

## 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 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 the Northwest Territories.

Life in the Northwest Territories is shaped by weather. We estimate when the first snowfall will be, wonder when there will be enough to use for snowmobiling and skiing and guess at 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. Warming 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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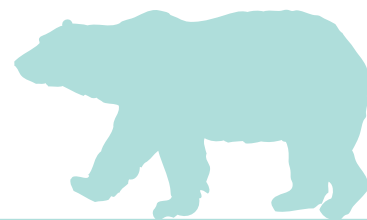
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# CURRICULUM Links



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 *Dene Kede* and *Inuuqatigiit* curriculum. You can find specific learning outcomes for each of these by following the links below.

If you're not already familiar with Dene Kede and Inuuqatigiit curriculum it's a good idea to take a look because they contain 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 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 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.

## 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.

#### Connected Lessons

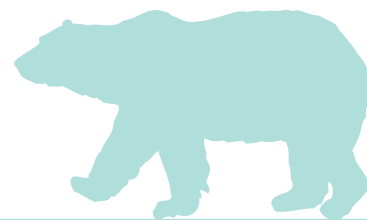
##### **Lesson 1 - Snow in our Communities**

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 Quinhzee**

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

# CURRICULUM Links



## Dene Kede - Land

### General Learning Outcome

With the aid of the Dene language, students can explore the following thematic units: Dog, Northern Lights, the Land & Sky, Geography and Land Use. Related legends include: A [Time of Two Winters Together](#) and *Winter camp stories* 10, 14, 20.

### Specific Cultural Expectations

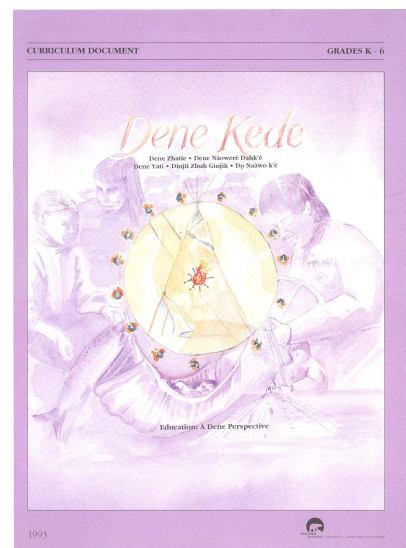
The dog has played an important role in the survival of the Dene on the land. The students should be made aware of the positive value of dogs on the land.

### Connected Lesson

#### Lesson 3 -

#### Snow and Transportation

This lesson provides an opportunity to explore the importance of sled dogs.



## 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

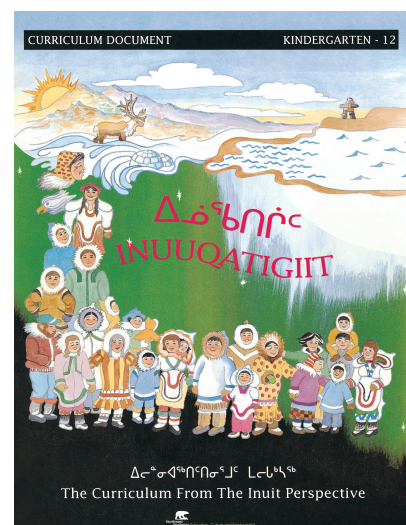
Have the students write stories about being caught in a storm. *What did their families do during the storm?* As a class observe the weather several times each day and keep detailed records. Continue this over a period of time – notice patterns and challenge students to begin to predict the weather.

### Connected Lessons

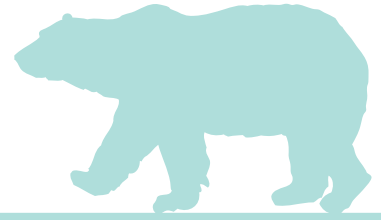
#### Lesson 1 -

#### 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.



# 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.

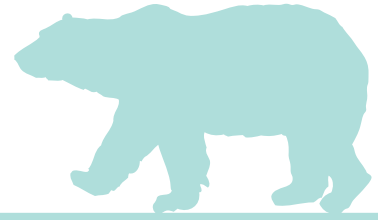


**Green Teacher Magazine**

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

[www.nomadpress.net](http://www.nomadpress.net)

### **Snow**

Valerie Bodden

Creative Paperbacks, 2014

ISBN 978-0898129212

[www.thecreativecompany.us](http://www.thecreativecompany.us)

### **Snow Amazing:**

#### **Cool Facts and Warm Tales**

Jane Drake and Ann Love

Illustrated by Mark Thurman

Tundra Books, 2004

ISBN 978-0887766701

[www.tundrabooks.com](http://www.tundrabooks.com)

### **Snow and Ice Canadian Winter Weather**

Nicole Mortillaro

*Canada up Close* series

Scholastic Canada, 2005

ISBN 978-0439957465

[www.scholastic.ca](http://www.scholastic.ca)

## Videos

### **How to Build an Igloo:**

#### **A Boy among Polar Bears (3:00)**

A young Inuit builds his first igloo.

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

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

Make the best igloo.

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

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

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

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

#### **Dog Sledding Adventure (3:00)**

A glimpse into the thrill, excitement and fun of dog sledding in the Canadian Rockies.

<http://www.howlingdogtours.com/dog-sledding-banff-canmore-video>

#### **Snow King Interview Yellowknife, NWT (4:00)**

<https://www.youtube.com/watch?v=PsIQ5Z62Ygo>

## Websites



### **Elders in Schools Handbook**

[http://www.ece.gov.nt.ca/files/publications/elders\\_in\\_schools\\_handbook\\_en\\_web.pdf](http://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.

<http://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.

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



### **Prince of Wales Northern Heritage Centre - Edukits**

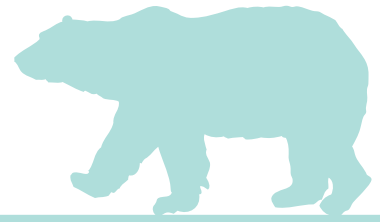
<http://www.pwnhc.ca/teach/teachers/edukits.asp>



### **Snow King**

<http://snowking.ca>

# LESSON Plans



## Lesson 1: Snow in our Communities

### 1 class period.

Communities in the Northwest Territories all receive snow each and every winter. Because of this, 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 the Northwest Territories live with snow?*

Plants and animals (that do not migrate) 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. The arrival of snow is useful to protect plants and small animals; the snow acts as a blanket for plants and small animals.

### ? 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. For example, Ulukhaktok, has long lasting snow cover, but the snow cover that builds up can be very thin. Fort Smith, receives snow for less time, but the snow layer is much thicker.

### Research Opportunity

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

### Extension

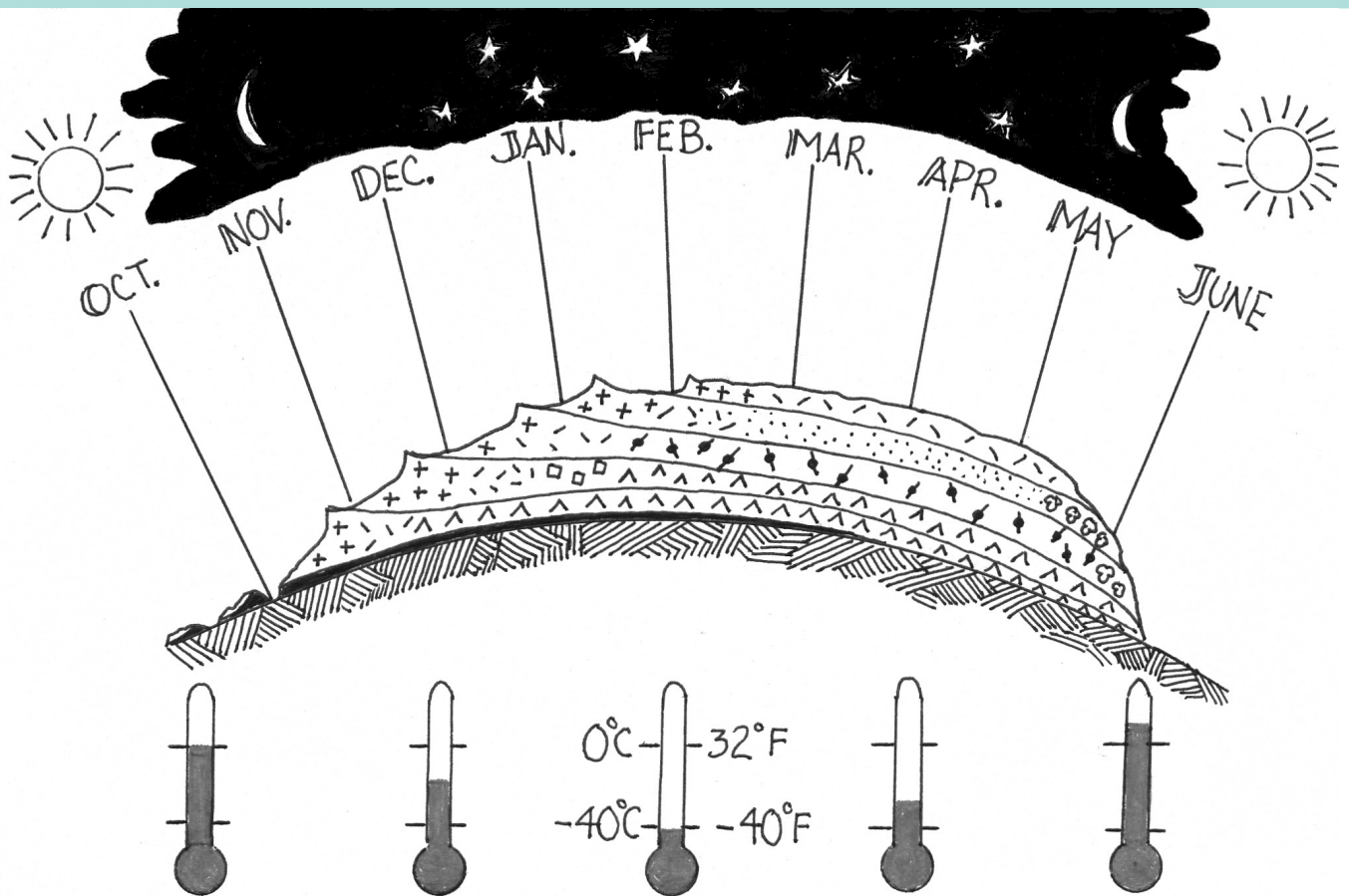
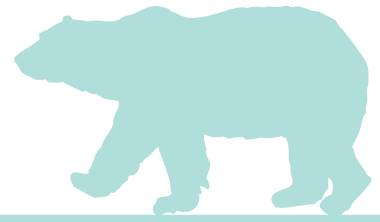
Depending on the time of year, record students' guesses as to when the first snow will arrive or when the snow will be all melted away.

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, which helps to attract heat from the Sun. A thick layer of fat that can measure up to 11.5 cm thick provides significant insulation from the bitter wind and icy waters of their habitat.



© Gordon COURT / WWF-Canada

# Lesson Plans



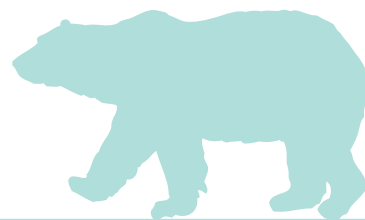
© Matthew Sturm / University of Alaska Press 2009  
Snow Calendar (used with permission from APUN)

## 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.

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. 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 and tents/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, Snow King's castle....
- 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 Dene Kede and 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

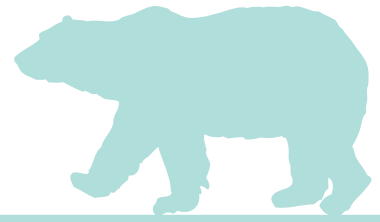
#### ▶ Snow King (4:00)

An interview with Tony Folliot

#### 📖 Build an igloo with an Ice Box tool

You can order an Ice Box tool from Grand Shelters.

# LESSON Plans



## Lesson 3: Snow and Transportation

**1 to 2 class periods. Includes connections to the Dene Kede and Inuuqatigiit curriculum.**

### Teacher Note

A special resource is needed for this lesson: PWNHC Edukit– Traditional Winter Travel. You can order from Prince of Wales Northern Heritage Centre (see **Teacher’s Resources**).

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, 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 with North Star Adventures \(1:30\)](#)

▶ [Dog Sledding Adventure \(3:00\)](#)

▶ [Ice Road Trucking \(10:00\)](#)

### 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.

## Traditional Knowledge Opportunity

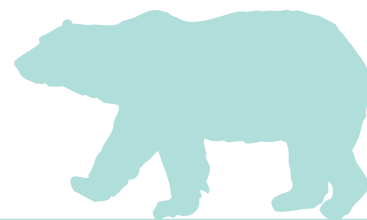
▶ [Prince of Wales Northern Heritage Centre Edukits](#)

All of the Edukits can be borrowed for 2 weeks at a time and will be shipped free of charge. Call (867)920-3267 to reserve a kit.





# LESSON Plans



## A Time of Two Winters Together

As a class, look at the Dene Kede *A Time of Two Winters Together*

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 type 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 bison, caribou or moose have passed through an area, and whether or not they were being pursued by wolves.

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.

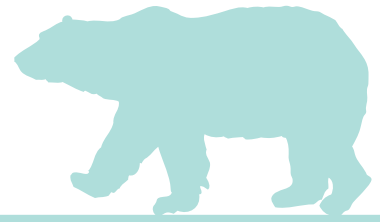
Conclude the unit with an opportunity for group discussion. Ask the students to reflect on their personal K-W-L charts and provide them time to complete the “Learn” section.

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



© Robert Service School

# WILD Ideas



## 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

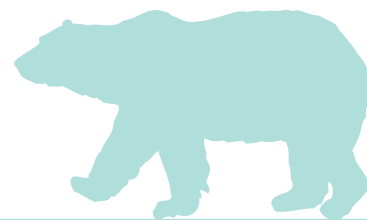
### ▶ [How to Build an Igloo 1922](#) (8:00)

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



© Rose-Marie Jackson / Ecology North

# 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](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>

#### Dene Kede curriculum

<http://www.ece.gov.nt.ca/early-childhood-and-school-services/school-services/curriculum-k-12/aboriginal-languages#dene-kede-grade-6>

#### Inuuqatigiit curriculum

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

#### Elders in Schools Handbook

[http://www.ece.gov.nt.ca/files/publications/elders\\_in\\_schools\\_handbook\\_en\\_web.pdf](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>

#### Interview with the Snow King

<https://www.youtube.com/watch?v=PsiQ5Z62Ygo>

#### Prince of Wales Northern Heritage Centre Edukits

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

#### Snowmobiling with North Star Adventures

<https://www.youtube.com/watch?v=D1w3CQHplI8>

#### Dog Sledding Adventure

<http://www.howlingdogtours.com/dog-sledding-banff-canmore-video>

#### Ice Road Trucking

<https://www.youtube.com/watch?v=dAQXLfRl4xo>

#### A Time of Two Winters Together

<http://www.ece.gov.nt.ca/files/K-12/Curriculum/dene-kede/Legends/story7.pdf>

#### How to Build a Snow Shelter

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

#### Nanook of the North

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



ECOLOGY NORTH



WWF is Canada's largest international conservation organization, 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](http://www.cibc.com).

WWF-Canada and Ecology North would like to thank the classroom teachers across the Northwest Territories who contributed many of the ideas presented here, especially 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](http://schools.wwf.ca). © 1986 Panda symbol WWF-World Wide Fund For Nature (also known as World Wildlife Fund). ® "WWF" is a WWF Registered Trademark.