Lesson - Measuring length, mass and capacity

Year: Year 2

Hello, I am Otto! We measure things to find out how long, how heavy or how much they hold. We use standard units so that everyone gets the same answer. In this chapter you measure length, mass, capacity and temperature, and you choose the best unit for the job.

Starter activity

Find a pencil, a bag of sugar and a bottle of water. Which one is the longest? Which one is the heaviest? Which one holds the most? To answer, you need to measure with a ruler, with scales and with a measuring jug. Why would it be unfair to measure your desk with your hand span, when your friend has bigger hands?

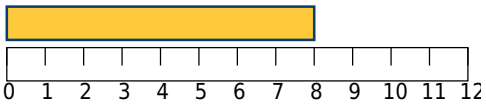
Length and height

Definition: units of length

We measure **length** and **height** in **centimetres (cm)** and **metres (m)**. 100 cm = 1 m. A pencil is about 15 cm long. A door is about 2 m tall.

Method: measuring with a ruler

1. Put the 0 of the ruler exactly at the start of the object.
2. Look straight down at the ruler and find the end of the object.
3. Read the number at the end and write it with the unit, for example 8 cm.



The yellow strip starts at 0 and ends at 8, so it is 8 cm long.

Worked example 1

A ribbon is 45 cm long. A second ribbon is 38 cm long. How much longer is the first ribbon?

Find the difference: 45 − 38 = 7. The first ribbon is **7 cm** longer.

Mass

Definition: units of mass

Mass tells us how heavy something is. We measure mass in **grams (g)** and **kilograms (kg)**. 1000 g = 1 kg. A pencil is about 5 g. A bag of sugar is 1 kg.

Method: reading scales

1. Look at the scale. Count how much each small mark is worth.
2. Find where the pointer stops, or read the display.
3. Write the number with the unit, for example 500 g.

Worked example 2

A bag of apples has a mass of 2 kg. A bag of pears has a mass of 3 kg. What is the total mass of the two bags?

Add the masses: 2 + 3 = **5 kg**.

Capacity and volume

Definition: capacity

Capacity is how much a container can hold. We measure capacity in **millilitres (ml)** and **litres (l)**. 1000 ml = 1 l. A teaspoon holds about 5 ml. A carton of milk holds about 1 litre.

Method: reading a measuring jug

1. Put the jug on a flat table.
2. Look at the liquid from the side, at the level of the surface.
3. Read the mark that the liquid reaches and write the unit, for example 250 ml.

Worked example 3

A jug holds 500 ml. Dad pours in 250 ml of juice. How much more juice will fit?

500 − 250 = **250 ml** more will fit.

Temperature

Definition: temperature

Temperature tells us how hot or cold something is. We measure it in **degrees Celsius (°C)** using a thermometer. Water freezes at 0 °C. A warm summer day is

about 25 °C. Your body is about 37 °C.

Worked example 4

It is 12 °C in the morning. By the afternoon the temperature is 8 degrees higher. What is the afternoon temperature?

12 + 8 = **20 °C**.

Choosing the right unit

Key fact: sensible units

What you measure	Small units	Large units
Length	centimetres (cm)	metres (m)
Mass	grams (g)	kilograms (kg)
Capacity	millilitres (ml)	litres (l)
Temperature	degrees Celsius (°C)	

Rule: choose the unit that fits

- Use cm for small things such as a pencil or a book, and m for big things such as a room.
- Use g for light things such as a sweet, and kg for heavy things such as a child.
- Use ml for small amounts such as a spoon of medicine, and l for large amounts such as a bath.

Worked example 5

Which unit would you use to measure the height of a tree: cm or m? Which unit would you use for a bottle of water: ml or l?

A tree is tall, so we use **metres**. A bottle of water holds a small amount, so we use **millilitres**, because it holds about 500 ml.

Comparing measures

Rule: comparing signs

We use **>** for "is greater than", **<** for "is less than" and **=** for "is equal to". The wide mouth of the sign always opens towards the bigger number.

Worked example 6

Compare 35 cm and 53 cm. Use > or <.

35 is smaller than 53, so 35 cm < 53 cm. Also, 53 cm > 35 cm.

Worked example 7

Are 2 m and 200 cm the same length?

1 m = 100 cm, so 2 m = 200 cm. They are **equal**: 2 m = 200 cm.

Watch out

Always compare measures in the same unit. 2 kg is not smaller than 500 g just because 2 is smaller than 500! 2 kg is 2000 g, which is bigger than 500 g. Also remember to write the unit in every answer.

Did you know?

Long ago, people measured with parts of the body. A "foot" was the length of a foot and a "cubit" was the length from the elbow to the fingertip. This caused many arguments because everybody's body is different. In France, in 1799, scientists agreed on the metre so that everyone could measure in the same way.

Otto's tip

Make an estimate before you measure. Think: "My hand is about 10 cm wide, so this book is about 2 hands long: 20 cm." Then measure to check. Good estimating helps you notice mistakes!