

Name:
Teacher:
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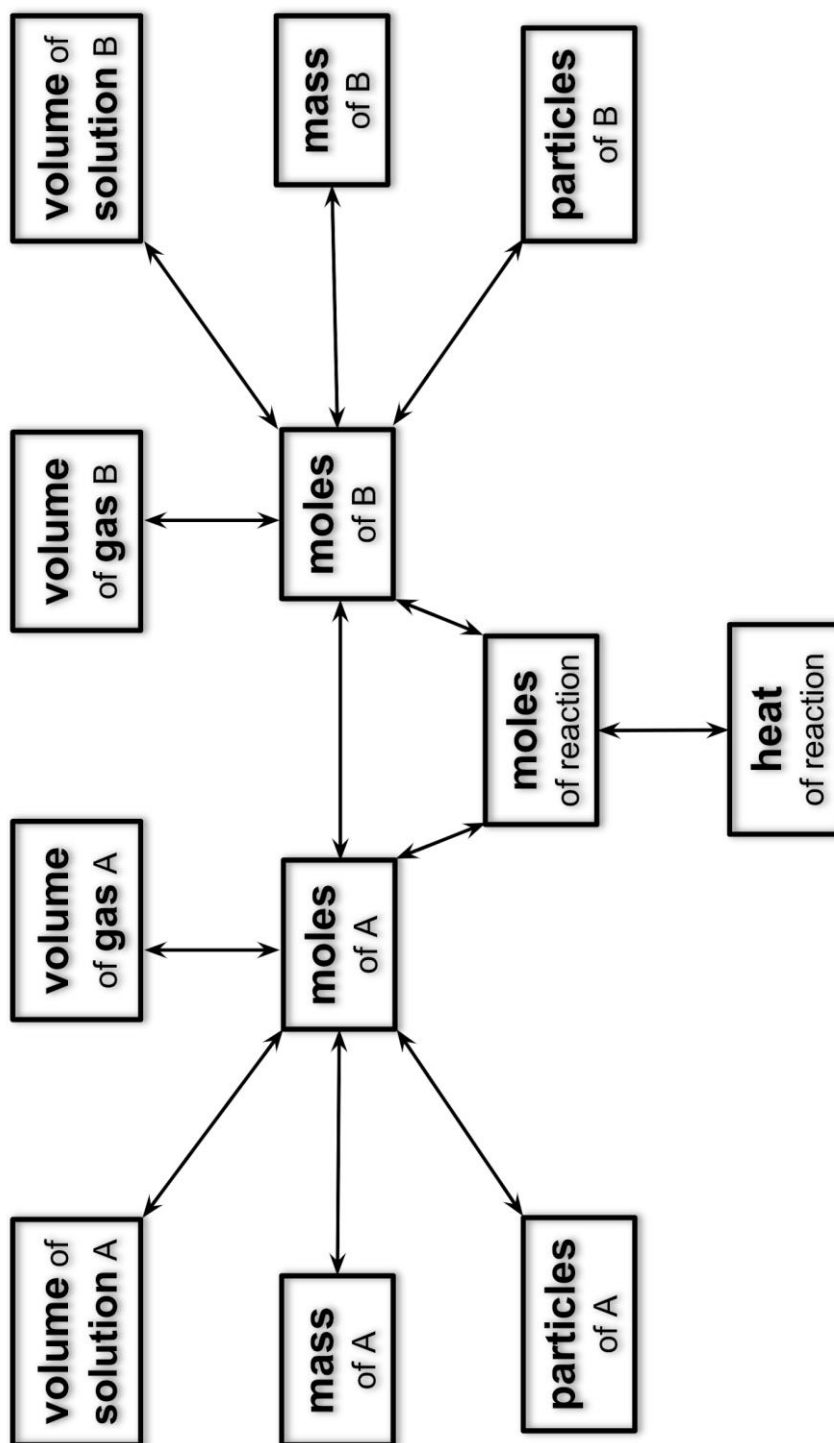
Stoichiometry Map and Practice

(All Conversions)

Unit 4: Chemical Reactions (Notes 3)

AP Chemistry Standards: 4.5 Stoichiometry (all conversions)

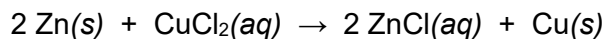
[Video](#) notes, part 1: [Stoich Map](#)



[Video](#) notes, part 2: Example Problems

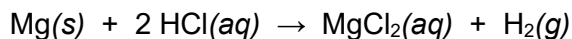
Problem 1: grams $\rightleftharpoons$ moles $\rightleftharpoons$ solution volume

How many milliliters of 0.550 M copper chloride are needed to completely react with 3.20 g of Zn?



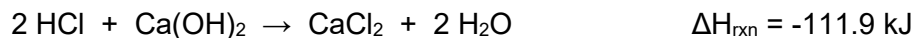
Problem 2: gas volume $\rightleftharpoons$ moles $\rightleftharpoons$ particles

You add a solid strip of magnesium metal to an excess of hydrochloric acid, collecting 45.0 mL of hydrogen gas in an inverted test tube. The temperature in the lab is 21.0 °C, and the pressure is 1.02 atm. How many atoms of magnesium must have reacted?



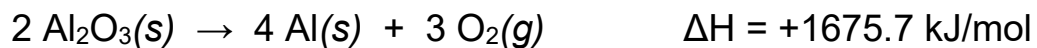
Problem 3: solution volume $\rightleftharpoons$ moles $\rightleftharpoons$ moles of reaction $\rightleftharpoons$ enthalpy

How much energy is released if 20.0 mL of 0.100 M hydrochloric acid reacts with an excess of Ca(OH)_2 ?



Practice Problems:

1. The decomposition of aluminum oxide is shown in the reaction below.



- a. How many grams of solid aluminum can be created decomposing 7.4 g of Al_2O_3 ? (The molar mass of aluminum oxide is 101.96 g/mol.)
- b. If this reaction were to occur at 1.00 atm and 273 K (i.e., at STP), how many liters of gas would be produced by the decomposition of 0.500 mol of aluminum oxide?
- c. *Not all stoichiometry problems are long and complex, of course. Don't be fooled at how short a problem can be! You might even be able to do one in your head from time to time. *cough*hint*cough**
If 0.42 mol of aluminum oxide decomposes, how many moles of elemental aluminum will be produced?
- d. How many kJ of heat would you need to add (e.g., by heating under a Bunsen burner) to decompose 2.00 g of aluminum oxide?

2. You mix 23.7 mL of 0.100 M aqueous aluminum bromide with excess aqueous potassium hydroxide in a test tube. A cloudy, white precipitate (aluminum hydroxide) forms at the bottom of the test tube.

Molecular
Equation:

Particulate
Diagram:

Net Ionic Equation:

How many grams of aluminum hydroxide can this reaction produce?
(The molar mass of $\text{Al}(\text{OH})_3$ is 78.00 g/mol.)

3. You add a 3.20 g strip of magnesium metal to an excess of hydrochloric acid, collecting the hydrogen gas in an inverted test tube. The temperature in the lab is 21.5 °C, and the pressure is 1.11 atm. What volume of hydrogen gas can you collect with this strip of magnesium?

