LENGTH

A STANDARD UNITS OF LENGTH

> **Definition Length**
>
> **Length** is the distance from one point to another. It tells us how long something is or how far it goes.

> **Definition Units of Length**
>
> We use different units for measuring small and large things.
>
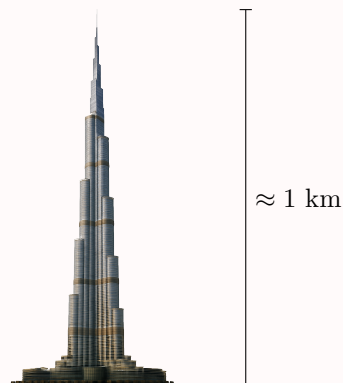> - **Millimeter** (mm): A very small unit of length, about the thickness of a coin.
>
> $$\approx 1 \text{ mm}$$
>
> - **Centimeter** (cm): A small unit of length, about the width of your finger.
>
> $$\approx 1 \text{ cm}$$
>
> - **Meter** (m): A longer unit of length, about the height of a 6-year-old girl.
>
> $$\approx 1 \text{ m}$$
>
> - **Kilometer** (km): A very large unit of length, used for long distances, like the distance between towns. It is about the height of the Burj Khalifa in Dubai, United Arab Emirates.
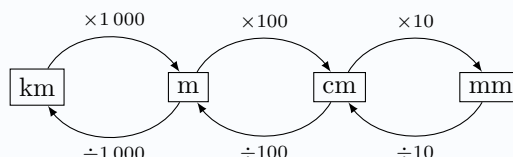>
> $$\approx 1 \text{ km}$$

B CONVERSION OF LENGTH UNITS

Definition Conversion of Length Units

Here are some useful metric conversions:

- $1 \text{ km} = 1\,000 \text{ m}$

- $1 \text{ m} = 100 \text{ cm}$

- $1 \text{ cm} = 10 \text{ mm}$

Method Converting with Multiplication or Division

- Use **multiplication** when you go from a **bigger** unit to a **smaller** one (e.g., m → cm).

- Use **division** when you go from a **smaller** unit to a **bigger** one (e.g., cm → m).

$$\text{km} \xrightarrow{\times 1\,000} \text{m} \xrightarrow{\times 100} \text{cm} \xrightarrow{\times 10} \text{mm}$$
$$\text{km} \xleftarrow{\div 1\,000} \text{m} \xleftarrow{\div 100} \text{cm} \xleftarrow{\div 10} \text{mm}$$

Method Converting Using a Table

To convert between units of length, we can use a metric place value table. This table shows the main metric units from kilometers to millimeters. Each column represents one step of 10 or 100 or 1 000 between units. Let's convert **1.2 meters** to **centimeters**.

1. **Draw the full metric place value table.**

km			m		cm	mm

2. **Place the number in the table.**
   The rule is: the digit in the **ones place** goes in the starting unit's column.
   For 1.2 m, the ones digit is 1, so it goes in the **m** column. The digit 2 (the tenths) goes in the next column to the right.

km			m		cm	mm
			1	**2**		

3. **Fill any empty spaces with zeros** until you reach your target unit.
   Our target unit is **cm**, so we put a 0 in the **cm** column.

km			m		cm	mm
			1	2	**0**	

4. **Read the final number.**
   Now read the digits as a number in centimeters:

   $$1.2 \text{ m} = 120 \text{ cm}.$$

   This matches the fact that we multiply by 100 when converting m to cm.