Chem 108
Lab
Week 17

- **Sit @ your original Lab Drawer Station:** ***the one that you signed in for @ the beginning of the semester.***

Pick up:

- **your pink inventory sheet**
- **a padlock**
- **a tag for your combination lock if you don't have the one that came with it @ the beginning of the semester**

Chem 108

Synthesis of Aspirin

Due Today

Name: _____

Section: _____

Report Form – Preparation of Aspirin

Mass, salicylic acid	
Mass, container + aspirin	
Mass, container	
Mass, aspirin*	
Theoretical yield*	
Percent yield*	

Show the calculations for each of the entries in the Data Table marked with * on the calculations page.

Weigh Aspirin

Complete Part B

Calculate % Yield

Complete Report Form pp. 90-91 Provide labeled Calculation of % Yield & answers to questions pg. 91

Percent Yield

- **In synthesis as in any experiment, it is very difficult and at most times impossible to be perfect. Therefore the actual yield (g) is measured and compared to the theoretical calculated yield (g). This is the percent yield:**

- **% Yield = actual (g) / theoretical (g) x 100**

Theoretical (Yield) Mass Calculations
Reactant → Product

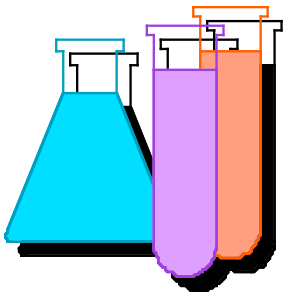
grams (Reactant) → grams (Product)

Moles

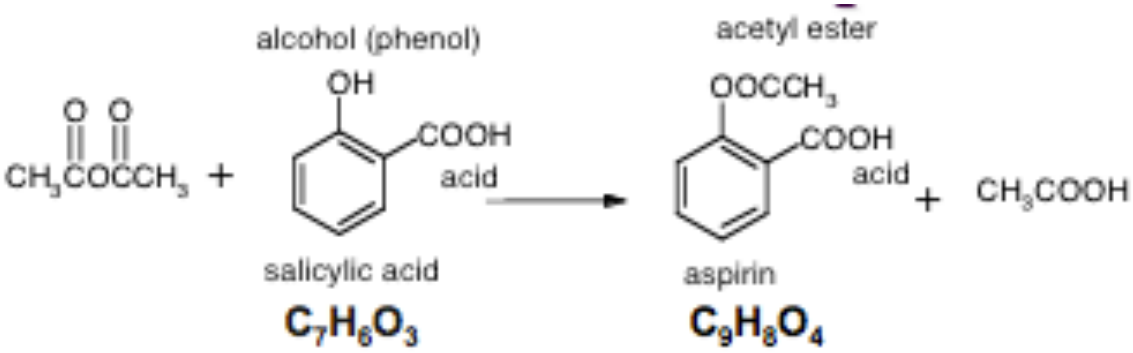
Molar Mass

Stoichiometry

grams (R)	1 mol (R)	? mol (P)	grams (P)	= ? grams (P)
	grams (R)	? mol (R)	1 mol (P)	
	(*Divide*) by Molar Mass (R)	*"Gatekeepers" from Balanced reaction*	(*Multiply*) by Molar Mass (P)	



Theoretical Yield Example:



grams (Salicylic Acid) ⟶ grams (Aspirin)

Moles
Molar Mass
Stoichiometry

$C_9H_8O_4$
MW = 180.15

6.00 grams (SA) | **1 mol (SA)** | **1 mol A** | **grams (A) (Molecular Weight A)** = **? (A)**

grams (SA) (Molecular Weight SA) | **1 mol SA** | **1 mol (A)**

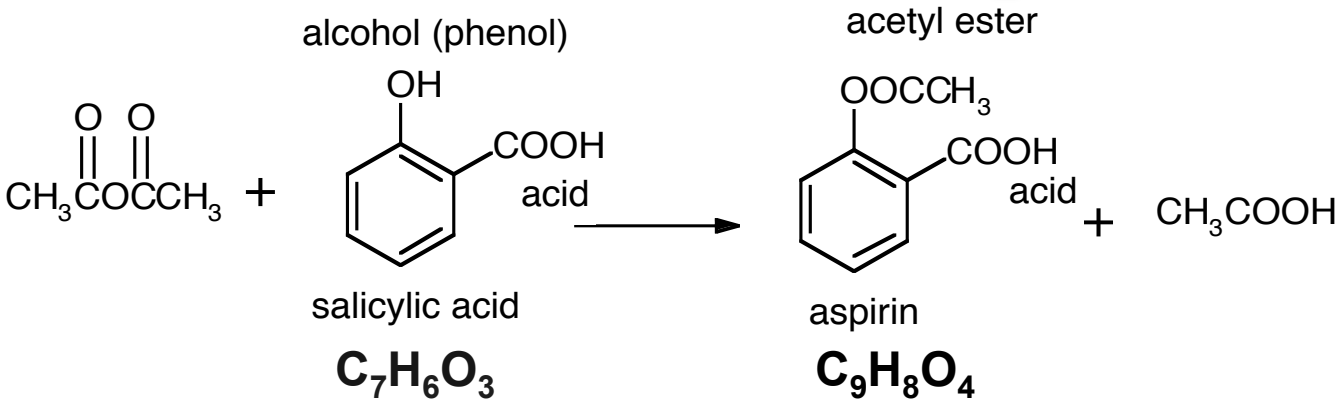
"Gatekeeper"

$C_7H_6O_3$

MW = 138.12

7.83 g aspirin

Percent Yield Example:



grams (Salicylic Acid) → **7.83 g** **grams (Aspirin)** Theoretical

Report Form – Preparation of Aspirin

Mass, salicylic acid	6.00 g
Mass, container + aspirin	84.60 g
Mass, container	77.69g
Mass, aspirin*	6.91 g
Theoretical yield*	7.83 g
Percent yield*	88.3 %

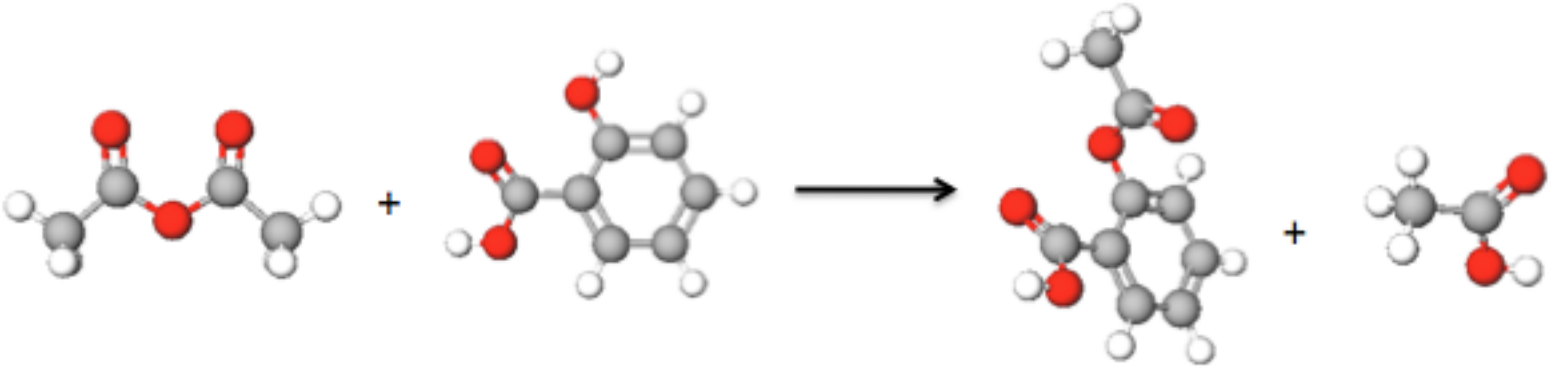
Show the calculations for each of the entries in the Data Table marked with * on the calculations page.

% Yield = actual (g) / theoretical (g) x 100

% Yield = (6.91g) / (7.83 g) x 100 = 88.3%

QUESTION

- **What is the % Yield of aspirin produced from 5.00 g of salicylic acid reacting with an excess of acetic anhydride, $C_4H_6O_3$ to yield 5.26g of aspirin?**
- **Balanced Equation:**



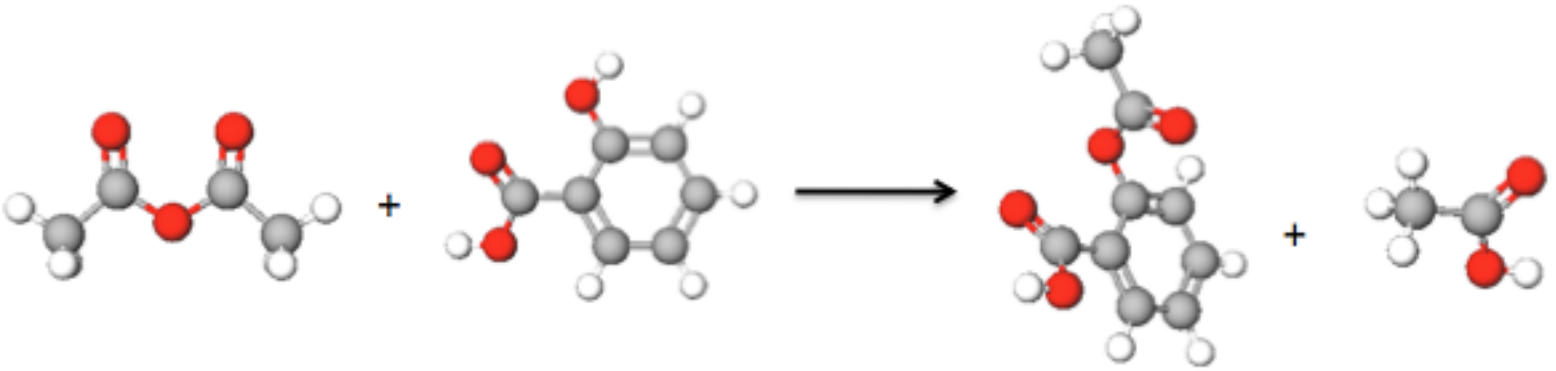
salicylic acid

aspirin

$C_4H_6O_3$	$C_7H_6O_3$	$C_9H_8O_4$	$C_2H_4O_2$
MW = 102.09	MW = 138.12	MW = 180.15	MW= 60.05

Answer (Part 1)

- **How many grams of aspirin can be theoretically produced from 5.00 g of salicylic acid reacting with an excess of acetic anhydride, $C_4H_6O_3$?**
- **Balanced Equation:**



salicylic acid

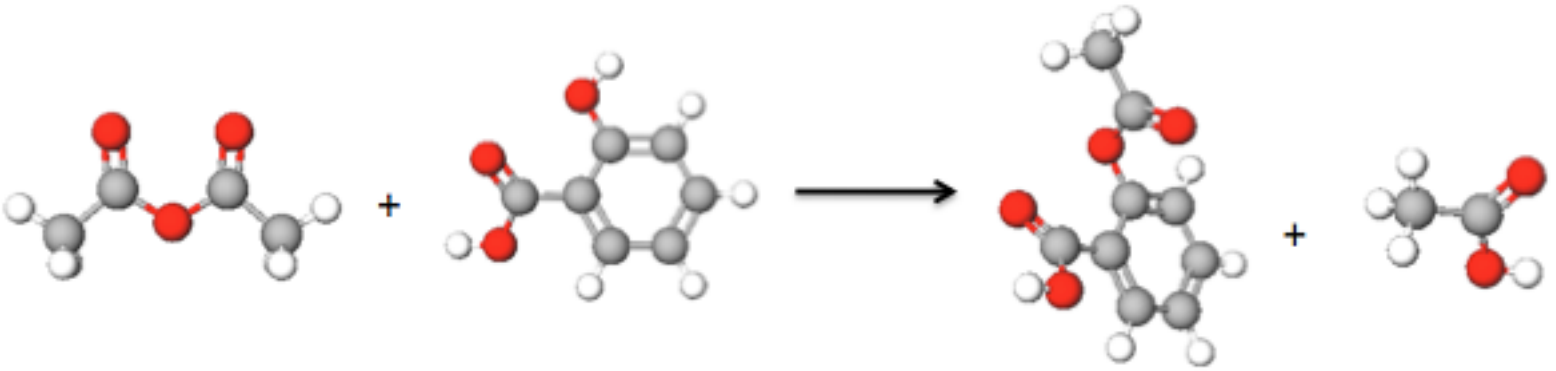
aspirin

$C_4H_6O_3$	$C_7H_6O_3$	$C_9H_8O_4$	$C_2H_4O_2$
MW = 102.09	MW = 138.12	MW = 180.15	MW= 60.05

A) 3.26 g **B) 5.00 g** **C) 6.52 g** **D) 7.83 g**

Answer (Part 2)

- **What is the percent yield based on the answer to Part 1, and actually obtaining 5.26 g?**
- **Balanced Equation:**



salicylic acid

aspirin

$C_4H_6O_3$	$C_7H_6O_3$	$C_9H_8O_4$	$C_2H_4O_2$
MW = 102.09	MW = 138.12	MW = 180.15	MW= 60.05

A) 65.2% **B) 80.7%** **C) 100%** **D) 105.2%**

Percent Yield

- **Calculate the % Yield:**
  actual yield (g) versus the theoretical calculated yield (g).

- **% Yield = actual (g) / theoretical (g) x 100**

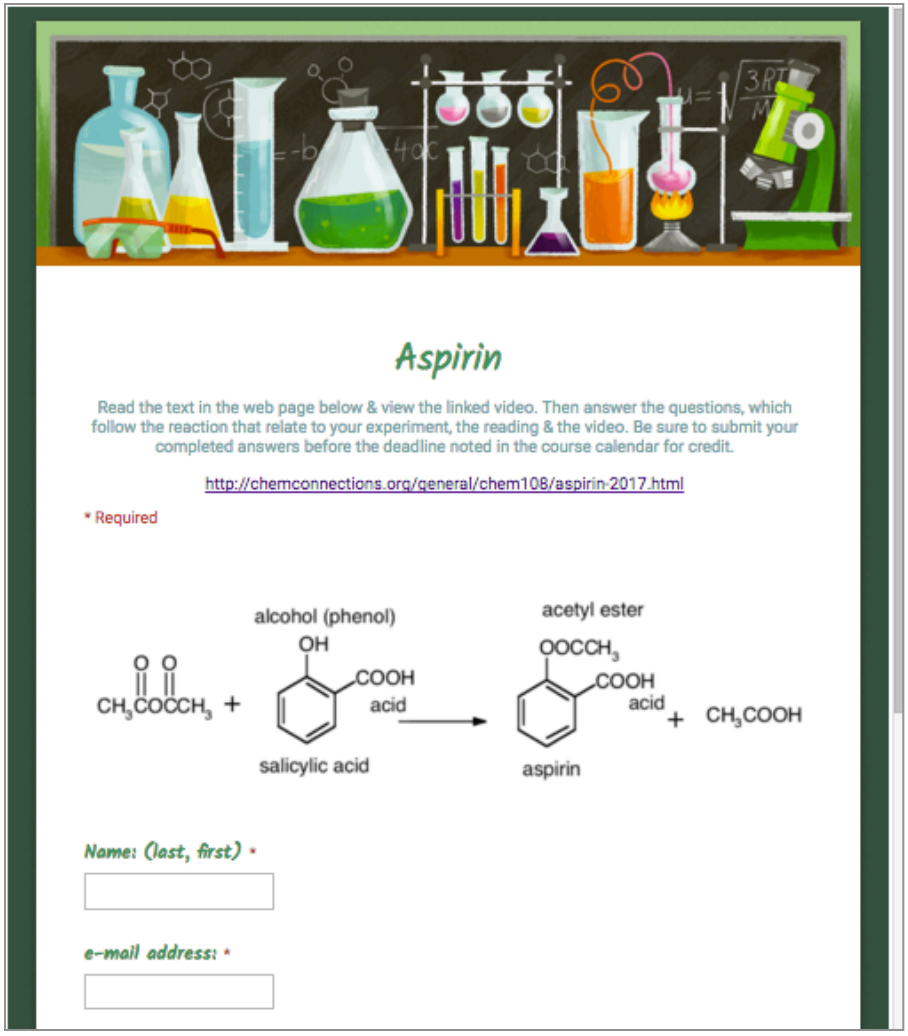
Weigh crude aspirin & calculate % yield.

$FeCl_3$ & Starch Tests

Complete Part B; record your results.

Turn in individual Report Form pp.90-91 with partner's name(s).

Post Lab Questions
Due on-line



Aspirin

Read the text in the web page below & view the linked video. Then answer the questions, which follow the reaction that relate to your experiment, the reading & the video. Be sure to submit your completed answers before the deadline noted in the course calendar for credit.

http://chemconnections.org/general/chem108/aspirin-2017.html

* Required

Name: (last, first) *

e-mail address: *

http://chemconnections.org/general/chem108/Aspirin%20Guide.html

Check in lab drawer

Chem 108: Class/ Lab

(Return any loaned i-clickers)

1. Check that you have everything on the pink inventory sheet: clean & not broken; dispose of any broken glass in the broken glass container.
2. Replace the paper @ the bottom of the drawer with clean paper towel.
3. Note any missing equipment on the pink sheet., then replace all equipment in the drawer. Take a tag, write the combination number on the tag & fasten to lock.
4. Write your name on the blackboard. Dr. R. will check pink sheet & sign off.
5. Take the signed pink form and combination lock to the stockroom. . This completes your lab in Chem 108.
6. Thank you, and best wishes.