Converting Between Measurement Systems

Name: _____	Date: _____	Score: _____ / 17

Travelling, cooking, or doing a science lab often means hopping between **customary** units (inches, pounds, gallons) and **metric** units (centimeters, kilograms, liters)—and the trick is a **conversion factor**, a fraction equal to 1 that bridges the two systems (for example, $\frac{2.54\ cm}{1\ in}$). Multiply by the conversion factor so the old unit cancels and the new unit stays—this technique is also called *dimensional analysis*. You can also set up a **proportion** just like any other equivalent-ratio problem. Get comfortable with the most common length, mass, and capacity conversions now and science labs, recipes, and real-world measurement tasks will feel like a breeze!

Key Concepts & Quick Review

Common Conversion Factors (approximate):

Length	Mass / Weight
1 inch $\approx 2.54\ cm$	1 pound $\approx 0.454\ kg$
1 foot $\approx 0.3048\ m$	1 kilogram $\approx 2.205\ lb$
$1\ mi \approx 1.609\ km$	1 ounce $\approx 28.35\ g$
Capacity	**Temperature**
$1\ gal \approx 3.785\ L$	$F = \frac{9}{5}C + 32$
1 liter $\approx 0.264\ gal$	$C = \frac{5}{9}(F - 32)$
1 quart $\approx 0.946\ L$	

Conversion Method: Multiply by a conversion factor written as a fraction equal to 1. For example, $\frac{2.54\ cm}{1\ in} = 1$. Arrange so the unwanted unit cancels.

Examples

① Convert 15 inches to centimeters.

Think It Through: Multiply by the conversion factor: $15\ in \times \frac{2.54\ cm}{1\ in} = 15 \times 2.54 = 38.1\ cm.$

Answer: $38.1\ cm$

② Convert 5 kilometers to miles (round to the nearest hundredth).

Think It Through: $5\ km \times \frac{1\ mi}{1.609\ km} = \frac{5}{1.609} \approx 3.11\ mi.$

Answer: $\approx 3.11\ mi$

Practice Problems

Convert each measurement. Round to the nearest hundredth when necessary.

1. Convert 8 inches to centimeters. _____
2. Convert 3 feet to meters. _____
3. Convert $10\ mi$ to kilometers. _____
4. Convert 20 centimeters to inches. _____
5. Convert 50 kilograms to pounds. _____
6. Convert 12 pounds to kilograms. _____
7. Convert $4\ gal$ to liters. _____
8. Convert 7 liters to gallons. _____
9. Convert $100\ m$ to feet. _____
10. Convert 6 ounces to grams. _____
11. Convert 2 quarts to liters. _____
12. Convert 15 kilometers to miles. _____
13. Convert 25 centimeters to inches. _____
14. Convert 9 pounds to kilograms. _____
15. Convert 36 inches to centimeters. _____

Study Tips

- Always write the conversion factor as a fraction so the **unwanted unit cancels**. If you start with inches, put inches in the denominator.
- Memorise the "big three": $1\ in \approx 2.54\ cm$, $1\ kg \approx 2.2\ lb$, $1\ mi \approx 1.6\ km$. Most problems can be solved from these.
- Check your answer: converting to a **larger unit** should give a **smaller number**, and vice versa.

Word Problems

16. A recipe from France calls for $250\ g$ of flour. Your kitchen scale only shows ounces. How many ounces of flour do you need? Round to the nearest tenth. _____

17. A track meet lists the 1,500-metre race. About how many miles is that? Round to the nearest hundredth. _____

Answer Keys

1) $20.32\ cm$
2) $0.91\ m$
3) $16.09\ km$
4) $7.87\ in$
5) $110.25\ lb$
6) $5.44\ kg$
7) $15.14\ L$
8) $1.85\ gal$
9) $328.1\ ft$
10) $170.1\ g$
11) $1.89\ L$
12) $9.32\ mi$
13) $9.84\ in$
14) $4.08\ kg$
15) $91.44\ cm$
16) about 8.8 ounces
17) $1{,}500\ m = 1.5\ km$; $\frac{1.5}{1.609} \approx 0.93\ mi$.

Step-by-Step Explanations

Tutoring notes not found for this topic.

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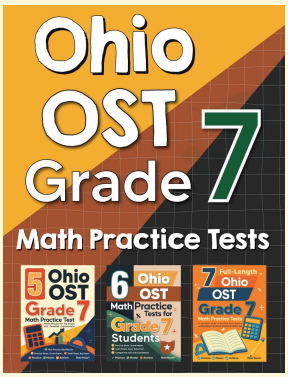

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