

LEARNING INQUIRIES

RENEWABLE AND NON-RENEWABLE ENERGY RESOURCES

TIME: 20-30 MINUTES

DEVELOPED BY: CANADIAN GEOGRAPHIC EDUCATION



OVERVIEW/FOCUS QUESTION

Students will explore energy types in Canada and classify them as renewable or non-renewable.

This lesson plan is a good introduction before completing the [Let's Get Energized](#) lesson plan, which explores renewable and non-renewable energy extraction and locations across Canada.

SUBJECT/TOPIC

ENERGY

GRADE LEVEL

GRADES 1 - 3

LEARNING GOALS

Students will:

- Understand the difference between renewable and non-renewable energy.
- Classify energy types into renewable or non-renewable.

MATERIALS NEEDED

- Scissors
- Glue
- White or black board
- Tape or sticky tack
- Energy Types set (1 per student)
- Renewable or Non-renewable chart (1 per student)

CONNECTION TO THE CANADIAN GEOGRAPHY FRAMEWORK

CONCEPTS OF GEOGRAPHIC THINKING

- Interrelationships
- Geographic perspective

INQUIRY PROCESS

- Ask geographic questions
- Interpret and analyze
- Evaluate and draw conclusions
- Communicate

GEOSPATIAL SKILLS

- N/A

LESSON DESCRIPTION

MINDS ON

Students will discuss what they think the terms renewable and non-renewable mean.

ACTION

Students will cut out images of different energy types and organize them as renewable or non-renewable.

CONCLUSION

Students will play a game where they review what they know about renewable and non-renewable energy types.

LESSON IMPLEMENTATION

MINDS ON

As a group, ask students what they think the word “renew” means. Where have they heard it? They might have heard “renew” when they want to continue borrowing a library book. Or perhaps they’ve heard of it in springtime, when flowers are growing and trees are budding again. Some people say that the plants are being renewed. Sometimes, when people are not feeling well, and they get better, they say that their energy is renewed. Explain to students that “renew” can mean when something happens again and again (such as a library book being taken out again or plants growing back).

Now that students have an idea of the word “renew”, ask them what they think “renewable” and “non-renewable” mean. Explain to students that renewable means something that can continue again and again (like when we renew a library book over and over), and non-renewable means something that cannot continue again and again (such as something we use once and throw in the garbage). What types of things would students classify as renewable and non-renewable? Students may need assistance in thinking of examples. Some examples:

Renewable: Driver’s license, a magazine subscription, plants, rechargeable batteries, etc.

Non-renewable: Plastic wrap, disposable coffee cup, plastic bag, gasoline, etc.

Now, ask students how they think these two terms connect to energy. What does renewable energy mean? What does non-renewable energy mean? Students should understand that renewable energy is energy that can continue to be used because the source can regenerate (like the wind or the sun). Non-renewable energy cannot continue to be used forever because the source will run out (like crude oil, natural gas or coal).

ACTION

Explain to students that we obtain energy that we need from different sources. Tell students that they will be looking at different energy types in Canada and learning about which are renewable and which are non-renewable. If the topic hasn’t already been explored with your class, allow for time to explain what energy is and how it is used in everyday life.

Distribute the Energy Types set (1 per student) as well as a Renewable or Non-renewable chart. Have students cut out each square on the Energy Type set. Next, as a group, look at each energy type, discuss where this energy comes from and whether the energy is renewable or non-renewable. Ask students to explain their thinking. Students can then glue the energy type in the correct column of their Renewable or Non-renewable chart. Demonstrate using the white/black board. Continue for each energy type.

Non-renewable energy types:

- **Coal, crude oil, and natural gas are all fossil fuels.** A long time ago, organic materials, such as the remains of plants and animals, sank to the bottom of the sea and became covered by sediment (i.e., rocks and sand) and compacted. Over the course of millions of years, the organic matter was transformed under high pressure and very hot temperatures, resulting in what we refer to today as fossil fuels.
- **Nuclear:** A type of energy that uses uranium (a radioactive element that is mined from the earth) to boil water, which produces steam to turn a turbine and generate electricity.

Renewable energy types:

- **Tidal:** Tidal energy works by harnessing the power of ocean tides (i.e., when the ocean water comes in and out on the shore), which are caused in large part by the gravitational pull of the moon, as well as the sun and the rotation of the Earth.
- **Solar:** Solar energy uses solar panels to capture the sun's energy.
- **Biomass:** The main forms of biomass in Canada use leftovers from the forestry industry and city waste. Burning biomass, such as firewood for heating homes, is widespread in Canada. Wood pellets, mainly made of sawdust and other waste from sawmills, are used both to produce heat and generate electricity. Other sources include agriculture and organic waste, such as animal manure and city sewage. There are different ways of converting biomass to produce electricity.
- **Hydroelectricity:** Hydroelectricity is electricity that is produced from moving water, which is referred to as hydro power. The rushing water turns a turbine, which generates electricity.
- **Wind:** The wind's energy is collected by wind turbine blades, which turn like a propeller or a windmill and generate electricity.

CONCLUSION AND CONSOLIDATION

Now that students have an idea of the different types of energy and which are renewable and non-renewable, have them practice classifying energy types with a game. Have students stand around the room, ensuring they have enough room to safely stretch out their arms to the side. Tell students that you are going to name energy types and the students will need to make either a “renewable” or “non-renewable” shape. Assign a star shape to renewable energy (standing with legs and arms outstretched) and a pencil shape (standing with legs together and arms stretched straight above with palms touching) as the non-renewable energy shape. An example of what this game would look like: You call out “solar” and students think about whether solar is renewable or non-renewable and decide whether to stand as straight as a pencil (non-renewable) or to make a star shape (renewable). Encourage students to refer to the board where you have classified the energy types. Continue until you have gone through the different energy types. Teachers can also use the Energy IQ [Interactive Energy Map](#) with their students, exploring where the different renewable and non-renewable energy facilities are found in Canada.

EXTEND YOUR GEOGRAPHICAL THINKING

- Review our [Let's Get Energized](#) lesson plan for a more in-depth look at the energy types and extraction methods.
- Take a virtual tour of an energy facility, such as Hydro-Quebec's [Robert-Bourrassa generating facility in this 3D video](#).
- Explore the CAPP 360-degree videos for [natural gas](#) development, [oil sands](#) and [SAGD](#) development.
- Have students explore the [Energy IQ Interactive Map](#) to learn more about energy production and transmission in Canada.

MODIFICATIONS

- Instead of having students individually cut out squares, the teacher can pre-cut them.
- As a class, come up with the different types of energy before classifying them.
- Students can write the names of the energy types on their chart instead of glueing the images.
- Extension: Students can research the benefits and drawbacks of renewable and non-renewable energy.

- Extension: Students can research where renewable and non-renewable energy facilities can be found in Canada and around the world.

ASSESSMENT OPPORTUNITIES

- Observational notes can be made of students' understanding of renewable and non-renewable energy during discussions and the game.
- Students' charts can be collected and used for assessment.

SOURCES AND ADDITIONAL RESOURCES

- Visit the [Energy IQ website](#) for more information about renewable and non-renewable energy.
- Explore Natural Resource Canada's [Energy Maps](#).
- Watch the Student Energy [Renewable Energy 101 video](#).
- [Fossil fuels 101 video](#)

STUDENT ACTIVITY SHEETS

RENEWABLE OR NON-RENEWABLE

RENEWABLE	NON-RENEWABLE

ENERGY TYPES



Biomass



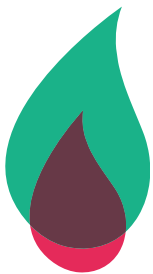
Crude Oil



Hydroelectricity



Coal

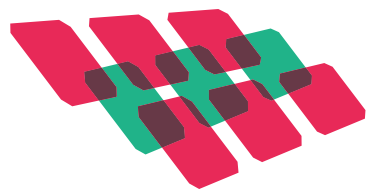


Natural gas

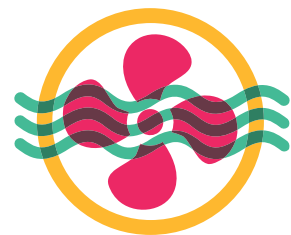


Nuclear

ENERGY TYPES



Solar



Tidal



Wind