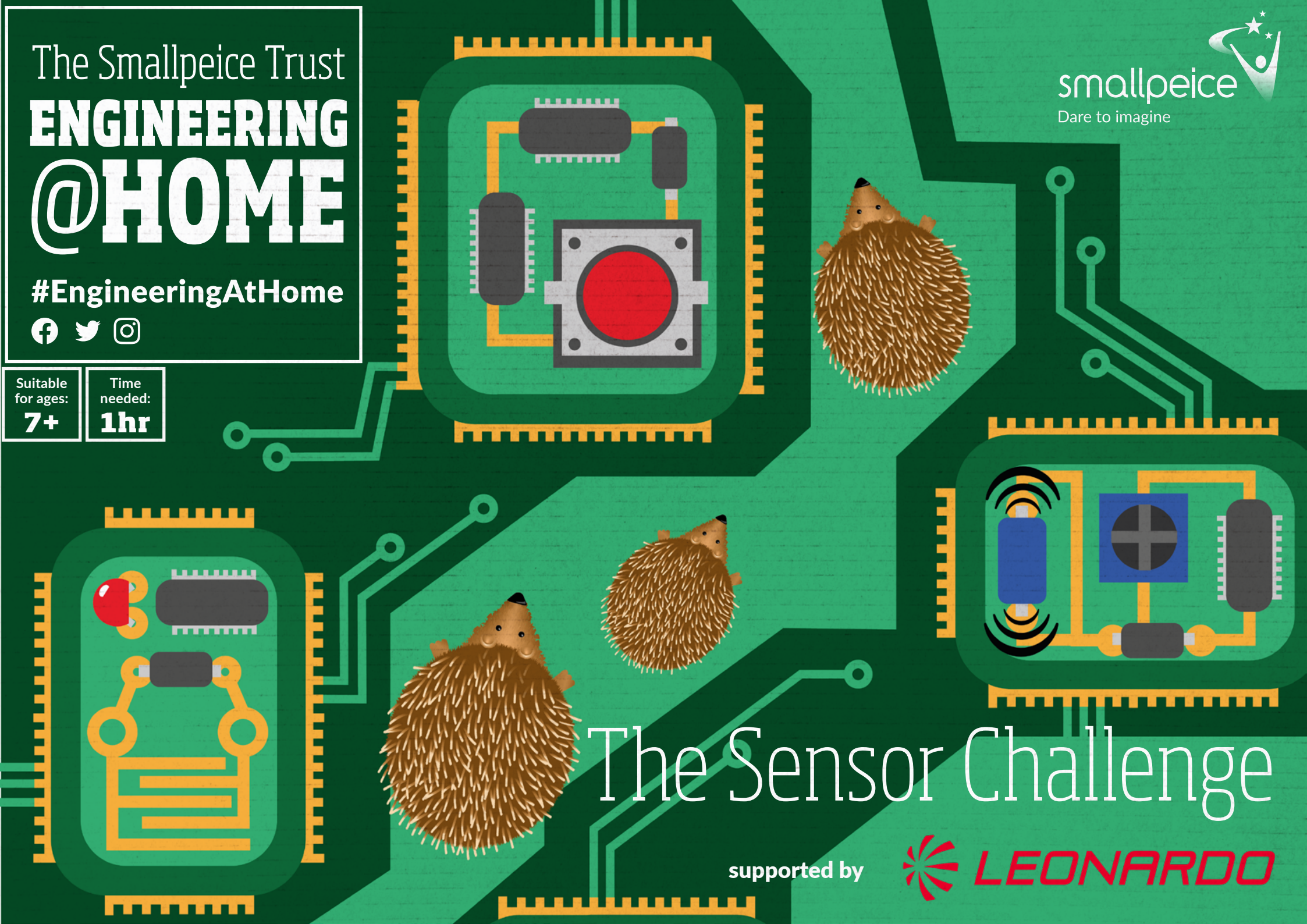
The Smallpeice Trust

ENGINEERING @HOME

#EngineeringAtHome

Suitable for ages:	Time needed:
7+	1hr

smallpeice
Dare to imagine



The Sensor Challenge

supported by LEONARDO

smallpeice

Dare to imagine

As it's half term, our Smallpeice team has put together five extra-special Engineering@Home challenges, perfect to complete as a family. This is number 2 in the series.

2

Objectives

- To make complex circuits
- To use simple materials to build sensors
- To think about how sensors can help animals

Engineering Themes

ELECTRICAL CIRCUITS
https://youtu.be/VnnpLaKsqGU

SENSOR TECHNOLOGY
https://youtu.be/8bMZCQqTIxw

ANIMAL BRIDGES
https://youtu.be/9JX6cqME6Hw

These are the tools and materials we used. If you're missing any items, why not substitute them with something similar?

- Play-Doh*
- 9V Battery
- Plastic Lid
- LED bulb
  (you can find these everywhere, try a keyring torch)

- Cardboard
- Tin Foil
- Sellotape
- Scissors
- Straws

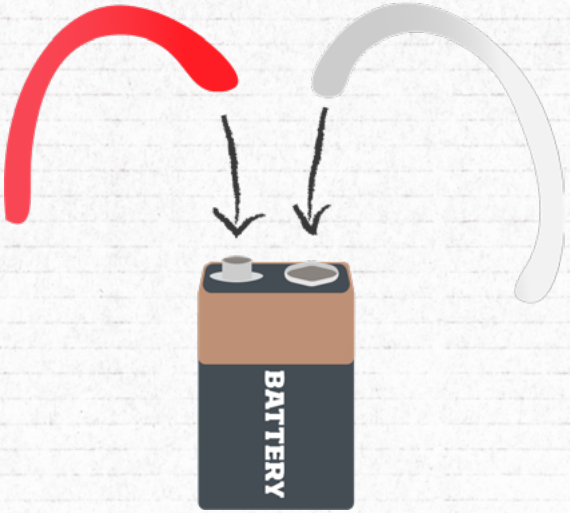
*if you don't have any Play-Doh, you can make your own using the instructions in The Circuit Challenge

01 MAKE YOUR OWN WATER SENSOR

1

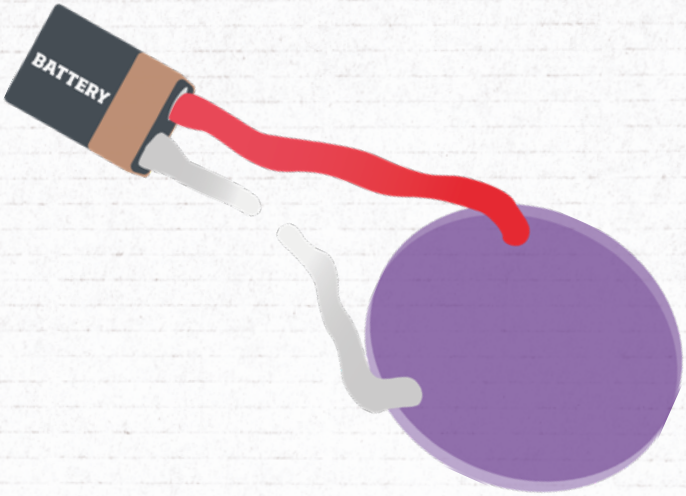
Roll your Play-Doh out into cylinders. These are going to be your 'wires'. You will need 2 white (-ve) wires.

2



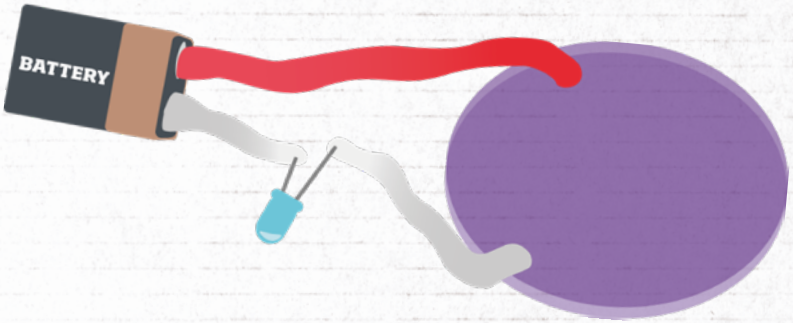
Attach the red wire to the small circular terminal (+ve) and the small white wire to the larger hexagonal terminal (-ve).

3



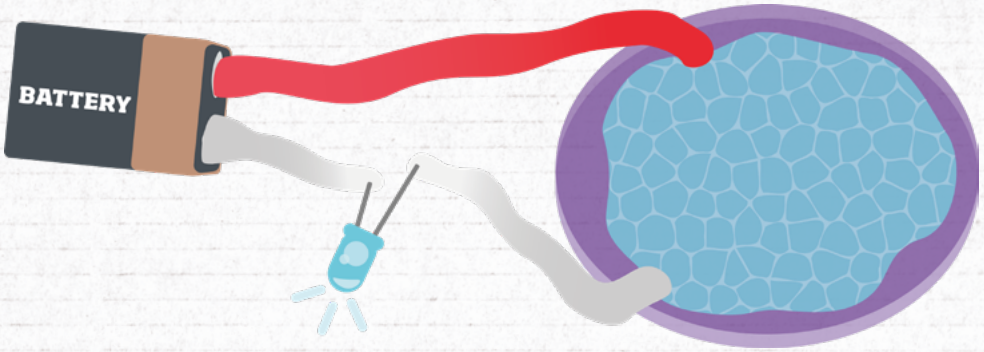
Place the opposite ends of the wires into a small dish/lid (you could use the Play-Doh tub lid).

4



Place your LED to connect the gap in the white wires. Make sure you put the shorter (-ve) leg closest to the -ve battery connector.

5



Fill the small dish with just enough water that it meets both wires.

The electricity will flow through the water and complete the circuit, lighting your LED.

02 MAKE YOUR OWN PRESSURE SENSOR

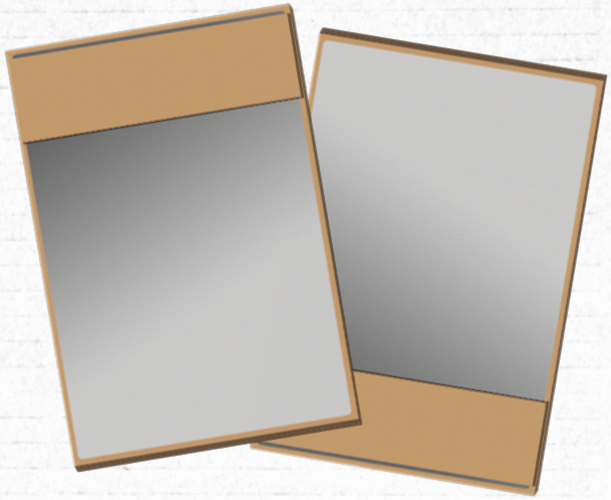
1

Cut two identical cardboard rectangles.

2

Coat one side of each rectangle completely in tin foil.

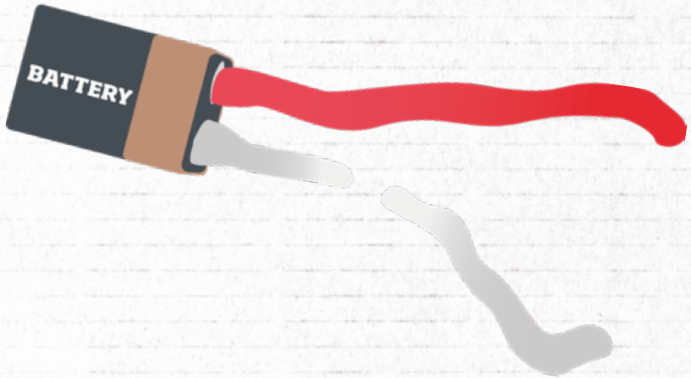
3



Cut another small strip of cardboard and stick this along the short edge.

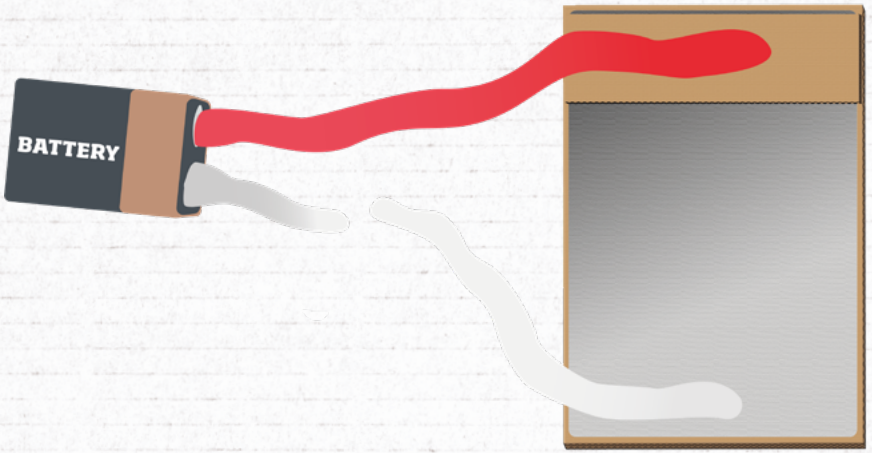
Repeat steps 2&3 on the second rectangle.

4



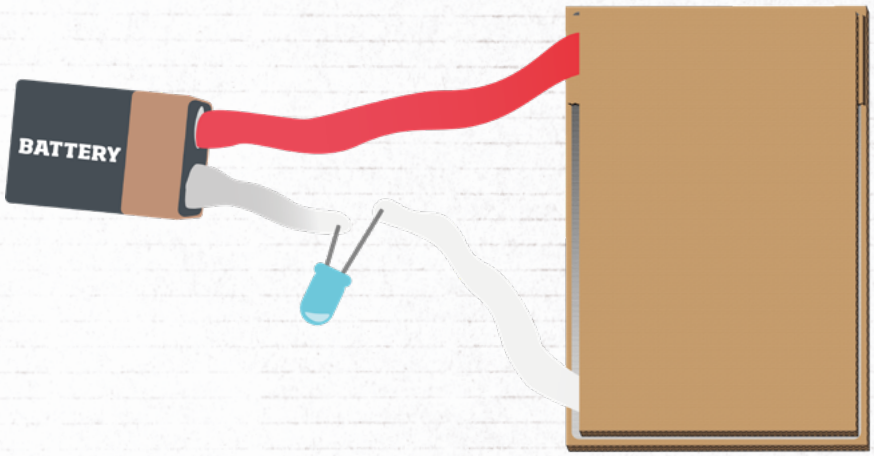
Create two white wires (-ve) and one red wire (+ve) out of Play-Doh and connect these to the battery. (Exactly the same as for the water sensor)

5



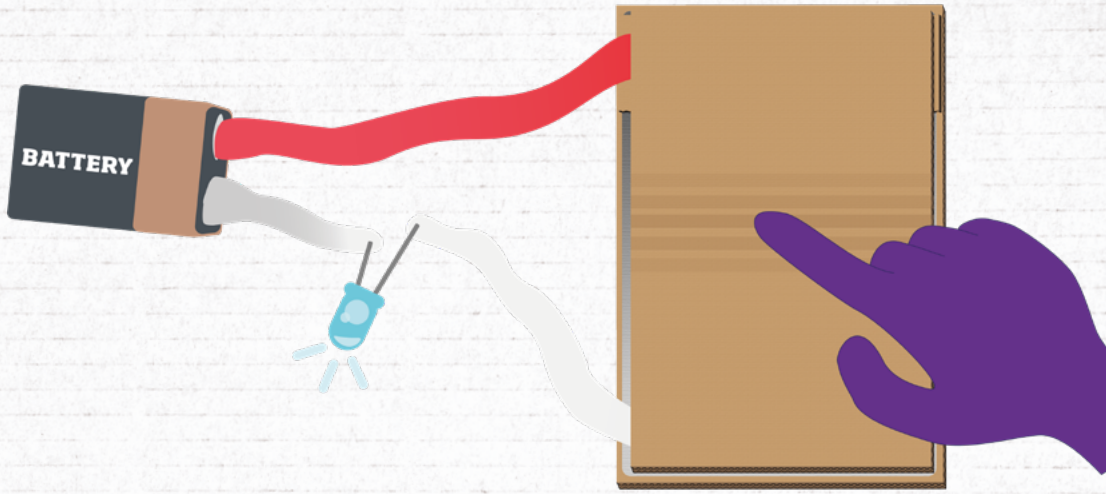
Take one rectangle from step 3 and place the end of the red wire on the cardboard side and the white wire on the tin foil.

6



Place the LED in between the two white wires. (Make sure the short leg goes near the -ve connector on the battery.) Then place the second piece of cardboard on top, with the tin foil in the middle and the cardboard strips on opposite sides.

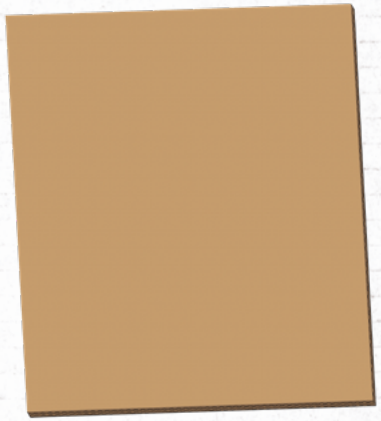
7



When you press the cardboard in the middle, the tin foil will touch, completing the circuit and lighting the LED.

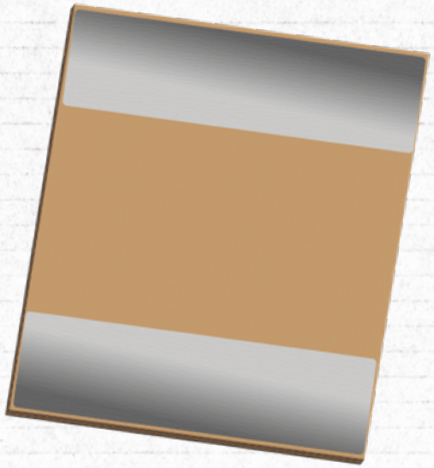
03 MAKE YOUR OWN VIBRATION SENSOR

1



Cut a small piece of cardboard.

2



Stick thin strips of tin foil along the two opposite edges.

3

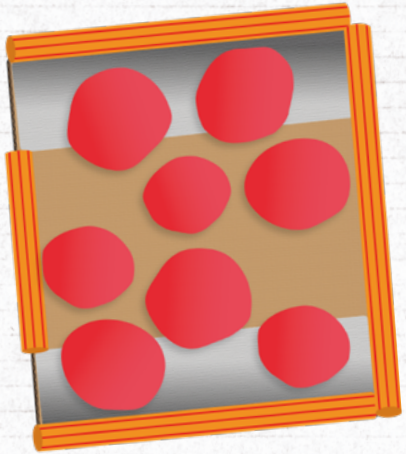
Place straws along the edges to act as walls.

Make sure one side has a short straw that goes between the tin foil.

4

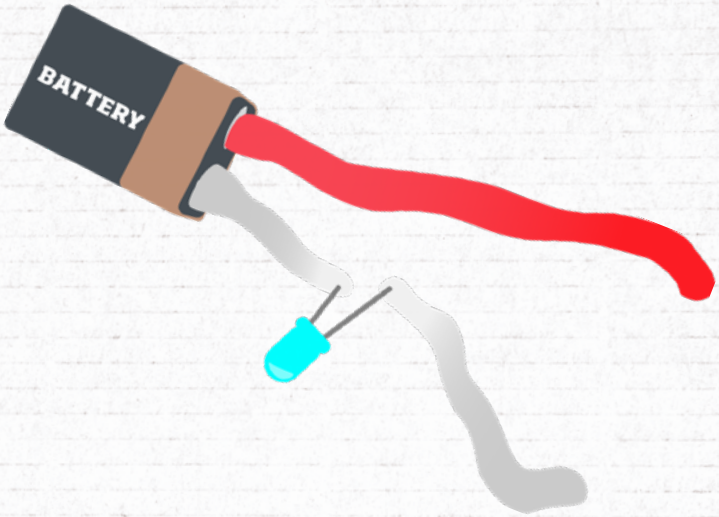
Make lots of small balls out of your Play-Doh.

5



Put these onto the cardboard and make sure they can rattle around.

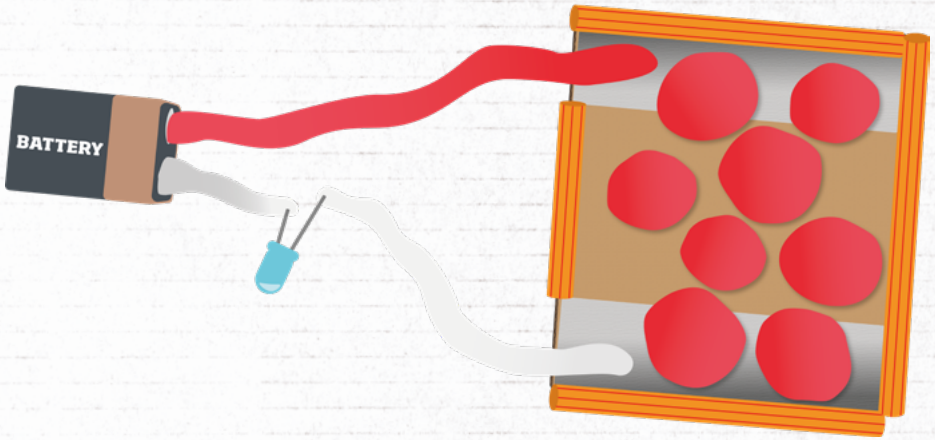
6



Set up your circuit, the same as with the pressure and water sensor.

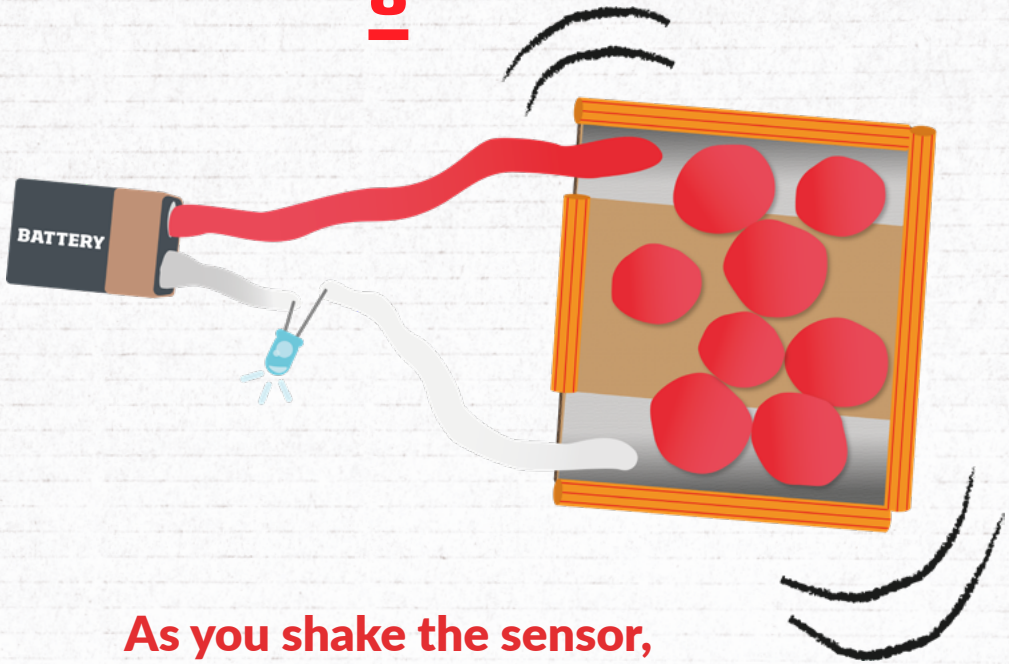
Make sure to get +ve and -ve the right way round.

7



Place your red wire onto one of the strips of tin foil and the white wire on the other.

8



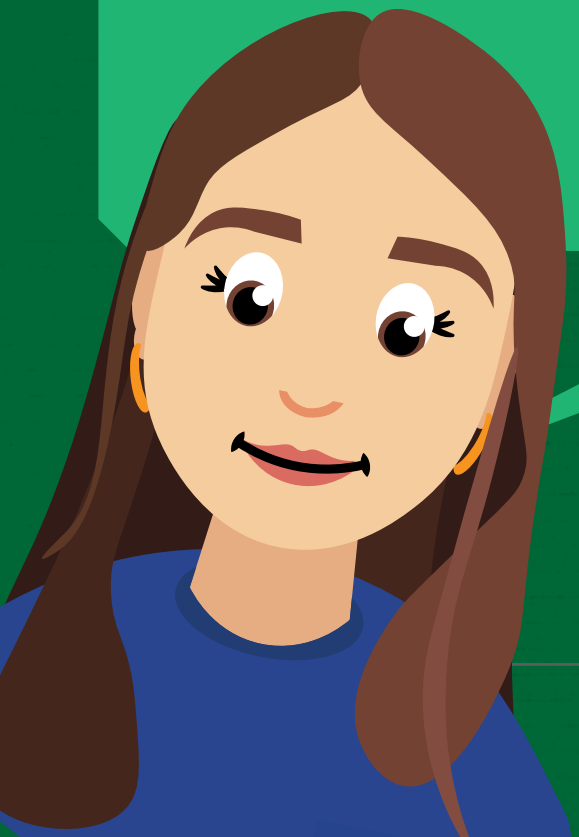
As you shake the sensor, the balls will move around and eventually align to connect all the way across, completing the circuit and lighting the LED.

Need a Challenge?

If you want to challenge yourself further:

1. See if you can come up with other uses for these sensors that could help wildlife?
2. Can you build better cases for the sensors to camouflage them in natural spaces?
3. Try and make some new sensors all together using these materials!

Check out the work Leonardo do with environment sensors!
tinyurl.com/y4z36zxn
tinyurl.com/y5jtowp2



Once you've completed your sensors, film them in action and share your videos on:

www.facebook.com/TheSmallpeiceTrust

www.twitter.com/SmallpeiceTrust
Use the hashtag **#EngineeringAtHome**

www.instagram.com/TheSmallpeiceTrust

Thanks again to LEONARDO for supporting this challenge.

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