

ORGANIC CHEMISTRY UPSIDE DOWN: THE FLIPPED CLASSROOM

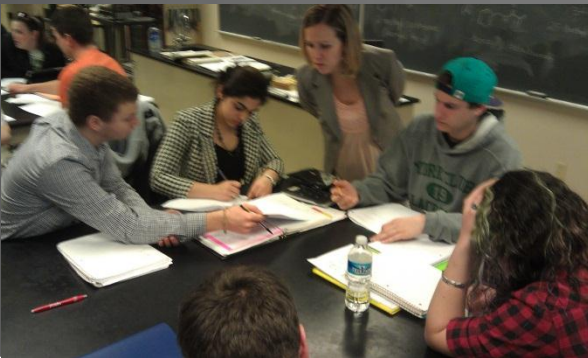
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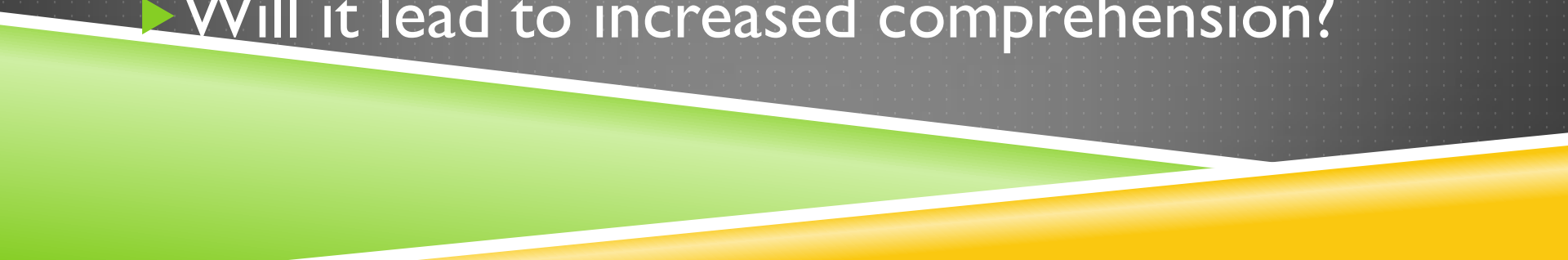
WHAT ABOUT THE “FLIP”?

- ▶ What is it?
- ▶ Why am I doing it?
- ▶ Does it work (so far)?
- ▶ How can it be improved?



<http://businessguide.com/2012/05/flipped-classrooms-passport-to-the-future-of-technology/>

WHY I AM TRYING THE “FLIP”

- ▶ Content-heavy course
 - ▶ Organic I; 2 sections of ~24 students each
 - ▶ Difficulty keeping up with content and in-class application
 - ▶ Not enough class time to interact with every student
 - ▶ Want more participation and responsibility on the student
 - ▶ Will it lead to increased comprehension?
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WHAT ABOUT THE “FLIP”?



TECHNOLOGY I USE TO IMPLEMENT FLIPPED CLASS

▶ Hardware:

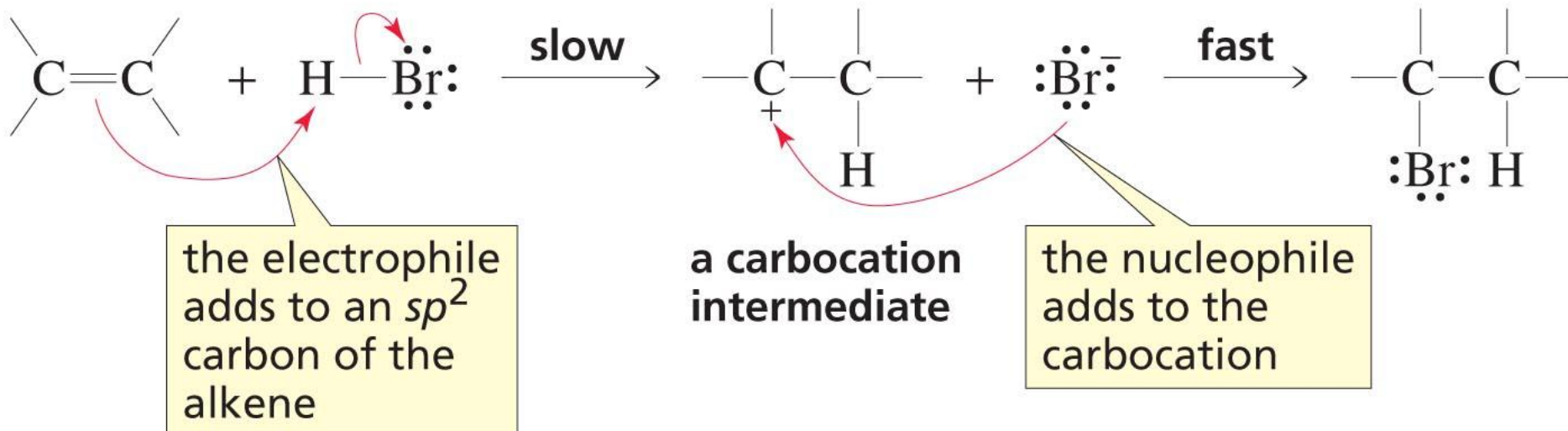
- ▶ Laptop with webcam (\$\$ to \$\$\$)
- ▶ Tablet with stylus (Wacom) (\$)
- ▶ External microphone (Samson) (1/2\$)

▶ Software:


- ▶ ScreenFlow (screencapture); Camtasia is another option (\$)
- ▶ Deskscribble (writing on slides); OmniDazzle is an alternative (1/2\$)
- ▶ Keynote or MS PowerPoint for presentations



Electrophilic Addition of Alkenes



CLASS FORMAT AND ASSIGNMENTS

- ▶ Watch assigned video
 - ▶ Take notes and write down questions
 - ▶ Alert instructor of any issues
 - ▶ Pause, rewind, re-watch if necessary
 - ▶ 5-minute quiz online (BlackBoard) (“warm-ups”)
 - ▶ Always one question: “what are you still unsure about?”
 - ▶ Come to class and apply what you just learned
 - ▶ Online homework for review
 - ▶ In-class quizzes and exams
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OUR IN-CLASS MEETINGS

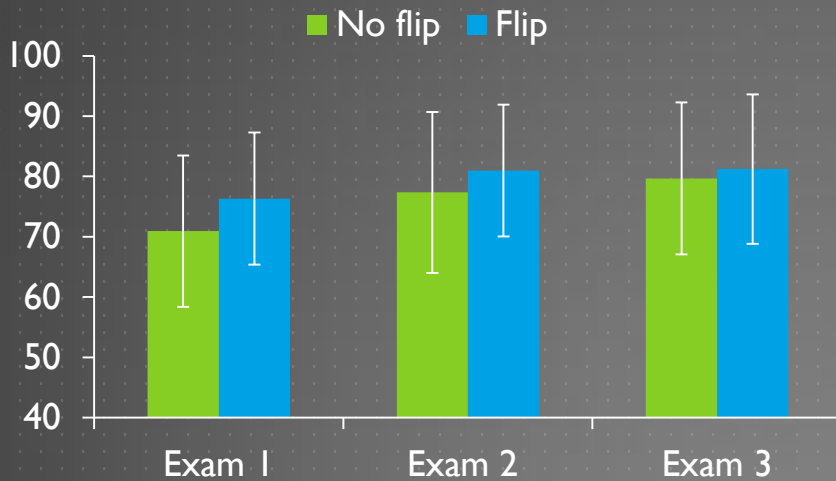
- ▶ Online quiz results
- ▶ Discuss submitted and other questions
- ▶ Practice problems with group discussion and chalkboard reporting
 - ▶ Naming, mechanisms, and synthesis
- ▶ Practice speaking “organic chemistry language”

DOES IT WORK?

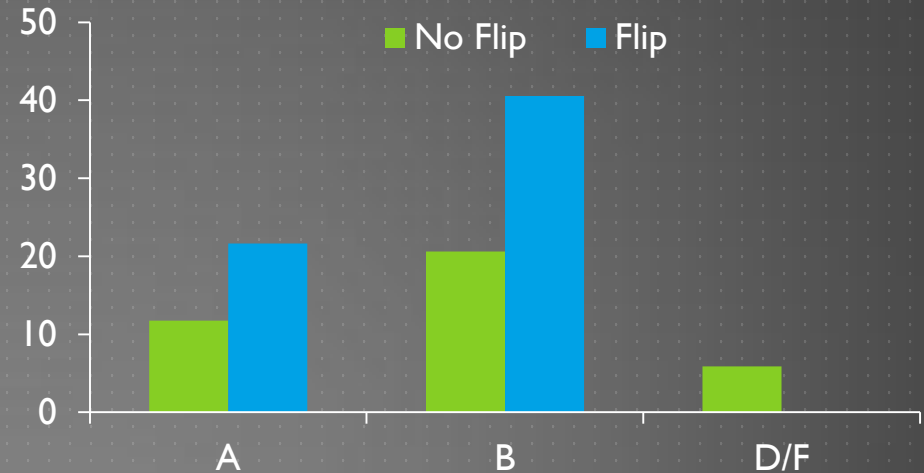
- ▶ My observations
 - ▶ “Arguments”
 - ▶ Increased confidence and in-class performance
- ▶ Exit survey
 - ▶ >90% of students surveyed liked/“loved” the format
 - ▶ 3 out of 37 students “strongly disliked” the flip
- ▶ Grade analysis

DOES IT WORK—SO FAR?

Average Exam Scores (%)



Overall Course Grade Distribution (%)




EXIT SURVEY RESULTS

1 (strongly disagree)	2	3	4	5 (strongly agree)	
Working on problems in class increased my problem-solving comfort level.					4.459
Listening to lectures outside of the classroom and problem-solving in class is effective.					4.405
Listening to lectures at home and problem-solving in class was more effective than if I had listened to a lecture during class and did problems on my own at home.					4.333
I have a good understanding of organic chemistry, and feel comfortable explaining concepts to others.					3.919
I am still nervous about the format of this course, even at the end of the semester.					1.946

ONE STUDENT'S PERSPECTIVE

“I LOVE the course format. I must say that it took some time getting used to not having lecture in the classroom, but it grows on you...By coming to class already with material in the back of your head, it definitely makes for a more productive class and any students that are having problems, it seems to help them out as well.”

HOW CAN THE “FLIP” IMPROVE?

- ▶ Constantly thinking about improvements!
 - ▶ Change online quizzes to in-class clicker questions
 - ▶ Reading assignments?
 - ▶ Can we know if these are completed?
 - ▶ Improve and add to in-class activities
 - ▶ POGIL
 - ▶ Shorter online vodcasts to hold interest
 - ▶ Better assessments: how do we assess retention?
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SUMMARY

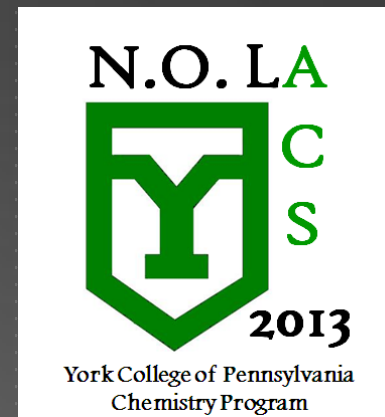
- ▶ The Flipped class:
 - ▶ Moves content outside the classroom as homework
 - ▶ Increased one-on-one interaction with the students
- ▶ Exam and overall grades improved with the flip
- ▶ Informal observations indicate increased comprehension and confidence in material
- ▶ Students appreciate the format once they get used to it
- ▶ Improvements are ongoing!

THANK YOU!

▶ YCP

- ▶ Physical Sciences Department
- ▶ Chemistry Program
- ▶ Pat Poet (Blackboard/Library)
- ▶ IT (Mac setup)
- ▶ Faculty Development Committee

- ▶ <http://www.flippedlearning.org>
- ▶ K. Butzler, Penn College of Tech. (survey questions)
- ▶ <http://www.flippedclassroom.com/>
- ▶ <http://www.flipteaching.com/>
- ▶ Bergman, J., Sams, A. “Remixing Chemistry Class”, *Learning & Leading with Technology* **Dec/Jan 08/09**, 22-27.



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