

Teachable Tidbit, Part 1: Learning Objectives, Backward Design – Syllabi and Selection of Content



COTTRELL SCHOLARS
COLLABORATIVE

*Integrating Discovery and Education
to Advance Science*

Did you do your homework?

The Plan

1. Form groups (by number*)
2. Complete the worksheet in groups
3. We'll regroup shortly

Objectives for this session

1. Summarize the process of backwards design
2. Apply backwards design principles to develop learning objectives

*remember your number, please

Backwards design: *Start from the student outcome*

Traditional instruction
"content-oriented"

What will I teach?



Plan lecture

Modern instruction
"learning-oriented"

What should students learn?



How will I measure that learning?

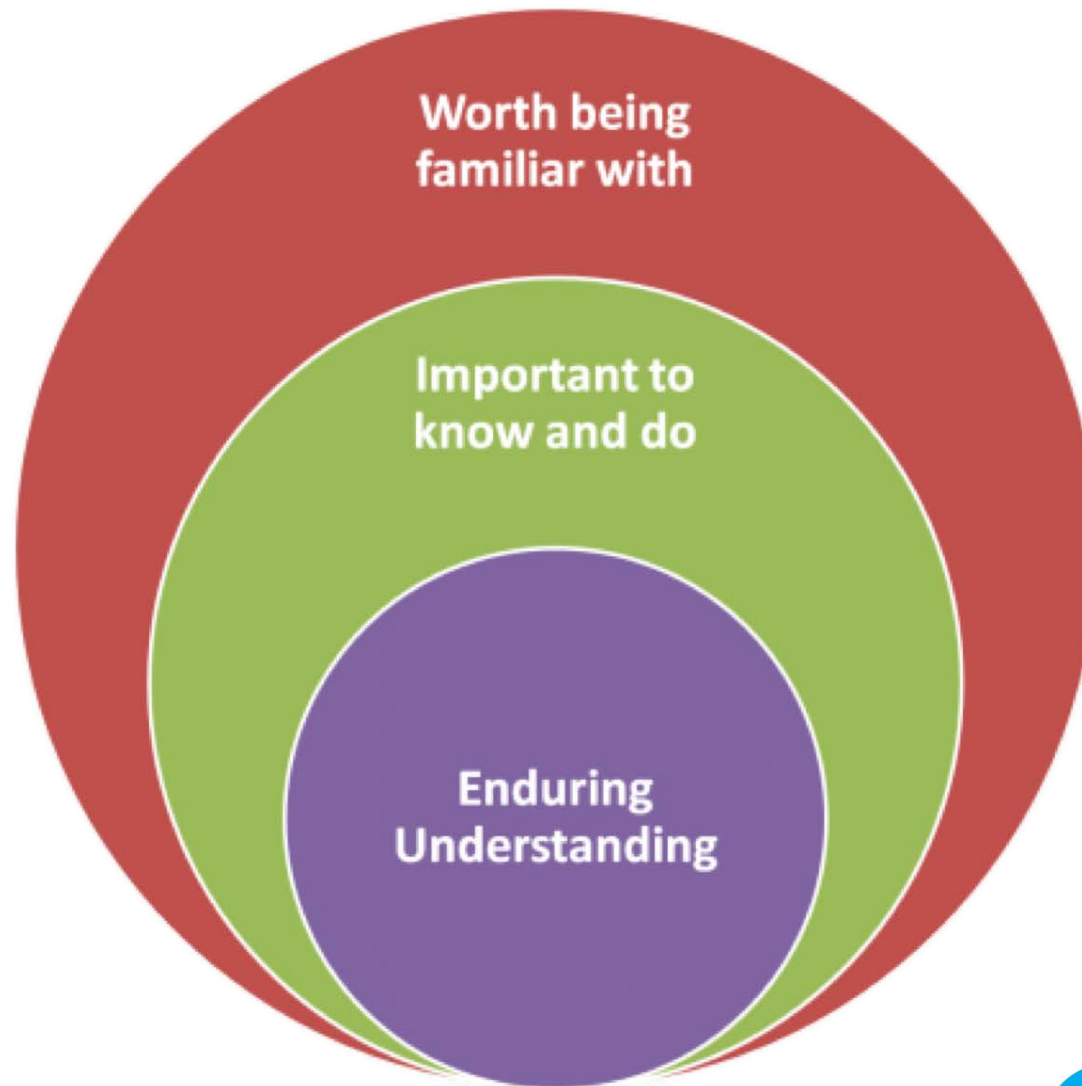


What activities promote that learning?

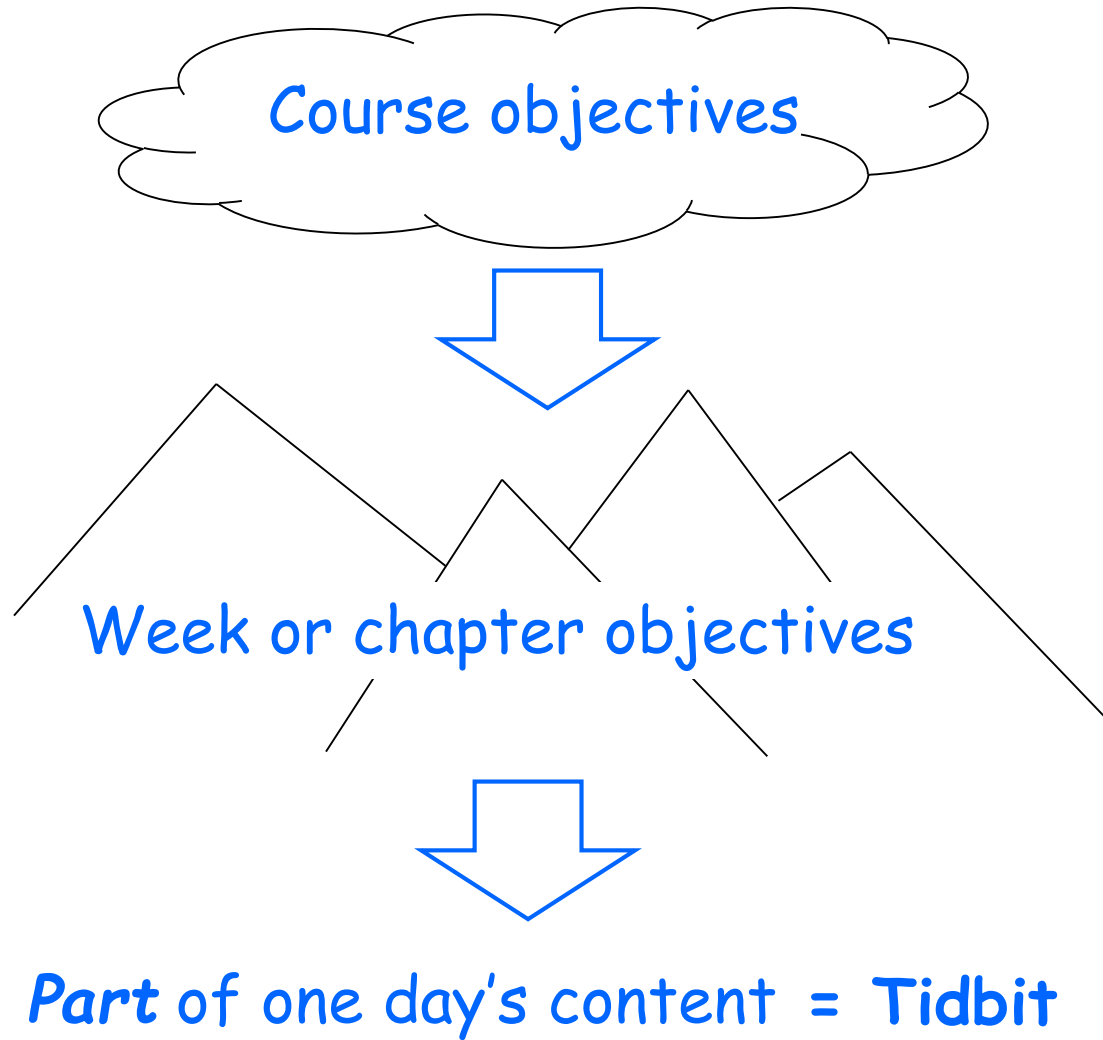


Design instruction and activities

Core of backwards design is a choice



Getting to your tidbit



Now what?

Tidbit = part of one class = content

Your goal: Turn that into a class experience

Step 1. Identify the content area

→ Step 2. Pick a key concept or skill

Step 3. Articulate goal for students (objective)

Step 4. Decide how to measure the outcome

Step 5. Pick activity for content/skill

Step 6. Practice

Work time now. Back to syllabi later.

A brief (abrupt) transition to syllabi

What items are required on a syllabus?

Only the items that my employer requires.

What can you accomplish on your syllabus?

Communicate key facts

Set the academic tone

Establish how you interact with students

Create (or minimize) anxiety

Teaching Centers love to help with syllabi

The Two Most Important Items

1. The above schedule, policies, procedures and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement and/or to ensure better student learning.
2. Students may vary in their competency levels on these abilities. Students can expect to acquire these abilities only if they honor all course policies, attend class meetings regularly, complete all assigned work in good faith and on time, and meet all other course expectations.

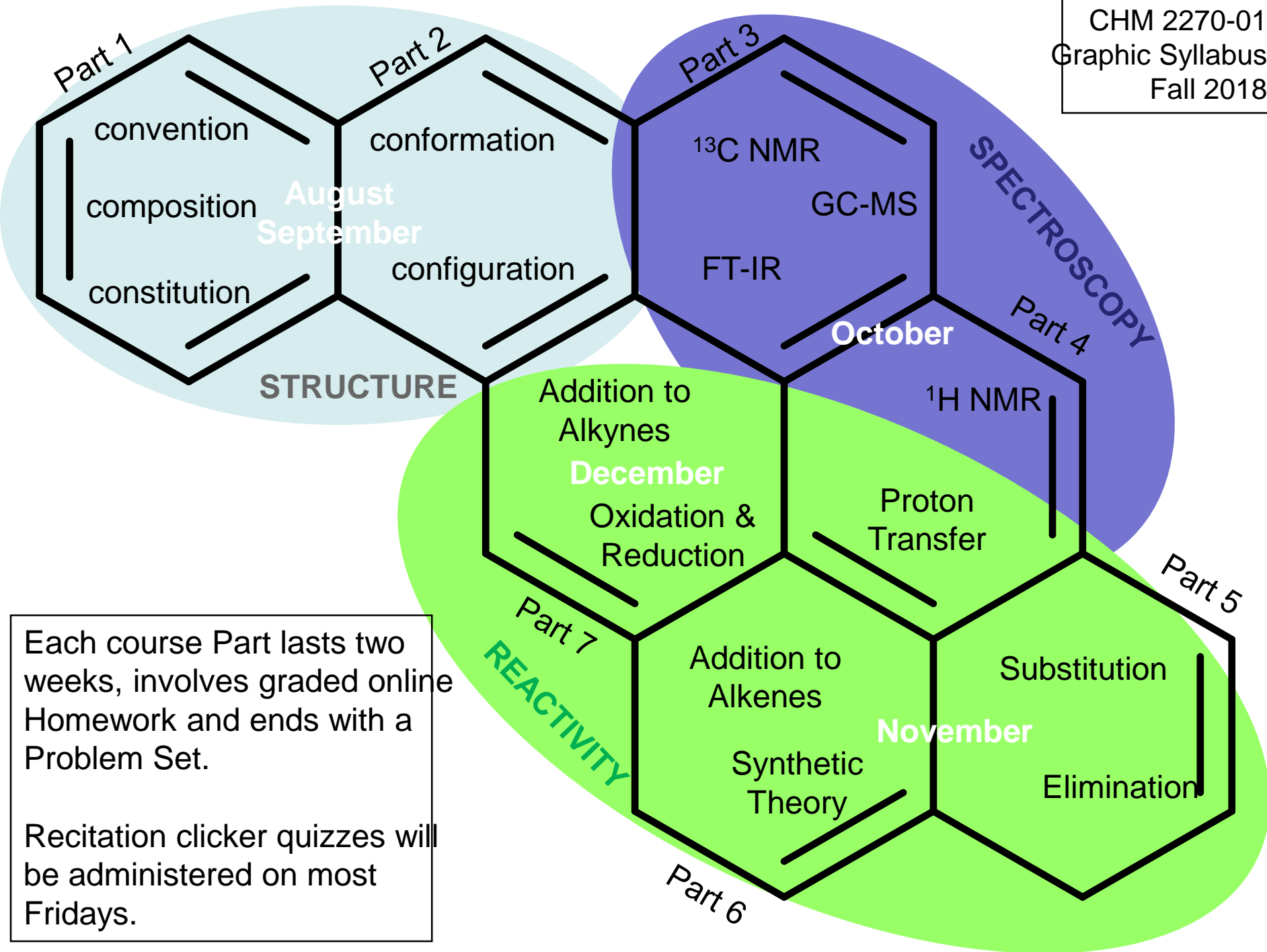
Not including these may lead to...complications



The Graphic Syllabus
and the Outcomes Map

COMMUNICATING
YOUR COURSE

LINDA B. NILSON



CHM 2270-01 Outcomes Map Fall 2018

As students progress through the course, they will be able to...

Apply the conventions of organic chemical composition in the modeling of molecular structure: valence, electron pair domains, molecular formula, Lewis/line-angle structures, resonance, 3D geometry

Define the primary importance of organic constitution: functional groups, IUPAC Nomenclature

Differentiate between the major theories of bonding: valence bond vs. molecular orbital, thermodynamic bond strength

Compare the different relationships of isomerism

Correlate single bond rotation to conformational isomers

Explain how 3D spatial arrangement gives rise to configurational isomers

Integrate knowledge of structural symmetry with Nuclear Magnetic Resonance data: ^{13}C , ^1H

Connect the concept of bond vibration to Fourier Transform Infrared Spectrophotometry data

Determine the molecular formula of an unknown using Mass Spectrometry data

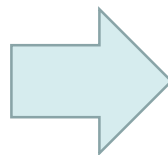
Estimate the $\text{p}K_a$ and likelihood of proton transfer using structural pattern recognition

Predict the products of substitution/elimination reactions

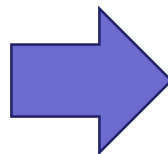
Use organic synthetic theory to assemble specific target structures

Contrast the mechanisms of addition reactions to alkenes and alkynes

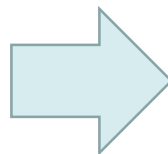
Relate the concepts of oxidation and reduction to organic reactions



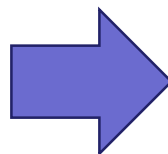
Communicate in the conventions and nomenclature of Organic Chemistry



Differentiate among the concepts of constitutional, conformational and configurational isomerism.

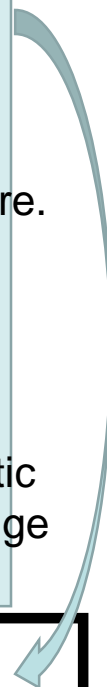


Apply the qualitative methods of Mass Spec, IR and NMR in the determination of organic chemical structure.



Determine the general modes of heterolytic organic reaction and employ this knowledge in the solving of mechanistic problems.

Evaluate organic molecules' structure and reactivity



ORGANIC CHEMISTRY 1
CHEM 2410



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What we will learn



Build foundation of chemical intuition

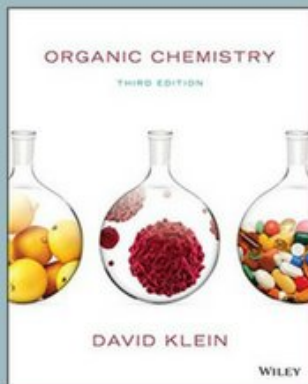


Learn spectroscopic tools to inspect molecules



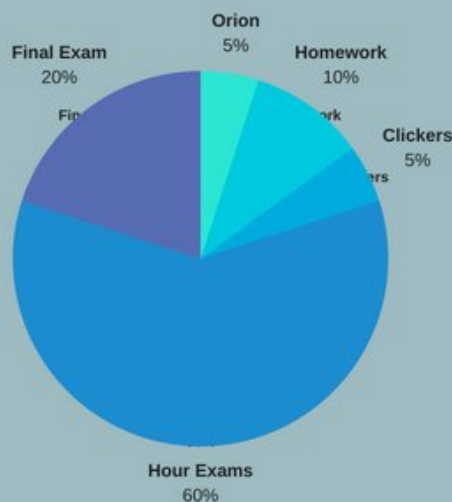
Apply chemical intuition to predict mechanisms, and build molecules

REQUIRED MATERIALS



- WileyPLUS required
- Model kit and Organic Chemistry as a second language optional

ASSIGNMENTS



- 2 lowest homework and Orion assignments can be dropped
- 50% of clicker questions correct to achieve 100% of points
- If final exam grade greater than any hour exam grade lowest hour exam grade will be replaced

GRADE SCALE

A	88.0%
A ⁻	84.0%
B ⁺	80.0%
B	72.0%
B ⁻	68.0%
C ⁺	64.0%
C	56.0%
C ⁻	52.0%
D	44.0%
F	