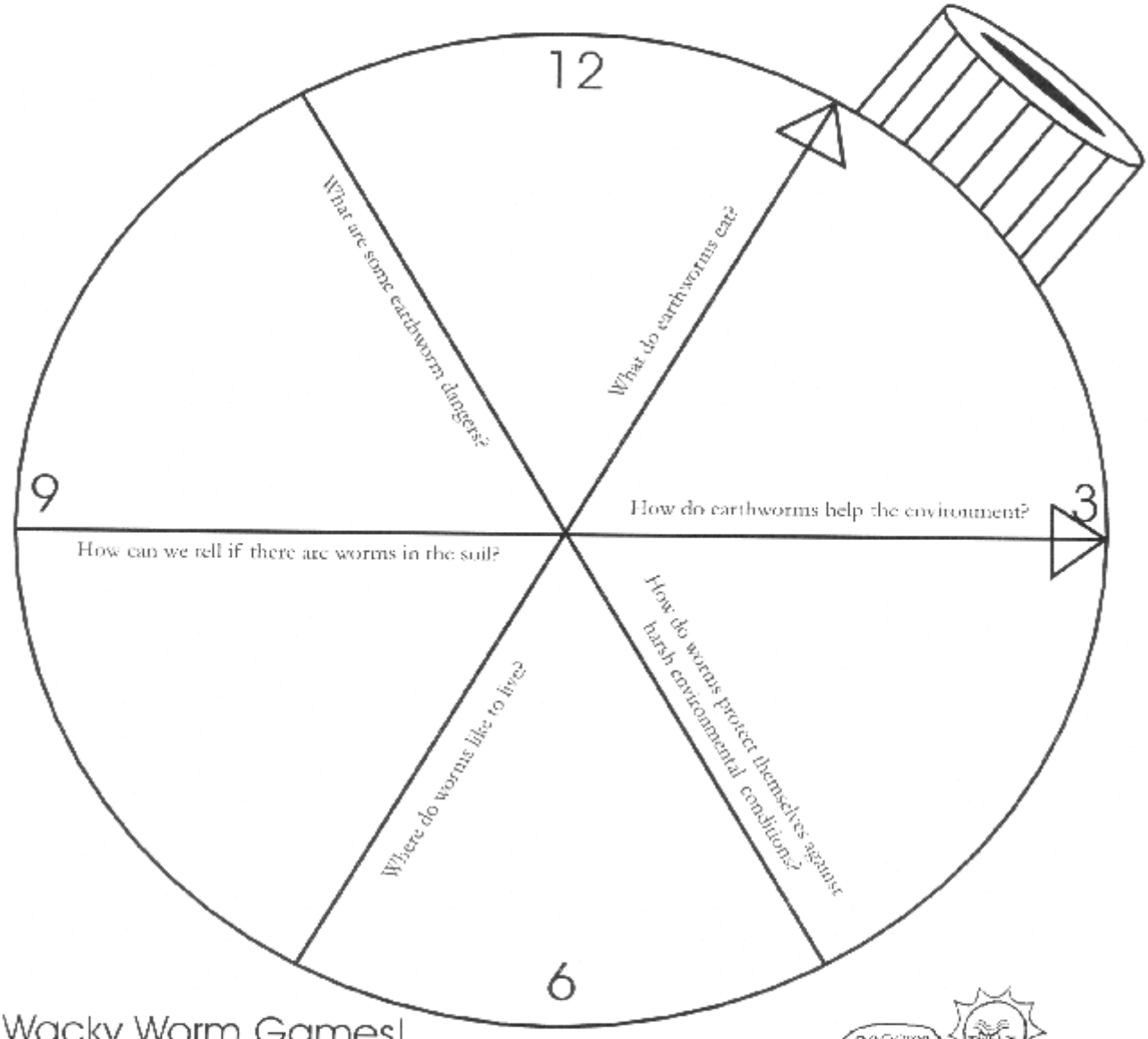
Larson, Gary. *There's a Hair in My Dirt.* Harper Collins, NY, 1999.

Suzuki, David. *Looking at the Environment.* Stoddart: Toronto, ON. 1989. pp. 18-19



How Ernie and I Met - Poetry in Motion!

Read the poem *How Ernie and I Met.* In this poem, Ernie shares with you what it is like to be an earthworm for the day. As a class, answer the following questions using the information in the poem. You will be amazed at how interesting earthworms are!



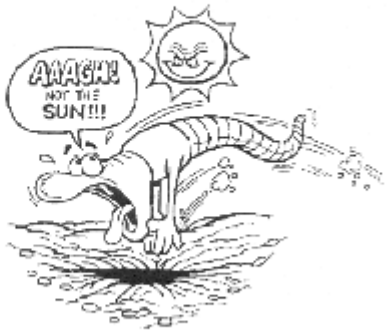
Wacky Worm Games!

Unscramble these earthworm words? Can you dig it?

1. giunf _____

2. lcadeyng _____

3. nsasctig _____



Worm Watch © 2000

How Ernie and I Met

Activity Key

1. What do earthworms eat?

   ANSWER: apple peels, decaying leaves, fungi Earthworms eat all sorts of organic matter such as seeds, bacteria, lawn clippings, decomposing bark.

2. How do earthworms help the environment?

   ANSWER: Earthworms eat decaying matter (they eat our garbage), make burrows which help aerate the ground and brings water to the plant roots. Imagine all the waste that would pile up if we didn't have worms breaking it down!

3. How do worms protect themselves against harsh environmental conditions?

   ANSWER: If the soil is too dry, cold, or doesn't contain enough organic matter, earthworms will tie themselves up into a knot and aestivate. Aestivation is like hibernation for bears, only it can occur anytime during the year.

4. Where do worms like to live?

   ANSWER: As Ernie says, dry conditions "make my skin ache", therefore earthworms need moisture, a food source, and can not come in contact with the sun for long periods of time. They need to be moist because they breath through their skin. Their bodies are sensitive to the sun, and thus they can burn (and eventually dry up) just like us.

5. How can we tell if there are worms in the soil?

   ANSWER: To see if you have earthworms, you must look for earthworm evidence. On the soil surface you will see the openings to their earthworm burrows. You will also see earthworm casts (or castings – basically earthworm poop) on the soil surface. Both of these things indicate earthworm activity.

6. What are some earthworm dangers?

   ANSWER: Earthworms have a lot of things to avoid in their daily lives: gophers, moles, sunlight, footsteps, birds, floods (when their burrows fill up after a heavy rainfall, there isn't enough available oxygen in the soil, so they can't breath), and of course fishermen.

Wacky Worm Games (ANSWERS)

1. fungi
2. decaying
3. castings

Track Tracers

Background Information

The untold mysteries of the grasslands can often be discovered by learning to read signs that animals leave behind. Identification of individual footprints proves useful, but recognition of track patterns provides the quickest clue, especially in snow. Four common Grasslands **track patterns** are left by **the walkers/trotters** (fox, coyote, and deer), **bounders** (weasel), **gallopers** (mice, voles, rabbits, and hares), and **waddlers** (skunk, racoon, badger, and porcupine). The **walkers/trotters** alternate right and left feet, placing the hind feet in the prints made by the front feet to create a straight or nearly straight line of single prints. The **bounder** bounds from snow tunnel to snow tunnel looking for mice and/or voles, its front feet get planted nearly side by side. As it leaps forward, its back feet fall into the tracks of the front feet, creating a track pattern that looks like that of a small two-footed animal hopping through the snow. The **gallopers** push off with their front feet and then swing their two back feet around so that they land just in front of the smaller front feet. **Waddlers**, having short legs, waddle from side to side, creating an alternating pattern as they place their large hind feet next to their smaller front feet. In deep snow, the porcupine's ploughed trail shows quill/fur markings and a tail drag.

After identifying the track pattern, measurements must be taken to distinguish between animals in each category. The **stride** measurement is the distance between footprints (as in walkers) or between sets of footprints (as in gallopers). The **straddle** measurement is the width of the track from the outer edge of one footprint to the outer edge of the next print or across the set of prints.

Tracks and their patterns provide not only animal identity, but clues as to where an animal has been, what it has been doing and where it is going. Individual measurements reveal whether the animal was being chased or was in pursuit of something. Other clues are a browsed tree branch, feathers, fur, bones, seed shells, blood, scat, and tracks leading to holes in the snow or dens. Herbivores such as the rabbit, deer, and porcupine all nibble, or **browse** on, bark in the winter. Predators such as the fox and coyote may leave remnants of fur, blood, feathers, or bones that identify their last meal. Taking hikes during school hours does not usually result in seeing actual animals, which tend to feed at dawn, dusk, or at night. Thus, learning to read the clues animals leave behind enable us to learn about the habits and behaviours of our natural neighbours without interfering in their lives.

Lesson Information

Grade Level: 4
Season: Winter
Group Size: For trail activities keep group size small (8-10)

Objectives

*To become familiar with the tracks and signs that animals of the grasslands leave behind.
*To create track stories.
*To explore the secretive world of grassland creatures.
*To appreciate grassland diversity.

Resources in Edu-kit

Animal Tracks of Sask.,
Reading the Wild
Hands-On Nature (p. 215),
Animal Trackers - In Fields & Meadows
Track Replicas,
www.nwf.org/kids/trackMatch.cfm

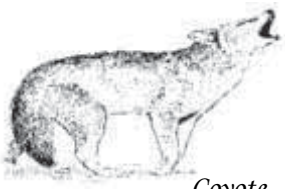
Track Patterns

Walking/Trotting

Walkers leave an almost straight path, which changes with increasing speed.

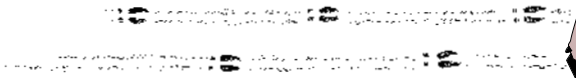
Fox

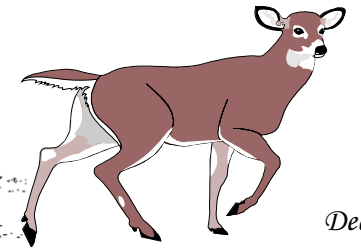
The Coyote has a more pronounced diagonal walk than the Fox.



Coyote

Deer drag their hoofs in the snow to display a track similar to a cross-country skier.





Deer

Bounding

With long, slender bodies moving in an undulating way, bounders' back feet land in front feet tracks.

Weasel

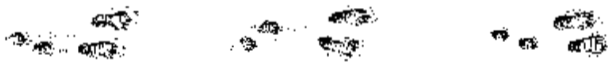
Waddling

Waddlers amble along on short legs.

Badger

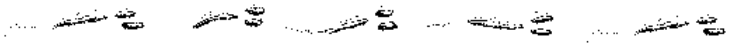
Galloping

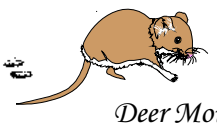
The larger hind feet of gallopers land ahead of their front feet; stride lengthens as speed increases.



Snowshoe Hare

This galloper often leaves a tail drag. A mouse track without a tail drag is likely a vole.





Deer Mouse

Track Tracers

Rouse Interest

Puppet Show

Students will better understand animal signs by putting on the puppet show on p.220 of *Hands-On Nature*.

Materials
puppets, Activity sheets, Info sheets, track and animal cards, clipboards, pencils

Track Matches

Students connect a footprint or track pattern to its animal owner, using individual copies of the Track-A-Match Activity sheet, p. 175. Post copies of track patterns, p. 172, for reference.

Each student receives a card (reproduced from pp. 177-183) showing an animal's picture or its track pattern, and then finds the classmate with the partner card (the track pattern that matches the picture of the animal).

Relate

Track Replicas

Seven students will use the rubber track replicas from the Edu-kit to create footprints in snow, soil, or sand without their partners (as determined by the above Track-A- Match game) seeing. After completion, partners identify the tracks made by their animal and determine whether it was walking or running. Alternate roles and track replicas until each student is exposed to most tracks.

Materials
track replicas, clay

If outdoor conditions are not favourable, replicate the activity using clay in the classroom. The seven students flatten pieces of clay, into which they press the track replicas.

Track Detectives

Students will act as track detectives as they seek signs of animal activity in the Grasslands. The teacher creates and duplicates an animal sign scaverger hunt activity sheet modeled after the Nature Quest Bingo Scarf in Edu-kit.

Students will use their sense of touch to identify animal signs. After the hike, students sit in a circle in a designated area to play the Mystery Bag Game. The teacher puts an object in the bag that symbolizes an animal clue: a browsed branch, piece of fur, a feather, tooth, scat replica, or track replica. Pass the bag around the circle for everyone to feel but not verbalize about until all have had a turn. Then discuss its identity and why it would be an important clue for a track detective.

Materials
Mystery Bag, biofacts, pencil, magnifying glasses

Track Patterns

Reflect

Track Journalists

Materials
Track replicas, shelf paper, writing paper, finger paints, water, towels, pencil crayons

In groups of 4 or 5, students design a storyboard in preparation for writing an animal track story. The story takes place during a real or imagined Grasslands hike. After completing their plan, students create related track patterns, using track replicas dipped into washable fingerpaint, which they transfer onto large sheets of paper. They fill in their animal's habitat as a background and then tape murals to the classroom wall. Students then write individual stories, using their storyboard and/or the mural as a guide.

Footprint Designers

Materials
Writing paper, Markers, Pencil crayons

Students will invent a new prairie animal, including a set of feet appropriate to its size, habitat, and movement classification. Each student describes his or her animal's footprints to the class. Based on that description, classmates predict its physical description, habitat, and pattern of travel.

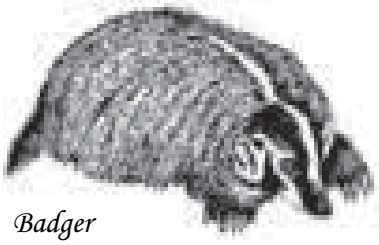
Track -A-Match

Deer

Fox

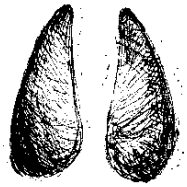
Vole

Weasel



Badger

Snowshoe Hare



Instructions

Refer to reference sheets and previous activities to detect which animal left which tracks. Then use a ruler and pencil to draw a line from each animal to its track(s).

Track -A-Match (answers)

Answer Sheet

Deer

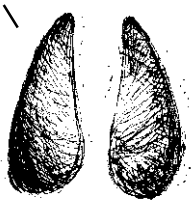
Fox

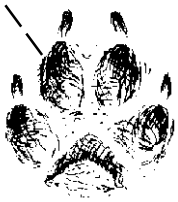
Vole

Weasel

Badger

Snowshoe Hare

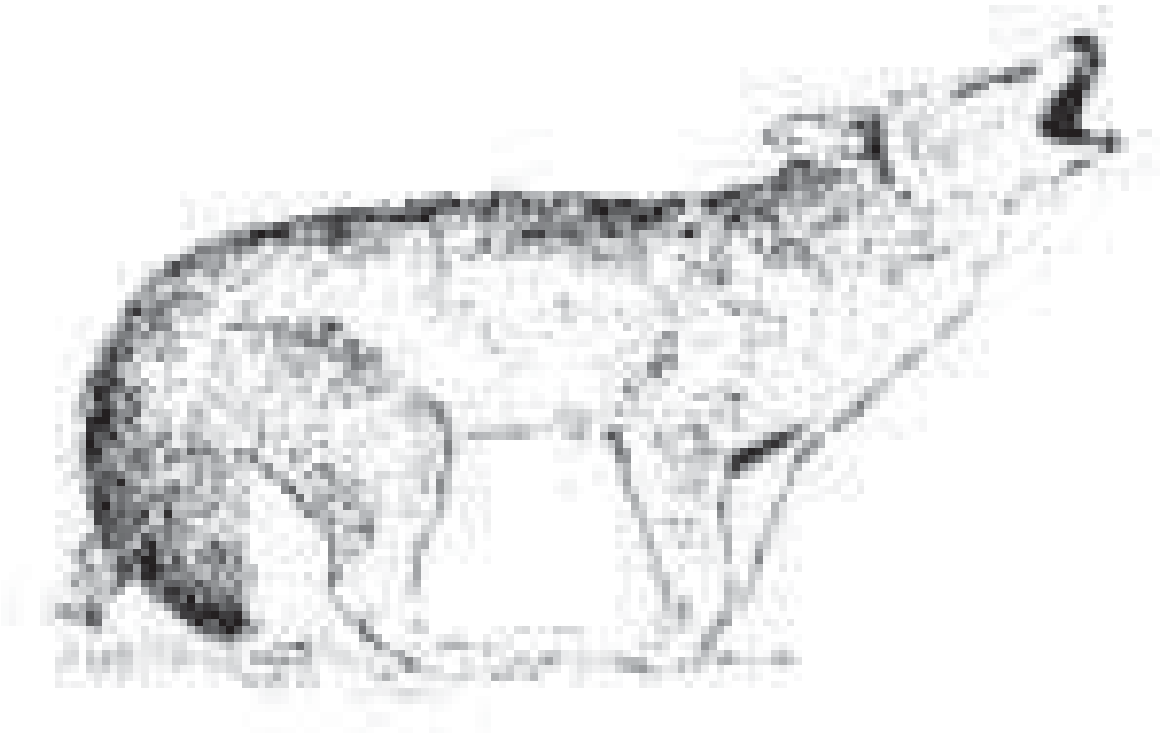




Galloper

Vole

Walker

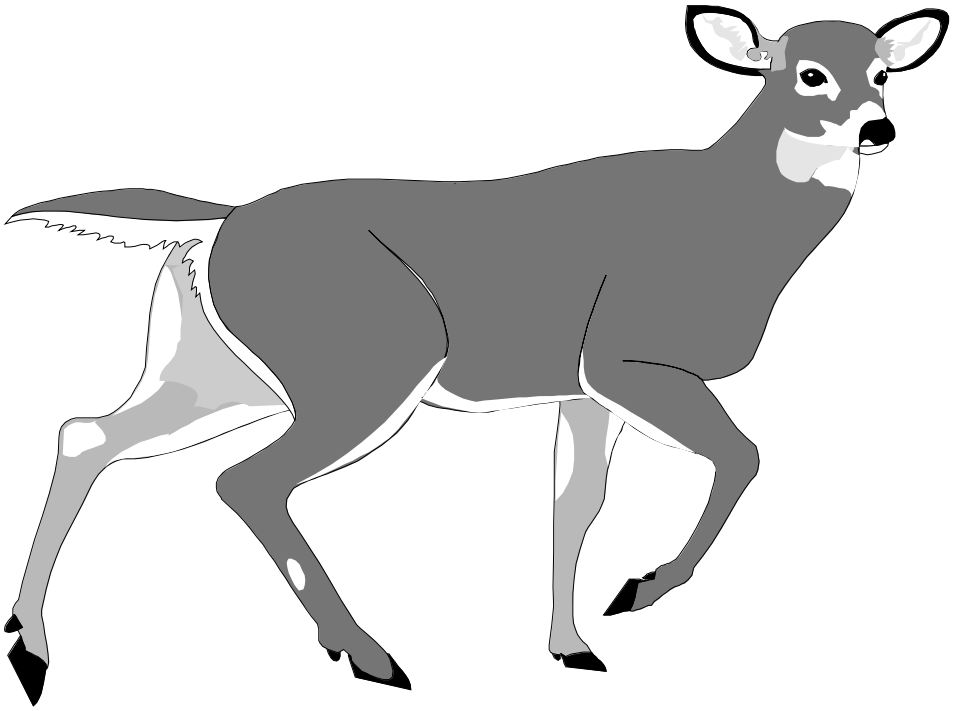


Coyote

Bounder

Weasel

Walker

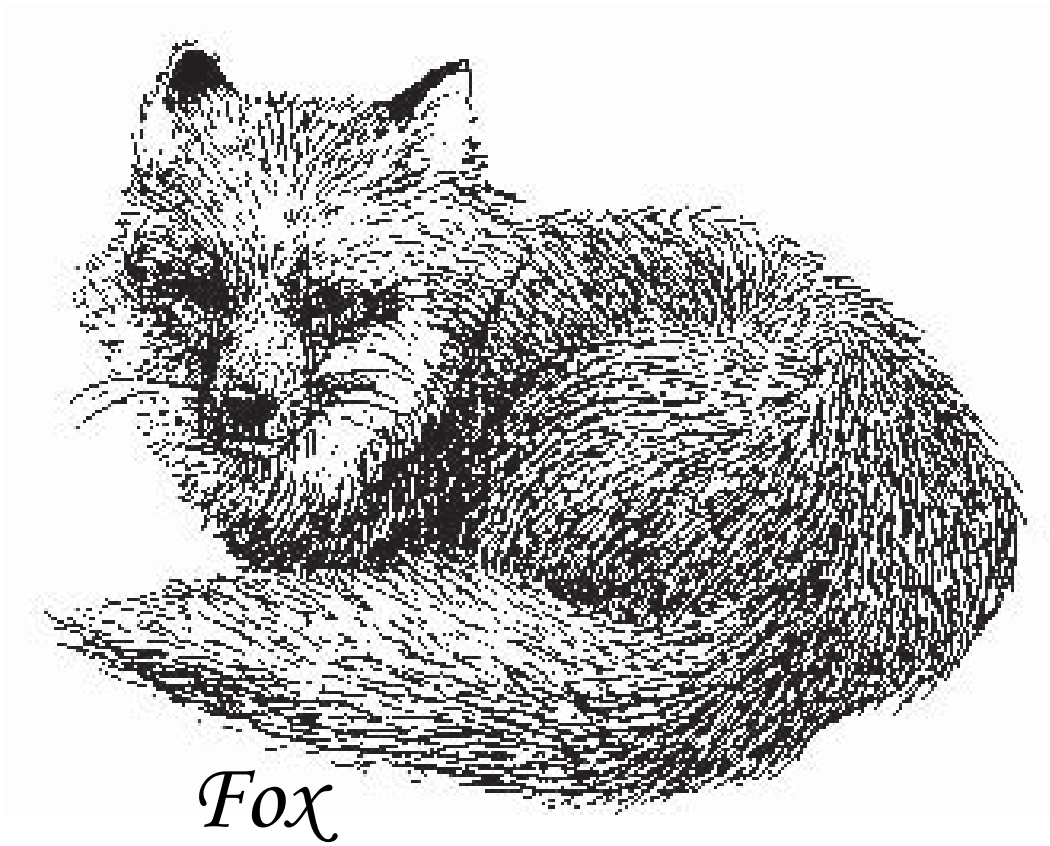


Deer

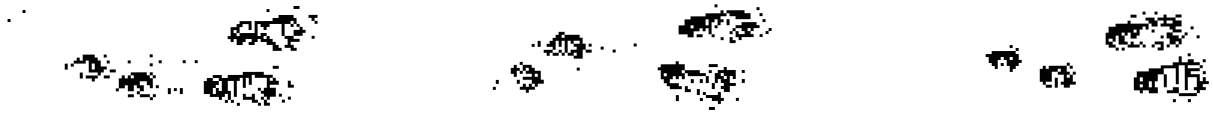
Waddler

Badger

Walker



Fox



Galloper

Snowshoe Hare

Litter Do We Know

Lesson Information

Grade 5
Any Season

Objectives

Understand the terms decomposition, biodegradable, and non-biodegradable

Trace some foods back to their source, including the impact on wildlife and the environment along the way to the consumer

Practice classifying material, interpreting data, and making inferences

Identify and evaluate ways that litter pollution can endanger wildlife

Propose ways students can help eliminate these dangers

Resources

Canadian Wildlife Federation, Project Wild, page 48.

Waste Reduction Council, http://www.link.ca/~swrc/index.html

Background Information

After taking the garbage out to the trash bin, most of us forget about it: out of sight, out of mind. A trip to a landfill might change our attitude. We only have ourselves to blame when landfill contents deteriorate and leach into the water table to contaminate our drinking water. The average Canadian produces a record-breaking 1.7 kg of waste per day. Most of those materials are reusable or recyclable. As responsible stewards of our Earth we must consider the consequences of every item we purchase.

We must ask whether the item is durable and something we really need, or disposable and an "impulse" purchase. The resources used to make all products, in fact, are limited. North America is home to only 5% of all the world population, but we are responsible for consuming one-third of all Earth's resources. We dispose of seventy-five percent of our purchases. Thus, the lifestyle to which we have become accustomed is not environmentally sustainable.

The three R's -- reduce, reuse and recycle -- are familiar to most of us. The first "R" is the key to waste reduction. Reducing our waste not only reduces landfill pressure, but it saves Earth's resources, saves us money, and enhances our environment. Businesses learn to operate more efficiently, and municipalities pay less for waste management. The greatest fraction of household solid waste is in the form of paper and paper products, followed by food and yard materials. We have the power to recycle our paper and paper products and to compost our food scraps and yard materials. If each household and every school participates, Canada could cut its garbage production in half.

Our positive efforts will not only improve the quality of human lives in the long run, but will also benefit our wildlife. Carelessly discarded fishing-line and plastic six-pack rings become tangled on the legs, beaks, and wings of water birds. The sharp edges of tin cans cut the tongues of curious animals. Broken bottles trap mice and chipmunks that crawl in and cannot get a footing on the slippery surface to exit. Shiny bottle caps, pop-tabs, cigarette butts, candy and gum wrappers, and paper waste from fast food restaurants may be ingested by wildlife, and result in dire consequences.

Litter Do We Know

Rouse Interest

Waste-free lunch skit

Students will learn about waste reduction as it relates to the lunches they eat. Contact the University of Saskatchewan Extension Division (966-5484) to present this program for your class. Their representative will:

1. Discuss and define the terms: decomposition, biodegradable, non-biodegradable.
2. Discuss what/who does the decomposing.
3. Discuss how manmade items decompose or remain in the environment.

Relate

Making a Neighbourhood a Fit Home for All

Students will become partners in environmental action plans for waste reduction. Students will need to wear work or surgical gloves and to carry plastic bags for the outdoor part of this activitiy. Plan a morning outing for the class to collect litter from the school yard and Grasslands. They will also collect waste from their lunches that day. In the afternoon, students sort the litter and waste into categories, such as (1) paper, (2) fruit and vegetable peelings and cores and (3)"other". Chart the results by counting the items and/or weighing them and or spreading them out to measure their total surface area. Compost (reuse), recycle, and throw away items from the day's collecting. If the school does not have a composter, arrange with a community parent to take the scraps for composting.

In the classroom, each student chooses an item from the litter collection activity to research and trace back to its origins, including where and how it grew, how it was harvested, transported, packaged, and made available to you the student. The teacher demonstrates how to make a simple flow diagram of the item's path.
Students draw pictures showing their item's impact on wildlife and the environment. Within small groups, students share their flow-charts and pictures. Students analyze their information and decide upon one change he or she could make in his or her own life that may be beneficial--or at least less harmful--to the environment. Explain to the class how this change could make a difference.

Resources:
Suzuki, David. *Looking at the Environment.* Stoddart: Toronto, 1989.
Project Wild. "What Did Your Lunch Cost Wildlife?", pages 335-336.

Contact the U of S Extension Division (above number) to build a classroom worm composter with students. The workshop includes how to maintain, observe and monitor the composter all year long.

"The earth does not belong to you; you belong to the earth. All things on this earth are connected, like the blood that connects one family; so that whatever happens to the earth, also happens to you."
Chief Seattle

Litter Do We Know

Plant a Garbage Garden

Students will observe the decomposition process.

Materials
Soil,
Garbage material,
Popsicle sticks,
Marker,
Watering cup

1. In a large, deep pan filled with soil "plant" and label with popsicle sticks: dead leaves, an apple core, candy and gum wrappers, pop can tab, pieces of newspaper, plastic bag, plastic container, fast food carton and styrofoam.
2. Sprinkle soil with water every few days. After one week, carefully dig up the litter (wear plastic gloves). Examine and record changes. Replant objects and continue to water every other day.
3. Repeat in two weeks. Note evidence of biodegradability. Replant once more and water regularly.
4. Two weeks later, uncover objects for the last time. Note decomposed items and those still intact. What do you conclude from this experiment? Rinse the items and sort into two groups: biodegradable and non-biodegradable.

Resource
Suzuki, David. *Looking at the Environment*. "Plant a Garbage Garden", p. 62-63. Stoddart. 1989.

Reflect

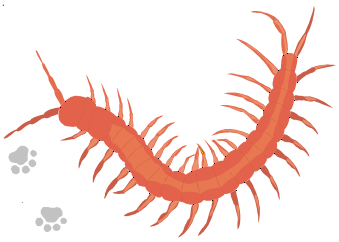
Neighbourhood Watch

Material
Collected garbage

Students will learn and practice the following research strategies: **classifying, drawing inferences,** and i**nterpreting data**. Using garbage collected during the "Making a Neighbourhood a Fit Home" activity, p. 185, **draw inferences** as to the source of each item (eg, fast food store) and characteristics of those responsible for the litter (age, interests, tastes, activities). **Classify** the garbage as biodegradable or non-biodegradable. In small groups, students choose items from both categories and arrange them (collage style) on a dinner plate. They then **interpret** the "value" of each item on a scale of ten, giving a higher value to materials potentially harmful to wildlife, and a lesser value to those least harmful. Groups add up value of items, and compare "data". Students further **interpret** their data by developing a corresponding poster to explain how people might apply one of the 3 R's on each item to eliminate its becoming a source of litter or garbage pollution.

Resources:
Education Goes Outdoors, p. 85.
Project Wild kit, "Litter We Know". pp. 48-49.

Soil Sifters



Background Information

Minute and microscopic organisms break down organic matter in the soil. During the process of decompositon, these mini-beasts sift through the soil, allowing air to circulate and make its nutrients readily available to enter plants through their roots. Earthworms actually eat the soil and supplement it with their nutrient-rich waste, or castings.

Soil sifters, such as beetles, millipedes, centipedes, ants, and mites are arthropods. Their hard exo-skeletons and jointed legs allow them to thrive within their soil habitat. Arthropods are the most numerous group of animals and also the most biologically successful. The fact that they continually transfer their energy into nutrient-rich soil makes them a vital part of the web of life.

Soil temperature, moisture content, and other factors determine the visibility of these tiny life forms. Leaf litter and moist, rich, surface soil (from forest floor or under shrubs) are the best venues for successful observation of mini-beasts, whether under the naked eye or the magnifying glass.

An amazing world lies under the soil surface for young detectives to explore.

Refer to *Hands-On Nature,* p. 73-74, in Edu-kit for further background information.

Resources

Holley, Dennis, *Animals Alive!: An Ecological Guide to Animal Activities*. Roberts Rinehart Publishers, 1997.

Johns, Frank A., Kurt Allen Liske and Amy L. Evans. *Education Goes Outdoors*. Addison-Wesley Publishing Company: Don Mills, Ontario. 1986, p. 33.

Tolman, Marvin N. and James O. Morton. "Life Science Activities for Grades 2-8". *Science Curriculum Activities Library*. Parker Publishing Company, Inc.: West Nyack, New York. 1986. p. 97.

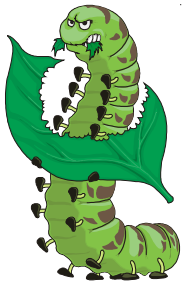
Siy, Alexandra. *Native Grasslands*. Dillon Press. 1991. (out of print)

http://www.naturewatch.ca/english/wormwatch/

Lesson Information

Grade Six

Fall or Spring

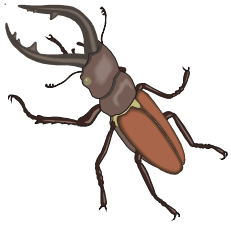


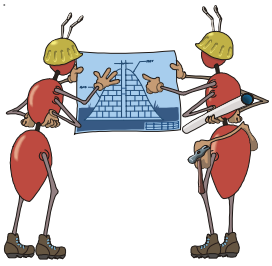
Objectives

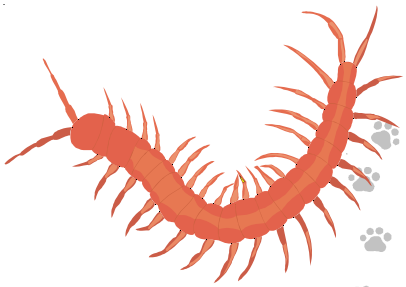
To explore the diversity of life in the soil

To appreciate the role that soil organisms play in the web of life

To understand decomposition and how to recycle organic garbage







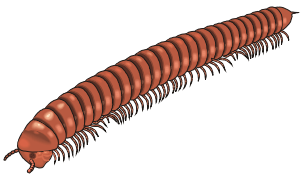
Soil Sifters

Rouse Interest

Recipe ingredients are listed in Earthworm Ecology Lesson

Materials

1 cup of soil each, tray or plastic lids; toothpicks, magnifying glass, critter identification sheets, recording sheets, pencils.

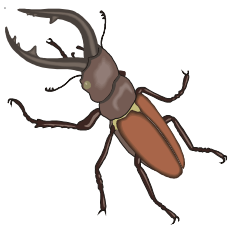


Mini-Munchers

In groups of five or six, students will examine nutrient-rich soil to examine organisms involved in the process of decomposition. In collaboration with the school caretaker, the teacher marks five schoolground locations where students may dig soil samples (to return after activity). A room with separate tables (science or art room) will be needed to facilitate the follow-up activity.

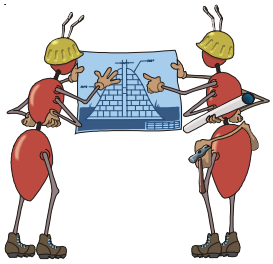
Students bring old spoons or other small digging tools from home. Each group collects about one cup of soil in a carton with a lid. In the classroom, students surround assigned tables to examine common samples. A volunteer from each group records data, or they may share recording. Students spread 1/2 cup soil on a tray or plastic lid. They identify, count, and describe critters in samples and note soil source and location. If they cannot name an organism, they draw a rough sketch and label with an imaginary name. Add more soil as necessary. At teacher's signal, students move in a clockwise direction to collect data from other groups' samples until each group has examined a total of five.

As a class, compare data and discuss findings. Speculate as to why their critters live in soil; why more reside in some locations than others and what role they play in the web of life.

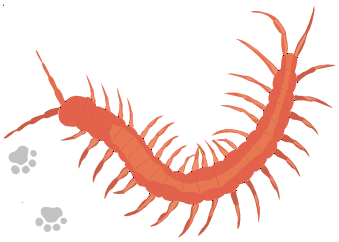


"Super" Arthropod Creations

Students will make predictions about arthropods and then research the facts. Pairs of students choose an arthropod info card (photocopied from pp. 189-900), draw what they think their creature looks like and the habitat they think it prefers. In the resource centre they research its natural characteristics, habitat, and defense mechanisms. Examples of defense mechanisms are: running, flying, jumping, swimming, biting, stinging, pinching, hiding, camouflaging, mimicking, emitting caustic chemicals, and making warning sounds. From this research they create a Super Hero poster of the arthropod in which they exaggerate its characteristics and defense mechanisms.

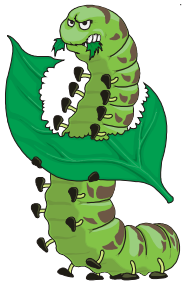


Soil Sifters



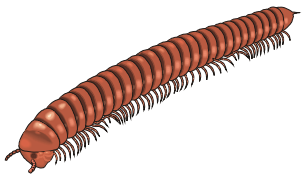
Centipede
I am a fierce hunter! I am known as a predator because I prey on earthworms and eat them. I have a pair of poison claws to help keep my prey from getting away. I move quickly on my many legs. I have only one pair of legs on each of my many (15-173) segments. I am about 1 to 2 inches long.

Ant
I am an insect with 6 legs and 3 body sections: head, thorax, and abdomen. I am an important decomposer because I break materials down into smaller particles. I create tunnels and assemble soil particles into clumps.



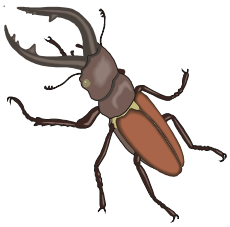
Sow Bug
I am an isopod. I have ten pairs of legs. I am related to crayfish and lobsters. I breathe with gills, so I must live in a damp, moist place. My ½ inch body is oval and flat, with a series of flattened plates like my close relative, the roly-poly. However, I can't roll up in a ball. I eat vegetation and leaf litter.

Mite
I am tiny. It takes 25 of us to cover an inch-long line. My body is so round and fat it's hard to see my 8 jointed legs. We are really important decomposers. Some of us eat plant material, such as mold and soft tissues of leaves. Others eat manure of other organisms. Some of us can harm earthworms.



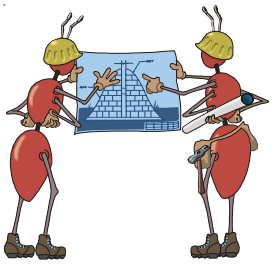
Millipede
I have so many legs you would have a hard time counting them. My name means "thousand legs", but I don't have that many. Each segment has 2 pairs of legs. I am not fierce, but quite timid. I roll up in a ball to avoid danger. I am a vegetarian. I eat soft, moist, decaying plants. I'm thick-skinned, dark-red in color, and 1 to 3 inches long.

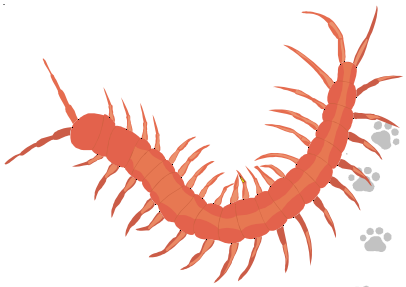
Springtail
I am a tiny white insect, less than 1/16 inch long. I have a pointed prong folded beneath my abdomen. By quickly extending this "spring", I jump high into the air. We feed on molds and decaying matter and are important producers of humus.



Collembola
I am a close relative of the springtail, but I don't have the springing tail. I am tiny, often white, and less that 1/16 of an inch long. With the springtails, we are members of a group of animals which are primitive insects. I eat molds and decaying matter.

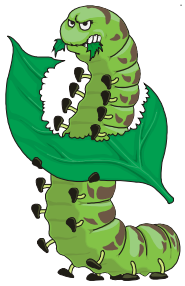
Carabid beetle
I am an insect with shiny black, tough wings and am about ½ inch long. I live beneath stones, boards, and other moist places. At night I rapidly pursue my prey, such as slugs, snails, and soft insects such as caterpillars. I am a fierce predator.

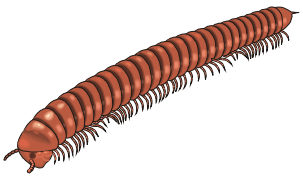


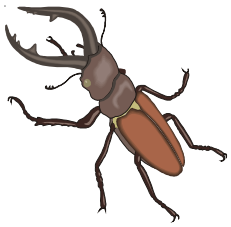


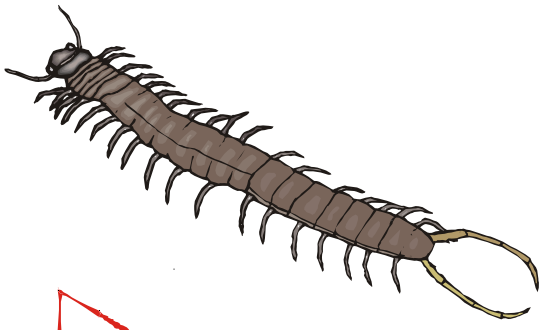
Soil Sifters

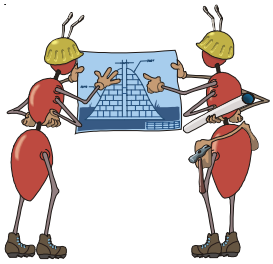
Fruit Fly I am a small fly. I don't bite, I don't sting, and I don't make any annoying buzzing sounds. I never harm earthworms. If it's warm and moist, and fruit and yeast are present, I lay eggs and they hatch.	**Earthworm** I am a long, thin, soft-bodied animal. My body is made up of little rings called segments. I have neither legs nor eyes, but when I see light, I slither away from it. I eat bacteria, fungi, protozoa, and decaying organic matter.
White Worm I am a skinny, white worm also known as a pot worm, or an enchytraeid (en kee tray' id). I am about an inch long but I am so thin I look like a frayed piece of thread. I move like an earthworm. In fact, we're related. I don't have red blood like an earthworm has. I eat well-decomposed material.	**Pill Bug or Roly-Poly** I am an isopod, which means that I have 10 pairs of legs that look very similar to each other. The flattened plates on my body make me look like an armadillo. I am about ½ inch long. I roll up in a ball if I am disturbed. I eat vegetation and leaf litter.

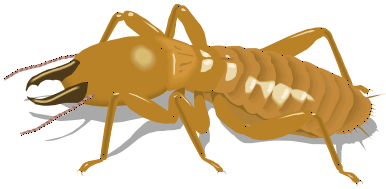




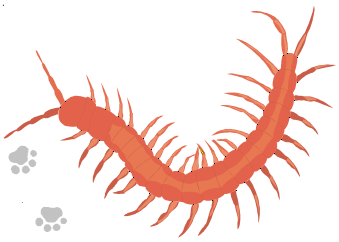








Soil Sifters

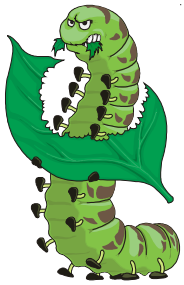


Relate

Materials
Digging Tools,
White pieces of cloth or white sheets of paper,
Pencil,
Magnifying glass

Soil Sifting

In pairs, students will increase their understanding of organisms involved in decomposition by isolating and examining them. From a small plot of land in the schoolyard or Grasslands buffer zone, students dig a sample of soil from 10-12 cm below the surface and place in in a sifter (directions below), which they shake over white cloth or paper. Observe, identify, and record critters that fall through and/or remain in sifter with remaining twigs, leaves, and stones. Students record the condition of the soil (dry, moist, clumpy, sandy, etc.), as well as observations about the organisms. Bring information back to class for further discussion.

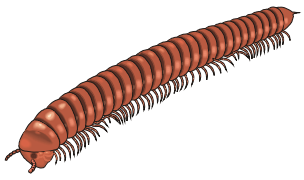


CONSTRUCTING A SOIL BEAST SIFTER

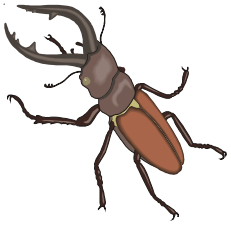
Materials
Straight bladed knife,
clean, dry, two-litre milk carton; single-hole hand punch .

1. Fully open the end of milk carton containing the spout.
2. Adult assistants use a straight-bladed knife to cut off the bottom corners of carton, starting each cut about 1.5 cm up the side of the carton. This will result in four pyramid-like waste pieces and leave four holes.
3. Note that the bottom of the carton has two triangular portions that are single-thickness and two triangular portions that are triple-thickness. Along the bottom edges where the carton has single-thicknesses, notch out a wedge along each side. There will now be a total of six holes in the bottom.

   Use a hand punch to make 20 to 30 additional holes in the single-thickness sections.

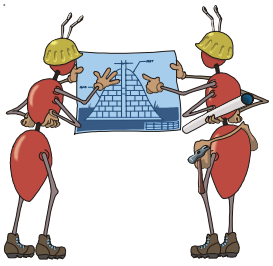


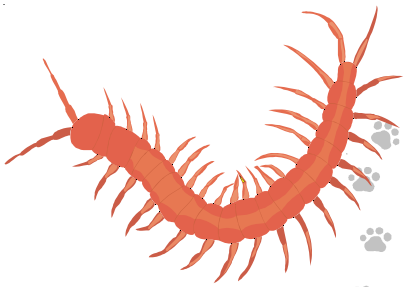
From Stroker, Dan. *Milk Carton Madness Book One* (developed for SEEDS Foundation),1991. p.20.



Prairie Parcel

Within small groups, students will realize the diversity of life within a small area when they adopt and investigate a mini-ecosystem. The teacher establishes areas of the school grounds that are suited to student examination. Students mark boundaries with a wire hanger bent into a circle or hula hoop. After writing descriptive paragraphs about an object within their ecosystem on a receipe card, each student anchors his/her card under the rim of the boundary marker or with a stone. Groups then rotate to read one anothers' descriptions.



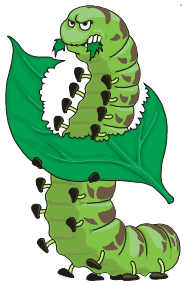


Soil Sifters

Reflect

Materials

Hanger, hula hoop, or string; clipboard; pencils & erasers; sketching paper; recipe cards

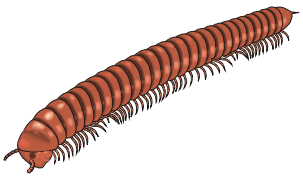


Soil Savers and Puppetry

Students will compare soil and critter information from a variety of soils: garden soil, outdoor compost, indoor compost, and grasslands buffer zone soil. They will determine components of "healthy" soil, why it is healthy, and the role of its organisms in decomposition. They communicate their learnings by drawing (1) the life cycle of a plant, showing the underground activity of critters working the soil, or (2) a diagram of a tree, from branch tips down to roots with an x-ray view of critters at work around the root system.

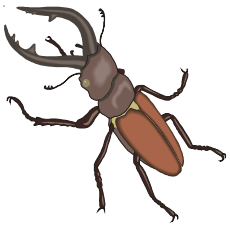
Ref. Suzuki, David. *Looking at Plants*. Stoddart. 1985, pp. 50-51.

Students will share with younger students information from their research by creating puppet plays starring critters they have created in previous lessons. Study the puppet play "Forest Floor" from *Hands-On Nature,* pp. 78-79(in Edu-Kit) as an example which they can adapt, using the Grasslands soil as the setting. Puppets may be made from socks, various scrap materials, a computer graphic, or magazine cutout glued to a popsicle stick.



Arthropods on Trial!

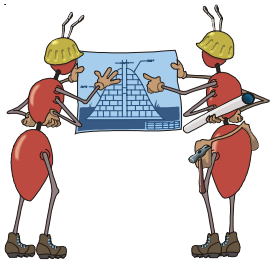
Students will prosecute and/or defend the relationship between arthropods and humans. The prosecutor declares that arthropods are humans' worst foe while the defense maintains that arthropods are humans' greatest ally. Individuals or partners write up notes for presentations on file cards, practice then present to whole class as in a courtroom.



(Adapted from Holly, Dennis. *Animals Alive!: An Ecological Guide to Animal Activities.* Roberts Rinehart: MD.1997)

The Diversity of Life

Students will write essays in which they react to the following statement by Edward O. Wilson in his book *The Diversity of Life*: "Humans dwell among the six-legged masses with a tenuous grip on the planet. Insects can thrive without us but we would perish without them." Students should substitute the insect family for the family of decomposers.



(Source: *Animals Alive!: An Ecological Guide to Animal Activities* by Dennis Holley, 1997)

Flora Flair

Lesson Information
Grade 7
Season: Fall

Background Information

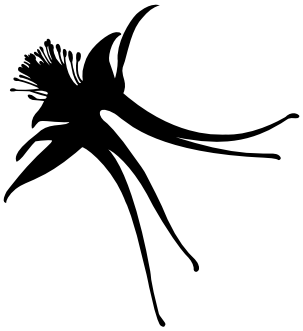
Plants hold more mysterious powers than people realize. Plants contain healing properties and are components of many medications, both traditional and modern. Aboriginal peoples treat plants, as well as animals, with reverence and gratitude. If city dwellers adopt this attitude we can work to preserve plant diversity. Plants also provide us with food, clothing, cosmetics, furniture, tools, glue, rubber, rope, brooms, baskets, flutes, and countless other items. This lesson will introduce how beneficial plants are to humans so that students will develop an appreciation for plant diversity.

Objectives

1. Students will become aware of the many uses of plants.

2. Students will discover the healing properties of some plants in the Grasslands.

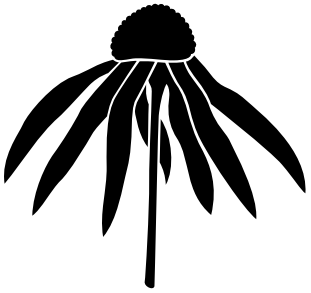
3. Students will appreciate the diversity of plants because of the variety of benefits they provide.



Resources

Ethnobotany Kit from Saskatoon Public School Board (in Edu-kit)

Plant Cards (Deck of cards in Edu-kit)



Flora Flair

Rouse Interest

What Good are Plants Anyway?

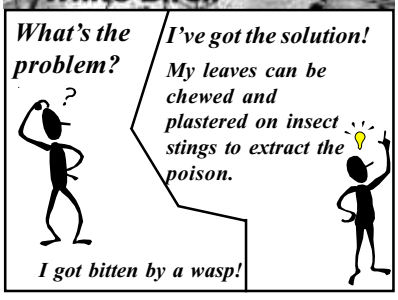
Materials

Plant Puzzles (in Edu-kit), Poster board, Crayons, Markers, plant guides such as Wildflowers Across the Prairies by Vance, Jowsey and McLean, 1977, 1999..

Students will become familiar with native plants by first playing a game and then researching a plant and advertising its value to humans.

1. Brainstorm traditional and modern use of plants. Review the rules first: all ideas accepted, no discussion until specified time period has lapsed.
2. Each student chooses one piece of the two-part plant puzzle (in Edu-kit) and finds a classmate in possession of the other half of the puzzle. The teacher supplies half the number of puzzles as students in his/her class, i.e., for a class of 22 students, 11 complete puzzles are needed.
3. Students with matching pairs introduce their plant to the large group by putting the puzzle together and showing the picture of the plant to the group and share information printed on the card.

Front side of puzzle card



Back side of puzzle card

An illustration of both sides of a two-sided plant puzzle

4. Allow each pair of students ample time to research their plant. After compiling information from plant guides, interviews with botanists, native plant users (aboriginal elders), and internet, students make a line drawing of their whole plant (including roots, flowers, and fruits) on poster board. Then they write or record a catchy advertisement based on its uses.

Flora Flair

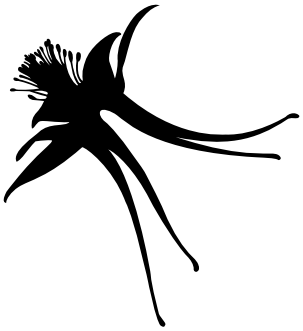
Relate

Ethnobotany Hike for Plant Detectives

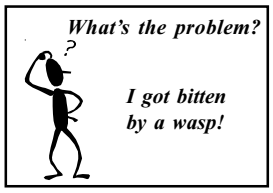
Individually and in pairs, students will become familiar with Grassland plants by first perusing Grassland volunteer-written brochures and *Wildflowers Across the Prairies*, available in libraries; and then finding the plants in the wild. The teacher selects the plant solution cards (in Edu-kit) which represent the twelve most common plants along the trail during that season. Give twelve students a problem card and another twelve the matching solution cards to use as guides to finding the plants along the trail. The teacher decides how to signal the discovery of a plant. All students then stop to admire the plant and to listen to the plant detectives read about its various uses from the solution cards. These solutions should solve the problem as stated on other detectives' cards. In the classroom use the same cards to play Concentration.

Materials

Plant Cards: Solutions and problems (in edu-kit)



Problem card



Solution picture card

Plant Posters

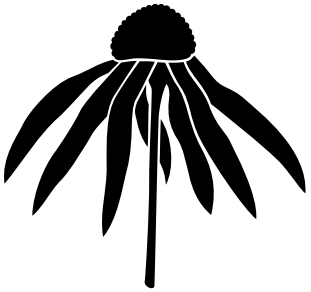
Students will reinforce their plant identification skills by sketching their plants from the ethnobotany hike and then writing poems or songs that praise the plants' attributes.

Relate

Flora Fun Fair

Invite parents to the school to enjoy student presentation on the many uses of plants. The presentation could include advertisements, powerpoint presentations, posters, skits, puppet plays, etc. Have rosehip tea and other edible plant refreshments available for parents to sample.

Invite Aboriginal elders to share plant legends and stories of native plants.



Snow Secrets

Lesson Information

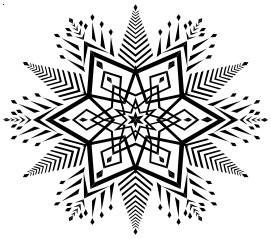
Grade Level: 8
Season: Winter
Group Size: For trail activities keep group size small (8-10)

Background Information

The snow world, or **nivean environment,** has three distinct levels. The **supranivean level** is located at and above the snow surface. Its inhabitants include the White-tailed Deer and Snowshoe Hare. The **intranivean level** lies within the snow pack. The **subnivean level** is the area lying between the ground and the snow pack. The latter two levels are often collectively referred to as the subnivean. Animals that inhabit the subnivean level include the Pygmy Shrew, Deer Mouse, and Meadow Vole.

A Snow Story

When snowflakes fall to the ground and build up air pockets form. These airy spaces trap warmth radiated from Earth. The snow pack acts as a blanket of insulation on Earth's surface. How much air the snow can hold depends upon the depth of the snow and its consistency. Fresh, fluffy snowflakes contain more air spaces than old, crusty snow. As snow ages, its crystals break down and bond together, resulting in decreased air pockets.



Over time, the aging and transformed snow crystals create distinct layers in the snow pack. At its base, the oldest snow is transformed into a layer of brittle, loosely arranged crystals known as **depth hoar**. This layer, also known as "sugar snow", is important to small mammals because they can easily burrow through it.

Plasticity, the ability of a material to flow around objects without breaking, is a property of snow and vital to small animals' survival. Over time, the weight of snow and the force of gravity will reform the snow pack and cause it to move. The snow that covers a boulder will gradually flow off its sides and create a protected hollow around the base of the rock that shelters small animals from the cold.

Because snow is mostly air, oxygen is ample. The penetration of branches and stalks through snow creates natural ventilation shafts. When carbon dioxide levels build up in late winter, mice, voles and shrews tunnel to create their own ventilation shafts. These shafts may inadvertently aid hungry predators, such as the Short-tailed Weasel, to detect and dig down to the subnivean layer to find prey.

Objectives

To explore the winter environment at SNG

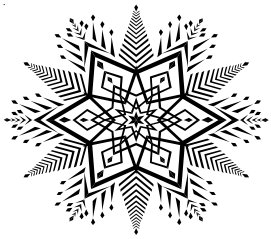
To appreciate the unique properties of snow

To understand how the nivean environment impacts animals

Snow Secrets

When the snow pack reaches a depth of 15-20 cm, the subnivean layer becomes remarkably stable. Temperatures within the layer fluctuate only slightly in response to larger changes in air temperature outside. When temperatures plunge to –40 degrees Celsius, the subnivean temperature may remain at a few degrees below zero. At these depths, the snow pack reaches the **hiemal threshold**, characterized by the relative absence of small mammals venturing forth to the snow's surface. At this point and with a good sugar snow layer, small mammals are able to establish runways under the snow. Plants under the snow pack are protected from frost damage and desiccation from harsh winter winds.

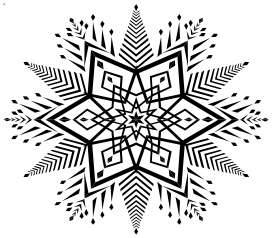
The snow world is known as the nivean environment



Before temperatures get too low, it is critical that the snow pack reaches the hiemal threshold so small mammals, perennial, and biannual herbaceous plants are spared from death due to exposure. Because the volume or "internal furnace" of small mammals is low in proportion to their surface area, they have difficulty maintaining a normal body temperature. The absence of snow cover creates a desperate situation for many plants and animals. Not only is death by exposure probable, but winter-white animals such as the Snowshoe Hare are readily visible to predators.

Grouse will plunge into deep snow for shelter from the cold winter nights

Factors such as snow depth and condition of crust also impact on animals. Deep snow with no crust deters movement and drains energy. If the crust can support their weight, animals may be able to move easily on the snow surface. Grouse plunge into deep snow for shelter, but a crust that forms overnight can trap the grouse. Crusty snow may also prevent owls, foxes, and coyotes from reaching their subnivean prey.



The snow world holds many secrets of animal activity. By following tracks in snow we can detect where animals have been, where they ended up, and any skirmishes between, such as the imprint of an owl's sweeping wing beside the tracks of a vole.

The snow pack becomes a protective layer of insulation on the earth

References

"Snug in the Snow", *Hands-on Nature,* p. 95 (in Edu-kit)
Knee High Nature in Winter (in Edu-kit)
Halfpenny, James C. and Roy Douglas Ozanne. *Winter: An Ecological Handbook*. Johnson Publishing Company: Boulder, CO. 1989.
Marchand, Peter J. *Life in the Cold*. University Press of New England: Hanover, NH. 1996.
Stokes, Donald W. *A Guide to Nature in Winter*. Little, Brown: NY. 1976.

Snow Secrets

Rouse Interest

Snow Secrets Display

Materials
Animal Posters, Cotton Batting, White Paper, Writing Materials

Students will create an interactive bulletin board display to share with others the clues animals leave in the snow. Use the winter animal posters (in Edu-kit) and add cotton batting, animal tracks, and holes, etc. Make up "Did you know?" winter fact cards or snow secret riddles to accompany the display.

Snow Story Time

Materials
Who Lives in the Snow by Jennifer Berry Jones

After listening to the story, *"Who Lives in the Snow?"* by Jennifer Berry Jones (in Edu-kit), students will brainstorm a list of questions arising from the text. Students select one of the questions to research for answers.

Snow World Showcase

Materials
Who Am I? Cards, Rubber Track Replicas, White Roll Paper, Construction Paper, Glue, Scissors, Markers, Pencil Crayons, Paints

Students will internalize the concepts of supranivean (at or above the snow pack) and subnivean (within the snow pack) as they play a winter version of "Who Am I?". The teacher selects the local winter environment cards from the pack (in Edu-kit) for student distribution and photocopies enough cards so each student receives one. Prepare a T-chart where students classify their animal as supranivean and subnivean after playing the game.

To continue the above objective and concepts, the class creates a large mural of a winter scene to illustrate the supranivean and subnivean layers and their inhabitants. Refer to the illustrations in "Who Lives in the Snow?" for ideas. Students research their animals as featured in the "Who Am I? game with a view to depicting their winter habits in the mural. Use the rubber track replicas (in Edu-kit), original drawings of the animals, materials to represent snow holes, etc.

Flaky Fun

Materials
Snow, Meauring Cup, Container, Heat Source, White Paper, Scissors, Hands On Nature

Students will experience how the air-trapping properties of snow illustrate why so much more snow is needed than rain to count as precipitation. To prove that snow is mostly air, students collect snow in 250 ml mugs or measureing cups without packing it down. In the classroom they measure the depth of the melted snow. (It should melt down to about 1/4 cup). Create snowflakes from *Hands on Nature,* p. 207 (in Edu-kit). Use the completed snowflakes to decorate the classroom.

Snow Secrets

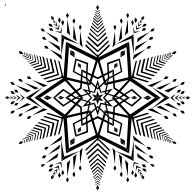
Relate

Subnivean Game

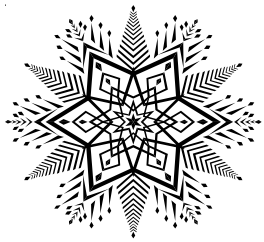
Students will simulate the predator/prey relationship surrounding the subnivean layer. Mark a large circle with 10 -15 chairs placed about 1 metre apart. Cover the chairs with a large parachute to represent the subnivean layer. The edges of the parachute must touch the ground.

Materials

10-15 Chairs,
Parachute,
Tokens such as bingo chips or pokerchips (8/student)

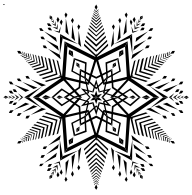


Students assume roles of predators and prey with a ratio of 1:3-5. Predator/prey combinations are coyotes/mice; snowy owls/mice; foxes/voles; coyotes/voles, etc. For each prey species distribute 8 colored (food) tokens within one metre of the outside circumference of the parachute. The prey species emerges partially or completely from the "subnivean" layer to collect food, all the while being careful not to bump chairs or parachute. Predators tag as many prey as possible. When a predator tags a prey, the prey must forfeit his/her food tokens. Each prey needs four tokens to survive. After collecting four, each prey is safe within the subnivean layer. Predators need 12 tokens to survive.



After a five-minute round, sit in a circle and discuss the results. When the prey turns over their food tokens to the predators, what is really happening? What advantages does the subnivean layer offer small mammals?

Try these scenarios. Harsh winter conditions increased predators' food needs. Reduce available food tokens, and play. Or, human foot traffic has compacted the subnivean layer, thus reducing space for sheltering prey. Rearrange chairs and parachute to create a reduced space. After each round, discuss how different factors impact the balance of nature.



Let's Snow More!

Students will explore snow's secrets during a guided walk in the SNG. The teacher, ahead of time, explores the trail and chooses places for discussion stops (e.g. ventilation shafts, fox tracks). Meanwhile new changes will occur. Invite students to share their own observations along the way, including mouse holes adjacent to the path, and cavities around large rocks, footprint patterns, etc.

Materials

Binoculars,
Magnifying glasses,
Field Guide to Animal Tracks
(all in Edu-kit)

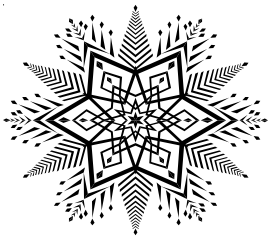
Snow Secrets

More Secrets in the Snow

Materials
garden spade or snow shovel
metre sticks,
clipboards or journals,
outdoor thermometers,
masking or duct tape,
writing materials

Students will duplicate subnivean areas for observation of animal activity. In hidden parts of the schoolyard or SNG buffer zone, students dig shallow one metre square snow caves. Reduce openings to a small hole and smooth snow on cave floors and "roofs" to erase signs of human activity. Each morning check and record signs of life on the snow surfaces inside and around areas. Look for tracks, scat, hair, tunnels, food caches, etc.

Students will examine and measure temperatures within a snow profile. With a garden spade or snow shovel, slice a deep natural snowbank in half to expose a vertical wall of snow, or snow profile. Count the different layers. Is there a sugar snow layer? Photograph and record other interesting conditions such as an ice layer that might impede the movement of small mammals. Tape thermometers to the ends of metre sticks, push through snow and hold in place for three minutes. Record snow temperatures at 10 cm intervals from the surface level.



In class, draw a graph to show the relationship between snow depth and temperature. What properties of snow make it a good insulator? What factors may diminish the insulating properites of snow?

Reflect

Snowy Sharing Circle

In a sharing circle students reflect upon their exploratory findings about snow's impact on plants and animals.

Subnivean Savvy

Materials
"Snug in the Snow"
Puppet show in *Hands on Nature*
(in Edo-kit),
Writing materials

In groups of four or five students plan and write up short presentations on the subnivean environment. For inspiration do an informal reading of "Snug in the Snow" a puppet show in *Hands-on Nature,* p. 98. After sufficient practice some students may wish to perform for other classes.

Tread Softly

Tread Softly

Ecological education serves as a positive step towards our evolving into a more reverent society. From a young age we can learn from our elders that by "treading softly" on Earth's special places we can conserve those places for ourselves now and for those who follow us into the future. Baba Dioum, founding member of the Executive Committee, International Union for the Conservation of Nature, believes, "In the end we will conserve only what we love. We will love only what we understand. We will understand only what we are taught". The purpose of the activities in this section are designed to foster in our young people a deep love and respect, or reverence, for the Grasslands. Albert Schweitzer, an advocate for teaching reverence for life, states:

> **Just as White light consists of colored rays, so reverence for life contains all the components of ethics: Love, kindliness, sympathy, empathy, peacefulness, power to forgive.**

"In the end, we will conserve only what we love, we will love only what we understand, we will understand only what we are taught."

Baba Dioum

Kindergarten to Grade Four students will develop an empathy with Grassland members as they engage in activities that promote understanding and appreciation of wildlife. Puppet plays, totem creations, pet rock promises, and friendship bracelets are components.

Grasslands stewardship will empower older students to take active leadership in action plans. Planting a butterfly garden in the school grounds restores habitat for butterflies and other creatures. Monitoring species numbers and trail impact, participating in a Grasslands debate, and developing a Grassland Charter promote conservation and communication within the Silverspring community.

Friends of the Flowers

Background Information

Flowers not only beautify Earth for humans, but contribute to Earth's health in many ways. Many students do not realize that if they pick a flower or a bouquet of wildflowers that they might have ended the life of the whole plant. Within each flower are its reproductive parts. After pollination they produce seeds that will eventually grow into new plants. To share the joy of discovering a wildflower, students must learn to preserve it for others. Flowers can be remembered and honoured in photographs or drawings. By being a friend to the flowers, students also become friends to butterflies, birds, and bees that depend upon the flowers for food.

Rouse Interest

Feel a Flower

Students will find flower parts inside the mystery box and guess what part of the flower they are feeling. The teacher should post a large poster showing flower parts and point out these parts to students before this activity. Be sure to include seeds and roots.

Flower Magic

Students will do an experiment to witness one of the functions of plant stems -- to transport water up to the flower. Fill a clear bottle or vase half-full of water and add five to ten drops of food colouring. Place three white carnations into the coloured water. After a few hours or overnight, observe changes in flower colour.

Source: http://yucky.kids.discovery.com/flash/fun_n_games/activities/experiments/experiment_flower.

Handprint Flowers

Students will cooperate in the creation of a class flower. After dipping one of their hands in tempera paint, students place handprints around the circumference of a large circle drawn on bristol board. See *Handprint Animal Art* book in Edu-kit.

Lesson Information
Kindergarten
Season: Spring or Fall

Objectives
To appreciate the beauty and magic of flowers

To instill a desire to be a friend of the flowers

Materials
Flower parts, Mystery box or bag

Materials
Three white carnations, water, food colouring, vase or glass jar

Materials
Poster board, square cake pans, tempera or fingerpaint

"The Earth laughs in flowers."
Ralph Waldo Emerson

Friends of the Flowers

Materials

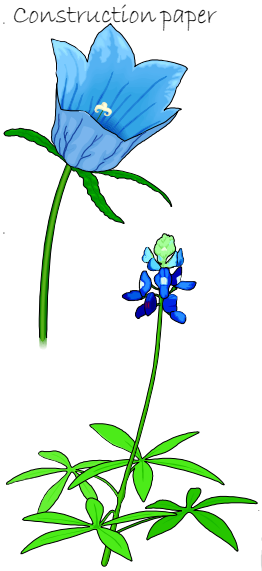
Poster board paper,
Construction paper

Flower Petal Game

Students will respond to questions as they invent original, wearable flowers. The teacher cuts petals from colored construction paper and prints the following questions on one side of each petal. Students print their answers with adult assistance:

What colour would you like to be?
What kind of insect would you like to attract?
How would you smell like-- chocolate, perfume?
How tall are you? Where would you like to grow?
If someone tried to pick you, what would you say?
What name will you give yourself?

Students glue their petals around a construction paper headband and wear their creations home to share.



Materials

Flower Scavenger
Hunt Sheets

Relate

Flower Search

Students will find Grassland flowers to match those described on Flower Scavenger Hunt sheets (p. 206). In groups of five, team members seek out the clues as read aloud by older student or adult leaders.

Materials

Native flower seeds,
Soil, Water,
Plant container

Blooming Beauties

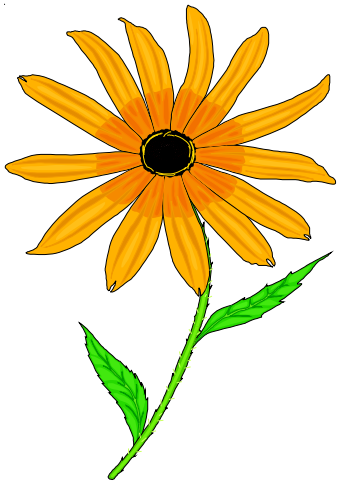
Students learn that plants need water, nutritious soil, air, and sunlight as they plant and nurture their own seeds. In individual peat pots, they plant three or four marigold seeds in potting soil, sprinkle with water, label with their names, and place on a tray in a sunny window. Monitor daily for dates of germination, number of leaves, stem length, etc. Since most potting soils do do not contain nutrients, the teacher should sprinkle with plant food after seedlings are 3-4 cms tall. Take home or plant in a school garden border.

Growing Flowers

Students learn the plant growing cycle by role playing, starting as seeds. Turn off lights and tell students to wait for rain. In reponse to simulated rain noise or that from a tape recording, they "grow" into sprouts. Turn on lights and tell them to grow into seedlings in response to the "sunlight" and fresh air. After more rain, light, and worms mix and enrich the soil, plants burst into bloom.

Adapted From: http://www.123child.com/easter/flow.html

Friends of the Flowers



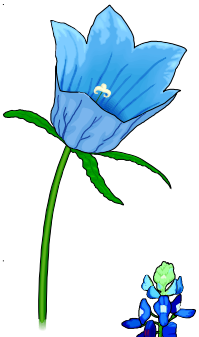
Reflect

Circle of Life

Students will recall the needs of flowers as they play a singing game. One child is a flower and stands in the middle of a circle of classmates who join hands and move around the flower as they sing (tune of "Here We Go Round the Mulberry Bush")

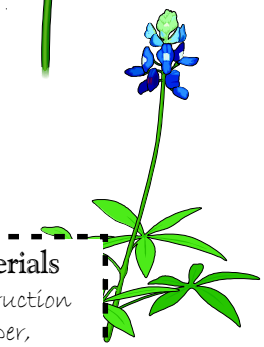
> Little flower, what do you need?
> What do you need? What do you need?
> Little flower, what do you need
> to grow up big and strong?

The child then answers and chooses someone to join him/her in the center to sing: "What we need is lots of rain (or a strong strong stem; or warm sunshine, or rich rich soil, or fresh clean air, etc.)" repeated three times and ending with "to grow up big and strong."



Friends are Flowers

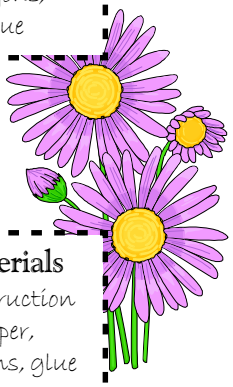
Students express their feelings in art as inspired by a theme: "Friends are flowers in the garden of life." Students draw sunflowers to represent a family member or friend. In the middle of the flower the child draws a picture of the chosen person, or glues in a photo, prints the person's name, and presents the art as a gift.



Materials
Construction paper, crayons, glue

Growing Garden

Students will feature themselves in a class garden: "Our Growing Garden", or "The Kinder Garden". From large construction paper circles and petal shapes, students create their own flowers and draw faces or glue close-up photos in the middle. Measure each child and write his/her name on a green paper stem cut to the length of his/her height. Attach stems to a hallway wall or bulletin board. Children add flowers, cut and add leaf shapes in shades of green paper. As they admire their class garden, invite them to compliment one another on their flowers: "I like Sara's flower because it has . . ."



Materials
Construction paper, crayons, glue

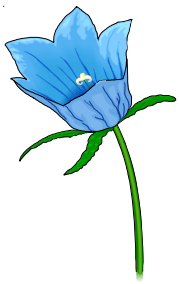
Adapted from

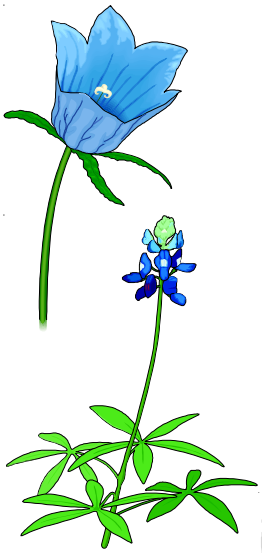
www.childfind.com/cgi-bin/printerfriendsly.cgi
www.frugalhomemaker.com/flowerfun.htm
www.123child.com/easter/flow.html

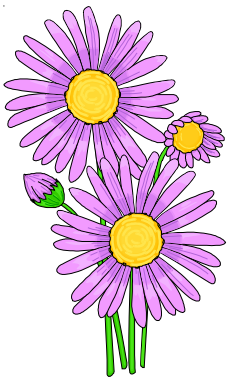
Friends of the Flowers

Flower Scavenger Hunt

While exploring the Saskatoon Natural Grasslands see how many of the following you can find. Good luck and don't forget to stop and smell the flowers!



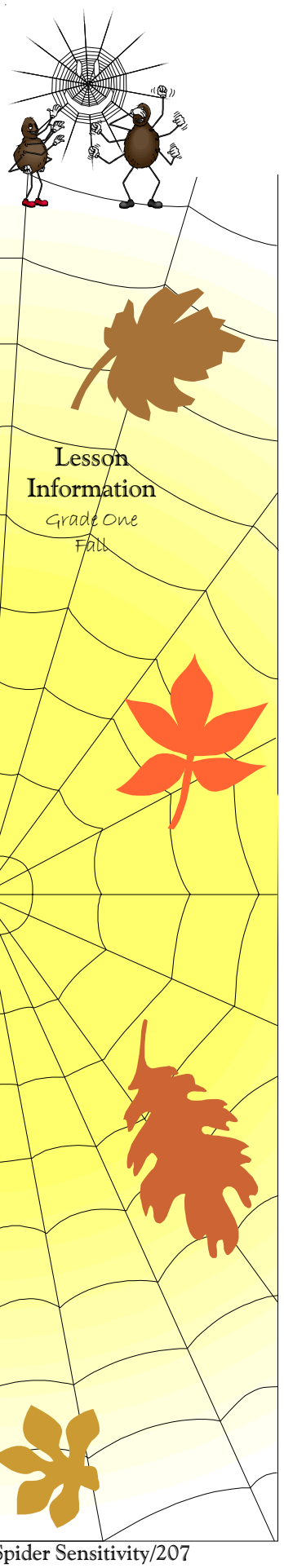




A yellow flower	An insect on a flower	A flower dried up and gone to seed	A tall flower
A flower with five petals	A purple flower	An orange flower	A closed up flower
A tiny flower	A flower with leaves with many leaves	A blue flower	A flower that smells good
A bee on a flower	A beautiful flower	A flower with many petals	A cluster of flowers

Please do not step on or pick any flowers or other plants as you walk. Leave them to make seeds for next year and for others to enjoy now.

Spider Sensitivity



Background Information

Spiders belong to a class of animals called arachnida. Like insects, spiders have exoskeletons, but they have only two body parts. Their head and thorax join together in one part called a cephalothorax. They also have an abdomen. Spiders have eight legs, as do their relatives: mites, ticks, and scorpions.

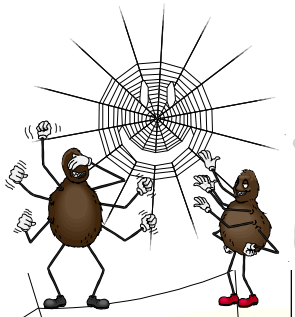
Spiders are divided into two groups, based on the way they catch their food. In one group are the trapping spiders so named because they build webs to trap their prey. The other group of spiders lie in ambush, waiting outside their web to attack their prey. They have pedipalps, appendages located between the jaws and the front legs.

Most insects have antennae and wings, but spiders lack both. Protruding from their abdomens are six spinnerets, tipped with many spigots through which silk is released from internal glands.. The silk begins as a liquid but dries upon contact with air.

Spider silk is a protein stronger than steel. Not only does silk provide strength but it also provides elasticity. Different kinds of silk have different functions. Some spiders use silk to wrap trapped insects to prevent them from damaging the web or harming the spider. When the female lays her egg mass she uses another type of silk to cover and protect the eggs from predators.

Some spiders travel by a method called balooning. When they need to move from place to place these spiders raise their abdomens and send out a strand of silk. The strand is caught by moving air which carries them as far as a few hundred metres to another location. The spiders attach their silk to trees or buildings to serve as safety lines that protect them from falling to the ground. Spinnerets can be extended, withdrawn, compressed, and to some extent aimed.

Spider Sensitivity



The same creatures that create beautiful silk orb webs are also voracious carnivores. Spiders hunt and trap insect pests such as flies and mosquitoes. Few spiders are poisonous, and they do not hurt humans.

Webs vary in complexity and structure. **Sheet webs** are usually woven on a horizontal plane. A **funnel web** has a funnel-shaped part where the spider hides. **Cobwebs** are tangled irregular webs. **Orb webs** resemble dream catchers. Two types of silk are used to build webs. **Rope silk,** strong but limited in flexibility, forms the frame of the web. The spider spins its thin and flexible **trap silk** in long lines, like spokes from a wheel, between the centre and the frame, like spokes of a wheel. Then it weaves strands in a spiral across the lines and secures them with secretions from its glands. Insect prey is caught in the middle of the circle. Many web-spinning spiders secrete an oil to prevent getting stuck. When it feels the web wiggle, it runs to its prey, wraps it in silk, and stores it as food.

Spiders lay eggs, but have no larval stage. The hatchings are miniatures of their parents. The young shed skin many times as they grow, and are usually adults by fall. Some mate, lay eggs, and then die. Other species enter a state of dormancy for the winter. The female either hides her eggs or carries them with her. The eggs often overwinter in this stage and hatch in the spring.

Objectives

To become familiar with the different kinds of spiders that live on the grasslands

To learn about some of the unique adaptations spiders have

To read stories about spiders to gain an appreciation of their role in nature

To respect spiders by staying on the trail so as not to disturb their funnel webs in the grass

Resources

Carreiro, Carolyn. *Hand-Print Animal Art.* Williamson Publishing: Charlotte,VT. 1997.

Everts and Kalman. *Animal Homes.* Crabtree Publishing Company. 1994.

Green, Jen. *Under a Stone.* Crabtree Publishing Company. 1999.

London, Jonathan. *Dream Weaver.* Silver Whistle, Hoarcourt Brace & Company: CA. 1998.

National Wildlife Federation. *Ranger Rick's NatureScope: Wild and Crafty.* Learning Triangle Press. 1998.

Suzuki, David. *Looking at Insects.* Stoddart Young Readers: Toronto, ON. 1986.

Winer, Yvonne. *Spiders Spin Webs.* Charlesbridge Publishing: MA. 1996.

Wishart & Hayley. *Knee High to Nature FALL.* Lone Pine Publishing. 1994. pp.134-148.

Spider Sensitivity

Rouse Interest

Spider Songs and Stories

Dream Weaver by Jonathon London (in Edu-kit)
"How Spiders Came to Be" *Knee High to Nature - Fall,* p.152)

Sing: "The Eensy Weensy Spider " *Knee High to Nature - Fall*, p.151
While class is singing the song over and over again, have each student act out the song with the spider finger puppet.

Puppet Play: Spiders Are Important Too!

Three students roleplay with the spider, bluebird, and bee finger puppets as teacher reads the story. The teacher may want to read the story first and then get student input as to how they could act it out with the finger puppets.

Characters: Bizzy Bee, Sonja Spider and Bonnie Bluebird

Bizzy Bee
Aren't you ecstatic about tomorrow's big celebration, Sonja? I can't wait!

Sonja Spider
What celebration Bizzy Bee? I didn't hear any news last night because I was spinning a new web.

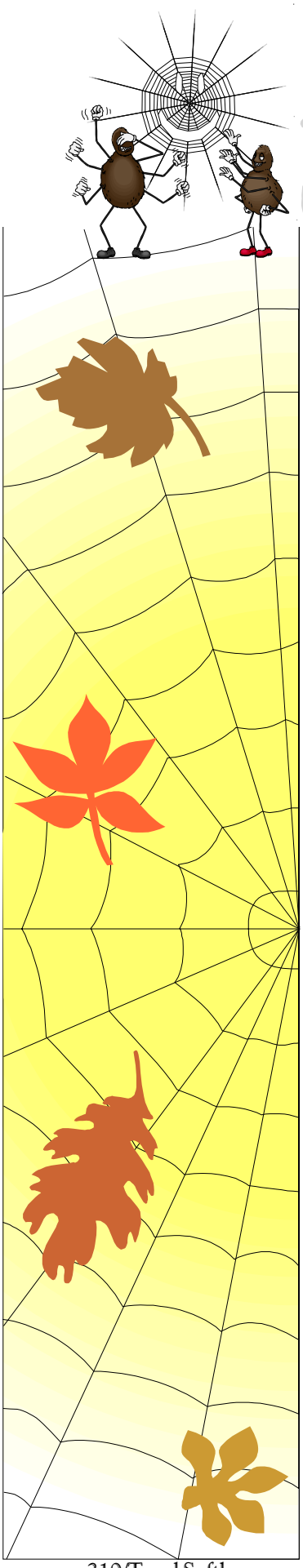
Bizzy Bee
Well the whole grassland community is planning a big party to thank the Earth Fairy for this wonderful season. All the prairie folk are doing something special for her.

Sonja Spider
Great! What do the spiders get to do?

Bizzy Bee
Well, all the insects are going to fly in a big parade making various patterns in the sky!

Sonja Spider
Fly?! I can't fly!

Bizzy Bee
Really? I thought all insects could fly!



Spider Sensitivity

Sonja Spider
Well, most insects can fly, but spiders aren't insects. Everyone thinks we are, but we belong to a different class all together. We are called arachnids.

Bizzy Bee
Oh...gee I though you were one of us.

Sonja Spider
No, no Bizzy. We are very different from each other. Spiders have no antennae and no wings, and we have eight legs instead of six like you and other insects.

Bizzy Bee
Eight legs! Let me see...(Bizzy counts Sonja's legs but only makes it to seven)

Sonja Spider
No, no, Bizzy. You missed one, I'm sure. Now count again.

Bizzy Bee
Okay, Okay, but I could use some help. Will someone please help me count? (all count to eight) Good golly! Eight legs and no wings! You really are different from us insects. We do just fine with our six legs. I don't know why you need so many. I don't know what you spiders are supposed to do if you can't fly in the parade with us.

Sonja Spider
You mean no one has come up with anything special for the spiders to do! (Whimpers)

Bizzy Bee
Well, uh....

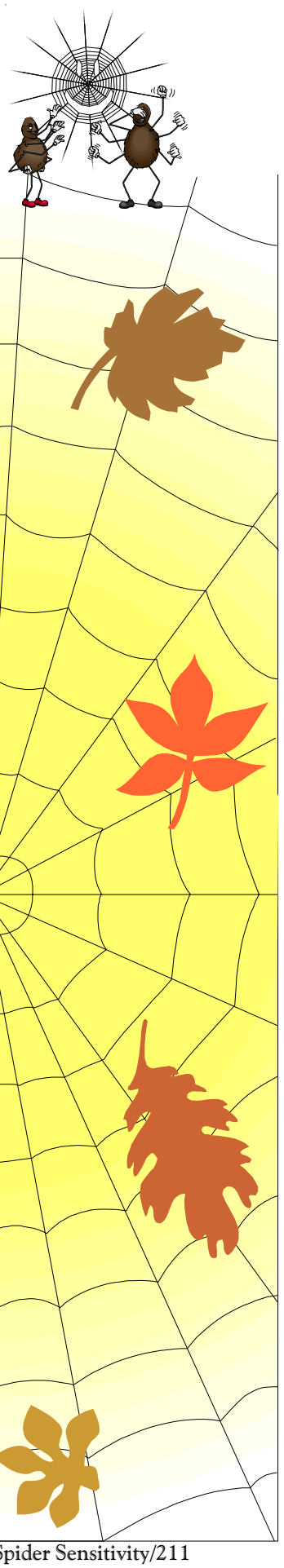
Sonja Spider
Why does everyone forget about us spiders?

Bizzy Bee
Now don't cry, Sonja. It's not that we forgot about you; we just thought you were an insect. There must be something special that you can do.

Sonja Spider
Well, most spiders have eight eyes!

Bizzy Bee
Eight eyes! That's all! How do you get around with only eight eyes? Most insects I know have have compound eyes.

Spider Sensitivity



Sonja Spider
Well, I can hunt for my food by feeling it.

BIzzy Bee
Hunt for food by feeling it? But you must have to catch it before you feel it!

Sonja Spider
Oh, we do. We catch our food and we know we've caught it when we can feel it.

Bizzy Bee
Sonja, I'm confused! What are you talking about?

Sonja Spider
Many of us spiders spin a web - a sticky silk web. Mine is shaped like a wheel, but other spiders spin different designs. Then we sit and wait.

Bizzy Bee
Wait? For what? I can't stand waiting around.

Sonja Spider
We wait for dinner time. When little insects like flies, moths, mosquitoes, and even bees fly into the web and get caught, we feel the web move. Then we rush out, wrap some silk around whatever we caught, and eat it.

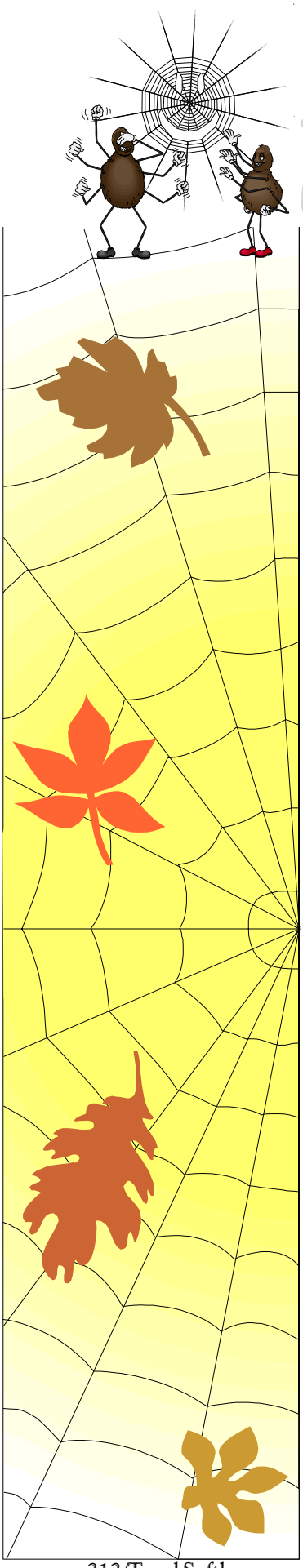
Bizzy Bee
Good golly! I like the feel of silk, but I definitely don't want to get wrapped up by you. Doesn't all that silk get expensive?

Sonja Spider
Expensive! Ha, ha, Ha! We don't buy the silk, Bizzy, we make it.

Bizzy Bee
Spiders can make silk? Wow, I wish I were a spider!

Sonja Spider
But don't forget, if you were a spider, everyone would be calling you an insect anyway. Oh, it's so depressing. I guess I'll just stay at home on my web and wait for a tasty meal. But hey, I guess that will be a waste of my time since all the insects will be parading across the grasslands...(Sonja mumbles as she walks off).

Bizzy Bee
Poor Sonja! It's tough being a spider.
(Bonnie Bluebird enters)



Spider Sensitivity

Bonnie Bluebird
On, Bizzy, I'm glad I found you. I need your advice.

Bizzy Bee
What's the problem, Bonnie?

Bonnie Bluebird
I've been flitting around all over the grasslands and even down to the river trying to find someone to decorate the grasslands for our celebration, but everyone is too busy!!

Bizzy Bee
Decorate the grasslands? What kind of decorations do you want?

Bonnie Bluebird
Oh, you know, we need some white doilies and lacy garlands to hang in the trees.

Bizzy Bee
Gosh, I wonder where we're going to get doilies and lacy garlands. Maybe somebody could make them for us. But who? **(pause; hopefully audience will suggest Sonja the Spider)** Sonja? Of course! The spiders could weave the decorations with their silk. It will solve our problem and make Sonja and the other spiders so happy to do something special for the big party.

Bonnie Bluebird
What a great idea, Bizzy! I'll go tell the Grassland Ground Squirrels Organizing Committee right now! When I left they were all ready to forget the whole thing and go find a hole to meet in. (Bonnie Bluebird leaves; Sonja Spider re-enters carrying a suitcase)

Bizzy Bee
Sonja! Sonja! Where are you going with that suitcase?

Sonja Spider
The spiders of the grasslands had a meeting. We can't stand the thought of a big celebration in which we have no part. So we've decided to move down to the river. No one here will even miss us.

Bizzy Bee
But Sonja, you can't leave. We will miss you, and besides, we do need you spiders. The spiders must work all night to make the decorations for our celebration tomorrow! We need beautiful white doilies and lacy garlands to hang in the shrubs and tall grasses. Can you do that in time for tomorrow's festivities?

Spider Sensitivity

Sonja Spider
Of course! We spiders often spend our evenings spinning silk. Tonight we'll all work on spinning and weaving decorations. We could even string glistening beads of dew on each strand! Oh, Bizzy, thanks so much for thinking of us!

Bizzy Bee
Oh, no need to thank me, Sonja. I'm just happy you'll be here to help us celebrate!

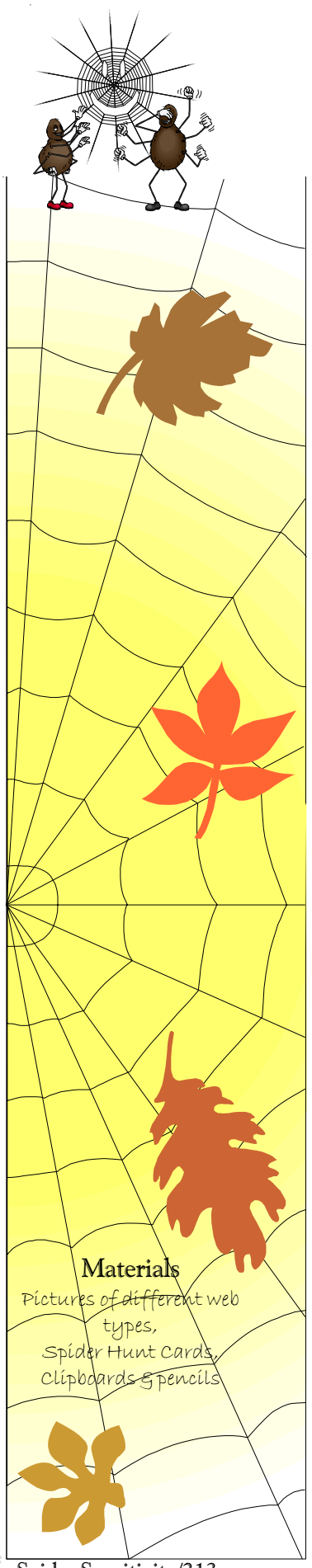
Sonja Spider
Well, you've made a lot of spiders very happy. I'd better go tell the others, Bizzy, and then get right to work. We'll want to make sure this celebration is one that the Earth Fairy will never forget. Bye-bye, Bizzy.

Bizzy Bee
Bye, Sonja. I'm sure you will dazzle us all with your fine creations. Now I've got to go back to my hive and get some rest. Being busy as a bee all day long makes for a sleepy bee at night. I'll see you resting on your sparkling lacy webs at the party tomorrow morning!

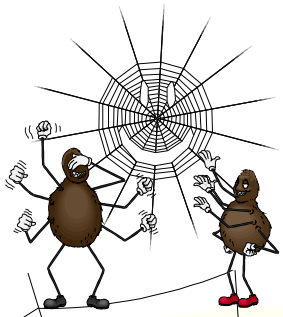
Relate

Spider Sensations
See page 187 of *Hands-On Nature* for instructions. Half of the class can do this activity in the school yard while the other half does the Spider Scavenger Hunt.

Spider Scavenger Hunt
Students will explore the many aspects of spiders as they hunt for spiders and webs. While half the class stays in the school grounds for the Spider Sensations activity, the other half, into supervised groups of five, do the Scavenger Hunt in the Grasslands. Supervisors read clues to their groups as they tread softly down the trail. Advise students that by being quiet and by treading softly rather than running down the trail, spiders and other animals will not be frightened and the group might actually see them. See *Hands-On Nature*, p.188, for Scavenger Hunt details. Each supervisor will need a copy of the Spider Hunt Card on page 214 to use as a checklist.



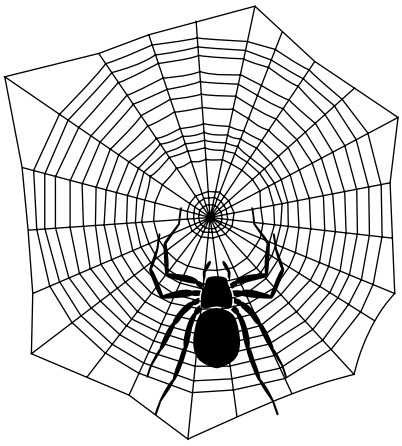
Spider Sensitivity



Adapted from Hands-On Nature p. 188

Spider Hunt Card

A messy web (a cobweb)
A web shaped like a sheet
A web shaped like a sheet with a funnel on one side
A web shaped like a wheel
A spider on a web
An insect caught in a web
A captured insect wrapped in silk
Part of a web that is sticky
(look for liquid beads on the web)
Part of a web that is not sticky
A web near the ground
A web in a tree or shrub
A spider egg case
A spider not in a web
A spider with very long legs
A small spider
A fat spider
A black spider
A colourful spider
A camouflaged spider
Something that eats a spider



Spider Sensitivity

Reflect

Weaving a Sharing Circle

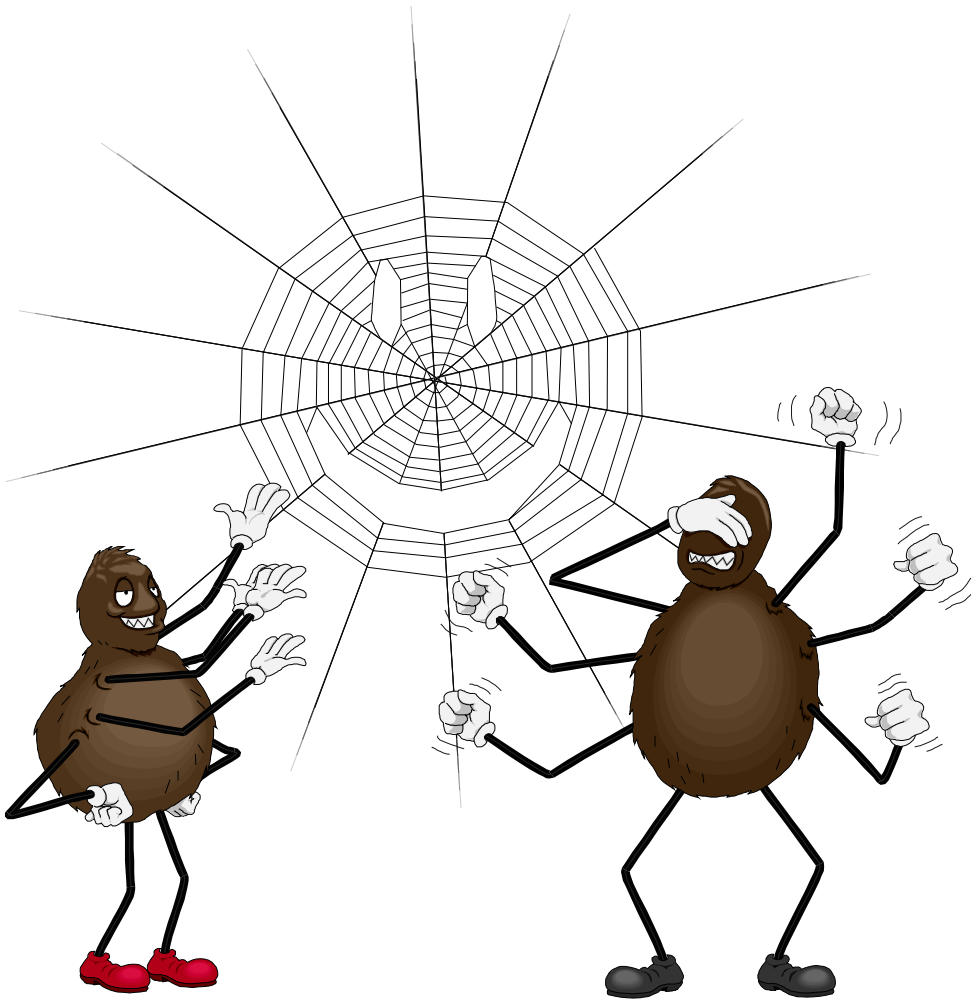
See *Hands-on Nature*, p.188.

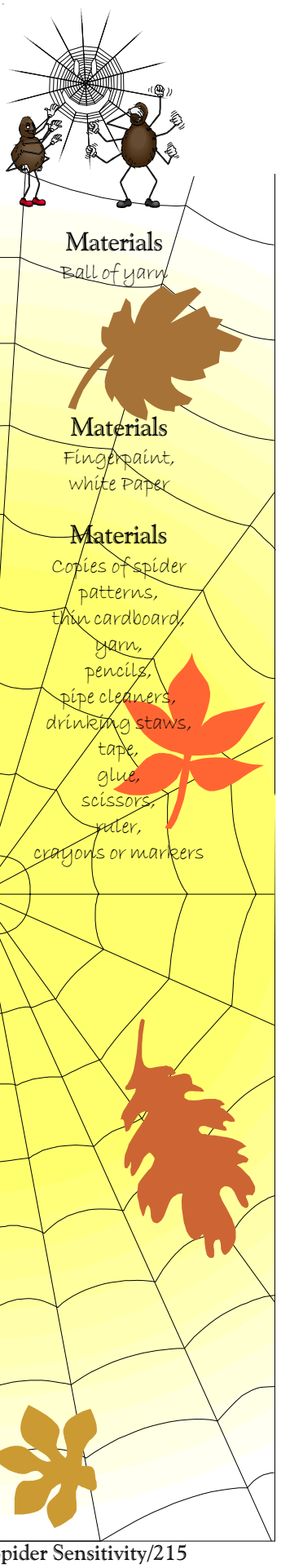
Hand-Print Spiders

Children will learn to communicate through art the value of spiders. See *Hand-Print Animal Art*, p. 116. They will create hand-print spiders on posters entitled "Save the Spiders! " or "Spiders are Sensational".

Climbing Critter Craft

See *Wild and Crafty, p.18-19.*





Prairie Totems

Lesson Information

Grade Two

Season: Spring, Fall or Winter

Background Information

"The hearts of little children are pure, and, therefore, the Great Spirit may show them many things which older people miss." Black Elk, *Black Elk Speaks*

In Prairie Totems students will learn empathy in the process of making connections that will enable them to tread softly in their world.

In many Native American cultures, each person adopts a totem animal according to their common traits, personality, dreams, or family traditions. Some believe that animals and people share a common ancestry and are able to communicate verbally. Australian Aborigines believe that people come from different animal clans and share not only a common ancestry but a common "songline" from which they can sing the world into existence.

Objectives

To develop interest in animals and all their "magic"

To create empathy and connections to animals and their habitat

Having a personal connection with an animal is a way of understanding that all living things (humans, animals, plants) share the same world and a kinship with each other.

As David Sobel, the writer of *Beyond Ecophobia*, points out:

> "Cultivating relationships with animals, both real and imagined, is one of the best ways to foster empathy during early childhood. . . Children feel implicitly drawn to baby animals, so let us cultivate this empathy. This natural emotional connectedness is the foundation of the idea that everything is connected to everything else."

Having a child find his or her own animal is a powerful and magical connecting experience. Nurturing the connection can create a life-long bond between child and animal, which will create care and respect for that animal and lead to a greater care and respect for the natural world.

Resources

Caduto, Michael J and Bruchac, Joseph. *Keepers of the Animals.* Saskatoon, SK: Fifth House Publishers, 1991

Cornell, Joseph and Deranja, Michael. *Journey to the Heart of Nature.* Nevada City, CA: Dawn Publications,1994.

Kriesberg, Daniel A. *A Sense of Place – Teaching Children About the Environment with Picture Books*. Englewood,CO: Teacher Ideas Press, 1999.

Sheehan, Kathryn and Waidner, Mary. *Earth Child 2000*. Tulsa, OK: Council Oak Books, 1998.

Prairie Totems

Rouse Interest

Animal books, videos, posters, and puppets from the Edu-kit

Students will learn about the SNG animals with a view to finding their own totems. Read stories from the Eco-kit: "A Walk in the Prairie", "The Whole Story" and "Wild Travelers". Show the "Tread Softly" video, display animal posters in the classroom, listen to the "Prairie Spring" CD, and allow time for playing with the animal puppets.

Materials

Books, videos, CD's, posters, puppets from the edu-kit

Animal Magic

Students will experience a sense of mystery and wonder of the animals and their totem connections by enjoying some magic tricks. Students dictate names of grassland animals as the teacher records them on slips of paper. Fold slips and place in a bag or box. One student draws from the bag, after which the teacher leaves the room. During his/her absence the student reads to the class the animal name. The teacher returns, hesitates, and names the animal. The trick is that the teacher has recorded the name of the same animal on all the slips.

Adapted from *A Sense of Place* by Daniel Kriesberg.

Animal Charades

Students to start to think like animals as they play charades. Write names of prairie animals on cards. A student volunteer will picks a card, which he/she keeps secret as he/she does an impersonation. Set a time limit for class members to identify the animal. Whoever guesses will pick the next card and be the next impersonator.

Prairie Totems

Relate

Brother/sister animal, May I?

Materials
Animal cards

Students will evaluate the actions of others in terms of conservation of the Grasslands and its wildlife as they play a variation of "Mother, May I?". For greater student interest, divide the class in half for simultaneous games.

A student volunteers to be Brother or Sister Animal, who stands at least 6 metres apart from the others. Brother or Sister calls the name of a classmate. That classmate has to say something good he or she will do for all the grassland animals, e.g., "I will not throw litter when I hike in the Grasslands" or "I will stay on the path so I won't trample animal homes".

Sister or Brother Animal evaluates the contributor by saying, "You may take [1-3] giant steps", depending upon the quality of the answer, the contributor asks permmission to move: "Brother or sister animal, May I?" Brother or Sister responds, "Yes, you may," and the classmate takes the given number of giant steps toward Brother or Sister Animal. The first child who reaches Brother or Sister's position trades places with him/her and the game continues. If the contributor forgets to ask, "Mother May I?" he/she misses the opportunity to move.

Adapted from *Earth Child 2000*, by Kathryn Sheenan and Mary Waidner

With Beauty Before Me

Students will develop a positive attitude about the SNG, a place where one must look closely and tread softly to realize its true beauty. The teacher may need to coach the class on making connections after reading this fable

A travel-weary dog wanted a place to rest. It found an old building with an open front door. What should the dog find inside but one hundred angry, snarling dogs. The frightened dog ran away. A while later another tired dog happily entered the same building. It found one hundred smiling dogs, all wagging their tails.

Why the difference? The room contained one hundred mirrors and each dog saw its own reflection x 100. The first dog mistrusted the other dogs and snarled in self defense. The second dog entered expecting the best and was rewarded with a friendly welcome.

Prairie Totems

Students will further appreciate Nature's beauty after memorizing the Navajo poem, *With Beauty Before Me,* which also reinforces the concepts of before and behind, above and below, and around and within.

> With beauty before me, may I walk.
> With beauty behind me, may I walk.
> With beauty above me, may I walk.
> With beauty below me, may I walk.
> With beauty all around me, may I walk.
> Wandering on a trail of beauty, lively I walk.

Practice this on the school grounds before repeating it in the Grasslands. Students close their eyes and carefully take three steps forward while repeating the first line of the poem. They then stop, open their eyes and look straight ahead and pause to respond. Take three more steps, repeat the second line, close their eyes, turn around, open their eyes and look for something beautiful behind them. Repeat for each line.

After repeating the last line, students keep their eyes closed and try to feel the beauty within them. Afterwards they record or discuss what they saw and how they felt. Once this is done give children time to walk slowly through the area with eyes open. Gather in a circle to repeat the poem as a group to absorb the joy in finding beauty together.

Adapted from *Journey to the Heart of Nature* by Joseph Cornell.

Prairie Totems

Students will learn the art of relaxation as they form visual images of fulfilling a special Grasslands quest. Students find a comfortable place to lie down in a designated Grasslations location or carpeted room in the school. If done inside play an outdoor sounds tape or CD to establish a prairie atmosphere.

Materials

Prairie Totem story, Prairie Sounds CD or tape if activity is done inside

Alert students that they must pay close attention if this activity is to work for them. Lead them in taking a few deep, but quiet, relaxing breaths. Ask them to close their eyes and paint pictures in their minds while you read the following story. Pause frequently to give children time to translate the words into visions.

Prairie Totems

"As you lie in soft wild prairie grasses you look to one side (e.g.pause) and then the other (e.g.pause) and finally at the sky. You alert your senses to the sights, sounds, and scents of the grasslands around you. You see prairie flowers and flowering bushes of yellow, orange, blue, and white. A robin sings. The breeze cools your cheek and brings with it the smell of sweet prairie clover. Animals emerge from their hiding places and slowly walk closer to you. Some nuzzle the grass and graze. Some scratch the soil and burrow into the soft earth. Some roost in the nearby Aspen Poplar trees, resting. Fluffy clouds drift along slowly in the blue sky. The sun warms you. A stirring inside you tells you to go for a walk. As you get up, ever so slowly, you notice a bracelet of silken threads has somehow attached itself to your wrist. The breeze lifts its ends into the air. You follow the threads with your eyes and watch as they connect themselves to objects around you -- an ancient boulder, a patch of moss, a stem of sweet clover, a tuft of wild grasses, a wild rose bush, a dragonfly, a field mouse, a deer, a red-tailed hawk. The threads drift into a giant web of life, and you are in the center. When you move, the web moves with you. It never pulls against you or entangles you. You smile, proud to be a part of this place. You walk over the sloping land the discover that you can see the prairie stretch far into the distance. You head towards the grove of poplar trees. You feel so good -- like you do when you are in a favorite place at home. The web drifts along with you.

(Pause) But before you reach the trees, you see an odd gray cloud moving towards you, just above the tips of the grass. It's a cloud of polluted air, full of litter from gum wrappers and fast food cartons, hunters shooting without purpose at the deer, gusts of air made poisonous from farm fertilizers and lawn chemicals, hunks of waste concrete. You know that you and everything else connected to you within the web are endangered!

The silken threads gently pull you towards the trees. You take a deep breath and wish for someone or something to help you -- perhaps a special animal will come.

You turn away from the pollution cloud and look across the prairie, run up and down the gentle hills, through short and long grasses. You run faster and harder, jumping over prairie flowers and mosses, through a creek and into the Aspen Poplar grove you saw before. Inside, you feel cooler and calmer; your heartbeat slows down. You look around and see a trail leading into the middle of the trees. You follow it.

Prairie Totems

You follow a path through the trees, being careful not to disturb the web, and feel safer for the time being.

Just ahead you see a bright opening where the trees end and the prairie begins again. Within the opening stands a special animal waiting for you. Its voice echoes in the wind, repeating, "Come. Together we can make wise decisions." You walk towards it and into it, becoming the same being, ready to make wise decisions. You travel across the Grasslands together, the web sweeping behind. You find an adult who listens to your idea (pause) and agrees to help you in your quest to protect the web of Grasslands life.

Tell the children to stay in place with eyes closed for one more minute. Gently say, "Now you are ready to return to our Grasslands, but you will be forever connected to that special person, and the delicate web.

Ask them to open their eyes and then sit up slowly. Guide them into a circle to share what they saw and experienced during their journey. Those who choose to hold their thoughts inside are welcome to do so. Talk about the living things within the web, which ones they would put into a totem, and what they would symbolize. Discuss what happened when they became one with the special animal. Ask: Who was that? What plans did you make to create a safe, clean environment for the Grasslands and its living things?

Prairie Totems

Reflect

Animal Masks

Materials
Cardboard, cloth, paints, crayons, markers, glue, beads, and whatever else you can think of

Students will identify with their favorite totem animal by wearing its image in the form of a mask. It could be as simple as a decorated two-dimentional cardboard mask, or a more elaborate creation made from plaster or cloth. They take masks home to reflect upon as a source of strength during difficult times, or when they want to remember their journey to protect the prairie.

Discuss the strengths (adaptations, role in the web of life, etc.) of each being represented in the masks. Help the children make connections between themselves and their totems. For example, they may share similar characteristics such as being fast as a coyote, active as a squirrel, quiet as a hare, loving to wear and paint in wildflower colors, etc.

Animal Wish Box

Students will feel empowerment for making a difference in protecting the web of life and the prairie habitat.

They create a container in which to place wishes for their totem animal's well-being--a closable box, reusable gift bag, or pouch, which they decorate as they wish. Ask them to think about wishes as they work.

After completion, sit in a circle where individuals tell about their containers and wishes. Give them time to write down or illustrate their wishes which they will fold and place inside.

Gifts for Feathered Friends

Background Information

Experienced backyard birdwatchers (birders) who provide food for our wild feathered friends marvel at the tenacity of birds who overwinter in the prairies. One must keep in mind, however, that they have developed defense mechanisms that have evolved over many centuries. We humans can help them through tough times but we cannot take full credit for their survival. Mother Nature has equipped animals with their life-sustaining adaptations.

During winter birds' food supplies dwindle. Their prime sources of sustainance -- insects, berries, and seeds -- have either gone underground for the season or been consumed during late summer and fall. By providing suet, we can help them restore lost body fat, seeds help with energy needs. Shorter days mean less time to forage. Regularly stocked feeders provide for the early and late comers -- chickadees, nuthatches, siskins, and woodpeckers -- giving them an advantage over the ever demanding house sparrows and magpies. All birds welcome a winter water supply.

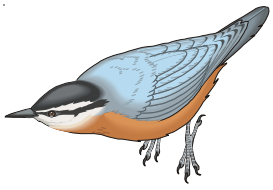
Since most winter birds are perchers (Passeriformes) -- chickadees, nuthatches, grosbeaks, finches, redpolls, waxwings, magpies, jays, ravens, house sparrows, and starlings -- they eat effortlessly from hanging feeders.

Cold weather saps birds'energy. Most shiver to produce heat. Feathers provide insulation as warm air is trapped between layers. Some birds huddle together to conserve warmth. At night, they must find sheltered spots that provide protection from wind. Some birds, such as the Ruffed Grouse, overnight in snow holes. Pockets of air within snow provide insulating properties. The Ruffed Grouse also has feathered legs. Some birds conserve heat by a counter - current exchange system. A thin membrane separates warm blood in arteries from veins carrying cooler blood from the foot. The warm blood warms the cool blood.

Another peril facing small birds is predation by owls, coyotes, foxes, and domestic cats. Camouflage is an adaptation of the ptarmigan, which turns from its usual brown to winter white. If pet owners choose to take responsibility they can prevent many bird casualties by keeping cats indoors.

Lesson Information

Grade Three
Season: Winter or Late Fall



Objectives

Students will understand why birds migrate

Students will get to know some common winter birds and how they survive winter conditions

Students will appreciate how difficult it is for birds to survive our winters and help them by building bird feeders

Gifts for Feathered Friends

Resources

Hayley, Dianne & Wishart, Pat. *Knee High Nature - Winter: A Guide to Nature Activities and Fun*. Lone Pine Publishing: Edmonton, AB, 1993.

Lingelbach, Purcell and Sawyer. *Hands-On Nature*. Vermont Institute of Natural Science. 2000: Woodstock, Vermont, 2000.

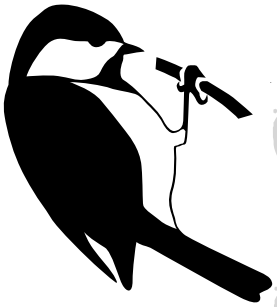
Rouse Interest

The Spruce Tree and the Chickadee

by Florence Holbrook (*Knee High Nature- Winter*)

One winter the chickadee, that little grey and black and white bird that calls "chickadee-dee-dee," decided not to fly south with the robin and the goose but to stay in the North all winter.

Now the chickadee had to find somewhere warm to go at night so he went up to the poplar tree and said, "Mr. Poplar Tree, may I spend the winter in your branches?" "Oh Chickadee" said the poplar tree, "I lose all my leaves in winter and you will be very cold in my bare branches."



The chickadee flew over to the mountain ash tree. "Oh Mr. Ash Tree, may I spend the winter in your branches?" "Little Chickadee, I already share all my berries with big flocks of waxwing birds. There will be no room left in my branches for you."

The little chickadee wondered if he had made the right decision.
Then he saw a beautiful birch tree, you know, the one with the white bark.
"Mr. Birch Tree, may I spend the winter in your branches?"
The birch tree looked at the chickadee and replied scornfully,
"You! In my branches! You might get me all dirty. Get lost chickadee!"

The poor chickadee was feeling very dejected when he came upon a spruce tree. "Mr. Spruce Tree, may I spend the winter in your branches?"
"Well, little Chickadee," the spruce tree replied, "I will try to take care of you. Maybe, if you get very close to my trunk, you will be warm enough."

Mother Nature was looking on and after hearing the response of all the trees she said to the spruce tree, "You have been so kind to the Chickadee when she needed your help, I am going to let you keep your leaves all winter long."

To this day the spruce tree remains green all winter and the chickadee and the spruce tree have remained the best of friends. Sometimes on a cold winter morning you can see the chickadee fly out from the branches of the spruce tree.

Gifts for Feathered Friends

Background Bird ID

Students deduce from information they read on the back of the birds pictured on "Who Am I?" cards (in Edu-kit) whether they will have food available for overwintering, or whether they will have to migrate.

Relate

Materials
'Who Am I?' bird cards (in Edu-kit)

Winter Survival Strategies

Students will assume the identities of birds and act out their survival strategies for classmates to identify. Each small group of students receives a card describing a winter survival strategy used by an overwintering bird. After a few minutes practice groups perform and watch pantomimes. Add props and sound effects as desired.

Examples of Winter Strategies:

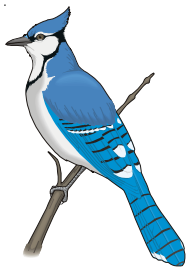
Chickadees: In a small flock, you visit a bird feeder for black oil sunflower seeds which you take to a branch, hold between your toes, and pound with your beak to remove the shell. You love the tender seeds inside.

Ruffed Grouse: On a very cold evening you dive headfirst into a soft snow bank to spend the night. In the morning, you fly out suddenly and perch on a low spruce tree branch to nibble buds.

Blue Jays: You fill your mouths with as many seeds as you can hold then stash them in cracks and small holes in trees. You eat the seeds later.

Materials
Winter survival cards

Adapted from *Hands on Nature,* p.145.



Who's Here Now?

After the teacher gives a sound and picture review of overwintering grassland birds (owl, chickadee, partridge, grouse, redpoll, and waxwing on Who Am I? cards in Edu-kit, plus the Blue Jay and the Downy Woodpecker from a bird guide) students will record data for the birds they see during a Grasslands hike. They count, describe, name, and/or draw the birds and try to answer the following questions:

In what vegetation did you see it? Did you recognize it by its appearance, silhouette, or call? Was it feeding? If so, what was it eating? Was it with other birds or alone?

Materials
'Who Am I?' bird cards (in Edu-kit)

Gifts for Feathered Friends

Materials

A deck of cards for each of the following labels: water, food, and shelter

The Big Chill

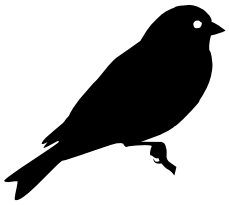
Many birds do not migrate and must face the hardships of a long northern winter. Students will role play to experience the challenges of winter survival. Half the class are birds, whose goal is to collect cards that represent food, shelter, and water. The other half, except for two, are members of "the big freeze" (winter weather conditions). The other two pose as predators who "catch" as prey the birds they tag.

The teacher distributes survival cards randomly around a large play area. The latter two groups attempt to tag the birds as they fly around collecting cards. Within a time frame designated by the teacher, birds collect three cards each, as required for winter survival. When predators tag a bird, they collect all of the bird's cards, the bird is considered "caught", and it must sit on the spot where it was tagged. If a bird is tagged by a big freeze, the bird must hand over its survival cards but may continue playing.

Reflect

Materials

Milk Cartons, Bird Seed, String



It's For the Birds!

Students will help birds through the winter by providing extra shelter and food. Simple milk carton feeders are easy to make and replacable. Cut a small entry hole in the middle of a thoroughly washed and dried two litre carton, staple the spout closed. Punch holes in the top for threading a wire or string hanger. Add birdseed, preferably black oil sunflower seed, and hang in a school yard tree. For extension activities see the "Winter Bird" section of *Knee High to Nature - Winter*: *A Guide to Nature Activities and Fun* (in Edu-kit), p. 30-54.

Migration Mysteries

See the "Reflect" activities for the Migration Mysteries lesson plan in this manual (p.161) and adapt them to grade three level.

Grassland Gardeners

Lesson Information

Grade Four

Season: Spring

Background Information

When educators commit to helping children develop a kinship with plant life and the animals that depend on plants, we are giving them a life skill. Hands-on activities with soil, seeds, and plants promote natural bonding with Earth. Charles Dudley Warner says:

> "To own a bit of ground, to scratch it with a hoe, to plant seeds, and watch their renewal of life, - this is the commonest delight of the race, the most satisfactory thing a man can do."

Participation firsthand in the miracle of growth provides fun, fresh air, exercise, and spin-off knowledge -- the seasons, plant and animal cycles, plant functions, and food production. A school garden becomes a community garden, binding school and community. A school butterfly garden accommodates the raising and releasing of butterflies. Students make connections to the web of life by being a part of it.

Adapted from *Earth Child 2000* by Sheehan & Waidner

"It is important that you know you are planting seeds even if you don't see them bloom."
Vivienne Verdon-Roe

Resources in Education Kit

Habitat and Biodiversity: Teacher Resource Guide. Dale Seymour Publications: Orangeburg, NY. 1998.

Habitat and Biodiversity: Student Edition. Dale Seymour Publications: Orangeburg, NY. 1998.

Harrington, Sheila, ed. *Giving the Land A Voice: Mapping our Home Places*. The Land Trust Alliance of British Columbia.

Klein, Marcia. *Prairie Plants*.

Overbeck, Cynthia. *How Seeds Travel.* Lerner Publications Company: MN. 1982.

Wallace, Marianne D. *America's Prairies and Grasslands: Guide to Plants and Animals.* Fulcrum Publishing: Colorado. 2001.

Grassland Gardeners

Rouse Interest

Plant Puzzles

Students will research how soil conditions affect plant growth directly and animal survival indirectly. Half the class receives seed cards and half parent plant cards. They link up with their "plant partners". Partners then research their plant to discover its ideal soil conditions and the animals which depend upon it. The process should result in the partners' creation of a plant 'care card' stating its needs: the degree of sunlight, required water, food, and soil composition.

Yo I'm a Flower

Students will appreciate the relationship between plants and butterflies as they create a native butterfly garden. As an introduction play "Yo I'm a Flower" from Billy B.'s CD "Sun Up Sun Down".

Relate

Seed Collectors

Students will collect native plant seeds along with an expert. Refer to Native Plant Society posters to familiarize students with Grassland flowers and their seeds. In fall or early spring arrange for the Resource Conservation Officer from Meewasin Valley Authority or a representative from the Native Plant Society of Saskatchewan (NPSS) to lead a seed collection hike within the Grasslands buffer zone. Alternatively, give students the plant parent cards and their matching seed cards to take on the hike, match the cards to the plants growing there, and collect the corresponding seeds. Lable Ziploc bags for easy handling.

Meewasin email: meewasin@meewasin.com
Meewasin Website: www.meewasin.com
NPSS email: info@npss.sk.ca NPSS Website: www.npss.sk.ca

Make a Seed Viewer

Students observe the process of germination. Plant two seeds in a seed viewer and two seeds in soil in a peatpot. The seed viewer is made by placing seeds between the inner wall of the inside of a clear jar and its dampened construction paper lining and then filling the jar with with damp paper towels. Water both containers daily and place in a warm area. What emerges first, root or leaves? (root). Which way does the root grow? (down). How much light do the seeds require? Place them in

Grassland Gardeners

a warm and dark place and observe what happens. At this stage, they do not need light to grow. About the time your seeds in the viewer send forth leaves, you will notice the stem and leaves sprouting from the seeds in the soil.

Source: *Earth Child 2000* by Sheehan and Waidner. 1998, p. 105.

Grow a Butterfly Garden

During the process of restoring wildlife habitat, students will observe first-hand the life cycles of butterflies after planning, planting, and maintaining a butterfly garden. In order to encourage butterflies to mate and lay eggs, as well as to stay in one place to complete their life cycles, students must include plants that provide food for both larvae and adults in a sunny plot sheltered from northwesterly winds. The editor of this guide has published a book which will provide a useful reference for planning the garden. *Butterfly Gardens* (grade 4 level novel) can be found in school resource centres, public libraries, or directly from the author, Judith Benson; jg.benson@shaw.ca.

Requirements for Success

GENERAL SUGGESTIONS:

A number of local nurseries stock **native** plant species**.** Plan purchases that ensure continuous flowering from early spring through late fall. Ask for plants that will yield fragrant red, orange, purple, and white flowers and plant in **clumps** rather than singly. Flowers with flat surfaces, such as yarrow and composites (daisy-like), offer flat landing areas for large butterflies. Asters, Milkweeds, and Butterfly Bush provide ample nectar for most species. See page 231 for a complete list.

Since caterpillars serve as a food source for natural predators -- spiders, wasps, ants, flies, beetles, birds, and small animals -- plant extra plants to ensure that many will escape predation. Include a diversity of plants: parsley, herbs, annuals, perennials, shrubs, vines, and food crops in the brocolli family.

Native plants require no chemicals. If well watered, fed, and cared for during the first three years, the garden should sustain itself thereafter and serve as an outdoor classroom area for years to come.

Grassland Gardeners

LIFE CYCLE OF A BUTTERFLY

Students will have the opportunity to observe the four distinct stages of **butterfly life cycle: egg**, **caterpillar (larva), chrysalis (pupa), and adult.** Patient observers may witness some species' elaborate courting and mating rituals during the adult stage.

Dilligent planning insures survival of caterpillars (larvae) which grow and moult as they voraciously feed on the larval food plant and nearby weedy plants. When fully mature they search for sheltered spots to create their pupae, or chrysalises. Most **metamorphose** (change into butterflies) within 10 to 14 days although others, such as the mourning cloak, overwinter in woodpiles.

Butterflies emerge in the morning for a full day of light during which time they dry their wings in the sun and then open and close them to pump enough blood into their veins to strengthen them for flight. Butterflies need nectar-producing plants of their preferred colors (see general suggestions previously) for sustenance as soon as they become airborne. Because butterfly larvae usually do not prefer to feed on the valuable ornamental trees, shrubs, and perennials they are welcome in most gardens.

Butterflies also need sources of moisture and nutrients which gardeners can easily provide. A regularly watered mud puddle or shallow pebble-lined dish to catch rain water are perfect watering holes especially when flat white rocks are placed next to them for sunning and warmth.

When natural butterfly habitat is restored this precious resource is sustained. Our efforts to support butterflies benefit other species in the web of life as well.

Grassland Gardeners

Nectar Preferences and Larval Food Plants

Monarch
- Larval food plant: milkweed
- Nectar: milkweed, butterfly bush, goldenrod, thistle, ironweed, mints

Buckeye
- Larval food plant: snapdragon
- Nectar: aster, milkweed chickory, coreopsis

Comma
- Larval food plant: nettle, elm
- Nectar: rotting fruit & sap, butterfly bush, dandelion

Great Swallowtail
- Larval food plant: citrus trees, prickly ash
- Nectar: lantana, Japanese honeysuckle, milkweed, lilac, goldenrod, azalea

Great Spangled Fritillary
- Larval food plant: violet
- Nectar: ironweed, milkweed, black-eyed susan, verbena

Mourning Cloak
- Larval: willow, elm, poplar, aspen, birch, hackberry
- Nectar: rotting fuit & sap, butterfly bush, milkweed, shasta daisy

Painted Lady
- Larval: daisy, hollyhock
- Nectar: goldenrod, aster, zinnia, butterfly bush, milkweed

Red Admiral
- Larval: nettle
- Nectar: rotting fruit and sap, daisy, aster, goldenrod, butterfly bush, milkweed

Tiger Swallowtail
- Larval: cherry, ash, birch, tulip tree, lilac
- Nectar: butterfly bush, milkweed, Japanese honeysuckle, phlox, lilac, ironweed

Viceroy
- Larval food plant: willow, poplar, apple
- Nectar: rotting fruit, sap, aster, goldenrod, milkweed

Source: http://www.amnh.org/exhibitions/butterflies/garden.html#nybg

Have students research what each of these butterflies and their respective larvae look like. Use the plant guides in edu-kit to discover what the plants look like. According to the height and needs of each plant, plan and map out a garden. Once planted, students could sketch a 'treasure' map of the garden and color in the plants as they grow.

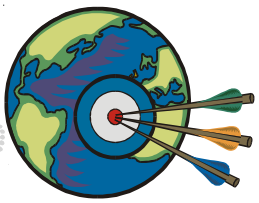
Grassland Gardeners

Reflect

Power Point Presentation on Butterfly Garden

Students work in partners to research butterflies and moths that are native to the Grasslands along with the preferred food plants of the larvae and adults. Students should include recordings of changes and happenings in the school butterfly garden to combine into a classroom power point presentation. Anna Leighton, Nature Saskatchewan member and Saskatoon butterfly specialist, would be an excellent resource person. The editor of this manual has written a grade four chapter book which is both a story about and a guide to the planning, developing and maintainance of a school butterfly garden. Copies of *Butterfly Gardens* are available in school resource centres and public libraries or directly from the author, Judith Benson; jg.benson@shaw.net.

Habitat Hazards



Background Information

The Saskatoon Natural Grasslands (SNG) is a remnant of the Fescue Prairie ecosystem. Although it contains native speargrass, northern wheatgrass, and blue grama, it also has the nonindigenous smooth brome and Kentucky bluegrass introduced by humans. The dominant grass is plains rough fescue. The SNG is considered virgin prairie because it has never been plowed for agriculture, grazed by livestock, or dug up for construction projects. It not only gives Saskatchewan its name -- "The Prairie Province -- but it once sustained herds of bison and supplied nutrients found in its rich, black topsoil. Students will become familiar with the components of grasslands habitat in general: food, water, shelter, and space; and fescue prairie habitat in particular.

Fire suppression and invasive plants have changed SNG from its original state and thus affected its biodiversity. Birds and other animals will nest at SNG when their natural food sources are available. Controlled burns at the Grasslands can eliminate the invasive species so the native plants can get a new start. It is the native plants that provide wildlife with natural food sources. Human-caused threats to SNG include people walking off trail, future development of the area, litter left behind, and house pets off-leash in the area. By raising student awareness of the threats, and proposing caring conservation practices, the SNG can remain a valuable outdoor classroom for years to come.

Lesson Information

Grade 5

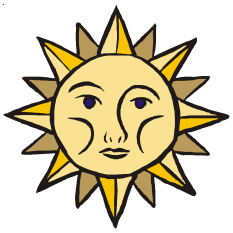
Any Season

Objectives

To understand the concept of habitat

To understand some human impacts on natural areas

To examine values and beliefs related to wildlife and other elements of the environment



Habitat Hazards

Rouse Interest

Hey, I Live Here!

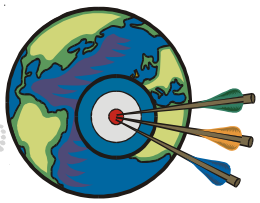
Students will make connections between their concept of home and what constitutes a home place for wildlife. Brainstorm (3 minutes) words related to the word "home" and record in a long column on chart paper. Teacher leads the class in reading through the list and discussing which of their words might also relate to the home needs of wildlife. Check off and then ask students to list additional words that they feel are exclusive to wildlife. Students close their eyes and form visual images during the story you will read them. Add to the lists afterwords.

One Saturday morning you are comfortably snuggled into your favourite living room chair, eating a bowl of cereal and watching cartoons. (pause) Suddenly you hear voices so loud that your ears ache and feel footsteps that shake your whole house. (pause) Ten kids, around your age but unknown to you, stomp into your living room with blankets, picnic baskets and baseball gear. (pause) They playfully shove each other and spray soda everywhere. (pause) No one notices you as you shrink into your seat horrified. The students look around, and one yells, "This looks like an awesome place!" They dump their stuff in a heap in the middle of the room. (Continue to take natural pauses so students can visualize events.)

The intruders carelessly handle books and other decorations, rearrange furniture, and leave muddy tracks all over the clean carpet. They throw pop cans and garbage on the floor. Two girls start a game of catch. Crash! They break a window! Several others have a sunflower seed spitting contest. A stray ball hits your cereal bowl and sends its contents all over the furniture.

Finally you have had enough. You stand up on your chair and order them to leave. The others look at you strangely and gather around you. They point and poke at you. You lunge off the chair to confront them further when one student picks up an empty pop can and throws it at you. The can hits the side of your head leaving a red mark. The others join in. You escape to a dark hallway closet and listen to the continuing noise. You sadly wonder if your home will ever be the same.

Habitat Hazards



What's That – Habitat?

Students will establish a definition of habitat as they examing a series of questions. The teacher duplicates the following questions (on side) and answers (reverse) on file cards, numbers them, and randomly hands out one to each class member. Students must ask their questions in numerical order. The teacher records students' answers on chart paper question by question, after which the reader shares the answer on the card.

1. Question: What is a habitat?
   Answer: A habitat is a place that has everything a living being needs to survive.

2. Question: What do animals need to survive?
   Answer: Food, water, air, shelter, and space.

3. Question: What are the four components of habitat?
   Answer: Food, water, clean air, shelter, and space in a suitable arrangement.

4. Question: Why do animals need food?
   Answer: Energy for movement, normal growth, and reproduction.

5. Question: What are an animal's food sources?
   Answer: Wild plants and/or other animals. Some eat dead or decaying animals.

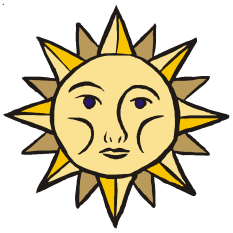
6. Question: What is an animal called that eats only plants?
   Answer: A herbivore.

7. Question: What is an animal called that eats other animals?
   Answer: A carnivore.

8. Question: What is an animal called that eats both plants and animals?
   Answer: An omnivore

9. Question: What is an animal called that eats dead or decaying animals?
   Answer: A scavenger

10. Question: Why do animals need water?
    Answers: Fish, beavers, some frogs, and many insect larvae live in water. Animals drink water, find food in water, clean their food with water, and wash in water.

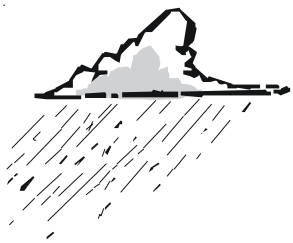


Habitat Hazards

11. Question: From what sources might animals find water in their habitat?
    Answers: Streams, ponds, puddles or depressions in which water collects. Eating plants or other animals

12. Question: Why do animals need shelter?
    Answers: For resting, bearing and raising young, food storage, protection from enemies and harsh weather.

13. Question: Why do animals need space?
    Answers: To find enough food, raise young, exercise, and rest.



Relate

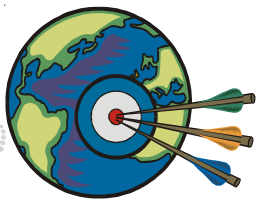
Habitat Headaches

Students will role play to better understand the relationship between animals and their need for space within a habitat. Long ropes arranged in a circle on the floor or ground represent the habitat. The circle must be large enough to accommodate all class members as they stand at arms length just inside the circumference. The teacher randomly distributes "Who Am I?" cards (in Edu-kit) and students become those animals.

Student animals then move freely within their habitat. The teacher blows a whistle to signal animals to freeze on the spot. After all is quiet, he/she reads a condition or problem that affects habitat quality. Students stretch their arms out to their sides to determine whether they are affected by the habitat change. Each animal who is within reach of another must leave the circle. After several rounds, stop and discuss the activity with the students, using these questions as a guide: Which conditions were human-caused? What are ways in which humans can improve their consideration of wildlife? Are posted rules necesssary for the Grasslands to be protected from carelessness?

Materials
Wildlife cards,
Rope,
Whistle

Habitat Hazards



Conditions/Problems

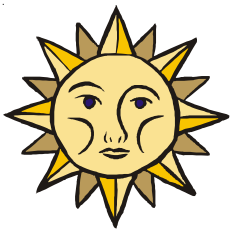
1. (Signal) The City of Saskatoon approved a new subdivision that infringes on the SNG. Students do the extend-arms test. Those affected leave the circle and assist in decreasing the circumference of the circle.
2. (Signal) People walking off-trail have badly trampled delicate plant material causing destruction and erosion. All students who represent plant species leave and assist in decreasing the circle.
3. (Signal) Crowding has placed predator demand on prey species. Prey species leave and assist as above.
4. (Signal) This spring a homeowner forgot to douse the coals in his backyard fire pit. Sparks blew into the SNG, resulting in an uncontrolled burn that temporary reduced available habitat. Students already out of the game assist in decreasing the circle. Rope still in hand, they pause as the teacher announces: "As months pass, the habitat restores itself." Students increase the circle to its pre-fire size.
5. (Signal) An non-native weed has crowded out native plant species important to some animals. An herbivore and its predator leave the circle and assist as in #1.
6. (Signal) Careless hikers have left litter behind. Those already outside the circle assist as above.
7. (Signal) Dogs and cats off-leash regularly disturb wildlife along the perimeter of the SNG. A ground-nesting bird leaves the circle. Proceed as above.
8. (Signal) Ask students outside the circle to find a place along the rope. They will have to stand close together and the rope will be slack. The teacher announces, "Students from local schools organize a clean-up campaign and create "Stay on the Trail" signs to post along the way. They take their family and friends on hikes through the SNG and model wise trail behaviour." Students back up until circle is restored to the size it was after #1 above. All wildlife returns to the middle of the circle for hi-fives.

Habitat Appreciation Hike

Students will practice being wise trail stewards as they hike through the SNG. Students carry binoculars, a magnifiers, and digital cameras. (Care and use of these tools must be taught prior to hike.) The teacher models for the class the role they might play while leading family hikes. Stop regularly to allow students time to spread out along the trail and carefully explore. Encourage them to examine habitat at a plant's or an animal's eye level by kneeling down and peering through the grass. Encourage use of all senses. Plan class time upon returning for students to express their feelings in poetry, creative writing, and art work. They may incorporate their experiences and knowledge into a school assembly or classroom simulation.

Materials

Binoculars, magnifying glasses, digital cameras, writing and art materials for classroom use



Habitat Hazards

Reflect

Harmful or Helpful?

Students will evaluate as appropriate or inappropriate their classmates dramatizations of grassland action statements (on cards in Eco-kit). Pairs of students discuss their "Grassland Action Statement" and plan its dramatization. The classroom audience identifies each action and labels it as helpful, harmful, or makes no difference to SNG habitat. Discuss each opinion and review ways students can initiate positive plans into action.

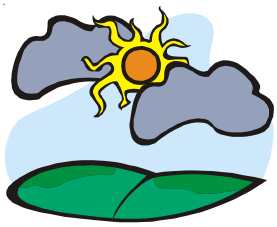
Grassland Action Statements

1. People are quiet and respectful of wildlife as they hike the trail.
2. People collect plant parts to make medicine.
3. People sing loud camping songs while hiking the trail.
4. People walk dogs into the SWG and then let them run off leash.
5. People pick wildflowers and berries.
6. People throw papers, cans, plastic, or other trash on the prairie.
7. People build roads through the SNG.
8. People pick up litter that others leave behind.
9. People collect bird nests.
10. People keep their pets on leash and clean up after them.
11. People ride bikes on and off trail.
12. People eat as they hike and drop bits of their food.
13. People smoke and throw cigarette butts into the grasses.
14. People bring along art materials and create drawings and paintings of the scenery.
15. People study different prairie plants and animals during their hikes.
16. People release their unwanted pet hamsters, gerbils, mice, and rabbits into the SWG.
17. People plant native plants to restore on bare spots along the trails.
18. People run off trail for a closer look at the animals.
19. People take family and friends on guided walks.

Indigenous Perspectives

Students will learn from a First National elder about traditional beliefs regarding the importance of the prairie habitat to his/her culture and how the land should be treated. Present him/her with a gift of loose tobacco to show appreciation for his/her time and expertise.

Sense of Place



Background Information

Meaningful interactions with land and waterscapes left in their natural states help humans develop a sense of place, a sense of belonging to and connectiing with nature. From an early age, our children can learn the impact of their actions and their parents' decisions regarding Planet Earth.

Experts have identified almost 300 species of wildlife that call the SNG home, including lichens, flowering and non-flowering plants, birds, butterflies, other insects, mammals, and reptiles. Fossils imbedded in limestone outcrops contain fossils of worms that once lived deep under the grasslands in an inland sea.

In the 1980s citizens fought for preservation of what is now known as the Saskatoon Natural Grasslands so generations of humans and wildlife might call it their home place for years to come. The group was successful in preserving only a small fragment of grassland which has since felt the stresses of human impact.

Ten thousand years ago retreating glaciers carved the Grassland's geological heritage. Aside from the quarrying of some of the boulders carried by the glaciers the SNG remained relatively undisturbed. Since the 1990s housing and road construction have forced much of the wildlife to either leave their SNG homes or struggle for survival within.

Urban construction projects and technology will never replace the warmth of the sun, the fragrance of balsam poplar after a shower, the springtime chorus of frogs and songbirds, or the gift of observing a wild creature.

First-hand experience sharpens awareness, arouses curiosity, and inspires development of talents--artwork, literature and music. The more connected we are within the circle of life, the more likely we are to protect it.

For further background, read this guide's Introduction, material on page 223 and the "Why Mapping?" piece in *Giving the Land a Voice: Mapping Our Home Places* (in Edu-kit).

Lesson Information

Grade 6
Season: Spring or Fall

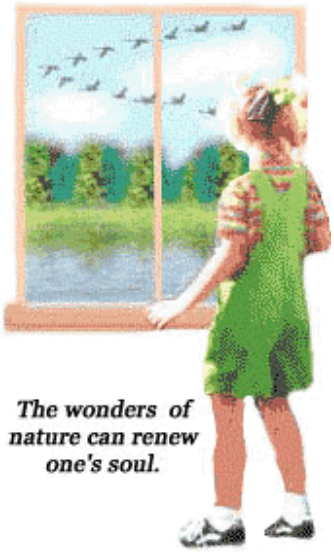
"Now I see the secret of the making of the best persons. It is to grow in the open air, and to eat and sleep with the earth."
Walt Wiltman

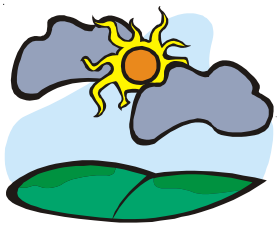
Objectives:

Learn to be keen observers

Be aware of one's surroundings

Recognize any part of the environment as being part of one community





Sense of Place

Rouse Interest

Materials

Construction paper, white unlined paper, markers, pencil crayons, staples & stapler, glue, scissors, old magazines, clear mac-tack

Nature Notes

Naturalists live what they believe -- that one's daily decisions influence one's success in living in harmony with nature. Consequently, they prefer to being out in the open air exploring plants, animals, and their environments. Some naturalists find peace and fulfillment from just being there. Others record their observations in sketches, drawings, paintings, photos, notes, poetry, and prose either as a hobby or as connected to a profession.

During outdoor experiences at the SNG students will assume the role of naturalists as they record observations, thoughts, and descriptions in personal journals. Journals may be purchased, homemade, or adapted from simple Hilroy lined notebooks. Students can decorate journal covers, include clippings from old magazines, and make lists of what they would like to see. Carry and store in a Zip-lock bag for protection.

"Now I see the secret of the making of the best persons. It is to grow in the open air, and to eat and sleep with the earth."
Walt Wiltman

Learning to Look – Learning to See

Students will experience the SNG as an outdoor classroom community within which they can develop the naturalist side of their characters. Looking and seeing become entirely different actions, depending upon who we are, where we are, our priorities, and objectives. Sensing more about our surroundings helps us detect changes in the environment; arouses our curiousity, which motivates us to ask questions; and helps us to become informed decision makers.

Sense of Place

Students will improve their observation skills. Before moving out into the hallways do a "cold" run, i.e., no forewarning. The teacher throws a coat over his/her desk and ask students to recall its contents. With prior notice to other school personnel give students fifteen minutes to walk around within the building to take mental photos of its everyday characteristics such as colour of main door and location of classrooms to specific characterists such as brand of school piano and subject matter of wall paintings.

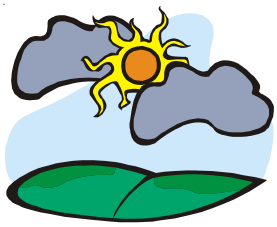
Students work in partners and quiz one another about the details of a certain area. The student asks for a description of X and the other describes it; then both go to check for accuracy. Reverse roles.

Repeat outside the school, then in the Grasslands. Challenge students to pick a quiet place to sit by themselves for 10 minutes to observe surroundings with their senses of sight, smell, touch, and hearing, after which they record observations in their nature journals. They must include the date, time, and location.

After each observation session students reflect on the following questions in a brief paragraph in their journals. What challenged you about having to concentrate for ten minutes? What did you notice that you had not noticed before? What surprised you? What sense(s) did you most rely upon? What sense(s) would you like to develop more fully?

Celebration Centre

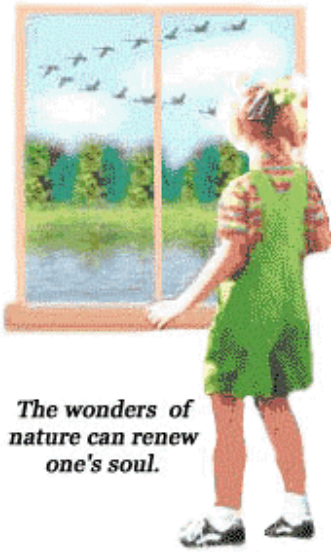
Students will plan, create, advertise, and maintain a community-wide information bulletin board where they display seasonal and other SWG events worth celebrating. Invite community members to add their observations and experiences. This may include wildlife sightings, date of the first crocus, or the wonder someone felt as he/she watched a beautiful sunset from the trail. Invite younger students to the celebration centre so the class can explain the notices to them.

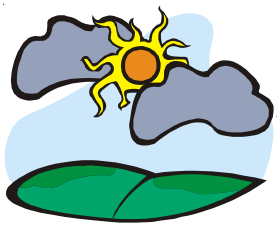


Materials

Nature journals,
writing instruments

"Now I see the secret of the making of the best persons. It is to grow in the open air, and to eat and sleep with the earth."
Walt Wiltman





Sense of Place

Relate

Materials
Clipboards, graph paper, maps of sections of the SNG, pencils, reference maps, compasses, metre sticks

Saskatoon Natural Grasslands Sketch

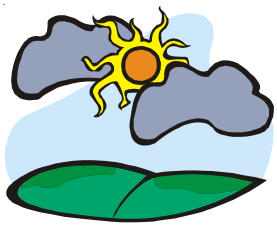
In groups of four or five students will develop a working sketch of part of the Saskatoon Natural Grasslands as a precursor to creating a map. The teacher leads the class in brainstorming a list of features to include in sketches (habitats, distinctive boulders, animal holes, nests, scenic views, points of interest,trees, reference points such as the Forestry Farm and Central Avenue, etc.).

On the largest graph paper possible, photocopy the map from this guide, (p. ix) and divide it into manageable sections, each with familiar landmarks to use as reference points. Determine the scale, depending upon the dimensions of the grid squares, e.g. 1/4" = 1 m.

"Now I see the secret of the making of the best persons. It is to grow in the open air, and to eat and sleep with the earth."
Walt Wiltman

Students explore their sections to find points they wish to include. Whenever they identify a key feature, they estimate its distance from the reference point and mark its location on their sketch, keeping in mind the need to stay on established trails.

Sense of Place



Creative Thematic Mapping

Students will convert field sketches to thematic map format. Share examples of thematic maps in *Giving the Land A Voice: Mapping Our Home Places* (in Edu-kit).

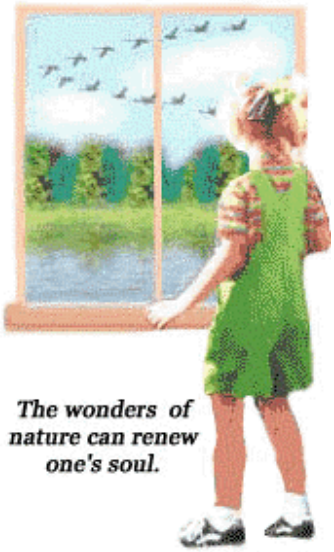
In same groups, students plan key topic(s), their point of view (2-D, 3-D relief in papier mache, collage), materials (variety), size, mounting, sources of materials and division of jobs. They need to regularly consult their field sketches to decide and recall key features to include, as well as a map of the SNG for reference. Simple is best.

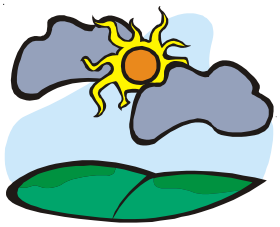
After planning is complete, students are ready to sketch maps to scale. (See the "Drawing your Map to Scale" instructions.) They reproduce their sketch onto plain paper of the same size. This is called their "blueprint sketch".

Now students decide the style in which to represent key features and points -- realistically or highly symbolic, where to glue the legend, scale bar, compass directions, map title, and their names. After assembling their blueprint sketch they transfer the sketch to the base on which to mount it, likely bristol board, cardboard, or particleboard. Using the gathered materials, they complete the maps and display.

Materials

Map(s) of the SNG, construction paper, bristol board, fabric, tissue paper, paper mache, ribbon, scissors, glue, double-sided tape, stapler, writing materials, pencil crayons, markers, paint, rulers, cardboard etc.





Sense of Place

Reflect

Sense of Place Speakers

Research local naturalists who had a hand in preserving the Saskatoon Natural Grasslands or who regularly make visits to the grasslands. Invite them to give presentations in their areas of expertise. Students should prepare questions ahead of time, decide who will express a verbal summary and thank you and what to give as a token of appreciation. Two or three students may wish to make a card after the presentation, decorate it with relevant subject matter, get class signatures, and take responsibility for mailing. Allow time for students to share their maps with the guest speaker(s).

Wild Expressions

"Now I see the secret of the making of the best persons. It is to grow in the open air, and to eat and sleep with the earth."
Walt Wiltman

Students will summarize their grassland experiences within an artistic creation of their choice. Review expertise gleaned from guest speakers. Suggestions are an illustrated poem, non-fiction article, newspaper essay for editorial page, song lyrics and performace, a drawing, painting, series of photographs, a multi-media collage, power point program, or a short skit.

Allow time for planning and working, space and material collection.

Grassland Debates

Rouse Interest

"Prairie Grasslands: Wind Country" Video

Students will get a comprehensive view of the grasslands of Western Canada -- landscape and plants and animals in each of four habitats: level plains, badlands, sloughs, and coulees. They will see examples of the adaptations of some grassland species within their shared community as well as the decline and depletion of others. Ask the class to consider the following questions because they will be asked to respond to them in their journal afterwards.

1) Which of the four habitats shown in the video is the most like the Saskatoon Natural Grasslands? Why?
2) Why are some grassland species threatened or endangered?
3) Why is the protection of native grasslands important to the future of native plants and animals?
4) What can people do to conserve the grasslands and its inhabitants?
5) What can you do for the Saskatoon Natural Grasslands?

Resource Management Plan Presentation

Invite the Resource Conservation Officer from Meewasin Valley Authority to speak to class on the resource management plan for the SNG. Ask him to focus on the conflict between exotic and native vegetation which became controversial during the efforts to create a grasslands plot at St. Joseph's High School. Also ask him to share the purpose of Meewasin's public hearings or forums and the role the public plays in development decisions.

Relate

Whose Home is this Anyway?

Students will imagine themselves as prairie animals as they hike from the Saskatoon Natural Grasslands and its buffer zone down to the river. Discuss why animals travel this route. Survey animal signs and plant diversity within each area. To pinpoint plant diversity, pairs of students shape a wire clothes hanger into a diamond shape and place it over a small plot of vegetation in each of the three areas. Students note plant variety and density within each area. Call the Resource Conservation Officer at Meewasin (665-6887) for more information on plant surveys.

Back in the classroom, compile findings of the survey and discuss their implications as to plant and animal diversity within the visited wildlife corridor.

Lesson Information

Grade 7
Season: Fall or Spring

Materials

Prairie Grasslands: Wind Country
48 minute video
Karvonen Films, Ltd., 1992
Distributed by NFB
113C0192 125
Also available from Media House and Public Library

Objectives

Students will appreciate the diversity of natural areas and become aware of the need to conserve it

Students will reflect on the future of the buffer zone and the role it plays as a wildlife corridor to the river

Students will learn how to defend a certain perspective during a roleplay of a public hearing about the future development of the buffer zone

Grassland Debates

Hear Ye! Hear Ye!

Students will debate the pros and cons of development of the buffer zone, the natural prairie that connects the Saskatoon Natural Grasslands to the river and separates it from housing, roads, and developed parks. The area between the Grasslands and the river acts as a wildlife corridor; grassland animals travel back and forth on it to get food and water. Originally, the city had set this land aside for safety reasons because in the past it had been used as a chemical disposal dump site.

Materials

Plainsville Prairie Role Play p. 104 - 109 of *Exploring the Grasslands* manual (in Edu-kit)

Present the hypothetical situation that the city is considering building another subdivision in the buffer area between the Grasslands and the river because they feel that enough time has passed to eliminate any safety concerns. The larger and more expensive houses are, the more property tax the city can charge. They woud make a bundle on a subdivision in this area. The mayor and city council have decided to call a public forum in which members of the community (human and non-human) are invited to share their concerns and offer ideas about how the land in the buffer zone is best used. See p. 99 in the *Exploring the Grasslands* manual for directions on setting up a public hearing.

Students will participate in a role play forum on the topic: What effect will the buffer zone's loss to development mean for the wildlife of the Saskatoon Natural Grasslands? The teacher will have to adapt the roles in the Plainsville Prairie Role Play to the buffer zone situation (from the *Exploring the Grasslands* manual in the Edu-kit.) Make copies for students to read and reflect upon as they assume their new identities. Encourage them to improvise the role to express the opinions and concerns of their characters.

Another topic is: What should be done when people's plans for land use are in conflict with the needs of other species?

Reflect

Grateful Grasslanders

Students show their appreciation for and knowledge of the SNG, its assets and problems, by writing to the MVA and Saskatoon's Mayor to express their own views on the protection of the grasslands. Publish excerpts from the letters and Meewasin's/Mayor's responses in school newsletters and/or Meewasin's newsletter and the SUN.

Grassland Stewards

Background Information

Stewardship is based on the premise that current generations do not own Earth's natural resources, but borrow them in trust for generations to come. When one understands the interconnectedness between living things, one realizes that as we do to nature, so we do to ourselves. The nurturing of a sense of stewardship in our young people today takes time and patience, plus a working knowledge of how to accomplish this goal.

Teachers in a school close to a conservation area have the advantage of facilitating first-hand experiences for their students. The reward for teachers' efforts in planning meaningful opportunities is to watch their young people develop socially, emotionally, cognitively, and spiritually. Wild places provide the ideal environment for growth.

The natural world does not judge. It exists. One route to self-esteem, particularly for shy or undervalued children, lies in the out-of-doors. The Earth enfolds people in storm or warm sun, in the glory of light filtering through the canopy of deep woods, or in the eddying flow of rivers – without regard for whether we say the right words, wear the right clothes, or believe the right dogma (Dr. Gary Nabhan, ethnobiologist, author, lecturerer on sustainable environments, 1994).

In addition to imparting knowledge of the natural world of the SNG, it is imperative to allow time for quiet reflection soon after each experience. In so doing, students will develop a sense of beloning to the natural world and strive to make a difference within it. All of society benefits from the responsible and reverent stewardship actions of a few. As the famous anthropologist Margaret Mead stated "never doubt that a small group of committed citizens can change the world. Indeed it is the only thing that ever has".

For detailed background information on the state of Saskatchewan's native prairie, see *Saskatchewan's Native Prairie: Taking Stock of a Vanishing Ecosystem and Dwindling Resource* in the Edu-kit.

Lesson Information

Grade Level: 8
Season: Fall/Spring

Objectives

To understand the concept of stewardship and reverence for nature

To develop the respectful and caring attitude of a steward towards the SNG

To act on behalf of the SNG by being a good steward of the land

Grassland Stewards

Rouse Interest

Materials
There's a Hair in My Dirt by Gary Larson

Stewardship Sentiments

Students will have the opportunity to form their own philosophy of stewardship as they consider the following quote: "You cannot really love or appreciate something you do not understand". After posting this quote and reading it together as a class, read *There's a Hair in My Dirt* by Gary Larson (in Edu-kit). Discuss connections between the author's text and the quote. Plan to take students on a guided walk through the Grasslands. Afterwards ask, "How might our working on ways to help others understand and appreciate the connections and interactions within the SNG lead them to care about it?" Break the class into small groups to discuss how showing reverence to Nature on a small scale (at the SNG) might affect one's attitude on a global scale. The teacher should advise students ahead of time that one member of each group will be expected to share discussion results with the whole class. Make note of students' statements and type them out for posting around the room as "words of wisdom about stewardship".

Materials
Raw eggs, felt pens, Egg cartons cut into thirds

Earth Egg

The teacher will use metaphor to foster students' understanding of how their consideration for and thoughtful choices about Earth can make a difference. Alert staff and parents of the date and intent of this exercise. Introduce the "Earth eggs" while distributing one raw egg to each student. They are to think of Earth as a raw egg -- inherently strong, but also fragile. Cut egg cartons apart to cradle eggs as students decorate and initial them with felt pens. Challenge students to keep the eggs in their constant care for 24 hours. Warn them that they will have to consider the nature of some of their activities in order to protect the egg. Do not allow the students to place eggs in protective containers and discourage them from carrying them in pants pockets.

Before starting, read the following questions to students so they might think about them over the 24 hours. After the allotted time, sit in a circle and reflect upon them.:

1. How did you alter activities in order to accommodate the Earth egg?
2. How did your feelings about caring for the egg change over time?
3. What connections did you make about caring for the egg and caring for the earth?
4. If your egg did not survive, how did that make you feel? What choices could you have made that would have ensured its survival?
5. Your egg's survival proves that you showed reverence towards it. What does reverence mean to you? How might you transfer your reverence to the Grassland?

Grassland Stewards

Relate

Words of Wisdom Wisdom"

Students will relate well-known quotations to Grassland areas special to them. Each studemt will need to fit a backpack with a pen, clipboard, clay, writing and sketching materials, and a copy of the list of quotes from page 253 of this guide. Take supervised groups of ten or fewer students to different sections of the SWG trail. Before entering the buffer zone remind them to assume an attitude of quiet reflection, for their own benefit, as well as for that of the upcoming activity and the wildlife whose home they will soon enter. Students spread out along the allotted section of trail to read over the list of quotes. After selecting their two favourites, they look for an item as small as a patch of moss, as large as a panoramic view of the horizon, or any grasslands feature in between that they feel fits their quotes. Take them back to the buffer zone to sit and express their feelings about their special places in words, drawings, and sculptures. Remind them that this space and time will be for reflection and creative expression, not for visiting.

"How strange and wonderful is our home, our earth."
Edward Abbey

Materials

Words of Wisdom quotations,
clipboards,
clay,
Writing materials,
Sketching materials

Grassland Stewards

Plant Watch

"People from a planet without flowers would think we must be mad with joy the whole time to have such things about us."
Iris Murdoch

Students will understand the relevance of global warming and Nature's response to climactic variations by registering in *Plantwatch* (www.devonian.ualberta.ca/pwatch/ and www.plantwatch.ca.). Students return to key SNG areas to observe flowering dates of certain species of plants -- indicator plants. They send their data to a central data base. Indicator plants flower largely in response to heat accumulation (degree-days), so after warm winters and springs they flower earlier than average. Grassland indicators include the Aspen Poplar tree *(Populus tremuloides)*, Saskatoonberry bush (*Amelanchier alnifolia),* and Prairie Crocus flower *(Anemone patens)*.

Conservation/Restoration Activities

Students will participate in an official capacity as SNG stewards. Contact the Meewasin Valley Authority at (306) 665-6887 to inquire about the class becoming involved in grassland conservation and restoration projects.

A Sense of Place

Materials
Giving the Land a Voice: Mapping Our Home Places (in Eco-kit)

Students will develop a powerful tool for highliting Grassland features -- the thematic map. Refer to Sense of Place activities, pages 242-243 of this guide, and *Giving the Land a Voice: Mapping Our Home Places*.

Reflect

Create a Grassland Charter

Materials
Earth charter from Internet, writing materials, posterboard, pencil crayons, markers, paint

Students will put into words their ideas for Grasslands stewardship by creating a Grassland Charter. Using the Earth Charter as a model, students compile ideas, reword as a charter, and transfer to a poster for decorating. In early April, reproduce the charter in a school newsletter and invite parents and other community members to endorse it. Display both the charter and list of names in hallway. Use the Charter during Earth Day celebrations.

Poetry of Place

Materials
"If the Earth were Only a Few Feet in Diameter" by Joe Miller, Writing materials

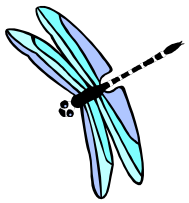
Students will quietly reflect upon a poem read by the teacher and connect its messages with knowledge gleaned from SNG experiences. Read "If the Earth were Only a Few Feet in Diameter" by Joe Miller. Students write in journals their thoughts after hearing the poem, ideas for connecting those thoughts to the Grasslands, and then combine them into a lyric poem. After reworking drafts of their poems individually and with peers, students develop their words into a related shape which they have outlined on art paper.

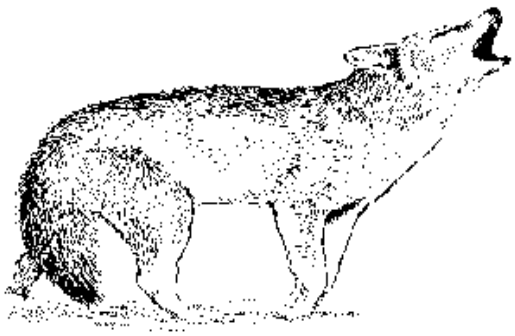
Grassland Stewards

If the Earth were Only a Few Feet in Diameter
by Joe Miller

If the Earth
were only a few feet in diameter,
floating a few feet above a field somewhere,
people would come from everywhere to marvel
at it. People would walk around it marvelling at its
big pools of water, its little pools, and the water flowing
between. People would marvel at the bumps on it and the
holes in it. They would marvel at the very thin layer of gas
surrounding it and the water suspended in the gas. The people
would marvel at all the creatures walking around the surface of
the ball and at the creatures in the water. The people would
declare it as sacred because it was the only one, and they would
protect it so that it would not be hurt. The ball would be the
greatest wonder known, and people would come to it
to be healed, to gain knowledge, to know beauty, and to
wonder how it could be. People would love it and defend
it with their lives because they would somehow
know that their lives could be nothing
without it. If the Earth were only
a few feet in diameter.

All of society benefits from the responsible and reverent stewardship actions of a few.





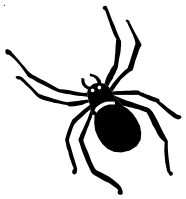
Grassland Stewards

Ecological Footprint Activity

Students will learn to minimize their "ecological footprint" by combining ideas into banners about treading softly in the Grassland. After discussing the concept of ecological footprints (www.earthday.net) the teacher supervises students as they print banner borders. They press the sole of one of their bare feet which they have dipped into water soluble paint around the perimeter of a long expanse of white shelf paper. Within the banner they glue a traced cutout of their foot in which they have neatly printed their ideas.

Materials

White roll paper,
Water soluble paint,
Writing materials,
Access to Internet



For further inspiration read these words from Kay Killson's Exploring the Grasslands: nderstanding an Ecosystem, p. 47.

Reflections on Our Hands

Look at your hands. They are unique.
No one else has hands exactly like yours.
They can do so many different things.
Plant seeds in a garden.
Chop vegetables for a stew.
Fix a bike and build a sandcastle.
Draw a picture and throw a ball.

The energy to do all these things with our hands
comes from the sun through the food we eat.

The very stuff our hands are made of,
the cells and tissues, the blood and bones
come from the air, the water, and the earth.

We grow by synthesizing our own flesh
from the nutrients in the foods we eat.

And the nutrients in our food come
from the plants that grow in the living soil,
fed by countless generations of organisms
which lived and died and decomposed,
enriching the soil and releasing the nutrients
so that new plants could grow.

Look at your hands again.
There is sunlight in your hands.
There are centuries of prairie grasses in your hands.
The long lost herds of buffalo run through your veins.
The unfolding blossoms of the corcus
are found in your fingertips.
You are part of nutrients cycling
in a spiral dance of living matter
growing and changing over time.

You are part of the living earth
which speaks with a human voice.

You are sunlight, air, earth and water
with the capacity to think and dream.
With your hands, you can shape the world.

From Kay Willson's *Exploring the Grasslands: Understanding an Ecosystem* (page 47)

Grassland Stewards

Words of Wisdom

"The Earth laughs in flowers."
Ralph Waldo Emerson

"When you try to change any single thing, you find it hitched to everything else in the universe."
John Muir

"In wilderness is the preservation of the world."
Henry David Thoreau

"The object of our game with nature is not to win, but to keep on playing."
Author Unknown

"Environmentalists make terrible neighbours but great ancestors. "
David Brower

"I am part of the world. I am able to change my life for the better. Therefore I am able to change the world for the better."
Helen and David Dufty

"We can do no great things, only small things with great love."
Mother Teresa

"We have not inherited the earth from our parents, we have borrowed it from our children."
Author Unknown

"A child educated only in school is an uneducated child."
George Santayana

"We need the tonic of wilderness – to wade sometimes in marshes…we are earnest to explore and learn all things…that land and sea can be infinitely wild. We can never have enough of nature."
Henry David Thoreau

"We shall require a substantially new way of thinking if mankind is to survive."
Albert Einstein

"Never doubt that a small group of committed citizens can change the world. Indeed it is the only thing that ever has."
Margaret Mead

"Nature is loved by what is best in us."
Ralph Waldo Emerson

"We have not inherited the earth from our parents, we have borrowed it from our children."

Author Unknown

Grassland Stewards

Words of Wisdom (continued)

"When you lose the power of wonder, you become old – no matter how old you are. But if you have the power of wonderment, you will stay forever young."
Sigurd F. Olson

"He who has begun his task has half done it."
Horace

"Nature is loved by what is best in us."
Ralph Waldo Emerson

"What use is a house if you haven't got a tolerable planet to put it on?"
Henry David Thoreau

"How strange and wonderful is our home, our earth."
Edward Abbey

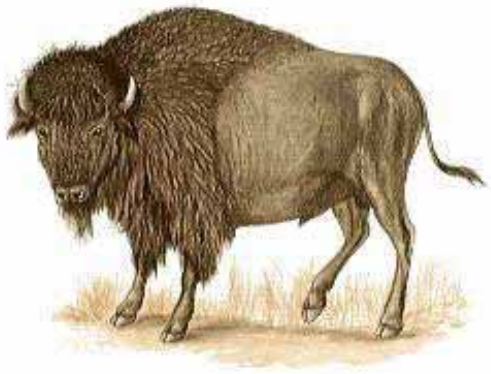
"Now I see the secret of the making of the best persons. It is to grow in the open air, and to eat and sleep with the earth."
Walt Whitman

"Nothing great was ever achieved without enthusiasm."
Ralph Waldo Emerson

"People from a planet without flowers would think we must be mad with joy the whole time to have such things about us."
Iris Murdoch

"We need the tonic of wilderness – to wade sometimes in marshes...we are earnest to explore and learn all things...that land and sea can be infinitely wild. We can never have enough of nature."

Henry David Thoreau



Appendix

Bird Bingo Card

Bird	Song
Black-Capped Chickadee	"Chick-a-dee-dee-dee"
Canada Goose	"honk, honk, honk"
Duck	"quack, quack, quack"
Yellow Warbler	"sweet sweet SWEET I'm so SWEEET"
Killdeer	"killdeer, killdeer"
Robin	"cheerily, cheer-UP-CHEERIO"
Blue Jay	"JAY, JAY, JAY"
Hawk	"keeeeer, keeeeer"
Crow	"Caw, Caw, Caw"
Mourning Dove	"oowoo-woo-woo-woo"
Magpie	"Mag!" or "Chuck"

Bird	Song
Towhee	"drink-drink-your-tea-ee-ee-ee"
Great Horned Owl	"hoo, hoohoo, hoo, hoo"
Meadowlark	7-10 gurgling flute-like notes
Common Redpoll	a rattling "chut-chut-chut-chut"
Cedar Waxwing	a high thin lisp "zee, zee, zee"
Bluebird	"tru-lee, tru-lee"
Vesper Sparrow	"baa baa black sheep have you any wool" 4 long 4 quick notes
Yellow-shafted Flicker	loud, rapid "wik-wik-wik-wik" and wick-er, wick-er, wick-er
American Goldfinch	"per-chik-o-ree"
Eastern Kingbird	"dzeet, dzeet, dzeet"

Bird Bingo Card

Bird	Song
Black-Capped Chickadee	"Chick-a-dee-dee-dee"
Canada Goose	"honk, honk, honk"
Duck	"quack, quack, quack"
Yellow Warbler	"sweet sweet SWEET I'm so SWEEET"
Killdeer	"killdeer, killdeer"
Robin	"cheerily, cheer-UP-CHEERIO"
Blue Jay	"JAY, JAY, JAY"
Hawk	"keeeeer, keeeeer"
Crow	"Caw, Caw, Caw"
Magpie	"Mag" or "chuck"
Mourning Dove	"oowoo-woo-woo-woo"

Bird	Song
Towhee	"drink-drink-your-tea-ee-ee-ee"
Great Horned Owl	"hoo, hoohoo, hoo, hoo"
Meadowlark	7-10 gurgling flute-like notes
Common Redpoll	a rattling "chut-chut-chut-chut"
Cedar Waxwing	a high thin lisp "zee, zee, zee"
Bluebird	"tru-lee, tru-lee"
Vesper Sparrow	"baa baa black sheep have you any wool" 4 long 4 quick notes
Yellow-shafted Flicker	loud, rapid "wik-wik-wik-wik" and wick-er, wick-er, wick-er
American Goldfinch	"per-chik-o-ree"
Eastern Kingbird	"dzeet, dzeet,dzeet"
Clay-colored Sparrow	"Bzzz, Bzzzz, Bzzz"

Bird Bingo Card

Bird	Song
Black-Capped Chickadee	"Chick-a-dee-dee-dee"
Grey Catbird	"mew, mew, mew"
Duck	"quack, quack, quack"
Yellow Warbler	"sweet sweet SWEET I'm so SWEEET"
Robin	"cheerily, cheer-UP-CHEERIO"
Killdeer	"killdeer, killdeer"
Blue Jay	"JAY, JAY, JAY"
Hawk	"keeeeer, keeeeer"
Crow	"Caw, Caw, Caw"
Magpie	"Mag!" or "Chuck"
Mourning Dove	"oowoo-woo-woo-woo"

Bird	Song
Towhee	"drink-drink-your-tea-ee-ee-ee"
Great Horned Owl	"hoo, hoohoo, hoo, hoo"
Meadowlark	7-10 gurgling flute-like notes
Common Redpoll	a rattling "chut-chut-chut-chut"
Cedar Waxwing	a high thin lisp "zee, zee, zee"
Bluebird	"tru-lee, tru-lee"
Vesper Sparrow	"baa baa black sheep have you any wool" 4 long 4 quick notes
Yellow-shafted Flicker	loud, rapid "wik-wik-wik-wik" and wick-er, wick-er, wick-er
American Goldfinch	"per-chik-o-ree"
Eastern Kingbird	"dzeet, dzeet, dzeet"
Clay-colored sparrow	"bzzz, bzzzz, bzzzz"

Bird Bingo Card

Bird	Song
Black-capped Chickadee	"Chick-a-dee-dee-dee"
Canada Goose	"honk, honk, honk"
Mallard Duck	"quack, quack, quack"
Yellow Warbler	"sweet sweet SWEET I'm so SWEEET"
Killdeer	"killdeer, killdeer"
Robin	"cheerily, cheer-UP-CHEERIO"
Blue Jay	"JAY, JAY, JAY"
Red-tailed Hawk	"keeeeer, keeeeer"
American Crow	"Caw, Caw, Caw"
Black-billed Magpie	"Mag" or "chuck"
Mourning Dove	"oowoo-woo-woo-woo"

Bird	Song
Towhee	"drink-drink-your-tea-ee-ee-ee"
Great Horned Owl	"hoo, hoohoo, hoo, hoo"
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Vesper Sparrow	"baa baa black sheep have you any wool" 4 long 4 quick notes
Yellow-shafted Flicker	loud, rapid "wik-wik-wik-wik" and wick-er, wick-er, wick-er
American Goldfinch	"per-chik-o-ree"
Eastern Kingbird	"dzeet, dzeet,dzeet"
Clay-colored Sparrow	"Bzzz, Bzzzz, Bzzz"

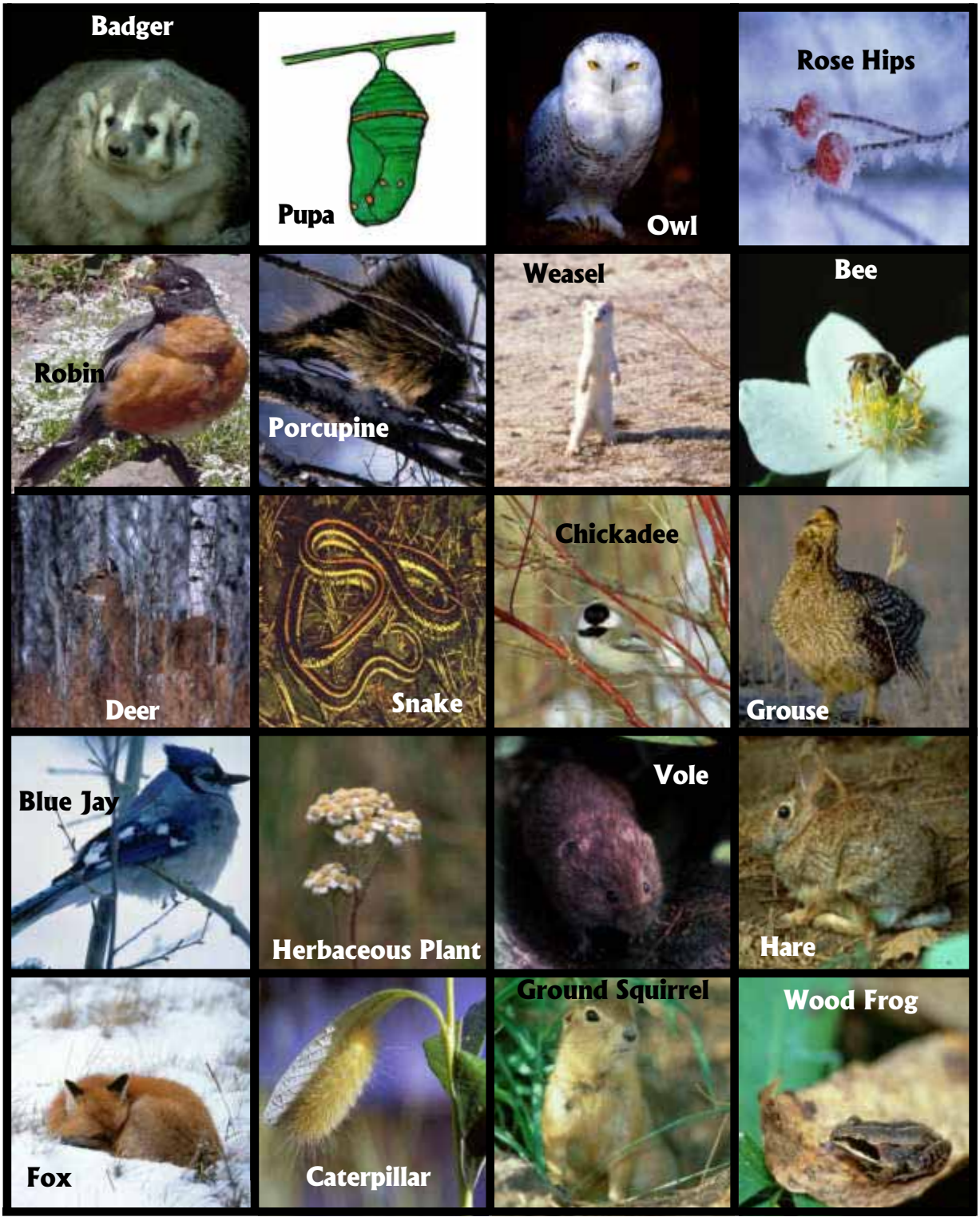
Bird Bingo Card

Bird (across)	Song
Brown Thrasher	dig-it, dig-it, hoe-it, hoe-it, pull-it-up pull-it-up
Vesper Sparrow	here-here there-there everybody-down-the-hill
Kildeer	deer deer deer
Black-capped Chickadee	"Chick-a-dee-dee-dee"
Blue Jay	jay! jay! jay!
American Gold Finch	po-ta-to-chip dear me!
Cooper's Hawk	cac-cac-cac-cac
Western Kingbird	whit-ker-whit

Bird	Song
Yellow-shafter Flicker	wick-wick-wick!
Mourning Dove	cooooo cooooo cooooo-ah (softly)
Spotted Towhee	here here here PLEASE!
Common Nighthawk	peent peent
Western Meadowlark	flute-like warbles (high whistle while raising and lowering tongue inside mouth)
Black-billed Magpie	yeah! yeah! yeah! (loud, nasal)
Grey Catbird	"mew, mew, mew"
Cedar Waxwing	tseeee-tseee-tseee (faint, high-pitches whistle)

Grassland Bingo Card

Grassland Bingo Card



Grassland Bingo Card

Grassland Bingo Card

Grassland Bingo Card

Exotic Species of the SNG Cards

Kentucky Bluegrass

Crested Wheatgrass

Smooth Brome Grass

Russian Pigweed

This page is set up with the most serious invasive species at the top and the least at the bottom.
All the three grasses above have been increasing their numbers considerably in the last 7 years and need to be controlled.

Lamb's Quarter

Dandelion

Canada Thistle

Common Tansy

Example of Prairie Butterfly Flowers

Golden Bean

Silverleaf Psoralea

Aster

Blazing Star

Flodman's Thistle

Brown-eyed Susan

Goldenrod

Yarrow

Purple Prairie-Clover