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| Gas Stoichiometry  CλeMis+ry: http://genest.weebly.com  Stop in for help every day at lunch and Tues, Wed., &Thurs after school!  After-hours question? Email me at home: [eagenest@madison.k12.wi.us](mailto:eagenest@madison.k12.wi.us) |  | Name\_\_\_\_\_\_\_\_\_  Period\_\_\_\_\_\_\_\_ |

Useful information: 0.0821 L atm / mol K = the gas constant “R”

1. Warmup, for people who are rusty with unit conversion. Give the quantity that make each statement true for the reaction **3H2 + N2 → 2NH3**
   1. \_\_\_\_\_\_\_\_\_ grams of N2 = \_\_\_\_\_\_\_\_ moles N2
   2. \_\_\_\_\_\_\_\_\_\_ moles of H2 = \_\_\_\_\_\_\_\_\_ moles NH3
   3. \_\_\_\_\_\_\_\_\_ moles of H2 = \_\_\_\_\_\_\_\_ grams H2
   4. \_\_\_\_\_\_\_\_\_\_ moles N2 = \_\_\_\_\_\_\_\_\_ moles NH3
   5. \_\_\_\_\_\_\_\_\_\_ mmHg = \_\_\_\_\_\_\_\_\_ atm
   6. \_\_\_\_\_\_\_\_\_\_ kPa = \_\_\_\_\_\_\_\_\_\_ atm

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| 1. This Friday in lab you will place a strip of magnesium in hydrochloric acid.   Perhaps you will start with a strip of magnesium that weighs 0.53 g, and the conditions in the classroom when you perform the experiment will be 746 mmHg and 26.4C. It might occur to you to wonder what volume of hydrogen gas will be produced. Let’s solve that problem. |  |

* 1. Step one, write a balanced equation.

\_\_\_\_ Mg(s) + \_\_\_\_ HCl(l) → \_\_\_\_\_ H2 (g) + \_\_\_\_\_ MgCl2(s)

* 1. Step two, use unit conversions to convert the mass of metal into the moles of hydrogen.

* 1. Use PV = nRT to find how many moles of hydrogen this will be. You will first need to fix the units of temperature.

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| 1. If you try a reaction where you put a chunk of iron that weighs 5.58 g, into aqueous hydrochloride and it forms Iron(III) Chloride and hydrogen gas, and and the conditions in the classroom when you perform the experiment are 746 mmHg and 20.5C. Do the following steps to find the volume of gas produced.    1. Step one, write a balanced equation. |  |

* 1. Using your balanced equation from (a), do a unit conversion calculation to convert grams of iron used in the reaction into moles of hydrogen gas produced.
  2. Use PV = nRT to find the volume of the moles you found in (b). Watch out for the temperature units.

1. Red phosphorus, P4, reacts with 0.250 L oxygen at 30.2°C and 133.6 kPa to produce how many moles of P4O10?
   1. Write a balanced equation.
   2. Use PV = nRT to find how many moles you have of the oxygen. [Hint: you must first fix your units for pressure and temperature to agree with the units of our constant, R]
   3. Do a series of unit conversions to answer the question.