

Name: _____ Date: _____

Answer Key: Your Mission: Conquer the 4th Grade Metric Mastery Challenge

Synthesize data and apply multi-step logic to solve complex measurement problems using International System (SI) units in real-world engineering scenarios.

1. An environmental engineer is building a wildlife corridor that is 2.5 kilometers long. If they place a motion-sensor camera every 500 meters, how many cameras are needed (excluding the very start)?

Answer: B) 5 cameras

To solve this, first convert 2.5 km to 2,500 meters. Dividing the total length (2,500m) by the interval (500m) results in 5 cameras.

2. A scientist has a liquid sample with a mass of 1.2 kilograms. After an experiment, the mass decreased by 400 grams. What is the final mass in grams?

Answer: C) 800 grams

First, convert 1.2 kg to 1,200 grams. Then, subtract the 400 grams lost ($1,200 - 400 = 800$) to find the final mass.

3. True or False: If a digital scale is calibrated to show 0.00g when empty, but consistently measures a 10g weight as 10.5g every time, the scale is precise but not accurate.

Answer: A) True

Precision refers to the consistency of results, while accuracy refers to how close a measurement is to the true value. Since it is consistent but wrong, it is precise but inaccurate.

4. You are designing a vertical garden. Each planter box is 40 centimeters tall. If you stack 8 boxes, how many decimeters tall is the entire garden tower?

Answer: B) 32 decimeters

8 boxes at 40cm each is 320cm total. Since 10cm = 1 decimeter, 320 divided by 10 equals 32 decimeters.

5. A botanist notes that a rare fern grows 15 millimeters every week. How many centimeters will the plant have grown after 4 weeks?

Answer: A) 6 centimeters

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15mm x 4 weeks = 60mm total growth. Since there are 10mm in every 1cm, 60mm is equivalent to 6cm.

6. Which of these scenarios requires the highest level of precision in measurement?

Answer: C) Creating a chemical solution for medicine

Medicine requires tiny, exact amounts (often in milligrams) where even a small error could be dangerous, unlike mulch or hiking distances where approximations are safer.

7. True or False: The 'mole' is the SI unit used by scientists to measure the amount of a substance, such as the number of atoms in a sample.

Answer: A) True

The mole (mol) is one of the seven base SI units specifically used to describe the amount of substance.

8. An Olympic pool is 50 meters long. A swimmer completes 20 laps (one-way trips). How many kilometers did the swimmer travel in total?

Answer: D) 1 kilometer

50 meters x 20 laps = 1,000 meters. Since 1,000 meters is exactly 1 kilometer, the total distance is 1 km.

9. Why do scientists across the globe use the International System of Units (SI) instead of local measurement systems like the Imperial system?

Answer: C) To ensure data can be shared and verified without conversion errors

Universal standardization allows scientists to replicate experiments and communicate findings accurately without the risk of math errors during conversion between different systems.

10. True or False: If you are measuring the luminous intensity of a light source, the standard SI unit you would record is the Candela.

Answer: A) True

The candela (cd) is the base SI unit for luminous intensity, which measures the brightness of a light source in a specific direction.