

## Stoichiometry T-Chart: Example

**Problem:** How many grams of sodium sulfate will be formed if you start with 200.0grams of sodium hydroxide and have unlimited sulfuric acid?

**Analysis:** grams of given (NaOH) > moles of given >> moles of unknown (H<sub>2</sub>SO<sub>4</sub>) > grams of unknown

Write a Balanced Equation:  $2\text{NaOH} + \text{H}_2\text{SO}_4 \gg 2\text{H}_2\text{O} + \text{Na}_2\text{SO}_4$

| Step | WORK   | EXPLANATION  |
|------|--|--|
| 1    | GFM of NaOH: $22.99+16.00+1.01 = 40.00\text{g/mol}$  | Given value (NaOH) is in grams; need to convert to moles using molar mass to 2 decimal places                          |
| 2    | $\left  \frac{200.0\text{g} \cdot \text{NaOH}}{1} \right  \frac{1\text{mol} \cdot \text{NaOH}}{40.00\text{g} \cdot \text{NaOH}} = 5.000\text{mol} \cdot \text{NaOH}$   | Convert grams of given to moles of given. Watch sig figs.  |
| 3    | $\left  \frac{5.000\text{mol} \cdot \text{NaOH}}{1} \right  \frac{1\text{mol} \cdot \text{Na}_2\text{SO}_4}{2\text{mol} \cdot \text{NaOH}} = 2.500\text{mol} \cdot \text{Na}_2\text{SO}_4$   | Multiply moles of given by <b>mole ratio</b> to calculate moles of unknown (Na <sub>2</sub> SO <sub>4</sub> ) produced |
| 4    | GFM of Na <sub>2</sub> SO <sub>4</sub> : $(22.99 \times 2) + 32.06 + (16.00 \times 4) = 142.04\text{g/mol}$<br>$\frac{(2.500\text{mol} \cdot \text{Na}_2\text{SO}_4)}{1} \left  \frac{142.04\text{g} \cdot \text{Na}_2\text{SO}_4}{1\text{mol} \cdot \text{Na}_2\text{SO}_4} \right  = 355.1\text{g} \cdot \text{Na}_2\text{SO}_4$ | Multiply moles of unknown by GFM to determine grams of unknown. Sig figs = 4.  |

**Your turn:** How many grams of lithium nitrate will be needed to produce 250.0 grams of lithium sulfate?

You have plenty of lead IV sulfate for this reaction.