

# Chem 51C - Organic Chemistry

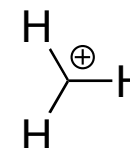
Instructor: Prof. Jarvo  
Email: [erjarvo@uci.edu](mailto:erjarvo@uci.edu)  
Phone: 4-7105  
Office hours: TBA, NS1 4114

Need a syllabus? See us (or the website)  
<http://sites.uci.edu/51cjarvo>

♪ “Somebody to love”  
by Queen

People just want to be  
loved

First row elements just  
want a complete octet



C only has 6 valence  
electrons

## Teaching Assistants



**Kirsten Hewitt**  
[khewitt1@uci.edu](mailto:khewitt1@uci.edu)  
Office hours: TBD



**Alissa Matus**  
[matusa@uci.edu](mailto:matusa@uci.edu)  
Office hours: TBD



**Tristan McGinnis**  
[mcginnit@uci.edu](mailto:mcginnit@uci.edu)  
Office hours: TBD

*Note:* email is the best way to contact Kirsten, Alisssa, and Tristan (and myself) outside of office hours or discussion sections, but:

**NO CHEMISTRY QUESTIONS WILL BE  
ANSWERED BY EMAIL!!!!**

Not even thoughtful, nicely worded chemistry questions:

*“In Chapter 12, page 912, the book states that bromopropane will react with sodium cyanide to give the  $S_N2$  product, but in class you said that nucleophiles with higher  $pK_a$ s are more likely to give elimination products. Is the book right and how can you tell which pathway the reaction will follow?”*

Why not?

These questions require thoughtful, in depth, IN PERSON answers:

[PLEASE COME TO OFFICE HOURS WITH THESE QUESTIONS!](#)

# Peer Tutors

**Ayat Hasan**  
[ajhasan@uci.edu](mailto:ajhasan@uci.edu)  
Office hours: TBD

**Myrick Nguyen**  
[myrickn@uci.edu](mailto:myrickn@uci.edu)  
Office hours: TBD

# Midterms and Final Exam

## Exams:

Midterm 1: Friday May 3, in class

Midterm 2: Friday May 24, in class

Final: Wed, Jun 12, 4:00-6:00pm (our classroom)

All exams are closed book and **comprehensive**. ***There are no makeup exams.*** Unexcused absences will count as a **zero**. The instructor must be notified in writing prior to the exam for any excused absences due to illness, etc.

Seating for exams will be assigned, and you must know your seat assignment prior to the exam. Please check your seat assignment prior to the midterms and final on the course website.

Picture ID (UCI Student ID or Drivers License) are required to take exams. IDs will be collected, checked, and returned during the exam. Exams will not be accepted from students without proper identification.

## Grading Scheme:

Quizzes: 7%

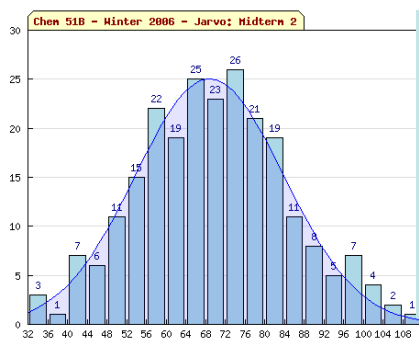
Midterm 1: 23%

Midterm 2: 23%

Final Exam: 47%

Under **NO circumstances** will a student be allowed to drop their lowest midterm grade and replace it with their grade on the final.

# The Curve



According to UCI:  
A - Excellent  
B - Good  
C - Average  
D - lowest passing grade

The mean will be a C+

Letter grades not assigned for midterms  
mean + St. dev ***approximately*** A/B cutoff  
mean - St. dev ***approximately*** D/F cutoff

# **Academic Honesty:**

Academic honesty is strictly enforced on midterms, exams, and all other aspects of this course.

Academic dishonesty will result in a failing grade and a letter in the student's file. For a detailed description of activities constituting academic dishonesty, please see:

<http://honesty.uci.edu/>

Seats will be assigned during midterms and exams, and we will be checking student ID's

## **Cell Phones:**

All cell phones must be turned off during class.

Cell phones are very disruptive and inconsiderate to your classmates. If your cell phone goes off during class, please expect to be asked to leave and not return for the day.

# UCI Disability Services Center

- DSC provides services to students with documented permanent and temporary disabilities. Services include reasonable accommodations, auxiliary aids, and individualized support services based on your disability documentation, functional limitations, and a collaborative assessment of needs. Testing accommodations are one specialized service that the Disability Services Center provides.
- See: <http://www.disability.uci.edu/index.html>



## Discussion Sections

Attendance of a weekly discussion section is mandatory.

Discussion sections will begin on week 2. Worksheet 0 (review from 51B) is on the website.

A worksheet will be handed out, we will split into groups to work on them, and then students will work through the answers on the board.

**YOU SHOULD DOWNLOAD THE WORKSHEETS AND TRY THEM ON YOUR OWN BEFORE YOUR DISCUSSION SECTION!**

[illegible]

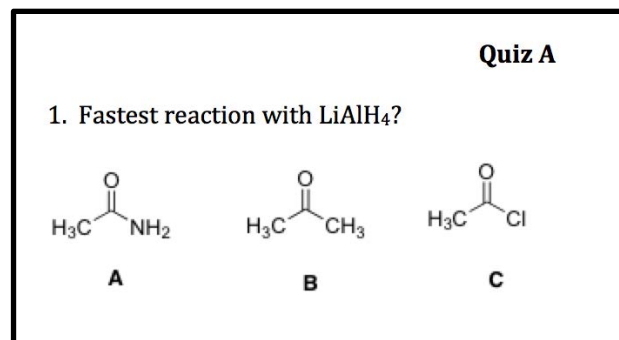
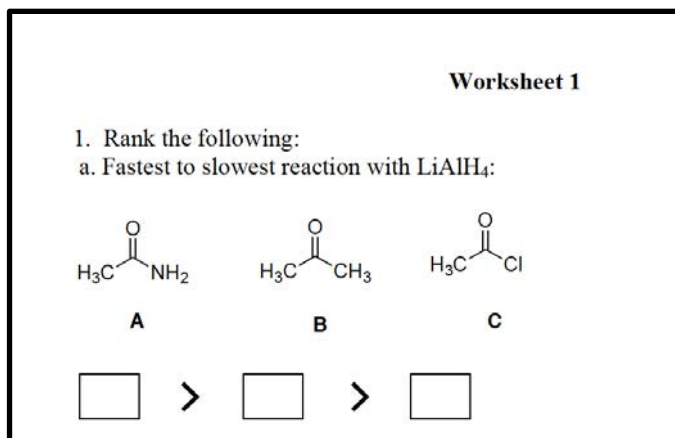
## Discussion Sections: Quizzes

There will be a **5-minute** scantron quiz at the beginning of discussion section most weeks.

- EASY Problems DIRECTLY from that weeks' worksheet
- 6 points, 3 points for attendance (turning it in) and 3 points for questions
- There are 7 quizzes, we will drop your lowest score and count your best 6 quizzes
- No makeup quizzes
- Quizzes will count for 7% of your total grade

Quiz weeks: Week 2, 3, 4, 6, 7, 9, 10

You must bring a scantron form with you to discussion to take the quiz.



Quiz A took your TA 1 min 11 seconds.  
You will have 5 min.

# Discussion section schedule

Monday	Tuesday	Wednesday	Thursday	Friday
	8 AM <b>DIS Kirst</b> RH 188			
			9 AM <b>DIS Kirst</b> RH 188	
	10 AM <b>DIS Kirst</b> RH 188	10 AM <b>Dis Tr</b> SSPA 1170		
				11 AM <b>DIS AI</b> RH 188
12 PM <b>Lecture</b> PSLH 100		12 PM <b>Lecture</b> PSLH 100		12 PM <b>Lecture</b> PSLH 100
1 PM <b>DIS Tr</b> RH 188				1 PM <b>DIS AI</b> RH 188
			2 PM <b>DIS AI</b> RH 188	
		3 PM <b>DIS Tr</b> RH 188		3 PM <b>DIS AI</b> RH 188

I will upload this weekly calendar to the website once we have final times and locations for office hours

This quarterly  
schedule is up on  
the class website

**Chem 51C, Jarvo  
Spring 2019**

**Approximate schedule and reading list, subject to change**

	Monday	Wed	Friday
<b>Week 1</b> <i>No discussion sections</i> <b>Do WS0 as a review on your own</b>	Ch 19 Intro to carbonyl reactivity (Ch 20)	Ch 20	Ch 20
<b>Week 2</b> <i>Discussion: WS1, Quiz A</i>	Ch 20	End Ch 20	Start Ch 21
<b>Week 3</b> <i>Discussion: WS2, Quiz B</i>	Ch 21	Ch 21	End Ch 21
<b>Week 4</b> <i>Discussion: WS3, Quiz C</i>	Start Ch 22	Ch 22	End Ch 22
<b>Week 5</b> <i>Discussion: WS4, no quiz</i>	Start Ch 23	End Ch 23	<b>Midterm 1</b> <i>Up to and including end of Ch 22</i>
<b>Week 6</b> <i>Discussion: WS5, quiz D</i>	Ch 24	Ch 24	Ch 24
<b>Week 7</b> <i>Discussion: WS6, quiz E</i>	Ch 25 ( <i>Select topics</i> )	Ch 28 ( <i>Select topics</i> )	Ch 29 ( <i>Select topics</i> )
<b>Week 8</b> <i>Discussion: WS7, no quiz</i>	Ch 18	Ch 18	<b>Midterm 2</b> <i>Up to and including end of Ch 29</i>
<b>Week 9</b> <i>Discussion: WS8, Quiz F</i>	Memorial Day	Ch 18	Ch 18
<b>Week 10</b> <i>Discussion: PS9, Quiz G and practice final</i>	Synthesis and review	Synthesis and review	Synthesis and review
<b>Finals</b>		Final Exam <i>comprehensive</i>	

Worksheets (from discussion section)  
and book problems are important



Working problems is critical to success in organic chemistry.  
I have chosen/written the problems specifically for you.

## **From my Spring 51B Teaching Evaluations:**

Anonymous student: “She also gives away quite a few hints about exams if you listen carefully.”

Worksheets (from discussion section)  
and book problems are important



Working problems is critical to success in organic chemistry.  
I have chosen/written the problems specifically for you.

# Class Website

<http://sites.uci.edu/51cjarvo>

The website will contain:

Handouts,  
list of assigned problems + readings

worksheets + answer keys,

exam answer keys,

times for office hours and discussions

etc, etc, etc.



# Class Website

We are not using Canvas

The Canvas site has a link to the actual website  
(<http://sites.uci.edu/51cjarvo>)

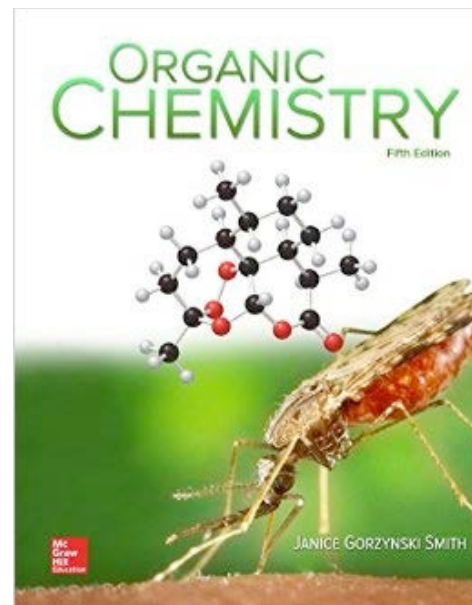
Chat or discussion functions have been disabled  
(I think?) and will not be monitored by me or the TAs

# Study Materials

## Texts:

Required: Smith, *Organic Chemistry, 5th Ed.*

Optional: Smith *Study Guide and Solutions Manual*



## Molecular Models:

Required: Darling (Molecular Vision) Molecular Models.

Bring your models with you to exams (partially assembled, in a bag from the bookstore).

## Outline:

Smith: Chapters 19 to 25, 28, 29.



For a reading list and assigned problems,  
see the website.

Start reading Ch 19 and 20 **tonight**.

**Chapter 19**

Read: 19.1, 19.2, 19.7-19.11, 19.13

Skim: 19.3 – 19.6, 19.12

Problems: 19.1-19.5, 19.7-19.18, 19.20-19.21, 19.26-19.31, 19.33-19.52, 19.56-19.73

This quarterly  
schedule is up on  
the class website

Chem 51C, Jarvo  
Spring 2019

Approximate schedule and reading list, subject to change

	Monday	Wed	Friday
<b>Week 1</b> <i>No discussion sections</i> <b>Do WS0 as a review on your own</b>	Ch 19 Intro to carbonyl reactivity (Ch 20)	Ch 20	Ch 20
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<b>Week 3</b> <i>Discussion: WS2, Quiz B</i>	Ch 21	Ch 21	End Ch 21
<b>Week 4</b> <i>Discussion: WS3, Quiz C</i>	Start Ch 22	Ch 22	End Ch 22
<b>Week 5</b> <i>Discussion: WS4, no quiz</i>	Start Ch 23	End Ch 23	<b>Midterm 1</b> <i>Up to and including end of Ch 22</i>
<b>Week 6</b> <i>Discussion: WS5, quiz D</i>	Ch 24	Ch 24	Ch 24
<b>Week 7</b> <i>Discussion: WS6, quiz E</i>	Ch 25 (Select topics)	Ch 28 (Select topics)	Ch 29 (Select topics)
<b>Week 8</b> <i>Discussion: WS7, no quiz</i>	Ch 18	Ch 18	<b>Midterm 2</b> <i>Up to and including end of Ch 29</i>
<b>Week 9</b> <i>Discussion: WS8, Quiz F</i>	Memorial Day	Ch 18	Ch 18
<b>Week 10</b> <i>Discussion: PS9, Quiz G and practice final</i>	Synthesis and review	Synthesis and review	Synthesis and review
<b>Finals</b>		Final Exam <i>comprehensive</i>	

## Music suggestions: Extra Credit

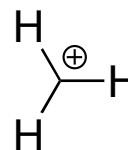
if you email me a suggestion for a song that **RELATES TO THE LECTURE**, and I decide to use your song at the beginning of lecture – extra 0.5% bonus added to your final grade, maximum of 1% bonus

Songs must:

1. Relate to the topic we are learning.
2. Be appropriate for all audiences. If I go to itunes and there is an “explicit lyrics” next to the song, you will be disqualified from all future song entries.
3. Songs from “Greg’s Science Songs” or previous years’ section of 51B or C will not be accepted.

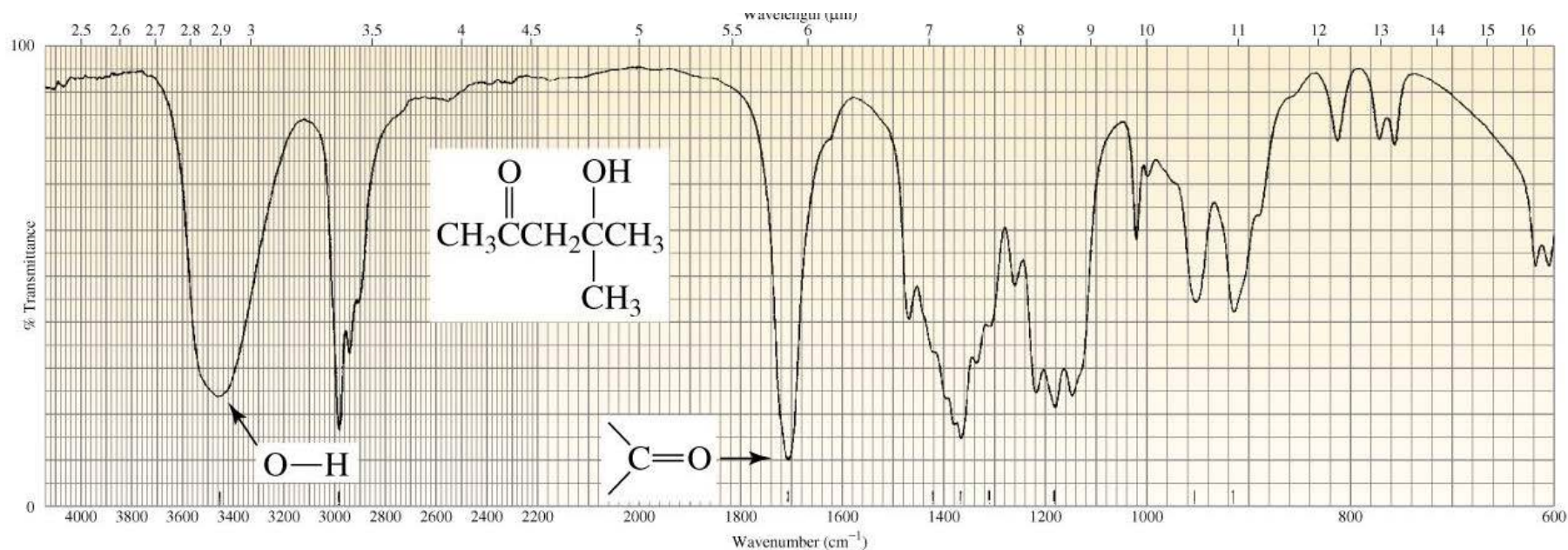
♪ “Somebody to love” by Queen

People just want to be loved  
First row elements just want a complete octet



C only has 6  
valence  
electrons

# Please send your suggestions



♪ “**Hey Ya**” by OutKast  
“Shake it like a polaroid picture.”

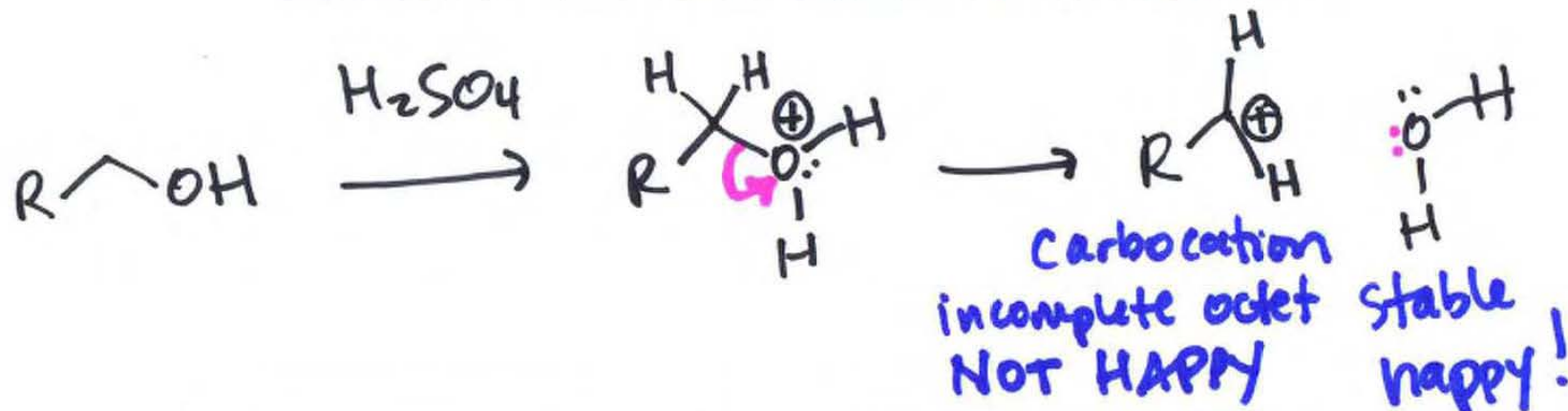
Shining IR light on a molecule causes some the bonds to vibrate.  
Each type of bond vibrates at it's own special frequency (it's own favorite song)



# Please send your suggestions

①

## Lecture 2: Reactions of Alcohols



♪ "Breakeven" by the Script **not stable!**

She moved on while I'm still grieving  
When a heart breaks, it don't break even  
...I'm trying to make sense of what little remains  
Cause you left me with no love

When alcohols react with strong acids, the C–O bond breaks to give the electrons (happiness) to oxygen. The carbon is left behind as the carbocation, a very unstable and unhappy predicament.

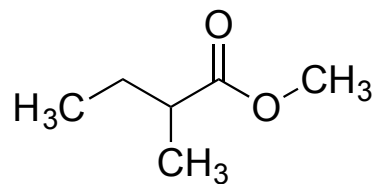
other  
reaction



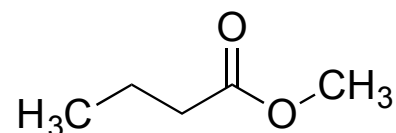
# Please send your suggestions



pineapple



apple

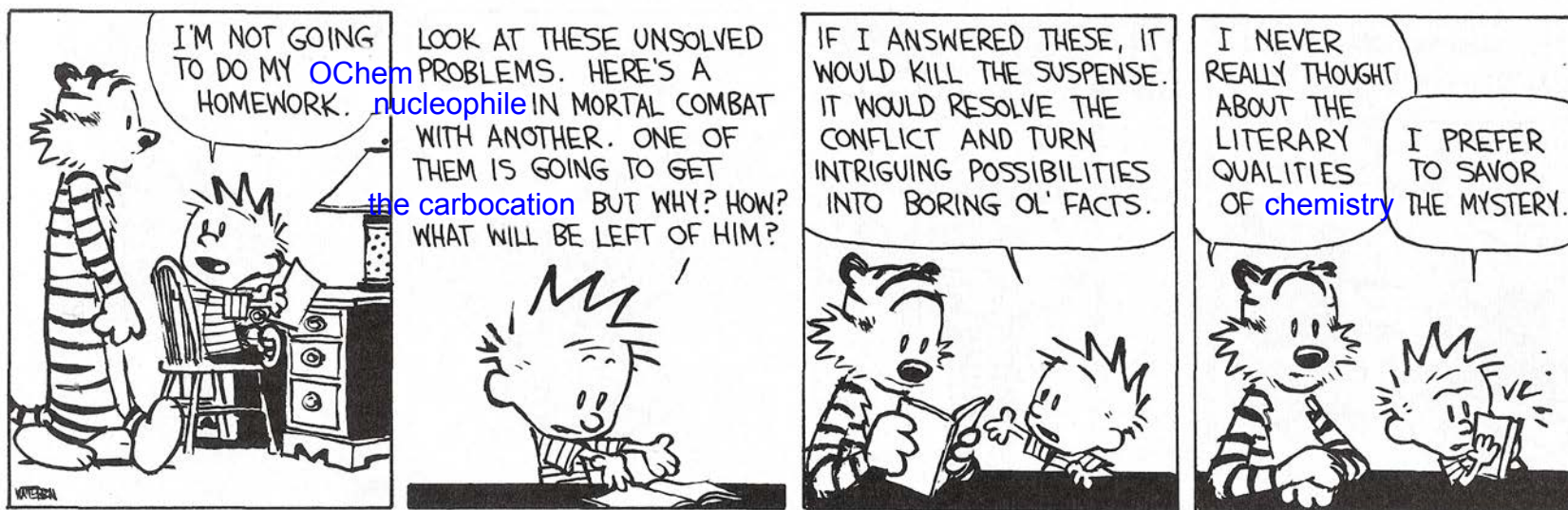


♪ PPAP

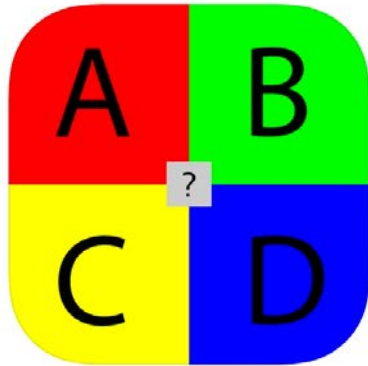
Esters smell like fruit. Actually, fruit smell like esters.

# Why do I do this?

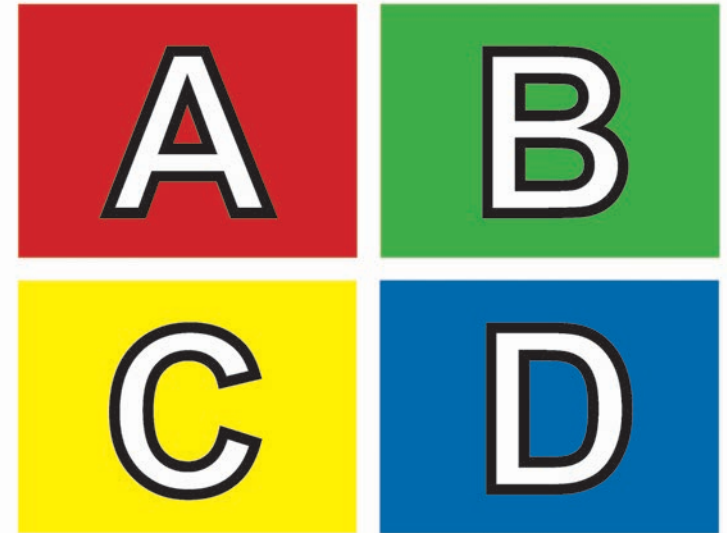
1. It's fun (debatable, I know.)
2. To anthropomorphize the functional groups and molecules we study, and make it easier for you to remember things.



# ABCD Cards



**ABCD Cards** 4+  
Western Washington University  
★★★★☆ 4.0, 9 Ratings  
Free

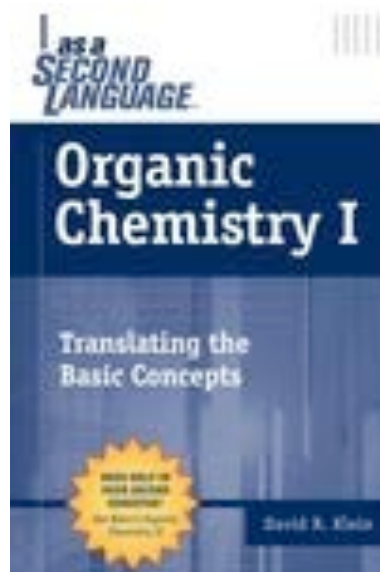
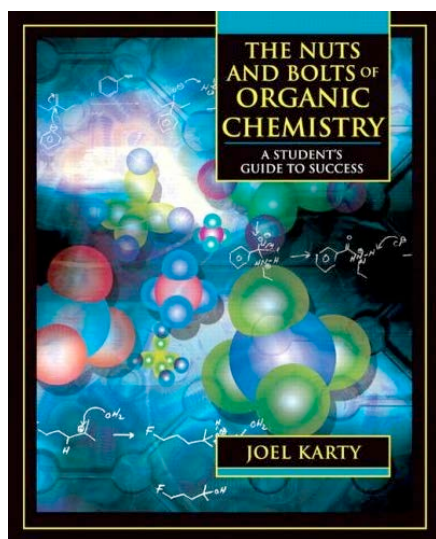


See also the WWU ABCD Card app: <http://cil.wvu.edu/cil/ABCD/>

- We will vote on in-class questions using the ABCD card method
- Please download ABCD card app on your phone or tablet
- Or download the ABCD card on your phone, tablet, or laptop (on the website as a jpg and pdf)
- Or print out an ABCD card on paper
- Show Kirsten the TA the app or your card by end of week 4 for a 0.5% extra credit



There are good supplementary books on the market:



The information for these books is posted on the website

# Use your models to help you understand stereochemistry

- On certain days I will expect you to bring your preassembled models to class.
- bring your models to discussion section
- Bring pre-assembled models to the exams in a clear bag from the bookstore (i.e. premake chairs, stereogenic carbons and any other structures you think might be helpful).
- This should be helpful in Ch 20



# There are many ways to study

- Recopy your notes, following along in the text
- Make review notes - summarize your notes and organize them
- Work the assigned problems
- Make lists (or posters) of functional groups (classify as nucleophile or electrophile) and reagents
- Make models of the compounds we discuss in class, discussion, and the homework
- Make flash cards
- Quiz yourself with flash cards
- Read the text

You should be doing all of these things every week!



# Study EVERY day

- Make a schedule and just stick to it



# Assigned Problems

**Actively** working through **lots of problems** is essential for success in organic chemistry.

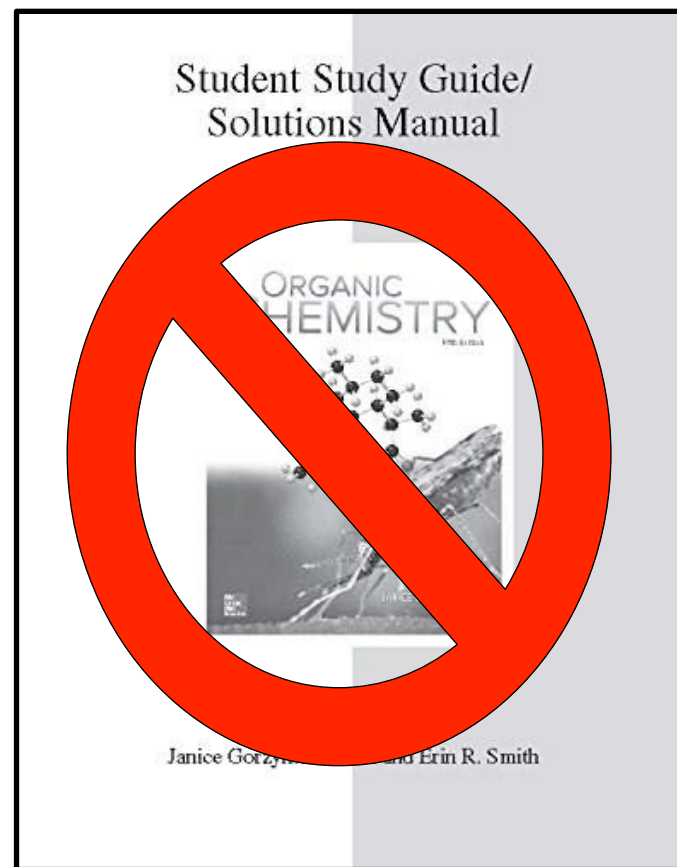
Once you have finished the assigned problems, make your way through the rest of the problems in the text.



**DO NOT** work the assigned problems with the answer key nearby

Store your answer key:

- Under your bed
- In a box
- Tie it with a rope
- Give it to your roommate



# Examples of Lists/Posters

- List of Nucleophiles
- List of Electrophiles
- Ways to make a ketone
- Nucleophiles that can make new carbon-carbon bonds
- Reagents - what do they react with?

# Priorities Every Week:

1. **Lecture**
2. **Discussion section** - attend every week and work through extra worksheet problems at home.
3. Text - skim before lecture and re-read when recopying/reviewing your notes and making your lists
4. Assigned problems (hide your answer key)
5. Office hours - attend with a list of questions from the problems from the book that do not make sense to you
6. Flash cards
7. Other text problems

# Before the exams:

1. Make review notes - summarize your notes and organize them, fill in your lists
2. Do the practice problems
3. Revisit problems in the worksheets + text
4. Attend office hours with a list of questions about things that don't make sense
5. Quiz yourself!

# I am going to lecture at the podium

- Notes, slides and handouts will be posted online.
- I STRONGLY suggest you take your own notes and double check them against mine online.
- Sit down front if you'd like to see the structures (and let me know if they are too small)
- If you can't hear me **LET ME KNOW**

Handouts will occasionally be posted online - print them out and bring them with you to class

## Tips from my previous students:

- Go to lecture. Consider it an hour of studying, you'll understand the material better than just reading the book and doing problems.
- Stay awake in class and take good notes - take advantage of this time to focus on the material. Summarize the lecture in 3-4 sentences right after class to help you digest the new information.
- Do not under any circumstances skip lecture or discussions. You may think that reading the book will get you through and that might work some of the time but **save yourself some time and go to lectures.** That will give you the best idea of what to focus on for midterms and finals.

# More tips from my previous students:

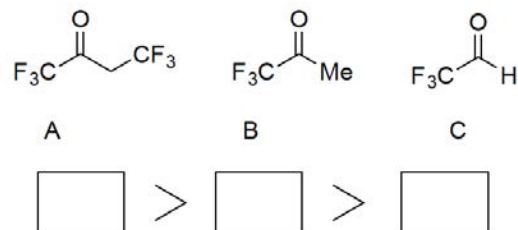
- Do not procrastinate.
- Keep up with the reading and problems
- Study everyday!!
- Do NOT put off studying :)
- TREAT studying like an everyday job, study a little bit (1-2hrs) a day and you will never have to cram. DO JARVOS WORKSHEETS and circle problems you get wrong, then redo them a bit later and understand why you made the mistake that you did.
- Go to discussion.
- Do every single worksheet problem on paper by hand... don't just look at it and then the answer key.
- Worksheets are very helpful and going to discussion helps because if you don't understand something that is on the worksheet, the TA can help clarify and go step by step in explaining.
- Do and redo the worksheet problems
- Discussion worksheets are based of the test format.
- The worksheets REALLY REALLY help when studying for exams!!

Two sets of tips are on the website.

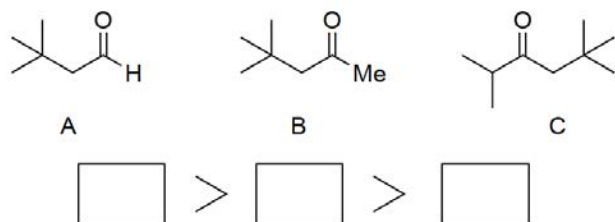
# The worksheet:

## Worksheet 3, Chem 51C, Jarvo

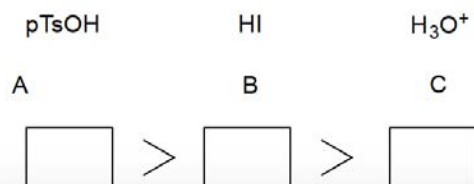
1. a. Rank the following compounds from highest to lowest percent hydrate:



b. Rank the following compounds from fastest to slowest addition of HCN:



c. Rank the following from most to least acidic, and list the pKa's:



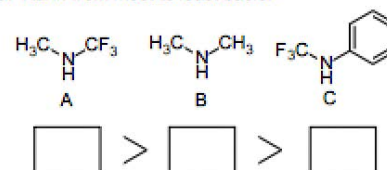
# The final:

## Final Exam, Chem 51C, Jarvo, Spring 14

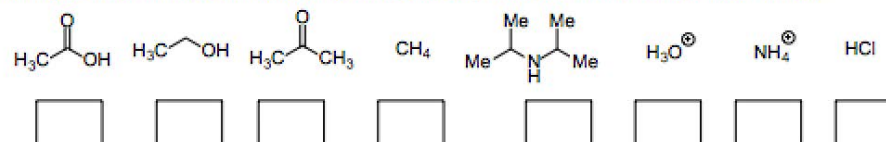
Initials: \_\_\_\_\_

1 (22 points)

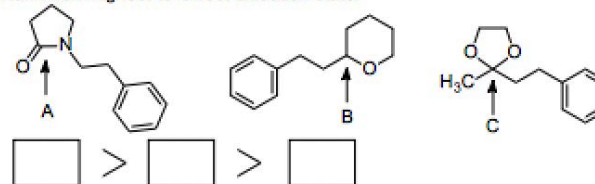
a. Rank from most to least basic:



b. Provide pKa's for **any 6** of the following compounds (if you do them all, we will count your best 6).



c. Rank from highest to lowest oxidation state:

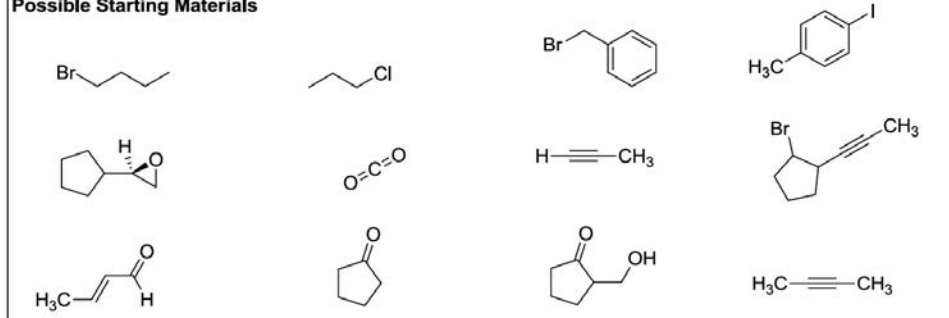




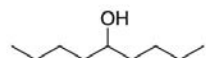
## The worksheet:

5. Propose syntheses of the targets shown below. You can use any of the possible starting materials and any reagent you wish.

### Possible Starting Materials



### Target A.



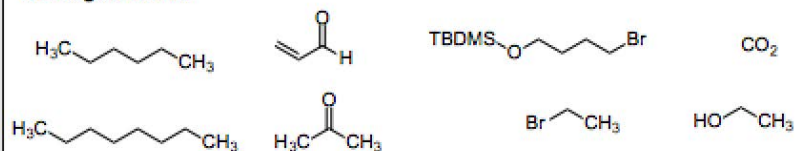
The final:

8. (16 points) Propose syntheses of the targets below.

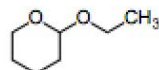
Initials: \_\_\_\_\_

All carbons must come from the starting materials provided, you can use any reagent you wish.  
YOU CAN IGNORE STEREOCHEMISTRY.

### Starting Materials:



### Target A.



# How much time should someone spend studying to do well in 51C?

4% 2 hours/week

13% 5 hours/week

33% 10 hours/week

29% 15 hours/week

9% 20 hours/week

11% more than 20 hours/week

From S18 class, 96 responses

# Abbreviations you will see

Me = methyl

Et = ethyl

Pr = propyl (*i*-Pr)

Bu = butyl (*t*-Bu, *i*-Bu)

Ph = phenyl

Ar = aryl (a substituted phenyl or aromatic ring)

Ts = tosylate, Tf = triflate, Ms = mesylate

Rxn = reaction

XS = excess

RDS = rate determining step

e<sup>-</sup> = electron

R = any functional group

X = any functional group, usually a leaving group

E, El = electrophile

Nu, Nuc = nucleophile

I will post these slides on the  
website....