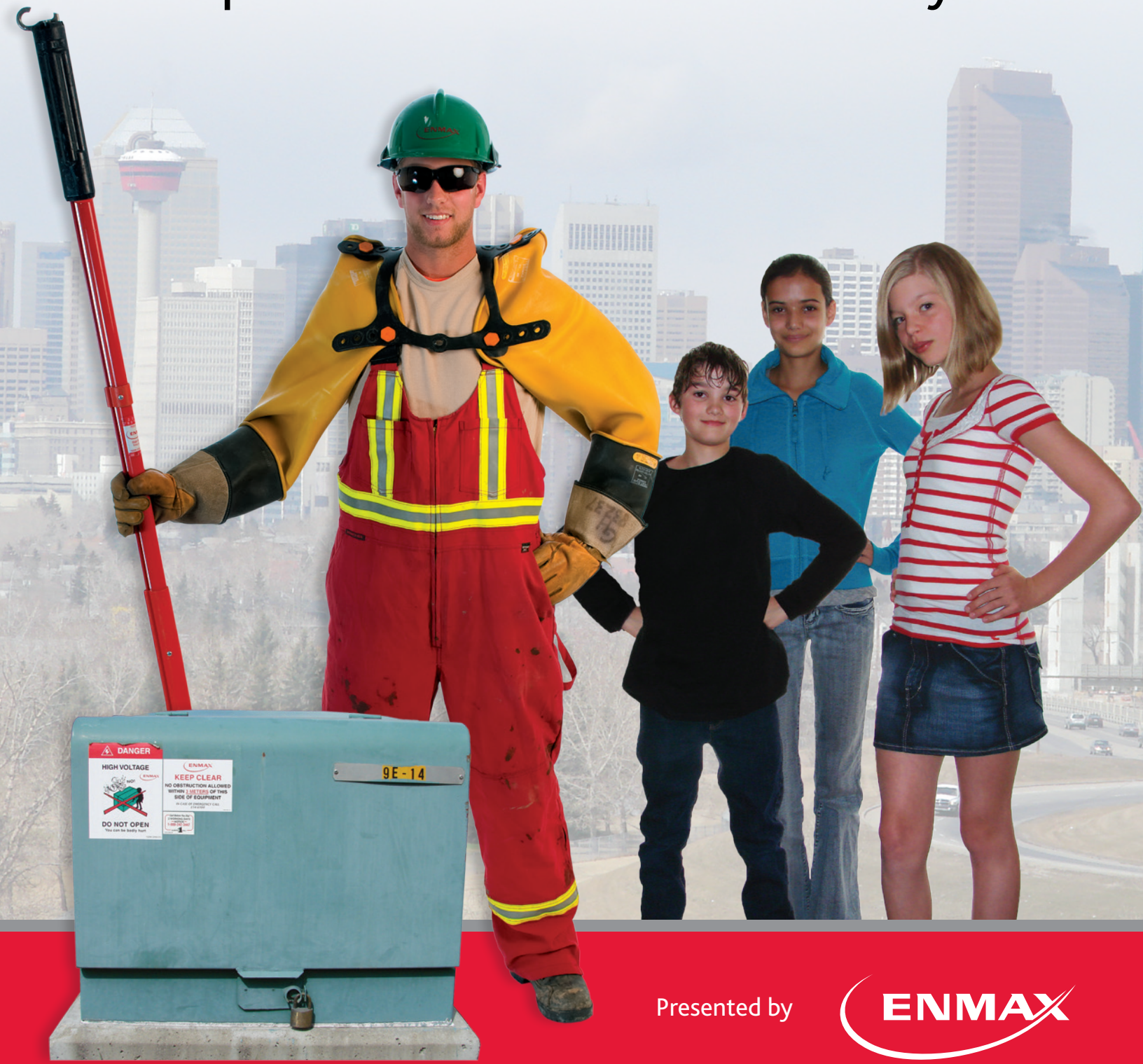
POWER SQUAD
Safety Heroes

Tips on how to be safe around electricity.



Presented by ENMAX

Attention Safety Heroes:

Electricity is everywhere!

Wherever you go, at home, school or play, electricity is an important part of our lives. We use it all the time, in many devices we don't think about very often. Safety Heroes need to know where the danger might be before we head out and share our safety tips with the world.

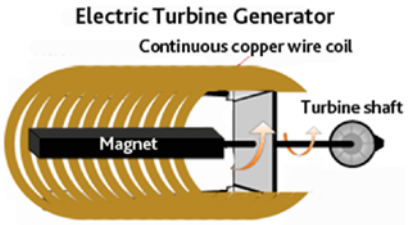
Draw as many electrical items as you can in the empty rooms above. You will see just how important electricity is in our everyday lives!

POWER FACT

Electricity is made of electrons. While each microscopic electron seems to move slowly from atom to atom, the combined group of electrons push each other along wires that can carry electricity at speeds up to 300,000 km a second. That's as fast as the speed of light!

Behind the scenes: bringing you electricity

The first step to getting power to people is making it! Some divisions of ENMAX use wind powered turbines and natural gas powered turbines to make electricity. They're also using solar panels to harness the energy of the sun! Other companies in Alberta also use coal and water power.



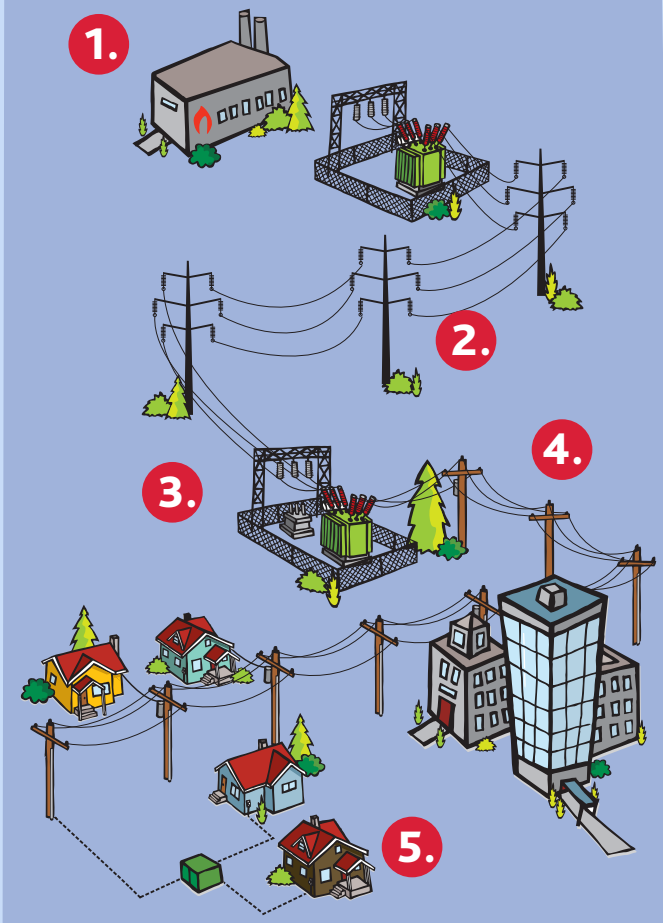
When the magnet spins inside of the copper wire, it generates electricity!

Solar

Wind Power

Natural Gas

Basics of the electricity system



Getting electricity to your house takes a lot of steps. It goes from (1) a generating station, like a wind turbine or gas powered turbine to (2) transmission lines which bring the power to cities and towns. (3) The sub station collects the high voltage electricity and gets it ready to distribute to the city through (4) overhead; and underground distribution lines that lead to (5) homes, schools, and any place that needs electricity!

Conductors and Circuits

Once electricity is made, the electrons need to flow. While these fast, negative particles want to flow to the ground, they cannot jump to it whenever they want. Electrons need a way to travel places: they need conductors.

Giving the electrons a road to travel isn't enough, since electricity will try and escape if it can. Creating a circuit allows electricity to move towards a device that will use of some of the electricity, and allow the electrons to keep moving with ease to the next circuit it can find that is connected and ready for power.

POWER FACT

Electricity wants to go to the ground. Why? the electrons that make up electricity are attracted to the biggest place around with a lower electrical charge. Of course, the biggest place is the ground that makes up the planet Earth. Electricity will never fill up the world, but will try to get there every chance it gets!

Danger! Your Body Is A Conductor

Water is a great conductor of electricity because it is filled with salt and minerals, especially when in your body.

Since our bodies are 50% to 75% water, electricity will use us to get to the ground!

Kite Makes Contact With Power Line!

Contact with a power line for even 1/10 of a second will give us a very bad shock and hurt us.

Electricity Is Hot!

Electricity creates friction as it moves, so it is very hot! It confuses our muscles because it replaces the signals from our brains. When it travels inside of our bodies, it can badly hurt us, or even kill us. Electrical burns can take a month of operations to try and repair, and up to six months to heal with lots of visits to the doctor. It only takes 40 volts to be burned. Power lines start at 120 volts!

Insulators Keep us Safe!

An insulator is any material that electricity has trouble moving through. Since electricity wants the shortest, easiest path to the ground, it will avoid these insulators and take another path that's a good conductor, like a power line!

Ceramic

strong and heat resistant

Glass and fibreglass

Rubber

it has to be 100% natural to work

thin pieces melt so it has to be thick

Plastic

Wood, paper, cotton and other low voltage insulators

Safety Warning

You can't trust everyday objects to be effective insulators! Safety Heroes know that the best way to stay safe is to stay away from power lines!

POWER FACT

Wood can be an insulator, but it can be a conductor too! Low voltages, like those in batteries, are not strong enough to use wood to travel. but high voltages can move through wood if there's even a tiny bit of moisture inside. This is why power poles have plastic, ceramic and fibreglass insulators between the wooden pole and the power lines!

Safety Hero Profile: ENMAX Power Lineman

A Lineman is a person who builds and repairs power lines!

To be safe around electricity, the Lineman uses the following gear:

- Fibreglass 'Hot Stick'
- Flash Goggles
- Heavy Rubber Sleeves
- Thick Rubber Gloves
- Leather Gloves
- Protective Safety overalls
- Steel-toed Safety Boots

The Lineman's safety equipment is tested every morning before work!

It takes a lot of knowledge and equipment to be safe around electricity. If you don't have everything you need, the only option is to stay away!

POWER FACT

It takes good grades in high school, and then FOUR YEARS of training as an apprentice before a lineman is fully qualified to work around electricity! Even after all of that education and experience, electrical workers remember to put safety before everything else.

Safety Hero Training Plan

Electricity and water?

Do not put them together!
Remember, water conducts electricity!

If you plug in anything near a sink or bathtub, it could be dangerous. We can't mix electricity and water, so having a cord or appliance near water could be a shocking experience! Even if you have an interupter outlet in the wall, you still have to use your safety hero brain and avoid the danger!

Watch out for broken cords!

When a cord is broken, you shouldn't plug it in. Always inspect cords, and only use electrical tape to fix them. This will make the cord safe until you can have the appliance repaired or replaced!

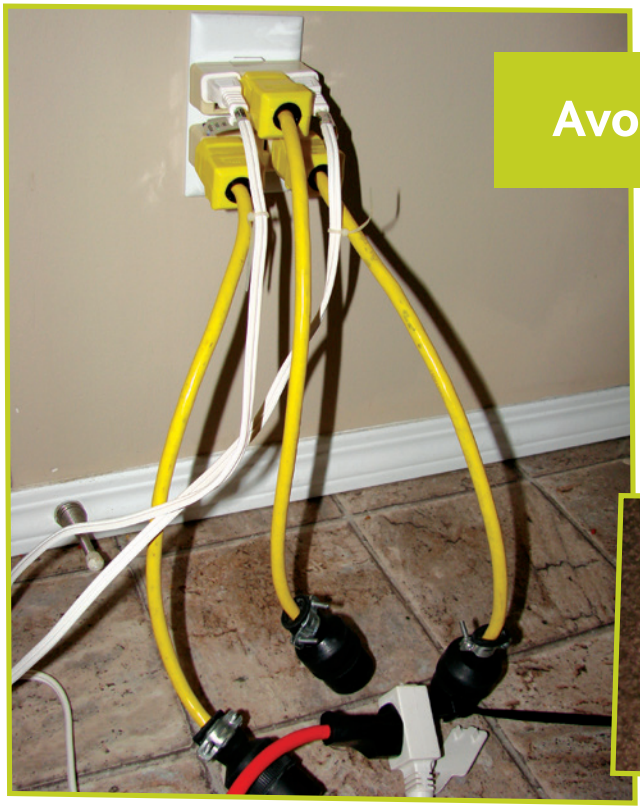
Always tug by the plug!

If you pull on the cord you will break the insulator and expose the wires!

Wet ground can be a big safety hazard!

If you need to run an extension cord across the ground, make sure the ground is dry! If you put the connection on the wet ground, electricity will escape and could shock you!

Avoiding Danger at Home



Avoid the Electrical Octopus Outlet!

On the left is a villain called the Electrical Octopus Outlet! It uses too much electricity and it will get too hot! Then the insulators melt and the wires start a fire! You can't put it out with water! Use a power bar instead, like the one below, or move some cords to a new outlet! It's much safer!

Power bars have safety features. The Octopus doesn't!

Be careful with appliances!

If your toast is stuck, you can't grab a fork and try to pull it out! Putting a fork inside would shock you with 120 volts! The first thing you should do is tug out the plug! This takes away the electricity and makes it safe to rescue the toast or check whatever appliance may not be working properly.

Call before you dig!

Important pipes and cables are buried under the ground. If you need to dig deeper that 30 cm in any spot, you need someone to find those pipes for you. If you dig and hit a pipe or power line, you will be hurt!

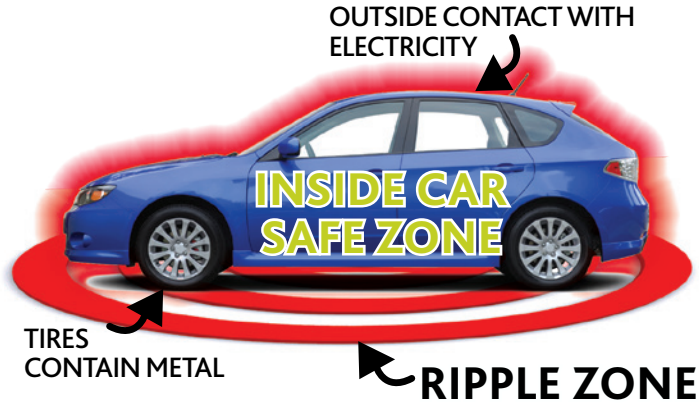
Danger on the ground: staying safe outside!

Sometimes, power lines break because of bad weather, car accidents, or people using big machines in a place too close to the wires.

What do we do if it happens?

Stay away from fallen power lines!

The electricity will escape, creating electric ripples in the ground that move much faster than we do! The zone will spread out for ten metres. If you step into that ripple zone, the electricity will use the water in your body as a conductor and shock you as it tries to fill more of the ground!



What happens if I am in a car or truck?

When electricity reaches a car or truck, it will use the metal frame to find a path to the ground and ignore the people inside! This is an example of a Faraday Cage, a device that keeps everything inside of it safe from the electric current. Electricity reaches the ground because tires contain bits of metal to make them stronger! So if you stay inside the vehicle you are safe, but if you get out, you get zapped!

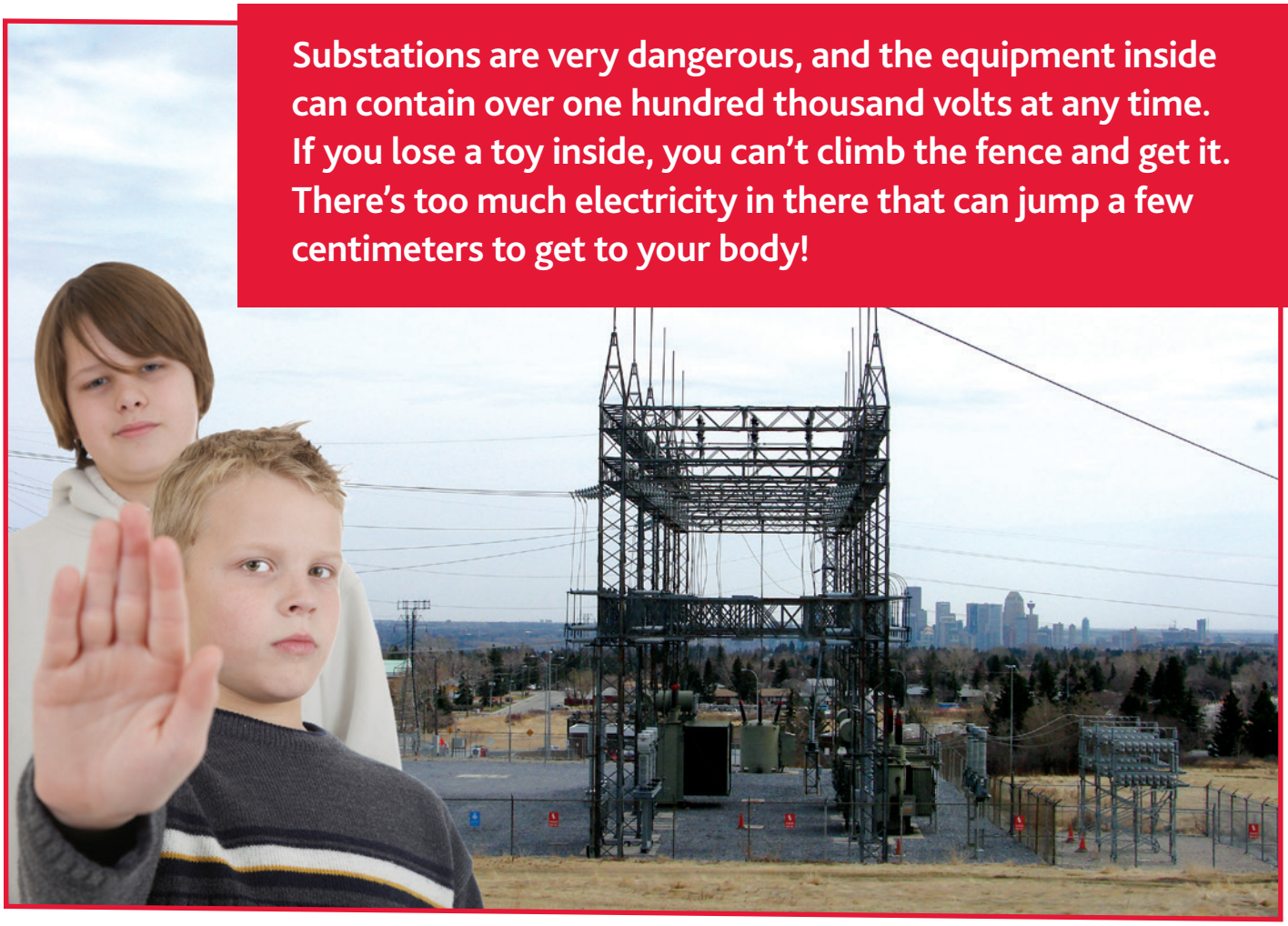
You can use a cell phone to call 911 when you're in the vehicle. Since it runs on batteries, it will be safe to use.

POWER FACT

The ability for electricity to shock you in the ripple zone is called Step Potential. Every spot on the ground is like a single power line, and the electricity is stronger and weaker at different points. If your feet are apart, electricity can take a step using your body and shock you!

Danger: High Voltage! Play safe outside!

Substations are very dangerous, and the equipment inside can contain over one hundred thousand volts at any time. If you lose a toy inside, you can't climb the fence and get it. There's too much electricity in there that can jump a few centimeters to get to your body!



The big green box that might be on your lawn or in your alley is a pad transformer. The wires inside carry thousands of volts of electricity! When the green box is closed, it is very safe to be near. But don't play on it! If the lock is broken or the box is open, tell an adult right away and make sure no one goes near it!

Safety in Action!

What to do when there is an electrical emergency!

What do you do when there is an electrical emergency?

Many people are hurt by electricity because they panic in an emergency. Be a safety hero and learn these three important steps to staying safe!

Remember, safety is easy!

Whether it is staying in the car when a power line falls down, or leaving your house to call 911 when there's a fire, you can make a safe and simple choice to keep you and your family safe in any situation!

1. **STOP!**

Instead of running around panicking in an emergency, which means you could trip over something or run into more danger, you need to stop and look.

2. **LOOK!**

It will only take a few seconds to spot the danger, whether it's smoke from a fire, a fallen power line, or an injured person.

3. **THINK!**

Once you know what the problem is, you can use your brain to think about the safest way to deal with the emergency.

Still not sure what to do?

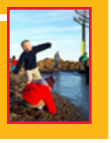
Always get an adult to help you, or call 911 and let the operator know that there is an electrical emergency!

Safety Maze Challenge!

Can you find your way home from school without running into any electrical hazards in the neighbourhood? If you use your brain and keep your eyes open, you'll be sure to make it home safe!

SCHOOL

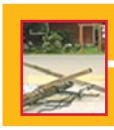
Kite flying near power lines



Throw rocks at power pole for fun

Unlocked transformer (the big green box!)

Fallen power line on ground



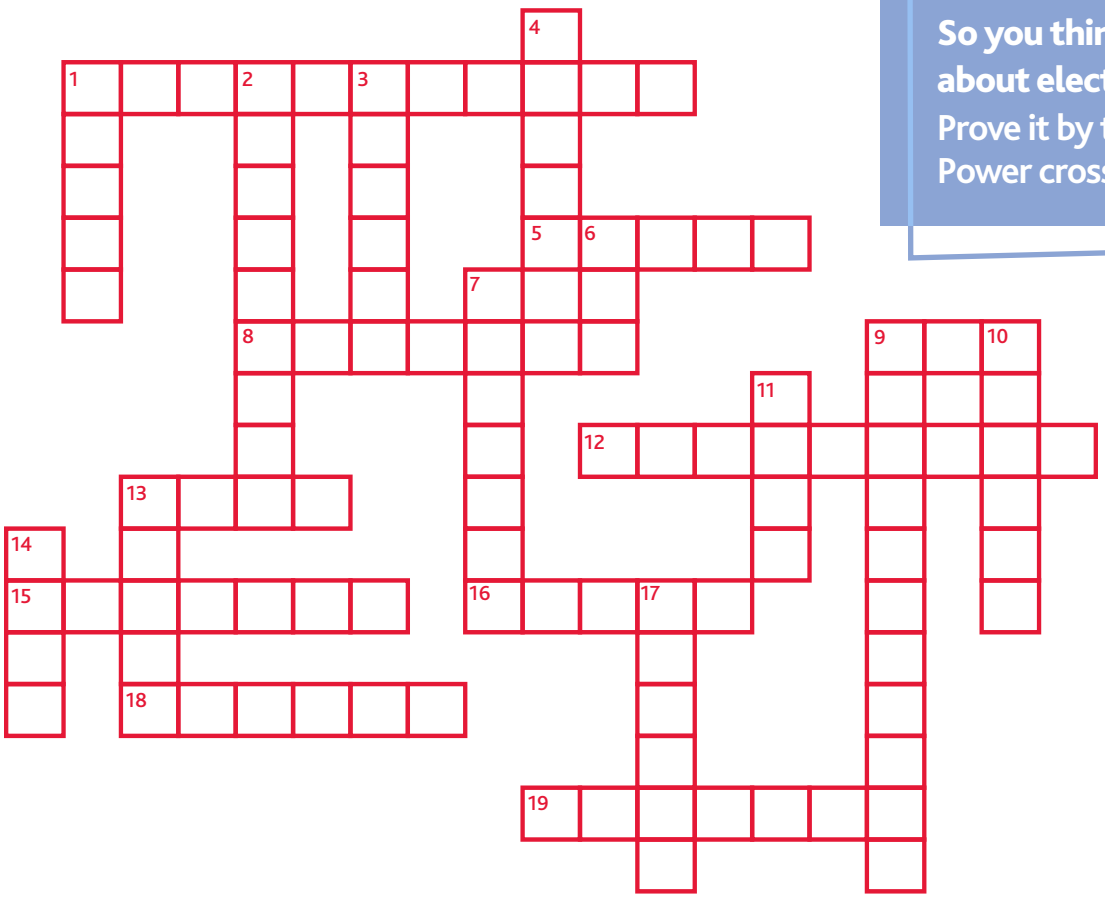
Tree near power line

Substation fence

HOME

Brain Power!

So you think you know a lot about electricity and safety? Prove it by taking the Brain Power crossword challenge.



ACROSS

1. _____ is made of electrons
5. We use our brains to _____ before we act
8. A loop or path that lets electricity flow is called a _____
9. Always ___ on a power cord
12. An _____ is something electricity avoids
13. ____ coiled around a spinning magnet can make electricity
15. An electrical outlet _____ is a fire hazard
16. Touching a power line can _____ us
18. Electricity creates a _____ effect in the ground
19. When we are shocked, our lungs stop and we can't _____

DOWN

1. _____ is the electricity company in Calgary
2. A _____ is something electricity likes to travel through
3. ____ is an insulator that comes from trees
4. Electricity moves at the speed of _____
6. Electricity burns because it is ___
7. Your _____ freeze up when you are shocked
9 A _____ is a box you should never open
10. Birds on a wire do not get shocked because they do not touch the _____
11. It only takes 40 volts to ____ you
13. Our bodies are 70 to 85% of this - _____
14. Your ____ is a conductor
17. _____ is a shiny, orange metal

Family Safety

Parents, the safety of your family is important to us, and the following list of twelve potential safety hazards will help you find problems before they begin. You can even make a game of this safety check, and your kids can be the Safety Heroes who are on the hunt for all the electrical dangers that could be in your home.

☐ Do you have any octopus outlets?
The octopus appears when too many plugs are connected to one outlet. This creates heat build-up and causes a fire. Instead, use a power bar with a safety breaker, or have a new outlet installed.

☐ Are electrical cords in good shape?
Watch for frayed cords or loose fitting plugs. The exposed wires can shock you!

☐ Are electrical cords easy to see?
Cords that run under rugs or appliances can be damaged, overheat and create sparks. Keep cords clear of obstructions.

☐ Do you have appliances near water?
Electricity and water lead to trouble. Avoid using items like blenders and hair dryers near water, even if it's just wet hands or water on the floor.

☐ Are your appliances childproof?
Children are curious! Make sure you use plastic safety covers on unused outlets and keep appliances away from the edge of the counter.

☐ Are flammable materials near any appliances that get hot?
Any appliance that gets hot, like a heater, should be kept away from anything that could catch fire.

Kids, it's time to get your parents to be Safety Heroes!

Please take some times to go over this checklist with your family!

☐ Do you unplug unused appliances?
Even when off, a plugged in appliance will use some electricity. To save energy and stay safe, unplug small appliances when not in use.

☐ Is there exposed wire in your house?
Repair broken outlet plates, frayed cords and cover holes that expose wires. Don't be afraid to call an electrician to help out.

☐ Do you have GFCI outlets in your kitchen /bathrooms?
The Ground Fault Circuit Interrupter is a special outlet with a built in breaker to shut off power in time to prevent serious shock injury. Have them installed for any outlet near a sink.

☐ Do you have a fire extinguisher?
A multi-purpose extinguisher is important because you can't throw water on an electrical fire. Use it for small fires only, and always call 911.

☐ Check your smoke detectors!
You should have a detector on each floor of your home. Test them regularly and change batteries every six months for battery operated models.

Make your home a safe place for your family! If you have any electrical safety questions you can email thinksafe@enmax.com or if you are concerned about an electrical issue and would like help right away, call (403) 514-6100 and speak to our ENMAX Power Trouble line about the situation.

Electrical Safety Phone List

These are important numbers you need for dealing with emergencies and safety hazards.

Post it on the fridge or keep it near the phone, and you'll always know whom to call to make sure your home is safe.

IF SOMEONE IS HURT, MIGHT BE HURT OR IF THERE'S A FIRE OR A BIG ACCIDENT...

911

If there's no power, if electrical equipment is damaged or you are worried about possible electrical hazards...

ENMAX TROUBLE (403) 514-6100

Call before you dig! Underground locates...

ALBERTA 1 CALL 1-800-242-3447

If a street light is burned out...

CITY OF CALGARY INQUIRIES 311

always ask yourself
WHERE'S THE LINE?
POWER LINE SAFETY

ENMAX is proud to be a member of JUST, the Joint Utility Safety Team, working with other utility companies and the Government of Alberta to promote power line safety in our province.

ENMAX