ENERGY ALL AROUND

3RD Grade

education.com

Table of Contents

Energy All Around

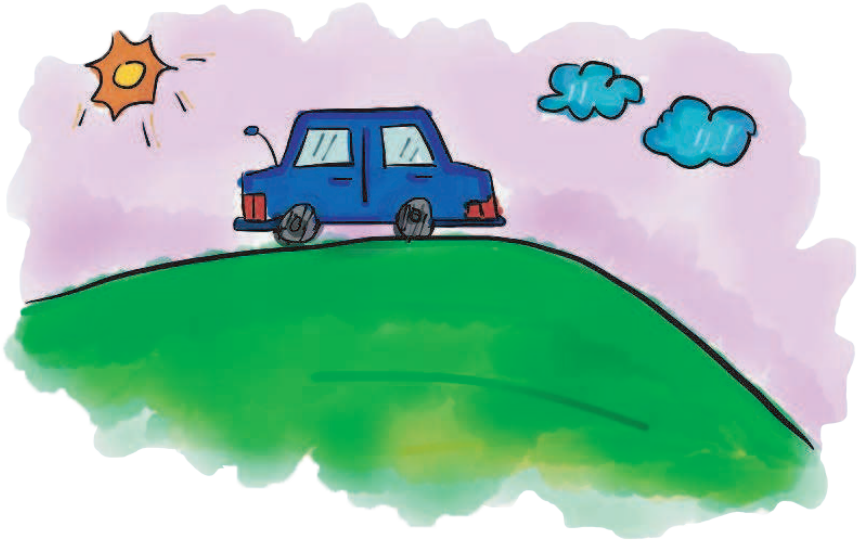
** Has an Answer Sheet*

WHAT IS ENERGY?

Energy is defined as the ability to do work. There is energy in everything, and we use energy for everything we do.

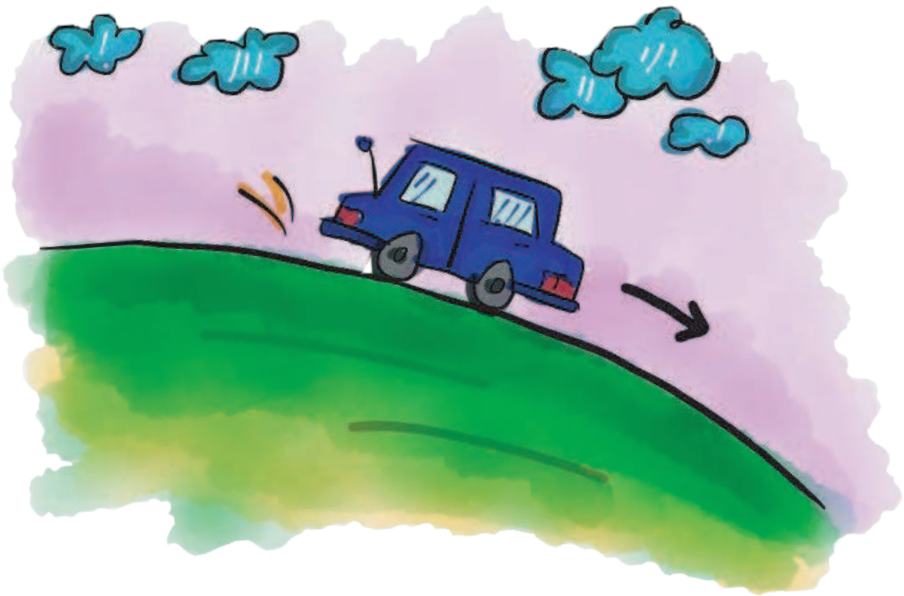
There are 2 types of energy: **potential and kinetic.**

POTENTIAL ENERGY IS ENERGY THAT IS STORED.



A car sitting at the top of a hill has potential energy.

KINETIC ENERGY IS ENERGY THAT IS IN MOTION.



When the car begins to go down the hill, the potential energy has turned into kinetic energy.

VOCABULARY & NOTES

Use the page to keep notes or jot down any words you come across while reading that you'd like the definitions of. Then if you look them up you can write down what you learn.

NOTES & VOCABULARY

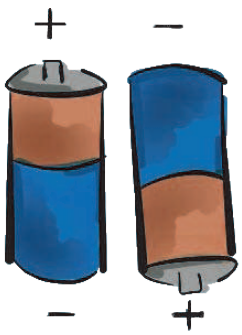
Use the page to keep notes, respond to reading questions or jot down anything you come across while reading that you'd like to remember or get more information on.

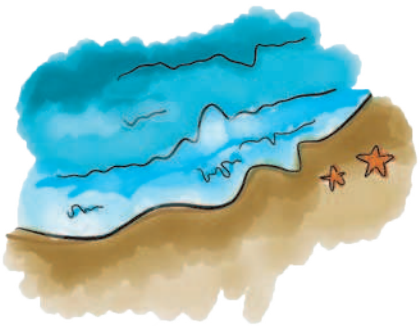
POTENTIAL VERSUS KINETIC ENERGY

Take a look at the chart to see some examples of potential and kinetic energy.

POTENTIAL ENERGY	KINETIC ENERGY
A car sitting in the driveway	A car driving down the street
A ball in a basketball player's hands	A ball bouncing down the court
A sleeping child	A child jumping on the bed
A log in a fireplace	A burning log
A lamp	A lamp turned on

Look at the pictures below, and label them potential or kinetic based on what type of energy they are showing.





DIFFERENT FORMS OF ENERGY

Energy comes in different forms, and each can be changed into another form.

HERE ARE SIX DIFFERENT FORMS OF ENERGY

CHEMICAL ENERGY

is the energy stored within bonds between molecules. There are many sources for this energy, such as natural gas, gasoline and coal.

THERMAL ENERGY

(or heat energy) is the energy of moving molecules. The energy that comes from a fire is thermal energy.

MECHANICAL ENERGY

is the energy stored in objects by tension. When the tension is released, motion occurs. A spring that is pressed down has mechanical energy.

RADIANT ENERGY

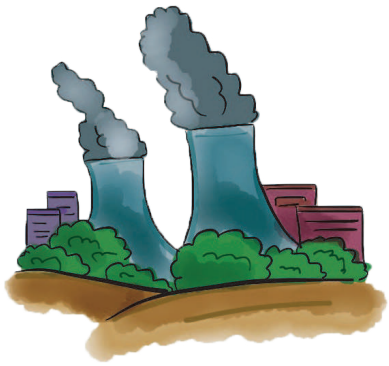
(or light energy) is related to the movement of light. The Sun provides radiant energy to warm our planet.

ELECTRICAL ENERGY

is energy that comes from tiny charged particles called electrons. In nature, lightning is one form of electrical energy.

NUCLEAR ENERGY

is the energy created when the nuclei of atoms are split or fused. This type of energy is produced in nuclear power plants.



ENERGY IS ALL AROUND US

Humans have always depended on energy for many things. From basic survival, such as cooking food, to the luxuries of television and video games, energy is an important part of our daily lives.

Before electricity, humans had to rely on the other sources of energy found in nature to complete tasks.

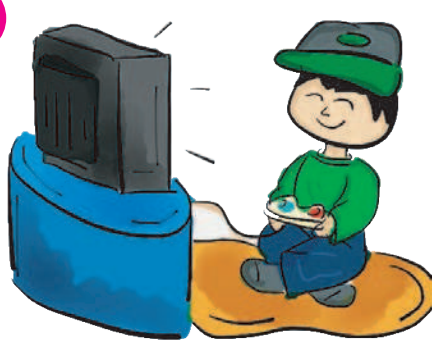
ACTIVITY

Look at the pictures below and label what form of energy is being used.

1

2

3

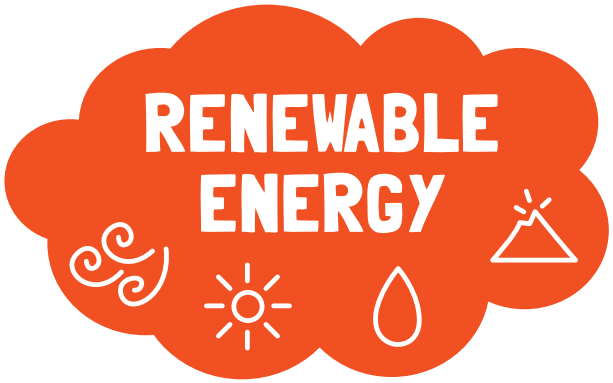


4

Think about the first two images above and write about what electrical devices help us to do these tasks today.

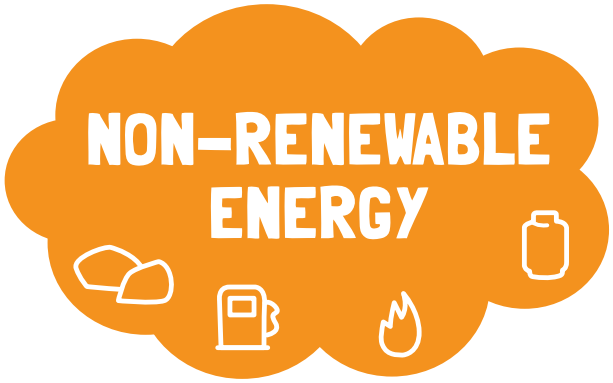
RENEWABLE VERSUS NON-RENEWABLE ENERGY

Energy is all around us in nature. Some sources of energy will never run out so that energy is known as renewable energy. Other sources of energy are available in specific amounts and will not regenerate, so they make non-renewable energy; it is energy from a source that will run out.



BIOMASS, WIND, WATER, GEOTHERMAL, SOLAR

Efforts are being made today to use more of these energy sources which are sometimes called “green energy” sources.



COAL, NATURAL GAS, PETROLEUM (OR CRUDE OIL), PROPANE, URANIUM

Coal, petroleum, natural gas and propane are known as fossil fuels because of the way they were formed.

WHAT IS BIOMASS ENERGY?

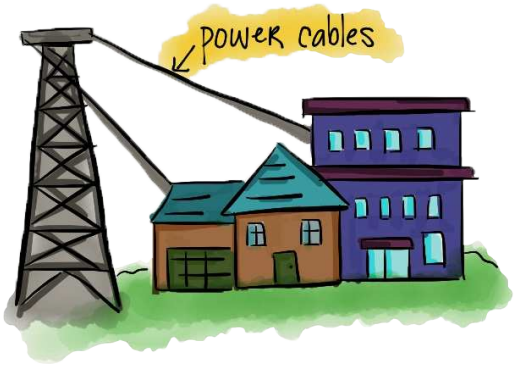
Biomass fuels come from living things such as trees, plants and crop residue. As long as we continue to grow trees and plants and replace those we use by planting new ones, we will always have biomass fuels.

TAKE A LOOK AT HOW BIOMASS ENERGY IS PRODUCED.

1 The original source of biomass fuels is from the sun. The energy is stored in trees and plants.

2 When trees or plants die or are cut down, they are burned.

3 Steam is released and moves blades inside a turbine or generator.



4 The power is then transferred to homes and businesses via cables.

★ THINK AND RESPOND ★

1. List 5 reasons why people cut down trees.

2. Why is it important that we plant new trees?

WHAT IS WIND ENERGY?

Wind is caused by convection currents (flow of air) in Earth's atmosphere. The sun produces the heat energy that produces these currents. The wind is full of kinetic energy.

Wind can be transferred into electrical energy with the help of wind turbines. A **turbine** is a machine powered by rotating blades.

The blades of a wind turbine move when there is wind. The energy is then transferred to a generator by a spinning shaft.

Windmills work the same as turbines. They are used for grinding grains or pumping water. These have been used around the world for over 1000 years.

Wind must be blowing at a rate of at least 14 miles per hour to power a turbine or windmill. Very strong winds, however, can damage these structures.

THINK AND RESPOND

What are the pros and cons of building wind turbines in Florida?

Hint:Think about the location of this state and what type of weather affects the area.

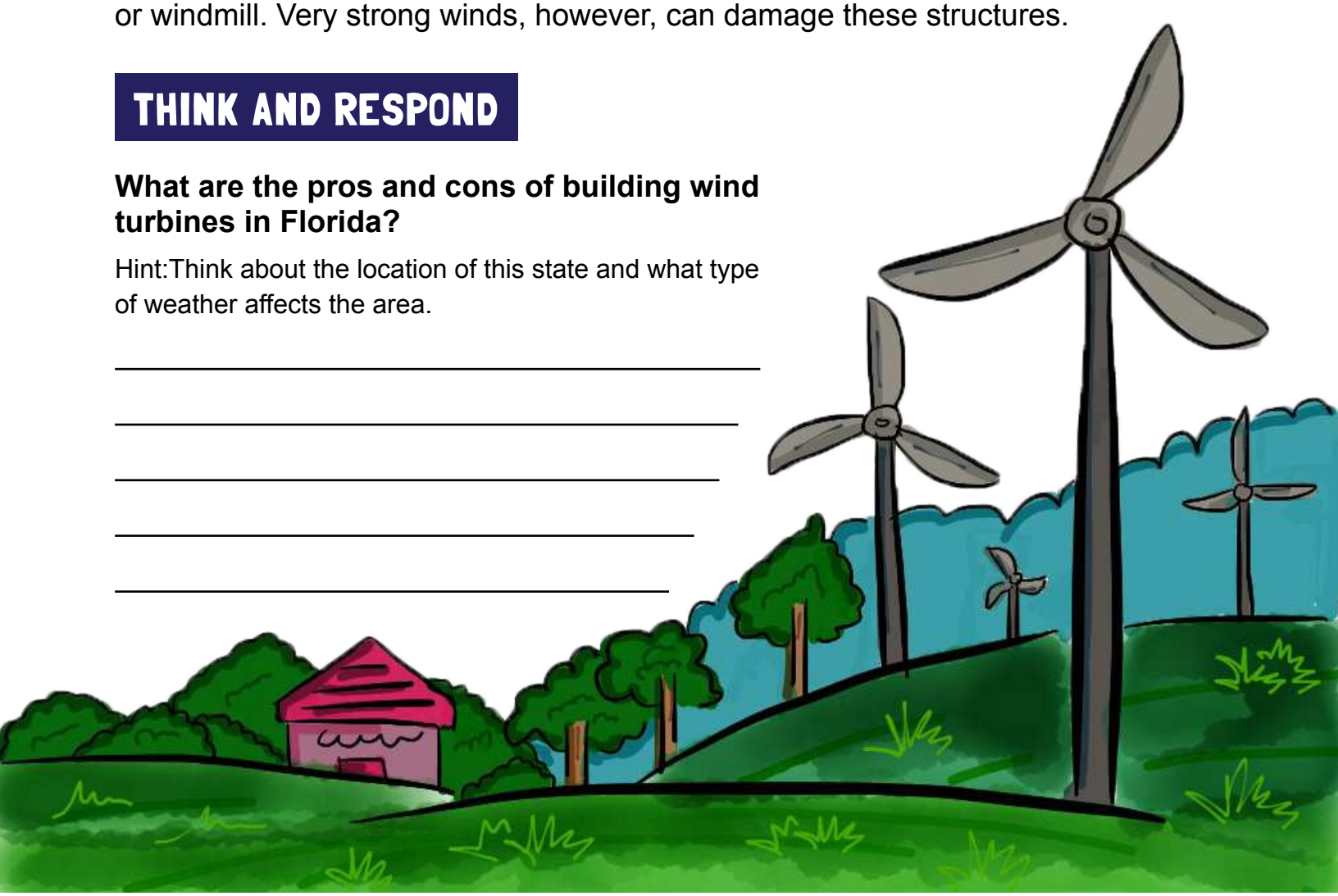
_____

_____

_____

_____

_____

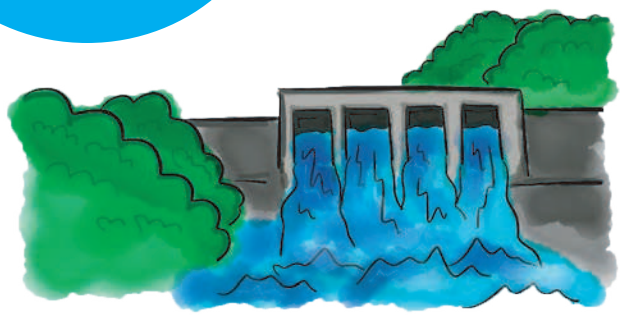


WHAT IS WATER ENERGY?

Water energy, also known as hydro power, is generated by moving water. The kinetic energy in moving water can be transferred into electicity. Here's how electricity is made at a hydroelectric power plant.

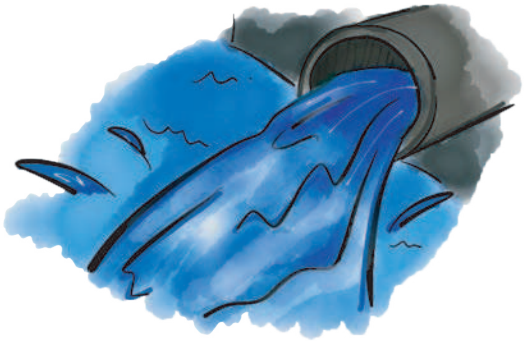
STEP 1

A dam is built to collect water (usually on a large river).



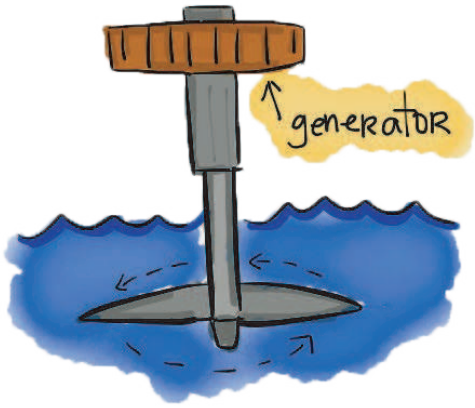
STEP 2

A gate is opened in the dam to allow water to rush into a large pipe. The pipe is sloped so that the water moves quickly, creating large amounts of kinectic energy.



STEP 3

The rushing water moves the blades, which in turn sends power to a generator.



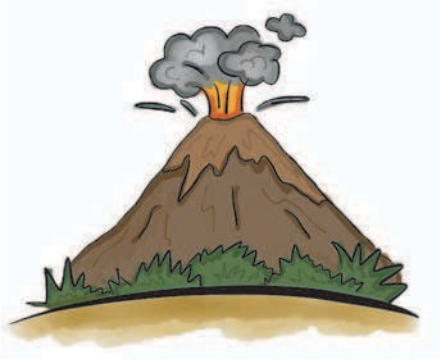
★ THINK AND RESPOND ★

Could a hydroelectric power plant be built on a lake? Explain why or why not.

WHAT IS GEOTHERMAL ENERGY?

Geothermal energy is produced by hot rocks underground. To harness this energy, deep wells are drilled into the earth. Then, cold water is pumped down into these wells. When the water goes through cracks in the rock, it is heated up. Upon its return to the surface, it has transformed into steam and hot water. This energy is then used to power generators.

Most places on the planet where geothermal energy is found are not visible. However, there are some places where geothermal energy makes its way to the surface. These places are volcanoes, fumaroles, hot springs and geysers.



A **VOLCANO** is a vent in the earth's crust in which hot, melted rock comes out.

A **FUMAROLE** is a hole in the ground where vapors and gas come out. These are usually found in volcanic regions.

A **HOT SPRING** is a source of water which flows out at a temperature higher than the average temperature of other springs.

A **GEYSER** is a spring that occasionally shoots out hot water and steam.

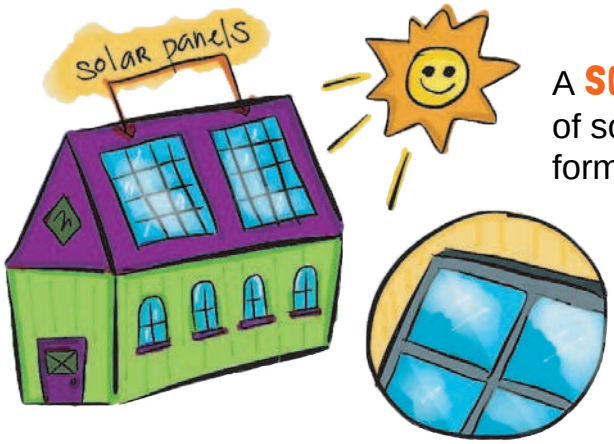
Using the vocabulary above (words in purple), complete the following sentences.

1. There is a _____ in Yellowstone National Park named Old Faithful that shoots out hot water like clockwork every day.
2. When a _____ is erupting, it is a good idea to get out of its path.
3. Many people take advantage of the warm waters of a _____.
4. The steam coming out of a _____ looks a lot like smoke.

WHAT IS SOLAR ENERGY?

Solar energy comes from the sun. The sun is an important resource, as it helps sustain life. Without the sun, our planet would have no life. Through the use of technology, we are able to harness the energy from the sun to convert it to electricity.

SOLAR CELLS are tools that change light energy from the sun and other light sources into electricity. Many calculators use solar cells to power them.



A **SOLAR PANEL** is a group of solar cells connected to form a large, flat surface.

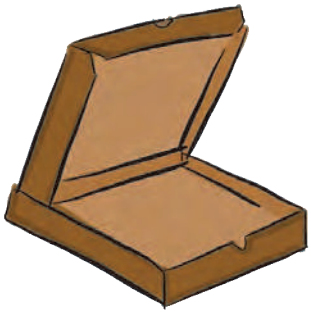
THINK AND DRAW

What do you think a car powered by the sun would look like? Draw a picture.

MAKE A SOLAR OVEN

In this fun project, you will harness the power and heat of the sun to cook a cheese quesadilla!

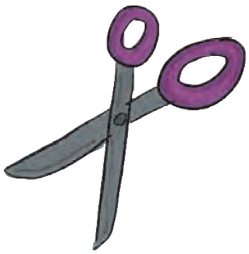
To complete this project, you will need the following materials, as well as an adult to assist you:



EMPTY PIZZA BOX

MARKER

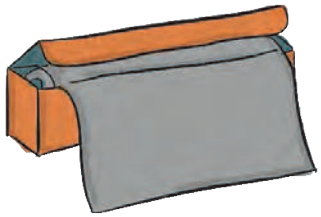
RULER



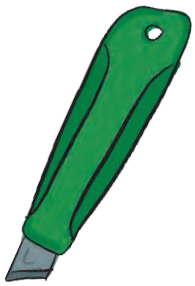
SCISSORS

GLUE STICK

BLACK CONSTRUCTION PAPER

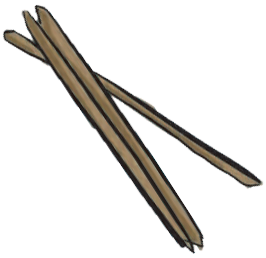


ALUMINUM FOIL



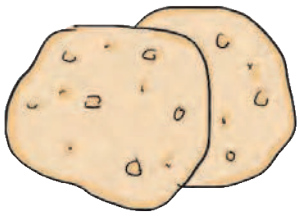
CRAFT KNIFE

⚠ to be used by an adult

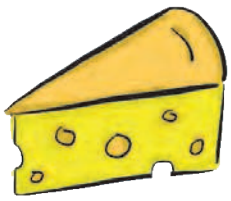


BAMBOO SKEWER, STICK OR DOWEL

CLEAR PLASTIC WRAP



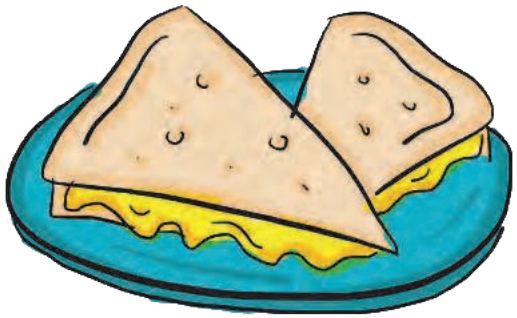
FLOUR TORTILLA



CHEESE

FOLLOW THESE INSTRUCTIONS TO CREATE YOUR OVEN AND COOK YOUR QUESADILLA.

1. Using your ruler and a pencil, measure a window with a 1 inch margin on each side of the top of the box.
2. Have an adult cut three sides with a craft knife, leaving one edge connected.
3. Carefully pry open the flap. This will become your sun window. Fold the window up along the uncut line.
4. Glue the aluminum foil to the inside of your window, smoothing out as many wrinkles as possible.
5. Line the rest of the box with foil, inside and out.
6. Tape the black piece of construction paper on the inside bottom of the box, on top of the foil.
7. Glue the plastic wrap to the underside of the lid. Try to make the seal as airtight as possible.
8. Place a flour tortilla on a piece of aluminum foil and cover half of the torilla with cheese.
9. Put the prepared tortilla (with foil underneath) into your oven and place outside in the sun.
10. Close the box.
11. Use a bamboo skewer, stick or dowel to prop the flap open.
12. Choose an angle that reflects the most light into the solar oven.
13. Cook! Check your food every 10 minutes. This could take anywhere from 20 minutes to 2 hours depending on how sunny it is outside.
14. When the cheese is melted, fold the tortilla in half and enjoy!



RENEWABLE ENERGY

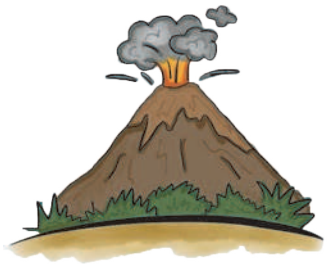
review

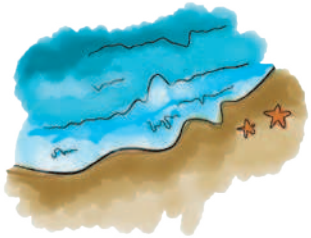
ANSWER THE FOLLOWING QUESTIONS ABOUT RENEWABLE ENERGY.

1. Why is it important to try to use as many renewable resources as possible?

2. Name all 5 renewable energy sources and give a brief description of each.

LOOK AT THE FOLLOWING PICTURES AND LABEL THEM ACCORDING TO WHICH RENEWABLE ENERGY SOURCE THEY DEMONSTRATE.





NON- RENEWABLE ENERGY

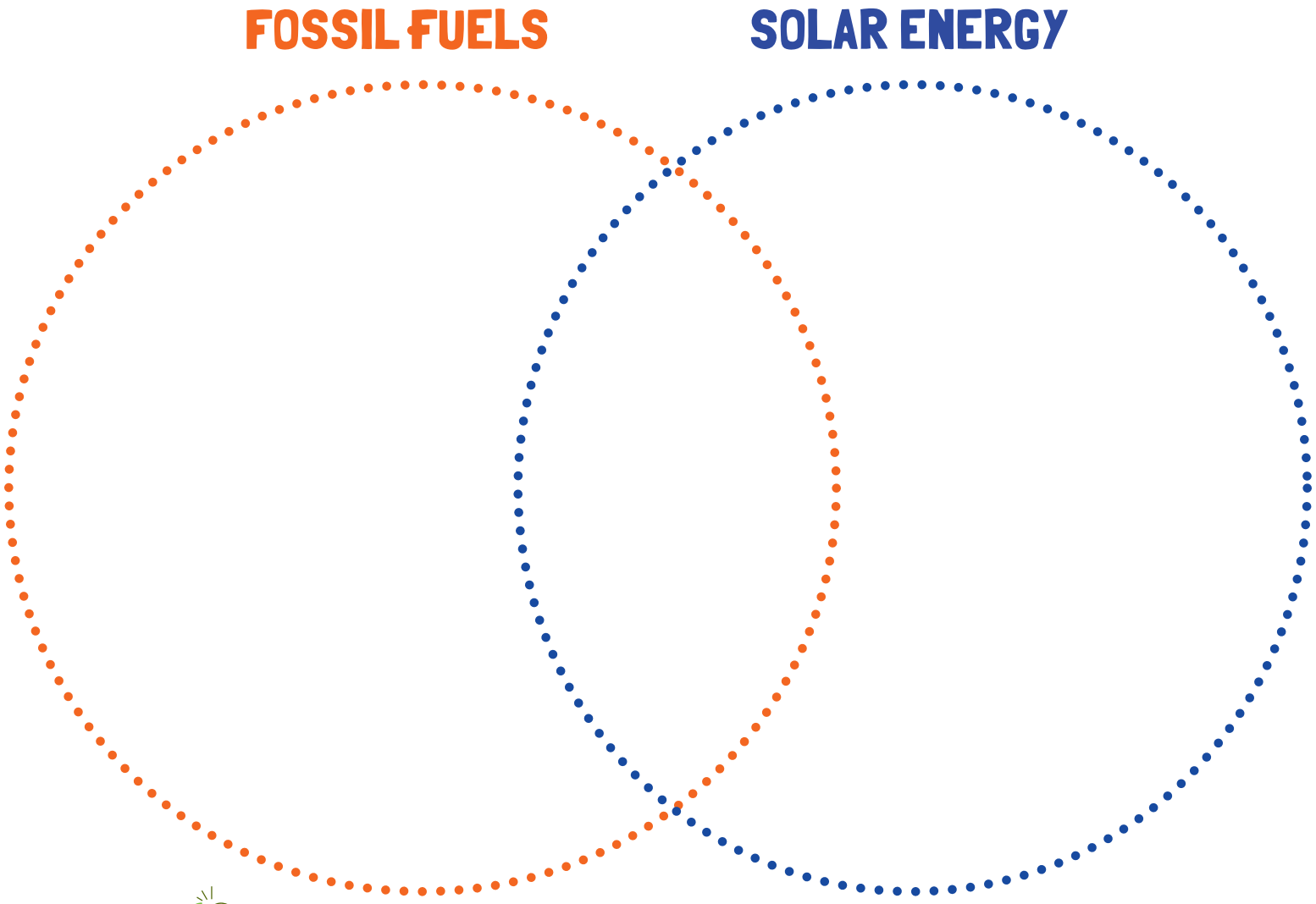
FOSSIL FUELS

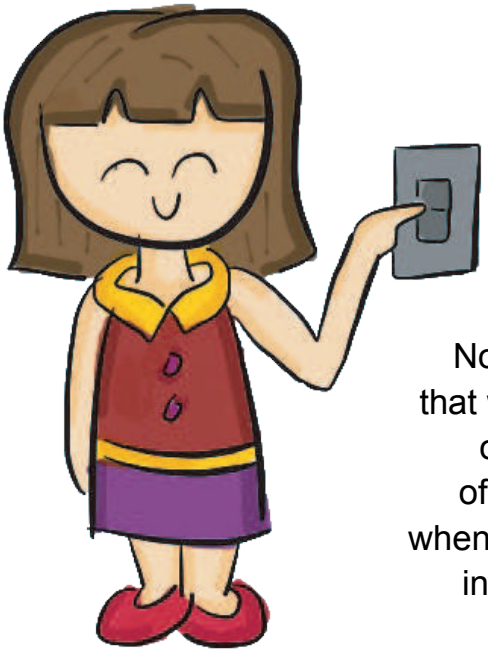
Most non-renewable energy is generated from fossil fuels which include coal, petroleum (crude oil) and natural gas. These are known as fossil fuels because of the way they are formed.

Fossil fuels were formed deep within the Earth from the remains of ancient animals and plants. Over a long period of time, heat and pressure turned these remains into fuel which releases energy when it is burned. Because they take millions of years to form, these fuels are considered non-renewable. If we run out of these, we will have to turn to alternative sources of energy.

COMPARE

Using the Venn diagram, compare fossil fuels to solar energy.





CONSERVING ENERGY

No matter which source of energy you are using, it's important that we don't waste energy. To ***conserve*** means to not waste or overuse something. Conserving energy is an important part of protecting our environment. Turning off electronic devices when they are not being used, or riding your bike down the street instead of having your mom drive you in a car are two simple ways to conserve energy.

THINK AND RESPOND

Make a list of 5 things you can do to conserve energy.

1. _____
2. _____
3. _____
4. _____
5. _____

VOCABULARY REVIEW

USE THE CLUES AND THE WORD BOX TO COMPLETE THE WORD SEARCH.

ENERGY	POTENTIAL	KINETIC	RENEWABLE	NON-RENEWABLE	BIOMASS
VOLCANO	FUMAROLE	GEYSER	HOT SPRING	SOLAR CELL	SOLAR PANEL
TURBINE	CONSERVE	Tip: → ↓ ← ↗ ↘ ↙ ↖			

P V B I O M A S S C A G Q U U T O E P F
D O G X X P R E O J H U E U U Q L I A O
R L Z X G W O N L S R M W Y Y B Q H R T
T C W S R P S T O O M E D I A X C O J R
U A T A O E U L E R R K S W G F O T E C
R N S W R E A E A N T A E Y L J I S N J
B O Z V I R N R N N T N M U E S G P E M
I G E O C I L I M I E I M U N G L R R S
N P A E B G G M X R V A A O F E M I G G
E T L R S O L A R P A N E L O P S N Y U
N O N R E N E W A B L E M N O N Z G O D
L L E C R A L O S G W K I N E T I C L B

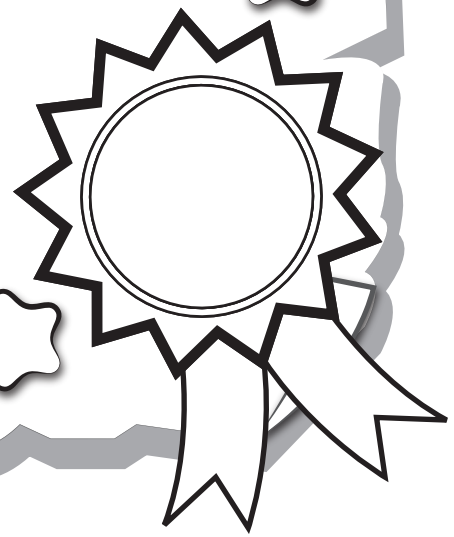
- Energy in motion is called_____ energy.
- Stored energy is called _____ energy.
- A machine powered by rotating blades is a _____.
- A spring that shoots out hot water is a _____.
- Sources of energy that will never run out are known as _____energy.
- Energy that comes from things such as plants and trees is known as _____ energy.
- _____ is the ability to do work.
- A hole in the ground that has vapors or gases coming out is called a _____.
- A tool that changes light energy into electricity is a _____.
- _____ means to use something in small amounts.
- A _____ is a vent in the Earth's crust in which melted rock comes out.
- Energy available in a specific amount that will not regenerate is known as: _____ _____ energy.
- A _____ is a group of solar cells connected to form a large, flat surface.
- A source of warm water is called a _____.

Great job!

_____

is an Education.com science superstar

education.com



Answer Sheets

Energy All Around

Potential Versus Kinetic Energy
Energy is All Around Us
What is Biomass Energy?
What is Wind Energy?
What is Water Energy?
What is Geothermal Energy?
Renewable Energy Review
Vocabulary Review

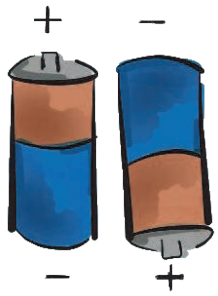
Answer Sheet

POTENTIAL VERSUS KINETIC ENERGY

Take a look at the chart to see some examples of potential and kinetic energy.

POTENTIAL ENERGY	KINETIC ENERGY
A car sitting in the driveway	A car driving down the street
A ball in a basketball player's hands	A ball bouncing down the court
A sleeping child	A child jumping on the bed
A log in a fireplace	A burning log
A lamp	A lamp turned on

Look at the pictures below, and label them potential or kinetic based on what type of energy they are showing.



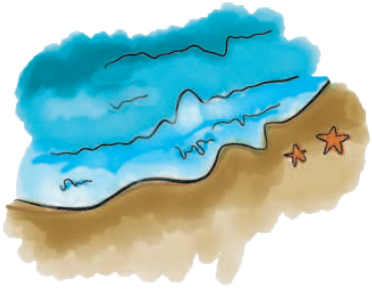
potential

kinetic

kinetic

potential

potential



kinetic

Answer Sheet

ENERGY IS ALL AROUND US

Humans have always depended on energy for many things. From basic survival, such as cooking food, to the luxuries of television and video games, energy is an important part of our daily lives.

Before electricity, humans had to rely on the other sources of energy found in nature to complete tasks.

ACTIVITY

Look at the pictures below and label what form of energy is being used.

1

thermal

2

radiant and thermal

3

electrical

4

chemical and mechanical

Think about the first two images above and write about what electrical devices help us to do these tasks today.

stove, oven, microwave

washing machine, dryer

Answer Sheet

WHAT IS BIOMASS ENERGY?

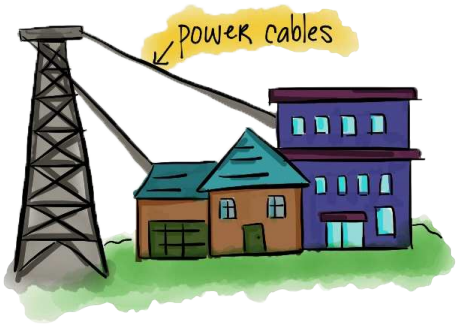
Biomass fuels come from living things such as trees, plants and crop residue. As long as we continue to grow trees and plants and replace those we use by planting new ones, we will always have biomass fuels.

TAKE A LOOK AT HOW BIOMASS ENERGY IS PRODUCED.

1 The original source of biomass fuels is from the sun. The energy is stored in trees and plants.

2 When trees or plants die or are cut down, they are burned.

3 Steam is released and moves blades inside a turbine or generator.



4 The power is then transferred to homes and businesses via cables.

★ THINK AND RESPOND ★

1. List 5 reasons why people cut down trees.

Answer will vary.

2. Why is it important that we plant new trees?

Answer will vary but you may include: trees are needed for many things including energy so it is important to replace what we use.

Answer Sheet

WHAT IS WIND ENERGY?

Wind is caused by convection currents (flow of air) in Earth's atmosphere. The sun produces the heat energy that produces these currents. The wind is full of kinetic energy.

Wind can be transferred into electrical energy with the help of wind turbines. A **turbine** is a machine powered by rotating blades.

The blades of a wind turbine move when there is wind. The energy is then transferred to a generator by a spinning shaft.

Windmills work the same as turbines. They are used for grinding grains or pumping water. These have been used around the world for over 1000 years.

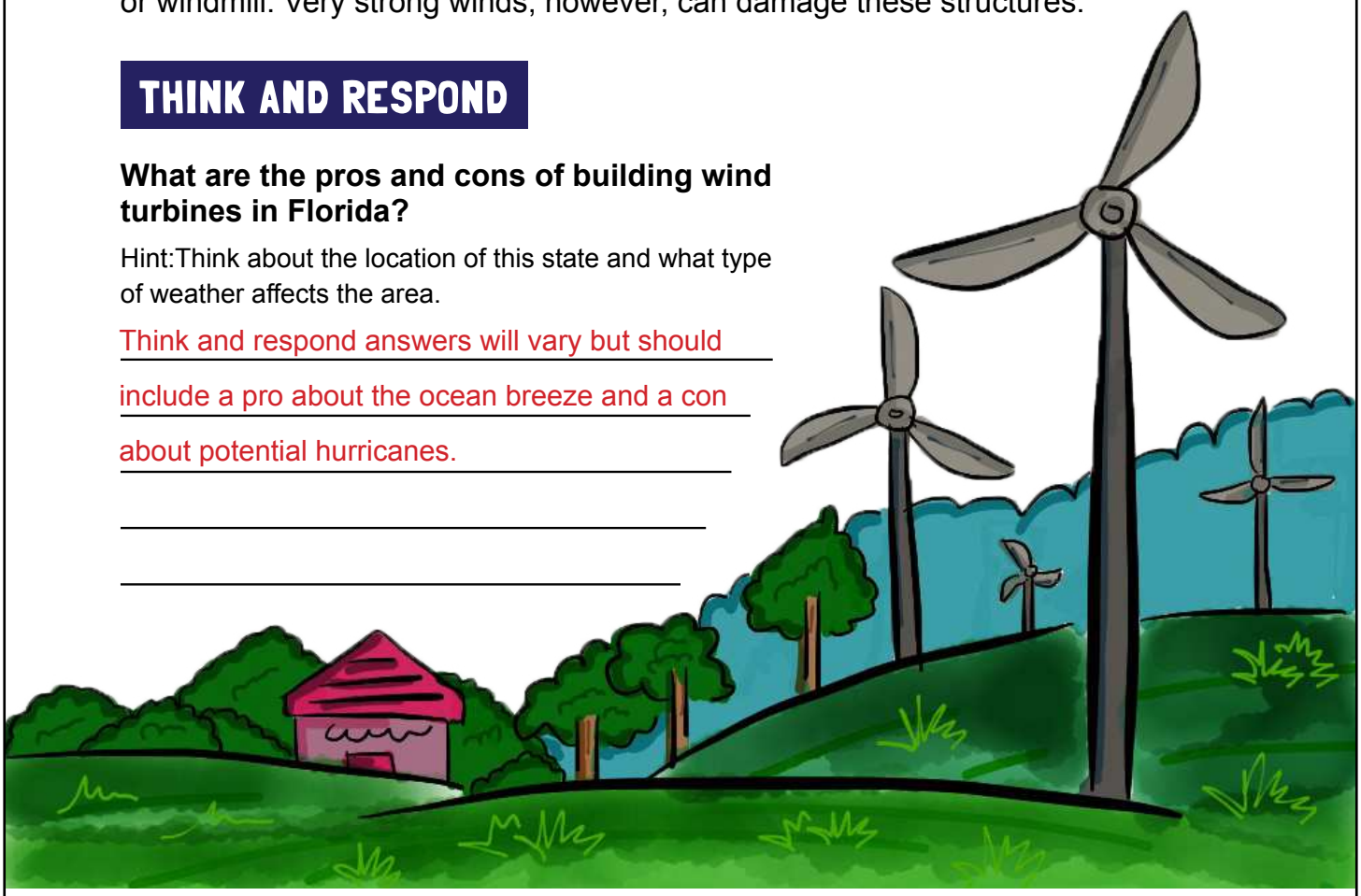
Wind must be blowing at a rate of at least 14 miles per hour to power a turbine or windmill. Very strong winds, however, can damage these structures.

THINK AND RESPOND

What are the pros and cons of building wind turbines in Florida?

Hint:Think about the location of this state and what type of weather affects the area.

Think and respond answers will vary but should include a pro about the ocean breeze and a con about potential hurricanes.



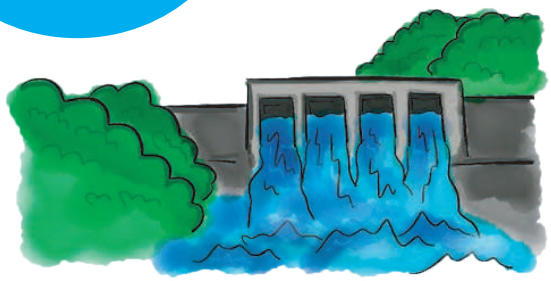
Answer Sheet

WHAT IS WATER ENERGY?

Water energy, also known as hydro power, is generated by moving water. The kinetic energy in moving water can be transferred into electicity. Here's how electricity is made at a hydroelectric power plant.

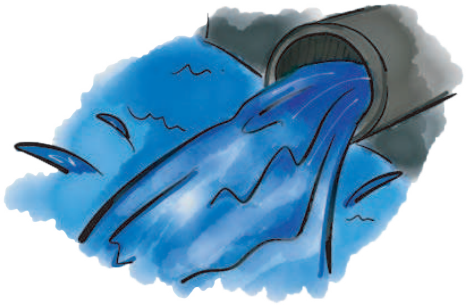
STEP 1

A dam is built to collect water (usually on a large river).



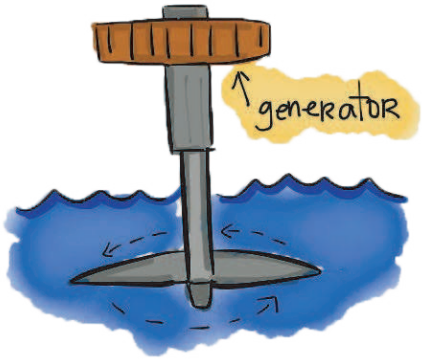
STEP 2

A gate is opened in the dam to allow water to rush into a large pipe. The pipe is sloped so that the water moves quickly, creating large amounts of kinetic energy.



STEP 3

The rushing water moves blades, which in turn sends power to a generator.



★ THINK AND RESPOND ★

Could a hydroelectric power plant be built on a lake? Explain why or why not.

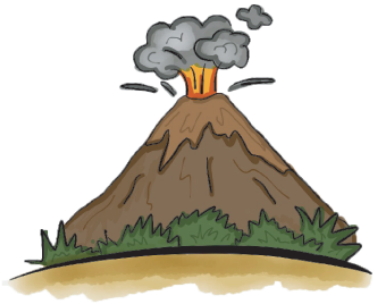
Yes, because a lake can be a large body of water.

Answer Sheet

WHAT IS GEOTHERMAL ENERGY?

Geothermal energy is produced by hot rocks underground. To harness this energy, deep wells are drilled into the earth. Then, cold water is pumped down into these wells. When the water goes through cracks in the rock, it is heated up. Upon its return to the surface, it has transformed into steam and hot water. This energy is then used to power generators.

Most places on the planet where geothermal energy is found are not visible. However, there are some places where geothermal energy makes its way to the surface. These places are volcanoes, fumaroles, hot springs and geysers.



A **VOLCANO** is a vent in the earth's crust where hot, melted rock comes out.

A **FUMAROLE** is a hole in the ground where vapors and gas come out. These are usually found in volcanic regions.

A **HOT SPRING** is a source of water which flows out at a temperature higher than the average temperature of other springs.

A **GEYSER** is a spring that occasionally shoots out hot water and steam.

Using the vocabulary above (words in purple), complete the following sentences.

1. There is a _____geyser_____ in Yellowstone National Park named Old Faithful that shoots out hot water several times a day.
2. When a _____volcano_____ is erupting, it is a good idea to get out of its path.
3. Many people take advantage of the warm waters of a _____hot spring_____.
4. The steam coming out of a _____fumarole_____ looks a lot like smoke.

Answer Sheet

RENEWABLE ENERGY

review

ANSWER THE FOLLOWING QUESTIONS ABOUT RENEWABLE ENERGY.

ANSWERS MAY VARY

1. Why is it important to try to use as many renewable resources as possible?

It is important to use renewable resources because they'll always be available. Non-renewable energy sources, like fossil fuels, will eventually run out.

2. Name all 5 renewable energy sources and give a brief description of each.

Geo-thermal: This type of energy is produced by hot rocks deep beneath Earth's surface.

Wind: The wind's energy is converted to electricity through the use of turbines.

Biomass: This type of energy comes from living things like trees and plants.

Water: Hydro power is created by converting the energy of moving water into electricity.

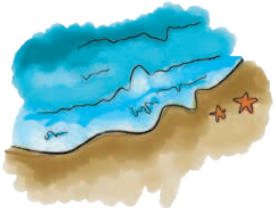
Solar: This type of energy comes from the Sun.

LOOK AT THE FOLLOWING PICTURES AND LABEL THEM ACCORDING TO WHICH RENEWABLE ENERGY SOURCE THEY DEMONSTRATE.

geo-thermal

wind

biomass



water

solar

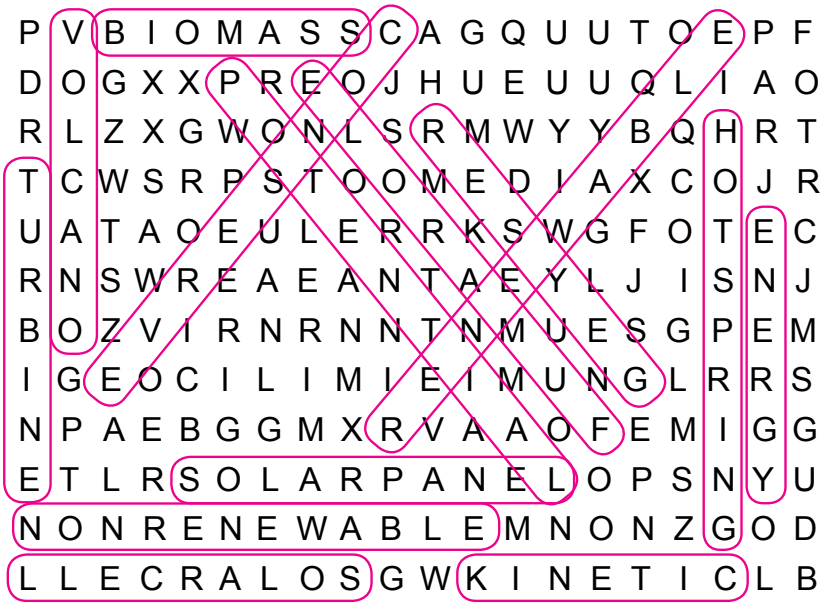
Answer Sheet

VOCABULARY REVIEW

USE THE CLUES AND THE WORD BOX TO COMPLETE THE WORD SEARCH.

ENERGY	POTENTIAL	KINETIC	RENEWABLE	NON-RENEWABLE	BIOMASS
VOLCANO	FUMAROLE	GEYSER	HOT SPRING	SOLAR CELL	SOLAR PANEL
TURBINE	CONSERVE				

Tip: → ↓ ← ↗ ↘ ↙ ↖



- Energy in motion is called _____kinetic_____ energy.
- Stored energy is called _____potential_____ energy.
- A machine powered by rotating blades is a _____turbine_____.
- A spring that shoots out hot water is a _____geyser_____.
- Sources of energy that will never run out are known as _____renewable_____energy.
- Energy that comes from things such as plants and trees is known as _____biomass_____ energy.
- _____Energy_____ is the ability to do work.
- A hole in the ground that has vapors or gases coming out is called a _____fumarole_____.
- A tool that changes light energy into electricity is a _____solar cell_____.
- _____Conserve_____ means to use something in small amounts.
- A _____volcano_____ is a vent in Earth's crust in which melted rock comes out.
- Energy available in a specific amount that will not regenerate is known as: _____ _____non-renewable_____ energy.
- A _____solar panel_____ is a group of solar cells connected to form a large, flat surface.
- A source of warm water is called a _____hot spring_____.