Girl Guide
Climate Change Challenge

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Girl Guides of Canada Take the Climate Change Challenge!

The City of Whitehorse, the Northern Climate ExChange, and Girl Guides of Canada – Yukon Council partnered in 2005 to develop a Climate Change Challenge for Girl Guides of Canada. This Challenge will be piloted in the Yukon in 2006, with the hope that it can become a National Challenge in 2007. The development of this Challenge was funded under the Federal Government's One-Tonne Challenge program.

The Federal Government acknowledges that climate change is happening and that as individuals there are many things we can do to reduce our greenhouse gas emissions and slow the process of global warming. Girl Guides of Canada – Yukon Council and their families can play an important role by helping shape this new Challenge, as well as cutting their greenhouse gas emissions and encouraging others to do the same.

The information in this Challenge contains an introduction to the subject of climate change. For more in depth information and for additional resources, please refer to the list of recommended websites in **APPENDIX A.**

Climate Change Challenge Overview

There are four components to the Climate Change Challenge: **SLEUTH**, **TAKE ACTION**, **CREATE**, and **CELEBRATE & SHARE**. Each component consists of several different modules. The girls can earn a badge for each component by completing a specified number of activities within the various modules. In the Appendices you will find supporting materials to accompany the activities. The description below outlines how many activities need to be completed in each module in order to earn a badge.

1.0 SLEUTH
- **1.1 ENERGY SLEUTH MODULE**
- **1.2 TRANSPORTATION SLEUTH MODULE**
- **1.3 WASTE SLEUTH MODULE**
- **1.4 EXPERIMENT SLEUTH MODULE**

In the SLEUTH component, girls will learn about climate change, investigate sources of greenhouse gas emissions and discover what they can do to reduce their emissions. In the Energy, Waste and Experiment Modules, the girls need to complete one activity. In the Transportation Module they should complete two.

To earn their SLEUTH badge the girls need to complete 2 of the 4 SLEUTH modules.

2.0 TAKE ACTION
- **2.1 INDIVIDUAL ACTION MODULE**
- **2.2 FAMILY ACTION MODULE**

In TAKE ACTION component, girls will have an opportunity to try several activities to reduce their greenhouse gas emissions. In the *Individual Action Module*, the girls choose 6 activities and in the *Family* module, the girls, along with their families, fill out an Action Plan.

To earn their TAKE ACTION badge, girls need to complete 1 of the 2 TAKE ACTION modules.

3.0 CREATE
- **3.1 CRAFT MODULE**
- **3.2 PERFORMANCE MODULE**

In the CREATE component the girls have the option of doing a variety of different crafts and performances to raise awareness about climate change.

To earn their CREATE badge, girls need to complete 1 activity in the Craft Module and 1 activity in the Performance Module.

4.0 CELEBRATE AND SHARE

- **4.1 LOCAL COOKING MODULE**
- **4.2 OUTDOOR EXPERIENCE MODULE**
- **4.3 SHARE THE MESSAGE MODULE**

This component consists of several fun-filled ways that girls can share and practice what they have learned about climate change.

To earn the CELEBRATE AND SHARE badge, girls need to complete 1 of the 3 modules.

The girls can complete the components in any order; however, they must begin all modules by reading or becoming familiar with the information in **GETTING STARTED.** Once they have earned all four badges, the girls will be able to put them together to form one large crest.

An overview page at the beginning of each module is written for the leader; however, the content of all the modules, unless otherwise indicated, is written for the girls. The **GETTING STARTED** backgrounder has also been produced for the girls. The activities listed are meant to motivate and inspire action but do not need to be followed rigidly. Leaders should feel free to adjust the activities to the needs of their particular unit.

Since this is a pilot project any recommendations that you have for improving activities and background materials would be greatly appreciated. At the end of each of the four components is an evaluation form for the leaders to complete. Evaluations should be kept in the binder until the **SPRUCEWIND WRAP UP** (tentatively scheduled for April 2006). As well, comments can be submitted anytime on the City of Whitehorse website (under the One-Tonne Challenge banner) and on the Girl Guide – Yukon Council webpage. *Your feedback is key to refining the program and successfully promoting it at a National level.*

Accompanying the Climate Change Challenge is a passport that can be used to track the modules and components that girls complete. When they finish a module the girls should ask their parents and/or their leader to sign or stamp their passport.

Getting Started

What is Climate Change?

Have you heard your parents talk about how the climate is changing? Do they say things like, "it was colder when I was younger" or "I don't remember so many forest fires and big storms?" Have you learned in school about how the permafrost is melting and new plants and animals are beginning to appear in the North? Or maybe you've watched the news and heard about the hurricanes and tropical storms in the United States and Central America.

From all of this talk about the weather you've probably figured out that there is something strange happening. The climate is changing, not just in the North, but all over the world. The difference in the North is that we are already feeling the changes even more than in other parts of the world. Here are a few things that are already happening:

- **Melting sea ice:** Much of the Arctic Ocean is covered with ice throughout the year. With climate change the extent of the sea ice is decreasing. At the same time the ice that is left is thinning. For the parts of the ocean that freeze and thaw each year, freeze up is arriving later and break-up is arriving sooner. Wildlife, like polar bears or walruses that live or rely on the ice, is already being affected. Ships are traveling in Northern waters for more weeks in the year.
- **Melting glaciers:** All glaciers in the North are melting. This changes the flow of water in rivers. Melting glaciers cause sea levels to rise, affecting communities along the coast.
- **Melting permafrost:** Some northern buildings and roads are shifting and sliding as the permafrost they are built on melts. The melting is also causing landslides and slumping riverbanks. As snow and ice melt in the North, climate change speeds up.
- **Changes in weather patterns:** Rain, snow and storm extremes are increasing. This results in stronger storms, areas of drought, and flooding. Combined with melting sea ice, coastal areas are being hit with more storms and waves.
- **More forest fires:** Hotter temperatures and changes to rain and snowfall are drying out some forests. This is leading to large areas of forest in danger of forest fire.
- **New plants, fish, animals, and insects**: All sorts of new species are being found in northern areas. Warmer temperatures are making it easier for southern species to survive farther and farther north. But some northern species are finding it harder to survive as their environment changes.

Do you know why all these changes are happening?

Why is the Climate Changing?

Every time you drive to the store, start up a snow-blower or heat your home, you are burning what is known as a fossil fuel. Fossil fuels are made from the carbon of plants and animals that decomposed millions of years ago. Over time, these decomposed materials were buried by layers of soil and other decaying material. Heat and pressure converted the materials into what we now call oil, gas and coal.

Fossil fuels are made up of a lot carbon – carbon that was trapped below the surface of the earth for millions of years. When we bring carbon – in the form of oil, gas and coal – back to the surface and burn it as fuel, it combines with oxygen to release a lot of carbon dioxide into the atmosphere.

Carbon dioxide (CO_2) is a greenhouse gas. It is the increase of greenhouse gases, most importantly CO_2 that is causing our climate to change. As the amount of greenhouse gases in our atmosphere increases, the temperature rises, and the weather becomes increasingly unpredictable. There are more big storms, greater fluctuations in the climate and in the North, warmer temperatures are causing sea ice, permafrost and glaciers to melt.

How much Greenhouse Gas do we produce?

We usually think of gases as being weightless, but they're not. In fact, gases weigh a lot. The average Canadian produces 5 tonnes of greenhouse gases per year! Per person, Canadians are among the highest greenhouse gas producers in the world!

To get an idea of what 5 tonnes looks like, picture a 2-storey, 3-bedroom house. If you filled it up to the top with greenhouse gases, this would be 1 tonne of greenhouse gases. The average Canadian fills FIVE houses per year with greenhouse gases. Now, find something that weighs a kilogram. (The block of cheese in your fridge, for instance, might be 0.5 of a kg or 0.75 of a kg.) Pick it up. Imagine what it would feel like to pick up ten kilograms . . . 100 kilograms . . . 1,000 kilograms. One tonne equals 1,000 kilograms. If you're an average Canadian, you're responsible for 5000kg!

In Canada, the two main sources of greenhouse gas emissions are driving and heating our homes. Imagine how much greenhouse gas emissions you could reduce if you walked to school or wore a sweater in your house instead of turning up the heat.

What can you do to solve the problem?

Scientists around the world agree that we need to do something about climate change and we must reduce the amount of greenhouse gas emissions we produce. Not only will this help to control the climate, it will ensure that we have cleaner air and a healthier environment. The Government of Canada has created a program called the One-Tonne Challenge to motivate everyone in Canada to reduce their greenhouse gas emissions by One-Tonne. In the Girl Guide of Canada Climate Change Challenge you will discover how you and your family can measure and reduce the amount of greenhouse gases you are producing.

Are you ready to take the Challenge?
Let's get started!

1.0
SLEUTH

Become a Greenhouse Gas Investigator!

1.0 SLEUTH

SLEUTH Overview (for Leaders)

This is the first of four components in the *Climate Change Challenge*. The purpose of the SLEUTH component is for the girls to investigate how they and their families produce greenhouse gas emissions, and to use basic scientific principles to understand the effects of climate change.

There are four modules in the Sleuth component:

To earn their SLEUTH badge, the Girls must complete the indicated number of activities in 2 of the 4 modules. The required number of activities to complete the modules is listed at the beginning of each module.

In each activity a recommendation has been provided for how girls can show they have done an activity. In some activities it is recommended that girls do a presentation for their unit, create a poster or write a story about what they've learned. If you have other interesting ideas about how girls can share what they have learned, please feel free to use them and to describe the techniques in your evaluation.

A number of the activities require supporting materials that can be found in the Appendices.

1.1 Energy SLEUTH Module

Energy SLEUTH Background

Attention all energy sleuths! Canada needs your investigative skills. The One-Tonne Challenge encourages Canadians to take action and reduce their greenhouse gas emissions by 1,000 kilograms or one tonne. Why? So you, your family and friends can have cleaner air, a better environment for animals and plants and the right temperatures for farms that grow our food.

One tonne may sound like a lot, but cutting these emissions isn't as hard as you might think. By doing the activity below you will discover many easy ways that your family can reduce their emissions by one tonne and achieve the One-Tonne Challenge.

By filling out the *Energy Sleuth Inspection* (**APPENDIX B**) you will discover how your family produces greenhouse gas emissions. Once you have completed the form you can read through the *Tips Sheet* (**APPENDIX B**) that includes 30 easy ways you and your family can reduce your energy consumption and greenhouse gas production.

After completing the Energy SLEUTH module you will be able to:

- Identify how you and your family produce greenhouse gas emissions
- Describe four actions you and your family can take to cut greenhouse gas emissions by one-tonne.

Energy SLEUTH Description

In this activity you and your family will learn how you can cut down your greenhouse gas emissions by one tonne.
Are you ready?

1. First, get a pencil and ask an adult to help you fill out the *Energy Sleuth Inspection Sheet.* Your leader will provide you with the sheet, which can be found in **APPENDIX B**. On the sheet you'll discover ways that each person in your family can meet the One-Tonne Challenge.
2. Second, check out the *Energy Sleuth Tips Sheet* that your leader has given to you. It includes 30 easy ways you and your family can reduce energy use. Choose four of your favourite tips to try out with your family. The Energy Sleuth Tips sheet will be provided by your leader.

Tell your leader and your unit what tips you tried with your family and how they worked.

Would you like to learn more about how to reduce your greenhouse gas emissions? Check out this websites for fun and interactive games.
http://oee.nrcan.gc.ca/calendarclub/

1.2 Transportation SLEUTH Module

Transportation SLEUTH Background

Did you know that driving is responsible for almost half of the greenhouse gas emissions produced by Canadians? Driving only four kilometres produces 1 kilogram of greenhouse gases. The average Canadian drives 10,000 kilometres per year. One thousand kilograms equals one tonne. Can you work out how many tonnes of greenhouse gases the average Canadian produces per year just by driving?

Fortunately, if you need to drive, there are some easy things that you and your family can do to reduce the amount of greenhouse gases you are producing:

- **Keep tires at the right pressure:** When your tires are under-inflated your vehicle requires more fuel and produces more greenhouse gas emissions.
- **Avoid unnecessary idling:** If you idle your vehicle for more than 10 seconds, you use more fuel than it would take to restart your engine.
- **Keep your car properly maintained:** A poorly maintained car can consume between five and fifty percent more fuel than one that is properly maintained.
- **Monitor your driving speed:** Driving 100 km per hour rather than 120 km per hour can reduce fuel consumption by 20 percent. Driving 90 km per hour rather than 100 km per hour can reduce fuel consumption by another 10 percent.

These suggestions work well if you need to drive; however, the best way to reduce greenhouse gases is by not driving at all and getting to the places that you need to go by walking, cycling, or rollerblading. You may not be able be able to drive yet, but you can help your parents reduce the number of trips they make in their car by proposing to use some of these alternatives. For example, some of you may live close enough to school that you can walk there.

In this module you will learn how to calculate the number of greenhouse gas emissions your family produces when they drive, and you will investigate some interesting ways to cut down on emissions while saving money and improving air quality. Remember to share what you discover with your family!

After completing the Transportation SLEUTH module you will be able to:

- Describe how driving adds to the problem of climate change
- Identify 4 ways you can travel to your activities without getting a ride in a car
- Reduce the number of times traveled in a car by at least one trip per week

Transportation SLEUTH Description

To complete the Transportation SLEUTH module you need to complete 1 of the 4 activities listed below.

1. Emissions Detective

Did you know that a big pickup truck produces 1 kg of greenhouse gas emissions for every 2 kilometres driven? That's like a pop can of greenhouse gas emissions for every kilometre. Imagine how many pop cans of emissions would be produced in a week if the car drove 30 kilometres a day. How many would be produced in a year? Compare how much gas is burned per kilometre by: a hybrid vehicle; a small vehicle, a medium sized vehicle, a station wagon; a mini-van; an SUV; a semi-truck; and your parent's vehicle. If your parents have more than one vehicle find out how much gas the largest burns per kilometre. To do this exercise, refer to the hand-out given to you by your leader called *Calculating your Travel Greenhouse Gas Emissions.* The sheet is in **APPENDIX C** of the Challenge binder. Once you have this information, calculate the number of greenhouse gas emissions the vehicles produce in one kilometre, then figure out how much it produces in 10,000 kilometres – the average amount driven by every vehicle in Canada each year. The charts on your hand-out will show you how to do the calculations requested above.

Suggested Sharing: Once you've done the calculations share the results. In your unit discuss how you can inform people in your community about what you've learned. Perhaps you can set up a booth in the mall or library with a bulletin board showing different sizes of vehicles and how much they emit, or you could do a short presentation for the other students in your school. The possibilities are only limited by your imagination!

2. Idling Investigator

Idling a vehicle for 10 minutes a day uses an average of 100 litres of gas a year. A recent study suggests that in the middle of winter, Canadians idle their vehicles for a combined total of more than 75 million minutes a day – equal to one vehicle idling for 144 years! With the cold winters in the North, lots of people think that that they need to warm up their vehicle for a long time before driving, but according to manufacturers it's best for a vehicle to idle for no more than 30 seconds. If every driver in Canada avoided idling for just five minutes in a day, we would prevent more than 4500 tonnes of greenhouse gases from entering the atmosphere. One easy way to reduce greenhouse gas emissions is for grownups to warm-up their car for only 30 seconds in the winter while they clear snow and ice from the windshield and to turn off the car when they are stopped in one place.

During one week calculate how much time your parents idle, in their largest vehicle, or the vehicle they use most often. Using the chart entitled *Calculating Greenhouse Gas Emissions from Vehicle Idling* given to you by your leader (**APPENDIX C**), figure out how many greenhouse gas emissions your family produces from idling every week and every year. Learn 3 different reasons why idling is bad for the environment then create an anti-idling poster.

Suggested Sharing: Ask for permission to put your poster up in at your school, or in a place where parents will see it. Alternatively, approach a shopping mall or gas station with the other girls in your unit and ask if you can put your posters up there.

3. Tired Tire Detective

When the tires on your parent's vehicle are not fully inflated their vehicle burns extra gas and produces more greenhouse gas emissions. If you can remind your parents to check the tire pressure and encourage them to tune up their vehicle regularly you can reduce your greenhouse gas emissions by 100 kg per person per year!

Ask an adult to show you how to check tire pressure and see if you can find the number inside the car that tells you how much pressure the tire should have. Did your tires have the correct amount of pressure? In your unit find out how many people had the correct tire pressure and how many had to add air. Discuss what you can do to ensure that your family always drives with the correct tire pressure. **APPENDIX C** includes background information to properly check tire pressure for your parents.

4. Zero Emission Investigator

For every six kilometres that you take the bus instead of walking, you reduce 1 kg of greenhouse gas emissions. When you carpool you reduce the number of trips that people have to make in their own vehicle and that means that you reduce greenhouse gas emissions. When you walk or cycle you produce ZERO greenhouse gas emissions!

Make a map showing all of the regular places you drive with your parents or guardians, i.e., school, grocery stores, libraries and community centres. Using a different colour marker, identify where you could carpool with others, take the bus, walk, or bike so your parents can reduce the number of trips they make to drive you somewhere. Share your map with the other girls in your unit and tell them how you will reduce your trips by 2 trips a week. Track your success over the next two weeks, then tell your unit if you were able to reach your goal and how you did it.

Find out how many greenhouse gas emissions you reduced by carpooling, walking, cycling or taking public transport by referring to the chart: *Calculating your travel greenhouse gas emissions* (**APPENDIX C**). Using a map, figure out how many kilometres you walked or cycled to your destination.

a. On the chart for calculating emissions, look up a vehicle similar in size to your family's vehicle. Find out how many grams of CO_2 emissions your car produces per kilometre.

b. Multiply this amount by the number of kilometres you walked or cycled. This is the amount of emissions you saved. If you carpooled multiply the emissions by the number of kilometres you drove then divide this amount by the number of people in the vehicle. If you travelled by bus you should refer to the chart on public transportation (**APPENDIX C**) to calculate the emissions you saved.

c. Using the number you calculated, determine how many emissions you will save in a month and in a year.

d. Present your results to your family and to the other girls in your unit.

Note: Be sure to ask your parents permission before agreeing to carpool with other grownups.

You can use the table below to help you with your planning.

Tracking Table for Zero Emission Investigator

Using the table you can track how you get to school, your friends house, Girl Guides, and your other activities. Fill out the table every day for two weeks, then pick two times during each week to carpool, take the bus, walk, or cycle instead of getting a ride.

Sample Table

Destination	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
School	carpool?	bus?	walk?			x	x
Friends							
Sports/ Dance							
Guides							
Other:							

Alternate Activity for Sparks and Brownies

This activity should be completed with your whole Unit. The instructions below are for your Unit leader.

Week 1: Have girls raise their hands to identify the number that were driven to school, Girl Guides, and other activities, **that day**, exclusively by their parents. Discuss as a unit other ways for the girls to make these trips. Set a goal for reducing the number of trips for the day of your next Unit meeting.

Week 2: Have girls raise their hands to identify the number that were driven to various destinations that day. Compare these results with the previous week and with trip-reducing goals.

This activity can be repeated for several weeks if desired.

Note to Leaders: You may not want to choose this activity if there are girls in the unit who are not able to participate.

1.3 Waste SLEUTH Module

Waste SLEUTH Background

Did you know that garbage produces greenhouse gas emissions? Everything we use and throw away took energy to produce. So if we reduce what we use we produce less garbage and use less energy that creates greenhouse gas emissions. For example, when you buy something you need, you can choose not to get a plastic bag or use a bag you brought with you from home.

After we reduce what we use, what happens when something gets worn out? Before it becomes garbage, maybe there's another use for it. For example, old clothing can go towards making a quilt, or a rag rug, or a cloth bag. And after we reduce and reuse, we should always recycle whatever we can. All three help us reduce garbage, energy and climate change.

When you toss kitchen scraps and yard waste in the garbage you are throwing out what is known as organic materials. When they decompose in a landfill, organic materials, like grass clipping and apple cores, produce methane (M), which is one of strongest greenhouse gases.

You can avoid putting organic materials in the garbage by composting. This is when you separate organic materials from the rest of your garbage so that it can be processed into fertile soil. This is really just a form of recycling. In many municipalities (e.g., Whitehorse, Toronto, Halifax), it is easy to compost. You can drop your organic materials off in a special area of the landfill, participate in the city compost program, or build your own backyard compost.

Although composting is easy, people continue to throw organic waste in the garbage. In 2000, Canadians generated over 31 million tonnes of waste – over 1 tonne per person! 23 million tonnes were sent for disposal – imagine 21 football fields piled 1km high with garbage! And just think, 70% of what we throw in the landfill could be composted or recycled.

In the Waste SLEUTH module you will discover how much of the garbage you and your family produce could be composted or recycled and learn what you can do to reduce the amount of garbage you produce.

After completing the Waste SLEUTH Module you will be able to:

- List 8 ways that you can reduce the amount of garbage that you produce
- Identify what percentage of your garbage could be composted or recycled
- Describe what is done with waste in your community

Waste SLEUTH Description

To complete the Waste SLEUTH Module you will need to complete 1 of the 6 activities listed below.

1. Sort

Take a look in the kitchen garbage container. Are there compostable materials in there? What about recyclables? Estimate how much of your kitchen garbage is compostable, recyclable and garbage. What about the bedrooms and living room? For a more advanced inspection, put on a pair of gloves, then take a full garbage bag and examine the contents. Empty the contents and sort them into categories of compost, recycling, and actual garbage. Weigh or estimate a percentage of each category and find out how much garbage you are throwing out. How much could be recycled or compost? **Note**: be sure to ask your parents for permission before going through the garbage.

Write down your discoveries and share them with your group leader and your parents.

2. Divide and Calculate

Look in your lunch bag. Are you using reusable containers for your lunch? Check out your class at school. How many of your classmates bring their lunch in a reusable container? Try to figure out how many bags of garbage your class generates from their lunches in one day. What about in a week or year? Estimate how many bags of garbage would be produced from the lunches of everyone in your school? Compare your estimate for both your class and the school with those of other girls in your unit, and find out why they estimated more or less than you.

3. Waste Tour

Take a trip to your local recycling centre, composting facility or landfill. Have an expert tell you about waste in your community and how to best deal with it. Create a drawing or story about your trip and share it with your leader and your unit.

4. Global garbage

Read an article or look at pictures from another country on how they dispose of their waste. Find out how waste is dealt with in your community. Describe to your unit how it is different than in your community and if it is better or worse.

5. Composting Part I

Build a home composter or start a worm composter ("vermiculture") using the instruction sheets in **APPENDIX D**. Describe the process that you used to the other girls in your unit. If you're not already participating in your municipal composting program (e.g, curbside collection in Whitehorse), help your family set up a sorting system at home and try it out for a month.

6. Composting Part II

Find out how compost is produced from fruits and vegetable scraps and yard waste. Create a drawing or describe in words this process. If compost is produced at your municipal facility (e.g, Whitehorse), describe the process that is used.

Note to Leaders: To demonstrate that the girls have done these activities, we've suggested they do a presentation to the rest of the Unit. You may have other ways for the girls to demonstrate they've done an activity. The Passport is for girls to keep track of their progress by having their Leader or guardian check off completed activities.

1.4 Experiment SLEUTH Module

Overview for Leaders

Science Experiments are a great way to learn hands-on what is going on with climate change. Here are a few experiments that explore some of the issues with climate change.

Climate change is affecting almost every natural system on the planet – forests, lakes, rivers, ocean currents, weather patterns, agriculture, insects, and of course people! Below are four examples of science experiments that investigate climate change. Feel free to modify these experiments or to introduce others that you know of.

To complete the Experiment SLEUTH Module, girls only need to complete 1 of the 4 experiments.

SLEUTH Experiment #1: BUILD YOUR OWN GREENHOUSE EFFECT

SLEUTH Experiment #2: WHEN THE ICE MELTS

SLEUTH Experiment #3: STORMY SEAS

SLEUTH Experiment #4: BEARLY ANY ICE

In *Experiment SLEUTH* you have the opportunity to explore these concepts through hands-on experiments that let you closely observe the processes that are affecting our climate. The key to success in this module is to observe very carefully. *What do you see? What do you hear? Do you smell anything different? How does what you're observing in the experiment compare to other things you've seen or heard about in the "real world" or on earth?* These are all important questions that you should keep in mind as you embark on the *Experiment SLEUTH* module.

Leaders should select experiments that are appropriate for the level of their unit. Older girls could be encouraged to do the experiments on their own or in small groups.

SLEUTH Experiment #1:
BUILD YOUR OWN GREENHOUSE EFFECT

Before you Begin

Where does the term "greenhouse effect" come from? Well, picture a greenhouse, built with walls of glass or clear plastic. As sunlight passes through the walls, its heat is absorbed by both the soil and by the plants. Some of the heat is radiated back into the air, warming the greenhouse. The walls keep the warm air *inside* the greenhouse.

A similar trapping of heat happens in the earth's atmosphere. Sunlight passes through the atmosphere and is absorbed by the earth's surface. Some of that heat is later radiated back into the air where some of it is trapped by the atmosphere. Without the atmosphere, earth's temperature would average about –18C. This warming from heat-trapping gases is called the "greenhouse effect". Unfortunately, burning fossil fuels is increasing the greenhouse effect too rapidly. This is putting the Earth out of balance and causing climate change.

In this Greenhouse Effect Experiment, there are two thermometers. One is exposed to the air in the room and stays at room temperature. The other thermometer is in a sealed jar which creates a greenhouse effect. The air trapped in the jar is unable to circulate to the rest of the room and as a result the air gets warmer and warmer.

Once you complete the GREENHOUSE EFFECT EXPERIMENT you will be able to:

- Understand what the greenhouse effect is
- Discuss what could happen when the greenhouse effect is increased
- Draw and interpret a simple graph (optional)

Special Note: This experiment can be simplified for younger groups. Simply omit the graph-making elements of this exercise. Instead, see how fast some ice cubes in a small dish melt in the greenhouse and outside the greenhouse.

Time: 1–2 hours

Materials

- two small thermometers (alcohol – NOT mercury – thermometers);
- one large jar with a lid (large enough that the thermometer fits inside);
- heavy black construction paper or Bristol board;
- one clock or watch
- cardboard to makes stands for the thermometers
- rubber bands
- bright desk lamp or sunny window
- graph paper (one piece per person)
- ruler – one per person
- pencil
- at least two coloured pens per person
- worksheet – this will be provided by your leader and can be found in **APPENDIX E** of this binder

Description

You will set up a simplified model of the earth and the greenhouse effect. By comparing temperatures inside a jar to temperatures outside the jar, you will be able to draw conclusions about how greenhouse gases are affecting the earth.

Procedure

1. Divide into groups and get your worksheet from your leader.
2. Use strips of cardboard and a rubber band to make a teepee to hold one of the thermometers up off the ground. Your cardboard tepee needs to stand up on its own. The thermometer should not be in direct light during the experiment, but you do have to be able to read it.
3. Make the second thermometer stand.
4. Make a black construction paper "L" and put it inside the big jar so it covers the bottom and the back of the jar (the side away from the light). Make another "L" just like the first one.
5. Place one of the thermometers inside the jar on the black "L" and put the lid on the jar.
6. Place the jar in a sunny window or beside a desk lamp. Place the second thermometer on the second black "L" next to the jar. Be sure that both thermometers are shaded from direct light by the cardboard to get an accurate reading.
7. Wait for approximately three minutes so the thermometers will be giving accurate readings. Record the initial temperatures from both thermometers.
8. Record the temperatures on the worksheet every 10 minutes for one hour.
9. Plot a line graph with both sets of data on the same axes (temperature on Y, time on X). See the example below. If you are not sure how to make a graph ask your leader.
10. Note about graphs: Line graphs can be used to show how something changes over time. They have an x-axis (horizontal) and a y-axis (vertical). Usually, the x-axis has numbers for the time period, and the y-axis has numbers for what is being measured. The data that gets plotted are called "values." Line graphs are useful for plotting data that has peaks (ups) and valleys (downs), or that was collected in a short time period.
11. Discuss the results with the other girls in your unit:

Questions

- Why is it hotter inside the jar?
- What would cause the temperature in the jar to change at different times?
- In what ways is our mini-greenhouse like the earth's atmosphere? In what ways is it different?

Guide to answers are in **APPENDIX E**.

SLEUTH Experiment #2:
WHEN ICE MELTS

Before you Begin

The Antarctic and Greenland are covered with large, heavy sheets of ice. Other places like the Yukon have ice masses in the form of glaciers on them. When land-based ice melts, more water flows into the sea and sea level rises. There are also huge amounts of the Earth's surface covered in floating ice like the Arctic Ocean. Icebergs in the ocean are considered sea ice, although most of them are made up of broken off bits of land ice.

We all know that when you heat ice, it melts. People are already noticing freezing happening later in the fall and earlier spring break-ups on rivers, lakes and even around the Arctic Ocean. When ice and snow on land melt, water levels in lakes and rivers rise, sometimes causing floods. Sea ice is breaking up earlier, thinning out, and covering less ocean surface during the summer months.

Less ice means it's harder for people and animals to get around during the winter. When ice is thinner, it makes travel more dangerous. More open water along the Arctic coast, means more storms and waves crashing against the shore. When you add that to melting permafrost, you can get collapsing coastlines. Some communities located on the coast may have to plan for big changes.

- Melting sea ice makes conditions for animals very difficult:
- With each week earlier that the sea-ice melts in spring or later that the sea-ice freezes in fall, polar bears lose 10kg of weight.
- As the ice breaks up into ice floes, the bears have to swim farther between the floes to hunt seals, burning up more energy.
- With each week earlier that the sea-ice melts, the seals have less opportunity to raise their pups.
- The diatoms and algae that form the bottom of the food chain flourish at the edges of the sea-ice, where the sunlight and the water interact with the ice. As the summer sea-ice disappears, there may be fewer diatoms and algae, causing a weakening of the whole Arctic marine food chain.
- If all the Arctic summer sea ice disappears by 2050, which the computer models are predicting, the polar bears will have no ability to hunt for seals at all. Without any ice, seals and walrus will be forced to risk having their pups on land, and to live around the shores.

The ice in the Arctic is shrinking as the temperatures in the north increase. Recent studies show that the sea ice in the Arctic is both shrinking and getting thinner. It's like a human losing weight and getting shorter at the same time.

In 2007, sea ice in the Arctic covered about 40% less area in the summer than it did in the 1950s. The ice was also estimated to be about 80% thinner in the late summer and early fall than it was in recent decades. That's quite the diet!

Once you complete the WHEN ICE MELTS EXPERIMENT you will be able to:

- Explain what happens when land ice melts
- Explain what happens when sea ice melts
- Describe which has more impact on rising sea levels
- Describe the impact of melting ice on people and animals in Canada's north

Materials

- A watertight container (like a plastic tub, large jar or an aquarium)
- Some sand or stones
- Ice cubes
- Water
- Ruler
- Figurines of polar bears or scraps of paper to represent them

Procedure

1. Fill tank with water
2. Use the sand or stones in one corner to make some land that's above the water; the water around the land, represents the oceans
3. Place some ice cubes into the tank so they are floating in the water (but not on the land or touching the bottom of the container)
4. Measure the water level with a ruler. Mark the water level with tape or ink on the side of the tank
5. Crumple up a few small pieces of white paper (to represent polar bears) – or find or make your own polar bear figurines – and place these on the ice floating on the water and on the land
6. When the ice cubes have melted, measure with a ruler and record the new water level and mark it on the side of the tank.
7. Now put some ice on the land to see what happens
8. When all the land ice has melted, measure and record the new water level and mark it on the side of the tank.

Questions

- What happens to the water level in the container when the sea ice melts?
- What impact do you think the melting of sea ice will have on sea level?
- What happened to the polar bears when the sea ice melted?
- What happens to the water level in the container when the land ice melts?
- What impact do you think the melting of glaciers and other land-based ice masses will have on sea level?
- Have you ever been on a frozen lake? What happened when it began to melt? If you depended on the lake as a bridge to get to the other side for your food source, what might happen when the ice melts?
- What impact might melting ice have on communities in the north and in the rest of the world? Discuss openly as a group.
- What impact might melting ice in the north and rising sea levels have around the world? Discuss as a group.

Guide to answers are in **APPENDIX E**.

SLEUTH Experiment #3:
STORMY SEAS

Before you begin

Erosion is comprised of physical and chemical processes that wear down rocks and soil. Running water is a major cause of erosion. Stones carried with a river's current scour and bump against the banks and beds. Ocean waves and currents erode rocky cliffs and sandy beaches, especially during storms. When an area receives more water than the ground can absorb, the excess flows to the lowest level, carrying loose soil with it. Erosion causes constant changes in land.

The effects of climate change include storms, changes in permafrost, flooding, sea level rise, and waves, all of which can increase erosion rates. Coastal communities are particularly susceptible to erosion from ocean waves. In the North when sea ice melts more open water is created, which means more water lapping and crashing against the shore. The erosion caused from these waves can eat away at the coastline, destroying habitats and homes.

After finishing the WAVE EROSION EXPERIMENT you will be able to:

- Define the term erosion
- Describe the impact that wave erosion can have on the coast

Materials

- 1 large rectangular container (approximately 8" x 12" x 6")
- 1 wooden block (4-5" 2x4 for example)
- Sand
- Water
- Ruler
- Watch or clock with a second hand
- Paper and pencil to take recordings/make sketches
- Toy houses (optional)

Procedure

1. Fill the container with about one inch of water and let stand until still.
2. Add sand to one end of the container until it rises above the water level to simulate a coast and a beach. Make sure to only add it to one end. Place houses on the sand above the water line. Be creative. Add whatever elements of a village you would like to see (people, trees, animals, etc.)
3. Take a measurement of how high the sand level is and record it on your paper. Also, make a sketch of your beach profile.
4. Place the wooden block in the opposite end of the container and move the block back and forth to create SMALL waves, just enough to move the sand a little bit. Do this for ten seconds and then stop.
5. Measure the sand level now and record the new measurement, then make a sketch of how the new beach looks. Is the beach different than before the waves?

6. Repeat the wave procedure once more, but make the waves slightly larger this time. Take another measurement and make a new sketch after thirty seconds. Are your findings different than the previous time?

Questions

- What did you observe?
- In your own words explain the term erosion
- Have you observed a similar process in the banks of lakes, oceans or rivers? How was this process similar or different?
- What factors might influence the type of impact that the waves have on the coast?
- What consequences might wave erosion have on habits and communities in the coast?

Guide to answers are in **APPENDIX E**.

SLEUTH Experiment #4:
BEARLY ANY ICE

Before you Begin

The polar bear is an international symbol of the Arctic and is the largest land-based carnivore in the world. Polar bears are very important for northern people.

Climate change is already having an impact on polar bears. Warming temperatures are reducing the thickness of sea ice as well as the length of the season in which the bears can use the ice for hunting. Bears depend almost solely on seals for their food source and hunt them on the sea ice. Polar bears are unable to capture and kill seals in open water.
Across the Arctic, the polar bear's hunting season has been shortened by several weeks over the last 20 years due to earlier ice melts. This is having a drastic impact on the bears. Bears are showing reduced weights, and fewer cubs are surviving. During the summer, when food sources are almost non-existent, bears have survived by using the fat stores built up during the winter. Now, however, many communities are struggling with hungry bears wandering into their towns and creating hazards for humans. The reduction of sea ice could lead to the extinction of polar bears.

Although this is more of a game than a formal scientific experiment, it teaches a valuable ecology lesson and introduces the concepts of population dynamics and the threats of climate change. It is a very fun game, similar to tag, that simulates the prey and predator relationship between polar bears and seals. It demonstrates the drastic impact of global warming by linking the amount of sea ice and length of season of sea ice to the survival of the polar bear.

Provide the girls with the *Bearly Any Ice Data Chart* in the **APPENDIX E** and collect the necessary materials for the game.

This lesson was adapted from Project Wild, Canadian Wildlife Federation, Ottawa, 1992.

Time: 1.5–2 hours

Setting: Playing field or gym

Materials: Copies of handouts, 10 food tokens per girl (pieces of cardboard), gym vests or other identifying devices, whistle, 8–10 hula-hoops, 4 traffic cones, pencil and paper, student handout (data sheets), graph paper

Description of Activity:

1. Identify girls as either polar bears or seals. About two thirds of the girls can be seals and one third can be polar bears. Polar bears can wear gym vests or other identifying markers.
2. Each seal is given 10 food tokens to represent the seals caught by the polar bears.
3. In a gymnasium or playing field, use the traffic cones to identify the ends as safety zones for the seals.
4. Place four hula-hoops in the open area. The hula-hoops represent areas of open water that are temporary safety zones for the seals.
5. Record the number of seals and polar bears at the beginning and end of each round on the data chart.
6. Begin the game with all the seals starting at one end of the playing field and all the polar bears scattered around the playing field. The seals will try to run to the other end of the playing field without being tagged by the polar bears. The seals can use hula-hoops as temporary safety zones from the polar bears for a maximum of five seconds before they need to move on. When a seal is tagged, they must give one of their tokens to the bear. A seal must not be tagged twice in a row by the same bear. Once a seal runs out of tokens, they are considered to have lost their life and they must move over to the side of the playing field. After all the living seals have made their way to the other end of the playing field, the leader signals for the seals to run back to the other end using a whistle blast. One round of the game runs six lengths of the gym or field. That equals one season of hunting for the polar bears.
7. At the end of a round, the polar bears are to count the number of tokens collected. In order for a polar bear to survive the season, at least four tokens must have been collected. Deceased polar bears become seals during the next round. Polar bears that collect seven or more tokens have found enough food to reproduce. Reproducing bears select one of the dead seals (or a live seal if there are no dead seals to be had) to be their cub. The cubs will not be able to hunt during their first two seasons. They will have to follow close behind their mother and hope that enough seals are caught for them both to survive. A mother will need to catch a total of six tokens to ensure that she and her cub survive the season. Record the number of polar bears and seals that survived as well as the number of cubs born at the end of each round or season.
8. At the beginning of the each round, replenish the seals' tokens to a total of ten tokens by collecting the tokens from the polar bears. All girls get back in the game and are involved at the beginning of each round.
9. Repeat the game again as played before. Remind the cub polar bears that they are unable to catch seals and must only run behind their mother polar bear. At the end of the round, the polar bears count to see if they have collected

enough tokens to survive – at least four for lone polar bears and six for both a mother polar bear and her cub to survive. If a polar bear has collected less than six tokens but has four or five, the cub has starved and will be returned to the seal population for the next round. If the polar bear has collected less than four tokens, then neither the mother nor the cub has survived. Once again, record how many polar bears, cubs, and seals survive. Polar bears that did not have a cub during this round will get a cub if they have seven or more tokens, just like in the first round.

10. In the next round, girls are introduced to the conditions that are changing due to climate change. Two changes can now be applied to the game:
    a. Increase the number of open water safety zones for the seals by increasing the number of hula-hoops on the playing field. Try adding three more hula-hoops to the playing area.
    b. Shorten the polar bears' length of hunting season by reducing the number of times the seals have to run back and forth from six to four.
11. Continue playing the game by increasing the number of hula-hoops and reducing the number of cycles for each season. When recording the data, be sure to also record what changes have occurred in the simulated ecosystem (increased open water, shortened hunting season). Since these changes will result in poor hunting for the polar bears, lower rates of polar bear reproduction and decreases in survival rates for the bears will follow. The game may be played until almost all the bears have died to show how climate change can lead to extinction locally or globally.
12. After the game, think about what happened to the bear and seal populations. If you want, you can graph the data you collected.

Handouts: (APPENDIX E)

- Handout for Girls: *Bearly Any Ice* Data Chart
- Handout for Leaders: *Bearly Any Ice* Question and Answer Key

2.0 TAKE ACTION

Reduce your GREENHOUSE GAS Emissions!

2.0 TAKE ACTION

TAKE ACTION Overview (for Leaders)

This is the second component of the Climate Change Challenge. The purpose of the **TAKE ACTION** badge component is for the girls to demonstrate and share how they and their families are cutting their greenhouse gas emissions and combating climate change.

This component consists of two modules:

- **2.1 INDIVIDUAL ACTIONS MODULE**
- **2.2 FAMILY ACTIONS MODULE**

> **To earn their TAKE ACTION badge, girls must complete either an individual or family module.**

Background information for this component can be found in **APPENDIX F** (Individual Action Pledge and Family Actions Pledge), and on the Girl Guides of Canada – Yukon Council website. **APPENDIX A** provides a list of websites with suggestions and background information for ways to cut greenhouse gas emissions.

TAKE ACTION Background

In **GETTING STARTED**, you discovered how we add to the problem of climate change by putting greenhouse gases into the atmosphere. In Canada, we create about half of our greenhouse gases when we travel in cars, trucks, planes and snowmobiles. We also produce a lot of greenhouse gases when we heat our homes because we usually burn oil or propane in our furnaces and heaters. If our electricity is produced by fossil fuels like diesel, we create greenhouse gas emissions every time we watch TV, play video games, turn on the lights or heat water for showers, dishes or laundry. Greenhouse gases are also produced when most of the food and "stuff" we use in our day-to-day lives is manufactured, processed and moved around.

On a person-by-person basis, Canadians put more greenhouse gases into the atmosphere than people in most other countries in the world! Canada produces about 2% of all the world's emissions – yet we only have about 0.5% of the world's population! It's time to go on a greenhouse gas diet!
If we can cut back our use of gas, oil, diesel and coal, we can cut back the amount of greenhouse gases we produce. The less you travel in a car, the less heat and electricity you use, and the fewer things you buy, the less greenhouse gases you put into the atmosphere… it's that simple.

In the Take Action component you will discover simple things that you and your family can do to cut down on greenhouse gas emissions.

After you complete the TAKE ACTION component you will be able to:

- Implement actions for reducing your greenhouse gas production
- Show others how they can reduce their greenhouse gas emissions

TAKE ACTION Description

In the TAKE ACTION component you can choose to do the Individual or Family Actions Module. If you do the Individual you need to complete 6 of the activities.

In the Family module there is a one-tonne pledge form that you can do with your family that will give you ideas on how to reduce your greenhouse gas emissions. Fill in pledge form given to you by your leader and bring it in to your leader when you have finished filling it out so she can see what actions you have chosen. Once your leader has seen your pledge form take it home and post it on your fridge so that your whole family will know what actions to support you in.

2.1 Individual TAKE ACTION Module

Pick 6 individual activities to complete the TAKE ACTION badge

- **Road Runner**

Road transportation is responsible for almost half of the average Canadian's personal greenhouse gas emissions. For every 4 km you *don't* drive, your family reduces *1kg* of greenhouse gas emissions. Reduce your greenhouse gas emissions by 10% — either by walking, bussing or biking to at least 1 out of 10 places where you usually get a ride. Use a sheet of paper to keep track of how many times you walk instead of getting a ride and present this to your leader. Once you've set an example encourage your friends and family to drive less, walk more and carpool.

- **Hot House**

Heating our home accounts for approximately 25% of greenhouse gas emissions. In the winter, lower the thermostat in your house before you go to sleep at night. Be sure to ask you parents how much you are able to turn down the heat. Use a calendar and check off the nights where you remembered to turn down the heat. At the end of the month count up how many nights that you turned down the heat and show the calendar to your leader.

- **Funky Foods**

The food that we buy in the supermarket often comes from a long ways a way. Trucks and planes emit many greenhouse gases transporting our food to the grocery store. When we have a garden in our backyard our food is steps away; we don't need to rely on food in the grocery store that is transported from thousands of miles away. Even better, plants absorb carbon dioxide, one of the largest greenhouse gas emissions.

Plant a garden in your yard, on your balcony, or in a community garden and you can reduce greenhouse gas emissions, while eating tasty and delicious food.

Suggested Sharing: Bring other girls in your unit to see your garden and explain how you take care of it, or bring some of what you have grown to a unit meeting.

- **Captain Compost!**

Nearly 70% of what we throw in the garbage could be recycled or composted. The organic garbage that we throw in the garbage produces methane, one of the strongest greenhouse gases. By reducing the amount you throw in the landfill, you can reduce your greenhouse gas emissions. Instead of throwing your fruit and vegetable peelings from your kitchen in the garbage, compost them. Less organic materials in the landfills means fewer greenhouse gases in the atmosphere. **Ask your leader for the handout on making compost (APPENDIX D).**

- **Energy Investigator**

Much of the heat generated for homes in the Yukon is produced by fossil fuels. That means when you heat your house you are producing greenhouse gas emissions. By ensuring that heat isn't escaping from your house you can reduce greenhouse gas emissions and save money.

Be an energy detective! Find out if there is heat escaping from your house. You can discover heat leaks by taking a feather or tissue and moving it around your windows. Does the tissue or feather appear as if it is being blown by a breeze? This means that air is escaping or that cold air is rushing in. Do the same test around your doors. Draw a picture identifying the heat leaks and share it with your parents. Then write down some ways that you can stop the cold air from coming in and the warm air from escaping and present your ideas to your leader. You can get some ideas on how to do this by visiting a building store with your parents and asking the clerk or looking on the internet. Make sure you have permission from your parents to use the Internet.

- **Very Veggie**

The energy required to produce the meat that we eat is much greater than the energy needed to grow meat substitutes such as beans and nuts. By decreasing your meat intake you are also decreasing your greenhouse gas emissions. There are many tasty vegetarian recipes that you can prepare that will provide you with the protein you need, without the greenhouse gas emissions. You can find easy to make vegetarian recipes on the internet or in recipe books. Prepare a vegetarian meal and share it with your unit or with your parents. Show the recipe you selected to your leader so she knows the recipe you tried.

- **Climate Club**

A fun way to share information about climate change and other environmental issues is to join a club. Become a member of an environmental club at your school -- *if there isn't such a club at your school, start one!*

Through the club you can do awareness-raising campaigns in the school and show other students how to reduce greenhouse gas emissions. You can start a school-wide recycling project, convince the school to do an energy audit, or set up a booth in your local mall to share information about climate change. You could also organize an environmental fair and invite different organizations to your school to share information and resources about environmental issues. The possibilities are limited by your imagination. Do a presentation for your unit about your environmental club and the different activities you have planned.

- **Packaging Pirate**

Most of the packaging on products ends up in the landfill. The more garbage we have, the more greenhouse gas emissions we have. Next time you go grocery shopping with your family buy products with less packaging and bring your own plastic or reusable bags. Make it a litter-free lunch too! Do a short presentation for the rest of your unit and tell them how you saved on packaging.

- **Lights Off!**

When our electricity is produced by burning fossil fuels like diesel and oil, we are producing greenhouse gas emissions every time we turn on the lights or switch on the TV. Remember to turn off the lights, computer, and TV when you leave a room – at home and at school. Keep track of how many times per day you remember to turn off the electricity, by using a calendar. Give yourself a star each time you remember to turn off the electricity. Try for at least two stars a day. At the end of the week show your tracking sheet to your parents and your leader.

- **Cool it!**

Many of our greenhouse gas emissions come from heating our homes, because the fuel we use for heating often comes from fossil fuels. You can reduce greenhouse gas emissions by reducing the amount you heat your home. Next time you are feeling cold, put on a sweater instead of turning up the thermostat. Draw a picture with your favourite sweater. Underneath the picture write down the number of times you used the sweater in a week instead of turning up the heat. Show the picture to your leader.

- **Catch it!**

We can reduce the amount that we need to heat our homes and reduce greenhouse gas emissions when we ensure that warm air doesn't escape from our home during the winter. An easy way to do this is to ensure that you close all windows and doors well during the winter. Give yourself a point every time you close the doors and windows properly during the winter. To complete the activity you need to earn 10 points.

- **Don't Scrap it**

By reducing the amount that we put in the landfill we can also reduce greenhouse gas emissions. Find out what you can recycle in your community. There is almost always a place to recycle paper and pop cans and in some places you can also recycle plastic. Set up a separate bin in your house for papers, pop bottles and other recyclables, and recycle these items instead of throwing them in the garbage. Ask you parents to sign your passport to show that you are recycling. Do the same at school, and ask your teacher to write a note or sign your passport.

- **Build it!**

The more people we can get involved in reducing greenhouse gas emissions, the healthier the climate will be. Ask your teacher at school if the whole class can participate in a greenhouse gas emissions reduction project. Talk to your class about climate change, and work with them to decide on one project that you can do together such as recycling, fixing energy leaks in the classroom or an anti-idling campaign. Talk to the other girls in your unit about the project that you did with your class.

- **Express it!**

Express yourself! Write, paint, draw or make a video – use your imagination to express how you feel about nature.

- **Bad Bananas**

The transportation cost to bring food to us in the North is enormous as is the amount of greenhouse gas emissions. Just think of the pollution produced to bring an orange from Florida or a banana from Ecuador. You can cut down on greenhouse gas emissions by buying local food, especially in the summer when farmers markets are filled with local produce. The next time you go grocery shopping with your family, choose foods grown as close to home as possible. You'll help reduce pollution from food transportation.

- **Fill it up!**

Taking one trip with several people in the same vehicle produces far less greenhouse gas emissions than if everyone were to take their own vehicle. Find out if there are other people in your Girl Guide Unit that drive the same way as you to get to guides, and ask your parents if it's ok if you get a ride with them– or offer a ride to the other guides. Encourage your parents to carpool as well, by finding someone they can catch a ride to work with. Talk to the other girls in your unit about how you arranged to carpool to different locations. **Note:** Be sure to ask your parents permission before agreeing to carpool with other grownups.

- **Short Showers**

Often the system that we use to heat water for our showers produces greenhouse gases because it uses fossil fuels. By cutting down the length of your warm shower you can reduce greenhouse gas emissions. The next time you have a shower record the time it takes. The following day see if you can reduce the time of your shower. Continue this for a week trying to reduce greenhouse gas emissions.

- **Play Time**

One of the best ways to reduce greenhouse gas emissions is to refrain from turning on lights and appliances. An easy way to do this is to play outside. Find a game to play with your friends or family that does not produce greenhouse gas emissions. Share your game with the other girls in your unit so that they can play it as well.

- **Environmentally Friendly Transport**

Pick a Girl Guide outing that your unit will be attending over the next year. Reduce the number of cars used to get to the event by planning carpools, using public transit, or a "walking school bus".

- **Walk the Talk**

Participate in the *Walk to School* program at your school and ask your school to give you a certificate of participation to present to your leader.

- **Tricky Transport**

Transportation is the number one way that we produce greenhouse gas emissions. Plan a trip with your friends and family that produces little to no greenhouse gas emissions. You could carpool, take public transport, ride your bike or walk to the location. Write a short story about your trip and present it to your leader.

- **Idle Free**

A recent study of Canadian driving habits indicated that, all together, Canadians idle their cars for a total of 75 million minutes a day in the winter! That is the same as idling one car for 144 years! Even in warmer summer weather, we still idle about 46 million minutes a day. Imagine all the unnecessary greenhouse gas emissions produced by idling. In cold weather it is important to plug in a vehicle, which helps it warm up faster. You only need to idle the vehicle for 30 seconds while you help clear the windshield of snow and ice. Tell five grownups who are idling, three different reasons why idling a vehicle is bad for the environment and what they could do as an alternative. Ask grownups to sign your passport to indicate that you have talked to them about idling.

- **Green Event**

Cut down on waste at your Girl Guide events. Pick a Girl Guide event where your unit will take charge of collecting recyclables and compostables. Your unit should also be involved in the planning of the event to reduce energy, minimize waste and disposable products being used.

2.2 Family TAKE ACTION Module

One-Tonne Challenge Action Plan

Take home the One-Tonne Challenge Action Plan (**APPENDIX F**) and fill it out with your family. The plan helps you determine what changes you can make in your home to reduce your greenhouse gases by one tonne. The table tells you how to reduce greenhouse gas emissions. Your leader will provide you with the forms, which are located in **APPENDIX F** of this binder. You can also find the form on the Girl Guides of Canada – Yukon Council website and the City of Whitehorse One-Tonne Challenge page.

If you have already completed this as a school project, bring it in and show your Unit what your Action Plan for cutting greenhouse gases is.

3.0
Create

Use Your Imagination!

3.0 CREATE

CREATE Overview (for Leaders)

This component includes two different modules: Crafts and Performance. The Craft modules consist of 4 different craft options.

Craft Activity #1: LIGHT SWITCH COVERS

Craft Activity #2: CLIMATE CHIME

Craft Activity #3: RECYCLED PAPER

Craft Activity #4: RECYCLED BAG PAINTING

The Performance Module consists of 5 different options.

Performance Activity #1: SHADOW PUPPET

Performance Activity #2: RAP SONG

Performance Activity #3: POEM

Performance Activity #4: CHARADES

Performance Activity #5: MURAL

Note: The complexity of the Craft and Performance Modules can be adjusted according to the age of the group.

To earn their CREATE badge, girls need to complete 1 activity from the Craft module and 1 activity from the Performance module.

CREATE Background

Once you've learned about climate change one of the most important things that you can do is to share what you've discovered with others, and encourage them to reduce their greenhouse gas emissions. A fun way to encourage environmentally friendly behaviour is to create crafts that will remind people to turn off their lights and to reduce, reuse and recycle. For those of you who like to perform you can also inspire others through songs, poetry and acting.

In this component you will learn how to make eye-catching crafts and produce thought-provoking performances that will encourage others to reduce their greenhouse gas emissions and join the One-Tonne Challenge.

When you complete the CREATE component you will be able to:

- Make a fun craft or develop a dynamic performance that inspires people to reduce their greenhouse gas emissions.

3.1 CREATE Craft Module

CREATE CRAFT #1: LIGHT SWITCH COVERS

Things to know about Light

Home electricity is a huge source of greenhouse gas emissions, particularly when coal or diesel is used to generate the power. These fun light switch covers remind us to shut off the lights when we're not using them and to be respectful of how much light we use! At the same time, we should also be looking at the type of light bulb being used. If every household in Canada changed just one traditional incandescent light bulb to an ENERGY STAR® -qualified compact fluorescent light, Canadians would save over $73 million in energy costs every year. Switching light bulbs would also reduce greenhouse gases by 397,000 tonnes per year – the same as taking 66,000 cars off the road!

By doing the Light Switch Cover Craft you will:

- Learn how to make and use light switch covers
- Draw your families' attention to light switches and encourage everyone to turn off the lights when they're not being used.

Light Switch Craft Description

Paint your own light switch cover with a colourful, creative design that helps remind you to shut off the lights when you're not using them. This is an activity that can be completed by the whole unit. Have your parents install the light switch cover with a foam gasket. Foam gaskets provide additional insulation and are available at hardware stores.

Light Switch Craft Materials

- Light switch covers (at any hardware store)
- Foam gasket (at any hardware store)
- Paints
- Paint Brushes
- Glue
- Old magazines (for images to cut out)
- Craft odds and ends (for gluing – like googlie eyes, sparkles etc.)

CREATE CRAFT #2: CLIMATE CHIME

Things to know about Climate

Wind patterns, in some areas of Canada, might change with global climate change. More severe weather, different weather, and warmer weather are all things that might affect your area. The Climate Chime reminds you to think about what's happening to the world's weather every time you hear it ring out in your garden!

One girl's garbage is another girl's treasure. It's important to try and find uses for things that our society is trying to throw away.

By doing the Climate Chime Craft you will:

- Learn to make a wind chime
- Find uses for recycled material
- Discuss and share the message about climate change and effects on weather

Climate Chime Description

Craft with your friends and unit leaders unique and attractive wind chimes made from recycled objects. Tell the unit to bring in any metallic or decorative junk or unused items from their house. This wind chime can be decorated with climate change, global warming, or strange weather as the idea or theme behind it.

Possible Materials for the Climate Chime

- Old cutlery
- Beads
- Fishing line
- Flexible wire
- Wire cutters
- Branches
- Old pieces of driftwood/riverwood
- Screw in hooks
- Old junk
- Glue
- Almost anything goes: as long as the objects are large enough and make a noise when banged together

CREATE CRAFT #3: MAKE RECYCLED PAPER

Background

Plants and trees breathe in and absorb carbon dioxide as they turn the sun's energy into food through a process called photosynthesis. Plants also breathe out some carbon dioxide when they are living. On the whole, plants and trees absorb more carbon dioxide than they release to the atmosphere when they are growing. This means they help to take some of the extra carbon out of the atmosphere.

Carbon dioxide is one of the most significant greenhouse gases. When we cut down trees we are destroying one of the few elements of our environment that has the potential to clean up greenhouse gas emissions and reduce some of the impacts of climate change. Buying recycled paper, re-using bags instead of accepting new paper bags at the grocery store, and printing on both sides of a sheet of paper are just a few things that you can do to reduce the number of trees that are cut down for human use. *Can you think of anything else you can do to conserve our forests?*

In this activity you will learn how to make your own recycled paper. New paper is made from cellulose, which is in plant fibers. The cellulose is made by cutting down trees, grinding them up, and dumping the wood pulp in acid. Recycling uses cellulose over and over again, which saves trees from being cut down. Recycling about 54 kg of newspaper will save one tree. Recycling can also save energy because making recycled paper uses **30% to 40% less energy** and produces **70-80% less air pollution** than producing paper from new wood pulp.

In Canada, paper and paper products account for more than one third of the materials discarded into Canada's municipal waste stream. The Canadian government tries to encourage people to recycle some of this paper. Right now, it is estimated that less than one quarter of the 6 million tonnes of paper and paperboard used annually in Canada is recycled.
Of course, not all the paper we use can be recycled: approximately 20 percent is unavailable for recycling, for a number of reasons. Some is destroyed through fire. There are some paper products that we want to preserve permanently, like books or roofing materials. There is also some paper that is so severely contaminated that recycling is impossible or impractical. Still, a substantial proportion of the millions of tonnes of paper products entering Canada's waste stream every year could be recycled.

You can help reduce wasted paper by participating in a local recycling program in your neighbourhood or at school. You can also make your own recycled paper!

By making Recycled Paper you will:

- Learn about different materials that can be used for making paper
- Make recycled paper

Materials

- an old picture frame
- a piece of nylon screening, a little bigger than the frame

- stapler
- scrap writing paper of different colours and textures that was going to be thrown away.
- a bowl or a deep tray
- a blender
- kitchen cloths
- a sponge
- a plastic wash basin big enough for the picture frame
- water

Procedure

1. Soak the scrap paper in the bowl full of warm water.
2. Staple the screening to the frame.
3. Take the scrap paper, tear it into small pieces, and put it in a blender half-filled with water.
4. Blend the paper until you don't see any pieces of paper. This mixture is called pulp.
5. Pour the pulp into the tray.
6. Dip the frame into the tray and scoop up some of the pulp onto the screen. Make sure that the screen is completely covered with pulp.
7. Remove the frame from the tray. Put a kitchen cloth on it and flip it over so that the paper is now on a cloth on the table.
8. Use a sponge to soak up any extra water through the screen.
9. Very gently lift the screen up - YOU NOW HAVE PAPER!
10. Leave the paper to dry. If you want it to dry quicker, you can ask your parents to iron it for you.
11. If you like you can add other things to the pulp, like dried flowers, sparkles, orange peels, potato peels, broccoli, and anything that you can think of!
12. Use the paper in one of your other climate change projects.

Conclusions

The process that you followed is very similar to the way recycled paper is made. It is also similar to how new paper is made, except that the pulp comes from wood instead of from other paper. It is the fibres in wood that tangle together to make paper. If you used broccoli, then it would be the broccoli fibres that would tangle together.

You can use your homemade paper to write letters, make birthday cards for your friends and family or to write a climate change poem.

CREATE CRAFT #4: REUSABLE BAG PAINTING

Things to know about garbage

Disposable plastic bags are a huge waste of plastic and clog our landfills. In 2000, Canadians generated over 31 million tonnes of waste. Of this, 23 million tonnes were sent for disposal. Imagine 21 football fields piled one kilometre high with garbage! Think about how much packaging you go through and see if your new painted bag can help replace some of that trash.

By doing the bag painting craft you will:

- Learn to decorate a reusable bag
- Have a fun and colourful bag for doing your shopping

Description of the bag painting craft:

Develop a slogan with the other girls in your unit about reducing greenhouse gas emissions, and then paint a reusable cloth shopping bag with the slogan and other colourful images. Use your cloth bag to carry your things rather than using disposable plastic bags!

Materials for the Bag painting craft:

- Natural cotton bags
- Fabric paints
- Paint brushes

3.2 CREATE Performance Module

To complete the Performance Module you only need to complete 1 of the activities described below. You can do the activities individually or in small groups.

CREATE a Shadow puppet

Create and perform a shadow puppet play for your unit about taking action on climate change. Make your own puppets out of old socks and reused items. Use fluorescent light bulbs instead of incandescent. Will this make a difference? Why?

CREATE a Rap Song

Write a rap song about the positive changes individuals can do to make a difference on climate change. Perform the song in front of your unit or a group of parents and friends.

CREATE a Poem

Write a poem or story about the actions you and your family are doing to reduce greenhouse gas emissions. Post your writing on the fridge as a reminder of your commitments. Send the story or poem to your local newspaper, telling them who you are and why you are writing and perhaps they will publish your work.

CREATE Charades

Play climate change charades! Write down different actions you can take to reduce your greenhouse gas emissions on pieces of paper. Each of the girls in your unit can act out an action for reducing greenhouse gas emissions and the rest of the group can guess what the action is.

CREATE a Mural

Paint a mural with your unit or family and include all of the actions you have committed to doing to reduce your greenhouse gas emissions.

4.0 CELEBRATE & SHARE

Making a positive change!

4.0 CELEBRATE & SHARE

CELEBRATE & SHARE Overview (for Leaders)

This component includes three modules:

- 4.1 **LOCAL COOKING MODULE**
- 4.2 **OUTDOOR EXPERIENCE MODULE**
- 4.3 **SHARE THE MESSAGE MODULE**

The **LOCAL COOKING** and **SHARE THE MESSAGE** modules have been written for the girls. The **OUTDOOR EXPERIENCE** module is written for leaders.

> **To earn their SHARE & CELEBRATE badge, the girls need to complete 1 of the 3 modules.**

4.1 CELEBRATE & SHARE Local Cooking Module

Local Cooking Background

It was not so long ago that people made their meals either from what was available that week at local markets or from out-of-season home-canned, -smoked, or -pickled goods prepared earlier in the year by the family. Today, most Canadians eat an international diet. That means that most of our food is shipped and flowing to the supermarket from all around the world.

Locally grown food generally takes less fuel to ship, which means fewer greenhouse gas emissions from fossil-fuel burning ships, trucks, and trains. Locally grown food often tastes better too!

The amount of energy that goes into producing food is important to consider as well. Food that is heavily processed and that travels a long distance will use more energy and produce more emissions than simpler, closer to home food products.

After doing the Local Cooking module you will be able to:

- Describe the origins of different types of food
- Plan or make a meal that minimizes energy from food production and transportation.

Local Cooking Description

Activity #1: For Sparks and Brownies

Plan a meal with your family that uses as many local ingredients and as little processed food as possible. Make a list of all the ingredients you would use and where they are grown. Share your meal plan with your Unit.

Activity #2: For Guides and Pathfinders

Prepare a meal with your family that uses as many local ingredients as possible. How can you minimize energy in the preparation of your meal? The list below provides some examples; can you think of others? Share your meal plan and the energy-saving tips you used with your Unit.

Energy-Saving Tips for Cooking

- Use microwave oven, crock-pot, pressure cooker or toaster oven instead of a conventional stove or oven when possible. Microwaves reduce energy use by up to 75% compared to a stove or oven.
- Turn off oven a couple of minutes before cooking is complete. There will still be plenty of heat.
- With electric burners, you can turn off the burner just before the cooking is finished. The burner will continue radiating heat for a short while.
- Use the smallest pan necessary to do the job. Smaller pans require less energy.
- Use a lid to keep the heat in.
- With electric cook-tops, match the pan size to the element size. For example, a 6" pan on an 8" burner will waste over 40% of the heat produced by the burner.
- Keep the burner pans (the metal pans under the burners that catch grease) clean and shiny so they will reflect more heat up to the cookware. Blackened burner pans absorb a lot of heat, reducing burner efficiency.
- To reduce cooking time, defrost frozen foods in the refrigerator before cooking. Thawing frozen foods in the fridge helps to cool the refrigerator, and this saves energy as well.
- With conventional ovens, keep preheat time to a minimum. Unless you're baking breads or pastries, you may not need to preheat the oven at all.
- Try to avoid peeking into the oven a lot as you cook. Each time you open the door, a significant amount of heat escapes.
- Cook double portions when using your oven, and refrigerate or freeze half for another meal. It doesn't take as much energy to reheat the food as it does to cook it-not to mention the saved preparation time!

4.2 CELEBRATE & SHARE Outdoor Experience

Please note: The activities below are written for leaders. The activities described below should be led and organized by leaders.

Outdoor Experience Background

The idea behind these activities and games is to bring the girls outside to connect with the environment, the climate – the world we are trying to protect. It is important to feel connected to the land – to the plants and animals that live in our backyard – so that we can be firsthand observers of climate change, and more active participants who know more intimately what is at stake.

After completing the Outdoor Experience Module, the girls should:

- Have an increased appreciation for and sensitivity to the outdoor world
- Know how to identify some of the climate changes happening to their region
- Connect with local people who live off the land and are on the front line of climate change
- Be able to recognize some plants or animals species that will be affected by climate change

Outdoor Experience Description

Two out of the following four activities section must be completed to fulfill the **Outdoor Experience** module.

Outdoor Exploration #1: **FEEL THE FOREST: A FIVE-SENSES TREASURE HUNT!**

Outdoor Exploration #2: **PEOPLE WHO LIVE OFF THE LAND**

Outdoor Exploration #3: **TREE-FRIENDS FOREVER**

Outdoor Exploration #4: **FOREST FOODS – EAT YOUR WAY TO THE TOP!**

OUTDOOR EXPLORATION # 1:
FEEL THE FOREST: A FIVE-SENSES TREASURE HUNT!

Time: 45 to 60 minutes

Setting: A forest, woodlot, meadow or tundra (whatever natural setting is close at hand)

Materials: Good walking shoes, suitable outdoor clothing that can get dirty

Objective: No matter where you live, climate change is affecting your local environment. Part of understanding how climate change might affect your region's forests, meadows, wetlands and other natural areas is getting to know these places better so that when changes start to happen, you can be a firsthand observer. To get to know a place better and to begin to care about protecting it, we have to develop personal relationships with these natural areas.

Most people, when they are walking through a forest, aren't really connected to the place. They are just walking along a path, watching the whole thing pass by like pretty scenery through the windows of their eyes. In this exercise, we want to step out of that bubble and deep into nature, activating all our five senses.
In this exercise, the girls are given a set amount of time to go out and "collect" or make mental note of "treasure" that stimulate each of their senses. They should find at least one "treasure" for each of their five senses. At the end of the time period they share with each other all the treasures that they have found.

This exercise may appear very simple but can be as challenging as each girl wants to make it.

Directions:

- Choose a nearby natural area where it is permissible to walk off the path. Make sure the area is safe and that there is no risk of girls getting lost. With the younger girls, choose an area with definite boundaries and borders (like fences, paths, houses, fields, etc.)
- Depending on the age of the group, the girls can participate as individuals, in pairs, or in groups of three or four. The younger girls may or may not feel comfortable venturing off by themselves – although encourage them to do so if it is safe.
- Set an appropriate time limit – somewhere between 10 and 25 minutes – depending on the age.
- Explain the rules:
    - You have a set period of time in the designated area for collecting "treasures"
    - You must collect at least five "treasures" – at least one for each of the five senses
    - You can wander around or stay in one place
    - You can walk, stand still, or crawl on all fours. You can lie down on your back, lie down on your front or stand on your head. You can lean up on anything, you can sit anywhere, you can touch everything.
    - ONLY TWO RULES: 1) Don't damage anything and 2) Don't talk.

- Encourage the girls to open up all their senses. See as much as you can see. Hear as much as you can hear. Smell as much as you can smell. Touch as much as you want to touch. Taste as much as you know is safe to taste (blueberries? cranberries? wintergreen? – you can show these things to the group in the debrief after the exercise is over). Be sure to tell them not to taste anything they are not sure about (no mushrooms or unfamiliar plants – with younger kids, you could either eliminate this element or instruct them to only taste the blueberries or cranberries or whatever it is that you know is safe to eat and show these to them.)
- After the time limit is up, the leader blows a whistle or rings a bell to call the girls back to the meeting area. The group then gathers together seated in a circle. One by one, each girl gets to tell the group about their five treasures – one for each sense – let them take as much time as they want to describe what they saw, felt, heard, smelled and tasted.
- After this, if there is still time, the group can walk together through the forest and try and identify some of the treasures (bring along ID books on plants, birds and birdsongs, tracks, etc.).

Did any questions come up? Have ID books on hand so that if there was a birdsong, a plant, or a funny looking mushroom, the girls can look them up if they so please.

Questions:

- What kinds of things do you see, hear or smell during this activity that might be impacted by climate change?
- What might happen to the berries, mushrooms, grass and birds in the area that you explored as a result of climate change?

OUTDOOR EXPLORATION # 2:
PEOPLE WHO LIVE OFF THE LAND

Time: Anywhere between 30 minutes and 2 hours

Setting: Regular meeting room

Materials: List of written questions

Objective

Our elders say that the younger generations are no longer connected to the land that provides for us. In the Yukon, it wasn't long ago that most people living here got all their food and building materials from their backyards. Although there are still people living off the land, there are less and less of them every day.

The objective of this exercise is to arrange for an elder (either an older person or an Elder from a local First Nation) who has lived a traditional, land-based lifestyle, to come in to talk to the group about what it is like to live off the land and how climate change is affecting this lifestyle. Each girl should have a question prepared to present to the elder during the visit.

Directions

Before the visitor arrives, give the girls a backgrounder on who he or she is. As a group, come up with a list of questions and then distribute one question to each girl.

OUTDOOR EXPLORATION #3:
TREE-FRIENDS FOREVER

Time: 30 minutes

Setting: A forest or woodlot

Materials: One blindfold for each team of two

Overview

This game attempts to allow the girls to "see the tree for the forest." A few points to relay to the group:

- Trees and forests are vast CO_2 absorbers and O_2 emitters.
- Without our forests (the vast Boreal forest that makes up more than 58% of Canada's land mass), there would be more CO_2 in the atmosphere and climate change would be worse
- Trees will bear the brunt of a lot of the climate changes that are happening. Although they could enjoy a longer growing season, changing rainfall and precipitation including drought and flooding could stress or kill trees. New pests are moving northward as temperatures increase. This leaves trees defenceless. Spruce budworm beetles in the Yukon and Mountain Pine beetles in British Columbia are hurting forests due to warmer winters that allow the beetles to survive. Increased forest fires are also being linked to climate change.
- We rarely pay attention to individual trees. This exercise is a fun way of giving a lot of attention to just one tree.

Objective

To get to know one tree, really, really well – so well, in fact, that you are able to locate it blindfolded and disoriented.

Directions

- Go outside to a forest.
- Get in pairs.
- One partner chooses a tree in the forest and studies it carefully so that they will be able to identify it later with their eyes closed.
- Fifteen feet away from the chosen tree, one partner blindfolds the other partner, spins her around 5 times and then tells her to go find her tree. The job of the non-blindfolded partner is only to make sure the blinded partner doesn't trip or smash into anything, but she should remain silent.

- Encourage the girls to use all the other senses:
    - Touch – to know exactly what the bark of the tree feels like
    - Hearing – to know what the tree sounds like when it's shaken, what the sound of wind in the leaves sounds like, the creaking branches etc.
    - Smell – what does the bark smell like? What do the needles or leaves smell like? The ground around the bottom of the tree?
    - Taste – well….maybe not… unless you know it's safe. Taste the bark? Taste the leaves?

When one girl successfully identifies her tree, switch roles between partners, and repeat exercise.

Questions

- What impacts have climate change had on the trees in your community?
- Name three things that could cause stress to your new tree friend as a result of climate change… (Answers could be: forest fires, drought, flooding, new pests, southern species invading…)

OUTDOOR EXPLORATION #4:
FOREST FOODS – EAT YOUR WAY TO THE TOP!

Time: 20 minutes

Setting: Ideally, an open, outside area (a field or forest clearing). But can be done in an indoor setting if preferred.

Materials: A banana, a candy bar, a box of cereal, a jar of cheese whiz or other examples of processed, imported or tropical foods.

Objective

This is a quick fun and silly game that starts out with a serious message.

- That the food we eat that is heavily processed and comes from far away contributes to climate change
- That there are foods that are locally available
- That we are part of the natural food chain

As we may have learned from our elders in the last activity, one of the root causes behind climate change and other environmental problems, may be that we have lost our connection to the land. Food used to be locally available, either through hunting, fishing and gathering or through local farmer's markets. Now our food comes from the grocery store – shipped up here from thousands and thousands of miles away in trucks and boats from all corners of the world – and often grown on large farms and processed in factories. All these things: trucks, boats, farms and factories, use a lot of energy which leads to climate change.

The objective of this game is to recognize that there are animals and plants in our backyard that used to make up our primary food sources – and the fact that we bring

our food in from so far away and put it through so much processing – contributes to climate change.
It's a fun game and well suited to the younger ages.

Directions

Before starting the game, talk to the girls about how far away our food comes from and how much energy, pollution, and greenhouse gasses it took for the food to get from the field to the factory to your table. Ask "*What did you have for lunch today?*" Make a list of the different items in your lunchbox and make guesses as to how far away the food came from. Then ask, "*What would you eat if the trucks and airplanes stopped bringing me food?*"

There are 5 levels

- Blueberry
- Salmon
- Porcupine
- Moose
- Human

The first four levels are all things that live in our area that we can eat.

1. Everyone starts out as a blueberry. This means that you're a little bunched-up ball, bouncing around. You don't have arms and you don't have legs.
2. When you're a salmon, you don't have legs and you don't have arms but you stand up straight and flap your little fins. To move around, you must hop.
3. When you're a porcupine, you have short little legs and short little arms, so lock your knees together, and lock your elbows together. That's the only way you can move around.
4. When you're a moose, you have long legs and long arms and you can run around.
5. To move up the food chain, you have to bump into another person who is the same plant or animal as you. You play rock paper scissors and the winner progresses to the next level.
6. After Moose, you become a human and win the game. Wait until everyone becomes a human.

Questions

- Where do humans get their food – where does it come from?
- Why do we bring in food from such long distances?
- Is there an alternative to bringing in food from long distances?
- What is the connection between climate change and where we get our food?
- What kinds of food can we grow in the Yukon?

4.3 CELEBRATE & SHARE
Share the Message

Share the Message Background:

Individual action is key to tackling climate change, but we can't solve the problem by ourselves; to make a substantial difference we need to get our friends, family and entire community involved in cutting down their greenhouse gas emissions.

By doing the Share the Message module you will:

- Teach others about climate change
- Motivate your friends and family to reduce their greenhouse gas emissions

Share the Message Description:

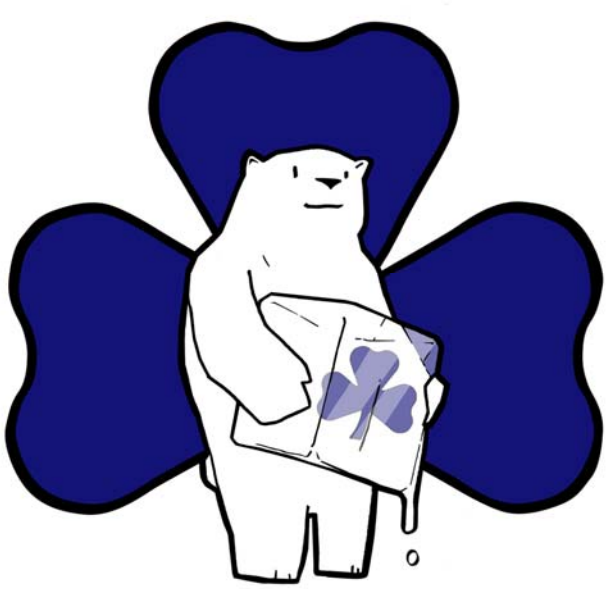
Below are a number of different activities that you can do to teach others about climate change and motivate them to reduce their greenhouse gas emissions.

To complete the SHARE THE MESSAGE module you only need to choose one of the activities below.

1. **Poster**
   Create a poster sharing what you have learned about climate change with others. Maybe you could create the poster in connection with National Environment Week, National Waste Reduction Week, Car Free Day, or National Walk to School Week.
2. **Picture Perfect**
   As a unit, draw pictures showing what the world would be like if we do nothing about climate change. Also draw the positive changes we would see if we all do our part. Make these pictures into a calendar and give it as a Christmas gift, submit the pictures to your local newspaper or hand them on display at a local art gallery or public space.
3. **Climate Change Recital**
   Invite parents and friends to your unit meeting and perform songs, skit or mime about what your learned during this climate change challenge.
4. **Climate Change Reporter**
   Submit a photo, poem or story relating to climate change to your local newspaper or write a letter to the editor of a newspaper about what your unit has been doing about climate change.

5.0 Appendices

Appendices



Appendix A More Information

Useful Websites

www.climatechangenorth.ca
www.taiga.net/nce
www.city.whitehorse.yk.ca
www.oee.nrcan.gc.ca/calendarclub
www.climatechange.gc.ca
www.scienceagogo.com
www.onelesstonne.ca

Girl Guides of Canada –Yukon Council Website:
http://dl1.yukoncollege.yk.ca/yukonguiding

Climate Change Vocabulary

Atmosphere
The atmosphere is a mixture of gases that surrounds the Earth. It performs many functions and helps to support life on our planet. One of its functions is to trap the sun's heat near the Earth's surface. Otherwise, the average temperature of the Earth would drop from 15 degrees Celsius to -18 degrees Celsius!

Carbon dioxide (CO_2)
Carbon dioxide is the most important of the greenhouse gases released by human activities. It is the main contributor to climate change because of the quantities released—especially through the burning of fossil fuels. Natural sources of carbon dioxide include forest fires, decaying plant and animal matter, volcanic eruptions, evaporation from the oceans, and breathing.

Carbon sinks
Trees, plants and ocean-dwelling plankton absorb carbon dioxide from the atmosphere through photosynthesis. Seawater also absorbs carbon dioxide. Because of this, forests, grasslands, and oceans are called carbon sinks. This process of taking carbon dioxide from the atmosphere and storing it helps to keep greenhouse gases in balance. Cutting down forests takes away potential sinks for the carbon dioxide being produced by human activities.

Emissions
Emissions are the release of gases that occurs as a result of natural processes and human activities such as:

- burning fossil fuels or wood to heat or cool our homes, run cars, produce electricity, and manufacture products (carbon dioxide emissions);
- using chemical fertilizers for agriculture (nitrous oxide emissions); and
- burying waste in landfills (methane emissions) and burning organic waste (nitrous oxide emissions).

Fossil fuels
Fossil fuels are fuel sources such as coal, oil and natural gas. These fuels have formed over millions of years through the decay, burial and compacting of rotting vegetation on land (coal) and marine organisms on the sea floor (oil and gas). When these fuels are burned, they produce high quantities of carbon dioxide, an important greenhouse gas.

GHG
This is just a short form for greenhouse gas.

Greenhouse gases
The natural greenhouse gases in our atmosphere are:

- water vapour or moisture (H_2O);
- carbon dioxide (CO_2);
- methane (CH_4);
- nitrous oxide(N_2O); and
- ozone (O_3).

These gases act like the glass in a greenhouse. They allow sunlight to pass through and they trap the sun's heat near the Earth's surface, helping to keep our planet warm. This is known as the "greenhouse effect." Certain human-made chemicals, such as chlorofluorocarbons (CFCs), are also powerful greenhouse gases.

Methane (CH_4)
Methane is produced naturally when vegetation is burned, digested or rotted without the presence of oxygen. Large amounts of methane are released by garbage dumps, rice paddies and grazing cattle. Methane is significant because it has 21 times the heat-trapping effect of carbon dioxide.

Nitrous oxide (N_2O)
Nitrous oxide occurs naturally in the environment, but human activities are increasing the quantities. Nitrous oxide is released in the production of nylon and when chemical fertilizers are used in agriculture.

Sources:

- Government of Canada Climate Change website
- Encyclopedia of the Atmospheric Environment

Appendix B Energy Sleuth

Energy Sleuth Inspection sheet

Be a One Tonne Challenge Energy Sleuth!
Ask a parent to work with you and complete the form. You'll be helping them save energy—and money!

Temperature Control

Question	Yes	No	Tip No.
If your home has a furnace, is the filter cleaned regularly?			1
Are there any air leaks around your home's windows and doors?			2
Are your basement, attic and walls insulated?			3
Do you have a programmable thermostat?			4
Are there any ceiling fans in your home?			5
Do you have an air conditioner in your home?			6
Do your parents regularly clean the air-conditioner filter?			7
On hot summer days, do you close your curtains and blinds during the day?			8

Water Use

Question	Yes	No	Tip No.
Is your home's hot-water tank insulated?			9
Have your parents insulated the hot-water pipes?			9
Does your shower have a low-flow head?			10
Do you take a shower instead of a bath?			11
Are any of your home's water faucets leaking?			12
Do you let the water run while you brush your teeth?			13
Is laundry washed in cold water?			14

Appliances and Lighting

Question	Yes	No	Tip No.
Do you leave on lights, sound systems, TVs and computers when they're not in use?			15, 16
Are compact fluorescent light bulbs used in your home?			17
Do your parents use the microwave when they need to cook small amounts of food?			18
Is the refrigerator located away from heat sources like a stove or direct sunlight?			19
Is your fridge's door seal checked regularly?			20
Is the clothes dryer's lint screen cleaned after each load?			21
Do your parents hang clothes outside to dry?			22
Do you use your dishwasher's air-dry cycle?			23

Transportation

Question	Yes	No	Tip No.
Do you use your bike, walk, and take public transportation whenever possible?			24
Do your parents allow the car to idle when it's parked?			25
Do your parents buy ethanol-blended gasoline?			26
Do your parents check their vehicle's tire pressures regularly?			27
Do your parents have their vehicles serviced regularly?			28
Is the car's block heater plugged into an automatic timer?			29
Does your family car have cruise control?			30

Energy Sleuth Tips Sheet

After you've completed your *Energy Sleuth Inspection Form*, you'll see that there are quick and easy ways your family can reduce greenhouse gas emissions while saving energy and money. Remember, every little bit counts. Using less energy at home will not only cut our greenhouse gas emissions, but it will also help keep our air clean and save money.

This sheet provides tips that will help each family member meet the One-Tonne Challenge. Some tips are safe for young people to do; others involve activities that only adults should undertake. Check the following codes before starting any greenhouse gas reduction activity.

Codes
* This is an activity young people can do to help cut greenhouse gas emissions.
**Young people should ask for help with this activity.
***Only adults should undertake these greenhouse gas reduction activities.

Temperature Control

1	**Change or clean furnace filters every one to two months**.** Dirty air filters block airflow, forcing furnaces to run longer and use more energy.
2	**Use caulking and weather stripping to reduce air leaks.** ** If combined, all the air leaks in an average older house would add up to a 40cm² hole / big enough for a large dog to pass through! By caulking and weather-stripping, your family can save up to 20 percent on home-heating costs and eliminate cold drafts and costly leaks around windows, doors and baseboards.
3	**Upgrade insulation in walls, attics and basements.** *** This is best done during renovation projects—when re-modelling a kitchen or bathroom, for example. Insulating basement walls can reduce your energy bill by up to 35 percent.
4	**Install programmable thermostats to control both heating and cooling.** *** It's easy to forget to turn down the thermostat at night and when we leave for work and school. Programmable thermostats raise and lower temperatures automatically. Remember: for every 1 degree Celsius (2 degrees Fahrenheit) you lower the thermostat, you save 2 percent on your heating bill!
5	**Install a ceiling fan.** *** Ceiling fans use less electricity than air conditioners or furnaces. When used properly, these fans help reduce the energy we use to heat and cool our homes. In the winter, you can set the ceiling fan's direction of airflow to push warm air toward the floor, where it's cooled and drawn back to the furnace for re-heating. In the summer, change the fan direction to draw air upward, cooling rooms with a constant flow of air.
6	**Set your air conditioner at 25°C.** ** For each degree set below 25°C, you use 3 to 5 percent more energy. This 25°C setting will provide the most comfort for the least cost.
7	**Clean the air-conditioner filter every month.** ** Dirty air filters reduce airflow and may damage air conditioners. Filters that are clean enable units to cool down quickly and use less energy.
8	**Keep doors, windows, blinds and drapes closed on hot sunny days; open windows at night**. * The warmer your house, the more energy your air conditioner will use to keep it cool. Open windows when the sun goes down, and let the night air cool your house.

Water Use

9	**Insulate hot-water tanks and hot-water pipes to reduce heat loss.** *** "15 percent of a typical energy bill goes to heating water. Ensure that your hot-water tank and pipes are insulated properly. Check your user's manual or consult with a professional to see if insulating the tank or the pipes is recommended for your home."
10	**Install low-flow showerheads.** ** These showerheads are easy to install and use up to 60 percent less water.
11	**Take a quick shower instead of a bath.** * You will use up to 50 percent less hot water. A five-minute shower, for example, uses less than 38 litres of water, compared with 57 to 95 litres for a bath.

12	**Repair all leaking faucets.** ** A leak of only one drop per second wastes about 10,000 litres of water each year—that's enough water for 16 baths each month. Most leaks are easy and inexpensive to fix.
13	**Don't run the tap while shaving, brushing teeth or doing dishes.** * Partially fill the basin with hot water—you'll save energy and help reduce greenhouse gas emissions.
14	**Wash your clothes in cold water.** ** When you wash clothes in cold rather than hot water, you use 90 percent less energy.

Appliances and Lighting

15	**Turn off lights when they are not needed.** * If no one's using a room, why keep it lit? Use timers and solar and motion sensors to turn lights on and off automatically.
16	**Turn off appliances when they're not being used.** * When no one's watching TV, listening to the stereo, or using computer equipment, turn them off. You'll save energy and money—and reduce greenhouse gas emissions.
17	**Use compact-fluorescent lighting.** ** These lights consume up to 75 percent less electricity than incandescent bulbs, produce less waste heat and last up to 10 times longer.
18	**Use a microwave instead of your conventional oven.** ** Microwave cooking consumes much less energy and produces much less waste heat than your stove. Convection ovens use up to 30 percent less energy than standard ovens. Toasters ovens and slow cookers are also more energy efficient than most conventional ovens.
19	**Keep refrigerators and freezers away from all heat sources**. ** These include direct sunlight, furnace vents, radiators and appliances such as ovens, cooking ranges and dishwashers.
20	**Make sure there are no gaps in your refrigerator's door seal.** * Test the door seal by closing it on a sheet of paper. If the sheet slides out easily, replace the seal. Try the flashlight test, as well. Turn on a flashlight, place it in the fridge and close the fridge door. If you can see light around the door, replace the seal.
21	**Clean your dryer's lint filter after each load, and clean the dryer duct regularly**. ** Clogged filters and ducts restrict airflow, reduce energy efficiency and can be a fire hazard.
22	**Hang clothes outdoors to dry.** * You'll use a lot less energy. If you do use a dryer, don't leave clothes in the machine too long. Over-drying not only consumes more energy, it can also causes your clothes to shrink.
23	**Let dishes air-dry.** * Your dishwasher's drying cycle uses a lot of energy. Select the no-heat drying cycle, or simply turn the dishwasher off and open its door after the rinse cycle is complete.

Transportation

24	**Leave your car at home.** * Reduce greenhouse gas emissions by using public transit and sharing rides. Walk, cycle and inline skate whenever you can. These activities are good for you and the environment.
25	**Don't let your car idle.** *** Ten seconds of idling uses as much gasoline as starting your car. When you're stopped for more than 10 seconds (except at traffic lights), switch off the ignition—you'll reduce greenhouse gas emissions and save money. In winter, cold engines really only need 30 seconds to warm up. Anything more wastes gas and produces unnecessary exhaust emissions.
26	**Use ethanol-blended gasolines.** *** These fuels are better for the environment than regular unleaded gasolines and diesel fuels. Check your owner's manual to see if your vehicle will run on ethanol-blended gasoline, which is available at nearly 1,000 stations across Canada.
27	**Check your tire pressures once a month.** ** Take your measurements when the tires are cold—three hours after use, or after driving a distance of less than 2 km. A vehicle driving on tires that are under-inflated by only 6 psi (pounds per square inch), or 40 kPa (kiloPascals), can use up to 3 percent more fuel. Under-inflated tires are also unsafe.
28	**Service your car regularly.** *** Have a professional check for poor wheel alignment, uneven tire wear and brake drag that can increase both fuel consumption and greenhouse gas emissions.
29	**Use a block heater in winter when the temperature drops below to -20°C.** ** A block heater warms the oil and engine coolant, makes your vehicle easier to start, and can improve winter fuel economy by as much as 10 percent. Don't leave your block heater on overnight. Use a timer to switch on the block heater one or two hours before you plan to drive.
30	**Use your vehicle's cruise control on highways.** *** Cruise control enables you to maintain steady speeds, so your vehicle will consume less fuel and produce fewer greenhouse gas emissions—and you'll save money.

Appendix C Transportation Sleuth

Calculating Your Travel Greenhouse Gas Emissions

Private Transport

Type of Transport	Ave. Litres per 100km	Av. CO_2 emissions kg / 100km	Av. CO_2 emissions grams/km	CO_2 – grams per person per km
Walk	0	0	0	
Bike	0	0	0	
Skate board/ roller blades	0	0	0	
Small hybrid car, e.g., Honda Insight	3.7	9.25	92.5	
2-seater sports car	10.84	27.1	271	
Compact car	8.64	21.6	216	
Mid-size car	10.32	25.8	258	
Large car	11.24	28.1	281	
Small pick-up	14.28	35.7	357	
Passenger van	12.44	31.1	311	
Small SUV	13.24	33.1	331	
Large pickup	15.88	39.7	397	
Cargo van	16	40	400	
Large SUV	17.04	42.6	426	
650 cc motorcycle	3.5	8.75	87.5	
Quad ATV	10	25	250	
Snowmobile	30	75	750	
50 hp outboard motor boat	42	105	1050	

Public Transport

Type of Transport	Ave. Litres per 100km	Av. $C0_2$ emissions kg per 100km	Av. $C0_2$ emissions grams/km	$C0_2$ – Grams per person per km
City Bus Av. # of people =30	33	82.5	825	
Twin Otter DCH600 Av. # of people =16	114	285	2850	
Boeing 737 Av. # of people =100	442	1105	11050	
Boeing 747 (cruising) Av. # of people =460	1653	4132.5	41325	
Helicopter (Bell 206 JR) Av. # of people =4	53	132.5	1325	

Figuring Out Your Travel CO2 Emissions

How much $C0_2$ do you emit when you go to school or take a trip? Use the table below to help you figure it out. Just follow these steps:

- Choose the type of transport that is closest to what you travel in.
- Figure out approximately how many km you travel in the time-period you have chosen.
- Use the table above to find out how many grams of $C0_2$ is emitted by the vehicle per km.
- Multiply (b) by (c) to get the total $C0_2$ emissions.
- Write in the number of people in the vehicle. Only include the people who actually need to be transported. (For example, if your mother is driving you to school, and then going home again, the number would be 1. If you mother is driving 3 students to school, the number will be 3. If your mother works at the school, then the number would be 4.)
- Divide (d) by (e) to get the per person emission of C02.

Take it Further

To get the total kilograms of $C0_2$, divide (f) by 1,000. (1,000 grams = 1 kg)
Keeping in mind that 1,000 kg = 1 tonne, think of ways you could reduce your travel GHGs by part of one tonne. In the small pick-up example below, the total kg would be 7.14. And, if you divide 1,000 kg (1 tonne) by 7.14, it would take 140 if these trips to make up one tonne. However, you could also reduce if you drove in a smaller vehicle, or took more passengers. There are lots of ways to reduce your GHG emissions.

(a) Type of Transport (vehicle)	(b) Km per ____ (day, trip, etc.)	(c) CO_2 grams/km	(d) Total CO_2 grams per ___ (day, trip, etc.)	(e) # of people in vehicle	(f) CO_2 grams per person
e.g. Sm. Pick-up	40/day	357	14,280	2	7,140

Calculating Greenhouse Gas Emissions from Vehicle Idling

Vehicle Size	CO_2 emitted per minute of idling time
Small compact car	.05 kg or 50 grams per minute
Mid-size car	.07 kg or 72 grams per minute
Large car	.08 kg or 82 grams per minute
Small truck	.09 kg or 90 grams per minute
Large truck	.12 kg or 120 grams per minute
SUV	.13 kg or 130 grams per minute

Background Information for Checking Tire Pressure

1. The vehicle's correct tire pressure is listed on an information placard normally located on the edge of one of the doors, the inside post of one of vehicle's doors or inside the glove compartment, trunk, or fuel door. The owner's manual should include the correct tire pressure or direct you to the placard's location on your vehicle.

2. The pressure listed on the tire sidewall is the maximum tire pressure - or the tire pressure that is required to carry the maximum load of the tire. It is not the manufacturer's recommended tire pressure, which is a common misperception.
3. Relying on sight inspection alone is not an accurate way to measure tire pressure. The only accurate way to know if your tires need to be inflated is by measuring their pressure with a reliable tire gauge. Tire gauges are available at most automotive supply and hardware stores.
4. Under-inflation is the leading cause of tire failure. Under-inflated tires on your vehicle lead to poor or delayed braking, steering and acceleration. Under-inflated tires may squeal when stopping or cornering even at moderate speeds, particularly on warm pavement.
5. Operating a vehicle with just one tire under-inflated by 20% (8psi) can reduce the life of the tire by 15,000 km and can increase the vehicle's fuel consumption by 4%. Without enough air, the sides of a tire bend and flex too much. This builds up heat, which can cause serious damage and leads to sudden tire failure. It will also increase rolling resistance, which reduces tread life and increases fuel consumption.
6. Over-inflation can be a problem too. An over-inflated tire rides on just the centre portion of the tread. The smaller contact area means reduced grip on the road, leading to a harsh ride, handling issues (such as steering and stopping problems) and increased wear on tires and suspension components. Seventeen per cent (17%) of vehicles in Canada have at least one tire that is over-inflated by 20%.

Source: http://www.betiresmart.ca (Rubber Association of Canada website)

Appendix D Waste Sleuth

User Guide for Compost
Instructions for Building a Composter
Worm Composting
Backyard Composting

Appendix E Experiment Sleuth

SLEUTH Experiment #1: BUILD YOUR OWN GREENHOUSE EFFECT

Worksheet

1. Record the date and time that you read the temperature in the column on the left.
2. Record the temperature in the column on the right.

Date & Time	Temperature (°C)	
	In Jar	Outside Jar

3. Now you can make a line graph and see what your data looks like!
4. Draw an x-axis and a y-axis on your graph paper. Use a ruler. You can look at the example
5. below as a guide.
6. On the x-axis, mark out 10-minute increments, starting with 0 and ending at 60.
7. On the y-axis, mark out 5-degree increments. You decide your start and end points.
8. Plot the values from your table onto your graph and see what it looks like.
9. (Remember that your values will be different. The graph below is just an example.)
10. Connect the dots!

Questions & Answers

- Why is it hotter inside the jar? (The glass lets the sun's energy inside, and then traps the heat.)

- What would cause the temperature in the jar to change at different times? (Different sun conditions)

- In what ways is our mini-greenhouse like the sun's atmosphere? In what ways is it different? (The jar traps heat, like the earth's atmosphere. But the earth's atmosphere is not solid, like glass. Some of the heat radiating from the earth's surface escapes into space. Some is absorbed for a short time by greenhouse gases and then emitted back to the earth's surface.)

http://www.climatechangenorth.ca/section-LP/LP_06_I_B_greenhouse.html

SLEUTH Experiment #2: When the Ice Melts

Questions & Answers

a. *What happens to the water level in the container when the sea ice melts?*
Nothing if not minimal changes to water level.

b. *What impact do you think the melting of sea ice will have on sea level?*
Sea Level does not rise when sea ice melts. However, melting sea ice adds fresh water to salty seas, disturbing the salinity levels and conveyer belt currents of the oceans. For example, the Gulf Stream depends on this balance and may be slowing down, threatening the climate stability of Europe.

c. *What happened to the polar bears when the sea ice melted?*
They drowned or jumped onto the island. The problem with the island is that it is not suitable habitat for them. They are ice dwelling hunters, dependent on seafood caught from the ice.

d. *What happens to the water level in the container when the land ice melts?*
The water level rose.

e. *What impact do you think the melting of glaciers and other land-based ice masses will have on sea level?*
Mid-range scenarios from the United Nations Intergovernmental Panel on Climate Change are of a 40-cm sea-level rise by the 2080s and up to 2 metres by 2500.

f. *Have you ever been on a frozen lake? What happened when it began to melt? If you depended on the lake as a bridge to get to the other side for your food source, what might happen when the ice melts?*
You can't get to your food. So you either perish or learn to find food elsewhere.

g. *What impact might melting ice have on communities in the north and in the rest of the world? Discuss openly as a group.*
North:
According to the Arctic Climate Impact Assessment, a year-round northern shipping route across the north could be possible in decades, opening up port towns across the north. Huge oil and gas reserves, now buried under sea ice, will also become exposed to development. Reductions in sea ice will also drastically shrink marine habitat for polar bears, ice-inhabiting seals, and some seabirds, pushing some species toward extinction.
Rest of World:
Potential damages to infrastructure in coastal areas from sea-level rise have been projected to be tens of billions US$ for individual countries—for example, Egypt, Poland, and Vietnam. Rapid urbanization in low-lying coastal areas of both the developing and developed world is greatly increasing population densities that are exposed to coastal climatic extremes such as rising sea level and tropical cyclones. Model-based projections of the mean annual number of people who would be flooded by coastal storm surges increase several fold (by 75 to 200 million people depending on adaptive responses.

SLEUTH Experiment #3: STORMY SEAS

Questions & Answers

a. *What did you observe?*
Sand washing away, the banks collapsing, houses and objects falling into the water.

b. *In your own words explain the term erosion.*
Definition of erosion is: n 1: (geology) the mechanical process of wearing or grinding something down (as by particles washing over it 2: condition in which the earth's surface is worn away by the action of water and wind.

c. *Have you observed a similar process in the banks of lakes, oceans or rivers? How was this process similar or different? What factors might influence the type of impact that the waves have on the coast?*
Severe coastal erosion will be a growing problem as rising sea level and a reduction in sea ice allows higher waves and storm surges to reach the shore.

d. *What consequences might wave erosion have on habitats and communities on the coast?*
The risk of flooding or damage to once protected coastal wetlands is projected to increase, with impacts on society and natural ecosystems. In some cases, communities and industrial facilities in coastal zones are already threatened or being forced to relocate, while others face increasing risks and costs.

SLEUTH Experiment #4: BEARLY ANY ICE

Bearly Any Ice Data Chart

	Number of		Number of Bears		Number of Cubs			Number of Seals	
Year	Rounds	Hula Hoops	At Start	At End	At Start	At End	Born	At Start	At End
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									

Questions & Answers

a. *How did the length of each round affect the polar bears' chances of catching enough seals to survive?*
The shorter the round, the more difficult it was to catch the number of seals required.

b. *What change in the ecosystem does a shorter round represent?*
The shorter round is equivalent to a shorter season of annual ice. This shorter season reduces the time for polar bears to acquire the food they need for survival.

c. *How did the number of hula-hoops affect the polar bears' chances to catch the required amount of seals in order to survive?*
The more hula-hoops, the more safety zones become available for the seals (i.e. open water), therefore increasing the seals' chance of survival and increasing the difficulty for the polar bears to find the food needed for survival.

d. *What change in the ecosystem does increased numbers of hula-hoops represent?*
More hula-hoops reflect greater amounts of open water for the seals to take protection from the polar bears.

e. *If the sea ice continues to vanish, what may be the ultimate fate for the polar bear?*
The polar bear could become extinct or at least extirpated from their southern range.

f. *Could the polar bears adapt in order to survive?*
The bears could find other sources of food or methods of hunting. However, adaptation usually takes a very long time and the changes brought on by global warming have been relatively fast compared with rates of adaptation.

g. *What economic and cultural impact would the loss of the polar bear have for northerners?*
Many communities have active sport hunting and eco-tourism businesses that depend on world interest in the polar bear. The polar bear is also of great cultural importance to Inuit including: legends, hunting skills development, clothing and food sources, as well as traditional rites of passage into adulthood.

More Information:
Global warming could starve polar bears:
http://news.bbc.co.uk/1/hi/sci/tech/521451.stm

Global Warming Impacts:
Polar Regions
http://yosemite.epa.gov/oar/globalwarming.nsf/content/ImpactsPolarRegions.html

The Shrinking Polar Bear:
CBC Special
http://www.tv.cbc.ca/national/pgminfo/warming/bears.html

Report says Arctic warming imperils polar bears
http://www.planetark.org/dailynewsstory.cfm/newsid/15956/story.htm

Polar Bear Headed For Extinction
http://www.scienceagogo.com/news/20030008220241data_trunc_sys.shtml

Appendix F Take Action

Individual ACTION Pledge
Family ACTION Plan