



# Year 6 - Energy and Electrical Circuits

## TEACHER REFERENCE GUIDE

### WORKSTATION #1

**Question 1a) Describe the brightness of the bulbs for each circuit when the switches are both turned 'ON'.**

The light bulbs glow brighter when they are wired in Parallel than when they are wired in Series. This is because the bulbs in parallel each receive a separate flow of electricity from the power source (i.e. separate circuits) so do NOT have to SHARE electrons. Bulbs in series are on the same circuit so DO have to SHARE electrons.

**Question 1b) Why does one lamp stay lit up even when all switches are turned 'OFF'?**

Turning off the switch only BREAKS the circuit affecting one bulb. The second bulb remains lit as the electrons can still flow from the power source, through the bulb, and back to the power source without flowing through the switch.

### WORKSTATION #2

**Question 2a) Describe the speed of the fan in the first circuit (parallel) compared to the second circuit (series).**

The fan spun much more quickly in the second circuit, where two power packs were connected in series, than the fan connected to power packs in parallel. In series, electrons were forced to flow through both power packs so twice as much voltage powered the fan compared to using a single battery pack.

**Question 2b) In which circuit do you think the batteries would last longer if the motor was left on?**

The batteries would last longer when connected in parallel. In this circuit, voltage output (i.e. fan speed) did not change but run-time increased two-fold compared to using a single battery pack.

### WORKSTATION #3

**Question 3a) Complete the following table from your observations at Workstation #3**

OBJECT / MATERIAL	DOES THE LAMP GLOW?	INSULATOR OR CONDUCTOR?
TEASPOON	Yes	Conductor
STRAW	No	Insulator
PENCIL	Yes (when touching internal graphite) - No (when touching wooden outer casing).	Graphite - Conductor Wood - Insulator
PAPERCLIP	Yes	Conductor
CARDBOARD	No	Insulator
WIRE	Yes	Insulator
TRY YOUR OWN...		



**Question 3b) Explain why the lamp glows when some materials / objects are used but not others.**

The lamp only glows when the circuit is complete – that is, when conductive materials allow the flow of electrons from the power source, through all components, and back to the power source. Insulating materials do not allow electrons to flow through them so cause a break in the circuit and stop power to all components.