

Resistance

KS3 Physics · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

A resistor has 6 V across it and 2 A through it. Find its resistance.

Step 1 · Formula

Resistance (Ω) = potential difference (V) $\div$ current (A).

Step 2 · Calculate

$$6 \div 2 = 3 \Omega.$$

Answer: 3 Ω

Check: Bigger resistance $\rightarrow$ smaller current for the same p.d.

2. Now try one with the steps

A bulb has 3 V across it and 0.25 A through it. Find its resistance.

Step 1 · $R = V \div I$

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. What is the unit of resistance? [1]

2. Write the equation linking resistance, potential difference and current. [1]

3. A resistor has 6 V across it and 2 A through it. What is its resistance, in Ω ? [1]

4. A component has 12 V across it and 0.5 A through it. What is its resistance, in Ω ? [1]

5. A bulb has 3 V across it and 0.25 A through it. What is its resistance, in Ω ? [1]

6. Which has a much higher resistance: a copper wire or a plastic ruler? [1]
7. What happens to the resistance of a wire when its length is doubled? [1]
8. Does a thicker wire of the same material and length have more or less resistance? [1]
9. A 50 cm length of wire has 2 V across it and 0.8 A through it. What is its resistance, in Ω ? [2]
10. A 6 V supply gives 2 A through a resistor. It is replaced with a resistor of twice the resistance. What is the new current, in A? [2]
11. A $30\ \Omega$ resistor carries a current of 0.2 A. What is the p.d. across it, in V? [2]
12. A 9 V battery is connected to an $18\ \Omega$ resistor. What current flows, in A? [2]
13. Explain why a wire gets warm when a current flows through it. [2]
14. How does a dimmer switch (variable resistor) make a lamp dimmer? [2]

4. Before you hand it in

$R = I \div V$.

$R = V \div I$: volts divided by amps. Check: a bigger resistance should give a smaller current.

"Insulators have no resistance."

Insulators have a very high resistance; conductors have a low resistance.

Forgetting units, or writing 'ohms' as ' Ω/A '.

Give resistance in ohms (Ω).