

Name: _____ Date: _____

Answer Key: Why Did the Scientist Cross the Metric Sea? Grade 4 Measure Quest

Calculate volume gaps and evaluate precision errors in complex laboratory scenarios to prevent a fictional scientific meltdown.

1. An oceanographer is measuring the depth of a coral reef. If they record 4.5 meters but the actual depth is 12 meters, their measurement is considered:

Answer: C) Neither accurate nor precise

Accuracy refers to how close a measurement is to the true value. Since 4.5 is far from 12, it is not accurate. Without multiple similar readings, we cannot claim precision either.

2. If a chef needs exactly 1 liter of milk but only has a 250-milliliter measuring cup, they must fill that cup exactly four times to reach the correct volume.

Answer: A) True

Since there are 1,000 milliliters in 1 liter, dividing 1,000 by 250 equals 4. This requires accurate repeated measurement (precision).

3. A botanist notices a sunflower grows 2 centimeters every day. To find out how many _____ the flower grew in 50 days, they would multiply 2 by 50.

Answer: B) Meters

$2 \text{ cm} \times 50 = 100 \text{ cm}$. Since 100 centimeters equals 1 meter, the botanist has measured exactly one meter of growth.

4. A baker's digital scale always shows '5 grams' even when nothing is touching it. What must the baker do to ensure their measurements are valid?

Answer: B) Calibrate or 'zero' the scale

Calibration is the process of adjusting an instrument to ensure its readings are accurate. Setting the scale to zero is a fundamental step in valid data collection.

5. In a scientific experiment, it is possible for a set of measurements to be very precise (consistent) but completely inaccurate (wrong).

Answer: A) True

Name: _____ **Date:** _____

Precision means the results are the same every time. If a scale is broken, it might give the same 'wrong' weight every time, making it precise but inaccurate.

6. To measure the amount of space a liquid medicine takes up in a beaker, a scientist evaluates the _____ of the liquid.

Answer: C) Volume

Volume is the defined scientific property for the amount of three-dimensional space an object or substance occupies.

7. Which of these scenarios requires the highest level of precision to avoid a dangerous mistake?

Answer: C) Measuring chemicals for a new medicine

Pharmaceutical science requires extreme precision because even a tiny error in measurement can change the chemical properties and safety of the medicine.

8. A kilometer is the best unit to use when measuring the thickness of a single sheet of notebook paper.

Answer: B) False

Kilometers are used for long distances. To measure something very thin like paper, a scientist would use millimeters or micrometers for better precision.

9. If an astronaut has a mass of 80 kilograms on Earth, their _____ will stay the same on the Moon, even if they feel lighter.

Answer: C) Mass

Mass is the amount of matter in an object and does not change based on gravity, unlike weight, which is the force of gravity acting on that mass.

10. A meteorologist records the temperature at exactly 22.458 degrees Celsius. Why would they use three decimal places instead of just rounding to 22?

Answer: B) To show a higher level of precision

Adding decimal places indicates that the tool used was capable of very fine, specific measurements, allowing for better analysis of small changes.