Electricity

P4.1 Electrical quantities

P4.1.1 Electrical Charge

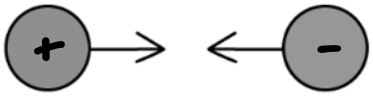
State that there are positive and negative charges

- There are two types of electrical charge: positive and negative
  Protons carry a positive charge, while electrons carry a negative charge.

State that positive charges repel other positive charges, negative charges repel other negative charges, but positive charges attract negative charges

- **Same charges repel**: Positive charges **repel** other positive charges, and negative charges **repel** other negative charges.
  E.g. Two positively charged balloons will push away from each other when brought close together.

- **Opposite charges attract**: Positive charges **attract** negative charges. E.g. A negatively charged balloon will stick to a positively charged wall due to the attraction between opposite charges.



Distinguish between electrical conductors and insulators and give typical examples

- **Conductors** are materials that allow electric charge to flow freely. They have many free electrons that can move easily through the material. E.g. metals like copper and aluminium are good conductors and are commonly used in electrical wiring.
- **Insulators** are materials that do not allow electric charge to flow freely. They have very few free electrons, making it difficult for electric current to pass through. E.g. rubber, glass, and plastic are common insulators, often used to coat wires to prevent accidental electric shocks.

State that charge is measured in coulombs

- Electric charge is measured in **coulombs (C)**. This unit is a measure of the amount of electrical charge present.
- One coulomb (1 C) is the amount of electric charge that passes through a conductor carrying one ampere or amp (1 A) of current in one second (1 s)
- 1 amp is equivalent to a charge of 1 coulomb flowing in 1 second

Q = charge, I = current, t = time