



## ENERGY LESSON PLAN

### POWER OF ONE, (How our energy conservation actions make a difference)

#### Background and concepts:

Provides a simple visual overview of what climate change is and how it is happening, including how our everyday actions contribute. Individual action cards using Saskatchewan-based energy information provide examples of ways we can reduce our greenhouse gas emissions.

- Climate change science
- Saskatchewan sources of CO<sub>2</sub> and other greenhouse gases
- Actions that reduce greenhouse gases

#### Time:

20-25 minutes, or more, if in depth discussion of both climate change and the impact of individual actions is included.

#### Materials:

Energy cards – one for each student (print the attached)

Understanding Climate Change Sketch (attached for reference)

White board, markers and eraser

#### Procedure:

Hand out one card to each student. Tell them we will use them in a few minutes.

Using the script below, and the attached sketches as a guide, draw on the white board as you talk, and ask students for their comments as you go.

Alternatively, show students the [climate change video](#) (12 mins) or show the climate change slide show and use the script to guide your discussion. The video or slide show could also be used as pre-teaching for this lesson.

#### Energy Cards:

Print one set of the attached cards for each class. Cards are formatted to print double sided, so that the illustration will be on the back of the action and energy information. Printed on cardstock, the cards could be used again.



Start with this explanation: **Most of you will have heard about climate change or the term, global warming. We are going to talk a bit about what it is, how our every day actions are connected, and how we can help.**

- **We have a sun, and we have the earth.** (draw sun and edge of earth below)  
**The earth has an atmosphere.** (draw dotted line above the earth edge)
- **The sun's rays shine out- some hit the earth, some go off into space.** (draw one ray going into space, one touching earth)
- **Some of the rays hit our atmosphere and reflect or radiate back out into space.** (or ask, "what happens to the rays when they hit our atmosphere?")(draw ray bouncing back out into space)
- **Some of the rays come through our atmosphere and hit the earth's surface and warm it.** (draw ray touching earth and draw warming lines)
- **Some of that heat radiates back out into space.** (draw it going back to space)
- **Some of those rays are captured by the greenhouse gases(GHG's) in our atmosphere - keeping that warmth near the earth.** (Draw dots to represent the GHG's. And show the ray stopping at edge of atmosphere and radiating back to earth. ) **This is called *The Greenhouse Effect*.** Ask the students: **Do you think the greenhouse effect is a good thing? It is necessary to us, keeping the average temperature around the earth about 15° C. Without the greenhouse effect, the average temperature of our world would be about -20° C. The problem we have created is we have added so many GHG's,** (draw more dots, and more lines at the earth edge to show warming) **mostly in the form of carbon dioxide, or CO<sub>2</sub>, we are warming the planet up too much. It is like we used to have a sweater on our planet to keep us warm and now we have a winter jacket.**
- Ask the students: **What are we doing, or what happens daily that contributes to those greenhouse gases?** (You may need to prompt some of the answers with drawings, but as they answer, draw the actions) **We heat our homes, drive cars, industries like SaskPower burn coal and gas to generate electricity, potash or other Saskatchewan industries burn gas, and we eat cows who create methane)** As you draw these things on the whiteboard, make lots of GHG "dots" coming from each thing.
- Students may name natural sources of GHG's. Draw those in as well – like forest fires and volcano eruptions.
- As well as carbon dioxide (CO<sub>2</sub>) students may name other greenhouse gases like methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), ozone (O<sub>3</sub>) and water vapour (H<sub>2</sub>O).



CO<sub>2</sub> stays in the atmosphere for over 100 years. Methane, while it only stays in the atmosphere for about 12 years, is a much more potent greenhouse gas.

- **Let's look at your cards. We will take turns reading out what is on your card. Read the action on the card, and how much CO<sub>2</sub> it saves. It says KgCO<sub>2</sub>/yr. You read that as "kilograms of CO<sub>2</sub> per year".** Read one out as an example. The information on the cards explains the parameters of how each calculation was made, and may also include the amount of waste saved from landfill, or the amount of water saved. With younger students, reading the first action line, and the amount of CO<sub>2</sub> reduced may be enough.
- As students read out their cards, talk about some of them, explaining the action and how it helps to reduce CO<sub>2</sub> emissions. Erase some of the dots each time, erasing more or less depending on how much the action saves.
- The comparison to the number of trees planted shows how some actions are really good at reducing CO<sub>2</sub> (turning out unnecessary lights at school every day = 35 trees), compared to others (having a "lights out" day = 0.2 trees).
- If an action doesn't save much CO<sub>2</sub>, highlight the amount of water that is saved, or the amount of garbage that is kept out of landfill.
- **Look what has happened to our greenhouse gas emissions. Each of our actions seem like a small thing, and some of them we wouldn't even notice the difference (like turning down the heat when we are sleeping) but when we each do things, and do things every day to reduce our greenhouse gas emissions, we can really make a difference.**
- **Which of these actions would be easy to do right now, or you already do them?** Discuss a few and talk about how to make those behaviours more common.
- **Which of these actions would be harder or more challenging to do?** Discuss a few and talk about ways to make it more likely that we would do those things. E.g. Bike or walk to school if they had a safe route, or a place to put their long board.
- **Let's take action. Choose an action that you can plan to do, and do on a regular basis. What are some examples of actions you could do?** Create a chart or have each student record actions they take each day for a period of time. Using the information on the cards, students could estimate the greenhouse gas reductions they are making with their actions.



## Curriculum Connections

**Grade 4 Earth and Space Science: Outcome: RM4.2** Assess how human uses of rocks and minerals impact self, society, and the environment.

**Grade 5 Social Studies: Outcomes: DR5.2** Assess the impact of the environment on the lives of people living in Canada. **RW5.1** Explain the importance of sustainable management of the environment to Canada's future. **RW5.2** Hypothesize about economic changes that Canada may experience in the future.

**Grade 6 Science: Outcome: EL6.1** Assess personal, societal, economic, and environmental impacts of electricity use in Saskatchewan and propose actions to reduce those impacts. **Social Studies: Outcomes: RW6.1** Examine and analyze factors that contribute to quality of life, including material and non-material factors. **RW6.2** Contribute to initiating and guiding change in local and global communities regarding environmental, social, and economic sustainability.

**Grade 7 Social Studies: Outcomes: IN7.2** Examine the effects of globalization on the lives of people in Canada and in circumpolar and Pacific Rim countries. **RW7.2** Investigate the influence of resources upon economic conditions of people in circumpolar and Pacific Rim countries. **RW7.3** Assess the ecological stewardship of economies of Canada and the circumpolar and Pacific Rim countries.

**Grade 8 Social Studies: Outcomes: RW8.1** Analyze the social and environmental consequences of living in the Canadian mixed market economy based on consumerism. **RW8.2** Assess the implications of personal consumer choices. **RW8.3** Critique the approaches of Canada and Canadians to environmental stewardship and sustainability.  
**Health Education: Outcome: USC8.6** Examine the concept of sustainability from many perspectives, and develop an understanding of its implications for the well-being of self, others and the environment.

**Grade 9 Science: Outcome: CE9.3** Assess operating principles, costs, and efficiencies of devices that produce or use electrical energy. **CE9.4** Critique impacts of past, current, and possible future methods of small and large scale electrical energy production and distribution in Saskatchewan.

**Grade 10 Science: Outcomes: SCI10-CD1** Assess the consequences of human actions on the local, regional, and global climate and the sustainability of ecosystems. **SCI10-CD2** Investigate factors that influence Earth's climate system, including the role of the natural greenhouse effect.

**Environmental Science 20: Outcomes: ES20-SDS1** Create and carry out a plan to explore one or more topics of personal interest relevant to Environmental Science 20 in depth. **ES20-AS1** Assess the impact of human activities on indoor and outdoor air quality and the need for regulations and mitigating technologies to minimize risks to human health. **ES20-AS2** Analyze the production, reliability and uses of geoscience data to investigate the effects of a changing climate on society and the environment.



## Understanding Climate Change Sketch

