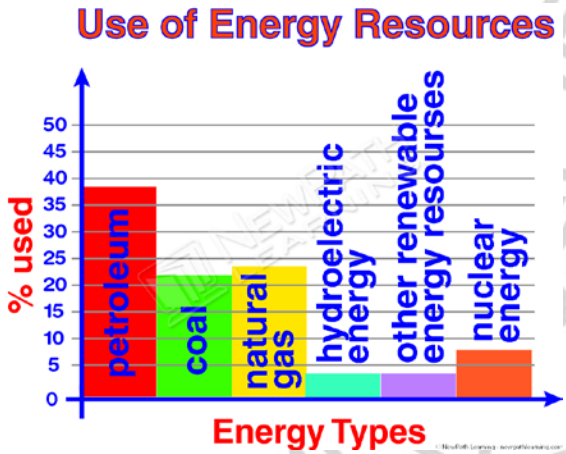
EARTH'S ENERGY RESOURCES



Fossil Fuels

Modern cultures depend on electricity for daily existence. Much, if not most, of this energy is derived from **fossil fuels**. As fossil fuels are being depl[illegible] of burning fossil fuels [illegible] and used. More deve[illegible] in the coming ye[illegible]

Fuel resou[illegible]

Ren[illegible]enished in a reasonable amount of time. Solar energy and wind energy are two examples of renewable energy resources.

Nonrenewable resources are resources that, once consumed, cannot be replaced. Natural gas, coal, and oil are three examples of nonrenewable energy resources because, once they are depleted, they will not and cannot be replaced.

What Are Fossil Fuels?

There are a number of natural materials that are burned to release the energy they contain, including oil, natural gas, and coal. These materials were formed from the decay of ancient plants and sea organisms that accumulated in enormous quantities in the Earth's crust. Because oil, natural gas, and coal are the products of plants and organisms, they are known as **fossil fuels**. The original source of the energy stored in fossil fuels is the sun. Radiation from the sun was absorbed by the plants. The plants used the energy in the process of photosynthesis. It is accurate to say that coal is solid sun energy!

Coal

Coal is a solid fossil fuel. Coal is the carbonized remains of swamp plants. Coal is categorized based on its hardness. Harder coal produces more heat energy per ton. The softest coal is **lignite**. **Bituminous coal** is the next hardest type. **Anthracite** is the hardest coal and provides the highest amount of energy. Coal is not pure carbon. Most coals contain some impurities, the most troublesome of which is su[PREVIEW] ne air and become **ac**

Natural g s both flammable extracted from natur l gas is methane.

Oil is the liquid fossil fuel. Crude oil is refined to produce a wide variety of flammable liquids. Home heating oil, kerosene, gasoline, jet fuel, and diesel fuel are among the products derived from oil. In addition, rubber, asphalt, and plastics are products made from crude oil.

Fossil fuels are very useful because they provide a lot of energy in many useful forms. They are relatively easy to move and deliver so that many people can use them. Some forms, like gasoline, are portable, and can be contained in vehicles to provide enough energy for long distances and time.

However, fossil fuels also present big problems and challenges. Coal, natural gas, and oil products are all nonrenewable resources. When they are used they cannot be replaced.

So we must keep finding new sources in the earth to use. Burning fossil fuels also creates big environmental problems. Air and water pollution, including smog and acid rain, have already damaged plant and animal life and can create long-term health problems for many people. Scientists and nations are starting to understand the long-term effects of the carbon dioxide that fossil fuels release when they are burned. Scientists and environmentalists say that humans must reduce our **carbon footprint** –that is, use fewer fossil fuels that leave a mark (or footprint) on environments and ecosystems. Many are concerned that this carbon footprint and the use of fossil fuels may be contributing to global warming and thus affecting the world's habitats.

Lesson Checkpoint:
What is the liquid form of fossil fuel?

Renewable Energy Resources

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Solar Power

Solar power is used in two ways. Solar radiation is used to heat water which is pumped through pipes to heat homes and water for showers and other uses. It takes less energy to heat water that is already 65 degrees to 110 degrees for a shower than it does to heat water that starts at 40 degrees. Solar power is also used to create electricity through the use of **photovoltaic cells.** These cells convert electromagnetic radiation from the sun into electricity that can be stored in batteries or used directly. Electricity for the International Space Station is produced by arrays of photovoltaic cells that are arranged on panels.

Other Natural Sources of Energy

The Earth provides a number of natural sources of energy. **Hydroelectric** power is created when large volumes of water turn turbines to create energy. Many dams have been built around the world to harness the power of flowing water.

Geothermal energy can be harnessed in regions where magma bodies are near the surface. The magma heats water in the crustal rocks to superheated temperatures. This hot water can be collected and piped into buildings to heat the buildings. In some cases it can be used to create electricity.

Newer ene…ance, an increasing …harness wind powe…**els** is also becoming more common. In underdeveloped countries, dried cow dung is a biomass fuel that is used for cooking and heating. Crops that are high in sugar, like sugar cane and corn, are grown to make ethanol that can be burned with or in place of gasoline.

Lesson Checkpoint:
Name two types of natural, renewable energy.

Nuclear Energy

An alternative energy resource that has been harnessed for more than 30 years is **nuclear energy.** In nuclear reactor facilities, radioactive fuel is allowed to create a nuclear reaction in a controlled environment. The heat created by the reaction is used to heat water. The heated water is used to drive turbines to create electricity. Nuclear energy has the benefit that it does not create the pollution (like smog and acid rain) or emit carbon dioxide.

On the other hand, it does have its drawbacks. When nuclear fuel is depleted, it remains highly radioactive and must be disposed of safely. This is difficult and costly. In addition, if a nuclear reactor were to malfunction, radiation can be released into the atmosphere. Such a release can create very serious health problems, short term and long term.

Wh ***se?***

Energy

As fossil fuels become increasingly costly and even scarce, and as we attempt to limit the environmental problems associated with burning fossil fuels, we find we must turn to alternative sources of energy. In addition, reducing and eliminating waste, reusing and recycling materials, and cautious consumption of energy resources are good practices. Carefully using energy resources and reducing, if not eliminating, waste is called **energy conservation**.

Simple steps in your everyday life can make a big difference in how much energy you and your family use. Turning off lights, air conditioners, televisions, stereos, computers, and other machines when they are not being used can dramatically reduce the amount of electricity used. More efficient automobiles and appliances reduce fossil fuel consumption and thus your 'carbon footprint.' If more people use public transportation and even walk instead of driving to local destinations, we can dramatically conserve energy resources.