MASS

A WHAT IS A MASS?

Definition Mass vs. Weight

In science, **mass** and **weight** mean two different things.

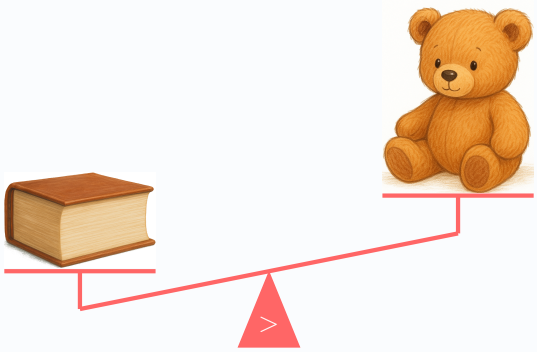
- **Mass** is the amount of matter, or "stuff," inside an object. An object's mass is the same everywhere, whether it's on Earth or on the Moon. We measure mass in **grams (g)** and **kilograms (kg)**.
- **Weight** is the force of gravity pulling on an object's mass. Because the Moon has less gravity than Earth, an object's weight is less on the Moon, but its mass stays the same.

In everyday language, we often use "weight" when we really mean mass. In this chapter, we will use the correct word and focus on measuring **mass**.

Method Comparing Mass

We can compare the mass of two objects using a balance scale.

- The side with the object of **greater mass** goes **down**.
- The side with the object of **lesser mass** goes **up**.
- If the scale is balanced, the objects have **equal mass**.



B STANDARD UNITS OF MASS

Definition Units of Mass

- **Tonne** (t): Used for very large masses. The mass of a small car is about 1 tonne.

- **Kilogram** (kg): Used for everyday objects. The mass of a big book is about 1 kg.

- **Gram** (g): Used for small objects. The mass of a small candy is about 1 g.

- **Milligram** (mg): Used for very tiny amounts, such as the amount of medicine in a tablet.

C CONVERSION OF MASS UNITS

Definition Conversion of Mass Units

In the metric system, mass units are related by groups of *1,000*. Each unit is 1,000 times larger than the next smaller one.

- 1 **tonne** = 1 000 **kilograms**
- 1 **kilogram** = 1 000 **grams**
- 1 **gram** = 1 000 **milligrams**

Method Converting Using Multiplication or Division

- Use **multiplication** to go from a **bigger** unit to a **smaller** one (like tonnes to kilograms, kilograms to grams, or grams to milligrams).
- Use **division** to go from a **smaller** unit to a **bigger** one (like milligrams to grams, grams to kilograms, or kilograms to tonnes).
- Each step to the **right** in the diagram means "×1 000". Each step to the **left** means "÷1 000".