

CONSERVATION OF ENERGY AND RESOURCES: Is it Renewable or Non-renewable Energy?



The Big Eco Idea: Energy sources are either renewable or non-renewable.

Description Of the Task

Students will work individually, with a partner and in small cooperative learning groups to understand a variety of energy forms. Students will learn to identify renewable and non-renewable sources of energy by playing the energy trivia game and the non-renewable energy bingo.

Students will also play the sunlight rays and pipelines game and have the chance to create trivia questions for it.

Curriculum Expectations:

SCIENCE & TECHNOLOGY-Understanding Earth and Space Systems: Conservation of Energy and Resources

- 2.4 Use appropriate science and technology vocabulary, including energy, heat, light, sound, electrical, mechanical, and chemical in oral and written communication.
- 2.5 Use a variety of forms to communicate with different audiences and for a variety of purposes.
- 3.1 Identify a variety of forms of energy and give examples from everyday life of how that energy is used.
- 3.2 Identify renewable (e.g. sun, wind, ocean waves and tides, wood) and non-renewable (e.g. fossil fuels such as coal and natural gas).sources of energy.

Lesson Title: Is it Renewable or Non-renewable Energy?

Unit: Science-Conservation of Energy and Resources

Grade: 5

Time: 115 minutes (total)

- 40 minutes for the Introductory Activity (Schema Activation – ‘Is it Renewable or Non-renewable Energy?’ Activity)
- 40 minutes for the Enhancing Activity (Hook – Energy Trivia Game Activity and Non-renewable Energy Bingo Activity)
- 35 minutes for the Culminating Activity (Sunlight Rays and Pipeline Game Activity)

Groupings

- Students working with a partner
- Students working individually
- Students working as a whole class
- Students working in cooperative learning groups

Teaching/Learning Strategies

- Discussion
- Science learning log/journal
- Brainstorming

Assessment Strategies

- Science learning log/journal
- Questions and answers
- Observation
- Peer/self assessment

Assessment Recording Devices

- Rubric
- Anecdotal record sheet
- Checklist

Resources Required:



Materials

Introductory Activity - Is it Renewable or Non-renewable Energy? Activity

- **BLM 1.1.a** – Renewable and Non-renewable Energy Cards 1
- **BLM 1.1.a** – Renewable and Non-renewable Energy Cards 2
- **BLM 1.1.b** – T-Chart Energy
- **BLM 1.1.d** – Cluster Map
- **BLM 1.1.e** – Mind Map
- **BLM 1.1.f** – ‘Is It Renewable or Non-renewable Energy?’ Task Card
- **BLM 1.1.g** – Checklist for ‘Is It Renewable or Non-renewable Energy?’
- **BLM 1.1.h** – Anecdotal Record Sheet
- **BLM 1.2.g** – Science Learning Log/Journal Page
- **BLM 1.2.h** – Student Criteria for Learning Log/Journal Page
- Tape
- White board with markers or chart paper
- Pencils
- Science learning log/journal

Energy Trivia Game Activity

- **BLM 1.1.h** – Anecdotal Record Sheet
- **BLM 1.2.a** – Energy Trivia Game Task Card
- **BLM 1.2.b** – Energy Trivia Game Student Worksheet
- **BLM 1.2.c** – Energy Trivia Game Questions
- **BLM 1.2.d** – Energy Trivia Game Answers
- **BLM 1.2.e** – Pictures of Renewable Energy
- **BLM 1.2.f** – Rubric for Energy Trivia Game
- **BLM 1.2.g** – Science Learning Log/Journal Page
- **BLM 1.2.h** – Student Criteria for Learning Log/Journal Page
- **BLM 1.2.i** – Rubric for Science Learning Log/Journal
- Masking tape (1 roll)
- Tennis balls (6-numbered from 1-6)

Non-renewable Energy Bingo Activity

- **BLM 1.1.h** – Anecdotal Record Sheet
- **BLM 1.2.g** – Science Learning Log/Journal Page
- **BLM 1.2.h** – Student Criteria for Learning Log/Journal Page
- **BLM 1.2.i** – Rubric for Science Learning Log/Journal
- **BLM 1.3.a** – Non-renewable Energy Bingo Task Card
- **BLM 1.3.b** – Non-renewable Energy Bingo Questions
- **BLM 1.3.c** – Non-renewable Energy Bingo Answers
- **BLM 1.3.d** – Non-renewable Energy Bingo Cards
- **BLM 1.3.e** – Non-renewable Energy Bingo Student Worksheet
- **BLM 1.3.f** – Rubric for Non-renewable Energy Bingo
- Bingo markers
- Pencils
- Science learning log/journal

Culminating Activity - Sunlight Rays and Pipelines Game Activity

- **BLM 1.2.g** – Science Learning Log/Journal Page
- **BLM 1.2.h** – Student Criteria for Learning Log/Journal Page
- **BLM 1.2.i** – Rubric for Science Learning Log/Journal
- **BLM 1.4.a** – Sunlight Rays and Pipelines Game Task Card
- **BLM 1.4.b** – Sunlight Rays and Pipelines Game Board
- **BLM 1.4.c** – Sunlight Rays and Pipelines

- Plastic buckets/waste bins (6)
- Numbered cards (1-6 to be placed on the taped line in line with the buckets)
- Pencils
- Number cards (1-6)
- Science learning log/journal



Black Line Masters (BLM)

- **BLM 1.1.a** – Renewable and Non-renewable Energy Cards 1
- **BLM 1.1.a** – Renewable and Non-renewable Energy Cards 2
- **BLM 1.1.b** – T-Chart Energy
- **BLM 1.1.d** – Cluster Map
- **BLM 1.1.e** – Mind Map
- **BLM 1.1.f** – ‘Is It Renewable or Non-renewable Energy?’ Task Card
- **BLM 1.1.g** – Checklist for ‘Is It Renewable or Non-renewable Energy?’
- **BLM 1.1.h** – Anecdotal Record Sheet
- **BLM 1.2.a** – Energy Trivia Game Task Card
- **BLM 1.2.b** – Energy Trivia Game Student Worksheet
- **BLM 1.2.c** – Energy Trivia Game Questions
- **BLM 1.2.d** – Energy Trivia Game Answers
- **BLM 1.2.e** – Pictures of Renewable Energy
- **BLM 1.2.f** – Rubric for Energy Trivia Game
- **BLM 1.2.g** – Science Learning Log/Journal Page
- **BLM 1.2.h** – Student Criteria for Learning Log/Journal Page
- **BLM 1.2.i** – Rubric for Science Learning Log/Journal
- **BLM 1.3.a** – Non-renewable Energy Bingo Task Card
- **BLM 1.3.b** – Non-renewable Energy Bingo Questions
- **BLM 1.3.c** – Non-renewable Energy Bingo

Game Questions

- **BLM 1.4.d** – Sunlight Rays and Pipelines Game Student Worksheet
- **BLM 1.4.e** – Rubric for Sunlight Rays and Pipelines Game
- **BLM 1.4.f** – Peer/Self Assessment Form
- Pencils
- Die (2)
- Game pieces/markers (6)
- Science learning log/journal



Print and Websites

- Ecokids. *Student section-interesting facts about energy.*
http://www.ecokids.ca/pub/homework_help/energy/index.cfm
- Energy Kid's Page. *Energy facts.*
<http://www.eia.doe.gov/kids/energyfacts/index.html>
- The University of Manchester. *Energy facts about renewable and non-renewable energy sources.*
<http://www.childrensuniversity.manchester.ac.uk/interactives/science/energy/discovermore/renewable.pdf>
- Alliance to Save Energy.
http://ase.org/section/_audience/educators

Answers

- **BLM 1.3.d** – Non-renewable Energy Bingo Cards
- **BLM 1.3.e** – Non-renewable Energy Bingo Student Worksheet
- **BLM 1.3.f** – Rubric for Non-renewable Energy Bingo
- **BLM 1.4.a** – Sunlight Rays and Pipelines Game Task Card
- **BLM 1.4.b** – Sunlight Rays and Pipelines Game Board
- **BLM 1.4.c** – Sunlight Rays and Pipelines Game Questions
- **BLM 1.4.d** – Sunlight Rays and Pipelines Game Student Worksheet
- **BLM 1.4.e** – Rubric for Sunlight Rays and Pipelines Game
- **BLM 1.4.f** – Peer/Self Assessment Form

Preparation:

1. Print off all Black Line Masters (**BLM 1.1.a, BLM 1.1.b, BLM 1.1.d, BLM 1.1.e, BLM 1.1.f, BLM 1.1.g, BLM 1.1.h, BLM 1.2.a, BLM 1.2.b, BLM 1.2.c, BLM 1.2.d, BLM 1.2.e, BLM 1.2.f, BLM 1.2.g, BLM 1.2.h, BLM 1.2.i, BLM 1.3.a, BLM 1.3.b, BLM 1.3.c, BLM 1.3.d, BLM 1.3.e, BLM 1.3.f, BLM 1.4.a, BLM 1.4.b, BLM 1.4.c, BLM 1.4.d, BLM 1.4.e, and BLM 1.4.f**) prior to the activity.
2. Photocopy the Black Line Masters (**BLM 1.1.a, BLM 1.1.b, BLM 1.1.d, BLM 1.1.e, BLM 1.1.g, BLM 1.1.h, BLM 1.2. b, BLM 1.2. c, BLM 1.2. d, BLM 1.2.f, BLM 1.2.g, BLM 1.2.h, BLM 1.2.i, BLM 1.3.b, BLM 1.3.c, BLM 1.3.d, BLM 1.3.e, BLM 1.3.f, BLM 1.4.b, BLM 1.4.c, BLM 1.4.d, BLM 1.4.e, and BLM 1.4.f**) prior to the activity.
3. Laminate the Renewable and Non-renewable Energy Cards (**BLM 1.1.a**), Energy Trivia Game Questions and Answers (**BLM 1.2.c, BLM 1.2.d**), Pictures of Renewable Energy (**BLM 1.2.e**), Task Cards (**BLM 1.1.f, BLM 1.3.a, and BLM 1.4.a**), Non-renewable Energy Bingo Questions and Answers (**BLM 1.3.b, BLM 1.3.c**), Non-renewable Energy Bingo Cards (**BLM 1.3.d**), Sunlight Rays and Pipelines Game Board (**BLM 1.4.b**), and Sunlight Rays and Pipelines Game Questions (**BLM 1.4.c**)
4. Pre-cut the Energy Trivia Game Questions (**BLM 1.2.c**), Non-renewable Energy Bingo Questions (**BLM 1.3.b**), and Sunlight Rays and Pipelines Game Questions (**BLM 1.4.c**) prior to the activity before the learning task.
5. Purchase the six baskets and tennis balls needed for the Energy Trivia Game, prior to the learning task.
6. Clear an area in the classroom to play the Energy Trivia Game. The six baskets should be lined up against a wall, an equal distance apart from each other. Place one renewable energy picture above each of the six baskets. Also, a line should be taped on the ground for the students to stand behind. The taped line should be a fair distance apart from the six baskets, making it challenging for students to throw the tennis balls. As well, six number cards should be taped on the line, indicating where students stand and which tennis ball they should use. For example, the person standing on the number two card should use the number two tennis ball.
7. Divide students into small cooperative learning groups of 5-6 to allow for heterogeneous grouping.

Vocabulary:

- Biogas
- Biomass energy
- Carbon dioxide
- Coal
- Electrical energy
- Electricity
- Energy
- Ethanol
- Fossil fuels
- Fumaroles
- Geothermal energy
- Geyser
- Gravitational energy
- Greenhouse effect
- Greenhouse gases
- Hot spring
- Hydropower energy
- Manure
- Methanol
- Micro-organism
- Natural gas
- Non-renewable energy
- Nuclear energy
- Ocean energy
- Oil
- Plankton
- Radiant energy
- Renewable energy
- Solar energy
- Solar panels
- Tidal energy
- Tides
- Turbine
- Volcanic energy
- Wave energy
- Wind energy

Teaching / Learning:

Lesson Plan Progression

A) Introductory Activity: Schema Activation - Is it Renewable or Non-renewable Energy?	Time	Assessment Techniques	Key Questions
<p>Activate Prior Knowledge: Whole class discussion –</p> <ol style="list-style-type: none"> 1. Ask students to define what energy is. Record responses on chart paper or on a black/white board. 2. Ask students to give examples from everyday life of how that energy is used. Record responses on chart paper or on the black/white board. 3. Introduce the topic of renewable energy. Record responses on chart paper or on the black/white board. 4. Think-pair share. Have them identify various renewable energy sources and how they are used. Share your responses with a partner and record them on a Cluster Map (BLM 1.1.d) / Mind Map (BLM 1.1.e). The cluster map can either be completed by each pair of students or as a whole class once their responses have been discussed. 5. Depending on responses, discuss renewable energy sources such as solar, wind, geothermal, biomass, tidal, wave, and hydropower. The discussion can be very brief or completed after the 'Is it Renewable or Non-renewable Energy?' activity. 6. Introduce the topic of non-renewable energy. Think-pair share. Have students brainstorm the definition of renewable and non-renewable energy. Record responses on chart paper or on the white board. Repeat the above process. 7. Students work with a partner to complete the 'Is it Renewable or Non-renewable Energy?' activity. Each pair is given a set of cards (BLM 1.1.a-with various pictures of renewable energy sources/non-renewable energy sources) and a T-Chart (BLM 1.1.b). Both students work cooperatively to identify the renewable from the non-renewable energy cards and place them correctly on the T-chart. Students record their answers directly on the T-chart (then glue in science journal) or directly in their science journals. 	<p>40 min</p>	<p>Observations: Observation notes will be made during discussion.</p> <p>Questions and Answers: Questions led by the teacher or student. Ask students to recognize and recall specific facts and ideas. Ask students to retell and summarize information.</p> <p>Checklist</p> <p>Anecdotal</p>	<ol style="list-style-type: none"> a) What is energy? b) How is energy used? c) What does renewable mean? d) What is renewable energy? e) Give an example of a renewable energy source. f) How is it being used? g) What does non-renewable mean? h) What is non-renewable energy? i) Give an example of a non-renewable energy source. j) How is it being used? k) Which cards were placed under the

		Record Sheet	renewable energy column? Non-renewable energy column?
B) Enhancing Activity: Hook Energy Trivia Game and Non-renewable Energy Bingo Activity	40 min		
<p>Divide students into small cooperative learning groups of 5-6 students to play the ‘Energy Trivia Game’ and the ‘Non-renewable Energy Bingo Activity.’ Each group will spend approximately 20 minutes playing each activity and then will rotate to the next learning task. The ‘Energy Trivia Game’ tests students’ knowledge of a variety of renewable energy sources, while the ‘Non-renewable Energy Bingo Activity’ is testing what they know about non-renewable energy sources.</p> <p>Energy Trivia Game:</p> <ol style="list-style-type: none"> 1. Select six students to play the ‘Energy Trivia Game’ at one time. 2. Students stand behind the taped line on the floor, making sure each of them are in front of a plastic bucket and a renewable energy picture. 3. Each player is given a numbered tennis ball which corresponds to the number cards taped to the line that they are standing behind. 4. Students hold the tennis ball in their hand and listen to the trivia question being read. Either the teacher or selected students can read the questions. If students are reading the question, make sure that you indicate to the class that they can’t throw their tennis ball until the entire question has been read. 5. When students know the answer, they throw their tennis ball into the correct bucket. Students who have the correct answer and the ball remains inside the bucket will receive a point. 6. The first person to answer three correct questions will win the trivia round. 7. Remind students that if they step over the line or throw the tennis ball before the entire question is read, they will be disqualified. 8. Also, to make the game flow better and eliminate cheating, have one or two students be the score keepers. Their responsibility is to identify which numbered balls land into the correct buckets and keep an eye on students remaining behind the taped line. 9. Have students play a few rounds prior to them answering their worksheet (BLM 1.2.b). 10. Discuss with students the outcome of the game and their answers from the worksheet. <p>Non-renewable Energy Bingo Activity:</p> <ol style="list-style-type: none"> 1. Select six students to play the ‘Non-renewable Energy Bingo Activity’ at one time. 2. Choose someone to be the bingo caller. 3. Each player receives a bingo card (BLM 1.3.d) and 12 bingo markers. 4. The caller reads out one question at a time. Remind students to listen to the entire question being read before marking their bingo card. 5. Have students decide what type of non-renewable energy source (coal, natural gas or oil) the question is referring to and place a marker on the answer found on the bingo card. There are approximately 6 different bingo cards so make sure that every student receives a different one. 6. The person who has four correct matches, either across, up and down or diagonally wins the bingo round. 7. Have students play a few rounds prior to them answering their worksheet (BLM 1.3.e). 	<p>20 min</p> <p>20 min</p>	<p>Anecdotal Record Sheet</p> <p>Rubric</p> <p>Anecdotal Record Sheet</p> <p>Rubric</p>	<p>a) Name all six renewable energy sources.</p> <p>b) What is one thing that you have learned about solar energy?</p> <p>c) What is one thing that you have learned about geothermal energy?</p> <p>d) What is one thing that you have learned about biomass energy?</p> <p>e) What is one thing that you have learned about hydropower energy? etc</p> <p>f) Where do you use each of these kinds of renewable energy sources?</p> <p>g) Why are renewable energy sources better for the environment?</p> <p>a) Name all three non-renewable energy sources.</p> <p>b) What is one thing that you have learned about coal energy?</p> <p>c) What is one thing that you have learned about natural gas energy?</p> <p>d) What is one thing that you have learned</p>

<p>8. Discuss with students the outcome of the game and their answers from the worksheet.</p>			<p>about oil energy? f) Where do you use each of these kinds of non-renewable energy sources? g) Why are non-renewable energy sources bad for the environment?</p>
<p>Culminating Activity (Wrap Up Activity): Sunlight Rays and Pipelines Game</p>	<p>35 min</p>		
<ol style="list-style-type: none"> 1. Students work in a small group of 5 to 6 to play the ‘Sunlight Rays and Pipelines Game’, which is similar to snakes and ladders. 2. Each group is given a game board (BLM 1.4.b), a task card (BLM 1.4.a - containing rules for the game), and a deck of trivia cards (BLM 1.4.c). 3. Students choose a game piece and place it on the start space of the game board. 4. They take turns rolling the die to determine who will play first. The first person with the highest number goes first and students continue taking turns in a clockwise order from the first person. 5. If students land on a pipeline, they must ‘slide down’ because it represents drilling for fossil fuels and this contributes to the greenhouse effect. 6. If students land on a ray of sunlight, they must ‘slide up’ because it represents using solar energy, which is renewable energy. 7. When students land on a trivia card space, a group member selects a card from the top of the card deck and asks them a trivia question. If the player answers the question correctly, they can roll the die again and have another turn. However, if they answer incorrectly, the trivia card is pile 		<p>Rubric</p> <p>Peer/Self Assessment</p> <p>Science Learning Log/ Journal – Completed worksheets glued into book and assessed</p>	

<p>and asks them a question. If the student answers correctly, they can have another turn. If they answer incorrectly, the player remains on the same space. The trivia card is placed at the bottom of the pile.</p> <ol style="list-style-type: none"> 9. The first person who lands directly on the 'finish space' wins the game. In order to land directly on the finish space, the student must roll the exact number. 10. When students are finished playing the first round have them develop trivia questions of their own, that they can use for the game. Depending on students' abilities, this step could be completed prior to playing the game. 11. Whole Class Discussion – Have students sitting at their individual desks for wrap up discussion. 12. Students glue all completed worksheets into their science learning log/journal. <p>Review the importance of renewable energy sources and discuss the long-term impacts on society and the environment of human use of non-renewable energy sources.</p> <p>Game Student Worksheet (BLM 1.4.b) to record their answers from the game. Students can glue this worksheet into their Science Journal.</p>			
--	--	--	--

Notes to Teacher:

Vocabulary Definitions:

- **Biogas** – Biogas is a mixture of gases, usually methane and carbon dioxide, produced by the decomposition of manure, sewage, garbage, organic waste or plant crops.
- **Biomass energy** – Biomass energy is produced from energy crops or from waste materials. Heat, electricity, and transportation fuels can be made from plant materials and wastes such as agricultural residues, forest underbrush, and organic human wastes. Most rubbish we throw out is buried in the ground (also known as landfill). The gas generated by landfill as it rots (biomass) is another form of renewable or "green" energy. Landfill gas is created when the waste you throw away starts rotting (or decomposing) in the ground. This gas can be captured and processed to create electricity. Biomass may also include biodegradable wastes that can be burn as fuel.
- **Carbon dioxide** – Carbon dioxide is a heavy, odourless and colourless gas formed during respiration and by decaying organic material. During photosynthesis, plants absorb it from the air.
- **Coal** – Coal is a fossil fuel formed millions of years ago from plants that grew in swamps and bogs. Buried under water and eaten by bacteria, the plants decayed into spongy, brown peat which was covered with layers of clay, sand and rock. Over millions of years, the pressure of these extra layers turned the peat into the coal we use for fuel.
- **Electrical Energy** – Energy made available by the flow of electric charge through a conductor.
- **Electricity** – Electricity is a form of energy that deals with the flow of electrical power/currents. Electricity is considered to be a secondary energy source because it is made by harnessing other sources of energy, such as coal, nuclear power, natural gas and oil.
- **Energy** – Energy is the ability to do work. There are many forms of energy, such as mechanical, chemical, heat, light, and sound. People have learned how to change energy from one form to another so that they can do work more easily and live more comfortably. Most of the energy that used today comes from oil, coal and natural gas, which are fossil fuels. However, renewable energy, which includes solar, wind, geothermal, biomass, hydropower and tidal sources are also being used as an alternative because they are usually less polluting than energy from fossil fuels.
- **Ethanol** – Ethanol refers to ethyl alcohol, a colourless liquid that burns and makes water and carbon dioxide. When ethanol vapour mixes with air, it is extremely explosive and can be used to produce transportation fuel. Ethanol is produced when corn and sugar cane are fermented.
- **Fossil fuels** – Fossil fuels are natural substances made deep within the earth from the remains of ancient plants and animals. Over time, heat and pressure turn the decomposing remains into fuels which release energy when burned. Coal, oil and natural gas are the three main types of fossil fuels.
- **Fumaroles** – Fumaroles are holes in the Earth's crust where volcanic gases are released.

- **Geothermal energy** – Geothermal power uses the heat that comes from deep rocks under the surface of the Earth. The steam or hot water that comes from inside the earth can be used to heat buildings or make electricity. Geothermal energy is a source of renewable energy because it uses water replenished by rainfall and heat that emanates from deep inside the Earth.
 - **Geyser** – A geyser is a hot spring that occasionally ejects water and steam into the air.
 - **Gravitational energy** – Gravitational energy is resting or position energy. For example, a rock resting at the top of a hill contains potential gravitational energy.
 - **Greenhouse effect** – The greenhouse effect is the gradual warming of the Earth's atmospheric temperature. It is caused by carbon dioxide and other greenhouse gases. The greenhouse effect disturbs the way the Earth's climate maintains the balance between incoming and outgoing energy.
 - **Greenhouse gases** – Greenhouse gases trap the heat of the sun in the Earth's atmosphere, producing the greenhouse effect. The two major greenhouse gases are water vapour and carbon dioxide. Lesser greenhouse gases include methane, ozone, chlorofluorocarbons and nitrogen oxides. The increase in these gases in the atmosphere contributes to global warming, which results from burning fossil fuels and deforestation.
 - **Hot spring** – A hot spring is made from the heated groundwater inside the Earth's crust.
 - **Hydropower energy** – Hydropower is generated from running water. Sometimes dams are built across a lake or river in a valley to trap water. The water then flows through tunnels, turning the turbines which make electricity.
 - **Manure** – Manure is an organic substance used to fertilize soil.
 - **Methanol** – Methanol is a colourless, flammable, poisonous liquid that is also called methyl alcohol. It is a major component of natural gas and considered a greenhouse gas.
 - **Micro-organisms** – A micro-organism is too small to be seen by the human eye. Examples of micro-organisms include bacteria, fungi and protists.
 - **Natural gas** – Natural gas is a non-renewable energy source that is used to cook meals, heat water, warm houses and buildings, and even power cars. It is usually found in fossil fuel deposits and was created from the remains of plants and animals which lived on Earth millions of years ago. Over time, the plant and animal remains were covered by layers of sand, rock and ice. Eventually, they were changed into fossils because of the heat and pressure in the earth's surface. Natural gas is a gaseous form of these fossils.
 - **Non-renewable energy** – Energy resource that is not replaced or is replaced only very slowly by natural processes.
-
- **Nuclear energy** – Energy that comes from splitting atoms of radioactive materials, such as uranium.
 - **Ocean energy** – Ocean energy uses the water in the ocean to produce wave and tidal energy.
 - **Oil** – The raw material that petroleum products are made from. A black liquid fossil fuel found deep in the Earth. Gasoline and most plastics are made from oil.
 - **Plankton** – Plankton are tiny plant and animal organisms, like algae, that are found in fresh or salt water. They are food for many fish and marine mammals.
 - **Radiant energy** – Radiant energy is electromagnetic energy that travels in waves, such as visible light, x-rays, gamma rays and solar energy.
 - **Renewable energy** – Renewable energy is energy generated from a natural resource such as sunlight, wind, rain, tides, which are renewable, quickly replaces itself and are usually available in a never-ending supply.
 - **Solar energy** – The radiant energy of the sun can be converted into other forms of energy such as heat (thermal energy) or electricity. Solar energy is used to heat water in homes, buildings and swimming pools and to heat spaces.
 - **Solar panels** – Solar panels convert the sun's energy into electricity.
 - **Tidal energy** – Tidal energy comes from the movement of water in the ocean.
 - **Tides** – Tides are caused by the gravitational pull of the moon and sun, along with the rotation of the earth.
 - **Turbine** – A turbine is a structure that has blades that are rotated by the force of water, gas, steam or the wind.

- **Volcanic Energy** – Volcanic energy is a form of geothermal energy produced from volcanic action.
- **Wave energy** – Wave energy uses the movement of waves created by the wind blowing across the ocean.
- **Wind energy** – Wind energy is an energy associated with the movement of air. It has been used for hundreds of years for sailing, grinding grain and for irrigation. Wind turbines and wind farms transform the energy in the wind into mechanical power.

Fossil fuels: Fossil fuels are natural substances made deep within the Earth from the remains of ancient plants and animals. Over time, heat and pressure turned decomposing remains into fuels, which release energy when burn.

Additional Activities:

Discovery Camouflage Game (An alternative to the Energy Trivia Game):

1. Tape a card showing either an item that uses energy or an energy source picture to the back of each student.
2. Have students walk around a designated area to determine their identities.
3. Prior to beginning the game, model examples of appropriate questions to ask (students can use these questions as well). Encourage students to create their own questions. Sample questions could be: Am I a type of energy? Am I a renewable energy source? Am I a non-renewable energy source? Do I use energy?....
4. Have students ask each other questions that can be answered with only yes or no.
5. Once students have found their identity, they then have to find the person who has their matching card (the item must match its correct energy source and vice versa).
6. Have students return to the carpet, discuss what cards they had and how their item uses energy and the kind of energy it uses.
7. Select pairs of students to present their matches to the whole class.

Adaptations:

All accommodations must take into account the student's Individual Education Plan. All of the learning tasks and activities are created to accommodate the needs of students at different ability levels. The lesson plan includes pictures and/or examples of a step-by-step process, lists and graphic organizers to enhance learning. The series of pictures are used to break tasks into more understandable steps. Many of the learning activities provide opportunities for peer or group interactions, encouraging the use of cooperative learning/social skills and risk-taking. Adaptations can be made in the following manner:

- Alternatives to written tasks (culminating task and the Mind Map), such as drawing, pointing to the correct answers and fill-in-the blanks could be useful. Keypads, word processors and writing software can also be used to support the writing tasks.
- Reduction in the length or number of written responses
- Students should be given extended timelines for task completion if required.
- All materials, equipment, and manipulatives should be labelled with text and visual aids.
- Students can be given exemplars (e.g., sample of completed game questions, and part of the energy trivia worksheet and non-renewable energy bingo worksheet) to demonstrate the expectations of the task).

Teacher Reflections: