

Unit Conversions and Examples

Common basic units used in health are listed below with examples showing how to do the conversions.

Measuring weight:

The units used to measure weight are:

- micrograms (mcg or μg)
- milligrams (mg)
- grams (g)
- kilograms (kg)

The metric conversions are:

$$\begin{aligned}1 \text{ mg} &= 1\,000 \mu\text{g} \\1 \text{ g} &= 1\,000\,000 \mu\text{g} \\1 \text{ g} &= 1\,000 \text{ mg} \\1 \text{ kg} &= 1\,000 \text{ g}\end{aligned}$$

Converting from one unit to another:

Example 1: Convert 4.25 grams to milligrams.

Steps to follow

1. Find out the appropriate unit conversion definition, that is: $1 \text{ g} = 1\,000 \text{ mg}$.
2. As we want to convert grams (**bigger** unit) to milligrams (**smaller** unit), we need to **multiply** the given unit by the equivalent, that is:

$$4.25 \text{ g} = 4.25 \times 1\,000 \text{ mg} = 4\,250 \text{ mg}.$$

Note: When you are multiplying by 1000, you can move the decimal point 3 places to the **right** to get the answer.

Example 2: Convert 250 milligrams to grams.

Steps to follow

1. Find out the appropriate unit conversion definition, that is: $1 \text{ mg} = 1\,000 \mu\text{g}$.
2. When converting from a **smaller** unit (milligrams) to a **bigger** unit (grams), we need to **divide**, that is;

$$250 \text{ mg} = (250 \div 1\,000) \text{ g} = 0.25 \text{ g}.$$

Note: when dividing by 1 000 you can move the decimal point 3 places towards your **left** to get the answer.

Volume

Units used to measure volume are:

- litre (L)
- millilitre (mL)
- microlitres (μL)
- cubic centimeter: cc (cm^3)

The metric equivalents are:

$$\begin{aligned} 1 \text{ L} &= 1\,000 \text{ mL} \\ 1 \text{ L} &= 1\,000\,000 \mu\text{L} \\ 1 \text{ mL} &= 1\,000 \mu\text{L} \\ 1 \text{ cc} &= 1 \text{ mL} \end{aligned}$$

Example 3: Convert 1500 millilitres to litres.

Steps to follow

1. Find out the appropriate unit conversion definition, that is: $1 \text{ L} = 1\,000 \text{ mL}$.
2. As we are to convert from a smaller unit to a bigger unit we need to **divide** the given unit by the equivalent. That is

$$1500 \text{ mL} = (1500 \div 1000) \text{ L} = 1.5 \text{ L}.$$

Time:

The symbols used for time units are:

- day (d)
- hour (h)
- minute (min)

- second (s)

The unit conversions for time are:

$$\begin{aligned} 1 \text{ d} &= 24 \text{ h} \\ 1 \text{ h} &= 60 \text{ min} \\ 1 \text{ h} &= 3600 \text{ s} \\ 1 \text{ min} &= 60 \text{ s} \\ 1 \text{ s} &= \frac{1}{60} \text{ min} \end{aligned}$$

Example 3: Convert 45 minutes to hours.

1. Find out the appropriate unit conversion definition, that is: $1 \text{ h} = 60 \text{ min}$.
2. **Divide** the given unit by the equivalent, that is:

$$45 \text{ min} = (45 \div 60) \text{ h} = 0.75 \text{ h}.$$

Example 4: Convert 3 hours to minutes.

1. Find out the equivalent, that is: $1 \text{ h} = 60 \text{ min}$.
2. **Multiply** the given unit by the equivalent, that is:

$$3 \text{ h} = 3 \times 60 \text{ min} = 180 \text{ min}.$$

Example 5: Convert 30 seconds to minutes.

1. Identify the unit conversion required: $1 \text{ s} = \frac{1}{60} \text{ min}$.
2. Now we need to multiply the given unit by the equivalent, that is

$$30 \text{ s} = 30 \times \frac{1}{60} \text{ min} = \frac{1}{2} \text{ min}.$$

Other resources

- Brotto and Rafferty (2016)
- Reid-Searl, Dwyer, Moxham, and Reid-Speirs (2007)
- Online resources at [Study Support](#);
- Arrange a consultation with a Mathematics Learning Advisor.

References

- Brotto, V., & Rafferty, K. (2016). *Clinical dosage calculations for Australia and New Zealand* (2nd ed.). South Melbourne, Australia: Cengage Learning.
- Reid-Searl, K., Dwyer, T., Moxham, L., & Reid-Speirs, J. (2007). *Nursing student's maths & medications survival guide*. Frenchs Forest, Australia: Pearson.