CONCEPT: PERCENT YIELD

● **Percent Yield** determines how successful the scientist was in creating their desired product.

□ The higher the percent yield then the __________ the efficiency of a chemical reaction.

□ In terms of percent yield values: ______ = Excellent, ______ = Very Good, ______ = Good, & ______ = Poor

Percent Yield Formula

Percent Yield = ____________________ x 100%

● **Actual Yield**: The amount of pure product ___________ created when the experiment is done in a laboratory.

□ The units used in the formula are based on the units of the actual yield.

□ No chemical reaction is 100% efficient so the actual yield is always ________ than the theoretical yield.

EXAMPLE: Consider the following balanced chemical reaction:

$$2\ C_6H_6\ (l) \quad + \quad 15\ O_2\ (g) \longrightarrow 12\ CO_2\ (g) \quad + \quad 6\ H_2O\ (l)$$

If a 2.6 g sample of C_6H_6 reacted with excess O_2 to produce 1.25 g of water, what is the percent yield of water?

STEP 1: Map out the portion of the stoichiometric chart you will use.

STEP 2: Convert the **Given** quantity into moles of **Given**.

STEP 3: Do a **Mole to Mole comparison** to convert moles of **Given** into moles of **Unknown**.

STEP 4: If necessary, convert the moles of **Unknown** into the final desired units.

STEP 5: Plug in the actual yield and theoretical yield into the formula to determine the percent yield.

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PRACTICE: For the following chemical reaction 53.1 g $HBrO_4$ is mixed with 25.8 g Li_2CO_3. Determine the percent yield if 7.17 g CO_2 are produced.

$$2\ HBrO_4\ (aq) + Li_2CO_3\ (aq) \longrightarrow H_2O\ (l) + CO_2\ (g) + 2\ LiBrO_4\ (aq)$$

PRACTICE: Ammonia, NH_3, can be created from the combining of H_2 and N_2 molecules. How many grams of ammonia are isolated when 10.0 g H_2 reacts with excess N_2 with a chemical reaction that has a 79.3% yield?

$$3\ H_2 + N_2 \longrightarrow 2\ NH_3$$

PRACTICE: The reduction of iron (III) oxide creates the following reaction:

$$Fe_2O_3\ (s) + 3\ H_2\ (g) \longrightarrow 2\ Fe\ (s) + 3\ H_2O\ (g)$$

If the above reaction only went to 75% completion, how many moles of Fe_2O_3 were require to produce 0.850 moles of Fe?