

What's the circuit?

Introduction

Fitters are involved in the installation of electrical components in substations and power stations. In order to do this job they need to understand how electric circuits work. This activity will test your knowledge of electric circuits by getting you to use a voltmeter and power supply to figure out how a mystery circuit works.

What you need

- A shoe box
- 4 split pins
- Two bulbs in holders
- 4 jumper leads with crocodile clips
- A resistance meter
- A low voltage power supply or small battery pack
- Electrical tape

Building a mystery circuit

Working with a partner, follow these steps to build your mystery circuit.

1. Push one split pin through each side of the shoe box – these will act as terminals that you can connect to with a crocodile clip.
2. Make two holes in the base of the box which will be big enough to push your light bulbs through.
3. Push your light bulbs through the base of the box so the glass part sticks out then screw the bulb holder onto the metal part of the bulb so that the holder is still inside the box.
4. Use your wires to connect the bulbs to the split pins. You can do this anyway you want.

Once you have completed your mystery circuit, pass it to another pair. Make sure that they can't see your circuit inside. For added security put the lid on the box and tape it up (remember that this is now the base).

Testing a mystery circuit

1. Connect your power supply to a pair of split pin terminals and watch what happens. Do either (or both) of the bulbs light? Make a note of your observations.
2. Try a different pair of terminals and see what happens.
3. Remember that there are 6 different ways in which you can choose pairs of terminals.
4. If you can't figure out what the circuit might be by seeing what the bulbs do, try repeating the steps above with a resistance meter instead of a power supply. Record your readings.
5. Draw what you think the circuit might be. If you have any spare parts build the circuit you have drawn and see if it behaves in the same way as the circuit in the box.

Extension tasks

- How could you make this a bit more challenging?
- What other equipment might be useful in investigating a more complicated mystery circuit?