Name: _____ **Date:** _____

Stoichiometry Showdown: Can You Build the Perfect Chemical Recipe?

Calculate precise mass-to-particle conversions and analyze chemical formulas to solve a high-stakes laboratory challenge during your next bell-ringer or group activity.

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1. An alchemist wants to create a specific amount of Silver Nitrate for a photo experiment. If they have 2 moles of Silver (Ag), but the recipe requires a 1:3 ratio of Silver to Nitrate, how many moles of Nitrate are needed to keep the reaction balanced?

A. 2 moles
B. 4 moles
C. 6 moles
D. 8 moles

2. In the world of the very small, a 'mole' is simply a counting unit, much like a 'dozen' represents 12. If a baker has 3 moles of sugar molecules, they have approximately _____ molecules in total.

A. 12.044 x 10^23
B. 18.066 x 10^23
C. 6.022 x 10^23
D. 3.011 x 10^23

3. True or False: If you have 1 mole of Gold atoms and 1 mole of Helium atoms, both groups will contain the exact same number of individual atoms.

A. True
B. False

4. A scientist is studying a fuel that uses Magnesium. If the balanced equation is 2Mg + O2 ’2MgO, what is the stoichiometric ratio of Magnesium used to Magnesium Oxide produced?

A. 1:2
B. 2:1
C. 1:1
D. 2:3

5. Imagine the 'molar mass' is the weight of a giant bag containing exactly one mole of atoms. If one atom of Element X weighs 10 units, and one atom of Element Y weighs 20 units, the molar mass of a molecule made of XY2 would be _____.

A. 30 units
B. 40 units
C. 50 units
D. 60 units

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6. True or False: If a reaction has a 1:1 ratio, but you provide 5 moles of reactant A and only 2 moles of reactant B, you will still be able to produce 5 moles of product.

A. True
B. False

7. Using the 'recipe' Phosphorus + 5 Oxygen ’Phosphorus Pentoxide, if you start with 10 moles of Oxygen, how many moles of Phosphorus do you need to ensure no oxygen is left over?

A. 2 moles
B. 5 moles
C. 10 moles
D. 50 moles

8. If you are trying to find the molar mass of Calcium Carbonate ($CaCO_3$), and the masses are Ca=40, C=12, and O=16, the total mass for one mole is _____ g/mol.

A. 68
B. 84
C. 100
D. 116

9. True or False: Stoichiometry is based on the Law of Conservation of Mass, which states that matter cannot be created or destroyed in a chemical reaction.

A. True
B. False

10. If a reaction produces 1 mole of Water (H_2O) for every 1 mole of Sodium Chloride (NaCl), and your experiment produced 3.5 moles of NaCl, how many moles of Water were also created?

A. 1.75 moles
B. 3.5 moles
C. 7.0 moles
D. 0.5 moles