6th Grade Energy Conservation Lesson

There are 7 Technological Resources used in Technology

People, Capital, Time, Information, Energy, Materials, Tools & Machines

What is Energy?

Energy - is defined as the ability to make change.

What are the different forms of energy?

Light – is energy that travels in waves.

Heat – is called **thermal** energy. We cannot see heat but we can feel it.

Motion – is a change in an objects position. Nothing can move without energy.

Sound – is energy vibrating through substances.

Growth – it takes chemical energy stored in simple sugars (food) to grow.

Energy Sources

In technology we use energy to make products; to move goods and people, to heat, cool

and light the places where people live and work. Like materials, energy sources are either renewable or nonrenewable.

Renewable	Nonrenewable
Biomass	Coal
Geothermal	Natural Gas
Hydropower	Petroleum
Solar	Propane
Wind	Uranium

Biomass – is anything that is alive or was alive a short time ago. Examples of Biomass are: wood, plants and garbage.

Geothermal – is energy that comes from the heat inside the Earth. Example is Old Smokey, a hot water and steam geyser in Yellow Stone National Park.

Hydropower – hydropower is energy we make from moving water. Examples are Hydro Electric Power plants and The Hoover Dam.

Solar Energy – we get most of our energy from the sun. It travels from the sun to the Earth in waves or rays. Light rays from the sun create our daytime light on Earth.

Wind Energy – is created from moving air. We use wind the make electricity, to dry our clothes and to move sailboats.

Coal – is a fossil fuel because it was made from plants and animals that were once alive. The energy came from the sun.

Natural Gas – is like air, you cannot see it or smell it in its natural state. Natural gas is a fossil fuel because it was made from plants and animals that were once alive. The energy came from the sun.

Petroleum – is a liquid that is found underground. Petroleum or oil was made from plants and animals that were once alive. The energy came from the sun.

Propane – is a lot like natural gas because you cannot see or smell in in its natural state. Propane is a fossil fuel because it was made from plants and animals that were once alive. The energy came from the sun.

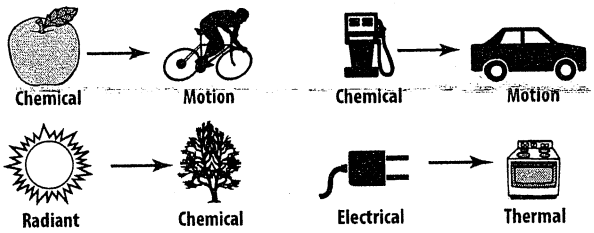
Uranium – is a mineral found in rocks in the ground. Uranium is an element that creates heat and radiation when its atom is split in two. We use the heat to turn water into steam to turn turbines that are attached to generators to make electricity.

Conservation of Energy

Your parents may tell you to conserve energy. "Turn off the lights," they say. To scientists, **energy conservation** is not just about saving energy. The **Law of Conservation of Energy** says that energy is neither created nor destroyed. When we use energy, it doesn't disappear. We change one form of energy into another.

A car engine burns gasoline, converting the chemical energy in gasoline into motion energy. Solar cells change radiant energy into electrical energy. Energy changes form, but the total amount of energy in the universe stays the same.

Energy Transformations



Efficiency

Energy efficiency is the amount of useful energy you get from a system. A perfect, energy efficient machine would change all the energy put in it into useful work—a technological impossibility today. Converting one form of energy into another form always involves a loss of usable energy.

Most energy transformations are not very efficient. The human body is a good example of this. Your body is like a machine, and the fuel for your machine is food. Food gives you the energy to move, breathe, and think.

Your body isn't very efficient at converting food into useful work. Most of the energy in your body is transformed and released as thermal energy (heat). You can really feel that heat when you exercise! This is very much like most energy transfers. The loss of useable energy is often in the form of thermal energy (heat).

Sources of Energy

We use many different energy sources to do work for us. They are classified into two groups—renewable and nonrenewable.

In the United States, most of our energy comes from **nonrenewable** energy sources. Coal, natural gas, petroleum, propane, and uranium are nonrenewable energy sources. They are used to make electricity, heat our homes, move our cars, and manufacture all kinds of products. These energy sources are called nonrenewable because their supplies are limited. Petroleum, a **fossil fuel**, for example, was formed hundreds of millions of years ago from the remains of ancient sea plants and animals. We can't make more crude oil deposits in a short time.

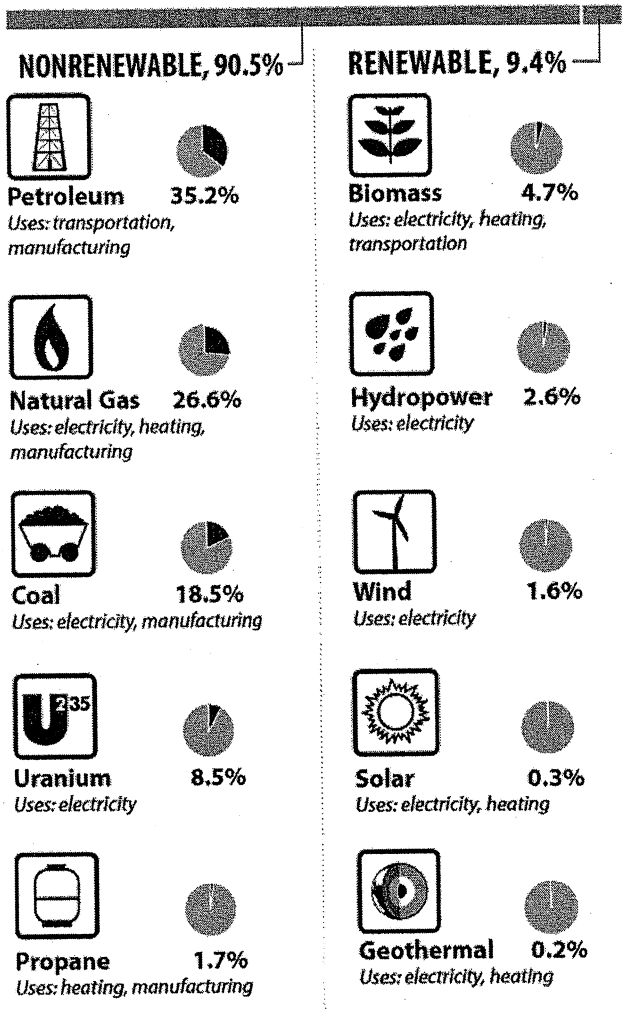
Renewable energy sources include biomass, geothermal energy, hydropower, solar energy, and wind energy. They are called renewable because they are replenished in a short time. Day after day, the sun shines, the wind blows, and the rivers flow. We use renewable energy sources mainly to make electricity.

Electricity

Electricity is different from the other energy sources because it is a **secondary source of energy**. We must use another energy source to produce electricity. In the U.S., coal is the number one energy source used for generating electricity.

Electricity is sometimes called an **energy carrier** because it is an efficient and safe way to move energy from one place to another, and it can be used for so many tasks. As we use more technology, the demand for electricity grows.

U.S. Energy Consumption by Source, 2013



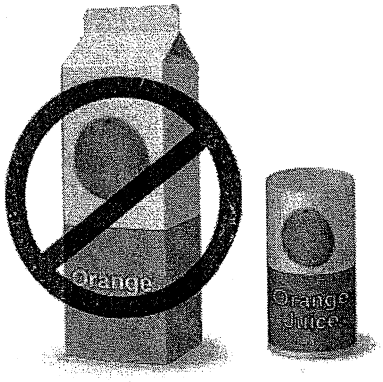
Data: Energy Information Administration
*Total does not equal 100% due to independent rounding.

Taking Action

What You Can Do

You can help reduce waste at home by learning basic waste-saving habits. You can buy products that come in concentrated forms or products that use minimal packaging. And you can reuse, repair, recycle, or compost products that would otherwise be thrown away.

Reduce



- Buy the largest size package and products that do more than one thing—for example, shampoos that include conditioners.
- Buy concentrated products or compact packages, such as frozen juices, fabric softeners, and cleaners you mix with water at home.
- Look for products with minimal packaging. You will be using fewer natural resources, and you'll have less to throw away.
- Leave grass clippings on the ground instead of bagging them when you mow your lawn. Grass clippings decompose quickly, adding nutrients to the soil.
- Go digital: buy music and books online and subscribe to digital magazines.

Reuse

- Buy reusable products such as rechargeable batteries.
- Pass on or donate magazines, catalogues, and books to neighbors, hospitals, schools, nursing homes, or shelters.
- Reuse plastic or glass containers for food storage, or organization of household items.
- Reuse plastic shopping bags, boxes, and lumber.
- Reuse wrapping paper, gift bags, and bows. Use the Sunday comics for wrapping children's birthday presents.
- Donate your old electronics, such as computers, when you upgrade to a new model.

Repair

- Try to repair broken items before you consider replacement of lawn mowers, tools, vacuum cleaners, and TVs.
- Donate items you can't repair to local charities or vocational schools.
- Keep appliances in good working order. Properly maintained appliances are less likely to wear out or break and will not have to be replaced as frequently.

Recycle

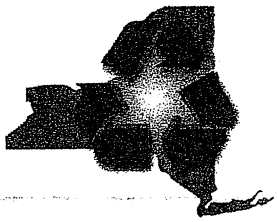
- Shop for items that are recyclable or are made from recycled materials.
- Recycle newspapers, plastics, glass, and cans.
- Recycle your electronics, computers, laptops, televisions, cell phones, PDAs, chargers, and accessories, where possible. Many retail stores have receptacles for recycling electronics.
- If a recycling program does not exist in your community, work with community officials to help establish one.

Compost

- Compost yard and kitchen waste. Compost makes an excellent fertilizer and improves the soil.
- If there's no room for a compost pile, offer compostable materials to community composting programs or garden projects near you.

Recycle

Recycle everything you can.



New York Recycles!
November 15

How Long Will it Last????

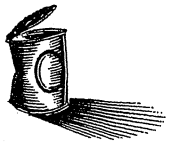
ANSWERS

Roadside litter is more than unsightly. It can last anywhere from months to hundreds of years. Trash needs four main ingredients to decompose, moisture, oxygen, light and heat. Buried in a landfill, trash lasts much longer because it is deprived of light and heat. Roadside litter, exposed to all four elements, decomposes at a faster rate. These estimates are based on roadside litter.

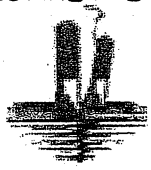
200 - 400 Years
ALUMINUM CAN

More than 500 Years
GLASS BOTTLE

100 Years
METAL CAN



2 - 5 Years
CIGARETTE BUTTS



2 - 5 Years
PAPER CUP

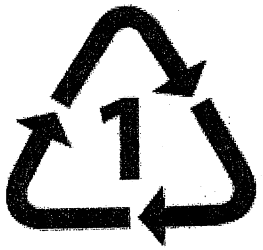
1 - 3 Months
BANANA PEEL

More the 500 Years
DISPOSABLE DIAPERS

1 - 5 Years
WOOL SOCKS

More than 500 Years
6-PACK HOLDER

WHAT DO RECYCLING SYMBOLS ON PLASTICS MEAN?

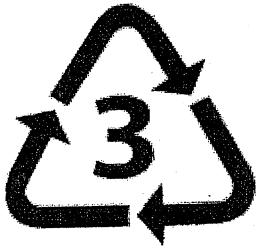


PET, PETE
(Polyethylene Terephthalate)

- Soft drink, water and salad dressing bottles; peanut butter and jam jars...
- Suitable to store cold or warm drinks. Bad idea for hot drinks.

HDPE
(High-density Polyethylene)

- Water pipes, milk, juice and water bottles; grocery bags, some shampoo / toiletry bottles...



PVC
(Polyvinyl Chloride)

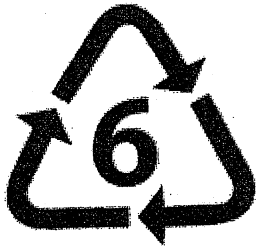
- Not used for food packaging.
- Pipes, cables, furniture, clothes, toys...

LDPE
(Low-density Polyethylene)

- Frozen food bags; squeezable bottles, e.g. honey, mustard; cling films; flexible container lids....

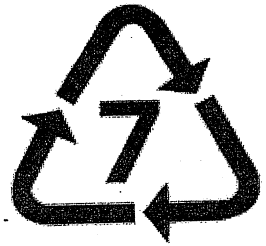
PP
(Polypropylene)

- Reusable microwaveable ware; kitchenware; yogurt containers; microwaveable disposable take-away containers; disposable cups; plates....



PS
(Polystyrene)

- Egg cartons; packing peanuts; disposable cups, plates, trays and cutlery; disposable take-away containers;....
  Avoid for food storage!



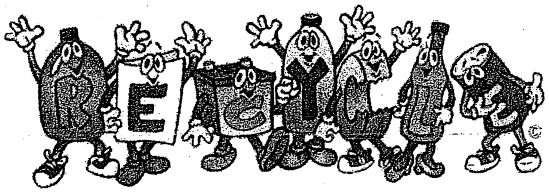
Other
(often polycarbonate or ABS)

- Beverage bottles; baby milk bottles. compact discs; "unbreakable" glazing; lenses including sunglasses, prescription glasses, automotive headlamps, riot shields, instrument panels...

Safe food containers are made from number

1, 2, 4, and 5 plastics.

Going Green at Bloomsburg



Little Known Recycling, Energy and Conservation Facts

- 25% to 30% of all the energy used in public schools across the U.S. is wasted.
- Turning off the lights in one classroom for one hour keeps over two pounds of pollutants out of the environment.
- The United States has about 5% of the world's population, yet we consume about 25% of the world's energy!
- It takes 16 times more energy to make a new aluminum can than it does to recycle one.
- Recycling one-aluminum saves enough energy to power a computer for 3 hours.
- Only about 700 paper bags can be made from one 15-year old tree.
- The typical American throws away 60 pounds of plastic packing each year.
- To produce one pound of butter, 10 gallons of water is required.
- About 75% of the water we use in our homes is used in the bathroom.
- Refrigerators in the U.S. consume equivalent of more than 50% of the power generated by all of our nuclear power plants.
- Lights consume about 20% of all the energy used in the United States.
- A ¼ inch crack under your front door will waste as much energy as a 2" X 2" hole in your wall.
- If we all installed "low-flow" showerheads, we could save billions of gallons of water every year.
- If we all recycled all our Sunday papers, 500,000 trees could be saved each week.
- A 10-minute shower can use more than 50 gallons of water.
- The junk mail Americans receive in one day could produce enough energy to heat 250,000 homes.
- Every year Americans throw away enough office paper to build a wall 12 feet high stretching from LA to NY.
- At the rate Americans are generating garbage, we need 500 new dumpsites every year.
- Over a billion trees are used to make disposable diapers every year.
- Americans buy over a billion incandescent light bulbs every year. That's equal to 3 acres of bulbs a day.
- Compact florescent bulbs last 5 times longer than a conventional bulb and uses 70% less energy.
- Turning lights out 2 hours earlier each day at your school can save as much as $500 per month or $5,000 each school year. (based on 1,000 light fixtures).
- Turning lights off in one classroom for one hour keeps over 2 pounds of pollutants out of the environment
- Imagine how much energy your family car would use in 156 years! That is how much the world uses every second of every day. In the time it takes you to snap your fingers, the world uses the equivalent of 85,000 gallons of gasoline!
- Regular faucets use 3 to 7 gallons per minute of water, assuming 20 minutes of faucet usage per day that's 60 to 140 gallons of water each day or 1,800 to 4,200 gallons each month for each household. Low flow faucet can cut that usage in half!
- Everyday in the United States we withdraw 340 billion gallons of fresh water from streams, reservoirs, and wells – an amount equal to 1,000 gallons of water per person per day.
- Electrical energy used to power lights, computers, TV's, etc., is generated by power plants. These power plants use coal, oil, natural gas, or nuclear fuel to run them.
- The Environmental Protection Agency estimates that an active energy conservation program can save as much as 30% of energy consumption.
- As much as 33% of our electric energy is used for lights or about $2,000,000.00.watts they use.
- A used aluminum can is recycled and back on the grocery shelf as a new can, in as little as 60 days. That's closed loop recycling at its finest!