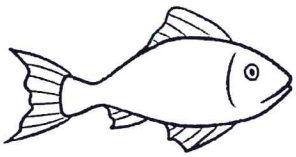
Natural Resources

Where did the paper this page is printed on come from? What about the food you ate for breakfast, or the clothes you are wearing? Where does the electricity for the lights in your classroom come from? Everything that people use in their daily lives comes from Earth. We call these things natural resources because they come from nature. Some resources help us to stay alive. Others help us to live more enjoyable lives. Some are sources of energy.

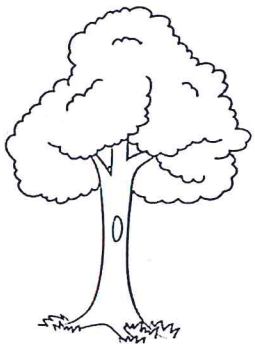
Living and Non-living Resources

Natural resources can be living or non-living. Living things get energy from their environment to do things such as grow, move, and reproduce. A tree is a living thing. It uses water and sunlight to make energy so it can grow. A rock is a non-living thing. It does not use energy, and it does not grow or move on its own.

Fish are a very important living natural resource. Fish are a source of food for people. Water is a very important non-living natural resource. We use water for drinking, cooking, and washing. We also use water to make electricity. We use the electricity for energy to make many things work, such as the lights in our homes and schools.



Renewable and Non-renewable Resources



Natural resources can also be renewable or non-renewable. Some renewable resources can be replaced or grown again. Trees are one example. Trees can reproduce themselves through seeds. Trees that are cut down can be replaced with seedlings. Seedlings are very young trees grown from seeds. Other renewable resources are always here for people to use. Wind is one example. Wind power is used to produce electricity.

Non-renewable resources cannot be replaced. They are non-renewable because they take a very long time to form. Fossil fuels and minerals are non-renewable resources. Oil is a fossil fuel. The oil we use today was formed millions of years ago. People use fossil fuels to produce energy. Oil can be made into gasoline to make cars and buses run.

"Natural Resources"—Think About It!

1. Complete the chart below with examples of living and non-living things. Try to list at least five for each category. Do not use examples from the text you have just read. Compare your chart with a classmate's chart. Do you agree with each other's examples?

Living Things	Non-living Things
leaves birds grass frogs snails lots of answers	soil Volcanoes gold aluminum mountains lots of answers

2. Below is a list of natural resources. Beside each one, write whether it is renewable or non-renewable.

a) the Sun R

b) coal NR

c) cotton plant R

d) copper NR

e) salmon R

f) cow R

g) gasoline NR

h) ocean waves R

3. Oil is used to make plastic bottles. Glass bottles are made from sand.

a) Which of these bottles could be called a renewable product? Why?

Glass is renewable. Sand is always being formed through the erosion of rock so it's renewable

b) Which of these bottles is a non-renewable product? Why?

Plastic is non-renewable. Made from oil which is non renewable

Using Resources

We use natural resources in many ways. We use some resources almost in their original form. We drink water and eat salmon. The water and the salmon are easy to identify. That is because they have not been changed into something else.

Products Made from Resources

Many resources are changed into products that we use. Sometimes it is easy to identify the resource that was used to make the product. Wood from trees is used to build houses and furniture. The wood in a bookcase looks like the wood in a tree. That is how we know it came from a tree. But wood can also be used to make paper, and paper does not look like wood.

Oil is a resource that is used in many different products. These include plastic containers, paint, soap, helmets, carpets, and tires. None of these look like the oil that comes from underground.

Different technologies are used to change resources into products. Before this can happen, the resources need to be harvested or extracted. Resources that are taken from Earth's surface are harvested. Resources that are taken from below Earth's surface are extracted. So trees are harvested, and oil is extracted.

From the Ground to Your Bathroom

Copper pipes are used for plumbing. You may have some copper pipes bringing water to the bathroom in your house. These are the steps for turning copper into copper pipes:

1. Ore containing copper is mined from below Earth's surface.
2. Ore is crushed, then ground into a powder.
3. The powder is concentrated so there is more copper in the mixture.
4. The copper mixture is smelted, or heated at high temperatures. This is done until it is 99 percent copper.
5. The copper is refined or made purer, then formed into big blocks.
6. Blocks are shipped to a manufacturer to make pipes.

That is one example of how we change a natural resource into a useful product.

"Using Resources"—Think About It!

1. Sometimes it is difficult to identify the resource a product was made from. Why?

The products don't look like the resources they are made from sometimes

2. a) Trees are harvested. Name two other resources that are harvested.

Fish seafood plants animals

b) Oil and copper are extracted. Name two other resources that are extracted.

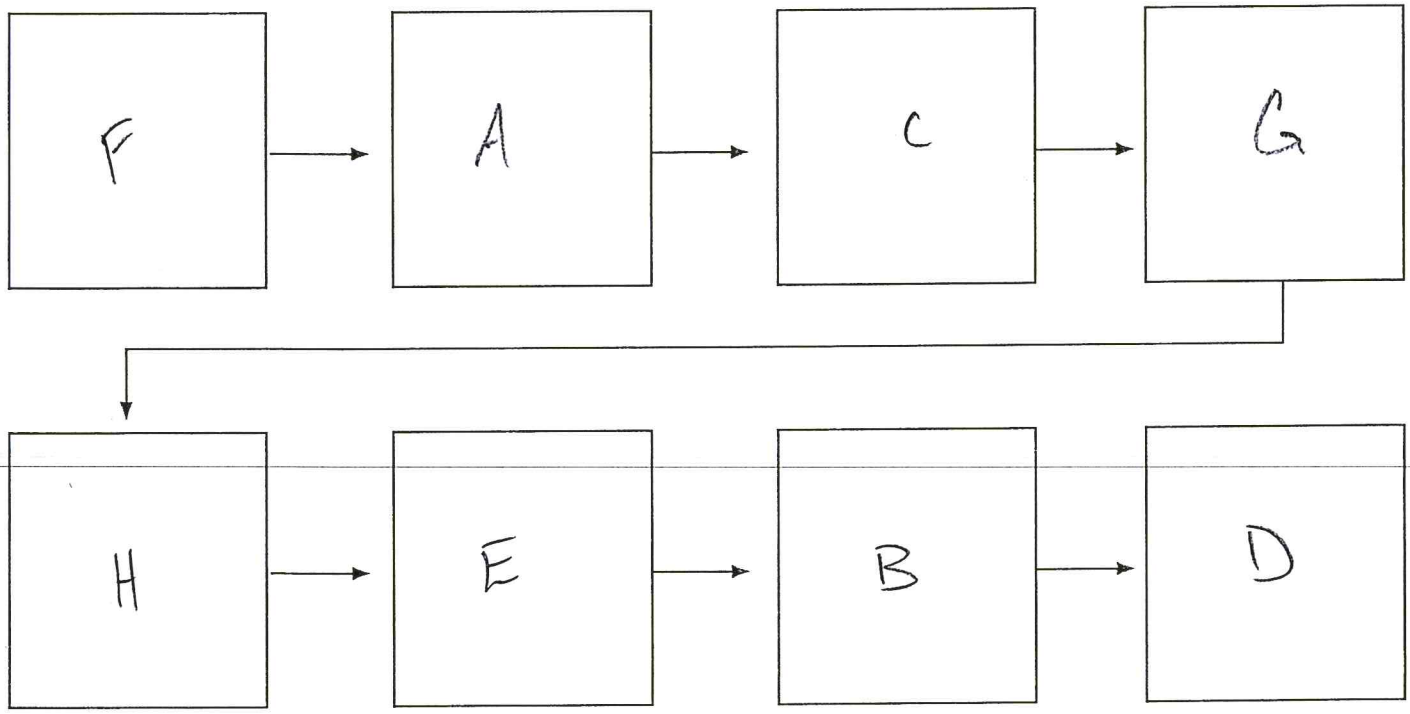
Any minerals coal natural gas

3. Copper ore and the copper used to make copper pipes are different. In what ways?

Copper ore contains copper but it also contains other materials. Copper can be used to make pipes

4. Below are the steps used to turn trees into the type of paper used in textbooks. Write the steps in the correct order in the flow chart.

A • Bark is rubbed off the trees.
B • Paper is coated to make finished paper.
C • Logs are cut into chips.
D • Paper is cut into sheets and packaged.
E • Pulp is dried and pressed to make paper.
F • Trees are cut down.
G • Chips are cooked with chemicals to make pulp.
H • Pulp is bleached to make it white.



Conserving Resources

Conservation means using Earth's resources wisely and not wasting them. If people use resources too quickly, those resources might disappear. That means they will not be here for others to use in the future. Many governments, companies, and organizations now understand how important conservation is. So do people just like you. They try to do what they can to conserve resources.

People today are not the first to care about how Earth's resources are used. Aboriginal peoples in Canada have practised conservation for a long time.

Traditional Aboriginal Cultures

Most traditional Aboriginal people believed that they were the caretakers of Earth. They believed that everything on Earth was connected. This meant that all things had to be treated properly or other things would be affected. For example, if all the rabbits in an area were killed, this would affect other animals. Animals that ate rabbits, such as foxes, would probably leave the area. Plants that the rabbits ate would grow more and take over other plants. The area could change in many ways because there were no more rabbits.

So Aboriginal people took only the resources that they needed. They were also careful about how they took these resources. The First Nations people of the Kluane region in Yukon were hunters. They used all parts of the animals they killed. Most of the animal was eaten. The antlers of large animals such as moose were made into tools, spoons, knives, and needles. People tanned the animal hides, which changed the hides into leather. They used the hides and furs to make clothing and shelters. Hides that were not tanned were used to make snowshoes and hunting bags. They even used the animals' intestines and bladders to make containers for cooking and storage.

Anishinabe Culture

Many Anishinabe people lived in the forest areas of Ontario, where they hunted and gathered food. They moved a number of times during the year to find food and to follow food sources. But they also moved around to make sure they did not use up all the food in one area. Most of the year, the Anishinabe lived in small bands. But during the warmer months of the year, they gathered in larger groups for a while. During that time, they celebrated the end of winter, saw old friends, and made new friends. The Anishinabe then moved on again. They stayed in places where they found fish, berries, and wild rice to live on but they never stayed for very long.

"Conserving Resources"—Think About It!

1. Three things that you can do to conserve resources are reduce, reuse, and recycle. By reducing, you use fewer resources and produce less garbage. When you reuse, you use the same product again or use it in a different way. Recycling is the third way to conserve. Many products can be recycled and made into new products. This includes things such as cans, paper, and glass.

   In the chart below, list what you could do to conserve resources. Try to list three ideas for each column. Put a check mark beside the things that you already do.

I can reduce by...	I can reuse by...	I can recycle by...
- use paper both sides - buy things without packaging - use own bags - tap water	- reuse gift bags - donate things - make own containers	- paper and glass in recycle bins - compost food - collect rain water

2. How would using all parts of an animal help conserve resources? You will end up with useful items. You would need to harvest less resources

3. How would moving from place to place during a year help conserve resources?
Give resources a chance to regenerate. Plants and animals would increase in numbers if left alone for a while

4. Aboriginal people believe that everything on Earth is equal and important. This means that humans are equal to the forest, animals, and other parts of nature, not more important. How is this different from the way most people think today?
Many people feel they are most important than things in the world and their needs come first.

Forms of Energy

Energy is the ability to do work. We use energy in everything we do. Our bodies use energy to grow. Cars use energy to move. Stoves use energy to cook food. Energy comes in many forms. Here are some examples:

- Chemical energy is energy that is stored in certain substances. Wood has chemical energy. When we burn wood, it releases its chemical energy.
- Motion energy or mechanical energy is motion that does work. Wind has motion energy. When wind moves, it can turn a windmill.
- Thermal energy is heat energy. We use heat energy to warm our homes.
- Electrical energy is movement, light, heat, or sound caused by electricity. Lightning is an example of electrical energy in nature. Electrical energy makes light bulbs work.

Sources of Energy

We get energy from different sources. Some of these sources are renewable. Renewable sources can be replaced or grown again. Examples of renewable sources include wind and trees. Here are some examples of energy from renewable sources:

- Biomass is energy from burning plants or garbage.
- Geothermal energy is heat energy from below Earth's surface.
- Hydroelectricity is energy from moving water.
- Solar energy is energy from the Sun.
- Wind energy is energy from wind.

We use renewable energy sources mainly to make electricity.

Most of our sources of energy are non-renewable. Non-renewable sources cannot be replaced because they take a very long time to form. Non-renewable sources include oil, natural gas, and coal. We use these sources mainly to produce electricity, heat, and gasoline. Oil, coal, and natural gas are fossil fuels. This means they were formed millions of years ago.

"Forms of Energy"—Think About It!

1. Read the examples below. Beside each one, write the form of energy the example shows: chemical, motion, thermal, or electrical.

   a) Throwing a bowling ball at the pins: motion

   b) Water falling over a dam: motion

   c) A battery in a flashlight: chemical

   d) Turning on a gas fireplace: thermal

   e) A computer plugged into a wall outlet: electrical

2. Why are the Sun, wind, and moving water considered to be renewable energy sources?

   They are renewable and always available and will never be used up

3. Why are fossil fuels non-renewable energy sources?

   They are non renewable because they will be used up. They take millions of years to make.

4. Do you think wind energy could be an important source of energy everywhere in the world? Why or why not?

   It could be important where wind blows often, and it can't be used where there isn't any wind.

5. Why do you think fossil fuels are our main sources of energy?

   Many types of fossil fuels in the world right now. Fossil Fuels are found in large areas, so there is a lot to remove.

Word Stretch

The prefix *bio* in biomass means "life." The prefix *geo* in geothermal means "earth" or "ground." The prefix *hydro* in hydroelectricity means "water." Find other words that start with each of these prefixes. What is the connection between each prefix and the meaning of each word?

Fossil Fuels

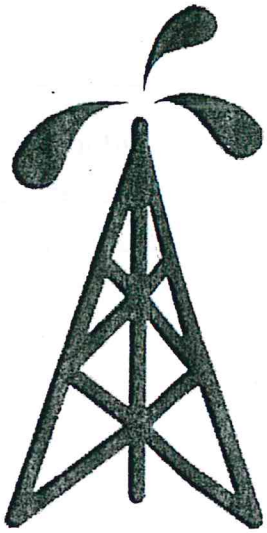
The three main fossil fuels are coal, oil, and natural gas. All of these were formed hundreds of millions of years ago, before the time of the dinosaurs.

When fossil fuels were formed, much of Earth was covered with swamps. The swamps were filled with trees, ferns, and other large leafy plants. The trees and plants died and sank to the bottom of the swamps. There they formed a spongy material called peat. Over many hundreds of years, sand, clay, and other minerals covered the peat. It slowly turned into rock. More and more rock was formed. The rock weighed down on the peat, squeezing all the water out of it. Over millions of years, the peat turned into coal, oil, and natural gas.

Oil also formed in the oceans. The ocean was full of tiny sea creatures called diatoms. When these creatures died, they fell to the sea floor where they were slowly covered by rock. Over time, heat and pressure turned them into oil.

Where Are Fossil Fuels Found Today?

Several countries in the Middle East are among the world's largest oil producers. Canada, the United States, Russia, and China are also among the largest oil-producing countries. Oil is found on land, as well as in the oceans. Canada has a number of drilling platforms in the ocean off the coast of Newfoundland.



The largest reserves of coal are found in the United States, Russia, and China. Canada is a mid-sized coal producer. British Columbia produces about one third of Canada's coal.

Natural gas is usually found with oil or coal. There may also be many undiscovered fossil fuel reserves in the world.

How We Use Fossil Fuels

One of the main uses of fossil fuels is to make electricity. In the world, coal is the main fuel source for making electricity. Natural gas and oil are also used.

The second main use of fossil fuels is to make fuels for vehicles. These fuels are mainly made from oil.

The third main use for fossil fuels is for heating and cooking in homes and businesses. Oil and natural gas are the main fuels used for these purposes.

"Fossil Fuels"—Think About It!

1. In the space below, make a flow chart to show how fossil fuels were formed.

plants in swamps die
sink to bottom
plants form peat
peat covered by minerals turn into rock
more rock formed
rock presses down squeezed water out of peat
peat turned into natural gas/oil/coal

2. Drills are used to get oil and natural gas from below Earth's surface. They make holes in the land or in the ocean floor. The oil or gas is then pumped out. Do you think it would be easier to drill on land or on the ocean floor? What are some problems that ocean drilling might present?

Easier on land because land doesn't move.
Equipment would be safe

Ocean would need a raft or something
Raft would move → dangerous
Drill has to reach bottom of ocean first

3. Natural gas has no odour. It is highly combustible, which means it burns easily. Before the gas is delivered for use, a chemical is added to give it an odour. Why do you think this is done?

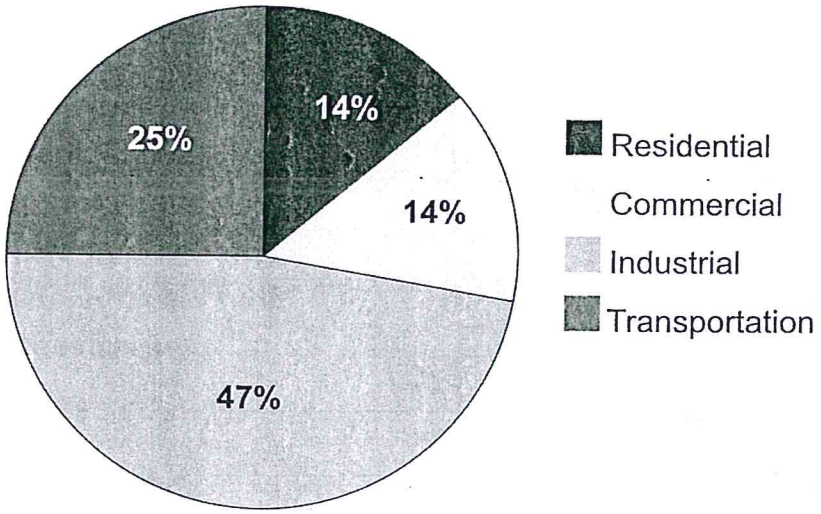
Natural gas burns easily. If no odour you might not know of a leak. Accidentally cause explosion
Odour allows you to notice it. Take safety and call for help.

How We Use Energy

Canada is a very developed country. We use a lot of energy in our homes, schools, businesses, and for transportation. The government of Canada measures how much energy is used in four areas:

- **Residential**—This includes houses and apartments
- **Commercial/Institutional**—This includes buildings such as offices, stores, malls, hospitals, and schools
- **Industrial**—This includes buildings and equipment used for industries: examples of industries are manufacturing, construction, agriculture, mining, and forestry
- **Transportation**—This includes all vehicles that move people or goods: examples include cars, buses, trucks, and trains

Energy Use in Canada



The circle graph shows approximately how much energy is used in each of these areas.

Energy Use in Our Homes

In Canada, natural gas and electricity are used to heat most homes, including apartment buildings. About 20 percent of all homes are heated through the use of other fuels such as oil, wood, wood pellets, or propane. We also use energy in our homes for other purposes, including:

- lighting
- heating water
- appliances such as refrigerators and blenders
- electronic equipment such as televisions and computers

The amount of electricity we use in our homes is increasing every year.

"How We Use Energy"—Think About It!

1. Why do you think industry uses so much energy?

Lots of machines are used to perform tasks and they all need energy. Many items are made in production plants. Machines are used to turn natural resources into products. Machines are used in mining from the ground or cutting down trees. Industry uses lots of energy

2. Some people use wood or propane to heat their homes. Where do you think these people might live? Why might they use these fuels instead of natural gas or electricity?

They might live far away from towns and cities. They might not be able to get electricity or natural gas. Some might not want to use fossil fuels, so they use wood instead.

3. People use more energy in their homes today than they did 20 years ago. What might have caused this increase in energy use?

People have lots of appliances in their homes and electronic devices such as TVs and iPads. Most homes have technology that didn't exist in the past.

4. In which room of your home does your family use the most energy? Why?

kitchen lots of appliances that use energy.

How Does Energy Work?

You have learned that energy is the ability to do work. You have also learned that energy comes in many forms. Each form of energy is either kinetic or potential. Kinetic energy is the energy of something moving, such as waves, rays, objects, electrons, atoms, molecules, and substances. So blowing wind is kinetic energy. It is also motion or mechanical energy. Potential energy is stored energy. So a battery has potential energy as well as chemical energy.

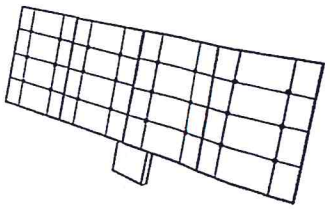
One very important thing about energy is that it cannot be created or destroyed. So when we use energy, it does not disappear. It just changes from one form of energy to another. An example is when a car engine burns gasoline. The engine changes the chemical energy of the gasoline into motion energy. The motion energy makes the car run. Some of the chemical energy is also changed into thermal energy. That is why a car engine heats up. The chemical energy from the gasoline has been changed to motion energy and thermal energy.

Energy Transformations

When energy changes from one form to another, we call it energy transformation. Here are some examples of energy transformations and their uses:

- A television changes electrical energy into sound and light energy. As a result, you can see and hear the television shows.
- A flashlight battery changes chemical energy into light energy. As a result, you can use the flashlight to see in the dark.
- A phone changes sound energy from your voice into electrical energy. This electrical energy is then changed back into sound energy. As a result, the person on the other end of the phone can hear what you said.
- Solar panels change sunlight into electric energy.

Energy transformations produce useful energy (energy that does work). They also produce wasted energy (usually as heat or sound). Most energy transformations are not very efficient. This means they produce a lot of wasted energy. For example, your body changes the chemical energy in food to motion energy. This gives you the energy to move, breathe, and think. But your body is not very efficient at converting food into useful energy. Your body is less than 5 percent efficient most of the time. The rest of the energy is lost as heat.



solar panel

"How Does Energy Work?"—Think About It!

1. Energy transformations make devices work so they can do things that help us. The alarm clock that wakes you up in the morning uses energy transformation. So does the bicycle you ride to school. Now it is your turn to design a device that will do a specific task. Your device can be something real, such as a child's toy. Or it can be something imaginary, such as a device that turns the pages of a book.

   Here are some guidelines:

   - You will not have to build the device, only design and sketch it.
   - Your device must have at least one energy transformation.
   - Your device must use materials that are readily available.

   * All different designs - anything that makes sense.

   On another sheet of paper, draw your design. Then answer the following questions:

   a) What is your device designed to do? _____

   _____

   b) Write a list of steps, in order, that explain how your device works. _____

   _____

   _____

   _____

   _____

   c) What energy transformation (or transformations) that will happen? When will it happen?

   _____

   _____

   d) Was any energy wasted in your device? What type of energy was wasted? Where was it lost?

   _____

   _____

   _____

   Share your design with a classmate. Talk about any improvements you could make to the device to make it work better.