



Mass and Weight Are Not the Same Thing

KS4 PHYSICS

Ages 11-14 ⌚ 3 min read

What is Mass?

Mass is the amount of **matter** (the stuff) that something is made of. It never changes, no matter where you are. If you have a bag of flour with a mass of **1 kilogramme**, it will always have a mass of **1 kilogramme** — whether you're on Earth, on the Moon, or floating in space.

Think of mass as the number of tiny building blocks packed into something. More blocks = more mass. Mass is measured in **kilogrammes (kg)** or **grammes (g)**.

What is Weight?

Weight is the **force** that **gravity** pulls on an object. It depends on where you are. The same bag of flour would weigh less on the Moon than on Earth, because the Moon's gravity is much weaker. Weight is measured in **Newtons (N)**, not kilogrammes.

Think of it like this: mass is like how many sweets are in a jar. Weight is like how hard the jar is being pulled down by a magnet underneath the table. The sweets don't change, but the pulling force might.

How Are They Connected?

The relationship between mass and weight is: **Weight = Mass × Gravity**. On Earth, where gravity is strong, a **1 kg** object weighs about **10 Newtons**. On the Moon, the same object still has a mass of **1 kg**, but it weighs only about **1.6 Newtons** because the Moon's gravity is **six times weaker** than Earth's.

A Real-Life Example

Imagine an astronaut who has a mass of **80 kg**. On Earth, they weigh about **800 Newtons**. On the Moon, they weigh only **130 Newtons**, so they can jump much higher and feel much lighter. But their mass — the amount of stuff they're made of — stays exactly the same at **80 kg**.

Think of it like your body: you're always made of the same amount of stuff (your mass), but the stronger the gravity around you, the heavier you feel.

Understanding the difference between mass and weight is important in physics because it helps us explain how things move, how gravity works, and why astronauts float in space even though Earth's gravity still pulls on them.