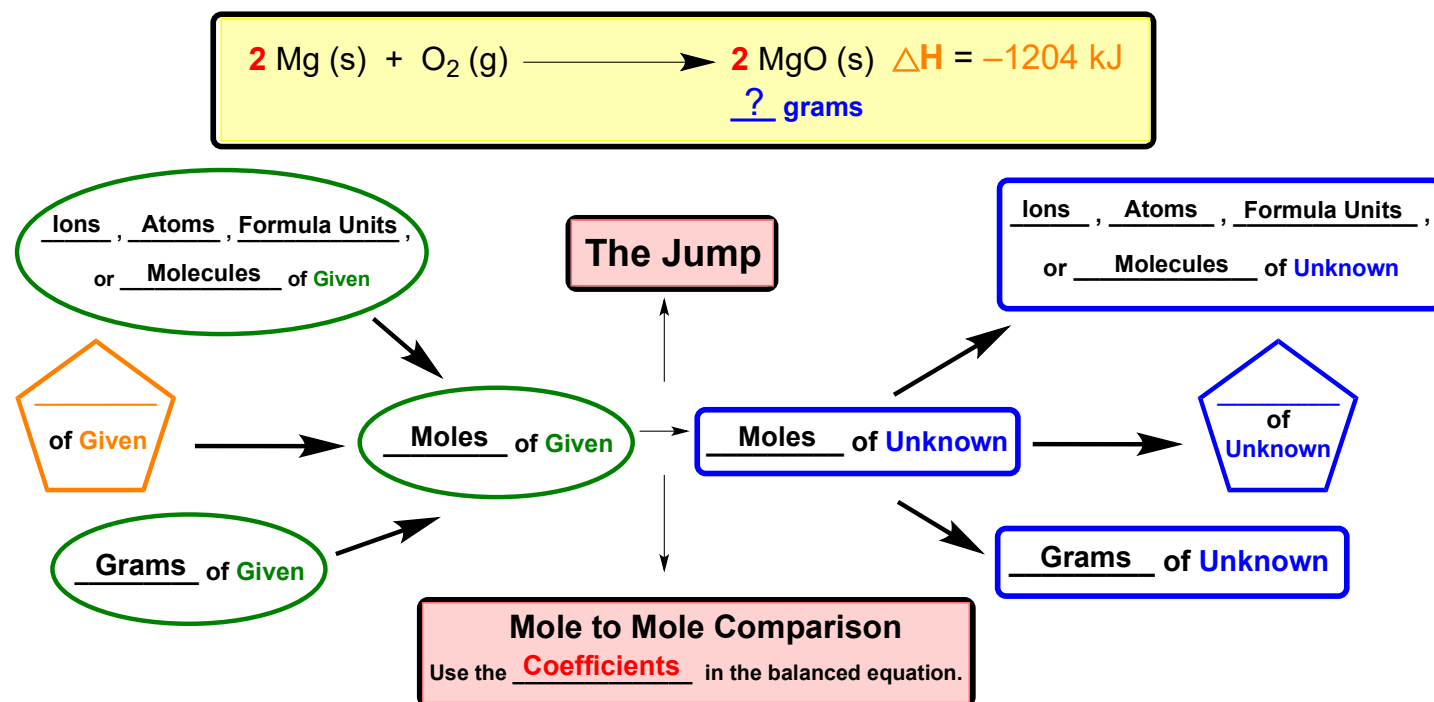


CONCEPT: THERMOCHEMICAL EQUATIONS

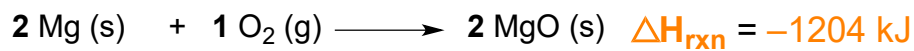
- Recall, stoichiometry deals with the numerical relationship between compounds in a *balanced chemical equation*.
 - Thermochemical Equations** deal with chemical equations that include an enthalpy of reaction (ΔH_{rxn}).

Thermochemical Stoichiometric Chart

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



EXAMPLE: Consider the following thermochemical reaction:



How many grams of MgO are produced during an enthalpy change of -375 kJ ?

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

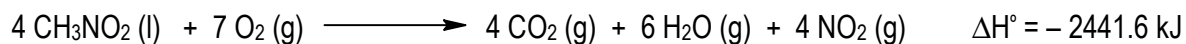
STEP 2: Do a **mole to mole comparison** to convert moles of **given** into moles of **unknown**.

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.

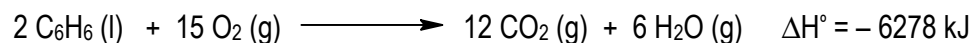
CONCEPT: THERMOCHEMICAL EQUATIONS

PRACTICE: Nitromethane (CH_3NO_2), sometimes used as a fuel for drag racing, burns according to the following reaction:



How much heat is released by burning 125.0 g of nitromethane (MW: 61.044 g/mol)?

PRACTICE: Consider the following reaction:



What volume of benzene (C_6H_6 , $d = 0.880 \text{ g/mL}$, molar mass = 78.11 g/mol) is necessary to evolve $5.19 \times 10^9 \text{ kJ}$ of heat?

PRACTICE: The creation of liquid methanol is accomplished by the hydrogenation of carbon monoxide:



How much heat (in kJ) is released when 125.0 g CO reacts with $2.32 \times 10^2 \text{ g H}_2$?