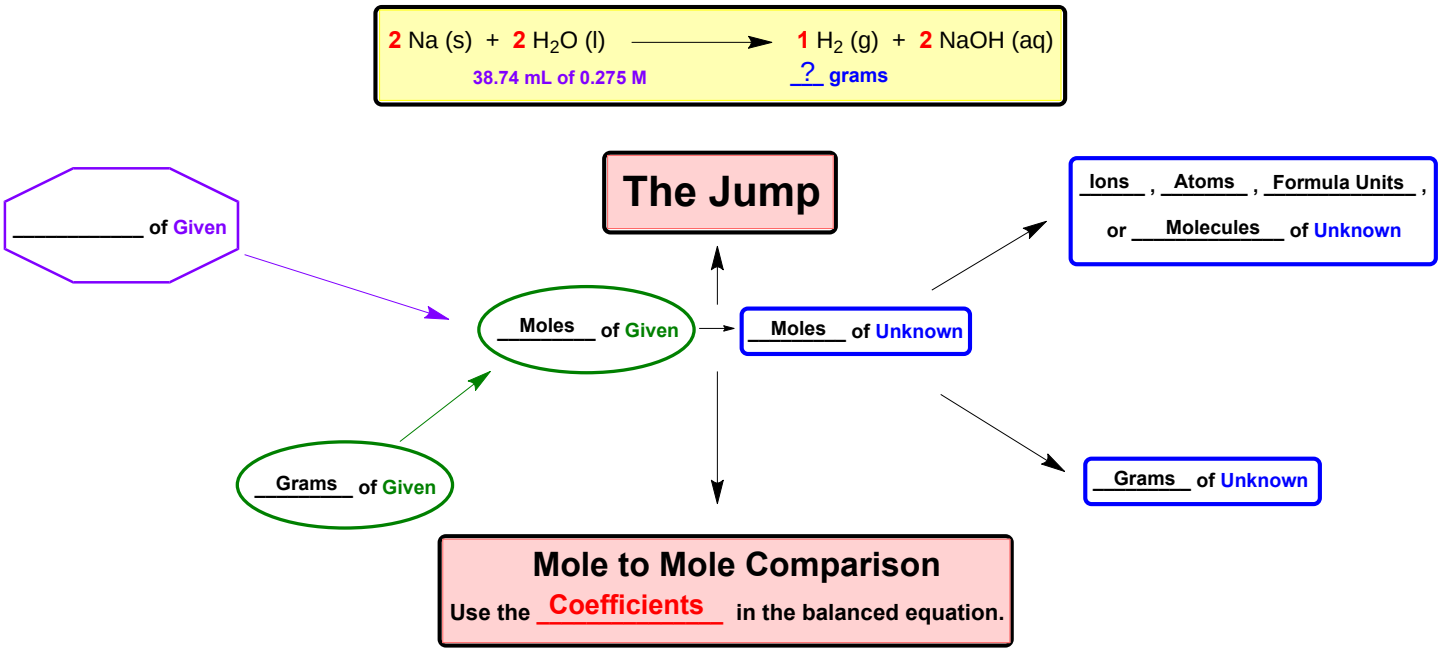
CONCEPT: SOLUTION STOICHIOMETRY

● **Solution Stoichiometry** deals with stoichiometric calculations in solutions that involve volume and molarity.

Solution Stoichiometric Chart

● The chart uses the **Given** quantity of a compound to determine the **Unknown** quantity of another compound.



EXAMPLE: How many moles of hydrogen gas were produced when 38.74 mL of 0.275 M H_2O reacts with excess sodium?

$$2\ Na\ (s) + 2\ H_2O\ (l) \longrightarrow H_2\ (g) + 2\ NaOH\ (aq)$$

STEP 1: Convert the **given** quantity into moles of **given**.

□ If a compound is said to be in excess, then just _____ it.

STEP 2: Do a **mole to mole comparison** to convert moles of **given** into moles of **unknown**.

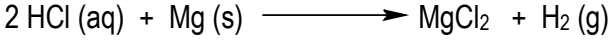
STEP 3: If necessary, convert the moles of **unknown** into the final desired units.

STEP 4: If you calculate more than one final amount then you must compare them to determine the theoretical yield.

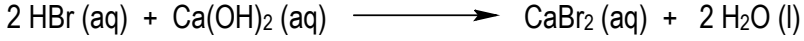
□ The ⇩ amount = limiting reagent, while the ⇧ amount = excess reagent.

CONCEPT: SOLUTION STOICHIOMETRY

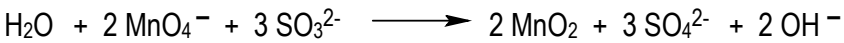
PRACTICE: How many milliliters of 0.325 M HCl are needed to react with 16.2 g of magnesium metal?



PRACTICE: What is the molar concentration of a hydrobromic acid solution if it takes 34.12 mL of HBr to completely neutralize 82.56 mL of 0.156 M $Ca(OH)_2$?



PRACTICE: Consider the following balanced chemical equation:



How many grams of MnO_2 (MW: 86.94 g/mol) will be created when 25.0 mL of 0.120 M MnO_4^- (MW: 118.90 g/mol) reacts with 32.0 mL of 0.140 M SO_3^{2-} (MW: 80.07 g/mol).