

How to Solve One-Step Dimensional Analysis Problems

Science & Engineering Practices:

6.S.1A.4 One-Step Dimensional Analysis Problems

Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to (1) reveal patterns and construct meaning or (2) support hypotheses, explanations, claims, or designs.

How to Solve One-Step Dimensional Analysis Problems

Conversion Factors	
1 L = 1000 mL	365 days = 1 yr
1 mL = 1 cm³	7 days = 1 week
1 kg = 1000 g	52 weeks = 1 yr
1 kg = 1,000,000 mg	1 min = 60 sec
1 km = 1000 m	1 hr = 60 min
1 m = 100 cm	24 hrs = 1 day

Steps to Dimensional Analysis

- **Step 1: Write out your problem.**
- **Step 2: Write all conversion factors as fractions.**
- **Step 3: Include all units with all numbers.**
- **Step 4: Arrange conversion factors, so that units cancel diagonally (what goes up, must come down).**
- **Step 5: Multiply the numerators (top numbers).**
- **Step 6: Multiply the denominators (bottom numbers).**
- **Step 7: Divide the final numerator by the denominator.**

How to Solve One-Step Dimensional Analysis Problems

Sample Question:

How many mL are there in a 15 L container?

Steps to Dimensional Analysis

- Step 1: Write out your problem.
- Step 2: Write all conversion factors as fractions.
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$$15 \text{ L} = \underline{\hspace{2cm}} \text{ mL}$$

$$\frac{15 \cancel{\text{L}}}{1} \bullet \frac{1000 \text{ mL}}{1 \cancel{\text{L}}} = 15,000 \text{ mL}$$

Conversion
1 L = 1000 mL

plug in the conversion



Cross out the diagonal units (what goes up, must come down) leaving the mL by themselves.

How to Solve One-Step Dimensional Analysis Problems

#1 How many meters will a person run during a 10 kilometer race?

Steps to Dimensional Analysis

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- Step 5: Multiply the numerators (top numbers).
- Step 6: Multiply the denominators (bottom numbers).
- Step 7: Divide the final numerator by the denominator.

Conversion
1000 m = 1 km

How to Solve One-Step Dimensional Analysis Problems

#2 Charlie drove rode his bike 320 meters to the grocery store. How many kilometers did he bike?

Steps to Dimensional Analysis

- Step 1: Write out your problem.
- Step 2: Write all conversion factors as fractions.
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- Step 5: Multiply the numerators (top numbers).
- Step 6: Multiply the denominators (bottom numbers).
- Step 7: Divide the final numerator by the denominator.

Conversion

$$1000 \text{ m} = 1 \text{ km}$$

How to Solve One-Step Dimensional Analysis Problems

#3 How many cubic centimeters are in a 50 mL cup of water?

Steps to Dimensional Analysis

- Step 1: Write out your problem.
- Step 2: Write all conversion factors as fractions.
- Step 3: Include all units with all numbers.
- Step 4: Arrange conversion factors, so that units cancel diagonally (what goes up, must come down).
- Step 5: Multiply the numerators (top numbers).
- Step 6: Multiply the denominators (bottom numbers).
- Step 7: Divide the final numerator by the denominator.

Conversion
1 mL = 1 cm³

How to Solve One-Step Dimensional Analysis Problems

#4 The average American student is in class 330 minutes/day. How many hours/day is this?

Steps to Dimensional Analysis

- Step 1: Write out your problem.
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- Step 7: Divide the final numerator by the denominator.

Conversion
1 hr = 60 min

How to Solve One-Step Dimensional Analysis Problems

#5 How many seconds are there in 75 minutes?

Steps to Dimensional Analysis

- Step 1: Write out your problem.
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- Step 6: Multiply the denominators (bottom numbers).
- Step 7: Divide the final numerator by the denominator.

Conversion
1 min = 60 sec

How to Solve One-Step Dimensional Analysis Problems

#6 Pepsi puts 355 ml of pop in a can. How many liters is this?

Steps to Dimensional Analysis

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Conversion
1 L = 1000 mL

How to Solve One-Step Dimensional Analysis Problems

#7 How many hours are in 180.0 days?

Steps to Dimensional Analysis

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Conversion
24 hrs = 1 day

How to Solve One-Step Dimensional Analysis Problems

#8 The distance from Myrtle Beach to Loris is 160,934 cm. What is the distance in m?

Steps to Dimensional Analysis

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Conversion
1 m = 100 cm

How to Solve One-Step Dimensional Analysis Problems

#9 During the previous year, Zach's weather station measured 91 cm of rain. Express this amount in m.

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- Step 7: Divide the final numerator by the denominator.

Conversion
1 m = 100 cm

How to Solve One-Step Dimensional Analysis Problems

#10 John discovered that the further he pulled back on a rubber band and puck, the farther forward the puck would go. He recorded a distance of 3 meters after releasing the puck. How many cm did it travel?

(Don't let the wording confuse you. What is the only information you need?)

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- Step 7: Divide the final numerator by the denominator.

Conversion
1 m = 100 cm