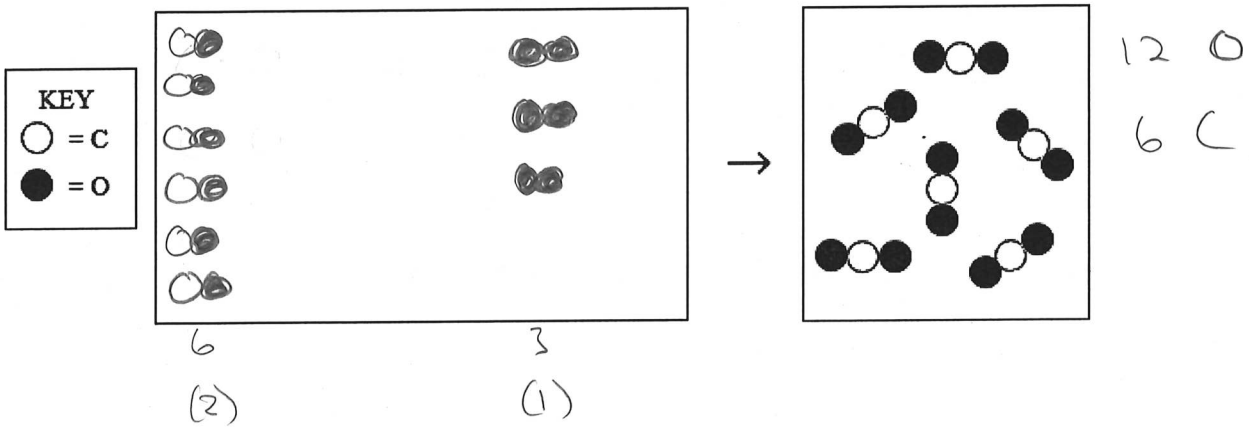
AP Chemistry
Stoichiometry Particle Diagrams

1. Consider the following unbalanced equation:

$$\ldots 2 \ldots CO\,(g) + \ldots\ldots O_2\,(g) \rightarrow \ldots 2 \ldots CO_2\,(g)$$

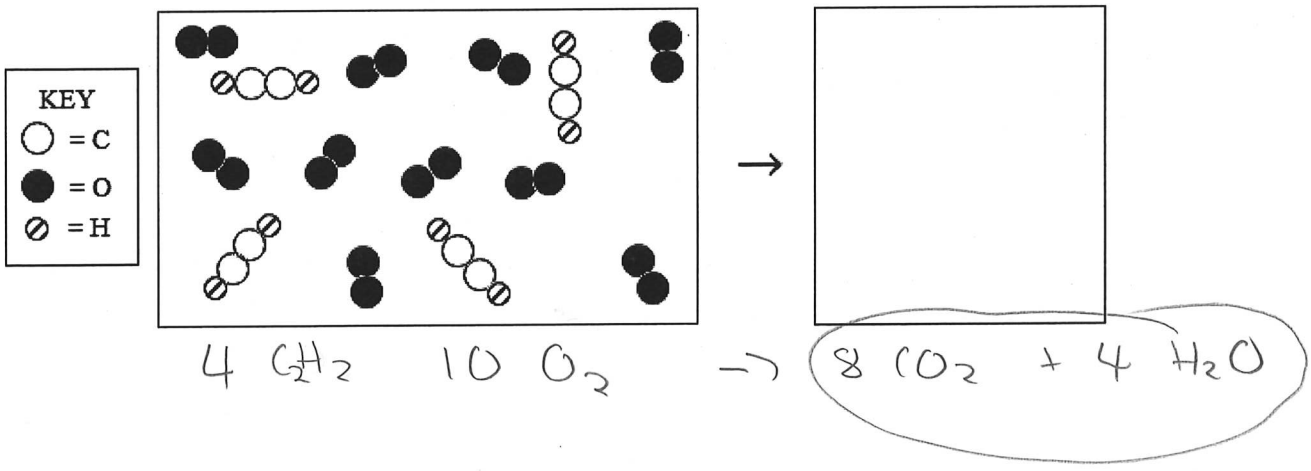
   a) Balance the chemical equation
   b) The particulate diagram represents the products of the reaction. In the other box, accurately depict the reaction mixture. Pay attention to number and types of atoms involved.



2. Consider the following unbalanced equation:

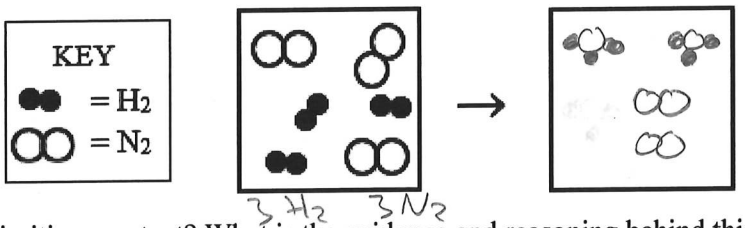
$$\ldots 2 \ldots C_2H_2\,(g) + \ldots 5 \ldots O_2\,(g) \rightarrow \ldots 4 \ldots CO_2\,(g) + \ldots 2 \ldots H_2O\,(g)$$

   a) Balance the equation
   b) The particulate diagram represents the reactants of the reaction. In the other box, accurately depict the products. Pay attention to number and types of atoms involved. Use  to represent water and  to represent carbon dioxide.



3. The diagram below represents hydrogen and nitrogen in a closed container. Draw the resultant mixture once the reaction runs to completion to form ammonia, NH_3.

Balanced Equation: $3H_2 + N_2 \rightarrow 2NH_3$



a) What is the limiting reactant? What is the evidence and reasoning behind this selection?

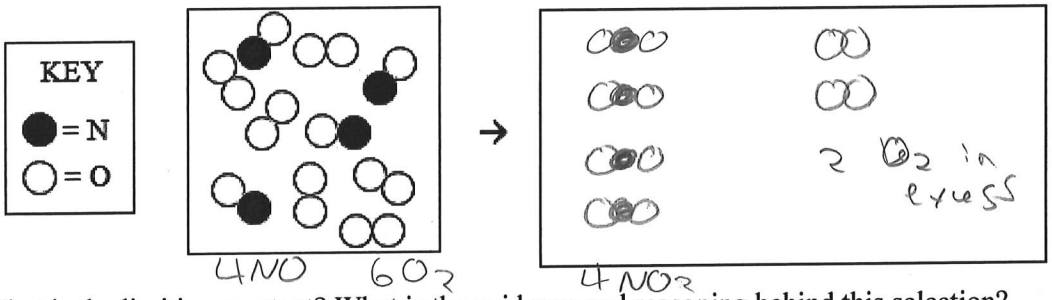
H_2 3:1 ratio → N_2 will be left over

b) How many molecules of the excess reactant are left over?

2

4. The diagram below represents a mixture of nitrogen monoxide (NO) and oxygen gas (O_2) in a closed container. Draw the resultant mixture once the reaction runs to completion to form NO_2 gas.

Balanced Equation: $2NO + O_2 \rightarrow 2NO_2$



a) What is the limiting reactant? What is the evidence and reasoning behind this selection?

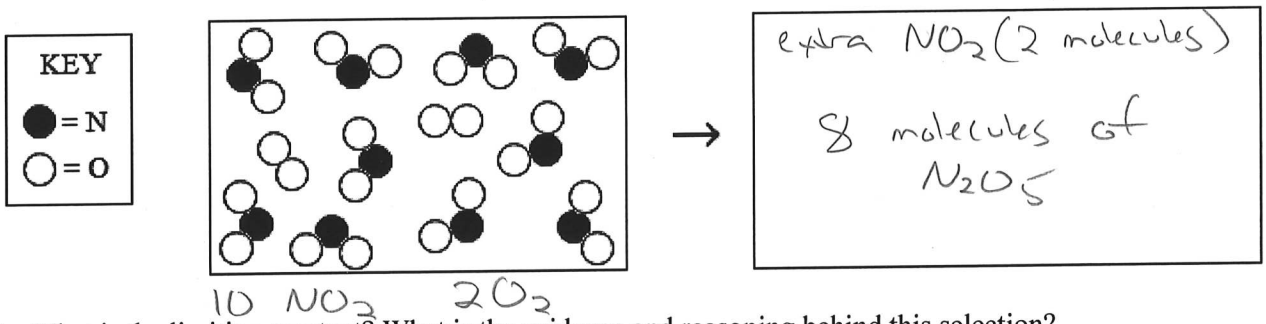
NO 2:1 ratio → O_2 will be excess

b) How many molecules of the excess reactant are left over?

2

5. The diagram below represents a mixture of nitrogen dioxide gas (NO_2) and oxygen gas (O_2) in a closed container. Draw the resultant mixture once the reaction runs to completion to form N_2O_5 gas. Express N_2O_5 as 

Balanced Equation: $4NO_2 + O_2 \rightarrow 4N_2O_5$



a) What is the limiting reactant? What is the evidence and reasoning behind this selection?

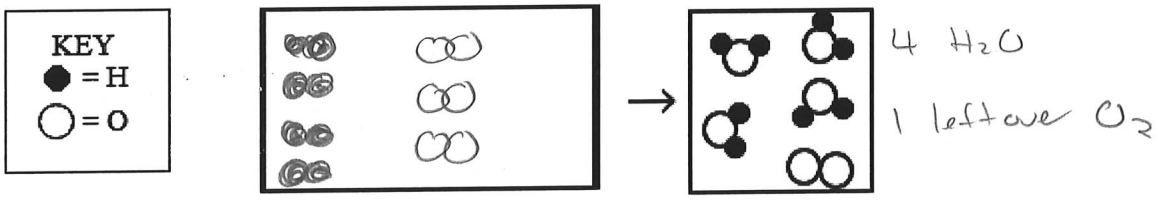
O_2 – not allowing a 4:1 ratio

b) How many molecules of the excess reactant are left over?

2

6. The diagram below represents the resultant mixture once a sample of hydrogen gas, H_2, is combusted with a sample of oxygen gas, O_2. In the space provided, draw the initial reaction mixture.

Balanced Equation: $2H_2 + O_2 \rightarrow 2H_2O$



a) What is the limiting reactant? What is the evidence and reasoning behind this selection?

H_2 – all of it was used

b) How many molecules of the excess reactant are left over?

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