**Explore/Explain: TE 131**

**Energy Resources:**

Energy cannot be created or destroyed. We depend on the natural world to provide energy resources for our use. Although all energy resources are related, we can generally divide them into two categories: nonrenewable and renewable.

**Nonrenewable Energy Resources**

An energy resource that is used much faster than it can be replaced by natural processes is called a nonrenewable resource. All fossil fuels such as coal, oil, and natural gas, are examples of nonrenewable energy resources. Coal, oil, and natural gas formed from the buried remains of living organisms that lived hundreds of millions of years ago. Inside Earth, heat and pressure caused the matter of the organisms to undergo both physical and chemical changes. The changes turned the matter into the fossil fuels we use today. Once these fossil fuels are depleted, or used up, they cannot be replaced by nature quickly.

Where did these plants and animals get their energy? Fossil fuels are really forms of stored energy that came from the Sun. Today when we burn coal, oil, or natural gas, we release energy that originated from the Sun but has been stored inside Earth for millions of years. Through the chemical change of burning, energy is released from the fuels.

Another nonrenewable resource of energy is nuclear energy. Nuclear energy comes from combining or splitting certain particles of matter. For example, most nuclear power plants generate electricity by using a special metal called uranium as a fuel. The tiny particles that make up uranium are split, releasing a great amount of energy. The released energy is then used to boil water to generate electricity in much the same way a power plant uses coal as fuel.

1. What does nonrenewable mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What does depleted mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Renewable Energy Resources**

An energy resource that can be replaced by natural process in a short amount of time is called renewable. Some renewable resources are called inexhaustible because they are available in almost limitless, or perpetual, supply. Two types of inexhaustible and renewable energy resources are energy from the Sun and energy from the wind.

1. What does perpetual mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What does Renewable mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What does inexhaustible mean?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The Sun gives off tremendous amounts of energy every second. This energy, called solar energy, is our most important renewable, or sustainable, energy resource. Without solar energy, the wind would not blow, the water cycle would not continue, and all living things would die. Other renewable energy resources include wind, hydropower, biomass, and geothermal.

1. Why is solar energy our most important renewable resource? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Wind is moving air. The uneven heating of Earth’s surface by the Sun causes areas of high pressure and low pressure to form in the atmosphere. The air then moves from the area of high pressure to the area of low pressure. The movement of air forms wind. Since ancient times, people have harnessed the energy of moving air to do work such as sailing a ship or grinding wheat and other grains. In today’s world, wind is the fastest growing energy resource for generating electricity.

Hydropower is energy that comes from the force of moving water. Gravity causes the water in rivers and streams to move from places of high ground to places of low ground. The movement of water produces a force that can be used to do work such as turning a turbine in a hydroelectric plant to change hydropower into electricity. Hydroelectric plants are systems made out of three basic parts: a dam built across a river to control the water flow, an electric plant to generate electricity, and a reservoir to store the water.

1. Hydro mean water. What does Hyrdopower mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What can be generated with Hyrdopower? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Biomass is a renewable resource from living things that can be burned to release energy. Wood, plants, and animal waste are examples of biomass. People have used biomass longer than any other energy resource. For thousands of years, people have cooked their food and heated their homes by burning wood. Today some biomass materials, such as corn, are used to make alcohol that is added to gasoline to form a mixture called gasohol.

1. Why has biomass been used longer than any other energy resource? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Geothermal energy comes from the heat of molten rock, or magma, deep inside Earth. The city of Hot Springs in Arkansas is famous for ponds and lakes warmed by geothermal energy that comes to the surface as hot spring water. In some areas, heat from magma can be used to boil water to produce steam that turns a turbine to generate electricity. These energy transformations, or changes, occur at geothermal power plants. However, the use of geothermal energy is limited to areas where the magma is close to Earth’s surface.

1. What does energy transformation mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is used from magma to produce steam which turns a turbine that will generate electricity?

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1. If we were on a field trip in a forest and wanted to cook hot dogs, what type of energy would be available for us to use? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Which type of energy would people who live near rivers be able to utilize that is less likely to be available to people who live in a desert? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Which type of energy would people who live in the desert more likely take advantage of than people who live in the mountains? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_