

**WARNING!**  
This experiment causes chemical changes in the lemons, so don't use them for food afterwards.

**ZAP!**  
The first battery, invented by Alessandro Volta in 1799, used discs of silver and zinc that were separated by salty water.

# Harness the power of lemons

Create your very own citrus-powered battery.

### What you need

- Five lemons
- Five galvanised screws
- Five copper coins
- A knife
- Six short electrical connectors with crocodiles clips at each end
- A LED light, for example from a string of Christmas lights

### How does it work?

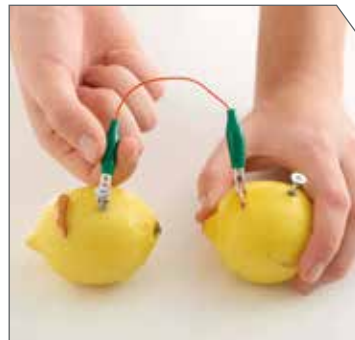
Electricity is the result of tiny negatively charged particles called electrons flowing through a material. Batteries are devices that can power other devices, once they are connected by a conducting material such as a wire. Your lemon battery uses two different metals (zinc and copper), separated by a substance called an electrolyte (lemon juice). A chemical reaction between the citric acid in the lemon juice and the zinc coating of the galvanised screw releases electrons, which flow around the circuit creating electricity that lights up the LED.



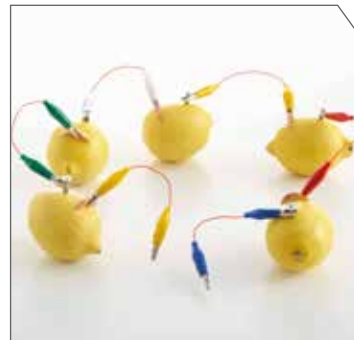
**1** Push down and roll each lemon, to release the juice inside. Ask an adult to cut a slit just off-centre and push a coin firmly into the slit.



**2** Screw one galvanised screw into the lemon, so that the coin and nail are about 2–3cm apart. Do the same for each of the five lemons.



**3** Link the coin on one lemon to the nail on the next, using an electrical connector. Continue until you have connected all five lemons together.



**4** Finally, attach the last coin to the longer wire on the LED light and the last nail to the shorter wire. Your circuit is complete.

If you've enjoyed these activities, share the fun with other readers. Send your photos and videos to [scienceandnature@dennis.co.uk](mailto:scienceandnature@dennis.co.uk)

Look out for more amazing activities in the next issue, including ways to connect with the natural world around you.