

Polar Bear

Snow Amazing! Inspiration

In late October, a pregnant female polar bear will den in a snowdrift and settle in, giving birth to cubs (usually twins) in December. The family will stay snug in the den until March to provide the newborn cubs with protection from the bitterly cold Arctic winds. The cubs grow quickly by drinking their mother's fat rich milk. The cubs stay with their mother for two years so they can learn how to find food and keep themselves safe.

▶ [Mother Polar Bear & Cubs Emerging from Den - BBC Planet Earth](#)

🦋 SMART Board / Promixa Ready

🐻 Northern Resources

Gr.5 Humans and Snow

SNOW AMAZING!

OBJECTIVE Students will learn about the importance of snow to people who live in Nunavut.

Life in Nunavut is shaped by weather. We estimate when the first snowfall will be, wonder when there will be enough to use for dogsledding and snowmobiling and guess when it will all melt away in the spring.

The snow that accumulates during a winter provides warmth and protection for small animals and a blanket of insulation for plants. The deeper the snow, the more difficult it is for those that live above the snow to forage for food. Changes in the weather have direct impacts on humans, animals and plants. Changing global weather patterns can cause freezing rain, which can have devastating effects on animals that must dig through snow for food. The amount of snow and how rapidly it melts in the spring can cause erosion, flooding and slush-filled trails. Take your students through a journey of discovery about snow.

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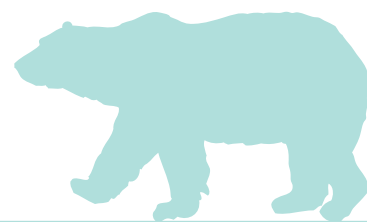
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CURRICULUM Links



The activities and resources in this document are intended to tie in with Grade 5 science curriculum *Matter and Materials: Properties of Change in Matter* and *Earth and Space Systems: Weather*, as well as *Energy and Control (Conservation of Energy)* and the *Inuuqatigiit* curriculum. You can find specific learning outcomes for each of these by following the links below.

If you're not already familiar with the Inuuqatigiit curriculum it's a good idea to take a look because it contains a lot of useful advice about bringing northern culture, language and traditional knowledge into the classroom. In culture-based education, teachers are expected to offer students the opportunity to extend learning experiences. Teachers are to involve students

Grade 5 Science

General Learning Outcome

Examine how weather forecasts influence decisions concerning human activity and how humans have adapted to a variety of weather conditions.

Specific Learning Outcomes

Examine how weather forecasts influence decisions concerning human activity and how humans have adapted to a variety of weather conditions.

Predict local weather patterns using data from their own observations of weather and weather reports.

Explain how humans rely on energy transfers from a variety of products and systems to survive.

in key experiences, both on the land and in school. In addition, culture-based education is enhanced with the involvement of Elders. ECE has developed a resource called **The Elders in Schools Handbook**. Its goal is to provide valuable information about inviting Elders to contribute to lessons and related activities. Interview templates are included as well as practical advice about compensation (see **Teacher's Resources**).

Here are some examples of where the lessons in this resource connect with these different curricula. Some suggestions for making connections have been included in the lesson plans, too.

Connected Lessons

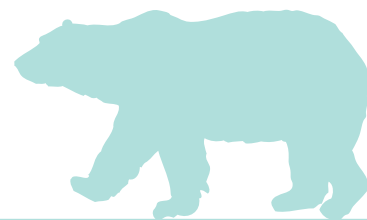
Lesson 1 - Snow in our Communities

Students will consider the influence of weather on human behaviour and will visually represent the snowpack through drawing a snow calendar.

Wild Ideas - How to Make a Quinzhee

A quinzhee allows a human to conserve heat (kinetic energy) to survive.

CURRICULUM Links



Inuuqatigiit - Land

General Objectives

Students will begin to develop a habit of frequently observing the weather and noting changes, explore beliefs about weather and how Inuit cope with the weather and begin to learn traditional ways of predicting weather using the sun, moon, stars, etc.

Key Activities

Have the students write stories about being caught in a storm. *What did their families do during the storm?* As a class observe the weather several times each day and keep detailed records. Continue this over a period of time - notice patterns and challenge students to begin to predict the weather.

Connected Lessons

Lesson 1 -

Snow in our Communities

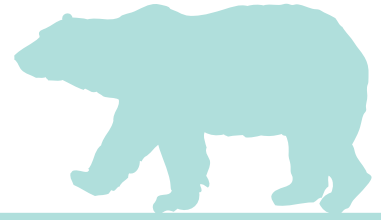
This lesson provides a good opportunity to discuss how the land will always have winter, cold and storms, and that children will need to be prepared to cope with the weather.



© Peter Ewins / WWF-Canada

Mr. Akumalik Sr., an Inuit elder, in the Inuit community of Arctic Bay (also known as Ikpiarjuk) with a paddle he carved in an hour from a piece of wood, Baffin Island, Nunavut, Canada.

JOURNALS



Snow Notes Notebooks

Students can design their own snow notes notebooks for recording observations and questions as they explore the snow and weather. Keeping a field journal helps develop scientific inquiry and research skills. Journals can be simple, homemade books with lined pages or sections for note taking and plain sections for sketching. **Great Stems** has an excellent, step-by-step guide for making nature journals. You can find the link in the **Teacher's Resources** section on page 6.

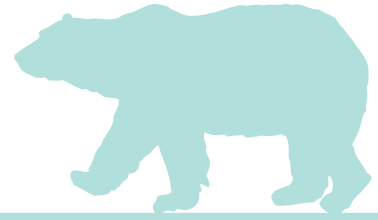
Journals can be used as assessment tools for almost all of the lesson ideas in this resource. Some suggestions for how to use them have been included. Consider pairing students who need help writing their ideas down with a student who can scribe for them, allow them to complete their notebook on the classroom computer or create a video blog.



Green Teacher Magazine

See the section on evaluating nature journals.

TEACHER'S Resources



Books

Amazing Arctic and Antarctic Projects You Can Build Yourself

Carmella van Vleet

Illustrated by Steve Weinberg

Nomad Press, 2008

ISBN 978-1934670095

Snow

Valerie Bodden

Creative Paperbacks, 2014

ISBN 978-0898129212

Snow Amazing: Cool Facts and Warm Tales

Jane Drake and Ann Love

Illustrated by Mark Thurman

Tundra Books, 2004

ISBN 978-0887766701

Snow and Ice Canadian Winter Weather

Nicole Mortillaro

Canada up Close series

Scholastic Canada, 2005

ISBN 978-0439957465

Plants and Animals of the North

Heather Kissock and Leia Tait

Weigl Educational

Publishers LTD, 2010

ISBN 978-1553889601

Videos

How to Build an Igloo:

A Boy among Polar Bears (3:00)

A young Inuit builds his first igloo.

www.youtube.com/watch?v=R-x5QOSqP3E

How to Make a Perfect Igloo: Ray Mears' World of Survival (4:00)

Make the best igloo.

www.youtube.com/watch?v=1aSL9La5ivo

Building a Snow Cave: Ray Mears' Extreme Survival (4:00)

How to make a warm, snow cave hide-out if caught in the mountains.

www.youtube.com/watch?v=XOJQPz1s-1c

Websites



Elders in Schools Handbook

www.ece.gov.nt.ca/files/publications/elders_in_schools_handbook_en_web.pdf

Great Stems

Find a step-by-step guide for making journals.

www.greatstems.com/2013/05/wildlife-projects-for-kids-making-a-nature-journal.html

Green Teacher Magazine

This issue features a handy guide for evaluating students' nature journals.

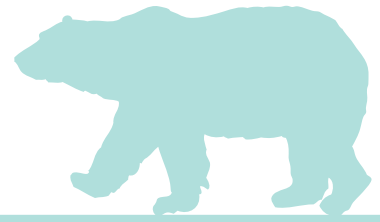
www.greenteacher.com/back-issues-index/green-teacher-69-fall-2002/



Prince of Wales Northern Heritage Centre - Edukits

www.pwnhc.ca/education-and-outreach/educational-programs-and-services/#tab-id-2

LESSON Plans



Lesson 1: Snow in our Communities

1 class period.

People have adapted to the winter conditions in a variety of ways. Encourage students to brainstorm all the ways people make the most of winter.

How do the people, plants and animals of Nunavut live with snow?

Plants and animals have adapted to the extreme conditions of the northern environment. Many hibernate; plants go dormant and animals adapt by growing thick fur and developing thick layers of fat before winter arrives while others migrate. The arrival of snow is useful to protect plants and small animals as it acts as a blanket.

? Adapting to Snow

Discuss what northern people have done to adapt to our snow-filled winters, historically and today.

- *How do we dress appropriately for the weather?*
- *What are the differences and similarities between igloos, quinzhees, tents and teepees?*
- *Can you think of any snow-based modes of transportation? Snowshoes, dog sleds, ice roads, snowmobiles...*

Individually the students are to think about how long their community has snow cover and how much snow their community receives. Students need to consider if the snowpack is thick or thin, and if the community is affected by strong winds and drifting snow.

Research Opportunity

Students find snow accumulation statistics for their community (or closest community with data) on the Internet.

Extension

Depending on the time of year, record students' guesses as to when the first snow will arrive or when the snow will be all melted away.

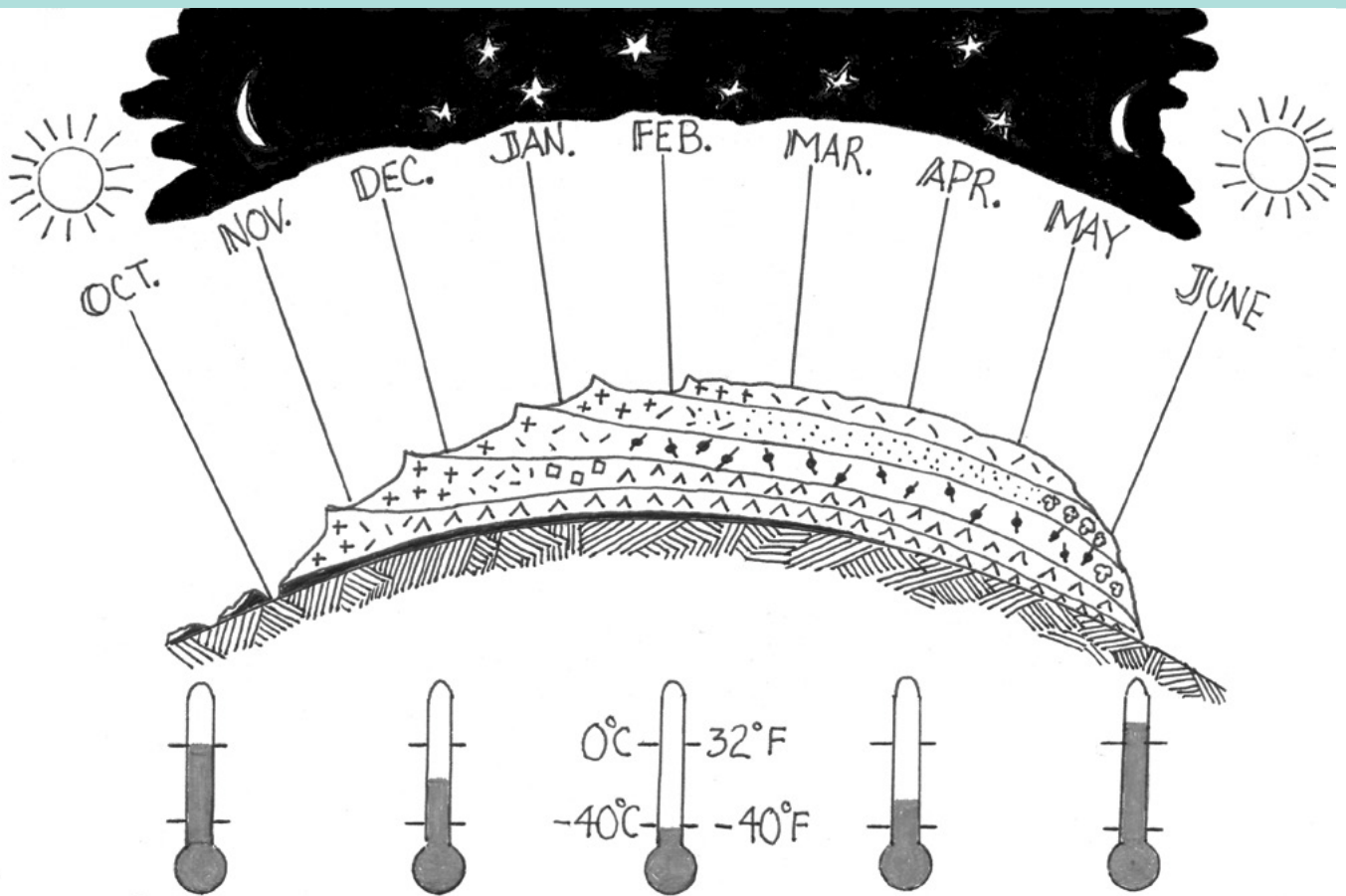
Polar bears have many adaptations to survive in the extreme cold found north of the Arctic Circle. Underneath their fur, the polar bear's skin is actually black. A thick layer of fat that can measure up to 11.5 cm thick provides added insulation from the bitter wind and icy waters of their habitat.



© Gordon Court / WWF-Canada

A polar bear walks on the frozen tundra.

LESSON Plans



© Matthew Sturm / University of Alaska Press 2009

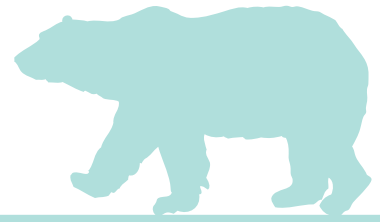
An example of a snow calendar provided by APUN

Assessment Opportunity

Using the snow accumulation data, ask students to create a snow calendar on page 6 of their snow notes notebook. Ensure that they understand that they must indicate when snow arrives, how thick the snow layers are and when the snow melts. They can use different colours or patterns to indicate different layers of accumulated snow in their data charts.

Please note there is no right or wrong answer to their illustration; it merely provides understanding that layers of snow accumulate, and are visible. They can relate this to their experience with the snow profile activity in **Theme 1: Snow Mechanics**.

LESSON Plans



Lesson 2: Snow and Shelter

1 class period.

? Snow and Shelter Discussion

Remind the students of what they discovered about snow during the snow pit activity (see **Snow Amazing Resource**). Under the right conditions, snow can be used to develop short- and long-term shelter. Guide your students on a discussion of how snow can be used for shelter.

- *What have people done traditionally for shelter from the snow?* Igloos, quinzhees, tents and teepees banked with snow...
- *What do people do now for shelter from the snow?* Present day shelters are typically used in winter camping and for fun (e.g., quinzhees and canvas tents with woodstoves, cabins...)
- Encourage students to share any experiences they may have of spending time on the land in the winter.
- *What would your students do in a survival scenario if they had to take shelter from a storm?* This discussion is a direct connection to the Inuuqatigiit curriculum. Provide more time to discuss in culture class. Use these videos to kick-start their thinking!

Assessment Opportunity

Ask the students to draw a picture in their snow notes notebooks of a style of snow shelter they might use on the land. *What equipment would they need to construct the shelter?* They can also develop a list of questions for an Elder in preparation for Lesson 3.

▶ Building a Snow Cave (4:00)

Building a snow cave in deep snow

▶ How to Build an Igloo (3:00)

An igloo-building video showing a young Inuit boy learning the skill from his father

▶ How to Make a Perfect Igloo (4:00)

An igloo-building video with a focus on the traditional seal skin lamp for heat and light within the igloo

📖 Build an igloo with an Ice Box tool

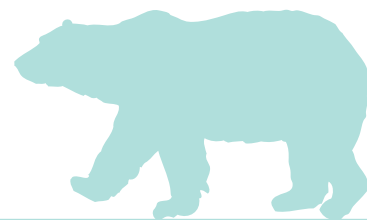
You can order an Ice Box tool from Grand Shelters.



© Blair Carter/ Ecology North

Ecology North's Rose-Marie Jackson takes a break inside the shelter of a quinzhee.

LESSON Plans



Lesson 3: Snow and Transportation

1 to 2 class periods. Includes connections to Inuuqatigiit curriculum.

Teacher Note

A collection of items is needed for this lesson on traditional winter travel. Consider working as a class to collect as many of these items and create an “Edukit” for your class and future students to use.

When the Arctic snow cover arrives, it provides people with opportunities for different modes of transportation. Lead your students through a discussion on all the different methods of transportation that can be used in the winter. Use the suggested video links to highlight some of the most common methods of winter travel.

Let's talk about transportation

- *How do humans use snow for transportation?*
- *What have people done traditionally for travel?* Non-motorized sleds (dog teams and mushing sled), komatik (sea-ice sled), long-distance dog-mushing sled made of plastic and aluminum, snowshoes and skis.
- *What about modern travel over snow?* Motorized - specialized heated sleds for scientific work, airplane on skis, snowmobiles, and Bombardier snow cat. Ask students to share winter-related travel stories.

Regardless of mode of travel, one must be able to “read” the snow in order to remain safe while travelling on top of the snow pack.

Snowmobiling to Treeline

Extension

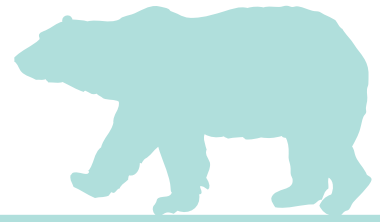
In small groups, have students develop slideshows about different modes of travel on snow. Groups share what they learned with the rest of the class.

Classroom-created Winter Travel Edukit

- Hands-on items: photos of a dog team, modern racing harness, babiche, stuffed toy dog, traditional dog harness, one dog bootie, model snowshoes
- Videos or DVDs about dogsledding
- DVD about winter travel and related activities
- CD of CBC North Radio One's “Sled Dogs to Snow Machines”
- Books or booklist from library on trapping, dogsledding, snowshoeing
- Classroom photo album

When the Arctic snow cover arrives, it provides people with opportunities for different modes of transportation. Lead your students through a discussion on all the different methods of transportation that can be used in the winter. Use the suggested video links to highlight some of the most common methods of winter travel.

LESSON Plans



Elder Visit

Focus on Travel, Tracking and Shelter

If possible, it will be very valuable to have an Elder visit the class and speak about how they would travel (traditionally) on the snow, and the dangers they would look out for, including air pockets in the snow and the different types of snow. Sometimes the snow develops a crust and if a sled or vehicle breaks through, it can get stuck in loose snow or slush.

The Elder can also speak to using the snow to follow the tracks of animals that they are trapping. For example, snow is helpful for finding the best place to set a snare or place a trap. Snow can indicate when muskox, caribou or polar bears have passed through an area, and whether or not wolves were pursuing them.

The Elder may also be able to speak about traditional uses of snow to make a shelter, such as an igloo

or a quinzhee (see **Wild Ideas**). See **Teacher's Resources** for suggested videos on this topic.

The Elder should also share the importance of being able to “read” the sky to predict the weather. *What colours and cloud formations indicate blizzards, fog, heavy wind or thunderstorms?*

Assessment Opportunity

In their snow notes notebooks, students can draw a picture and write 5 to 10 sentences about what they learned from the Elder.

Conclude the unit with an opportunity for group discussion. Ask the students to reflect on their personal K-W-L charts and provide them time to complete the “Learn” section.

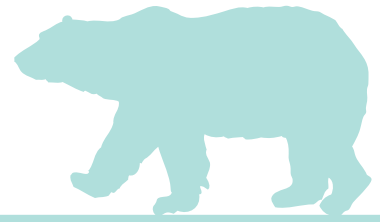
In small groups, ask students to share one thing they learned about snow that they hadn't considered before.



© Sybille Klenzendorf

Komatik ready for use in the community of Arviat

WILD Ideas



© Rose-Marie Jackson / Ecology North

Ecology North's Blair Carter. crawls inside a quinzhee on National Snow Day 2015



© Sophie Jackson

A snow scape painting by a young northern artist.

Culture Lesson

An Elder guides students on how to read the snow and sky to predict weather.

Snow Scape

Paint a northern snow scene complete with northern lights and polar bears (and other winter animals). Consider making a mural to hang in the classroom or school hallway.

Build a Quinzhee

▶ [Build a Quinzhee](#) (3:40)

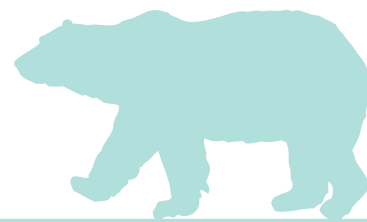
View the video and challenge your class to build a quinzhee in your school yard or at a winter camp.

Build an Igloo

▶ [How to Build an Igloo 1922](#) (8:00)

View this classic documentary and challenge your class to build an igloo and create a video of the process.

Glossary



Nunavut has two official languages: Inuktitut and Inuinnaqtun. Inuvialuktun is used in some parts of western Nunavut. Languages develop over thousands of years and they tell us a lot about the people who speak them and the environment that they live in. You've probably heard that Inuit have many different words for snow. This is because there are many different types of snow in the Arctic and knowing the difference between them and what they can be used for at one point in time would have meant the difference between life and death. We asked speakers of some of these languages to

translate some of the key words in these resources and provide literal back translations. You'll see that some words translate easily while some require very long explanations. The same is true when trying to translate from Aboriginal languages into English and French. There are many words that have no translation. Try using these translations to have a conversation with your students about the differences between languages and how they reflect different ways of life and ways of thinking. This would be a great opportunity to invite a native language speaker into the classroom too.

Accumulation of Snow

Continual build-up of snow layers over the course of a winter.

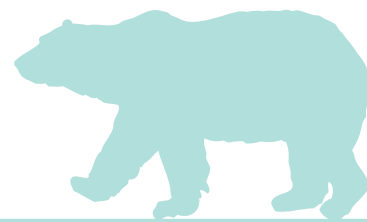
Inuktitut	Apivallianiġ / The steady permanence of snow on the land.
Inuvialuktun	Natiruviktuaġ
Inuinnaqtun	Appihimaangnia / It is covered in snow

Igloo

Shelter made of snow blocks, usually cut with a snow knife

Inuktitut	Iġlu / Snowhouse/home
Inuvialuktun	Iġlu
Inuinnaqtun	Iġlu / Any type of house

Glossary



Qamutik

A long sled put together with only ropes to ensure flexibility on the rough lands and sea ice. No nails are used on these, traditionally.

Inuktitut	Qamutik
Inuvialuktun	Qamutik
Inuinnaqtun	Alliak

Quinzhee

A shelter made by piling snow and hollowing out a space for shelter

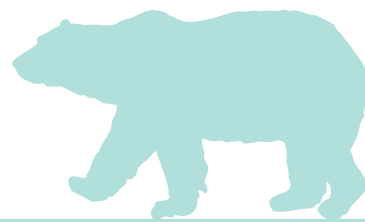
Inuktitut	Uqquaq / A shelter of any kind out on the land
Inuvialuktun	Uquutchiutiyaapunmiq / Shelter made from snow
Inuinnaqtun	Apittiq / Den

Spring melt

When snow and ice thaw in the spring

Inuktitut	1. Aukpallianiq / The process of melting / 2. Sikuijarniq / Time of ice melting 3. Tuvaijarniq / Sea ice disappearing
Inuvialuktun	Augvingnaqtuq upinraksaq
Inuinnaqtun	Upinngamimahaktirvia / Spring melt

Glossary



Forecast

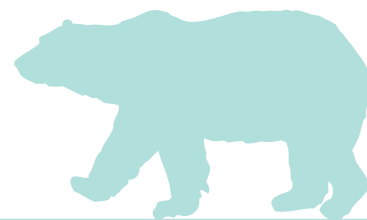
To predict or estimate a future event or trend, in this case concerning the weather.

Inuktitut **Silamik nalautaarutiit** / Forecast of weather

Inuvialuktun **Sila** / Weather

Inuinnaqtun **Hilapqanuruliuruhikhaa** / Weather predictions, patterns

URLs



Some hyperlinks have been embedded throughout the **Humans and Snow** resource. If a link appears to be broken, try visiting the homepage or keying in the URL as it's written below.

Watch polar bear cubs

https://www.youtube.com/watch?v=OwZH_aT0FGI

Grade 5 science curriculum

<http://www.ece.gov.nt.ca/files/Early-Childhood/K-6%20Science%20%26%20Technology%20CurriculumFINAL%20.pdf>

Inuuqatigiit curriculum

<http://www.ece.gov.nt.ca/early-childhood-and-school-services/school-services/curriculum-k-12/aboriginal-languages#inuqatigiit>

Elders in Schools Handbook

http://www.ece.gov.nt.ca/files/publications/elders_in_schools_handbook_en_web.pdf

Green Teacher Magazine

<http://greenteacher.com/back-issues-index/green-teacher-69-fall-2002/>

Building a snow cave in deep snow

<https://www.youtube.com/watch?v=XOJQPz1s-1c>

Igloo-building video 1

<https://www.youtube.com/watch?v=R-x5QOSqP3E>

Igloo-building video 2

<https://www.youtube.com/watch?v=1aSL9La5ivo>

Prince of Wales Northern Heritage Centre Edukits

<http://www.pwnhc.ca/teach/teachers/edukits.asp>

Snowmobiling to Treeline

<http://www.cbc.ca/news/canada/north/nunavut-man-travels-to-treeline-for-christmas-tree-1.2858328>

How to Build a Snow Shelter

<https://www.youtube.com/watch?v=HHQITrghbR8>

Nanook of the North

<https://www.youtube.com/watch?v=LFswUeom96A>



WWF is working to build a future where people live in harmony with nature. The Schools for a Living Planet program empowers educators and students of all ages with the tools they need to lead us into a sustainable future. Schools for a Living Planet is grounded in the principles that make WWF a global success - including strong science and a focus on solutions.

Ecology North is a charitable, non-profit organization that has engaged Northerners in hands-on learning opportunities in the Northwest Territories since 1971. Our mission is to bring people and knowledge together for a healthy Northern environment. Education, public engagement and youth involvement are integral to all of our program streams that include climate change adaptation, watershed protection planning, waste reduction, food sustainability and alternative energy promotion.

This project was made possible with the financial support of CIBC. For more information, visit www.cibc.com.

WWF-Canada and Ecology North would like to thank the classroom teachers across Nunavut and the Northwest Territories who contributed many of the ideas presented here, especially Paul Strome, Jennifer Thompson, Kathy Tollenaar and Shawn Mosey. Ecology North Education Committee member Stephanie Yuill also provided guidance. This resource is available as a free download from WWF-Canada Schools for a Living Planet. Visit schools.wwf.ca.

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