Weather Through the Seasons

An Integrated Science Learning Unit for Yukon Grade 4 Students

March 2012

Acknowledgments

In 2008, the Yukon First Nation Education Advisory Committee proposed several goals and priorities for education in the Yukon. Central priorities included the development of curriculum and resources that integrate into curricula, First Nations content, perspectives, values, knowledge *and ways of teaching and learning.* This resource provides teachers with the support for providing learning experiences that allow for learning to be grounded in the heritage of northern students including culturally preferred learning styles rather than just learning about their heritage.

The development of this resource for teachers and students in the northern Yukon has been made possible through the granting agency Social Sciences and Humanities Research Council. Their support has ensured that northern students are provided with the opportunity to learn about their heritage through means responsive to their learning style preferences, especially when they study core curriculum areas such as science. The development of this resource has also been made possible through the support of the Tr'ondëk Hwëch'in community of Dawson City. The elders and community members have given their time and knowledge to ensure that their experiences can be recorded and incorporated into learning activities valuable for their community's children.

As well, the school community of Robert Service School, especially the teachers of the Intermediate grades is thanked for its support in the development of the learning activities outlined in this resource.

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Guiding Principles of the Unit

- Draw upon teaching orientations that are identified as culturally located practices.
- Affirm cultural competencies honored by the local community.
- Provide two-way learning experiences by integrating traditional knowledge, beliefs and values and contemporary scientific knowledge, processes and attitudes.
- Use traditional and contemporary cultural examples as contexts for student learning.
- Include the local community and its people in students' learning opportunities, especially in the use of narratives including local people.
- Foster Han language development where possible.
- Use diagnostic and formative assessment to inform planning and teaching and monitor student learning.
- Engage students by starting lessons by providing first-hand experiences for students or drawing upon common experience.
- When using story to engage students, use the interrupted-story-line as a vehicle to prompt consideration and first-hand investigations.
- Deliberately promote scientific attitudes of mind (curiosity, problem-solving, working to end) student through thoughtful independent consideration of questions and challenges posed.
- Move from the experiential, first-hand experiences to the psychological; that is, after providing concrete experiences assist students in making sense of experiences by using purposeful strategies to promote understanding such as role plays, illustrations and analogies.
- Assist students in their consolidation of ideas only as an extension of the initial experiential and psychological learning experiences.
- Provide opportunities for student-initiated and directed investigations.
- Provide opportunity for students to make connections among science and all other learning areas.
- Foster student independence, creativity and curiosity by providing opportunity for students' ideas and questions and follow-up opportunities for problem-solving and investigation.
- Provide students the opportunity to make connections between what they are learning and career opportunities specific to the local context.

Cross-Curricular Applications

This unit is developed to reinforce the learning outcomes of all science units experienced during Grade 4. These include:

Earth and Space Science: Weather
It is expected that students will:

- measure weather in terms of temperature, precipitation, cloud cover, wind speed and direction
- analyse impacts of weather on living and non-living things

Life Science: Habitats and Communities
It is expected that students will:

- compare the structures and behaviours of local animals and plants in different habitats and communities
- analyse simple food chains
- demonstrate awareness of the Aboriginal concept of respect for the environment
- determine how personal choices and actions have environmental consequences

Physical Science: Sound and Light
It is expected that students will:

- identify sources of light and sound
- explain properties of light (e.g., travels in a straight path, can be reflected)
- explain properties of sound (e.g., travels in waves, travels in all directions)

The unit is also developed to reinforce or address the learning outcomes of the Social Studies curriculum of British Columbia (2005). These include:

Society and Culture:
It is expected that students will:

- identify and clarify a problem, issue, or inquiry
- locate and record information from a variety of sources

- identify alternative interpretations from specific historical and contemporary sources
- assess at least two perspectives on a problem or an issue
- organize information into a presentation with a main idea and supporting details
- design and implement strategies to address school problems or projects

Politics and Law:

It is expected that students will:

- describe how people's basic needs are met in a variety of cultures
- demonstrate understanding of timelines
- demonstrate awareness and appreciation of various Aboriginal cultures in Canada
- demonstrate understanding of contributions of Aboriginal people to Canadian society

Economy and Technology:

It is expected that students will:

- compare the "discovery" and "exploration" of North America from European and Aboriginal peoples' perspectives
- describe the structure and functions of the BC provincial government
- describe a traditional and a contemporary Aboriginal form of government

Environment:

It is expected that students will:

- compare bartering to a monetary system of exchange
- demonstrate understanding of factors that influenced early European exploration of North America
- describe traditional technology used by Aboriginal people in Canada
- describe technology used in exploration
- identify economic and technological exchanges between explorers and Aboriginal people
- evaluate the influence of mass media on stereotyping

The emphasis in Social Studies on the validation of Aboriginal Cultures and Continuity and Change in Society are emphasized in this unit. As students are engaged in science, they will also be engaged in social studies learning. They will also be developing oral and written language and numeracy skills specific to Grade 4. The unit has strong connections to experiencing weather within the northern Yukon environment, both within an historical and contemporary social context.

Students are encouraged to explore the characteristics of weather especially through the stories and accounts of persons from the community. By hearing these accounts and having their own first-hand experiences with weather, students can develop a rich understanding of weather and greater sense of their own culture.

There are obvious connections to social and environmental change and personal health and well-being. Teachers are encouraged to make reference to how technology associated with monitoring and understanding weather has changed over time and the importance of a healthy lifestyle. The activities suggested are starting points. Broaden the focus by adding stories and activities of your own or from the experiential base of your community.

Conceptual Ideas and Progression

The recommended sequence for supporting student conceptual development of the phenomenon of weather is suggested below. For the most part, the activities and the conceptual and skill development embedded within the activities is sequential. Lower elementary experiences and ideas primarily focus on experiencing and communicating these experiences. Upper elementary experiences focus on understanding and investigating these experiences and appreciating applications of this understanding to their students' everyday world. It is suggested teachers address the following key ideas:

- We have words to describe the weather we observe.
- Weather influences our activities and the activities of other living things.
- When we talk about the weather we are talking about the air conditions
- We can make instruments to measure the weather.
- We have access to many accurate sources of weather information: temperature.
- We have access to many accurate sources of weather information: wind.
- We can monitor the weather. When we are monitoring the weather we are measuring different conditions of the air over time
- There are reasons from a cultural perspective to explain why weather and seasons are the way they are.
- There are also scientific reasons to explain why the weather is the way it is.
- We can predict what the weather will be like.
- Most people have memories of severe weather.
- We need to be prepared for severe weather.
- Seasons are what we call times of year with more regular predictable weather and behavioral patterns.
- There are local beliefs about what causes the seasons.
- There are also scientific reasons for the cause of the seasons.

- There are suggestions that weather patterns are changing. This is what is called ‘climate change’.
- Climate changes affect living things. Sometimes these changes cause extinction.
- Human beings are contributing to climate change.

Skills Development

This unit emphasizes that the learning of science ideas is inextricably linked to the development of the processes of science. As asserted by British Columbia Science Grade 4 (2005), the legislated curriculum for Yukon schools, science experiences should provide opportunity for the development of conceptual understanding within the context of relevant investigative experiences. Although individual scientific process skills may be emphasized in specific activities, they are to be supported more holistically in teacher-facilitated or student-directed inquiry. The skills to be developed are expected to be appropriate to the level of the learner. These skills and a typical developmental sequence are outlined in detail in the Science Grade 4 (2005) guide.

Kindergarten
use the fi ve senses to make observations
share with others information obtained by observing
Grade 1
communicate their observations, experiences, and thinking in a variety of ways (e.g., verbally, pictorially,graphically)
classify objects, events, and organisms
Grade 2
use their senses to interpret observations
infer the probable outcome of an event or behaviour based on observations
Grade 3
ask questions that foster investigations and explorations relevant to the content
measure objects and events
Grade 4
make predictions, supported by reasons and relevant to the content
use data from investigations to recognize patterns and relationships and reach conclusions

These skills involve coordination between cognitive and psychomotor skills. Handling and manipulating equipment require not just the physical ability to perform a task but also the intellect to know how to measure or observe accurately. It is anticipated that by the end of intermediate school, a student might be able to, with assistance, conduct a scientific investigation. This unit provides opportunities for students to work physically and cognitively towards this end.

There is no universal list of scientific process skills. Those identified in this curriculum are not intended to be a linear scope and sequence; instead, they suggest multiple ways in which learning science can be explored. At each grade level, two processes are introduced and then reinforced with the curriculum content in the subsequent grades; but teachers are expected to involve all of the skills their students are capable of using.

Process skills are best learned in hands-on activities where students engage in a problem-solving task while doing science. The hands-on model of learning science allows students to construct meaningful connections within the brain. In young children, process skills can be found in the natural practice of manipulating materials while asking questions and being curious. The names of the skills can be used and reinforced by teachers as students use and learn to apply these skills to science activities. The science process names will become familiar to students, enabling them to use the correct vocabulary when they explain their involvement in science and technology inquiries.

Attitudes and Beliefs Development

An explicit goal in the development of this resource and the other resources being developed in this northern Yukon project and the accompanying professional development provided for teachers is to use these as a vehicle to contribute to student 'success' in science. Although success in science is often attributed to measurable outcomes such as knowledge acquisition and development, the intent of this development project is much more encompassing. It extends this notion of success to investigate the influence of 'two-way' learning experiences on students' perceptions of success in their personal attitudes and beliefs.

What does success in science mean to northern Yukon students? It is anticipated that students will experience success in a variety of ways, beyond the border of knowledge into the domain of attitudes and beliefs. Attitudes are regarded as states of mind, behavior or conduct regarding some matter, as indicating opinion or purpose. The program of study suggested in the activities that follow will foster student curiosity and creativity, and openness to new ideas of thinking. As well students will develop confidence in their perceptions of self as students of science. Similarly they will develop confidence as evidenced in risk-taking and their effort to conduct science investigations. Their participation in the processes of science will foster their perseverance, precision and objectivity in solving scientific problems. As members of a team they will develop in their respect for and ability to work co-operatively towards purposeful goals with their peers.

Above all, it is anticipated that students will develop a more positive sense of themselves in contemporary society as they learn about the inextricable link between science and the world in which they live. It is anticipated that students will see science as part of their life trajectory both in future formal and informal settings as a result of science study that advocates 'two-way' learning.

Watching the Weather

Date	Cloudy or Clear?	Very Windy, Windy or Calm?	Very Cold, Cold or Warm?	What will I do today after school?

Describing the Weather

Very windy	Clear	Partly Clear
Little wind or breeze	Cloudy	Raining
Calm	Foggy	Drizzle
Snowing	Cold	Very Cold
Warm	Hot	Sunny

Use as many words from the list above to describe the weather pictures below.



_____ _____ _____

_____ _____ _____

_____ _____ _____



_____ _____ _____

_____ _____ _____

_____ _____ _____

Which of the words above describe your:

Favorite Weather	Least Favorite Weather

Wedding in November: *An Account of a wedding by Rita Drugan of Dawson City.*

I was married in Dawson City in November in 1945. Everyone said that we should wait until the summer to get married. I thought, well, November is usually not that cold. Sometimes in November just after Halloween it can still be good weather.

We decided to get married at St Paul's Anglican Church. Both my husband and I had gone to school at St Paul's Hostel. It was at this school I learned to play piano as a teenager.

Boy, did we get the weather wrong. During the week of our wedding the weather changed and the temperature dropped. On our wedding day it was -67 degrees Fahrenheit. This is -55 degrees Celsius. It was one of the coldest days in Dawson's history.

It was so cold that day. The cars and trucks would not start. The church was so cold and it was hard to heat. Friends from Pelly Crossing could not travel to the wedding. But the worst thing was my wedding dress cracked. It was made of a synthetic fabric (like a plastic material) and it cracked because of the cold. I was just outside for maybe 5 minutes but in that time, the dress froze and became very brittle and cracked in many places.

It was a good day, but a bad day. We should have listened.

Odd Winter Winds: *An account of weather change while huntingin the Richardson Mountains by Johnny Semple.*

We were hunting by dog team in the Richardson Mountains not far from where the Dempster Highway crosses the Yukon-NWT border. It was still winter so because the days were very short, we especially liked to hunt when there was full moon. Most days it was about -20 degrees Celsius.

We would camp in canvas tents along the river valleys in the mountains. We would put caribou skins down on the spruce (tree) branches to keep us from getting cold from the snow at night. With the caribou hides and blankets, we kept warm at night.

One night, the winds came up and the wind blew and blew. It was good we were protected from the winds by the trees in the area. As the wind blew, it started to get warmer inside the tent. This was very strange because you would think it would be colder. Pretty soon, it was so warm we did not need covers to keep us warm. We went outside and the snow was melting. It was like spring had come! The snow continued to melt. It was probably about +10 degrees Celsius.

We went back to sleep and in the morning much of the snow was gone. This was not a good thing. There were many bare patches which would make hunting difficult. I had never experienced such a warm wind before. We were fortunate that the next day it got colder and it snowed again.

Weather I Do It or Not!

Complete the chart for the two stories read. Describe the weather and describe how it affected the people in the story.

Story Name	Describe the Weather	Affect of the Weather
A Wedding Day		
Odd Winds		

Use words and pictures to describe what you would do on days when it is:

The Weather	Words to Describe	Drawing
A Hot Summer day		
A Cold Summer Day		
A Blizzard in Winter		
A Warm Day in Springtime		

What Do Animals Do in These Weather Conditions?

It is a hot summer day in your town. There is a light wind. Draw a picture of what people and other animals like birds, dogs and other wild animals are doing on this day.

It is an extremely cold winter day in your town. There is a very strong wind. Draw a picture of what people and other animals like birds, dogs and other wild animals are doing on this day.

Understanding Weather: *Based on an interview with Alfred Kendi of the Fort McPherson area.*

You learn that you have to respect the weather. You have to understand the weather. It is not something you can just ignore. You grow up in the north hearing stories about how people have got in trouble and there have been tragedies because people have taken the weather for granted.

I know my father told me that I had to respect the environment and be sure to just ask God for travelling safety because things can change so much and so fast. It's like if you see yourself better than the environment or stronger than it, you are asking for trouble. Be careful, be well planned, be respectful, be wise, don't take things for granted that is what is important. If you don't know how to get somewhere, just don't head off thinking you will get there. You need to ask for advice.

I think the story of the Lost Patrol and the death of the RCMP going from Fort McPherson to Dawson City is an important one. The police were told to be careful and not be too confident in their own ability. I think they might have been too confident and should have listened to advice.

The "Lost Patrol" had set out from Fort McPherson, N.W.T., Dec. 21, 1910, heading for Dawson, Yukon Territory, a trek of roughly 800 kilometers (500 miles). Failing to find their way through the mountains, the lost patrol had turned back to Fort McPherson in a desperate race against cold and starvation. The grisly discoveries of the bodies of Taylor and Kinney, then Carter and Fitzgerald, were all made within 50 km of Fort McPherson on March 21-22, 1911. They are now buried in Fort McPherson.

Understanding Weather: *Based on an Interview with Zachariasie PANIPPAKUTTUK of Igloolik*

To understand the weather you need to understand SILA. Across the north people refer to Sila. It is more than the weather; it is more like the person who is the weather. It is greater than us all.

SILA is an old word. I am not certain what it is but SILA has to do with anything outdoors including the weather. A child must understand the outdoors and being sent outside to see SILA in the morning was part of the training. Upon returning indoors, we would always be asked how the weather was (SILA). We would say SILAALUK to describe the atmosphere and the sky above us or the surrounding.

From the word SILA we can have meaning meanings, for instance SILAITTUQ a person who is not very smart. SILA is a huge massive things, so SILAITTUQ means someone who has a small amount of SILA. Other words in our language like SILATUNGITTUQ means the person's thinking ability is very limited. So it would appear as if one would shrink the SILA to describe this type of an individual. SILATUJUAALUK means a wise person, or a person with huge SILA. This is the type of an individual is comparable to that of an individual who has a reasoning capacity of the huge mass of SILA.

I cannot fully understand what SILA can really mean. When a person goes outdoors he would say that he went out to SILA. On the hand we can term it as SILALUKTUQ which means bad weather or SILATTIAVAK meaning good weather.

SILA could be angry. When there was bad weather it was always believed to be associated with someone breaking a taboo. Taboos are things that cannot be done. Should someone breach a certain taboo, their life would change. Perhaps they would get some kind of an illness or it might have an effect on the game animal that they hunted or it might change the weather because one person had breached a taboo. This was the most common occurrence when certain taboo had been breached. This is what was believed.

Land Eggs and Sila: *A story based on an interview with George A. Kappianaq of Igloolik. The story of Sedna and her association with weather (Sila) is found across the north*

My mother used to tell me about a certain creature that could do anything to other things that resided in the waters of the Arctic Ocean.

She has a fluke (tail) like a whale with the upper body like a human with head. My mother used to mention this creature. It is said that it is a powerful creature that guards the northern sea and earth. It can penetrate the earth and lives in the water. It is known as "TUUTALIK" or Sedna [mermaid].

I heard that one was caught. They were afraid that it might take revenge so it was buried same as one would humans. It was caught

as one would with marine animal. I think they should not be caught. The one my mother told me about was a powerful creature one who a man can depend on for help. If you saw one, it would look like an ordinary marine animal that can penetrate the earth and travel in the water at the same time.

It is said it is much larger than a human, possibly about the same size as a beluga whale. I have also heard about polar bears that have flukes like a whale, but the body is a polar bear with its fore legs and head. I guess they were from sea eggs. There are square flippers that are all white except that their backs have dark color. It is said that one should not be caught as they are hatchings from sea eggs.

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There are sea eggs that are known as SILAAT [earth eggs]. They are found along the coast of Yukon, NWT and Nunavut. When they hatch, some are polar bears with square flippers and paws that are white where it is supposed to be black. The fur is very pretty with white fur. They are all white – even their nose - albinos.

Should one kill one for their skin, this will result in death to whoever caught it before his time. Other misfortunes might befall this individual. Especially, the weather will turn on you.

You cannot kill albino animals especially SILA would grieve the lost of her hatching so it was advised against hunting these particular animals. She would seek revenge. Sedna would revenge.

Even if one is tempted to hunt one of these animals you should leave them alone as there are others for the taking. This is a way to ensure they are preserved.

Grieving Sila: *Based on an Interview with George Kappianaq of Igloolik.*

This past spring we saw a sea egg in the water on the beach. I told everyone to leave it alone. The water was shallow. It was a large egg. It was in the water resting at the bottom. The water was not too shallow but it was very clear.

I was afraid that someone might try and hook it with a fish hook. I told everyone to leave it alone. Whenever someone came up from the beach I would ask that if they had tried to get it.

What would have happened if someone took it? It would have caused bad weathers with strong winds and unpleasant weather conditions. This is usually the consequences when as earth or sea eggs are broken or the hatchings caught.

It was not long ago that there was a terrible snow storm in the summer when my cousin caught a caribou yearling that was an albino - a SILAAT. That summer our north region was covered with snow with snow drifts. It was the caused by him killing something that was protected. The words of the elders came to pass at that time. So that's the reason why albinos should not be caught when there are others around.

I saw a PUKI once. Once in a while it would go down to the northern coast area with others. It was much bigger than caribou. It was all white including the skin on the leg. The back had darker fur. I watched it whenever it came down. If I had stalked it, I would have easily caught it but I chose to leave it alone. This was in summer yet it was all white so it is very clear to see in the dark background.

I am going to say something I have heard from my mother. She used to lecture me on subjects that would ensure I would not experience bad things. It was believed that bad things such as bad weather or scarcity would come for some reason such as they did what they were not to do.

You did not want to grieve SILA by your actions.

Watching the Weather

Look at your Weather Diary and answer the following questions:

1. How many days was the air windy?

2. How many days was the air calm?

3. How many days was it cloudy?

4. How many days was it clear?

5. Which day was the coldest day?

6. Which day was the hottest day?

Draw a picture to show what you were doing after school on a:

Warm Day	**Windy Day**
Cold Day	**Wet Day**

Research the story of the Lost Patrol. What caused the tragedy? How could it have been prevented?

_____
_____
_____
_____
_____
_____
_____

If I Were There

What would it be like if you were made very small and were in these places? What would you see, feel, smell and hear? What would be around you? Draw a picture in the big space and write describing words in the small space.

In The Water of the Sea	In the Rocks on the Hills
In the Air on a Rainy, Windy Day	In the Air on a Clear, Sunny Day
Inside the Stomach of a Polar Bear	In the Shoe of a Student

Weather Information for November 14

Whitehorse, YT

-24°C

- **Feels Like :** - 32
- **Wind :** NW 7km/h
- **Pressure :** 102 kPa
- **Visibility :** 64.0 km
- **Ceiling :** unlimited

Toronto, ON

11°C

Feels Like : 9
Wind : NW 14km/h
Pressure : 98 kPa
Visibility : 4.0 km
Ceiling : 400m

The weather report gives much information to describe what the air is like in Toronto and Whitehorse at the same time on November 11th.

1. In which community is it colder? _____
2. What is the difference in temperature?_____
3. In which town is it windier?_____
4. What is the difference in wind speed?_____
5. What direction is the wind coming from in both communities? _____
6. In which town is it clearer?_____
7. What is the difference in visibility?_____
8. Use this information to describe orally the weather in both towns. Write sentences to describe the weather for both towns.

In Whitehorse today
In Toronto today

Temperatures Across Canada

What are the temperatures in these places today?

Place	Temperature	Hottest to Coldest (1-12)
My Town		
Inuvik		
Whitehorse		
Yellowknife		
Iqaluit		
Vancouver		
Winnipeg		
Edmonton		
New York		
Los Angeles		
Miami		
Mexico City		

1. Locate the cities and towns on the map that follows. Write down both Temperature and Rank (1-12) for each town.
2. What pattern, if any, do you notice?

_____

1. What is the difference in temperature the two hottest places?

2. What is the difference in temperature between the two coldest towns?

3. What is the difference in temperature between the hottest and coldest place?

Making and Reading a Thermometer

When a liquid like water is heated, it takes up more space. This causes the liquid and the temperature of the thermometer to go up. If it cools, the water takes up less space and the liquid and temperature go down. Use the knowledge that water expands when it is heated and contracts when it is cooled to make a thermometer. Here is how to do it.

What do you need?

1. Tap water
2. Rubbing alcohol (**do not drink this**)
3. Clear, narrow-necked plastic bottle (11-ounce water bottles work well)
4. Food coloring
5. Clear plastic drinking straw
6. Modeling clay

What to do?

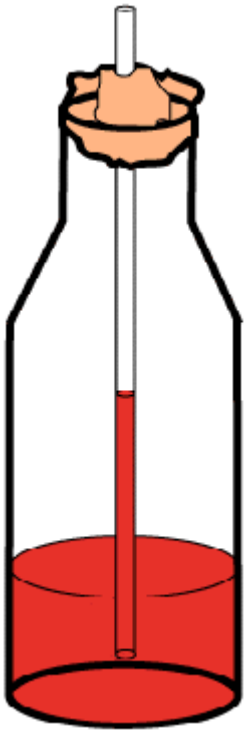
1 Pour equal parts of tap water and rubbing alcohol into the bottle, filling about 1/8 to a 1/4 of the bottle.

2 Add a couple of drops of food coloring and mix.

3 Put the straw in the bottle, but don't let the straw touch the bottom (**DO NOT DRINK THE MIXTURE**).

4 Use the modeling clay to seal the neck of the bottle, so the straw stays in place.

5 Now hold your hands on the bottle and watch what happens to the mixture in the bottle. Place the thermometer in different locations around the classroom and school, especially in hot and cold water to see how the water level changes.



Questions:

1. Which place was the water level the lowest? _____

2. Why was the water level the lowest in this place? _____
_____

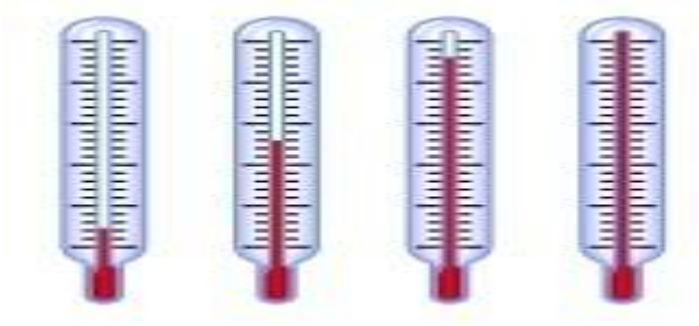
3. In which place was the water level the highest? _____

4. How could you get the water level in your thermometer to go higher? _____
_____

5. What is temperature? _____

6. In what units do we measure temperature? _____

7. There are four thermometers below. Make a scale that goes from -20 to +80 on the thermometers. What would the temperature be for each thermometer?



_____ _____ _____ _____

8, What temperature is:

a) the temperature that water freezes? _____
b) the temperature water boils? _____
c) the temperature of your body? _____
d) the temperature of a normal room? _____
e) the temperature in a fridge? _____
f) the temperature of a fever? _____
g) the temperature of lukewarm water? _____

9. Explain why the level goes up in a thermometer when it is warm and goes down when it is cold.
_____
_____
_____

Measuring Temperatures

Use thermometers to measure places in and around the school. Complete the table below.

Location	Temperature	Rank (Highest (1) to Lowest (6)

1. What was the highest temperature? _____
2. What was the lowest temperature? _____
3. What is the difference in temperature between the two highest temperatures? _____
4. What is the difference in temperature between the two lowest temperatures? _____
5. What is the difference in temperature between the highest and lowest temperatures? _____
6. Mayo, Yukon is often called the hottest and coldest community in the Yukon. How hot and cold does it get? _____
7. What difference in temperature is there between these two temperatures? _____
8. Another town in the Yukon called Snag has the record for having the coldest temperature in Canada. Find out what this record is. _____

We can use and make instruments to measure the weather: wind speed

What you need

Lots of Plastic pop bottles
Scissors
Long thin pieces of wood
Stick pins

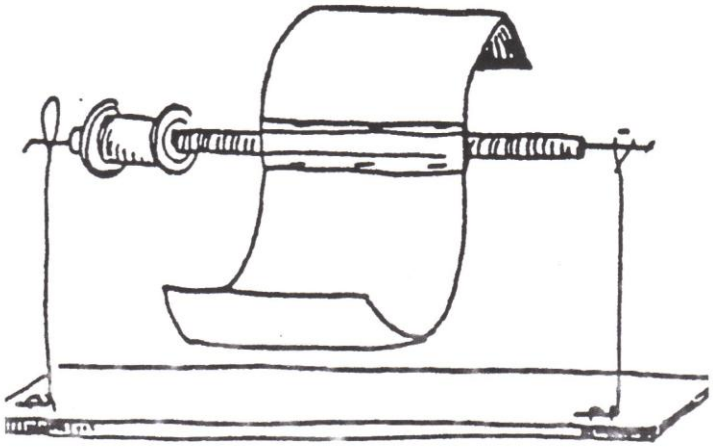
What you do

- Over the past few days the children have been noting changes in the wind. You have used words to describe the wind, such as calm and very windy. At this stage children don't need to know that we can measure wind speed, but they should be able to recognize that the wind can move and sometimes it moves very fast. Its speed can be observed in various ways. The activities that follow look at ways we can observe and hear the differences in wind speeds.
- Start by getting students to demonstrate speed as a movement pattern. The students might stand on one side of the class and you describe movement patterns and they have to respond accordingly. Make a game out of it possibly by doing something like Simon Says, be calm air or Gale-force air. Get across the idea wind speed is how fast the air travels in a period of time.
- Follow this with a simple construction activity that shows that the strength of the wind changes the volume of a sound-making object. If they are given a clean bottle, they should be aware that when they blow air across the mouth of the bottle, they can make a sound. The greater the wind speed, the greater the sound volume. As well, the amount of space in an object influences the pitch of sound.
- It probably is best for students to use the same size plastic pop bottle for this next activity. Students simply cut a long hole in the side of the bottle. You may wish to have a template for a standard size for all, such as a 'wiener-sized' template that is drawn with a marker onto each bottle. Students then secure the bottle onto a length of wood with a thumb tack. They then must plug the space at the bottom of

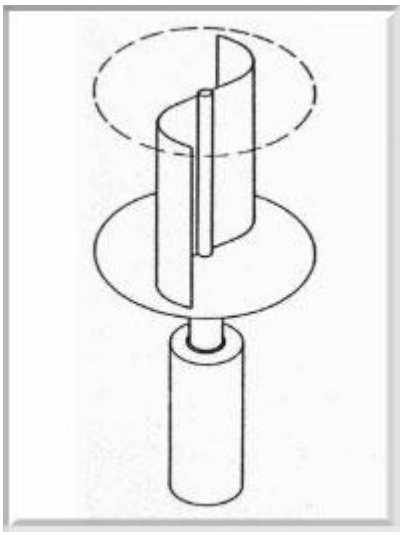
the bottle with plasticine or some form of filler. You may wish to try these with and without the filler.

- Students then can take their objects outside and note any sound made. The stronger the winds the louder the sound. Students might go to various places near the school where there are differences in weed speed to note differences in volume. There is often an eerie quality to the sound, reminiscent of science fiction movies. Students can modify (and they will want to!) these by using different sizes of bottles or different sizes of slits. They should note that pitch changes by the size of the hole or bottle, but wind speed changes the volume.
- Further to this, take another pop bottle and cut and fold out ‘flaps’ on two or four sides of the bottle as illustrated below. Be careful. Some plastic bottles are quite firm and cutting flaps can only be done with a very sharp blade which may require you to cut the flaps. Again, secure the bottles to a pencil or wood length with a tack but ensure the bottle can rotate freely in the wind or when blown upon. The speed at which it rotates gives a ‘measure’ of what the wind speed is. It is possible to count or measure the wind by coloring one of the flaps an easily observable color and counting how many rotations it does in a set period of time like10 seconds. This ‘count’ becomes a wind speed. This pop-bottle instrument is not much different than an anemometer used at the local airport for measuring wind speed. Students have probably seen this at the airport and may inquire as to what it does and how it works.
- Keep these instruments so that students can measure the wind speeds in the investigation that follows.

- There are many ways to make wind-speed measurers. Anything that moves freely in the wind that gives a ‘measure’ is good as a wind device. Below two further examples are shown. In both cases a hollow tube like a toilet paper roll or pop bottle with the top and bottom cut off are cut to make two halves that can be secured to a straw by tape. Then, a skewer or something solid is placed through the straw so that a rotator is made. The rotor can be secured to something like some wire loops (paper clips) secured to pencils to provide a free rotation in the wind. As a matter of interest a spool from thread can be slipped onto the axle and can have a long piece of sting tied to it so that it acts like the reel for fishing line, but in this case winds up when there is a wind. This rotor with its string can now be tied to an object to haul or lift it in the wind.



- Students can also make a vertical rotor using the same materials as illustrated below.



What you look for

- Can students make the connection between wind speed and the differences they see in sound volumes and rotations of their pop bottle instruments?
- Are they able to think about other creative ways to measure wind speed?

Make an Anemometer!

Measure how fast the wind blows.

An anemometer is a device that tells you how fast the wind is blowing. The device you can build is a model of a wind speed indicator. A real one will be able to accurately measure how fast the wind is blowing. Yours will give you only approximation of how fast it's blowing. It can't give you an exact wind speed.

The energy in the moving wind can be used to generate electricity. But you have to know how fast the wind is blowing before you can harness wind power.

What do you need?

1. Scissors
2. 4 small paper cups (like drinking cups)
3. A marking pen (any color)
4. 2 strips of stiff, corrugated cardboard -- the same length
5. Ruler
6. Stapler
7. Push pin
8. Sharpened pencil with eraser on the end
9. Modeling clay
10. A watch that shows seconds

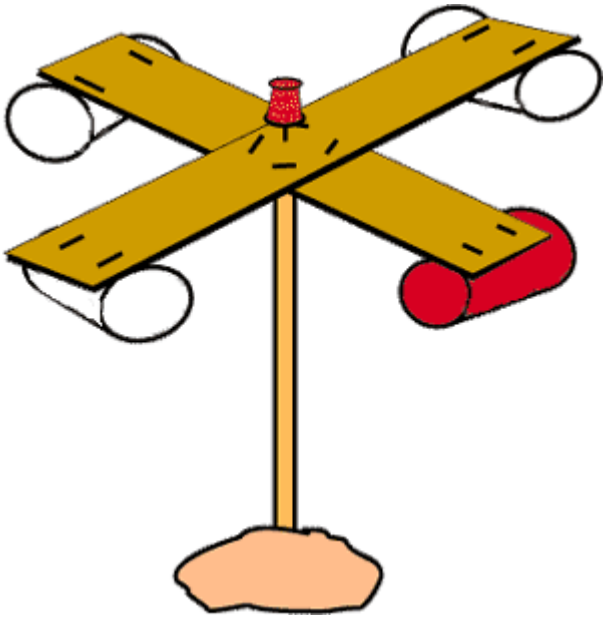
What to do?

1 Cut off the rolled edges of the paper cups to make them lighter.

2 Color the outside of one cup with the marking pen.

3 Cross the cardboard strips so they make a plus (+) sign. Staple them together.

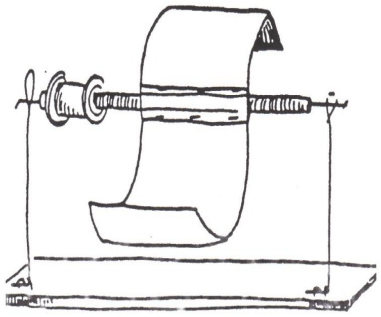
4 Take the ruler and pencil and draw lines from the outside corners of where the cardboard strips come together to the opposite corners. Where the pencil lines cross will be the exact middle of the cross.



5 Staple the cups to the ends of the cardboard strips; make sure the cups all face the same direction.

6 Push the pin through the center of the cardboard (where the pencil lines cross) and attach the cardboard cross with the cups on it to the eraser point of the pencil. Blow on the cups to make sure the cardboard spins around freely on the pin.

7 Place the modeling clay on a surface outside, such as a a porch railing, wooden fence rail, a wall or a rock. Stick the sharpened end of the pencil into the clay so it stands up straight.



Our Weather Investigation Planning Sheet

What is the question we want to answer?

_____

_____

How will we carry it out? Draw a picture or explain what you are going to do to answer the question?

Use this to help you think about how you will carry out the investigation.

What will you change?	What will you keep the same?	What will you measure? How will you measure? How often will you measure?

Our Weather Investigation Recording Sheet

Time of Day / Location	Temperature	Wind Speed

Our 3-day Weather Investigation Recording Sheet

Time of Day	Temp Day 1	Wind Speed Day 1	Temp Day 2	Wind Speed Day 2	Temp Day 3	Wind Speed Day 3

Patterns Around Us

1. The numbers below show a pattern. Figure out the pattern, write down the pattern and list the next two numbers:

a. 2 4 6 – pattern is the numbers go up by 2 – next are 10 & 12.

b. 1 2 3 _____

c. 3 6 9 _____

d. 5 10 15 _____

e. 16 14 12 _____

f. 30 25 21 _____

g. 25 20 30 25 35 _____

h. 2 7 17 32 _____

i. 1 3 7 15 _____

2. What is a pattern?

_____

3. What are 5 changes people are seeing in the weather patterns?

_____

_____

_____

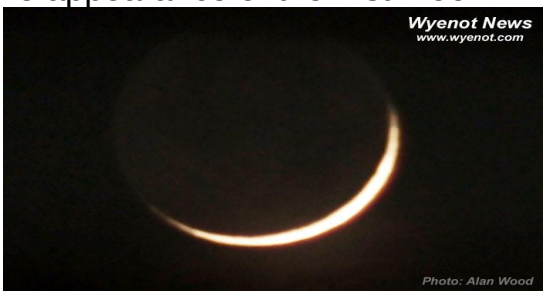
4. People say it is hard to predict the weather. What does this mean? Why is harder to predict?

_____

We can predict what the weather will be like

The Moon and Hunting: *This is an adaptation of a story told by Ilkoo Antutiqjuak of Clyde River. It is a story repeated across the north.*

From an early age I was shown to look at the moon and to know what the appearance of the moon meant. There were patterns with the moon. There were many stories to be told that had to do with the moon. Sometimes we were told things that weren't stories. It was just important for us to know these things as they would be important in knowing what was ahead. We did not have electricity or fuel in those days so the moon was very important in the dark season. For many weeks we would not see the sun, and the moon was our only light. It was during this time that it was very cold and hunting could be very hard. The moon would tell us what the next month of weather and hunting would be like. We would look for the first sign of the moon after the new moon. It was important to look at the appearance of the first moon.



We would look to see if it was leaning or not. When the moon comes out, and just before it starts to grow, if it comes out tilted up, there is a saying that goes: It is bringing wind and the weather would be stormy. What it means is that the winds will prevail as the moon gets bigger. If it comes out in almost a vertical position, it is said that the weather will be fair. We would look at the moon and if it was leaning we would still hope that the days ahead would be good for hunting. It was not always a sure thing. Nothing was ever certain, but it did make you hopeful. We would also look for a ring around the moon in winter. This halo told us there would soon be a change of weather with snow to come. Today, things have changed. It is hard to predict the weather.

We can predict what the weather will be like

In Ilkoo's story we are told they were able to predict the weather based on the moon.

1. Below are pictures of the moon. What do they tell us about the weather?

_____
_____

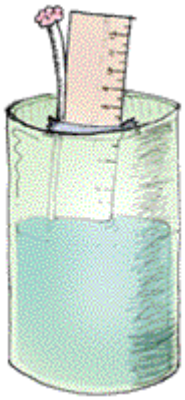
2. Why does Ilkoo say that it is harder to predict the weather today?

_____
_____
_____

3. Ask and older person if they know any ways that you can predict the weather. Write down the ideas that they have below.

Measuring Air Pressure:
Make Your Own
Barometer

The one weather factor that helps us to best predict weather is air pressure. Air pressure is just what it sounds like – the pressure the air around us is placing on the surface of the Earth. Air pressure changes when there is moisture in the air. In this activity we construct a device that helps us to measure air pressure. We will see the water level in a tube go up the tube when the air pressure is high and forces water up the tube or whether the air pressure is low and the water lowers in the tube.



You'll need these materials:

- a glass or beaker with straight sides
- a ruler (12 inch)
- tape
- one foot of clear plastic tubing
- a stick of chewing gum or plasticine
- water

Begin by standing the ruler in the glass and holding it against the side. Tape the ruler to the inside of the glass. Make sure that the numbers on the ruler are visible.

Stand the plastic tube against the ruler in the glass. Make sure that the tube is not touching the bottom of the glass by positioning the tube up a half inch on the ruler. Secure the tube by taping it to the ruler.

Chew the stick of gum so that it is soft. While you're chewing, fill the glass about half way with water. Use the plastic tube like a straw and draw some water half way up the tube. Use your tongue to trap the water in the tube. Move the gum onto the top of the tube to seal it.

Make a mark on the ruler to record where the water level is in the tube. Each time you notice a change in the water level, make another mark. You'll notice, over time, that the water level rises and falls. Pay attention to the change in weather as the water level changes.

The water in the tube rises and falls because of air pressure exerted on the water in the glass. As the air presses down (increased atmospheric pressure) on the water in the glass, more water is pushed into the tube, causing the water level to rise. When the air pressure decreases on the water in the glass, some of the water will move down out of the tube, causing the water level to fall. The change in barometric pressure will help you to forecast the weather. Decreasing air pressure often indicates the approach of a low pressure area, which often brings clouds and precipitation. Increasing air pressure often means that a high pressure area is approaching, bringing with it clearing or fair weather/

Above are two barometers. They both measure air pressure. When the air pressure changes, the needle on the barometer or level of mercury changes. Low air pressure means cloudy and stormy days. High pressure means clear days. In the arctic high pressure in winter usually means very cold temperatures. Low pressure usually means milder, cloudy and snowy days.

Monitoring and Predicting the Weather: Based on a conversation with Terry Kalluk of Clyde River, Nunavut.

There were a few of us from the north that decided we wanted to be airport controllers which involved learning about the weather. If you know the weather, you can help the pilots. The training we took was at Forth Smith, N.W.T. When we first started as weather reporters for our towns we had to do all the testing ourselves. There was a small weather station beside the airport and we would read the temperatures, read a barometer that gave us the air pressure and other things.

It was always interesting to find out how high the clouds were from the ground. This was important as planes needed to know when they would break through the clouds as they descended to land the plane. We would fill a large balloon and time how long it would take to reach the clouds and disappear. Because we timed the balloon we could calculate how high the clouds were.

Things have changed though. Now it is all electronic equipment we use. The equipment we use now sends the information to a computer in the airport office. It gives us things like pressure, temperature, and visibility. Every hour we sent this information through the computer to head office and this information gets sent to different weather centres across Canada. You can see the weather data from places like Rock River, Yukon and Aklavik, N.W.T. on the weatheroffice.gc.ca website. The weather scientists then take this data and use computers to make a weather forecast. They can predict what the weather might be like for the next few days and again you can see the five day forecast on the website.

The important things to look for are the air pressure and wind direction. If the pressure is dropping a low pressure system might be coming our way and this will bring cloudier conditions and maybe rain or snow. If the pressure is getting higher it means that it will be clearer. In the winter when it is really cold and clear there is a polar high pressure system on us. If it's a low pressure system it likely came from the Atlantic area to the southeast.

You should try to predict what the weather will be like by using the pressures given on the website.

We Can Predict the Weather

Go to the weatheroffice.gc.ca website and find your community. For your community record the information for Day 1 below. Based on this information, especially the pressure and the wind direction, predict what you think the weather will be like tomorrow.

	Day 1	Prediction for Tomorrow (Day 2)
Temperature		
Air Pressure		
Visibility		
Humidity		
Wind speed & Direction		

How did you do?

_____

Now try again. Write down the weather for today (Day 2) and use his information to predict for tomorrow.

	Day 2	Tomorrow
Temperature		
Air Pressure		
Visibility		
Humidity		
Wind speed & Direction		

Compare your forecast to the one on weatheroffice.gc.ca Is yours similar?

_____

Extreme cold in the Blackstone: *A Story told by Percy Henry*

I was raised in the Blackstone country. Today this is an area you can drive to on the Dempster Highway just after the Tombstone Mountains. The Blackstone flows into the Ogilvie River.

In the winter, we would trap and travel between the Blackstone, Hart and Ogilvie Rivers. There was a trading post in the area where would get supplies like coffee and flour by trading furs. One winter it was extremely cold - maybe -65 degrees. It was very difficult travelling with the dog team, especially camping at night.

It was so cold. At night you could hear the trees exploding. Yes, they would explode because of the cold. It was like the firing of a gun – CRACK! CRACK!

This was because the green wood – the living trees - have water in them. When the water freezes, the water swells up and the tree explodes. It is like if you take a glass bottle of pop and put it in the freezer, the bottle will explode because the water expands.
I hear that the First Nations people in the NWT call the month of January the “Month of the Cold-Exploding Trees”. I can understand that after what we experienced in the Blackstone.

The Story of the Great Flood: *A story from Gwich'in oral history*. Recorded by Dr. E.E. Cass, 1958 From *People of the Lakes* page 33-34.

This is the *Gwich'in* story of the flood. The *Gwich'in*, who live in the Old Crow area of the northern Yukon and western N.W.T. say that many years ago, all the North of Canada was covered with ice, but one day, due to the heat of the sun, the ice melted and there was a great flood. Now one Aboriginal had time to build himself a raft and he and his wife were on the raft and they even had a little wigwam there.

Many animals swam toward them and tried to get on the raft; they took as many as they could but they had to stop because of the danger of sinking. Now, among the animals who swam to the raft was the beaver, and the beaver saw a poor little ground squirrel who was clinging to a branch. The ground squirrel begged the beaver to take him on his back and the kindly beaver did so.

There was also a large porcupine there and the porcupine also requested a ride but the beaver told him that he could not possibly take them both. However, the great big porcupine jumped on the ground squirrel's back and the little beaver was nearly submerged. He tried to argue but he couldn't, for if he had opened his mouth, he would have drowned.

With great difficulty, the beaver managed to get to the raft. Now that is why the beaver has a flat back with no fat on it. All his fat is on his belly. And the ground squirrel is flattened above and below because he was on the beaver's back and he had the weight of the porcupine above him. The porcupine has no fat on his belly because he was resting on the ground squirrel and he only has fat on his back.

Also they say that because the beaver and the porcupine are now such enemies, you must never, never go hunting the two of them on the same day because you will be unlucky. The floodwaters still continued rising and rising and the man got very worried. So he called to the duck, and he said,

"Please duck, will you dive – I know you can do so- will you dive as deep as you can and see if you can find any earth under the flood waters?" Well, the little duck did his best; he dived and dived repeatedly until he was exhausted. But he could not find any earth. Then the man turned to the muskrat and he said,

“Oh muskrat! I know you will help me if you can. We must do something about this. Do you think you can try?”

So the little muskrat dove over the side and he stayed down a long, long time and everyone became very worried about him. Finally, he floated to the surface more dead than alive. They pulled him on the raft and there in this paw was a little bit of earth.

The man revived the poor muskrat and then he took the earth in his hand and he molded it. As he started to mold it, the earth started to grow so that soon he could put it in the water. And when it grew sufficiently large, he landed the raft on it and he and his wife and the animals left the raft.

The land went on growing until there was a big piece of land, which is now northern Canada.




Severe Weather

Draw and describe the severe weather events you have heard about or experienced through the stories heard.

Story One	**Story Two**
Who? Where? When?	**Who? Where? When?**
Drawing:	**Drawing:**
Story Three	**Story Four**
Who? Where? When?	**Who? Where? When?**
Drawing:	**Drawing:**

Jake's Tires

One day in the middle of the spring, Jake took his car to a garage in his community of Dawson City. At the garage Jake had the oil in his car changed and, as part of the car maintenance program, had the air pressure in his tires checked. The mechanic at the garage said that the air pressure in his tires was good.

One chilly morning several days later, Jake went out to his car and noticed that his back left tire looked a little flatter. On his way to work he stopped at a local self-serve gas station to put some air in his tire but realized he didn't have his tire air pressure gauge with him. Jake didn't have time to return home to get it so he decided to just put a small amount of air in his tire.

Weeks passed and Jake went for a summer trip in his car, he was driving from Dawson on the Dempster Highway to Inuvik. One day after he had been driving several hundred kilometers during a scorching heat wave Jake experienced a blowout. Luckily it was a rear tire and no other cars were around. Jake was able to keep control of his car and come to a safe stop.

Jake purchased a new tire at Eagle Plains. He had it installed and had all his tires checked for wear and tear and air pressure. The mechanic assured Jake that everything was up to specifications and the air pressure in the tires was fine.

Months passed and Jake had no problems with his tires until one cold night in January. It was so cold in Jake's community of Dawson that the thermometer outside his window read –40°C.

Jake was called into work for an emergency and when he got to his car he noticed that all four tires were low. Jake decided to call his friend Ben to avoid the chance of getting stuck with a flat tire on the road in his community late at night in such a cold temperature.

Map of Inuvik to Fort McPherson
Map from: http://www.yukoninfo.com/maps/dempster.htm

"Jake's Tires" Worksheet

Explain what happened to Jake's tires.
Why did the mechanic say the tires were safe on a warm spring day, and then they were flat several days later when it was cool outside?
Explain why Jake had a tire blowout in the summer?
Explain why Jake's tires were flat in the cold weather?
Relate the weather to the air pressure in Jake's tires.
Have you ever had an experience like Jake? Has anyone in your family or community ever had an experience like Jake? Explain.

Effects of Temperature and Air Pressure

Hot Water:	Ice Water (Snow):
What I Observed:	What I Observed:
Sketch of What I Observed	Sketch of What I Observed
Why I Think This Happened:	Why I Think This Happened:
Where I See Something Like This Happening in Daily Life:	Where I See Something Like This Happening in Daily Life:
Conclusions:	Conclusions:

We need to be prepared for severe weather

Severe Weather Event	What Happened?	What was done right?	What was done wrong?	What could they have done?

What did you learn about being prepared for severe weather? Write words and describe what you have learned.

Be Prepared for Severe Weather

Finish this story:

Esther and James are going to go skidooing after school in the winter dark season when it is windy. School has just finished in the afternoon and they decide to go to a place a few kilometers from the town on their own. They run out of the school to get their family skidoo when the school day ends excited about their ride. **Make one story about the bad choices they make and one about good choices.**

Good Choices:

Bad Choices:

Other Extreme Weather Events

Use the internet to find out information about the following 2 kinds of severe weather events:

Tornadoes:

Where do They Occur?	What causes them?	What They Do?	Picture

Hurricanes

Where do They Occur?	What causes them?	What They Do?	Picture

Explain why neither of these severe weather events occur in the north.

_____
_____
_____

Yukon Weather Goes to Extremes

Almost every year, the Yukon sets records for the weather. The territory has the greatest range of annual temperatures in North America, and the highest air pressure in Canada. But last year the Yukon also broke one of its own weather records.

The St. Elias Mountains are a major influence on Yukon weather, trapping moisture and blocking warmer air from the Pacific.
(photo: Yukon Wildlands Project)

Based on 51 years worth of weather information, 1998 was the driest year ever recorded in the territory. According to Environment Canada, annual precipitation was 34 percent below normal in 1998. Seasonally, 1998 had the second driest summer on record, the third driest spring, the fourth driest fall, and the third driest winter.

Last year was also the seventh warmest year on record, but during the summer, thick clouds of smoke often obscured the cloudless skies. The warm dry weather meant there were more big forest fires blazing around the Yukon. 386,000 hectares of forest were burned, compared to a normal total of 154,000 hectares.

The increase in the number of fires was not as dramatic, with 196 compared to a normal average of 162.
In 1998, the annual average temperature was 1.5 degrees Celsius warmer than normal. 1981 holds the record as the warmest year, with an average temperature 2.8°C warmer than normal.

The Yukon holds the record for the coldest temperature ever recorded in North America. On February 3, 1947, a temperature of -63 degrees Celsius was recorded at Snag, Yukon, an abandoned airstrip located east of Beaver Creek. The Yukon also holds the Canadian record for the highest atmospheric pressure. On February 2, 1989, the air pressure was measured at 107.96 kPa (kilopascals) in Dawson City.

On any given year, people living in the central Yukon can experience the greatest range of annual temperatures of any place in North America. Mayo is the place to live if you enjoy extreme high and low temperatures.

Mayo set the record for the Yukon's extreme high on June 14, 1969, when the thermometer topped out at 36.1 degrees Celsius. The extreme low for that community, -62.2 degrees Celsius, was recorded on the same day in 1947 that the record low was recorded in Snag.

For the record, some people in Mayo hotly contest Snag's claim to fame, saying that Mayo had a lower temperature on that same day. But Mayo never had a chance to confirm this reading because the weather office there burned down a few days later.

With a difference of 98.3 degrees Celsius between the extreme high and low temperatures, Mayo holds the Canadian record for the greatest range of absolute temperatures. For the Yukon as a whole, the difference between the average

What's happening in My Special Month

Draw pictures and write words that describes your special month. What do you wear outside? What are you doing? What sports are being played? What food is eaten? What are other people doing?

Seasons are what we call times of year with more regular predictable weather and behavioral patterns

Name of Month in English	Name of Month in my community's language	Activity in this Month
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		

Seasons of the Year: *Based on an Interview with Percy Henry of Dawson City Yukon.*

There are patterns in the year. If you observe you will see them.

June is what we call “Ch’edoghor Sranan”. This means it is Play Month. Then it is so full of life and activity both in the community and on the land. The sun is high and there are already young animals to be seen.

We look forward to King Salmon month. We call this month “Luk Cho Sranan”. This is a special time for preparing salmon that are caught in the nets.

August is called Dog Salmon month. It is Called “They Sranan” in Han language. This is a month you could Blueberry month too! The leaves will be starting to change colour.

September is Moose Month. This is an important time because we are collecting more meat for winter. It is called “Jejik Sranan”

In October it is Ninchun Sranan or Big Moose month. People are out calling moose and hunting caribou. We hope the Porcupine and Forty Mile caribou are in the area.

In November, the river is frozen over. We call it sheep month or “Debe Stranan”. People are now beginning to go out trapping.

In December, the short days and cold weather has come. We call it Small Moon Month or “Sra Tsul Sranan”. The northern lights will be more common, especially on the cold, clear nights.

In January, we have Big Moon Month or “Sra Cho Sranan”. The days are only getting abit longer and it is really cold.

In February, we have Frosty Month. Even though the days get longer it is still very cold. We call it “Ch’ets’ik Sranan”.

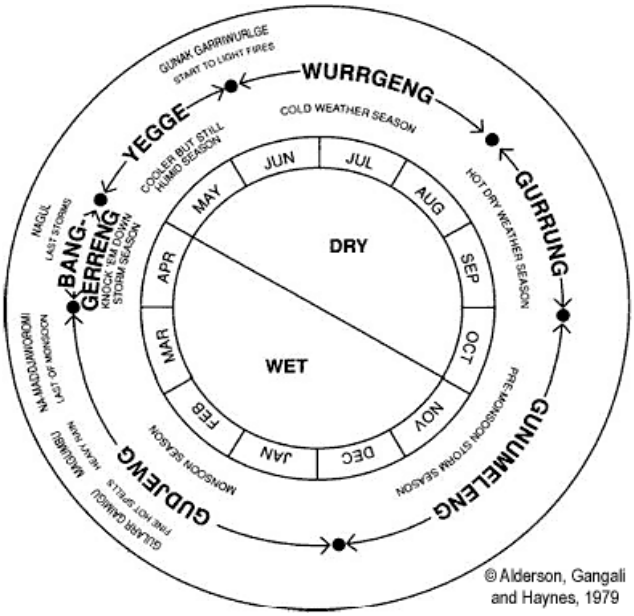
March is “Jeje-in Srana”. The days are longer and people and animals are more active. It is usually more windy and the river ice begins to rot. People will be ice fishing.

April is called High-Flying Hawk Month. “Detthat Jorn Cho Sranan”. At this time the weather is getting warm. Hawks are soaring in the sky. People might be catching grayling along the Klondike River or ice fishing.

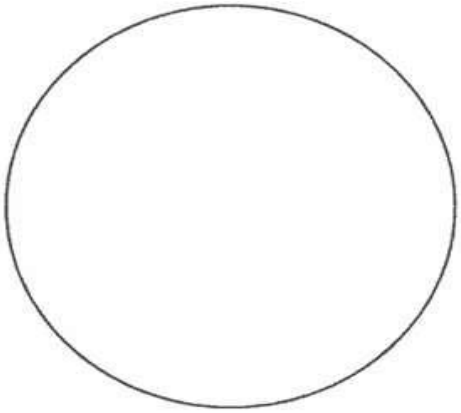
May is Dog Month or what we call “Lay Stranan.” By this month we are already harvesting and being prepared for a busy summer. We are looking forward to the salmon coming.

Each month is important. There is always something important to come. Everyone will have a favorite month. Each month is important to us. We live in a land that gives us much and we need to be thankful of this. When you get something from the land, you had to thank the Creator. Give back something in return. Leave a gift as an offering. You must be thankful for what you have received and not take too much.

Seasons of the Year: *A circle representation of the seasons of the year of Aboriginal People in Australia*



The picture above describes the seasons for Aboriginal people in northern Australia. Use the information provided by Percy Henry in the story to complete a seasonal cycle for the people of the Klondike area or another cultural group.



Months and Seasons of the Year: *Based on an Interview with Mark IJJANGIAQ of Igloolik.*

There are patterns in the year. If you observe you will see them.

January was the month that the moon and the sun competed. We would look to see which one would appear first. We hoped the sun would appear first at this time.

I remember what I heard and indeed I did and still do is to smile at the sun when we saw it for the first time with only half of your face, while the other side of the face must be in a straight face. The reason was that it was going to get warmer once again, so one side of the face that smiles welcomes the warmer temperature to come, while the other still faces the reality that it is going to be cold for sometime longer. I still do that when I see the sun out in the horizon. I pretend to smile at the sun.

February was known as QANGATTAARSAN [the winter/ period when the sun gets higher] that is when the sun has returned and it was starting to get higher and higher.

The next one, the month of March was referred to as AVUNNIT [towards spring/ birth of premature seal pups], and the next, the month of April was called NATTIAN towards spring/ birth of the premature seal pups], that is when the seal pups are being born.

I am not certain about May, I believe it was NURRAIT [spring/ caribou calves], that is when the sun starts to melt the snow, but soon after that there is a period when it freezes everything, this period is called QIRSUQAQ, [or the freeze over], that is the time when the temperatures will plummet to freezing so that the ground that had previously melted will freeze over once again. It is at this time the caribous will give birth to their young. In the past there was a saying that the SILA [weather] does not have a bit of sympathy to the caribous. The reason of course being that when the caribous are giving birth to their young the weather usually gets really cold and the stormy. On the other hand, it is said that the SILA sympathizes with the seal pups. When the seal pups are being born, the weather will get really mild and the snow usually starts to fall blanketing the

ground with soft snow. I use to hear often that the seals were adored by the SILA, whilst the caribous were not, even when the caribous had to give birth out in the open and the temperatures would be cold and the weather foul at this time. That is in the period of QIRSUQAQ in May.

Then in June, it is called TIRIGLUIT [early spring/ bearded seal]. This refers to the bearded seals, the [bearded seal pups are called TIRIGLUK] so therefore it is at this time the bearded seals give birth to their young.
For the month of July it is called MANNIIN, [spring/ eggs].

The next one being SAGGARUUT, [summer/ when the hairs on caribous had molted so that the new hair is now very thin].

The next is AKULLIRUUT [summer]. When the hair on a caribou is prime as they are not too thin nor are they too thick, the word means the middle.

September is AMIRAIJAUT [towards autumn/ which is when the bull caribous velvet on their antlers starts to peel off]. This is an indication that it is now well on its way to the autumn.

October is UKIULLIRUUT [autumn/ beginning of winter]. This is when the hairs on caribous are now getting thick with their winter hair, later on in the winter the hairs will get even thicker.

The next is TUSARTUUT [early winter/ when one is able to hear from another camp]. This is the time when the sea has frozen over so it is now possible to visit other camps in which they had not been able to do since the spring, so they are [now able to communicate with each other], thus TUSARTUUT.

Seasons of the Year: This story is an adaptation of an interview with Joelie Sanguya of Clyde River).

In the calendar we use today there are 12 months. This calendar doesn't take into account the changes that are occurring around us because of the changes in the weather caused by the amount of light or the temperatures. For Inuit there are changes that we see in the environment. You can observe them.

I remember as a child TUSAQTUT (news-month). This is around November when it is getting colder and the ice is beginning to form. Up until then it had been open water and as the ice began to form we could slide and travel carefully on the ice and begin to share the news of what had happened over the summer. I remember my father making skis out of 2x4s so he could travel across the thin ice safely. December is TAUVGJUAQ. This was the start of the dark season. In QAUMMAGIAQ (January), the light returns. In QANGATTAAQSI (February) the seal begin to make spaces under the drifts on the ice to have their pups. This is followed by AVUNNIT (March) which is when the first seal pups would be born. In NATTIQQALIQTANGA (APRIL) is the main time the seal pups are born. As the weather gets warmer we could no longer stay in snow houses and we would need to move into tents. This was around May and we call this time TUPIQTUUT. The snow at this time melts during the day but still at night it might freeze. The snow would get a crust on it at night and this season in June is called QIQSUQQAQTUUT. As the snow begins to melt and there was not often freezing at night we would get the season of flooding which is IKSUUT or July. Around August we notice that the caribou hair is still very thin and the caribou skins were not good for clothing. We called this time SAGGARUUT. As it gets colder it often gets windier and this made for difficulty in traveling. So we called this season in September the season waiting because of winds or AMINAIJAUT. Again as it got colder we would see the velvet on the caribou coming off. This is around October and this time was called AMINAIJAUT.

All of these things we observed were caused by it getting warmer or colder. In the fall it would get colder and then in the spring it would get warmer. Today there is some change in these seasons. It is warmer and we see changes from the earlier days.

Dealing With Seasonal Change

Using books or the internet find out how the following plants and animals adapt to the seasons. Illustrate and explain your findings.

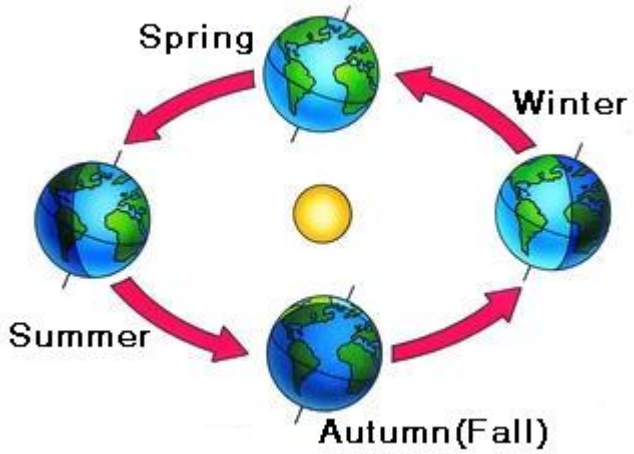
Living Thing	In Winter?	In Summer?
Black Bear 		
Beaver 		
Trees 		
People 		

How Does Weather Affect Animals?

In your community there are many stories about how, in the past, weather has affected animals. Maybe a very cold winter has affected caribou. Maybe in summer a very dry or wet summer has affected animals. Maybe a dry summer season has caused severe forest fires. Ask questions of an adult in your community to find out what animals have been affected and how they have been affected. In the space below draw pictures of the animal and tell a story of how the animal has been affected. You may choose to describe an animal that does not live in your area and use the internet to complete this task. Maybe you wish to look at the affect of a drought or floods.

Explaining the Seasons

The picture below tries to show the movement of the Earth around the sun in a year.



1. Draw lines from the sun to the Earth to show the light from the sun striking the Earth in both summer and winter in the Northern Hemisphere. Note where the light is directly hitting the Earth in summer and winter
2. What is the difference between the way the sun's light hits the Earth in winter and summer? Why does this cause a difference to northern Canada in the summer and winter?

   _____
   _____
   _____
   _____
3. Does the north get more sunlight in summer or winter? _____
4. Explain why.

   _____
   _____
   _____
5. There are two reasons for warmer temperatures in summer. The sun's rays are more direct. The days are longer. What are the two reasons why we get colder temperatures in winter:

   a)_____
   b)_____

Changes in Our Environment: *This story is an adaptation of documented information in the northern Yukon. Included in the interviews were Victor Henry, Percy Henry and William Henry.*

When you are out on the land lots and from year to year, you become very familiar with it. So you are used to things being the same. So when you see something different, you know there is a change. You can only notice the changes if you are on the land and are familiar with it.

We see many changes that tell us the climate is changing. They aren't big changes but altogether they tell us our climate is getting warmer. We are seeing animals in the Yukon that have not been that common. You see red squirrels, cougars and deer. It is surprising to see deer in the area. There are many more mice.

The caribou numbers are lower and they are not as big as they have been. I think this is because there is not as much snow and wolves are able to capture caribou easier in less snow. There are less salmon. Although this is maybe only because they are being netted more, the warmer water of the river is not good for the salmon. You see more diseased fish and we think it is difficult for the salmon to spawn.

In the summer we seem to see more really hot days. Drier temperatures some years and then wetter summers the next. The winters used to be long stretch of cold, cold winter days. Now we get much milder winters. There are some plants here now that we have not seen. These are mainly things like grasses. The spruce and pine trees are also showing signs of disease. The scientists say it is because the winters are not as cold and insects are able to survive and these harm the trees.

Changes I Have Seen: *This story is an adaptation of documented information from Dawson City resident Tommy Taylor.*

When I was growing in Dawson City I remember the winters being very, very cold. I basically grew up on the river helping my father fishing during the summer and helping on the traplines in the winter.

It seems like for the past 40 years the weather has been warming. I can remember temperatures like -72 and it would last for months. Now we get cold weather but it is never that cold and it never lasts that long. The ice fog would be so thick and it would be over the hole town. It is not as common anymore. Because it was so cold, you could not let children stay outside very long. It became very hard to breathe. I notice that the river ice is getting thinner and thinner. The river seems to freeze over later

The summers are drier. Some seasons are extremely hot and dry and even the winters are milder. I notice the trees are dying and I hear that is because of an ant or beetle. You notice leaves changing colour because of this. It isn't normal to see leaves changing colour early in the summer.

We used to catch many salmon and they were large salmon. In the 1950s and 60s we used to catch 35 and 40 kg salmon. They were huge salmon caught in the nests and salmon wheels. They are much smaller salmon now.

You never know what the next season may bring, but there are changes. If you keep records in your mind, you can see them.

There are suggestions that weather patterns are changing. This is what is called 'climate change'

In the space below draw pictures and explain with words the changes mentioned by the story tellers.

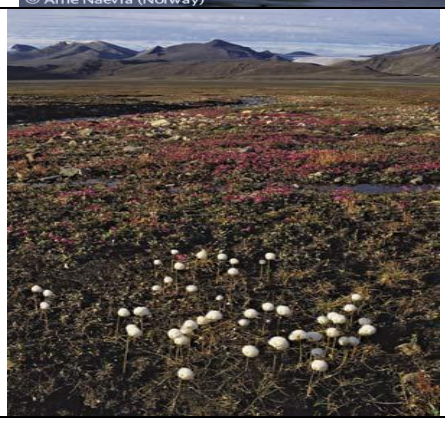
Climate changes affect living things. Sometimes these changes cause extinction

Between two continents on the edge of the Arctic lay the ancient place called Beringia. It was a land of ice, giant mammals and the First People of North America. We may think that our climate today is typical but over the past 2 million years, the climate of the northern hemisphere has been dominated by huge ice sheets. During each Ice Age, vast glaciers locked up much of the world's water as ice. Global sea levels dropped as much as 100 - 150 meters as a result, revealing the floor of the Bering Sea and creating a land connection between Alaska and Siberia (shown by the area in green). This land bridge was part of a larger unglaciated area called Beringia. Gold miners in the northern Yukon have found many examples of the animals that lived in this area. Use the internet to find out what caused the extinction of these giant mammals in this part of the north.

_____

_____

How might these things be affected by global warming?

Living Things	What Might Happen?
	
	
	

What is climate change?

_____

What is extinction?

_____

Why can climate change cause extinction?

_____

Does climate change always lead to extinction?

_____

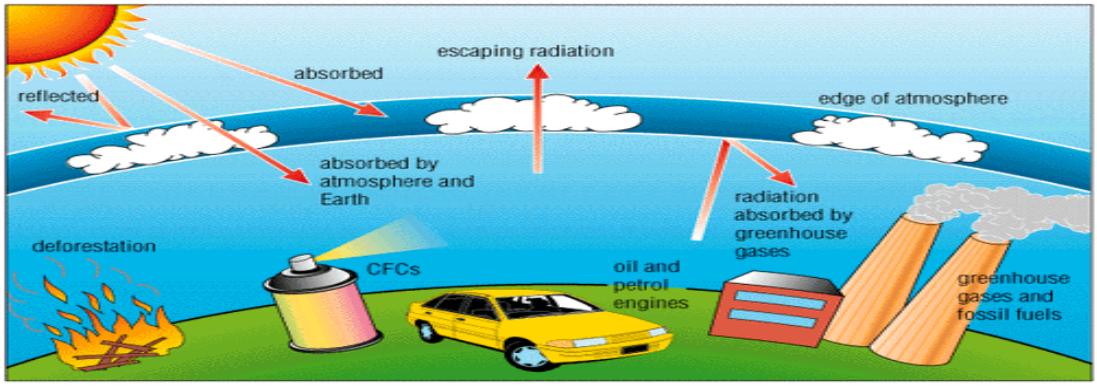
Human beings are contributing to climate change

1. **Draw a picture of the experiment we did.**

2. **Record your temperatures in the chart below**

Time in Minutes	Bottle with Lid	Bottle with no lid
0		

3. **What do these results tell us?**



1. Explain why the temperature rose in one bottle more than the other?

   _____

2. Use the picture below to explain how this investigation relates to the greenhouse effect and what might cause climate change.

   _____

Human Beings are Contributing to Climate Change: Making a Plan and Acting Upon It

What changes can be made by our community to contribute less greenhouse gas to the environment? What changes can we make to contribute less greenhouse gases to the environment? Think about what your class might do to help in this way. Discuss what you might do and make a plan using some of the ideas below.

(1) Respecting others and relationships (2) Serving and providing for family and community especially for organizations within the community and who they serve) (3) Ensuring all aspects of community development are fostered through decision making through collaboration (4) Development through practice and action ensuring members of the communities are full and meaningful partners (5) Working together for a common cause) (6) Being innovative in seeking solutions) (7) Respect and care for all aspects of the environment) and (8) Fostering good spirit by being open and inclusive