**Name: _____**

**Year 9 Electricity**

**Formative Assessment**

**/35**

1. List the three things that electrical circuits require (3 marks)

   a. Energy source (cell or battery)

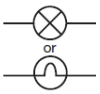
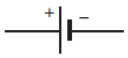
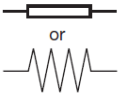
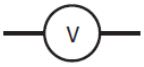
   b. Energy user (light globe, motor)

   c. Connecting wires (completing the circuit)

2. What will happen if there is a break in the circuit? (1 mark)

Electrons stop flowing and no load connected to the circuit will work.

3. Draw the circuit diagram symbols for the following circuit components: (4 marks)

| | |
|---|---|
| Wire |  |
| Light globe |   |
| Open switch |  |
| Cell |   |
| Battery | |
| Resistor |   |
| Ammeter |   |
| Voltmeter |   |

4. Complete the table defining current, voltage and resistance, what devices they are measured with and the units we measure them in. (6 marks)

| | Definition | Measured with | Units |
|---|---|---|---|
| Current | The amount of electrons moving along wires per second | Ammeter | Amperes (A) |
| Voltage | The measure of the amount of energy the electrons have | Voltmeter | Volts (V) |
| Resistance | The measure of how difficult it is for an electrical current to flow through a material or component | Multimeter | Ohms (Ω) |

5. How does the thickness of a wire affect the movement of electrons through it? (1 mark)

The thicker the wire, the easier it is for the electrons to flow through it. (or vice versa)

Use the formula ***V = I x R*** to calculate the following. (4 marks)

6. What will be the current flowing through a circuit with 12V and a resistance of 4 ohms?
   V = 12 I = V / R
   R = 4 = 12 / 4 = 3 A
7. Calculate the voltage in a circuit with a resistance of 5 ohms and a current of 3 amps.
   R = 5 V = I x R
   3 = 3 = 3 x 5
   = 15 V

8. A circuit has a current of 5 amps and has 20V through it. What is its resistance?
   I = 5 R = V / I
   V = 20 = 20 / 5 = 4 Ω

9. Two 9V batteries are connected to a circuit which has 2ohms of resistance. What is its current?

   2 batteries x 9V = 18V 18V / 2 Ω = 9 A

10. What is voltage drop? What does it depend on? (2 mark)

Voltage drop is the loss of energy by the electrons as they pass through a component.

It depends on the resistance of the component.

11. Detail two advantages of parallel circuits compared to series circuits. (2 marks)

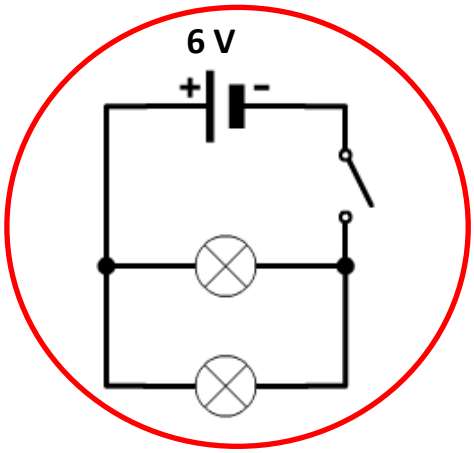
2 of the 3 below

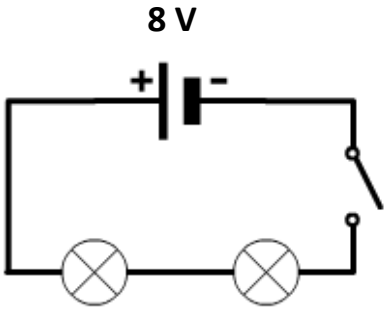
1. Each component can have its own switch, allowing them to be turned on or off independently of each other
2. Only one branch is affected if a globe blows, and the blown globe is easy to find
3. Adding extra globes does not affect their brightness as they all receive the same supply voltage

12. Draw a circuit diagram with a two cell battery, an ammeter, 3 light globes in parallel and a switch that only turns off two of the globes allowing the third to remain on constantly. (4 marks)

Teacher to draw on whiteboard

13. Circle which circuit will have the brightest globes. (1 mark)



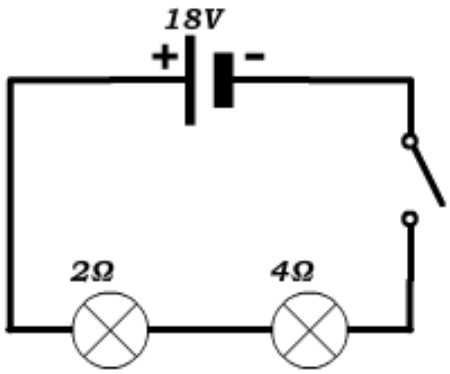
14. If an extra globe is added to a series circuit, what will happen to the voltage in each globe? (1 mark)

The voltage in each globe will decrease because there is an extra globe now sharing it.

15. If an extra globe is added to a parallel circuit, what will happen to the voltage in each globe? (1 mark)

Nothing – each globe receives the same amount of voltage.

16. Look at the circuit below. When the switch is closed . . .




a. Calculate the total resistance of the two light globes. (1 mark)

4Ω +2 Ω = 6 Ω

b. Calculate the current of the circuit. (1 mark)

18V / 6 Ω = 3A

c. Calculate the voltage drawn over **each** of the light globes. (1 mark)

2 Ω x 3A = 6V  4 Ω x 3A = 12V

17. What will the ammeter and voltmeter read in the following circuit when the switch is closed? (2 marks)

a. Ammeter reading - 12V / 2 Ω = 6A

b. Voltmeter reading – 6A x 2 Ω = 12V