# Conversion Lab Worksheet

Dimensional analysis · Logical Home Schooling

**Name:** _____ **Date:** _____ **Period:** _____

In this lab you will use Conversion Lab to build chains of conversion factors, watch the units cancel, and solve unit problems from science and everyday life.

**Link:** www.logicalhomeschooling.com/conversion-lab.html

## Objectives

By the end of this lab you will be able to:

- Explain why a conversion factor equals 1, and flip it so the unwanted unit cancels.
- Chain several conversion factors to solve multi-step conversions.
- Convert metric prefixes, including squared and cubed units.
- Solve real problems with rates such as speed, cost, and medicine doses.

**Materials:** a computer or tablet with Conversion Lab open, a calculator, a pencil, this worksheet. Time: about 45 minutes.

**Write each chain like this:** 3.5 ft × (12 in / 1 ft) = 42 in. Put the unit you want to cancel on the **bottom** of the next factor. Cross out units as they cancel.

## Part 1: Pre-lab

1. 12 in / 1 ft is called a conversion factor. Why doesn't multiplying a length by it change how long the object is?

   _____

2. How many seconds are in one hour? Show how you figured it out.

   _____

## Part 2: Stage 1, Conversion factors

For each problem, write the chain you built (with units), then the answer.

| Problem | Chain (with units) | Answer |
|---|---|---|
| 3.5 ft → in | | |
| 90 min → h | | |
| 2.5 kg → g | | |
| 500 mL → L | | |
| 26.2 mi → km | | |

1. In the 90 min → h problem, which number ended up on the bottom? How could you tell the answer should be smaller than 90?

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## Part 3: Stage 2, Build the chain

| Problem | Chain (with units) | Answer |
|---|---|---|
| 2 days → s | | |
| 1 mi → in | | |
| 3.0 mi → cm | | |
| 1 yr → s | | |
| 0.50 gal → mL | | |

1. Some tray factors were never needed (like 7 days / 1 week). How did you decide which factors to use?

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## Part 4: Stage 3, Metric, squared, and cubed units

| Problem | Chain (with units) | Answer |
|---|---|---|
| 4.5 km → cm | | |
| 350 mg → g | | |
| 2.0 $m^2$ → $cm^2$ | | |
| 1.5 L → $cm^3$ | | |
| 1.0 $m^3$ → L | | |

1. Why did you have to use the 1 m = 100 cm factor twice for $m^2$ and three times for $m^3$? Draw a sketch if it helps.

## Part 5: Stage 4, Real-world rates

| Problem | Chain (with units) | Answer |
|---|---|---|
| 65 mi/h → m/s | | |
| Gas money for 240 mi | | |
| Medicine dose for a 44 lb child | | |
| 9.0 g of water → molecules | | |
| Heartbeats in 80 years | | |

1. In the speed problem, two units had to cancel (miles and hours). Explain how the hours factor was set up.

## Part 6: Practice problems

Solve these **without** Conversion Lab. Write out the full chain and cross out units as they cancel.

1. How tall in centimeters is a person who is 5.0 ft tall? (1 ft = 12 in, 1 in = 2.54 cm)

2. Convert 3.2 L to mL.

3. A sprinter runs 100 m in 12.5 s. What is the speed in km/h?

4. A tile covers 0.25 $m^2$. What is its area in $cm^2$?

5. A patient weighs 154 lb. The order is 2 mg of medicine per kg of body weight. How many mg should the patient get? (1 kg = 2.2 lb)

6. What is the mass of 3.5 mol of $CO_2$? (molar mass 44.01 g/mol)

## Conclusion

Write 3 to 5 sentences explaining how dimensional analysis works and why it helps you avoid mistakes. Use the words **conversion factor**, **cancel**, **units**, and **chain**.