

SCIENCE 10: SUSTAINABLE ECOSYSTEMS

SUBNIVEAN WORLDS

OUTCOME

- SCI10-CD1 Assess the implications of human actions on the local and global climate and the sustainability of ecosystems.

BACKGROUND KNOWLEDGE

- Watch this video of a red fox hunting mice in the subnivean ecosystem.
- Read this short article on the subnivean ecosystem from Ecology for the Masses

ACTIVITY: OUTLINE

1. Brainstorm signs of subnivean life that you might observe, and visit a natural or naturalized space to look for them (tracks, holes, trails, green plants beneath the snow).
2. Dig a snow pit and examine the characteristics of the snow. You can pick and choose procedures from this snow pit guide based on the equipment that you have access to.
3. Try to determine which characteristics of the snow would be better for the organisms that live in the subnivean zone (think about snow depth, density, compression, ice crust).
4. Back in the classroom, visit the Climate Atlas of Canada and determine how climate change is likely to impact our subnivean ecosystems (you can view the Saskatoon report by clicking on our city, and viewing the “Climate Report” PDF which lists seasonal precipitation predictions). Compare this to other regions of Canada.
5. Hypothesize about the relationship between urban development and subnivean ecosystems. Look at a satellite map of Saskatoon (try google maps) and determine where intact subnivean ecosystems are likely to exist (remember that subnivean creatures need shelter, as well as food). What role do conservation organizations like Meewasin play in maintaining sustainable ecosystems (map of Meewasin conservation zone)?

EXTENSIONS

1. **SCI10-CD3:** Examine biodiversity through the analysis of interactions among populations within communities. If you have a lot of subnivean activity in the region you are studying, use the sampling method from our Grade 10 Science: Sustainable Ecosystems lesson to map the frequency of signs of subnivean life. Can you see a relationship between activity and types of vegetation? Open spaces? Water bodies?

MATERIALS

- Snow shovels
- Metric tape measure (30 m) or meter stick
- Compass (could be a phone app)
- Clinometer (could be a phone app)
- Thermometers
- Soft paintbrush
- Golf tees, popsicle sticks, etc.
- Pencil with eraser
- Plastic knife
- Spatula
- Hand lens (5X or 10X)
- Snow crystal card or playing card to hold snow grains
- Small plastic centimeter/millimeter ruler
- Balance – an inexpensive, but accurate, gram/kilogram kitchen scale
- Snow sampling tube (This is a small, open-ended aluminum or plastic tube of known volume and mass. You can use an aluminum soup can and remove both ends.

DID YOU KNOW?

The snow pack in our ecoregion is typically quite shallow compared to mountainous or forested areas. Wind-blown hilltops will have the shallowest profiles, so look for prairie potholes or valleys where drifted snow accumulates.

HOME CONNECTION

You can explore populations, communities, and other ecosystem dynamics from the comfort of your own home with EcoXPT. This virtual field trip will guide you through thinking routines that help sharpen skills for observation and interpretation in the real world.