

Name: _____ Date: _____

Answer Key: Sizzling Scoops and Chemical Batches: A 6th Grade Quiz

Counting by weighing and recipe-style scaling—foundational skills that build a concrete understanding of mass relationships in chemical reactions.

1. Imagine you are building a bicycle. You need 2 wheels for every 1 frame. If this were a chemical reaction, the number of wheels and frames would be known as:

Answer: B) The recipe ratio

In 6th-grade science, we use the analogy of a recipe ratio to explain stoichiometry, which describes the fixed proportions of ingredients needed for a reaction.

2. True or False: Scientists use a special counting unit called a 'mole' because atoms are too tiny to count one by one.

Answer: A) True

Because atoms are microscopic, the mole serves as a bridge between the invisible world of particles and the visible world we can measure.

3. If a recipe for a 'Sizzling Science Bar' requires 10 grams of sugar and 5 grams of cocoa, what is the total mass of the bar after mixing?

Answer: C) 15 grams

According to the Law of Conservation of Mass, the total mass of the ingredients (reactants) must equal the total mass of the final product.

4. A baker uses a balance scale to find out how much a dozen eggs weigh. In chemistry, finding the mass of a specific number of 'units' is called finding the:

Answer: A) Molar mass

Molar mass is the weight of one mole of a substance, similar to how we might weigh a standard pack or 'dozen' of an item.

5. True or False: If you have 1 mole of gold and 1 mole of aluminum, they will both weigh exactly the same amount on a scale.

Answer: B) False

Name: _____ Date: _____

Even though they have the same number of atoms, different elements have different masses, just like a dozen bowling balls weigh more than a dozen ping-pong balls.

6. In the 'recipe' for rust, Iron + Oxygen yields Rust. If you start with 4 atoms of Iron and 3 molecules of Oxygen, the _____ are the starting ingredients.

Answer: B) Reactants

Reactants are the starting substances in a chemical reaction that undergo a change.

7. A scientist wants to know how many water molecules are in a drop. Which 'counting tool' would they use to represent a huge number of particles?

Answer: C) The mole

The mole is the standard unit in chemistry used to represent 6.022×10^{23} particles.

8. True or False: Stoichiometry is used in real life to make sure matches have the right amount of chemicals to light safely.

Answer: A) True

Stoichiometry is used in manufacturing to ensure products have the correct balance of chemicals to work safely and effectively.

9. If you have a chemical equation that says $2A + B \rightarrow C$, and you use 4 parts of 'A', how many parts of 'B' do you need to keep the ratio the same?

Answer: B) 2 parts

If the original ratio is 2:1, doubling the first ingredient (4) means you must also double the second ingredient (2) to maintain the proportion.

10. Which of these is the best example of 'counting by weighing' in a grocery store?

Answer: B) Estimating how many jellybeans are in a jar using a scale

Counting by weighing involves using the total mass to determine the number of items present, which is the core concept of using moles in chemistry.