

USING MOBILE DEVICES TO CONDUCT PRE- LABORATORY EXERCISES

Dr. Kendrew K. W. Mak
Department of Chemistry



Supported by:
Course Development Grants (2011-12)

BASIC GOAL OF OUR UNDERGRADUATE PROGRAM



Students finished high schools



Undergraduate training



Professional and Independent Chemists



CHEMISTRY IS AN EXPERIMENTAL SCIENCE

**Chemistry is an experimental science –
Laboratory training is very important.**

Year 1: 4 x 2-units lab courses

Year 2: 5 x 2-units lab courses

Year 3: 1 x 2-units lab course
+ 1 x 4-units FYP

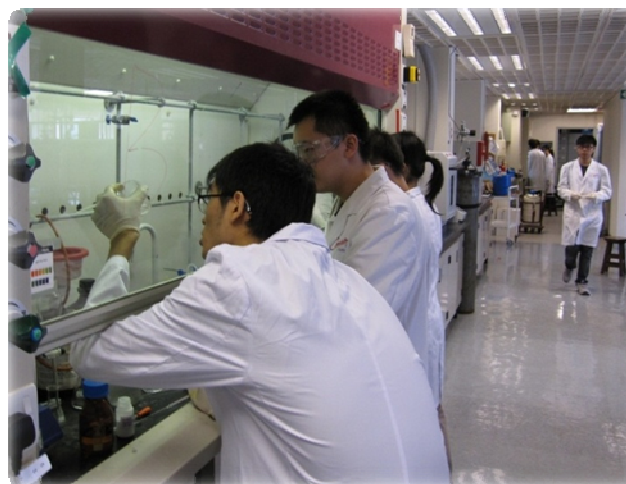
(Total: 24 units)
(1/3 of the major requirement)

- Students should acquire a good level of lab skills for developing their career.
- Develop their skills for chemical research.



IN THE LAB COURSES, WE TRAIN STUDENTS TO

- acquire chemical knowledge through hands-on experiments
- acquire the technical skills to carry out chemical investigations
- acquire the skills to record the experimental details and data precisely and concisely
- acquire the skills to plan (and design) an experiment
- analyze and draw conclusions from the experimental data



To Be Professional and Independent Chemists

PREPARATIONS BEFORE THE LAB SESSION

- Understand the chemical principles and the objectives of the experiment
- Understand the purposes of the experimental procedures
- Perform pre-lab calculations
- Identify the important observations and data that should be taken
- Predict the expected results of the experiment from theory
- Have a good time management plan
- Aware of the necessary safety precautions

Experiment 1 Grignard Reaction - Synthesis of Triphenylcarbinol

Experiment 1 Grignard Reaction - Synthesis of Triphenylcarbinol

Tasks

1. To prepare the Grignard reagent phenylmagnesium bromide from bromobenzene and magnesium metal.
2. To synthesize triphenylcarbinol from benzophenone and phenylmagnesium bromide by the Grignard reaction.

Learning Objectives

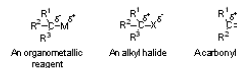
1. The preparation of Grignard reagents.
2. The application and the reaction mechanism of the Grignard reaction.
3. The technique of carrying out anhydrous reaction.

Before Coming into the Laboratory

1. Read the MSDS (Material Safety Data Sheet) of the chemicals used in this experiment. Familiarize yourself with the toxicity and suggested precautions of the chemicals involved in this experiment.
2. Familiarize yourself with the Grignard reaction.
3. Familiarize yourself with the experimental procedure that you are going to carry out, particularly the precautions for carrying out anhydrous reactions.

Introduction

Organomagnesium compounds (RMgX), which are commonly called the Grignard reagents, belong to an important class of compounds known as organometallic compounds which contain carbon-metal bonds. The polarization of the bond between the carbon atom and the electropositive metal in these reagents renders the carbon atom electron-rich, and the carbon atom bears a partial negative charge, δ^- . Thus, one of the applications of organometallic reagents is that the carbon atom serves as a nucleophile in chemical reactions. In contrast when a carbon atom is bonded to electro- halogen atoms as in alkyl halides or oxygen atom in carbonyl or deficient and possesses a partial positive charge. Such electrophiles in chemical reactions.



Because of their nucleophilic character, Grignard reagents in reactions that produce new carbon-carbon bonds, often used to prepare secondary alcohols, from aldehydes and ketones. The Grignard reagent also reacts twice with esters to give tertiary alcohols or carboxylic acids by reacting with carbon dioxide.

CHEM 3810 Organic Chemistry Laboratory II - CUNY (2012-2013)

Experiment 1 Grignard Reaction - Synthesis of Triphenylcarbinol

Experimental Procedure

Preparation of Phenylmagnesium Bromide

Precautions:

- Diethyl ether is extremely flammable and volatile.
- Grignard reagents react readily with water. All reagents, solvents and apparatus used for their preparation must be thoroughly dry. Protect the glassware and reagents from water and moisture. Use anhydrous ether for the reaction solvent. Rinse the glassware with acetone and dry them thoroughly.
- The reaction of aryl halides with magnesium metal is exothermic. Prepare an ice-water bath before initiating the reaction in case you need to moderate the reaction rate.
- The anhydrous diethyl ether used in this experiment is stored in metal cans, and the cap should always be put on to prevent evaporation, contamination by moisture and oxygen, and accidental fire.

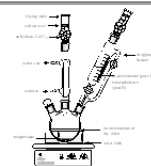
Prepare the Grignard reagent in a 250 mL 3-necked round-bottomed flask that fitted with a water condenser and an addition funnel as shown in the figure. Pack two drying tubes with lumps of calcium chloride and fit them to the top of the condenser and the addition funnel. Place dry magnesium turnings (0.5 g, 0.021 mol) into the flask.

Make an ice bath available for cooling down the reaction in case of the reaction becomes too vigorous. Dissolve bromobenzene (2.3 mL, 0.4 g, 0.006 mole) in anhydrous diethyl ether (5 mL) and transfer the solution to the addition funnel. Add 1-mL of the aryl halide solution to the magnesium turnings and stir the resulting mixture.

You can tell the reaction has started if small bubbles form at the surface of the magnesium turnings or if the mixture becomes slightly cloudy. The flask should also become slightly warm.

Optional Step: If the reaction does not start smoothly, warm the mixture gently for several minutes. If it does not work, contact your demonstrator. You may add a small crystal of iodine or 2-3 drops of 1,2-dibromobenzene to the mixture to facilitate initiating the reaction.

Once the reaction has started, warm the reaction mixture to attain gentle reflux. Add about 10 mL of anhydrous ether to the reaction mixture. The rest of the halide-ether solution can now be added dropwise to the stirred reaction mixture at a rate that is just sufficient to maintain a gentle reflux. Maintain the mixture to gentle reflux while adding the halide-ether solution. The addition may take about 5-10 min. Add extra anhydrous diethyl ether, if necessary, so that there is at least about 15 mL of solution present in the flask. After the addition has completed, heat the mixture under gentle reflux for 15 min. It is normal if there is a small amount of metal in



Try these steps if the reaction does not start.

Prepare an ice-water bath to moderate the reaction.

CHEM 3810 Organic Chemistry Laboratory II - CUNY (2012-2013)

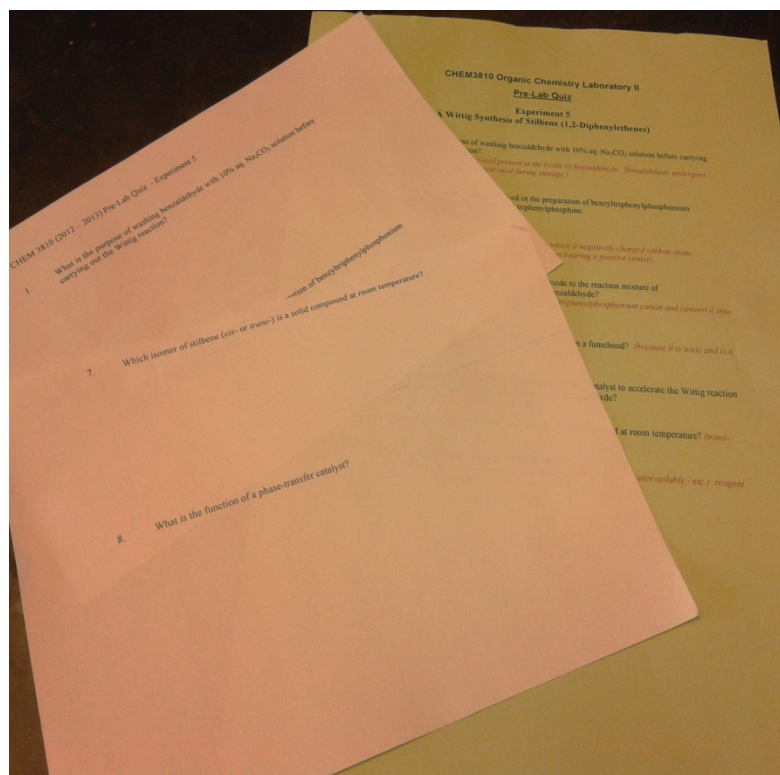
8

PREPARATIONS BEFORE THE LAB SESSION

- Prepare a flowchart for the experimental procedure
- Draft the data sheet
- Pre-lab quiz

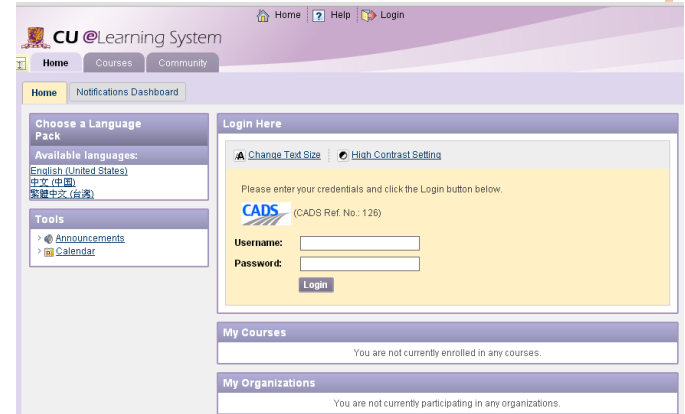
Pre-lab quiz

- 2 - 5% of the total course marks
- Chemical principles, purposes of the procedure, pre-lab calculations, safety issues, etc.
- MC / short questions
- Traditionally, pen/paper quiz, in the first 10 minutes of the lab sessions



STARTING FROM 2012-2013 ON-LINE PRE-LAB QUIZ

Availability of Technologies



Objectives of Switching to On-Line

- Streamline the course administrations and conduction
- Provide flexibility to students
- Allow the TAs to know the performance of the students before the students come to the lab

Support

Course Development Grants (2011-2012)



ASSESSMENT TOOLS IN THE NEW BLACKBOARD LEARN SYSTEM

COURSE MANAGEMENT

- Control Panel
- Content Collection
- Course Tools
 - Announcements
 - Blogs
 - Collaboration
 - Contacts
 - Course Calendar
 - Course Portfolios
 - Discussion Board
 - Glossary
 - Journals
 - McGraw-Hill Higher Education
 - Messages
 - Rubrics
 - Self and Peer Assessment
 - Send Email
 - Tasks
 - Tests, Surveys, and Pools
 - Wikis
 - WileyPLUS

CHEM 2850A (G...)

Expt 1
Expt 2
Expt 3 (Long Re
Expt 4
Expt 5
Expt 6
Expt 7 (Long Re

CHEM 2850A (Gr...)

Expt 1
Expt 2
Expt 3 (Long Re
Expt 4
Expt 5
Expt 6
Expt 7 (Long Re

Success: test pool created.

Pool Canvas: test pool

The Pool Canvas presents an inventory list of questions that can be managed and change the points for them. [More Help](#)

Create Question Find Questions Upload Questions

- > Calculated Formula
- > Calculated Numeric
- > Either/Or
- > Essay
- > File Response
- > Fill in Multiple Blanks
- > Fill in the Blank
- > Hot Spot
- > Jumbled Sentence
- > Matching
- > Multiple Answer
- > Multiple Choice
- > Opinion Scale/Likert
- > Ordering
- > Quiz Bowl
- > Short Answer
- > True/False

Create Question drop-down list.



THE QUIZ

- **Question type** : Multiple choice
- **Question bank** : 8 – 12 MC questions for each experiment
- **Students to answer** : 2 questions randomly picked from the pool by the e-learn platform
- **Ordering of the answer options** : randomized

Displaying 1 to 8

<input type="checkbox"/>	<u>Question Text</u>	<u>Question Type</u>	<u>Default Points</u>
<input type="checkbox"/>	Question 1: How many valence electrons does the boron atom in BH ₃ have? ▾	Multiple Choice	-
<input type="checkbox"/>	Question 2: What is the geometry of the BH ₃ molecule? ▾	Multiple Choice	-
<input type="checkbox"/>	Question 3: A toxic gas will be formed if NaBH ₄ is mixed with diluted sulphuric acid. ... ▾	Multiple Choice	-
<input type="checkbox"/>	Question 4: How many lone pair of electrons does the boron atom in BH ₃ accept when for... ▾	Multiple Choice	-
<input type="checkbox"/>	Question 5: Which of the following explains why the borane-amine adduct is not directly... ▾	Multiple Choice	-
<input type="checkbox"/>	Question 6: What is the technique to be carried out in the experiment to purify the pro... ▾	Multiple Choice	-
<input type="checkbox"/>	Question 7: Which of the following is not a potential hazard of BH ₃ (B ₂ H ₆)? ▾	Multiple Choice	-
<input type="checkbox"/>	Question 8: Which of the following is the reaction solvent to be used for synthesizing ... ▾	Multiple Choice	-

Displaying 1 to 8 of 8 items | Show All Edit



THE QUIZ

- Lab sessions start at 2:30 pm
- Quiz available : 8:00 am – 2:00 pm on the same day
- Adaptive Release – to control
who can access and do the quiz
when they can see and do the quiz

Adaptive Release

Create an Adaptive Release rule for this content item. Each criterion narrows the availability of this item to users. To create multiple rules on an item or delete this rule, use Adaptive Release: Advanced.
Content Status: Available

Cancel Submit

1. Date

Setting a Date criterion for this item will restrict the dates and times of the visibility of this item.

Choose Date

Display After 10/15/2012 08:00 AM
Enter dates as mm/dd/yyyy. Time may be entered in any increment.

Display Until 10/15/2012 02:00 PM
Enter dates as mm/dd/yyyy. Time may be entered in any increment.

2. Membership

This content item is visible to all users until a Membership criterion is created. Users must be specified in the Username list or must be in a course group.

Username Browse...

Enter one or more Username values or click **Browse** to Search. Separate multiple Username values with ;

Course Groups

Items to Select	Selected Items
2012R1-CHEM2650AL01	A10_A12
2012R1-CHEM2650BL01	A13_A16
A01_A03	A16_A18
A04_A06	
A07_A09	
B01_B03	
B04_B06	
B07_B09	

Invert Selection Select All Invert Selection Select All

- Each student can only complete the quiz once
- They can do the paper version in the lab if they missed the online version

Setting a Date criterion for this item will restrict the dates and times of the visibility of this item.

Display After 10/15/2012 08:00 AM
Enter dates as mm/dd/yyyy. Time may be entered in any increment.

Display Until 10/15/2012 02:00 PM
Enter dates as mm/dd/yyyy. Time may be entered in any increment.

THE QUIZ RESULTS

Retrieve the quiz results from the Grade Center (*Create Smart Views Shortcuts*)

The screenshot displays the CU@Learning System interface for the course 2012R1-CHEM250AB: Inorganic Chemistry Laboratory I. The main area shows the Grade Center for section A2, with a table of quiz results. The table has columns for Quiz 1A through Quiz 6A_1 and rows for individual students. A 'No Grade' tooltip is visible over the bottom row. On the left, a 'COURSE MANAGEMENT' sidebar shows the 'Grade Center' section expanded, listing 'Needs Grading' and 'Full Grade Center' with sub-items A1 through A5. A 'Control Panel' is also visible at the top of the sidebar.

Quiz 1A	Quiz 2A_1	Quiz 3A_1	Quiz 4A_1	Quiz 5A_1	Quiz 6A_1
0.00	10.00	10.00	20.00	10.00	20.00
20.00	10.00	20.00	20.00	20.00	20.00
20.00	20.00	20.00	20.00	10.00	10.00
10.00	10.00	20.00	20.00	10.00	10.00
--	10.00	20.00	20.00	20.00	20.00
--	20.00	--	20.00	20.00	10.00

The results are provided to the TAs at the beginning of the lab sessions

DOWNLOAD THE STUDENTS' MARKS FOR PROCESSING AND GRADING

[More Help](#)

Column ▾ Manage ▾ Reports ▾ Filter Work Off

Sort Columns By: Layout Position ▾

Last Saved: November 14, 2012

Quiz 1A ▾	Quiz 1B ▾	Quiz 2A_1 ▾	Quiz 2A_2 ▾	Quiz 2B_1 ▾
--	20.00	--	--	20.00
	--	10.00	--	--
--	--	20.00	--	--
--	--	--	--	--
--	20.00	--	--	20.00
--	20.00	--	--	20.00
--	20.00	--	--	20.00
--	20.00	--	--	20.00
--	10.00	--	--	--
20.00	--	20.00	--	--
--	--	--	--	--
--	--	10.00	--	--
--	20.00	--	--	20.00



COURSES PARTICIPATED IN 2012-2013

1st Semester

- CHEM 2850 – Inorganic Chemistry Laboratory I
(Compulsory course for 1st year students – 3-year curriculum)
- CHEM 3810 – Organic Chemistry Laboratory II
(Compulsory course for 2nd year students – 3-year curriculum)

2nd Semester

- CHEM 2820 – Organic Chemistry Laboratory I
(Compulsory course for 1st year students – 3-year curriculum)
- CHEM 3820 – Organic Chemistry Laboratory III
(Compulsory course for 2nd year students – 3-year curriculum)

Enrolment of each course: ~ 65 - 75



STUDENTS' VIEW

Blackboard Learn - CUHK

https://elearn.cuhk.edu.hk/webapps/portal/frameset.jsp?tab_group=courses&url=%2Fwebapps%2Fblackboard%2Fexec

Windows Media Windows 免費的 Hotmail 自訂連結 Particulate matter Chemistry Olympiad Nature Contents Vol

DUMMY s1 STUDENT Account My Places Home Help Logo

CU @ Learning System

Home Courses Community

2012R1-CHEM3810AB : Organic Chemistry Laboratory II (2012R1-CHEM3810AB) Course Content > Expt 1 Grignard Reaction - Synthe

2012R1-CHEM3810AB : Organic Chemistry Laboratory II (2012R1-CHEM3810AB)

Notifications
Announcements

Course Content

Discussion Board
Email
Groups

My Grades

Table of Contents

Page 1 of 5

- Pre Lab Talk PPT for Expe
- Triphenylcarbinol 1H NMR
- Triphenylcarbinol with D2O
- Triphenylcarbinol 13C NMR
- Pre-Lab Quiz 1A

Pre Lab Talk PPT for Expe

This link only appear during the time specified in “adaptive release”





Take Test: Pre-Lab Quiz 1A

Description

Instructions

Timed Test This Test has the time limit of 10 minutes. This Test will save and submit automatically when the time expires. Warnings appear when **half the time, 5 minutes, 1 minute**, and **30 seconds** remain.

Multiple Attempts Not allowed. This Test can only be taken once.

Force Completion Once started, this Test must be completed in one sitting.

This Test does not allow backtracking. Changes to the answer after submission are prohibited.



Remaining Time: **9 minute, 55 seconds.**

Question Completion Status:

Moving to the next question prevents changes to this answer.

Question 1 of 2 >

Question 1

10 points

Save Answer

In the experiment, which of the following steps are exothermic?

- (i) Reaction of magnesium with bromobenzene
- (ii) Reaction of phenylmagnesium bromide with benzophenone
- (iii) Addition of ammonium chloride to the magnesium salt of triphenylcarbinol

- A. (i) and (ii) only
- B. (i) and (iii) only
- C. (ii) and (iii) only
- D. (i), (ii) and (iii)

Moving to the next question prevents changes to this answer.

Question 1 of 2 >

FEEDBACKS TO STUDENTS

2012R1-CHEM3810AB : Organic Chemistry Laboratory II (2012R1-CHEM3810AB) Course Content > Expt 1 Grignard Reaction - Synthesis of Triphenylcarbinol

2012R1-CHEM3810AB : Organic Chemistry Laboratory II (2012R1-CHEM3810AB)

Notifications

Announcements

Course Content

Discussion Board

Email

Groups

My Grades

Review Test Submission: Quiz 1A

User	DUMMY s1 STUDENT Account
Course	2012R1-CHEM3810AB : Organic Chemistry Laboratory II (2012R1-CHEM3810AB)
Test	Quiz 1A
Started	11/14/12 6:17 PM
Submitted	11/14/12 6:17 PM
Status	Completed
Score	20 out of 20 points
Time Elapsed	0 minute out of 10 minutes.
Instructions	

Wednesday, November 14, 2012 6:17:41 PM CST



DO STUDENTS LIKE DOING THE QUIZ ONLINE?

No. of students completed the quiz on Blackboard Learn

CHEM 2850 – Inorganic Chemistry Laboratory I
(*1st year students – 3-year curriculum, Class size = 67*)

Experiments	1	2	3	4	5	6
No. of students (%)	48 (72%)	55 (82%)	55 (82%)	58 (87%)	60 (90%)	58 (87%)

CHEM 3810 – Organic Chemistry Laboratory II
(*2nd year students – 3-year curriculum, Class size = 72*)

Experiments	1	2	3	4	5	6
No. of students (%)	38 (53%)	43 (60%)	45 (63%)	39 (54%)	42 (58%)	42 (58%)



IMPROVEMENTS UNDERWAY: DETAILS OF STUDENTS' ANSWERS

From the Grade Center / Smart Views

Quiz 1A	Quiz 2A_1	Quiz 3A_1	Quiz 4A_1	Quiz 5A_1	Quiz 6A_1
0.00	10.00	10.00	20.00	10.00	20.00
20.00	10.00	20.00	20.00	20.00	20.00
20.00	20.00	20.00	20.00	10.00	10.00
10.00	10.00	20.00	20.00	10.00	10.00
[icon]	10.00	20.00	[icon]	20.00	20.00
--	20.00	--	--	20.00	10.00


From this report, TAs don't know about:

- which question that the students have answered.
- which answer that the students have chosen, if they answered the questions incorrectly.



IMPROVEMENTS UNDERWAY: DETAILS OF STUDENTS' ANSWERS

From the Grade Center / Smart Views

User:  an CHAN (Attempt 1 of 1) ✓ View: A4 Exit Submit < 1 of 1 >

Test Information

Question 1: Multiple Choice 10 out of 10 points

The commercial available MCPBA usually has only 70% purity. What other substances are usually present in the reagent mixture?

- (i) *m*-chlorobenzoic acid
- (ii) water
- (iii) sodium hydrogen carbonate

Given Answer: ✓ D. (i) and (ii) only

Correct Answer: ✓ D. (i) and (ii) only

Question 2: Multiple Choice 0 out of 10 points

Which of the following are the necessary precautions for handling *m*-chloroperoxybenzoic acid in the lab?

- (i) Never try to dry the substance by heating
- (ii) Never grind the substance with mortar and pestle
- (iii) Never mix the substance with a diluted aqueous acid

Given Answer: ✗ D. (i), (ii) and (iii)

Correct Answer: ✓ C. (ii) and (iii) only



IMPROVEMENTS UNDERWAY: DETAILS OF STUDENTS' ANSWERS

Grade Center : A2

In the [Screen Reader mode](#), the table is static and grades may be entered on the Grade Details page accessed by selecting the table cell for the grade. In the interactive mode of the Grade Center, grades can be typed directly in the cells. Use the arrow keys or the tab key to navigate through the Grade Center and the Enter key to submit a grade. [More Help](#)

Create Column Create Calculated Column Manage Reports Filter Work Offline

Move To Top Email Sort Columns By: Layout Position Order: Ascending Last Saved: November 14, 2012 1:17 PM

Quiz 1A	Quiz 2A_1	Quiz 3A_1	Quiz 4A_1	Quiz 5A_1	Quiz 6A_1
0.00	10.00	10.00	20.00		
20.00	10.00	20.00	20.00		
20.00	20.00	20.00	20.00		
0.00	10.00	20.00	20.00		
	10.00	20.00			
	20.00	--	--		

- > Quick Column Information
- > Grade Attempts
- > Grade Anonymously
- > Attempts Statistics
- > Download Results
- > View All Attempts
- > Grade Questions
- > Edit Column Information
- > Column Statistics
- > Set as External Grade
- > Show/Hide to Users
- > Clear Attempts for All Users
- > Sort Ascending
- > Sort Descending
- > Hide Column

Icon Legend Edit Rows Displayed

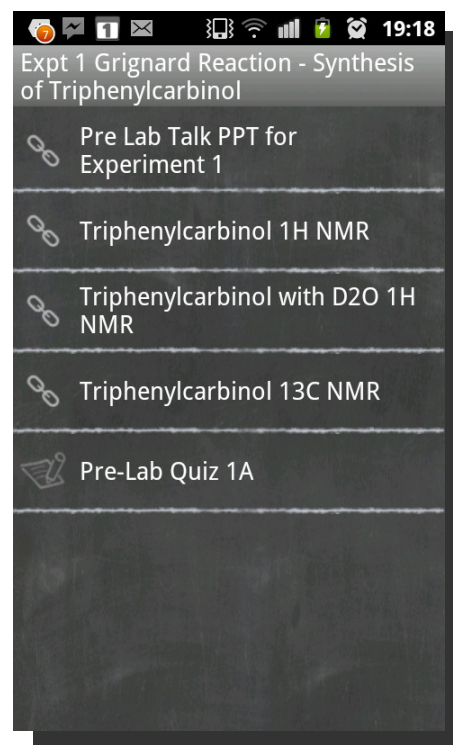
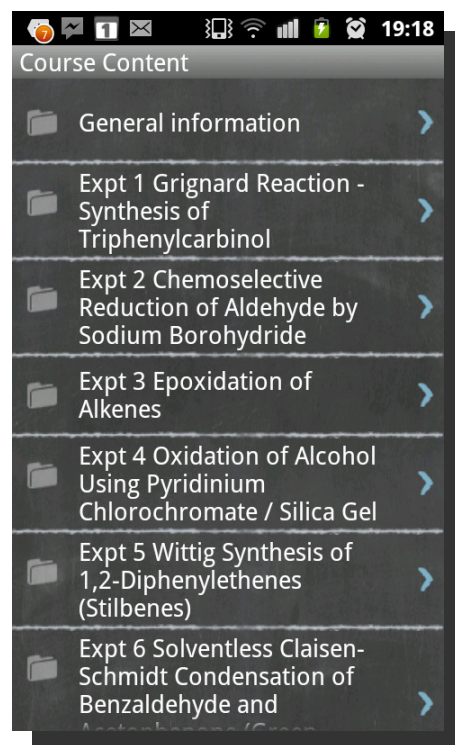
IMPROVEMENTS UNDERWAY: DETAILS OF STUDENTS' ANSWERS

Results Summary in Excel Format

Not Reader Friendly

	A	B	C	D	E	F	G	H	I	J	K	L	M
	Username	Last Name	First Name	Question ID 1	Question 1	Answer 1	Possible P	Auto Score	Manual Sc	Question 2	Question 2	Answer 2	Possibl
1	1.16E+09			g	Question ID 1	<span lang	10	10		Question 2	<span lang	<span lang	
2	1.16E+09			a	Question ID 1	<span lang	10	10		Question 2	<span lang	<span lang	
3	1.16E+09				Question ID 1	<span lang	10	0		Question 2	<span lang	<span lang	
4	1.16E+09				Question ID 1	<span lang	10	10		Question 2	<span lang	<span lang	
5	1.16E+09			o	Question ID 1	<span lang	10	10		Question 2	<span lang	<span lang	
6	1.16E+09			g	Question ID 1	<span lang	10	0		Question 2	<span lang	<span lang	
7	1.16E+09				Question ID 1	<span lang	10	10		Question 2	<span lang	<span lang	
8	1.16E+09			L	Question ID 1	<span lang	10	10		Question 2	<span lang	<span lang	
9	1.16E+09			a	Question ID 1	<span lang	10	10		Question 2	<span lang	<span lang	
10	1.16E+09				Question ID 1	<span lang	10	10		Question 2	<span lang	<span lang	
11	1.16E+09				Question ID 1	<span lang	10	10		Question 2	<span lang	<span lang	
12	1.16E+09				Question ID 1	<span lang	10	10		Question 2	<span lang	<span lang	
13	1.16E+09				Question ID 1	<span lang	10	10		Question 2	<span lang	<span lang	
14	1.16E+09				Question ID 1	<span lang	10	10		Question 2	<span lang	<span lang	
15	1.16E+09			a	Question ID 1	<span lang	10	10		Question 2	<span lang	<span lang	

IMPROVEMENTS NEEDED: INTEGRATION WITH BLACKBOARD MOBILE



Android Phone



IMPROVEMENTS NEEDED: INTEGRATION WITH BLACKBOARD MOBILE



Blackboard
Mobile for iPad



IMPROVEMENTS NEEDED: INTEGRATION WITH BLACKBOARD MOBILE

The image displays three screenshots of Blackboard mobile interfaces. The leftmost screenshot, on an iPad, shows a 'View in Browser' interface for 'Preview Test: Pre-Lab Quiz 1A'. It features a sidebar with course navigation options like '2012R1-CHEM3810AB: Organic Chemistry Laboratory II' and 'Course Content'. The main area shows test details: 'Description', 'Instructions', 'Timed Test' (10 minutes), 'Multiple Attempts' (not allowed), and 'Force Completion' (once started). A question is visible: 'Which of the following are the expected observations when the reaction of magnesium and bromobenzene has started?' with three sub-steps and four multiple-choice options (A, B, C, D). The rightmost screenshot, on an Android phone, shows the 'Take Test: Pre-Lab Quiz 1A' interface. It displays the same test details and a question: 'Which of the following substances react with Grignard reagents?' with three sub-steps and four multiple-choice options. A 'Remaining Time: 9 minute, 51 seconds' timer is visible. A central text box at the bottom of the screenshots reads 'Take assessment on Web'.

- The test tools do not work well with the Blackboard Learn Apps
- Redirect to the Web browser on iPad / iPhone / Android phones



FURTHER EXPLORATION – OTHER QUESTIONS TYPES?

Pool Canvas: Sample P

The Pool Canvas presents an inventory list of questions and allows you to change the points for them. [More Help](#)

Create Question ▾ **Find Questions**

- > Calculated Formula
- > Calculated Numeric
- > Either/Or
- > Essay
- > File Response
- > Fill in Multiple Blanks
- > Fill in the Blank
- > Hot Spot
- > Jumbled Sentence
- > Matching
- > Multiple Answer
- > Multiple Choice
- > Opinion Scale/Likert
- > Ordering
- > Quiz Bowl
- > Short Answer
- > True/False

change the points for them. [More Help](#)

Create Question ▾ **Find Questions**

- > Calculated Formula
- > Calculated Numeric
- > Either/Or
- > Essay
- > File Response
- > Fill in Multiple Blanks
- > Fill in the Blank
- > Hot Spot
- > Jumbled Sentence
- > Matching
- > Multiple Answer
- > Multiple Choice
- > Opinion Scale/Likert
- > Ordering
- > Quiz Bowl
- > Short Answer
- > True/False

...e check boxes to select any or all questions and

	Question Type	Defa
	Multiple Choice	-
	Multiple Choice	-

SWITCHING THE QUIZ TO ONLINE : ADVANTAGES AND LIMITATIONS

Advantages

- Streamline the conduction of the quiz.
- Save some precious class time.
- Provide some flexibility to students.
- Encourage students to read the lab manual before they come.
(If they gave a wrong answer in the quiz, they may immediately look for the correct answer from the lab manual.)

Limitations

- Feedbacks from TAs become more indirect and less timely.
- Difficult to control cheating (*sharing quiz questions and answers*).
- Extra workload for Instructors and TAs to setup and maintain the online quiz system.
- The varieties of question types are less flexible.



POSSIBILITIES OF ADOPTION TO OTHER COURSES / ASSESSMENT METHODS?

- In-Class Quiz?
- In-Class Response System (like Clicker / uReply)?
- Pre-Lecture Reading Assignment?
- Post-Lecture Quiz?

- Thank You -

