Physics - Key Stage 3

Lesson 6- Electricity and Magnetism

Resistance

Miss White

Questions from video

Quick Check

1. What carries charge through a metal wire?

2. Define resistance.

3. State the unit of electrical resistance.

4. What is Ohm’s Law?

Independent Task 1

p.d. = **Current** x **Resistance**

Resistance = **p.d.** ÷ **Current**

Current = **p.d.** ÷ **Resistance**

1. The current through an ipad is 0.10A and the p.d. of its power supply is 12V.

   Calculate the resistance of the ipad.

2. The resistance of a fixed resistor is 34 Ω and the current through it is 0.30 A.

   What is the p.d. across the resistor?

3. The p.d. across a 50 Ω resistor is 6.0 V.

   What is the current through the resistor?

Harder

kΩ = 1000Ω

mA = 0.001 A

MA = 1,000,000 A

1. The resistance of an iPhone is 3 kΩ and the current through it is 4 mA.

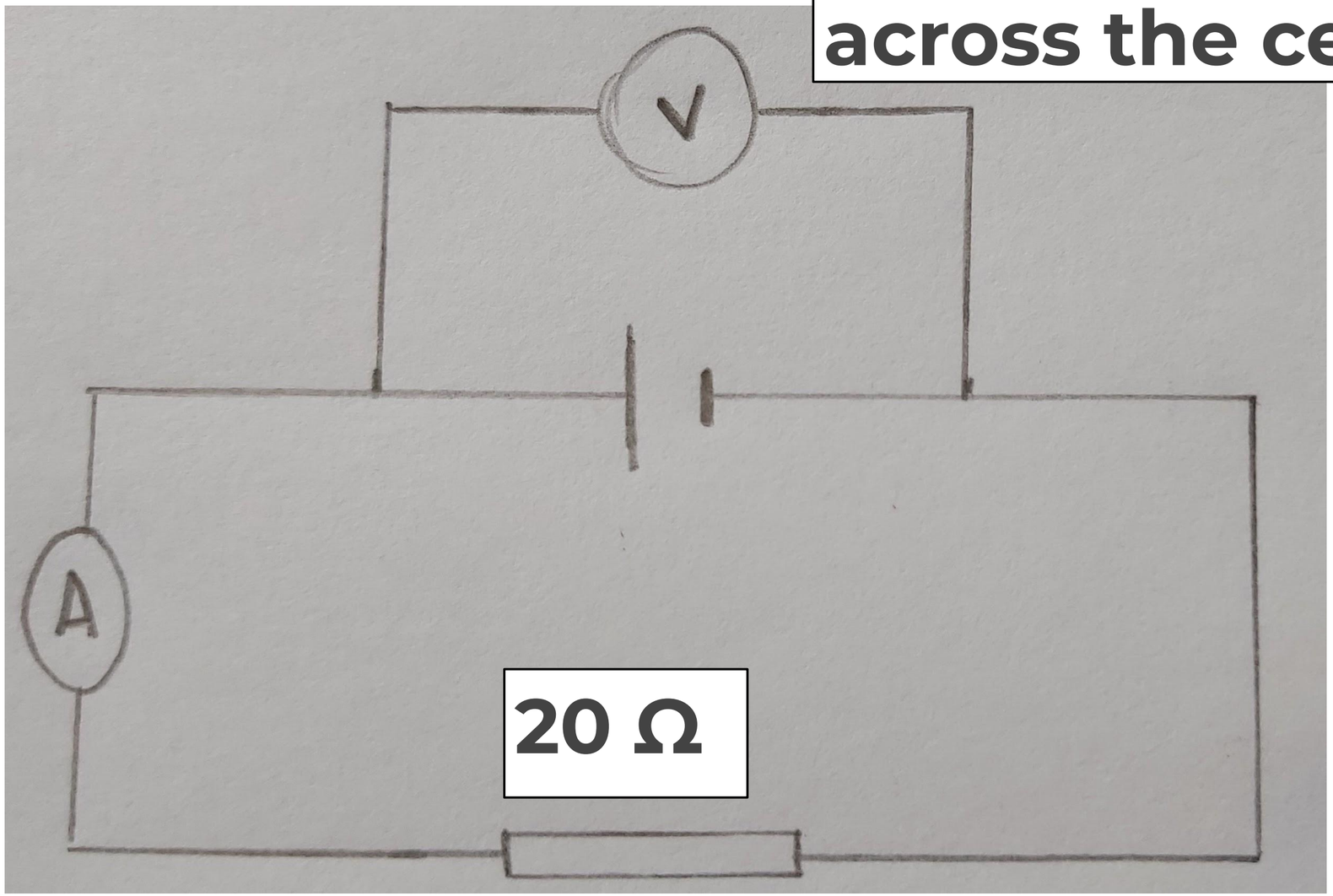
   What is p.d. of its power source?

2. The potential difference (p.d.) across a woman when she is struck by lightning is 33 MV and the resistance of a human being is around 100 kΩ.

   What current flows through the woman?

Application - Your go!

Calculate the p.d. across the cell



6 A

Independent task 2 - complete the table

	Current (A)	Potential difference (V)	Resistance (Ω)
a)	4.0	20	
b)	3.0		15
c)		50	200
d)	0.50	12	
e)	0.25		60
f)		6.0	30

Answers

Quick check - Answers

1. What carries charge through a wire?

   Electrons carry charge through wires

2. Define resistance

   Resistance is anything which makes the flow of charge more difficult

3. What is resistances measured in?

   Resistance is measured in Ohms (Ω)

4. What is Ohm's Law?

   p.d. = Current x Resistance

Independent task 1 - answers

p.d. = **Current** x **Resistance**

Resistance = **p.d.** ÷ **Current**

Current = **p.d.** ÷ **Resistance**

1. The current through an ipad is 0.1A and the p.d. of its power supply is 12V.

   Calculate the resistance of the ipad? **Resistance = 12 ÷ 0.10 = 120 Ω**

2. The resistance of a resistor is 34 Ω and the current through it is 0.3 A.

   What is the p.d. across the resistor? **p.d. = 0.30 x 34 = 10.2 V**

3. The p.d. across a 50 Ω resistor is 6 V.

   What is the current through the resistor? **Current = 6.0 ÷ 50 = 0.12 A**

Harder - answers

1. The resistance of an iPhone is 3 kΩ and the current through it is 4 mA.

   What is p.d. of its power source?

   I = 4 mA = 0.004 A; R = 3 kΩ = 3 000 Ω

   V=IR = 3000 x 0.004 = 12 V

2. The p.d. across a woman when she is struck by lightning is 33 MV and the resistance of a human being is around 100 kΩ.

   What current flows through the woman?

   V = 33 MV = 33 000 000 V; R = 100 kΩ = 100 000 Ω.

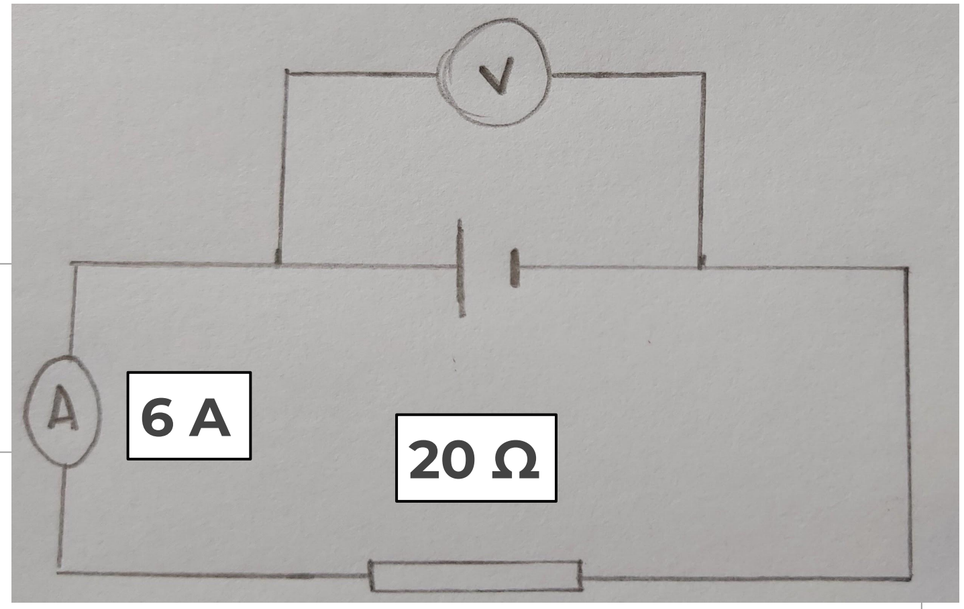
   I = V ÷ R = 33 000 000 ÷ 100 000 = 330 A

kΩ = 1000Ω

mA = 0.001 A

MA = 1,000,000 A

Application - answers



Values	Current is **6 A** Resistance is **20Ω**
Equation	**Potential difference = Resistance x Current**
Substitute	**p.d = 6 A x 20 Ω**
Rearrange	
Answer	Potential difference = 120
Units	V

120 V

Independent task 2 - answers

	Current (A)	Potential difference (V)	Resistance (Ω)
a)	4.0	20	**5**
b)	3.0	**45**	15
c)	**0.25**	50	200
d)	0.50	12	**24**
e)	0.25	**15**	60
f)	**0.2**	6.0	30