Name: _____ **Date:** _____

Answer Key: A Recipe for Galactic Goo: 4th Grade Stoichiometry Squad

Calculate secret ingredient ratios and predict chemical yields to save a space station's experimental laboratory from an overflowing foam crisis.

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1. The 'Cosmic Chef' needs to make Neon Noodles. The recipe says: 2 cups of Blue Dust + 1 cup of Sparkle Water = 2 bowls of Noodles. If the Chef has 6 cups of Blue Dust and plenty of water, how many bowls can he make?

Answer: C) 6 bowls

Since the ratio of Blue Dust to Noodles is 2:2 (or 1:1), using 6 cups of dust will yield exactly 6 bowls of noodles.

2. In chemistry, we use a giant number called a 'Mole' to count tiny particles. If 1 Mole of 'Zargon Gas' weighs 20 grams, then 2 Moles of 'Zargon Gas' would weigh _____ grams.

Answer: C) 40 grams

If one unit (mole) is 20g, doubling the amount to two units means doubling the mass (20 x 2 = 40).

3. True or False: In a chemical reaction, if you start with 100 grams of 'Star Glitter,' you must end up with exactly 100 grams of total product because atoms cannot be destroyed.

Answer: A) True

The Law of Conservation of Mass states that matter is neither created nor destroyed, so the mass stays the same.

4. To build a 'Moon Rover' molecule, you need 3 Wheels and 1 Crate. If you have 12 Wheels and 10 Crates, which item will you run out of first?

Answer: A) The Wheels

You need 3 wheels per crate. 12 wheels divided by 3 only allows for 4 rovers, even though you have 10 crates. Wheels are the 'limiting reactant'.

5. Scientists use the 'Molar Mass' to turn Grams into Moles. If a substance has a Molar Mass of 5g/mol, how many Moles are in a 25-gram sample?

Answer: B) 5 Moles

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To find moles, divide the total mass by the molar mass (25 divided by 5 equals 5).

6. A reaction requires a 1:3 ratio of Iron to Oxygen. If a scientist uses 5 atoms of Iron, how many atoms of Oxygen does she need to complete the reaction perfectly?

Answer: C) 15 atoms

In a 1:3 ratio, you multiply the first amount by 3. 5 multiplied by 3 is 15.

7. True or False: A 'Mole' is a specific number (Avogadro's Number) used because atoms are too small to count one by one.

Answer: A) True

The mole is a standard scientific unit for measuring large quantities of very small entities like atoms and molecules.

8. Imagine a reaction: 4A + 1B -> 2C. If you want to create 10 units of 'C', how many units of 'B' must you start with?

Answer: B) 5 units

The ratio of B to C is 1:2. This means you need half as much B as the amount of C you want to produce (10 divided by 2 is 5).

9. If the molar mass of 'Bubbly-on' is 10g/mol and the molar mass of 'Glow-ite' is 30g/mol, which statement is true about 1 Mole of each?

Answer: A) They have the same number of particles, but Glow-ite is heavier.

One mole always contains the same number of particles (Avogadro's number), but the mass depends on how heavy those specific particles are.

10. True or False: Stoichiometry is like a math 'map' that tells chemists exactly how much of each ingredient they need to avoid wasting materials.

Answer: A) True

Stoichiometry is the study of quantitative relationships in chemical formulas and reactions, acting as a calculation guide for efficiency.