**Limiting Reactants (Reagents)**

Tricycle Analogy

* To make a tricycle, you need 1 frame and 3 wheels.
* If I have 10 frames and 12 wheels how many tricycles can I make?
  + 4 tricycles
  + I have *excess* frames; my wheels **limit** how many tricycles I can make.

Limiting Reactant – is the reactant that *is fully consumed*.

Excess Reactant – is the reactant that is **NOT** fully consumed.

Ex:

N2H4 + 2 H2O2 🡪 N2 + 4 H2O

Which is my limiting reactant when 0.750 moles of N2H4 is mixed with 0.500 moles of H2O2?

How much water will form if all reactants react?

0.750 mol N2H4 x 4 mol H2O = 3 mol H2O

1 mol N2H4

0.500 mol H2O2 x 4 mol H2O = 1 mol H2O

2 mol H2O2

\*\*H2O2 is the limiting reactant becase it forms LESS PRODUCT!

\*\*So the amount of water formed will be 1 mol H2O.

* How much excess reactant remains unchanged?

0.500 mol H2O2 x 1 mol N2H4 = 0.250 mol N2H4 NEEDED

2 mol H2O2

So… 0.750 mol – 0.250 mol = 0.500 mol N2H4 remains unchanged

**Summary:**

1. Determine how much product will form if all of each reactant reacts.
2. The reactant which forms the least amount of product is the limiting reactant.
3. The amount of limiting reactant determines how much product can be formed.