

Chapter 12-Stoichiometry

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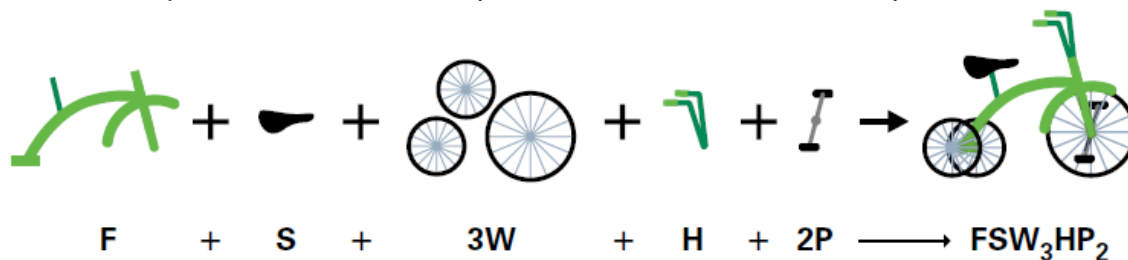
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Section 12.1-The Arithmetic of Chemistry

- balanced chemical equations provide the 'recipes' for chemical reactions
- like baking recipes, it tells you how much you need and how much you get

EXAMPLE:

- each tricycle needs the material pictured below minimum to complete one unit

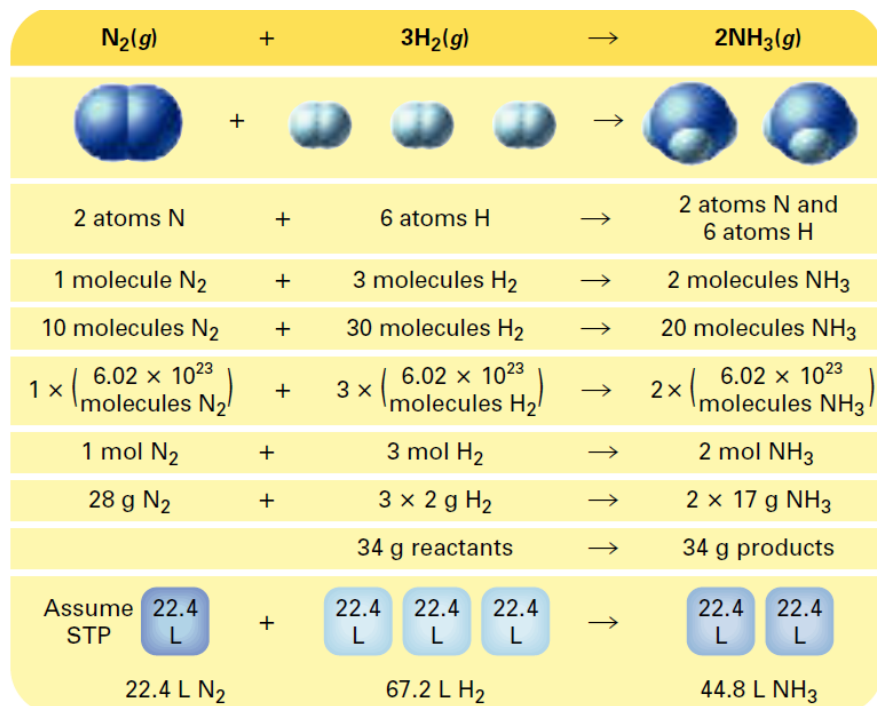


Questions:

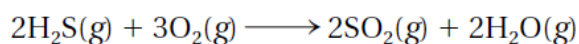
1. How many complete tricycles could you make with 12 wheels?
2. How many seats would be needed?
3. How many pedals would be needed?
4. How many complete tricycles could be made if you had 17 wheels?
5. How many seats would be needed?
6. How many pedals would be needed?
7. How much of each material is needed to make 175 tricycles? Is anything left over?

Interpreting Chemical Equations

- balanced chemical equations can be interpreted a number of ways
 - > atoms, molecules, moles, mass or volume(if gases)

**Interpreting a Balanced Chemical Equation**

Hydrogen sulfide, which smells like rotten eggs, is found in volcanic gases. The balanced equation for the burning of hydrogen sulfide is:



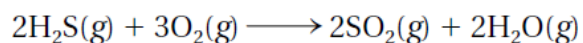
Interpret this equation in terms of

- numbers of representative particles and moles.

The coefficients in a balanced chemical equation can be interpreted as atoms, particles or moles.

EXAMPLE:

$2\text{H}_2\text{S}$ can mean 2 molecules of H_2S or 2 moles of H_2S and so on



b. masses of reactants and products.

since the coefficients can be interpreted as # of moles, this balanced chemical equation tells us that 2 mol of H₂S and 3 mol of O₂ react to produce 2 mol of SO₂ and 2 mol of H₂O

Mass of Reactants

1 mol of H₂S = 34.1g therefore 2 mol = 68.2g

1 mol of O₂ = 32g therefore 3 mol = 96g

Total Mass is 68.2g + 96g = 164.2g

Mass of Products

1 mol of SO₂ = 64.1g therefore 2 mol = 128.2g

1 mol of H₂O = 18g therefore 2 mol = 36g

Total mass is 128.2g + 36g = 164.2g

Chemical Calculations

Limiting Reagent and Percent Yield