10 Conductors and capacitors – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	**Write it 3 times** (English)
capacitor	
capacitance	

Recall

Many devices store electric charge:

- A camera flash charges up, then releases energy in a burst.
- Phones and computers are full of tiny components called capacitors.

This sheet lines up conductors and capacitors. Each idea has a worked example.

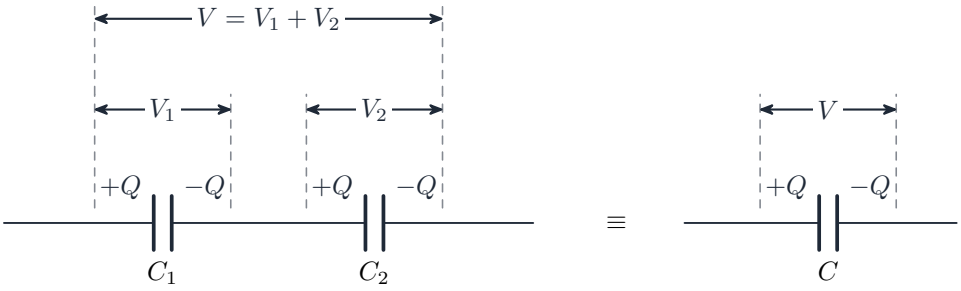
New ideas

1 Conductors

In a **conductor**, charge moves freely. Any extra charge spreads out over the **surface**, and inside the metal the field is zero.

2 Capacitors

A **capacitor** stores charge on two conducting plates separated by a gap.



3 Capacitance

The **capacitance** links the charge stored to the voltage across it:

$$C = \frac{Q}{V}.$$

Worked example. A capacitor holds $Q = 1.2 \times 10^{-3}$ C at $V = 12$ V, so $C = \dfrac{Q}{V} = \dfrac{1.2 \times 10^{-3}}{12} = 1.0 \times 10^{-4}$ F $= 100$ μF.

4 Finding the charge

Rearranged, $Q = CV$: a bigger capacitance or a bigger voltage stores more charge.

Watch out: capacitance depends on the plates' **size and spacing**, not on how much charge you put on. Adding charge raises the voltage in step, keeping $C = Q/V$ fixed.

Practice

Try these in order. The methods are all above.

2.1 State where extra charge sits on a conductor. [1]

2.2 State what a capacitor does. [2]

2.3 A capacitor stores 6.0×10^{-4} C at 12 V. Find its capacitance. [2]

2.4 A 50 μF capacitor is charged to 10 V. Find the charge stored ($Q = CV$). [2]

2.5 State what capacitance depends on. [2]