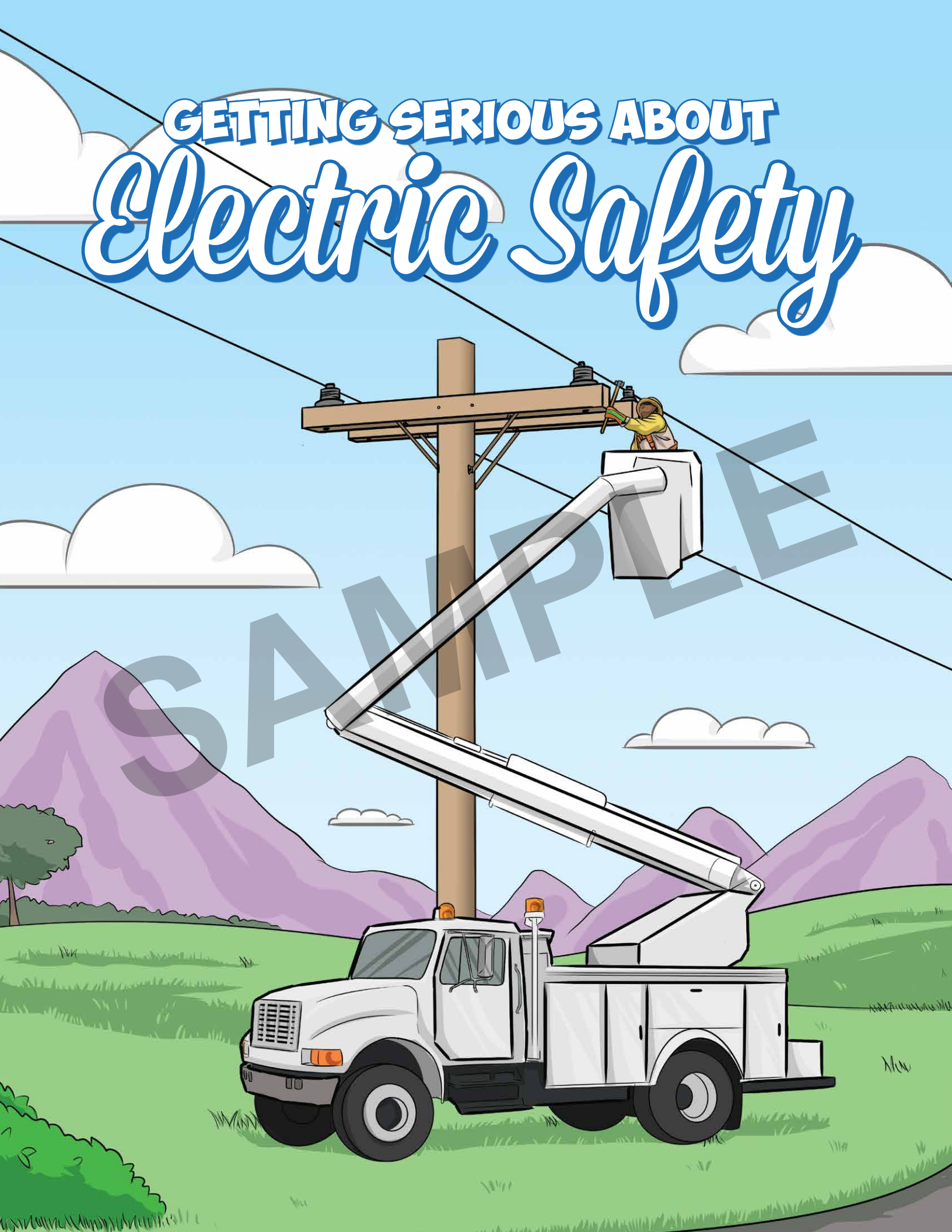
GETTING SERIOUS ABOUT
Electric Safety
SAMPLE

Contents

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ELECTRICITY IS AMAZING!

DID YOU KNOW?

Lightning is a discharge of electricity in the atmosphere. The energy from a lightning bolt can heat up the surrounding air to 60,000 degrees Fahrenheit.

Electricity is very powerful.

TRY IT!

How far away is the lightning? After you see a lightning strike, count the number of seconds until you hear thunder (sound travels through air much slower than light!). Divide the number of seconds by 5 to determine how far in miles the bolt was from you.

ELECTRICITY POWERS OUR LIVES.

We use electricity to light our homes, schools, and hospitals, store our food, browse the Internet, charge our smart phones, manufacture goods, and much more! Electricity makes our modern-day way of living possible. Even though electricity allows us to do many amazing things, it also can be very dangerous.

TRY IT!

Can you imagine what life would be like without electricity? How would you do your homework at night? What would you do for entertainment?

ANIMALS USE ELECTRICITY TOO!

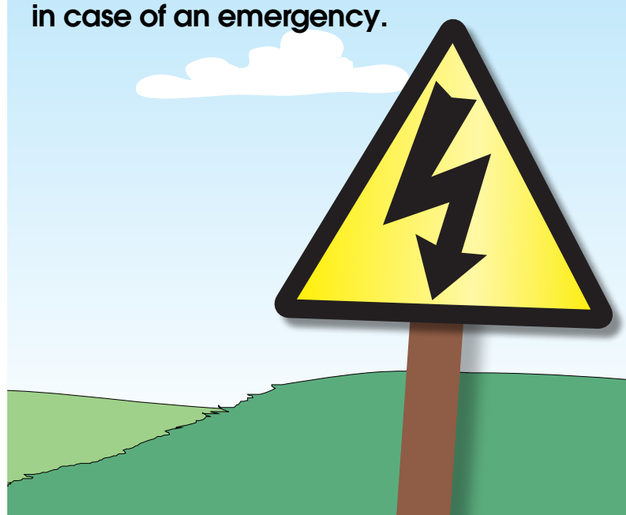
Animals like the electric eel and the platypus utilize electricity as a sense to navigate the world around them — just like we use our five senses! Electric eels can produce strong electric shocks of around 500 volts for both self-defense and hunting. The platypus's bill is covered in electroreceptors, which are electricity sensors that the platypus uses to detect electrical impulses emitted by its prey!

TRY IT!

How much more electricity can an electric eel produce compared to a standard US outlet? Remember, outlets supply 120 volts and electric eels can generate shocks of around 500 volts.

500 volts - 120 volts = 380 volts! An electric eel produces 380 more volts of electricity than a standard wall socket.

Clearly, electricity is awesome—but its incredible power also makes it very dangerous. We wrote this book to show you how to use and enjoy electricity safely, and what to do in case of an emergency.



SAMPLE

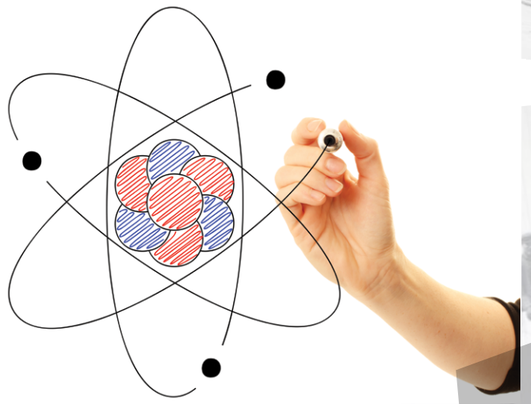
The History of Electric Safety

Electricity wasn't always as available as it is today. Before its invention, people used candlelight, kerosene, or oil lamps to illuminate their homes at night. Many scientists, engineers, and inventors contributed to the development of the safe use of electricity that powers our modern day way of living!

What is Electricity?

Atoms are tiny particles that are way too small to see with your eye—in fact, millions could fit on the tip of a pin! Atoms are made up of even smaller particles called protons, neutrons, and electrons. These are known as subatomic particles.

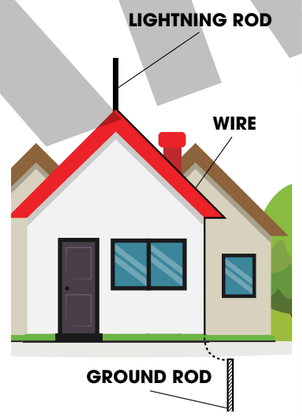
Electricity is the flow of electrons! Electrons can move from one atom to another and when they move in the same direction, through a conductor, we call this an electric current.



Lightning Rods

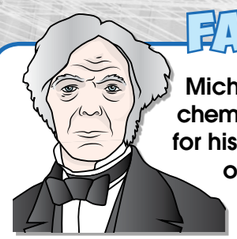
Benjamin Franklin lived in the 1700s and was a man of many talents. Through his experiments, Franklin proved that lightning is an electrical phenomenon. Along with his investigation of electricity, Franklin invented the lightning rod, which is still widely used today to protect homes and buildings from dangerous lightning strikes.

How do lightning rods protect buildings? Lightning rods are pointy metal rods that are attached to the highest point of a building and connected to the ground through a wire. When lightning strikes the rod, the charge moves into the ground, protecting the building and the people inside.



It's a Fact! In the United States alone, about 330 people get struck by lightning every year—remember, the safest place to be during a thunderstorm is inside a sturdy building or vehicle.

Faraday Cage



Michael Faraday, an English chemist and physicist, is known for his many contributions to our modern understanding of electricity and magnetism. Faraday's monumental discovery that a charged electrical conductor exhibits that charge only on its exterior surface (not the inside), led to many amazing applications!

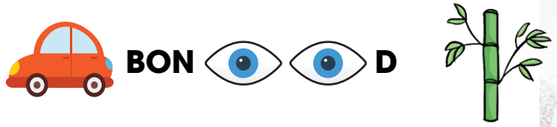
Did You Know?

Planes are often struck by lightning—so how do you and the rest of the passengers stay safe inside? The aluminum hull of the plane (a conductor) creates a Faraday cage—the charge from the lightning strike moves through the exterior surface only, leaving the people and equipment inside unharmed. Can you think of any other objects that act as a Faraday cage?

Let There Be Light!

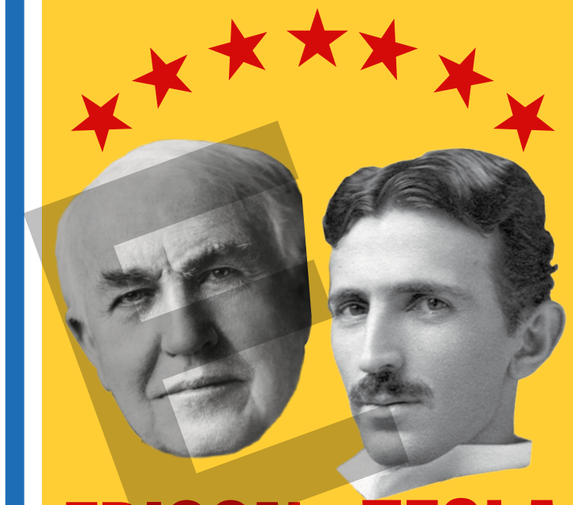
In 1880, Thomas Edison began commercializing his incandescent light bulb. Edison's team tested more than 6,000 materials for the bulb's filament before settling on something that lasted for over 1,200 hours!

Use the visual clues to fill in the blank and find out what the filament in Edison's bulb was made of!



answer - carbonized bamboo

The War of the Currents



Edison ★ Tesla

The Fight for How You Turn On the Light

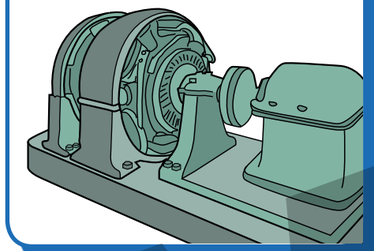
Nikola Tesla, a Serbian-American engineer and inventor, is to thank for much of the energy technology we use today. After moving to the United States in 1884 to work for Thomas Edison, Tesla decided to pursue his own work on the alternating current (AC), which was later used by the Westinghouse Electric Company. The Edison Electric Light Company, however, utilized direct current (DC). In basic terms, AC current is an electric current where electron flow can reverse direction. DC current is an electric current where electrons flow in only one direction. Tesla's AC electricity system was cheaper, could travel farther, and required fewer power plants, but Edison argued (falsely) that it was also more dangerous than his DC current. Today most household appliances and electronics require a conversion from AC to DC current to work and Edison's DC current was largely phased out over time. Tesla wins!

How Electricity Gets to You

Even though we use it every day, most of us don't think about where our electricity comes from. However, the construction of the power grid is one of the greatest achievements of the 20th century and something we rely on daily! Electricity may be generated a long way from your home and may travel a long way before it gets to your home. Here's how it safely gets to you.

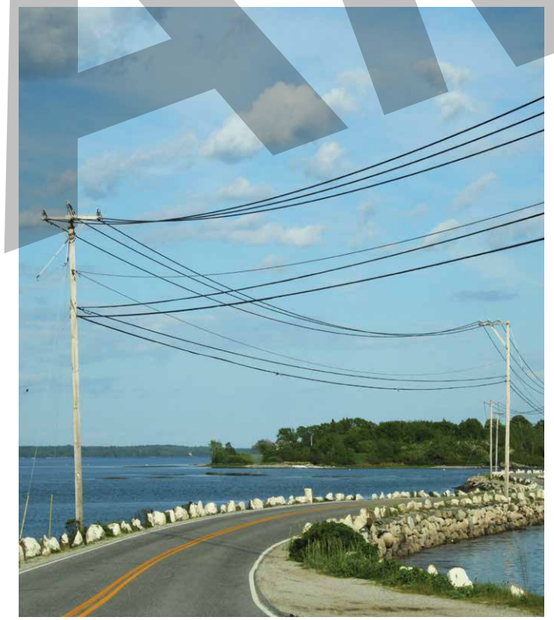
1 Electricity is generated at about 7,000 power plants across the nation! Different kinds of power plants use either nonrenewable energy sources (like coal, oil, or natural gas) or renewable energy sources (like solar, wind, or hydropower) to produce electricity.

2 Inside the power plant, a spinning turbine turns the shaft inside a generator, creating an electric current.

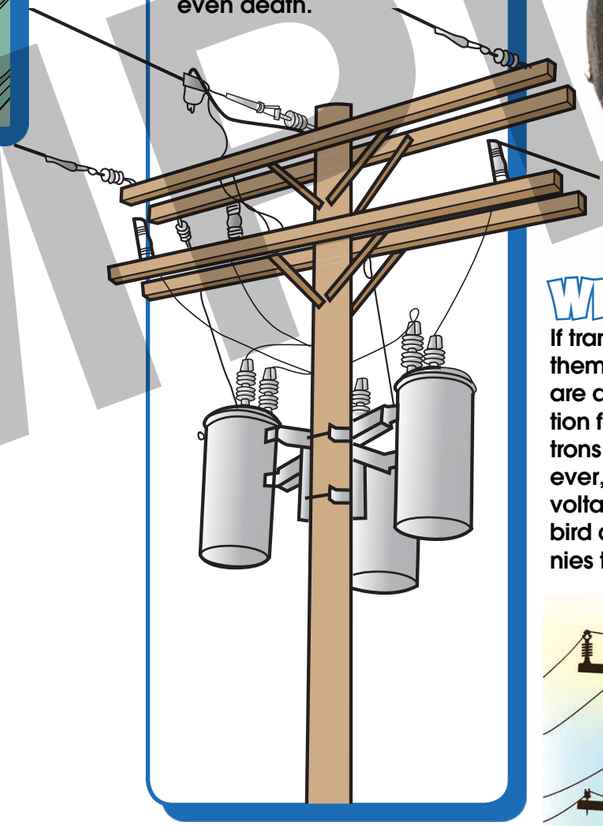


3 Once electricity is generated in the power plant, it must travel and be distributed. This distribution system is called the power grid. The first stop is a transformer station, where the voltage is increased. This allows the electricity to travel farther, but it also makes it much more dangerous. The high-voltage electricity travels long distances through wires called transmission lines.

4 Once the electricity gets closer to its destination the voltage must be lowered again at a substation. This lower voltage electricity is then brought one step closer to your home through smaller wires called distribution lines. You can spot these wires running along highways and sometimes on neighborhood streets.



5 The voltage has to be lowered one more time before it is safe to enter your home. This happens at a pole-mount transformer. These pole-mounted transformers are smaller versions of the ones used at the transformer station and the substations. Even though the voltage has been lowered, the electricity that comes out of your home outlets can still be very dangerous. An electric shock from wires in your home can cause injury or even death.



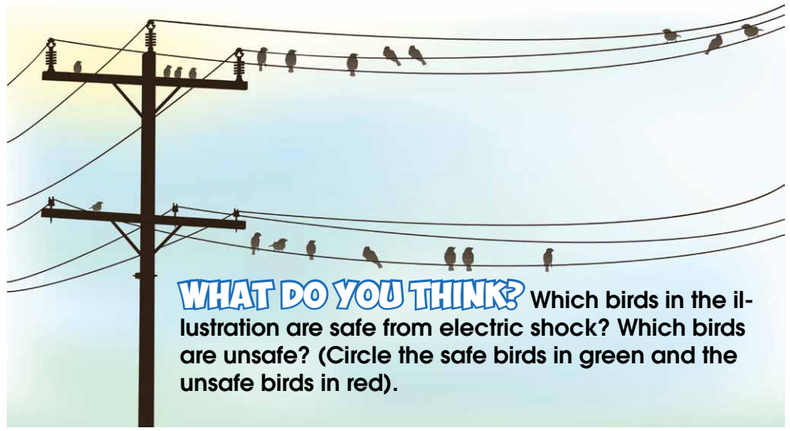
CONTINUED ON PAGE 8!

Inside a Transmission Line

Transmission lines can be seen along major highways and carry very high voltage electricity—up to 500 kilovolts (kV)! Transmission lines are commonly made of aluminum because it has a low resistance and allows electricity to flow. Electricity moves through the wire over long distances via the flow of electrons. Transmission lines are extremely dangerous because unlike household wires, they are usually not insulated. Never go near or touch a transmission or power line.

What About the Birds?

If transmission lines are so dangerous, why don't all the birds sitting on them get electrocuted? When a bird sits on a single wire, its two feet are at the same electrical potential (voltage), so there is no motivation for the current to travel through the bird's body and thus the electrons will continue along the path of least resistance (the wire). However, if the bird's wing or leg touches a second wire (with a different voltage), a path will be created for the electrons to flow through the bird and the bird will be electrocuted. But don't worry—utility companies try to spread out the wires so this doesn't happen.



WHAT DO YOU THINK? Which birds in the illustration are safe from electric shock? Which birds are unsafe? (Circle the safe birds in green and the unsafe birds in red).

SAMPLE

6 Electricity enters your home through the service box. Here a meter keeps track of your home's electricity usage.

REMEMBER!

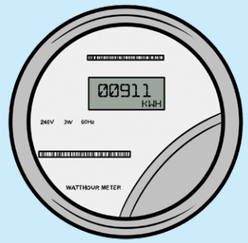
- Stay away from areas marked with signs that say 'High Voltage' or 'Danger.'
- Stay away from and don't climb the fences around electrical substations.
- Never go near or touch transmission or power lines (learn more about power lines on pages 18 and 19).

CALCULATE IT!

How much electricity did this family use this month?

_____

Calculate the bill if the price per kilowatt hour is 11 cents. _____



911 KWH, $100.21

7 Electricity is distributed in your home by the service panel. Your home's service panel distributes electricity to switches, outlets, and appliances. It's also where breakers and fuses protect the wires inside your home from being over loaded. It's important to never touch or go near the service panel.

8 Electricity travels through wires inside the walls of your home to outlets and switches located on the walls in each room. Electrical outlets are where you plug in devices that need electricity to work.

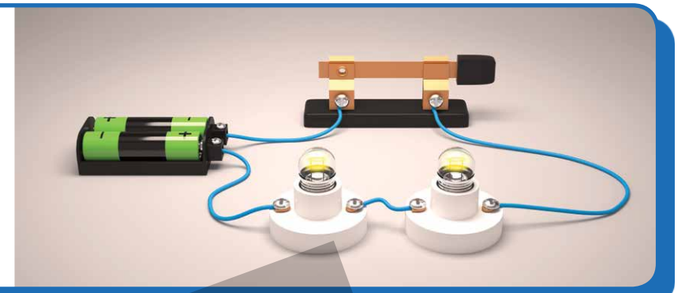
HOW DOES YOUR FAMILY GET ELECTRICITY?

Do some research! (Note: Some of these things may be hard to figure out — If you need help, ask an adult. And here's a hint! Check the front cover of the service panel for your utility's name).

Where is the closest power plant? _____
What kind of energy source does it utilize? _____
How far does electricity travel before it gets to you? _____
What is the name of your electric utility company? _____

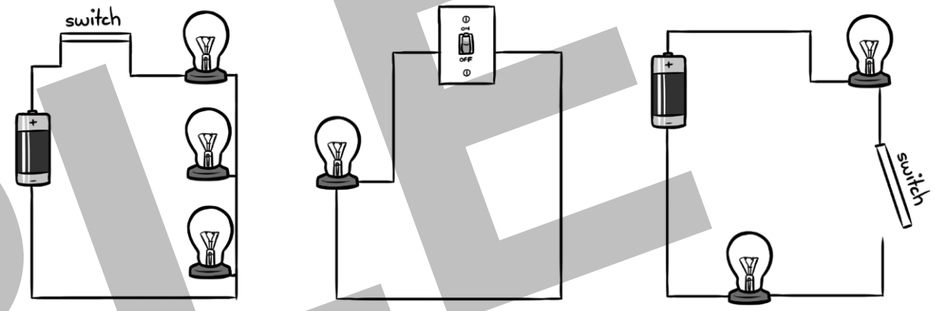
CIRCUITS

The word circuit means circle. Electricity can only move in a closed circuit—if a circuit is open, the electricity cannot flow. When we flip on a light switch, we close a circuit. The electricity flows from a wire, through the light bulb, and back out another wire. When we flip the switch off, we open the circuit and no electricity flows to the light.



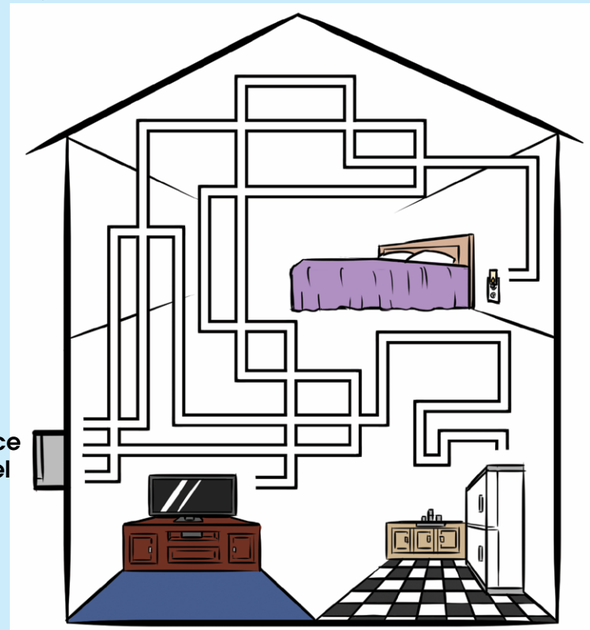
WHICH BULBS WILL LIGHT UP?

Color the light bulbs yellow that will light up. Remember, in order for electricity to flow the circuit must be closed!



TRY IT!

With your pencil, draw the path that electricity takes from the service panel through the wires inside the walls of the home to the: refrigerator, night-light, and television.



SOME TERMS TO KNOW

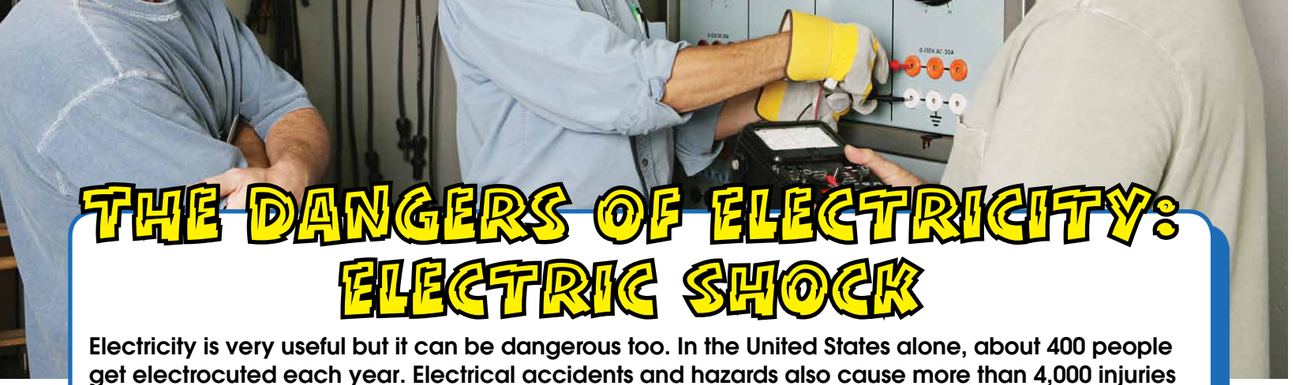
Electricity and current are not easy to understand — sometimes analogies can help! Try thinking of electric current as water passing through a pipe to understand the terms below.

VOLTAGE (VOLTS) is a kind of electrical force that makes electricity move through a wire — you can think of voltage like water pressure.

AMPERES are the standard unit to describe the current — you can think of amps like the flow rate.

RESISTANCE (OHMS) is a measure of how well a material conducts electricity — you can think of resistance like the size of the pipe.

SAMPLE



THE DANGERS OF ELECTRICITY: ELECTRIC SHOCK

Electricity is very useful but it can be dangerous too. In the United States alone, about 400 people get electrocuted each year. Electrical accidents and hazards also cause more than 4,000 injuries annually. Luckily, by better understanding the dangers of electricity, you can help to prevent electrocution and electric shock.

WHAT IS AN ELECTRIC SHOCK?

When a person comes into contact with electricity, the electricity (electrons) will flow through the person's body causing a shock. Receiving an electric shock can be extremely dangerous and damaging to skin and well as internal organs.

WHY IS ELECTRICITY DANGEROUS TO US?

CONDUCTORS Some materials allow electric current to flow more freely than others — these materials are called conductors. In a conductor, electrons are loosely bound and can move through the material easily. The metal parts inside of electrical wires are conductors and allow electricity to flow. Can you list some other conductors?

(water, aluminum, copper, iron, tungsten)

INSULATORS Other materials resist the flow of electricity. These materials are called insulators. Insulators are important in that they keep us safe from electricity. Have you noticed that all electrical wires are wrapped in a rubbery material? This is to keep us safe from electric shock. Can you list some other insulators?

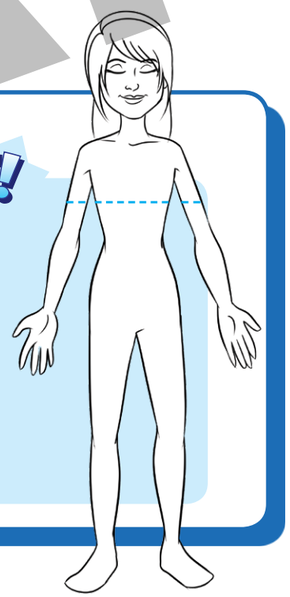
(Plastic, wood, rubber, glass)

YOUR BODY IS A CONDUCTOR!

The human body can conduct electricity because 60-65 percent of our bodies are made of water and water is an excellent conductor. That means that electricity could easily flow through you. This is why you must be very careful around electricity!

TRY IT!

Color the body up to the 65% line — this represents the portion of your body that is made of water.



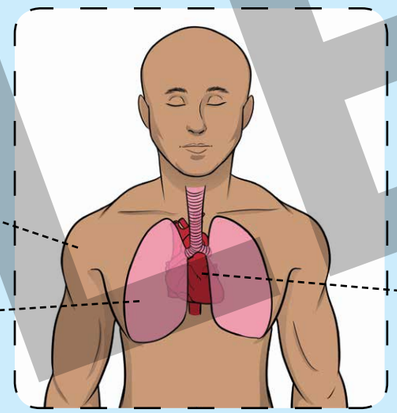
WHAT HAPPENS IF SOMEONE GETS AN ELECTRICAL SHOCK

When a person gets an electrical shock, it may affect the person's heart rate, damage internal organs, and/or burn the skin. You can think of it like a power surge. It's important to know the signs of electric shock and what to do in case of an emergency.

WHEN A PERSON GETS AN ELECTRIC SHOCK:

MUSCLES may tighten making it very hard to move away from or let go of the source of electricity.

BREATHING may become difficult.

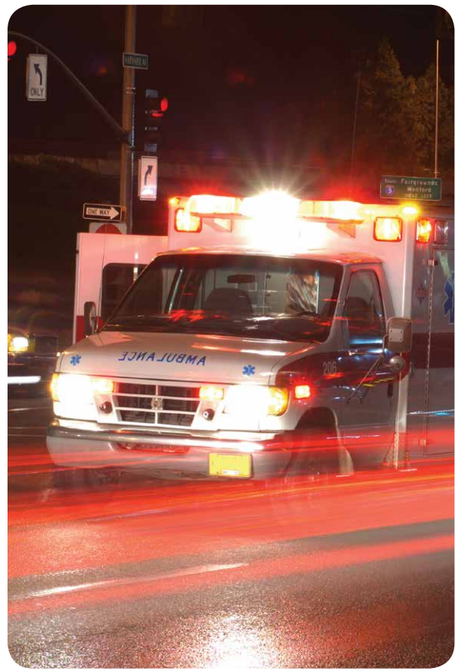


BURNS may appear where the electricity entered or left the body.

HEARTBEAT may become abnormal.

HOW YOU CAN HELP:

1. Never touch the victim of an electrical shock. The electricity can flow into you. It's also important not to touch wires or other electrical equipment nearby.
2. Alert an adult. Then ask the adult to turn off the power at the main service panel.
3. Call for help. Call 911 and tell the dispatcher that someone has been shocked.
4. Make sure the person gets checked by a medical professional. Anyone who has gotten an electric shock should see a doctor or visit the hospital because some injuries from an electrical shock may not be seen from the outside.



SAMPLE

ELECTRIC SHOCK PREVENTION

HERE ARE SOME SIMPLE WAYS TO STAY SAFE!

Even though electricity can be very dangerous, most electric shock and electricity related injuries can be prevented by understanding the dangers and following safety precautions.

If you see a worn cord do not touch it and alert an adult right away.

Never turn on an electrical appliance when you are wet or in the bathtub.

Keep all electrical devices far away from water.

Remind adults to turn light fixtures off before changing a light bulb.

IMPORTANT SAFETY TIPS TO REMEMBER:

Sometimes a person will not have any visible injuries after an electric shock. However, it's important to always see a doctor or medical professional because electric shocks can cause damage to the internal organs too.

The most common ways that children get electric shocks is by biting or chewing on electrical wires or by sticking objects into electrical sockets. Never do either of these things!

If you see someone getting an electric shock, it's important never to touch the person because the electricity can flow right into you. The best thing to do is call for help. An adult will turn off all the power at the main switch box.

Learn more about home electrical safety on pages 14 and 15!

TRY THIS SHOCKING EXPERIMENT!

HAVE YOU EVER felt a small shock when touching a metal doorknob after walking across carpeting in socks? This is called static electricity! Don't worry, most household static electricity shocks are not dangerous and nothing to worry about.

WHAT IS STATIC ELECTRICITY?

Static electricity is an imbalance between negative and positive charges in an object (remember electrons can move from one atom to another). Charge can build up until there is a path for release or discharge—the small shock you feel is a result of the quick movement of electrons.

So, when you rub your socks on the carpet you are gaining electrons and building up a negative charge. And, when you touch the doorknob electrons are discharged from you to the knob and you get a small shock. Dangerous electric shocks can work in a similar way but on a much larger scale—electrons move from an electrically charged object through your body.

TRY IT! MAKE YOUR OWN STATIC ELECTRICITY

MATERIALS

- Styrofoam plate
- Thumbtack
- Aluminum pie tin
- Pencil with eraser
- Piece of wool fabric

PROCEDURE

1. Gather your materials. Push the thumbtack through the center of the pie pan from the bottom up (be careful not to poke yourself!). Push the eraser end of the pencil into the tack.

2. Place the Styrofoam plate upside-down on a table. Rub the bottom of the plate with the wool rigorously for at least 60 seconds.

3. Using the pencil as a handle, pick up the aluminum tin and place it on the Styrofoam plate.

4. Carefully touch the aluminum tin. You should feel a tiny shock! (If you don't feel anything, try rubbing the Styrofoam plate again.)

5. Now try it in the dark! Repeat steps 2-4 but turn off the lights before you touch the tin. You may see the tiny spark light up!

DID YOU KNOW?

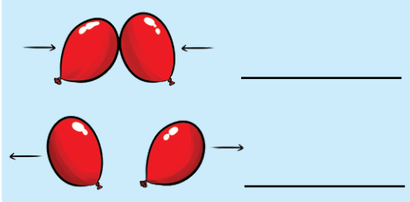
Static electricity happens more often during the colder seasons because the air is drier. During this time it's easier to build up electrons on the skin's surface. In warmer and wetter weather, the moisture in the air helps electrons dissipate slowly into the atmosphere.

IT'S AMAZING!

If two objects have the same charge they will repel (push away) each other. If two objects have different charges they will attract (pull toward) each other. A simple example of this is staticky hat hair! Your hairs all have the same charge and will repel each other causing your hairs to stand up and frizz out. Bummer!

TRY IT!

On the balloons below, label the charges based on their positions.



SAMPLE

Electric Safety Inside

It's important to be safe around electricity in your home. Remember, electricity is safe when used correctly. Follow these tips to prevent electrical fires and electric shocks. Always remember to ask an adult for help if you need help with something that uses electricity.

Outlets, Switches, and Cord Safety

Don't plug too many things into one outlet. This is a common problem during the winter and holidays.

Keep all electric cords around outlets organized and neat so no one trips and falls.

Never yank electrical cords out from wall or power strip outlets.

Never stick an object into an outlet.

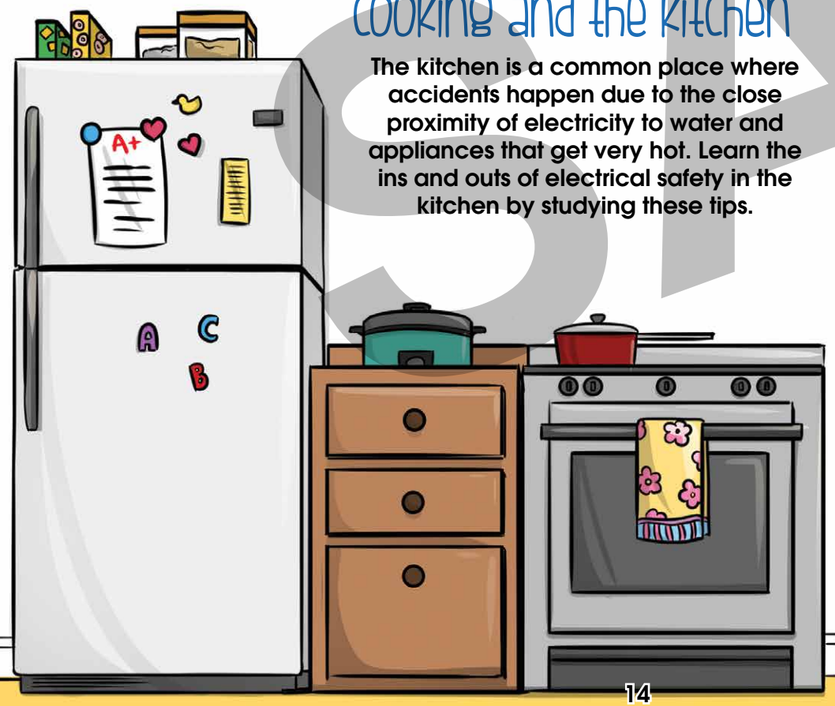
Check cords for cracks or other damage. Ask an adult to replace any frayed or loose cords and plugs.

Do not run extension cords under carpeting, furniture, or across doorways.

Do not staple or nail cords to the wall or floor. Use tape or twist ties instead.

Cooking and the Kitchen

The kitchen is a common place where accidents happen due to the close proximity of electricity to water and appliances that get very hot. Learn the ins and outs of electrical safety in the kitchen by studying these tips.



Cooking & Kitchen Safety Tips:

- Do not leave cooking devices unattended.
- Unplug devices or appliances when not in use.
- Keep all electrical appliances away from water and do not operate any electrical devices with wet hands. Make sure that your outlets and switches are a safe distance from the sink.
- Ask an adult to check that appliances are in good condition with no signs of damage. If you see smoke, sparks, or hear popping noises, discard the device or have it repaired.
- Never stick anything into the toaster to try and get a stuck piece of toast out.

Electric Safety Inspection Checklist:

Now that you know how to be safe around electricity inside, perform an energy safety inspection of your home. Check the boxes that apply. If you see something wrong, ask an adult to fix the problem.

- ☐ My home has working smoke and carbon monoxide detectors.
- ☐ All electronic devices are located away from water.
- ☐ Loose cords and wires are organized.
- ☐ Space heaters are located at least 3 feet away from flammable objects.
- ☐ Outlets are not overloaded.
- ☐ Wires and cords are not frayed.
- ☐ My home has a fire extinguisher handy.
- ☐ Cords and wires do not run under rugs or furniture.

Notes:

In this section write down anything you see that is unsafe and tell an adult!

SAMPLE

The Dangers of Electricity: ELECTRICAL FIRE

Sometimes the electricity you use in your home can cause a fire. Some electrical fires happen because of faulty wiring or old appliances. Other fires can happen because of an overloaded electrical outlet or a space heater placed too close to bedding or other flammable objects.

If an electrical fire does happen, it's important to know how to stay safe. It's a good idea to have a meeting with your family and make a plan so you know exactly what to do in the case of an electrical fire in your home. Use the 'how to' guide on page 17 to get started on your own emergency plan.

IF AN ELECTRICAL FIRE DOES HAPPEN, YOU SHOULD:

1. Exit the area immediately. Never use water to try to put out an electrical fire.
2. Cover your mouth and nose with a towel or an article of clothing while exiting, to keep smoke out of your lungs. If it is very smoky, crawl under the smoke to an exit. Since smoke rises it's a good idea to stay as low to the ground as possible.
3. Touch the door (not the doorknob) to see if it is hot before opening. If it is hot, try an alternate exit. If it is not hot, exit through that door.
4. If you live in an apartment building, exit using the stairs, not the elevator.
5. Once outside, call 911 and stay outside. If a family member or pet is still inside alert the fire department. Firefighters have special safety equipment for rescues. Never go back in unless emergency personnel say it's okay.

ELECTRICAL FIRE SAFETY TIPS:

- Remind an adult to install smoke alarms in each bedroom, and make sure there is at least one on every level of your home.
- Make sure you and your family have a plan in case of a fire.

ELECTRICAL FIRE PREVENTION

- Never use an appliance with a worn or frayed cord—this can cause a fire.
- Keep space heaters at least three feet from anything flammable like curtains, clothes, bedding, or newspapers.
- Do not run cords under carpets or doorways.
- Remind your parents to use bulbs that match the lamp or fixture's recommended wattage.

MAKE YOUR OWN EMERGENCY PLAN

IN CASE of an electrical fire, it's a good idea to have a meeting with your family and make a plan.

MY EMERGENCY PLAN CHECKLIST:

Follow this step-by-step guide to make your own emergency plan. Check off the boxes as you go along and place the final plan on your refrigerator or somewhere everyone can see it.

☐ First, find a time when everyone is home and call a meeting. A good time might be after dinner.

Our family meeting time is _____ am/pm on _____.

☐ Identify escape routes. During a fire emergency, you must exit your home as quickly as possible. Walk through your home together and identify all possible exits and escape routes.

Use the graph paper provided to sketch a floor plan of your home. Mark two ways out of each room, including windows and doors. Fire escape ladders can provide a safe exit from second story windows in an emergency.

☐ Check the exits. Make sure all the identified escape routes are free of clutter and that doors and windows can be opened.

☐ Check fire alarms. Multiple smoke detectors should be installed throughout your home. Ask an adult to make sure they are working correctly and have extra batteries handy.

My family has _____ working smoke alarms in our home.

☐ Pick a meeting place. Choose a place outside your home where everyone can meet after they have exited. The meeting place should be a safe distance away from your home (like a neighbor's house or stop sign). Make sure that everyone knows where the meeting place is.

My family's emergency meeting place is _____.

☐ Review. Make sure everyone in your family understands and remembers the plan.

MY EMERGENCY PLAN SKETCH:

Sketch a floor plan of your home. Mark two ways out of each room, including windows and doors. You can also include the location of smoke alarms and your meeting place outside.

Electric Safety Outside

IT'S IMPORTANT to be safe around electricity outside your home.

- Stay away from areas marked with signs that say 'High Voltage' or 'Danger.'
- Stay away from and don't climb the fence around electrical substations.
- Stay inside during thunderstorms.

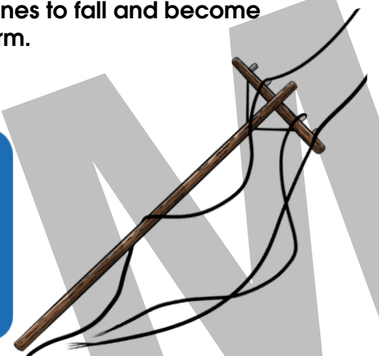
LIGHTNING is an electrical discharge! Lightning bolts are so hot that they can heat the immediately surrounding air to temperatures up to 60,000 degrees Fahrenheit! Outside is the most dangerous place you can be during a storm. If you hear thunder or see lightning, get inside as soon as you can.

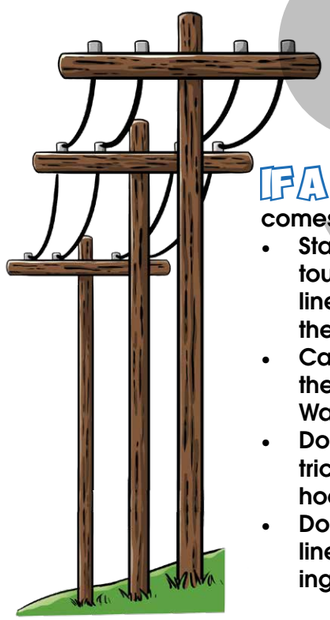
POWER LINES

One of the biggest electrical dangers outside are power lines. Electricity travels to your home through power lines. You may see these wires mounted on utility poles along neighborhood streets and highways. Power lines can carry high voltage electricity and are extremely dangerous. Remember to be aware of your surroundings when outside — it's not uncommon for trees and power lines to fall and become damaged after a storm.

DOWNED POWER LINES: BE AWARE!

- Stay far away from downed power lines. If you see one, ask an adult immediately to call the power company.
- Never touch fallen electrical poles or transformers. These can fall during heavy storms or strong winds.
- If your car does come into contact with a downed wire, stay inside and do not exit. Call emergency services immediately for help.





INTACT POWER LINES: LOOK!

- Fly your kite away from power lines in a wide-open area. If your kite touches an electrical wire, you are at risk of electrocution.
- Avoid climbing trees near electrical wires or power lines.

IF A PERSON OR OBJECT

comes into contact with a power line:

- Stay clear of the area and do not touch the person, animal, or power line. You should always assume that the whole area is electrified.
- Call 911 and tell the operator that there is an electrical emergency. Wait for a qualified electrical worker.
- Do not post posters or flyers on electric poles. Try posting in neighborhood shops instead.
- Do not plant tall trees near power lines. Make sure to plant all tall growing plants a safe distance away.

OUTDOOR OUTLETS, SWITCHES, & CORDS

Some homes have outdoor electrical outlets. Follow these safety tips:

- Only use electrical devices outdoors if they are specifically for outdoor use.
- Keep outdoor outlets covered.
- Keep outdoor outlets dry.
- Never use outdoor electrical appliances or devices while you are wet or near water.

UTILITY WORKER SAFETY

Utility workers help to repair damaged power lines — it's a very important and dangerous job! To stay safe, utility workers go through extensive safety training, wear special gear, and use appropriate equipment around energized power lines.

TAKE A LOOK at this utility worker in action! To work around electricity safely, utility workers need a lot of gear and equipment. After putting on boots, strapping on tools, and throwing the hand line over one shoulder, utility workers are carrying a lot of extra weight — in fact, all this equipment can add an extra 50 pounds!

SAFETY GOGGLES/GLASSES Utility workers wear nonmetallic and nonconductive eye protection that blocks hazardous sun glare and protects the eyes too.

HARD HAT Hard hats are required when working on poles, buildings, and in trees. They are usually made from hard plastic and have an extended rim to protect the worker's head from electrical hazards and falling debris.

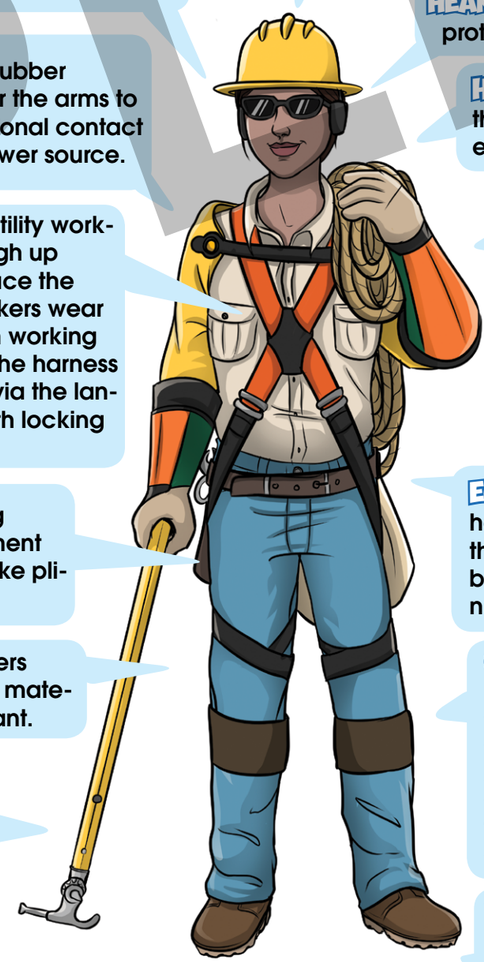
HEARING PROTECTION Workers wear ear protection to reduce noise while working.

RUBBER SLEEVES Rubber sleeves are worn over the arms to protect from unintentional contact with an energized power source.

HAND LINE The hand line is a rope that is used to hoist equipment and for emergency missions.

SAFETY HARNESS Utility workers must often work high up off the ground. To reduce the chance of falling, workers wear a safety harness when working in elevated buckets. The harness attaches to the truck via the lanyard (a nylon strap with locking snap hooks).

GLOVES Utility workers wear special rubber insulated gloves for work on high-voltage lines to protect against electric shock and burn. Gloves also prevent cuts and skin irritation. Leather rubber glove protectors are often worn to further reduce the chance of punctures and injury.



TOOL POUCH This bag hangs from the equipment belt and carries tools like pliers and wrenches.

EQUIPMENT BELT The equipment belt helps utility workers to carry the tools they need. The ditty bag is a canvas bag that hangs from the belt and holds nuts, bolts, connectors, and wires.

CLOTHES Utility workers wear clothes made of materials that are fire resistant.

CLIMBERS Made of aluminum, the climbers are strapped on just below the knee with velcro pads and hold the worker's gaffs in place. Gaffs are sharp steel points (like cowboy spurs) that are used to climb utility poles. They dig into the wood and help the worker climb up safely.

HOT STICK This tool is used to move or adjust live electrical equipment. It is usually made of insulated fiberglass and is extendable up to 40 feet!

WORK BOOTS Utility workers wear ceramic or steel-toed boots to protect the feet and provide support for climbing.

ELECTRIC SAFETY: THE BOARD GAME

Now that you know how to be safe around electricity inside and out, test your knowledge with this fun board game!

How to play:

Each player places a coin, button, or token on the 'Start' space and rolls one die. The player that rolls the highest number goes first. Take turns rolling the die to move through the game. If you land on a picture, follow the instructions written next to it. The player who makes it to the 'Finish' first is the winner!

START

Be smart around electricity!

Outlet Overload. You plug several electronics into one outlet in the living room, overloading the outlet. This is a fire hazard!

Stay here until you roll a 3 or 5.

Get Organized. All of the cords around your home are neatly organized and bundled so no one trips and falls.

Move forward 3 spaces!

Space Heater. You place your space heater close to bedding and curtains. This is a fire hazard!

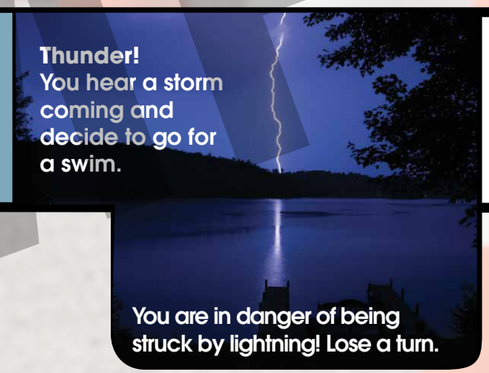
Move back 3 spaces.

Without Looking ... list three things you can do to stay safe around electricity inside your home.

Get it right and move forward 2 spaces. Get it wrong, stay here!

Smoke Alarms. Your family installs smoke alarms and checks their batteries regularly.

Move forward 2 spaces.



Thunder! You hear a storm coming and decide to go for a swim.

You are in danger of being struck by lightning! Lose a turn.

Worn Cord. You see a worn or frayed cord and alert an adult immediately.

Roll again!

Electrical Poles. During a big storm, an electrical pole falls on your block. You tell an adult immediately and stay far away from it.

Roll again!

Power Lines. You go outside to fly your kite and make sure to stay clear of power lines. Move ahead 1 space.

Emergency Plan. You and your family make a plan in case of an electrical fire in your home, identify exits, and choose a meeting place a safe distance away.

Move forward 2 spaces!

Without Looking ... list three things you can do to stay safe around electricity outside.

Get it right and move forward 2 spaces. Get it wrong, stay here!

END

You win!
You are an electric safety expert!

SAMPLE

WORD FIND

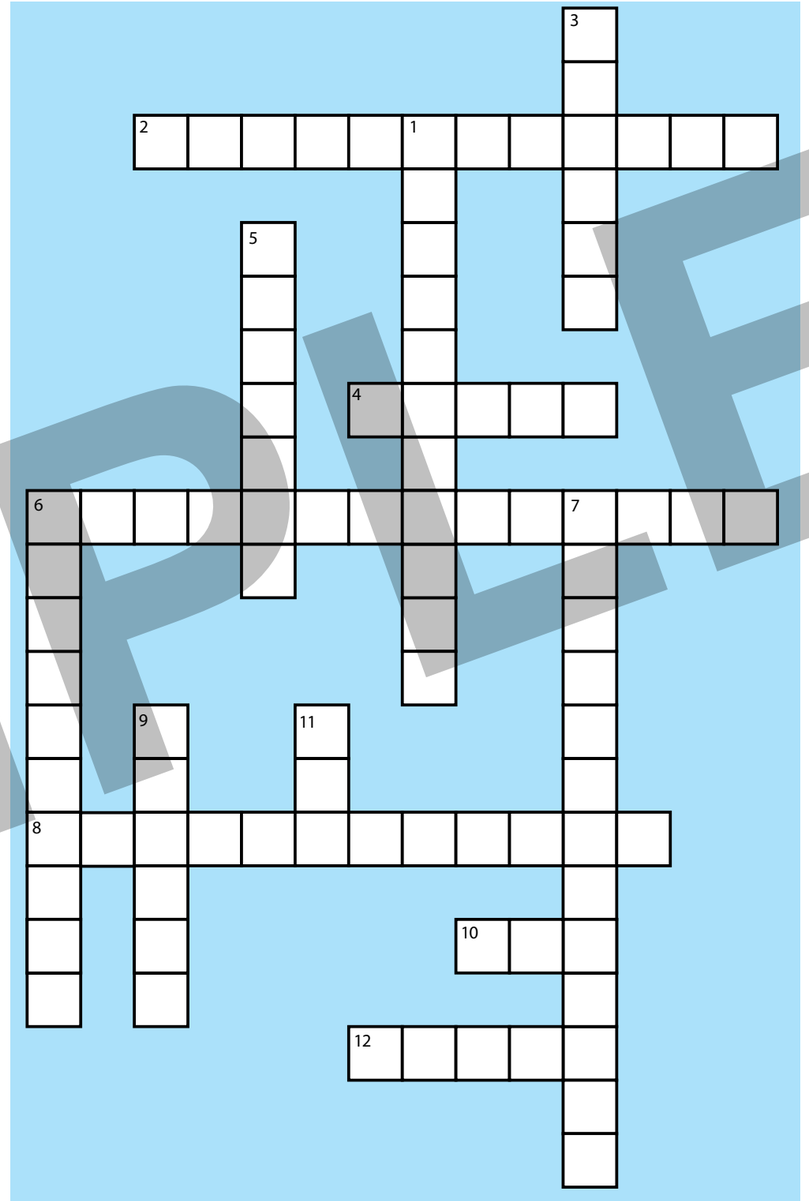
Can you find all the electricity words you've learned in this book? Circle in green the words you know, and circle in red the ones you don't remember!

A	G	I	R	E	U	A	X	I	G	I	N	S	R	T	L	S
T	I	F	I	L	I	E	M	I	E	I	I	E	L	I	B	U
O	M	C	U	E	N	M	A	G	N	E	T	L	S	U	O	B
M	I	S	I	C	I	I	G	I	E	S	I	E	U	C	I	A
T	B	B	A	T	T	E	R	Y	R	I	K	C	E	R	K	T
R	I	N	A	R	E	I	J	I	A	S	I	T	L	I	P	O
A	T	F	I	O	L	N	I	S	T	I	N	R	C	C	I	M
N	I	N	I	N	E	I	G	I	O	E	I	I	U	I	B	I
S	O	O	A	I	C	I	I	A	R	I	A	C	N	E	L	C
F	H	T	I	H	T	V	A	R	M	I	G	I	H	R	U	P
O	I	O	N	I	R	I	U	I	E	O	I	T	I	A	B	A
R	X	R	W	V	I	C	I	N	N	I	R	Y	H	L	T	R
M	O	P	I	E	T	A	K	R	X	A	N	T	I	T	H	T
E	I	C	I	C	I	Y	F	E	I	I	O	I	C	I	G	I
R	F	H	E	I	C	B	I	N	I	T	S	I	A	E	I	C
T	S	R	I	I	W	I	R	E	I	P	I	P	I	H	L	L
L	I	G	H	T	N	I	N	G	R	O	D	I	F	D	I	E
D	A	I	N	E	U	T	R	O	N	N	E	R	I	S	U	B

Word List

- Atom
- Battery
- Circuit
- Direct current
- Edison
- Electricity
- Electromagnetic
- Electron
- Generator
- Light bulb
- Lightning rod
- Magnet
- Neutron
- Nucleus
- Proton
- Subatomic particle
- Transformer
- Wire

ELECTRICITY SOURCES CROSSWORD



Across

2. Keep _____ at least three feet from anything flammable like curtains, clothes, bedding, or newspapers.

4. Keep all _____ organized so no one trips and falls.

6. Make sure your home has _____ installed on each floor

8. Never touch fallen electrical poles, _____, or wires.

10. Never turn on an electrical appliance when you are _____

12. Never use _____ to try to put out an electrical fire.

Down

1. Stay away from areas marked with signs that say _____

3. Do not stick anything into an electrical _____

5. Keep _____ far away from water

6. Stay away from and don't climb the fence of a _____

7. Stay inside during _____

9. Never use an appliance with a _____ cord, this can cause a fire.

11. If someone is getting an electric shock, ask an adult to turn _____ the power.

World List

- Smoke Detectors
- Outlet
- Cords
- Devices
- Wet
- Water
- Off
- Space Heaters
- Frayed
- High Voltage
- Substation
- Transformers
- Thunderstorms

SAMPLE

Resources

Electrical Safety Foundation International

www.esfi.org

National Fire Protection Association

www.nfpa.org

Department of Homeland Security's Ready Campaign

www.ready.gov

Centers for Disease Control and Prevention

www.cdc.gov/disasters/

Federal Emergency Management Agency

www.fema.gov

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SAMPLE