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| *Errors and Predicting Moles Yield*  CλeMis+ry: http://genest.weebly.com  Stop in for help every day at lunch and Tues &Thurs after school! |  | Name\_\_\_\_\_\_\_\_\_\_\_\_\_  Period\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Part 1: Solving a concentration problem in a single line.**

It will often be helpful to set up our story problems using a single line calculation.

1. A solution was mixed up that contained 344 grams of sodium chloride (table salt) per 1700 mL of aqueous solution. If a chemist took 6 squirts of this substance using a pipette that holds 1.3 mL and then she evaporated it in a crucible, how many grams of salt should she expect to obtain?
2. A solution was mixed up that contained 40.6 grams of sodium chloride (table salt) per 568 mL of aqueous solution. If a chemist took 5 squirts of this substance using a pipette that holds 2.1 mL and then she evaporated it in a crucible, how many grams of salt should she expect to obtain?

**Part 2: Deciding what effect an error has**

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|  | Dr. Roosevelt mixed up some brine by stirring 429 grams of sodium chloride into enough water to make 788 mL of solution. She then took a clean 48.83 gram crucible filled and filled it by completely emptying a pipette 5 times into the crucible (a pipette that holds 1.2 mL). Heating this until all of the water evaporated resulted in a dry crust of salt in her crucible. Her cooled crucible, with salt, weighed 50.55 grams. |

1. Draw a picture or a table to organize your data from above.
2. What mass of dry salt *should* she have recovered according to your theoretical calculations? (Set up your calculation in a single line if possible, like we did in class--it will make the next part *much* easier to solve.)

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1. Based on her scale readings, how many grams of salt did she actually recover?

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1. Did she recover more or less than was expected in a perfect experiment?

***Look carefully at your answer for 5 and consider the following possibilities.***

1. During heating, tipping occurred, causing some brine solution to spill out from the crucible!

This would make her result accidentally (too small / still accurate / too large )!

1. Heating stopped too soon. The stuff was still wet when it got weighed.

This would make her result accidentally (too small / still accurate / too large )!

1. During the first weighing of the empty crucible, the scale wasn't tared (zeroed). The scale read 0.2 g even with nothing on it.

This would make her result accidentally (too small / still accurate / too large )!

1. Popping and sputtering occurred and much liquid shot out during heating.

This would make her result accidentally (too small / still accurate / too large )!

1. Two grams of sand from 1998 was stuck in the old crucible. It remained there for the entire experiment

This would make her result accidentally (too small / still accurate / too large )!

1. The pipette, when you re-checked it, was *actually* a 0.9 mL pipette.

This would make her result accidentally (too small / still accurate / too large )!

**Part 3: Predicting how many moles of product should form.**

1. How many moles of hydrogen gas will be produced if 2.5 moles of calcium hydride react according to the following equation?

CaH2 + 2 H2O → Ca(OH)2 + 2 H2

Before  
  
Change  
   
After

1. How many moles of water will be produced if 0.45 mol of oxygen reacts according to the following equation?

2 C6H6 + 15 O2 → 12 CO2 + 6 H2O?

Before  
  
Change  
   
After

**Part 4: How well did the results come out for some of the previous problems?**

1. If the chemist in Problem #1 on this homework actually obtained 1.4g of product, calculate their percent error.
2. If the chemist in Problem #13 actually produced 5.2 moles of hydrogen gas, calculate percent error
3. Calculate the percent error for Eleanor Roosevelts experiment in #4 and #5