



ENERGY DETECTIVES

Lesson 4
Electrical
safety

STUDENTS
Energy Detective Handbook

Name: _____
Class: _____

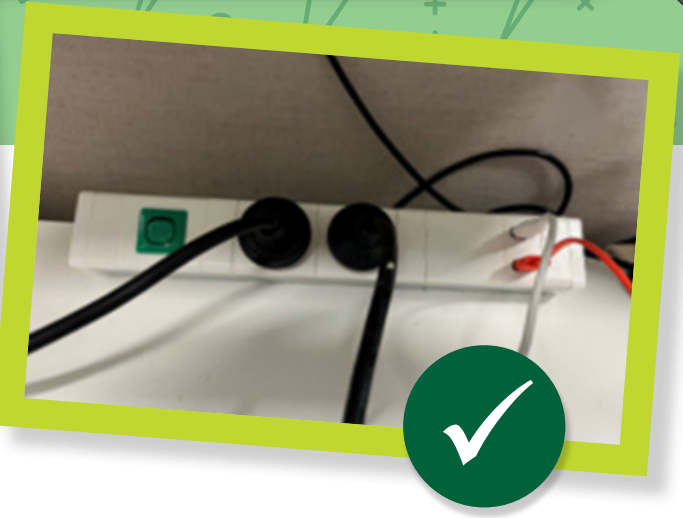




**Being Power Savvy also means
being a Safety Hero**

ACTIVITY 4.1: IDENTIFYING ELECTRICAL HAZARDS

What's wrong in the picture on the left?







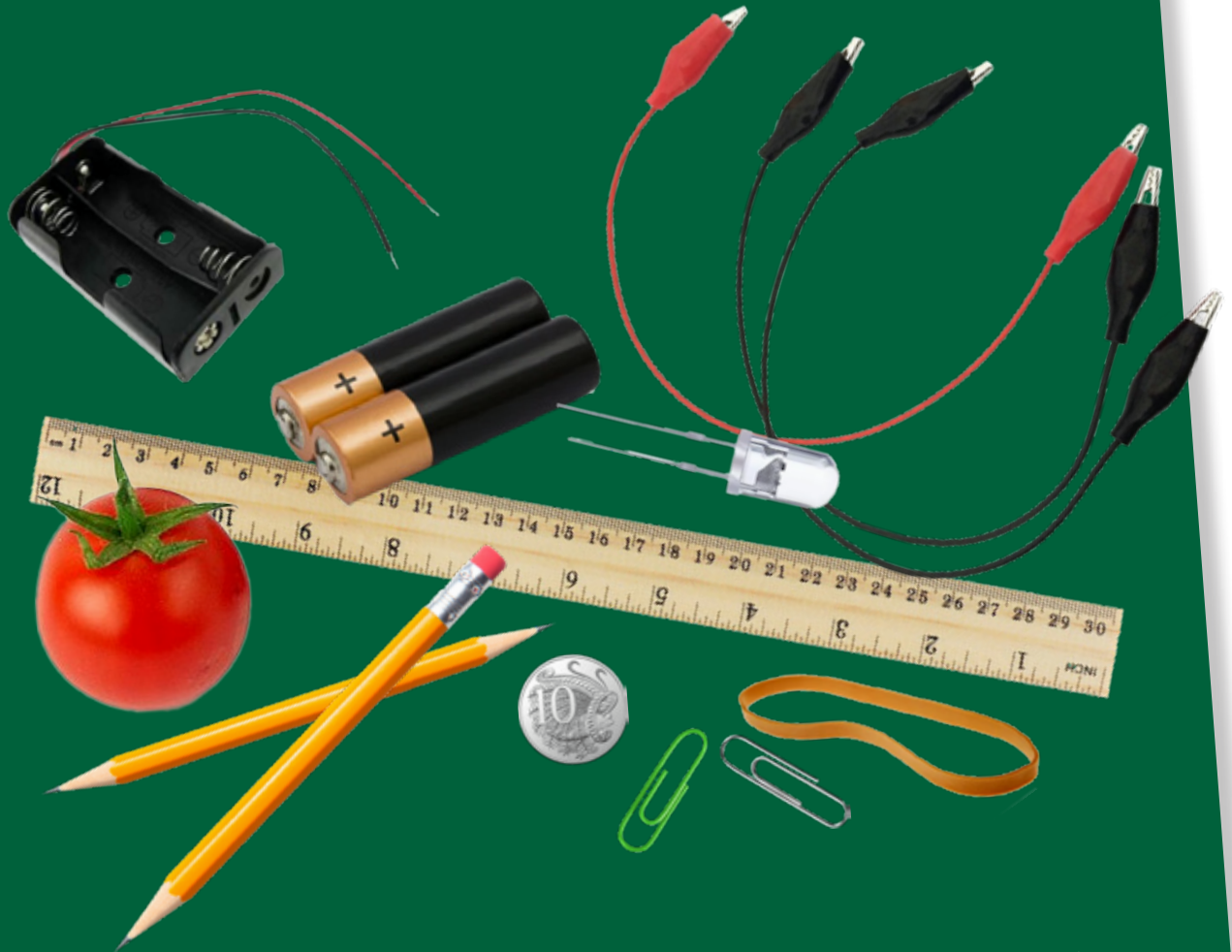
What's wrong in the picture on the left?





ACTIVITY 4.1: IDENTIFYING ELECTRICAL HAZARDS

Materials you will need:



- 2 x AA batteries and battery holder
- 1 x red (positive) and 2 x black (negative) connector cables with clips
- Light emitting diode (LED)
- Wooden ruler
- Coin
- Rubber band
- Wire paper clip (uncoated)
- Wire paper clip (with plastic coating)
- Graphite pencil with eraser on end (take care with pointy end of pencil)
- Graphite pencil with graphite exposed at both ends (take care with pointy ends of pencils)
- Small (juicy) fruit or vegetable e.g. cherry tomato

Method:

STEP 1

Install the 2 x AA batteries into the battery holder – following diagram in holder.

STEP 2

Connect one end of the red connector cable (clip) to the red (positive) battery wire.

STEP 3

Connect the other end of the red connector cable (clip) to the longer of the two wires of the Light Emitting Diode (LED).

STEP 4

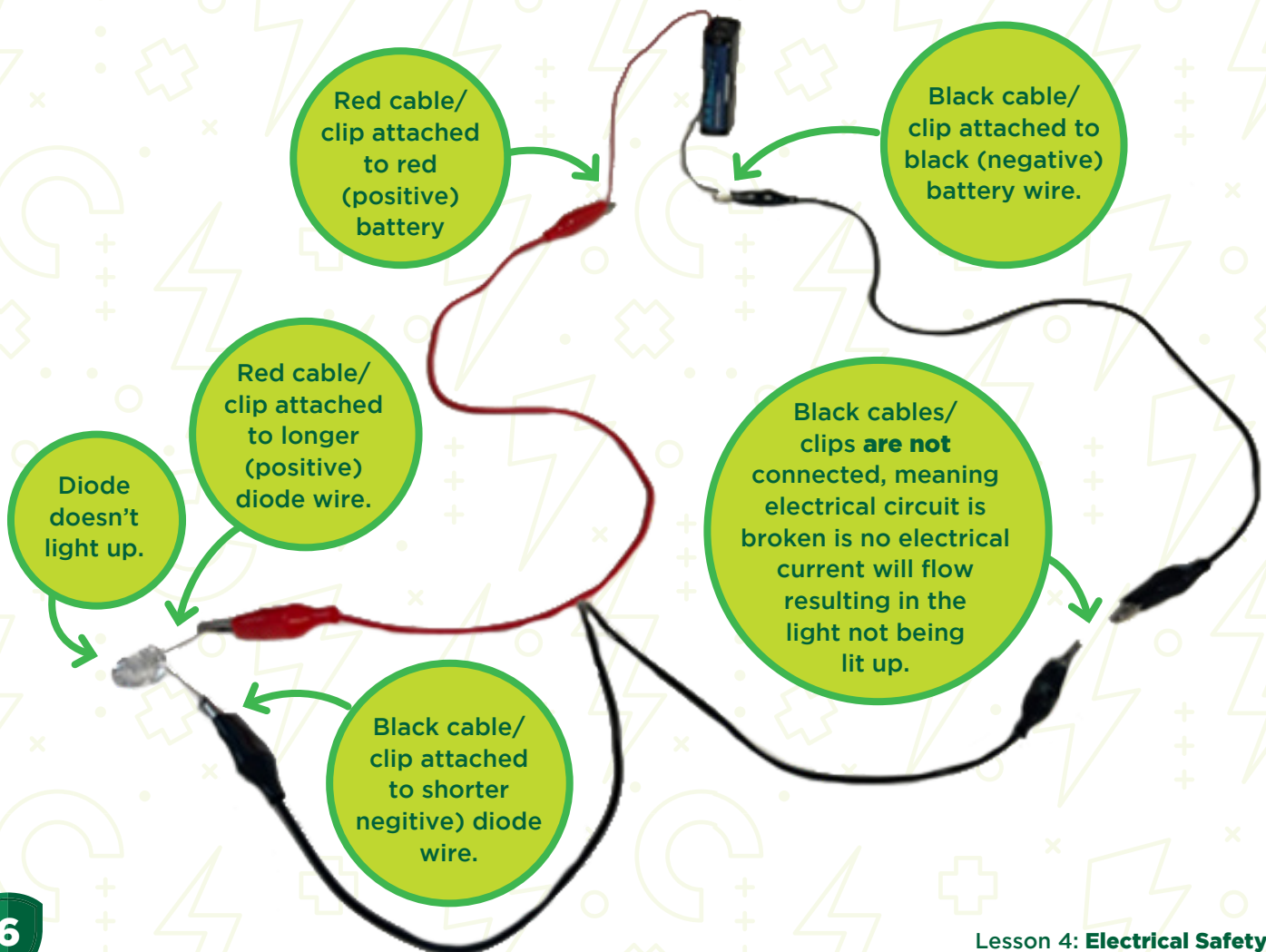
Connect one of the black connector cables (clip) to the black (positive) battery wire.

STEP 5

Connect the other black connector cables (clip) to the shorter of the wires of the LED.

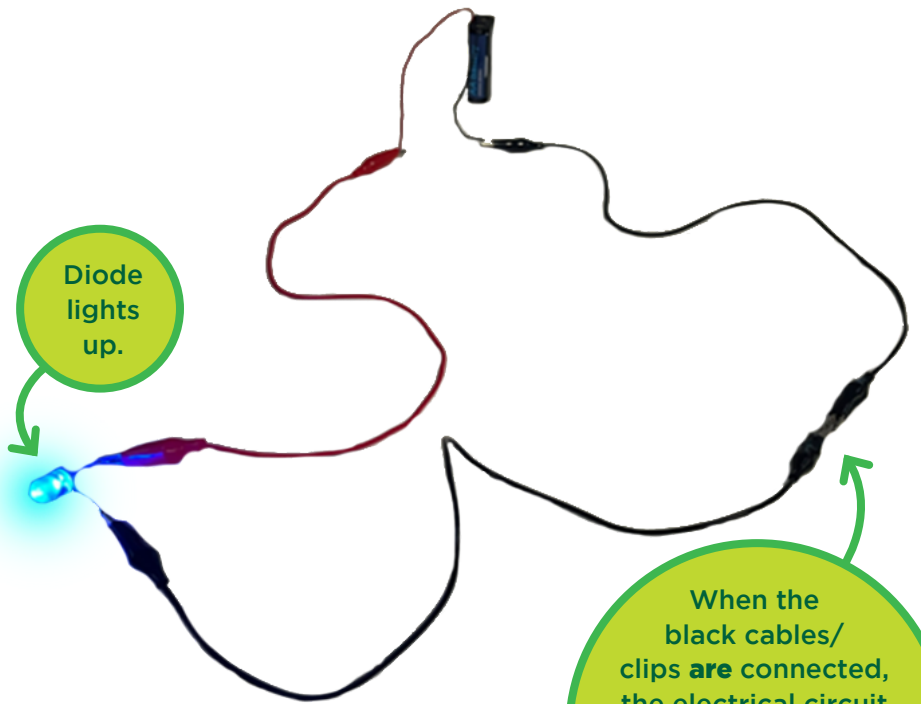
At this stage there should be two black connector cables with ends that aren't connected to anything.

This means that the electrical circuit isn't complete, and the LED shouldn't be lit up (see image below).



If you touch the two ends of the black cables together, the circuit will be complete, and the LED should light up (see image).

Diode lights up.



When the black cables/ clips are connected, the electrical circuit is complete and an electrical current will flow resulting in the light being lit up.

If the LED doesn't light up, then the circuit isn't connected correctly.

Troubleshoot by:

- Checking batteries have charge and are installed properly in holder.
- Checking that all connections are securely made.
- Check that all the steps were followed correctly.

STEP 6

Coin

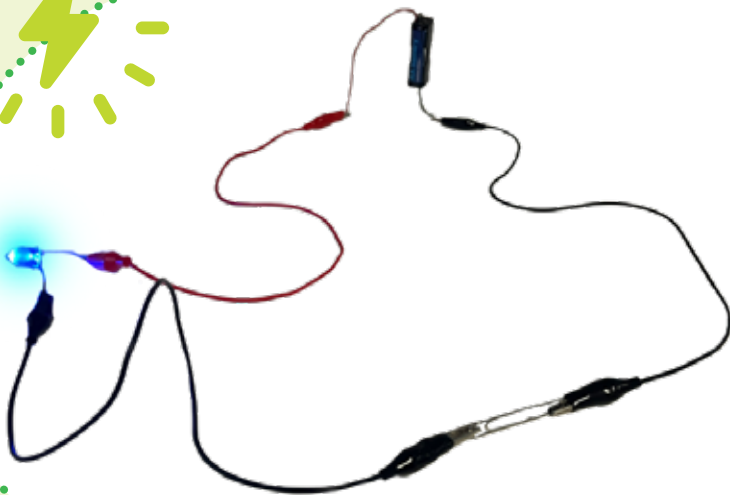
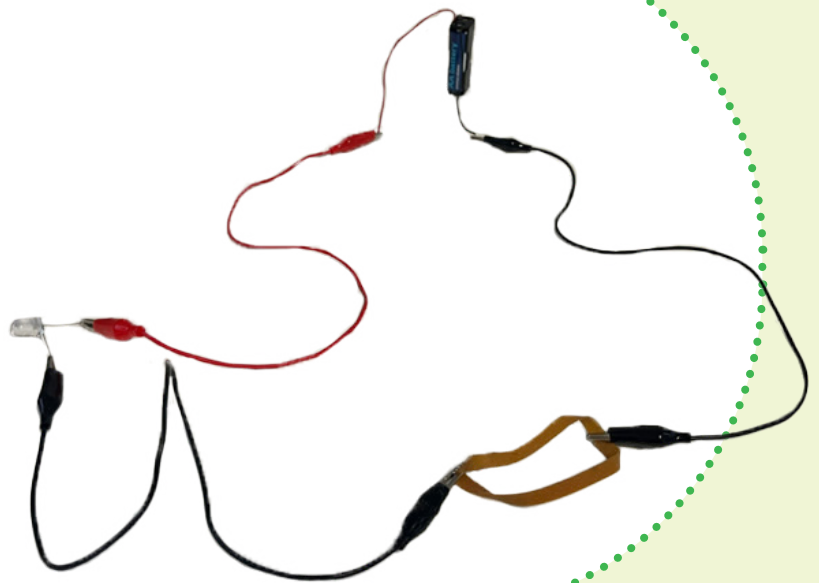
Now test each of the materials to see whether they conduct electricity (conductors) or don't conduct electricity (insulator) by connecting them to the two black cables as shown in the below images. Discuss after each test.



The LED **does** light up. Why?

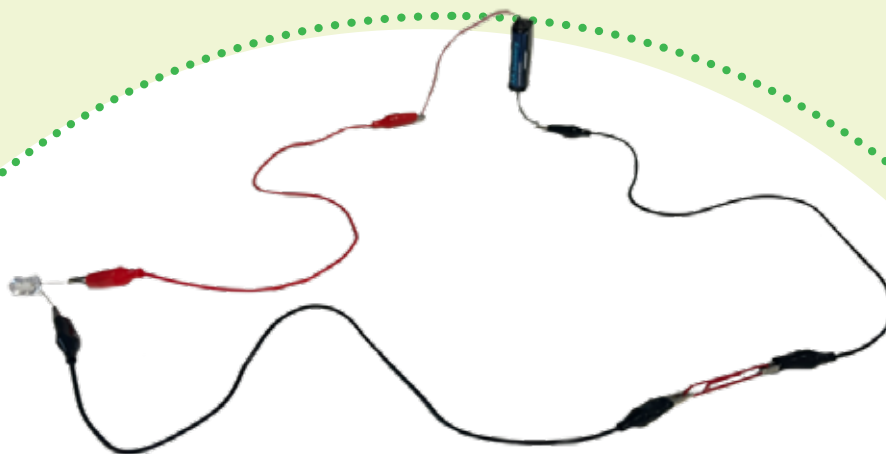
Rubber band

The LED **doesn't** light up. Why?



Paper clip (bare metal)

The LED **does** light up. Why?

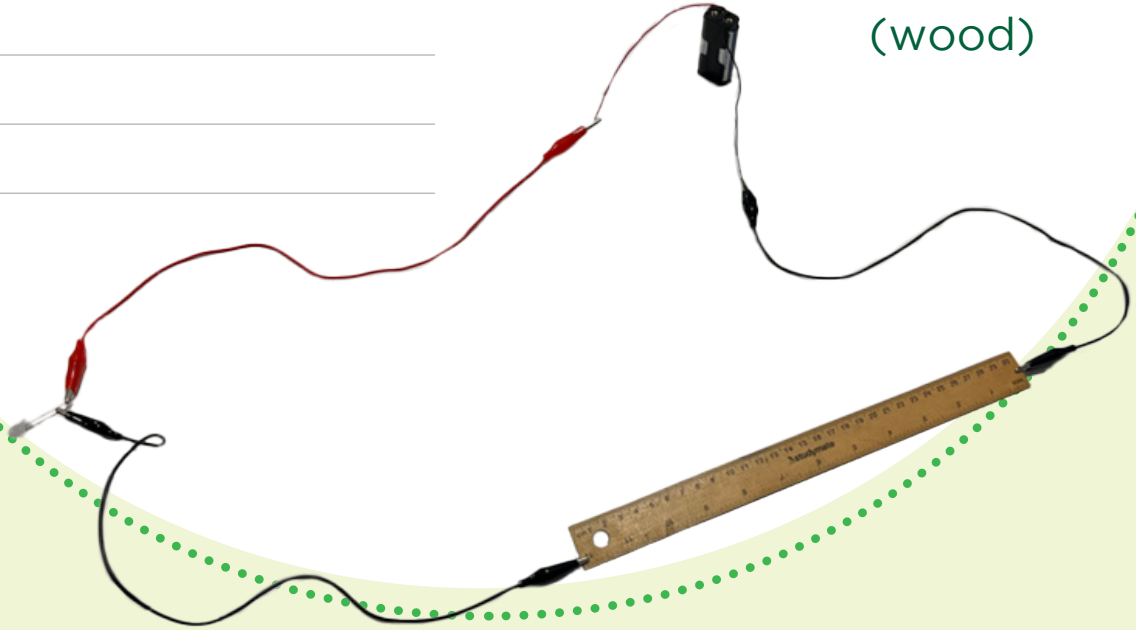


Paper clip (plastic coating)

The LED **doesn't** light up. Why?

The LED **doesn't** light up. Why?

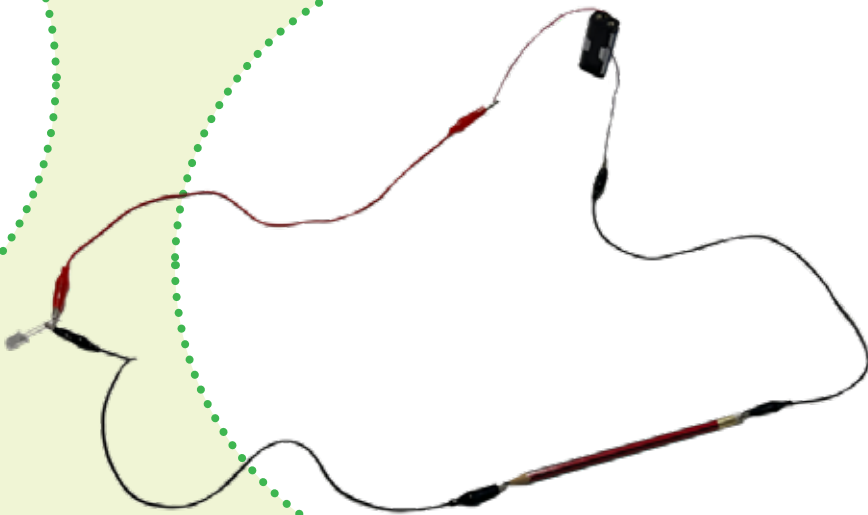
Ruler
(wood)



Pencil

(graphite one end and eraser on the other)

The LED **doesn't** light up. Why?



Pencil

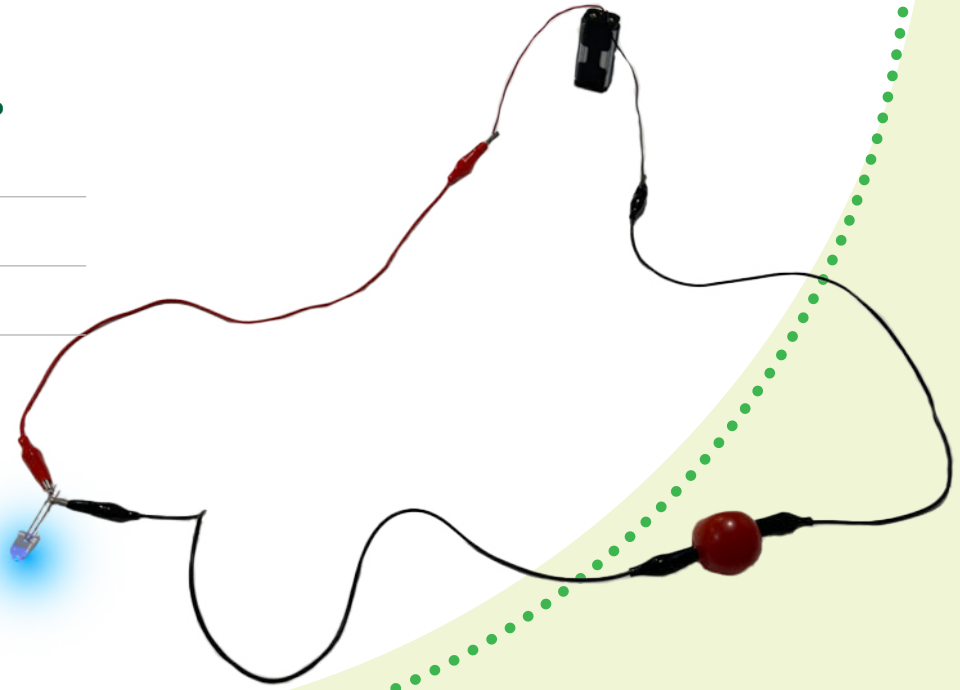
(graphite at both ends)

The LED **does** light up. Why?

Small (juicy) fruit or vegetable

(e.g. cherry tomato)

The LED **does** light up. Why?



You can try all kinds of different things

Why the diode lights up with some materials and not others?

Cross out the incorrect word in the below sentences:

- Conductors [carry] [don't carry] electricity.
- Insulators [carry] [don't carry] electricity.



Just like the fruit in our little experiment, your body is made mostly of water.



70%
water



Have you felt a shock or tingle?

If so...

- Stay away from it
- Tell your Mum or Dad if at home
- Tell a teacher or staff at school
- Get a licensed electrical contractor (electrician) to take a look

What's wrong in this picture?



Take care, stay line aware.



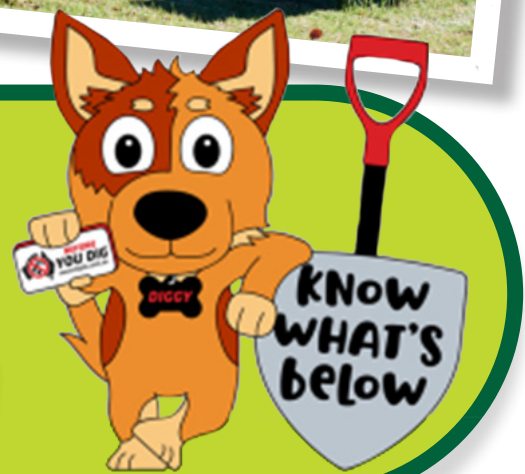
They can be next to us



They can even be below us

It's really important to know what's below.

Let's hear why from Diggy



Look up when playing outside

Fly kites and drones in open spaces.
Always look up before you fly.



Never climb a tree that's near powerlines.

Look up before you climb.



Fallen powerlines

Electricity will try to jump to the nearest conductors, and sometimes can cause fires. That's why you need to stay at least 10 metres away.

Stay at least 10 metres away.
Tell an adult.
Call 000.

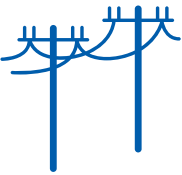
QUIZ



What is the emergency phone number in Australia?



What should you do if you see faulty electrical equipment at school and at home?



What do you do if you see fallen powerlines?

BE ON THE LOOKOUT FOR DANGERS

You can be a Safety Hero by doing a Home Safety Check with your parents or an adult at home.

Now that we're learning about being safety heroes and will be on the lookout for dangers, let's get ready to go on our mission.





HOME SAFETY CHECK

Ask an adult to help you check for electrical safety around your home using our safety checklist.

Cords and power points. At your place, are there any:

Power points that are damaged, cracked or coming away from the wall?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Electrical cords that are frayed or damaged?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Cords that have plugs with broken or missing pins?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Multiple double adapters in power points or powerboards?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Has anyone in your home done their own electrical work or fixed a faulty electrical appliance?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

If you have answered Yes to any of these questions, you should ask Mum or Dad to call a licensed electrical contractor to check the faulty power point, cord or appliance. Never try to fix anything electrical yourself and remind Mum and Dad not to consider doing any electrical work themselves either.

Appliances

Should you leave the power on while plugging and unplugging appliances?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Should you use electrical appliances with wet hands or while standing in water or on a damp floor?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Should you leave appliances out and plugged in after use in the bathroom?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do you clean electrical appliances with the power left on?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

If you have answered Yes to any of these questions, ask Mum and Dad to read with you our home safety information at ergon.com.au

Outdoor. Ask Mum and Dad if they would:

Look out for overhead powerlines when moving ladders and equipment around the yard?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Use the Dial Before You Dig app on their phone to check for underground powerlines and services before they dig in the yard?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Get a professional tree trimmer to trim trees near powerlines?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Keep electrical appliances a safe distance from your pool?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Look up for overhead powerlines before flying kites or drones?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

If you have answered No to any of these questions, ask Mum and Dad to read with you our home safety information at ergon.com.au

Safety equipment. At your place, do you have:

A safety switch installed? And do you test it regularly every three months?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
A surge protector to protect your valuable sensitive electrical appliances?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Smoke detectors installed?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
A fire blanket or fire extinguisher?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

If you answered No to any of the questions above, ask Mum or Dad to consider your family's safety and have these vital pieces of safety equipment installed in your home. **And remember to check them regularly.**



Ergon Retail acknowledges the Traditional Custodians of the land on which we live and work, and recognise their continuing connection to land, waters and community. We pay respect to Elders past and present.

ENQUIRIES

1300 135 210
8am to 5pm, Mon - Fri

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