

3.1 SI Measurement

The Metric System

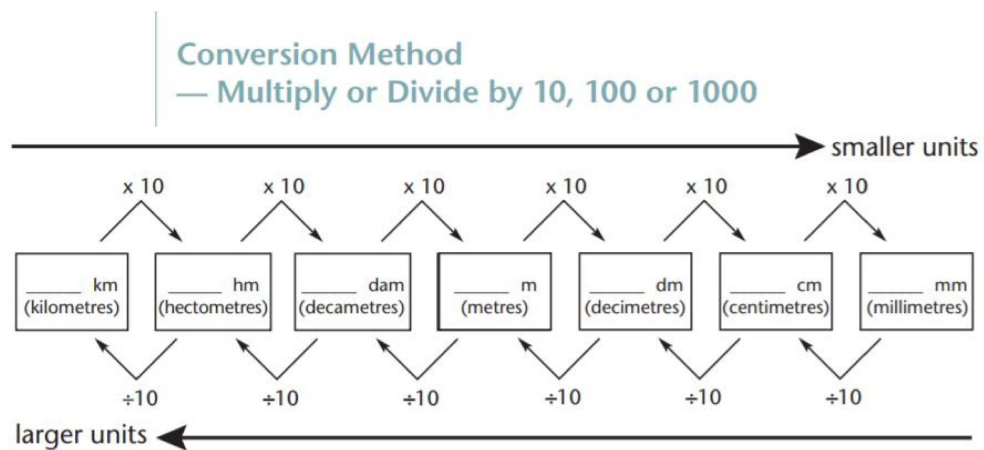
The International Bureau of Weights and Measures is in Sèvres near Paris, France. This is the headquarters where representatives from around the world meet to set standards that affect the way people take and report measurements, both in science and in their daily lives. These standards are called the International System of Units. The internationally-used abbreviation, SI, comes from the French *le Système International d'Unités*. This system includes units of measure such as metres, litres, and kilograms, which you may already be familiar with. You may know this system by its other name—the metric system.

The SI has its origins in France. It arose as an effort to standardize and simplify measurements after the French Revolution. Today, the SI (or the metric system) is commonly used in the majority of countries around the world.

In Canada, the metric system was legalized in 1871, although the imperial system of measurement (feet and pounds) continued to be widely used until the second half of the 20th century. Even today, there are many people who think of their height and weight in feet and pounds rather than in centimetres and kilograms. Do you?

Converting Between SI Units for Length

What are the common units used when measuring length in SI? **mm, cm, m, km**



If you are converting from a larger unit such as centimetres to a smaller unit such as millimetres, you will multiply because large pieces can be broken into more smaller sized pieces. You multiply by 10 because centimetres and millimetres are next to each other on the chart and because 1 cm = 10 mm.

SI Measurement

Examples:

The distance from Earth to the moon is 38 440 300 000 cm. What is a more appropriate SI unit of measurement to state this distance? Convert the distance to km.

$$1 \text{ m} = 100 \text{ cm} \quad 38\,440\,300\,000 \text{ cm} \div 100 = 384\,403\,000 \text{ m}$$

$$1 \text{ km} = 1000 \text{ m} \quad 384\,403\,000 \text{ m} \div 1000 = 384\,403 \text{ km}$$

$$1 \text{ km} = (100 \times 1000) \text{ cm} \rightarrow 38\,440\,300\,000 \div 100\,000 = 384\,403 \text{ km}$$

The length of a worm measures 0.068 m. What is a more appropriate SI unit of measurement to state this distance? Convert the distance to cm and mm.

$$0.068 \text{ m} \times 100 = 6.8 \text{ cm}$$

$$6.8 \text{ cm} \times 10 = 68 \text{ mm}$$

Practice: Convert each measurement to a more appropriate SI unit.

- a) A tube of toothpaste is 205 mm long.

$$205 \text{ mm} \div 10 = 20.5 \text{ cm}$$

- b) The circumference of a highlighter measures 0.06 m.

$$0.06 \text{ m} \times 100 = 6 \text{ cm}$$

- c) You travel 418 000 m from Penticton to Vancouver.

$$418\,000 \div 1000 = 418 \text{ km}$$

- d) The top of a door is 2032 mm above the ground.

$$2032 \text{ mm} \div 10 = 203.2 \text{ cm}$$

$$203.2 \text{ cm} \div 100 = 2.032 \text{ m}$$

$$\text{or } 2032 \text{ mm} \div 10 \div 100 = 2.032 \text{ m}$$

Assignment: p.44 #3 – 7