

Electricity 1

Safety with electricity

We plug into electricity in our homes, school and other Buildings. This electricity has a high *voltage*. This means that it is a very high source of power and heat. If the electricity touches us directly we receive an electric shock which can kill people. It can cause serious burns and stop the heart.

It is dangerous to have electrical devices around water. Electricity travels through water and most other liquids. If a liquid is spilled near an electrical outlet or a device that is plugged in, the electricity can flow through the liquid and shock a person.

Old, damaged electrical cords dangerous! The wires inside electrical cords are covered with a plastic material which protects us. If the wire is exposed it can cause a shock or spark. The sparks from the wire may cause a fire.

Why is it dangerous to:

1. Poke a knife into a toaster when it is going?
2. Poke a nail into an electrical wall socket power point)?
3. Fly a kite near power lines?
4. Hit a nail into a wall near a light switch?
5. Use a hair dryer while you are in the bath?
6. Dry a wet piece of clothing on an electric light?
7. Use cords that have exposed wires.
8. Touch the prongs on an electrical plug while you are pulling it out from the wall.
9. What kind of accident could happen with a toddlers and electricity?

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What is electricity?

Electricity is a source of power that humans can use. It is part of God's creation. God provided us with electricity when He made the world for us to live in. Electricity can be seen in nature in the form of lightning. Electricity is energy.

Energy makes something work. It makes things move, heat up, or light up.

Here are some sources of energy:

- Fossil Fuels - Coal, Oil and Natural Gas
- Water (hydro) Power and Ocean Energy
- Nuclear Energy
- Solar Energy from the sun
- Wind Energy

People have learned how to take these natural forms of energy and convert them into electrical energy. Energy is produced by these fuels in power stations. The electricity goes along wires from the power station to our homes.

Everything in the universe is made of atoms. These are too tiny to see. In the atoms are little components called electrons. They can travel along a wire to produce electricity.

1. What do we use electricity for?
2. When can electricity be seen in nature?
3. What fuel sources can be used by power stations to make our electricity?

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Renewable and non-renewable energy

We need energy for heat, light, transport, cooking and electrical appliances.

Electricity has to be produced in power stations and sent along wires to our homes and cities. The electricity can be produced from renewable or non-renewable sources of energy.

Renewable means that it is always available and does not run out.

Non-renewable means that it will run out if we keep using it.

Non-renewable sources: Coal, gas and oil.

Power stations burn these fuels to make electricity. These fuels are called fossil fuels because they are made up of dead and decayed plants that have been buried for thousands of years. Once they are taken from the ground they are used for fuel. It would take thousands more years to replace them. The burning of these fuels also causes pollution.

Renewable sources:

Waterwheels get energy from rivers.

We can get solar energy from the sun.

We can get energy from wind.

These can be quickly replaced.

1. *How does electricity get to our homes and cities?*
2. *What is non-renewable energy? List some sources.*
3. *What is renewable energy. List some sources.*
4. *Why is it better to use renewable sources of energy?*

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Static electricity

Static electricity is stored electricity. It can be stored in objects. People and the clouds.

In a storm, static electricity sometimes builds up in the clouds. This can give us thunder and lightning.

Rubbing a piece of plastic, like a plastic ruler or comb, can charge it with a type of electricity.

This is called static electricity, or *non-moving* electricity.

Experiment:

(Experiments with static electricity work best on a dry day.)

Rub a plastic ruler, pen or comb with a piece of fabric. Wool works best. Rub about 20 times. Bring it close to some small bits of paper. Now bring it close to someone's hair.

1. *What happened?*
2. *Static electricity is also called _____ electricity.*
3. *When you rub a plastic ruler on fabric you _____ it with electricity.*

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Conductors and insulators

Electricity will travel through some things very well. These are called *conductors*.

Other things will not conduct electricity. These are called *insulators*.

With your teacher, join up a battery and bulb with wires. Test some different materials and see which ones the electricity will travel through. These are the conductors. The bulb will light up. The insulators will not allow the electricity to pass through. The bulb will not light up.

Here are some things to try: rubber, plastic, an iron nail, wood, copper, aluminium foil, glass, paper, a cup or pottery. You will think of other things.

Make two lists: conductors and insulators.

Insulators can stop us getting an electrical shock.

What insulating material is used around wires in an electrical cord?

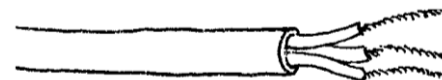
Your body is a conductor of electricity. This is why it is very dangerous to fool around with electricity.

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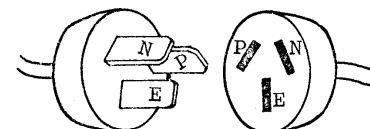
Three-pin plugs

Every day you plug something into the main electricity supply. You use a 3-pin plug to do this. These plugs are wired up in a special way. You can get a shock if your plug is not correctly wired.

Inside the lead:



Inside the plug:



The wires in the lead must be connected to the three pins in this way:

The brown wire goes to the letter "P" (Phase).

The blue wire goes to the letter "N" (Neutral)

The green/yellow wire goes to the letter "E" (Earth).

1. *If you need to repair an electrical fault, or put in a new power point in your home, who should you employ to do the job?*
2. *What could happen if the wires were not connected correctly to the 3-pin plug?*

Some plugs have only two pins. The "E" pin is missing. These plugs are not as safe as three-pin plugs..

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History of electricity

The electric light bulb was not discovered until 1879.

After many experiments, Thomas Edison (U.S.A.) invented a light bulb that could be used for about 40 hours without burning out. By 1880, his bulbs could be used for 1,200 hours.

In 1882 Thomas Edison opened a power station in New York City. The power station was one of the world's first central electric power plants and could power 5,000 lights.

1. *What did people use for light before the light bulb was invented?*
2. *How did people cook without electricity?*
3. *What do you consider to be the most important uses of electricity today?*
4. *Write a description of how your family would live if there was no electricity.*

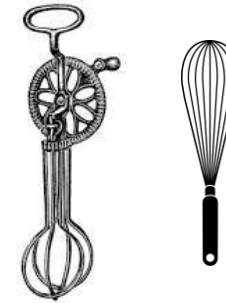


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What did we do without electricity?

Make a table to show the appliances used today, who uses it, and how the job used to be done before had electricity in our homes.

Appliance	Who uses	How it used to be done



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Electricity in the home

Make a list of all the things in your home that use electricity. Think about hearing, cooling, lighting, appliances and entertainment. Make a table and show which things use the mains power and which things use batteries.

Remember that things that operate by battery are still using electricity. Batteries contain stored electricity.

Appliance	Mains or battery	Who uses it



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Let's not waste electricity

Electricity is an important part of our lives. It costs money to produce. It also uses resources to make. Some people have a habit of using much more electricity than they need to.

Explain why the following things waste electricity:

- Don't leave lights on when you leave a room.
- Don't use air conditioning when you could use a fan.
- Don't leave the fridge door open.
- Don't put hot things in the fridge.
- Don't have long hot showers
- Don't leave the TV on if no one is watching it.
- Don't iron your clothes unless you really need to.
- Don't allow hot taps to drip.

Make a poster telling people not to waste electricity. As well as using words, include at least 5 pictures to explain.

