

How Do Species Adapt to the Cold?

Objective: To familiarize students with how animals and people adapt to Northern temperatures

Introduction: Over time, animals have developed certain features that allow them to survive in harsh climates. In the North, cold Temperatures, freezing waters and winds can make it difficult to survive. Animals that live in the North have adapted by altering behavior, physiology and body chemistry. This lesson aims to introduce students to adaptations and what humans may learn from them.

Curriculum Connections:

Science Strands:

Diversity of Living Things – cold and warm-blooded animals, adaptations

Air and Flight – air in common products

Dene Kede Thematic Unit: The Land and The Sky

Supplies / Materials:

- Examples or picture of down-filled winter gear.
- Optional – Pictures of northern species in winter



SCIENCE FOCUS

Lesson Subject

Science 6

Topic

Diversity of Living Things, Air and Flight

Location

Classroom or Outdoors

Length

1 period



Hook: Watch adaptations video - <https://www.youtube.com/watch?v=YX8VQIJVpTg> or read *Be a Wilderness Detective* to your class (see **Resources**). Stop at page 16 and explore the winter survival section. Ask guiding questions such as “Where do you think animals go in the winter?” or “What do you know about hibernation?” Have more time? Use this **alternative hook** – set up the “blubber glove” experiment to engage your students with a hands-in experiment.
<https://www.stevespanglerscience.com/lab/experiments/blubber-gloves/>

Intro Activity: Have students brainstorm some of the geographical and climatic factors that northern animals (including humans) have to adapt to in order to survive in the North (temp., dryness, rockiness etc).

Main Activity:

Let students know this lesson will focus mainly on adaptations to lower temperatures.

- 1) Show students an example of a down product and/or feather – what happens with the air that makes down warm? (Air is trapped and cannot be carried away; air itself doesn't transfer heat very well). Which animals does down come from? Why is it so light (birds-flight-hollow shafts). What are other materials animals produce to cover themselves? (fur, hair, fat). Interesting fact: caribou have hollow hair. How does snow cover work? (also traps air)
- 2) What about animals that don't produce their own heat (ie cold-blooded)? Some hibernate (many amphibians), some hibernate in groups (e.g. snake hibernaculum) some produce chemicals to help them tolerate lower temperatures (e.g. insects) or even freeze solid (e.g. wood frog)
- 3) What are other strategies to deal with winter? (Eat lots, optimize activity, good shelter, external sources of warmth (fire, taking advantage of the sun, others)
- 4) How do environmental changes (increasing average temperatures) affect these survival strategies? (Higher overall temperature may mean less need to produce heat but also can mean lower snow pack, shorter hibernation (more time to eat but more resources needed), less water in ponds/lakes so they are more likely to freeze solid etc.)

Independent Student Work: Have students reflect on what they can learn from animals in terms of being prepared for the winter (as this will help reduce our dependence on energy outside of us).

Conclusion / Review: Share some student reflections.

Homework: Have students explore other materials that could be used in the “blubber glove” experiment. (<https://www.stevespanglerscience.com/lab/experiments/blubber-gloves/>). Ask them to be creative – bringing in household items (sawdust, flour, pompoms (or other craft supplies) to compare with the natural features (down, fat, sand) that (may) have been already tried in class. (This is a fun experiment! For all ages!).

Extension: Research how different NWT frogs adapt to winter. Participate in Frog Watch to see how average warmer temperatures effect local frog populations.

Resources:

Be a Wilderness Detective: solving the mysteries of fields, woods, and coastlines. Peggy Kochanoff. Nimbus Publishing LTD. 2013. Available through the Yellowknife Public Library or Interlibrary Loan.

Adaptation, Polkadot place, YouTube. Oct 12. 2006, <https://youtu.be/YX8VQIJVpTg>