

# G.P.S. Guidance for Building Community and Motivating Students

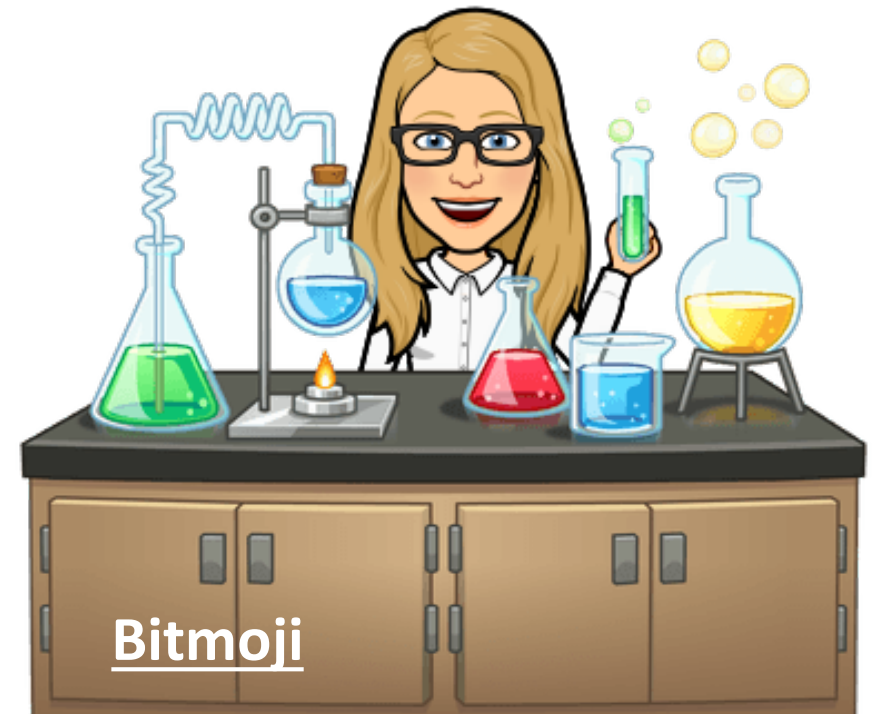


Laurie S. Starkey

Cal Poly Pomona

[lsstarkey@cpp.edu](mailto:lsstarkey@cpp.edu)

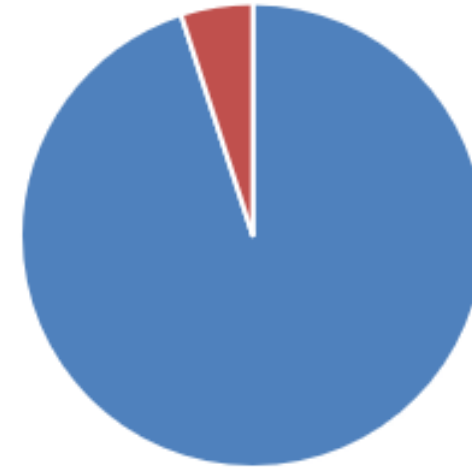
**BCCE 2022**



# Remote Teaching → Course Redesign

## To Reduce Cheating, *Minimize High-Stakes Exams*

- Pre-pandemic grading:  
95% exams, 5% homework
- Major redesign needed!



■ Exams ■ Homework

|                |            |               |
|----------------|------------|---------------|
| Chap. 1, 2, 3  | Exam I     | 100 pts (20%) |
| Chap. 4, 5, 15 | Exam II    | 100 pts (20%) |
| Chapters 6, 7  | Exam III   | 100 pts (20%) |
| Chapters 1-11  | Final Exam | 200 pts (40%) |

Thursday, February 14 (50 min. during class time)

Thursday, March 14 (50 min. during class time)

Thursday, April 18 (50 min. during class time)

Tue, 5/14 or Thu, 5/16 (see schedule for times)

# Remote Teaching → Course Redesign

## New Grading Scheme

- 60% exams, lower-stakes final & lowest midterm is dropped
- 25% homework (WileyPLUS & “free red ink” assignments)
- 15% reflection (study groups, exam wrappers, writing prompts)

### How will your learning be measured?

Course grades are based on textbook-based homework (EOC), occasional quizzes, brief weekly assignments, three written midterm exams, and a final exam. I am planning on proctoring the written exams synchronously via Zoom, but please let me know if you need to adjust your time slot. *Each exam is cumulative but will emphasize the immediately preceding chapters.* Exams must be taken as scheduled and NO make-up exams will be given, but **the lowest midterm grade will be dropped**. If more than one midterm is missed, a grade of zero will be assigned for the missing midterm exam(s).

|                         |               |  |
|-------------------------|---------------|--|
| Homework problems       | 125 pts (25%) | End-of-Chapter (EOC) problems/WileyPLUS/Quiz   |
| Weekly study/reflection | 75 pts (15%)  | Friday Fives, OLC Study Group, Exam Wrapper... |
| Ch. 1, 2, 3             | Exam I        | 100 pts  |
| Ch. 4, 5, 15            | Exam II       | 100 pts  |
| Ch. 6, 7                | Exam III      | 100 pts  |
| Ch. 1-11                | Final Exam    | 100 pts (20%)                                  |

Thursday, 2/18 (60 min. during class time)  
Thursday, 3/18 (60 min. during class time)  
Thursday, 4/22 (60 min. during class time)  
Tuesday 5/18 (see schedule for times)



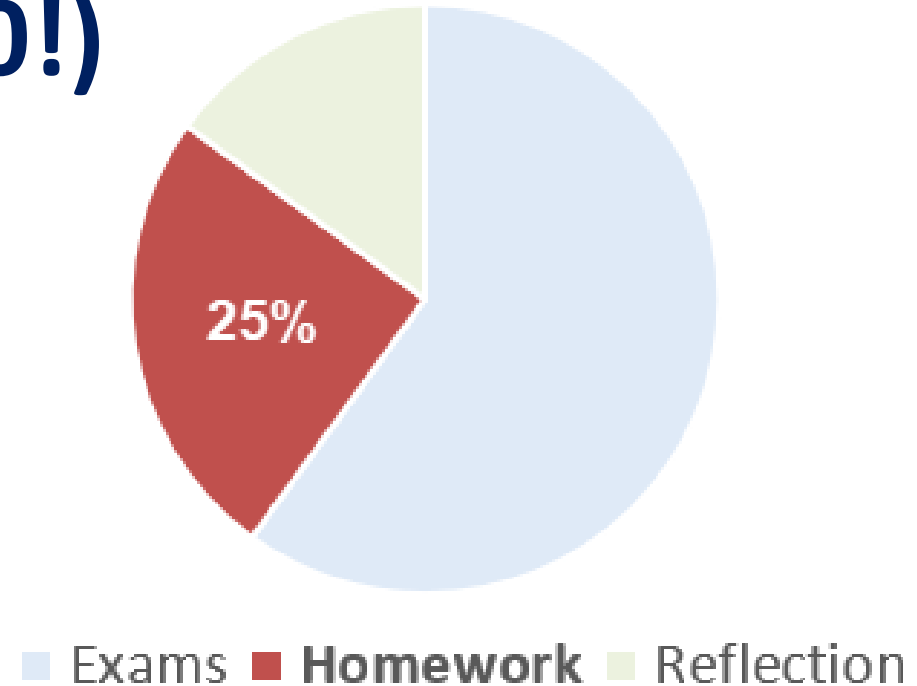
■ Exams ■ Homework ■ Reflection

**Goal: ENGAGE and MOTIVATE students!**

# Online Homework = Formative Assessment

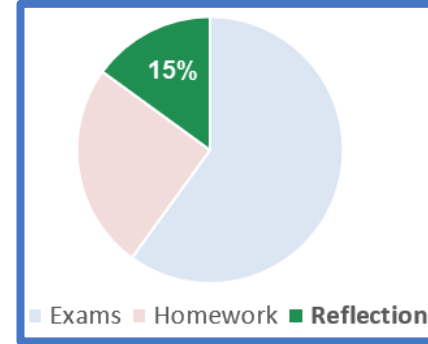
25% Homework: Klein SkillBuilders and/or End-of-Chapter Problems (>5,000!)

- If you value it, assign points to it!  
*(...and then **students value it!**)*
- Encourages self-assessment and use of Solutions Manual
- Interaction and engagement with e-text/resources, auto-grading = 24/7 feedback



# Keeping Students Motivated

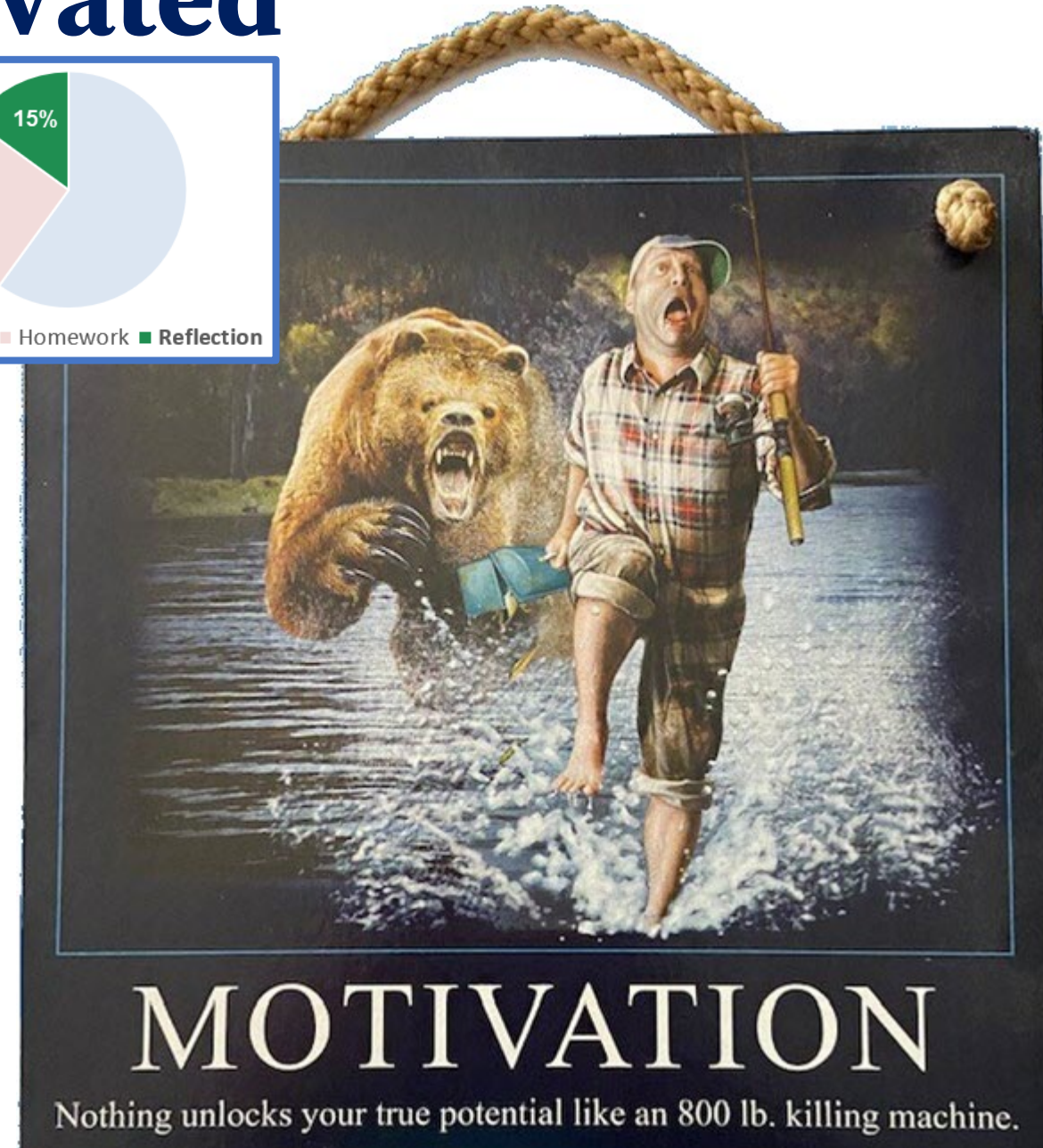
15% of grade:  
study groups and weekly  
“Friday5” reflection



Motivate Lab training (GPS)

- ✓ Growth Mindset
- ✓ Purpose & Relevance
- ✓ Sense of Belonging

Dustin Thoman  
[dthoman@sdsu.edu](mailto:dthoman@sdsu.edu)



# GPS: Encouraging a Growth Mindset

- Value formative assessment (points for textbook problems!)
- Drop lowest exam
- Discuss study strategies
- Discuss neuroplasticity, etc.
- Share your own stories (struggles/growth)
- Provide metacognitive exercises
  - Exam Wrappers, weekly study plans



resources

# Fostering Metacognitive Reflection

## Exam Wrappers

- Survey given after each midterm exam
- Students reflect on...
  - ✓ how they prepared
  - ✓ what mistakes they made
  - ✓ how they will prepare differently next time
- Course credit earned by submitting wrapper + exam corrections (4 points each)

# Metacognitive Reflection: Exam Wrapper

## CHM 3140 Exam Wrapper - Post-Test Survey

Name: \_\_\_\_\_

Metacognition By taking a step back and thinking about the way you learn, you can improve your learning! The following survey will guide you through an exercise in self-reflection, with the goal of improving your performance on the next exam. You will earn 4 points credit if you complete this survey, and 4 points for corrections (\*include written reflection, if score <50). It analyzes the following three areas

1. How did you prepare for this exam?
2. What kinds of mistakes did you make?
3. How will you prepare differently next time?

What was your score\* on the exam?

*\* If exam score is below 50, you must submit a written reflection with your exam corrections (what will you do differently for the rest of the semester?)*

What was your grade in CHM 1220?

Are you repeating CHM 3140? Y / N

1. Leading up to the exam, approximately how many hours per week outside of class (on average) did you spend studying Organic Chemistry?

2. Given the number of textbook problems in each chapter (#), about how many did you work on?

| <b>Ch. 1 (# problems)</b><br><b>(Lewis, hybridization, bp)</b> |  | <b>Ch. 2 (# problems)</b><br><b>(Resonance)</b> |  | <b>Ch. 3 (# problems)</b><br><b>(Acid/Base)</b> |  |
|--|--|---|--|---|--|
| 10 SkillBuilders (34)  |  | 10 SkillBuilders (33)                           |  | 11 SkillBuilders (33)                           |  |
| End-of-Chapter (EOC) (47)                                      |  | EOC (51)  |  | EOC (40)  |  |





# Metacognitive Reflection: Exam Wrapper

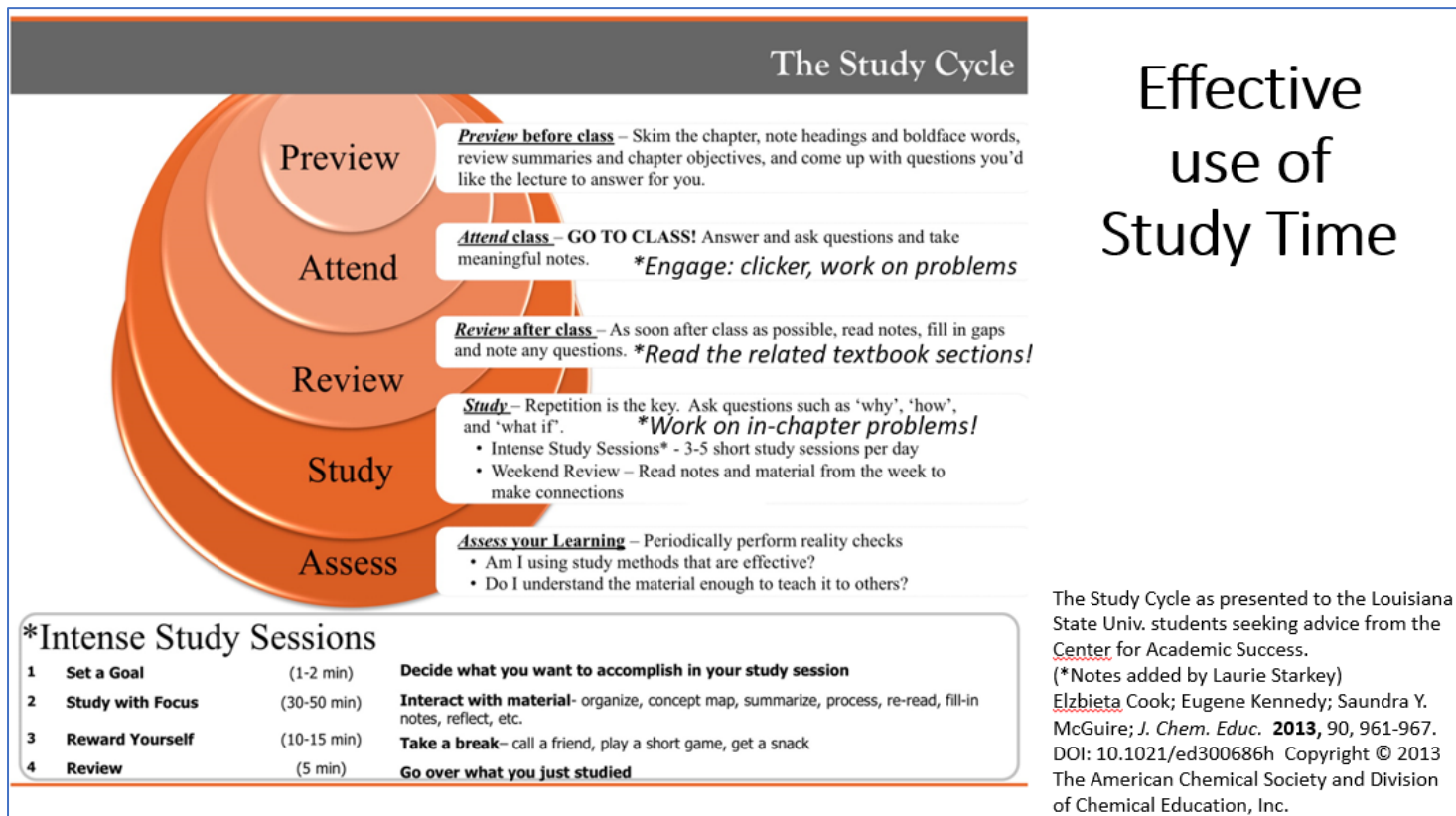
10. Did you experience any test anxiety? Mark all that apply.

- I felt rushed.
- I was so hungry I could not concentrate.
- I panicked.
- I could not concentrate because I was too distracted. (Explain.)
- I was so tired I could not concentrate.
- I experienced mental block.

11. Would you like to improve your performance on the next exam, or maintain your high level if you did well? Mark the things you will do differently or spend more time on when preparing for the next exam.

- Improve my time management
- Reading textbook section(s) for the first time
- Rereading textbook section(s)
- Work on/review homework assignments
- Solving textbook problems for practice
- Working on online homework (e.g., Sapling)
- Writing/using flash cards
- Writing key concept or chapter summaries
- Reviewing sample exams
- Working on sample exams
- Reviewing/rewriting your own notes
- Reviewing materials from course website
- Working with a study group
- Other (Please specify)

# Metacognitive Reflection: Exam Wrapper



Effective  
use of  
Study Time

## Study Strategy Handouts

How to  
"study"  
o-chem

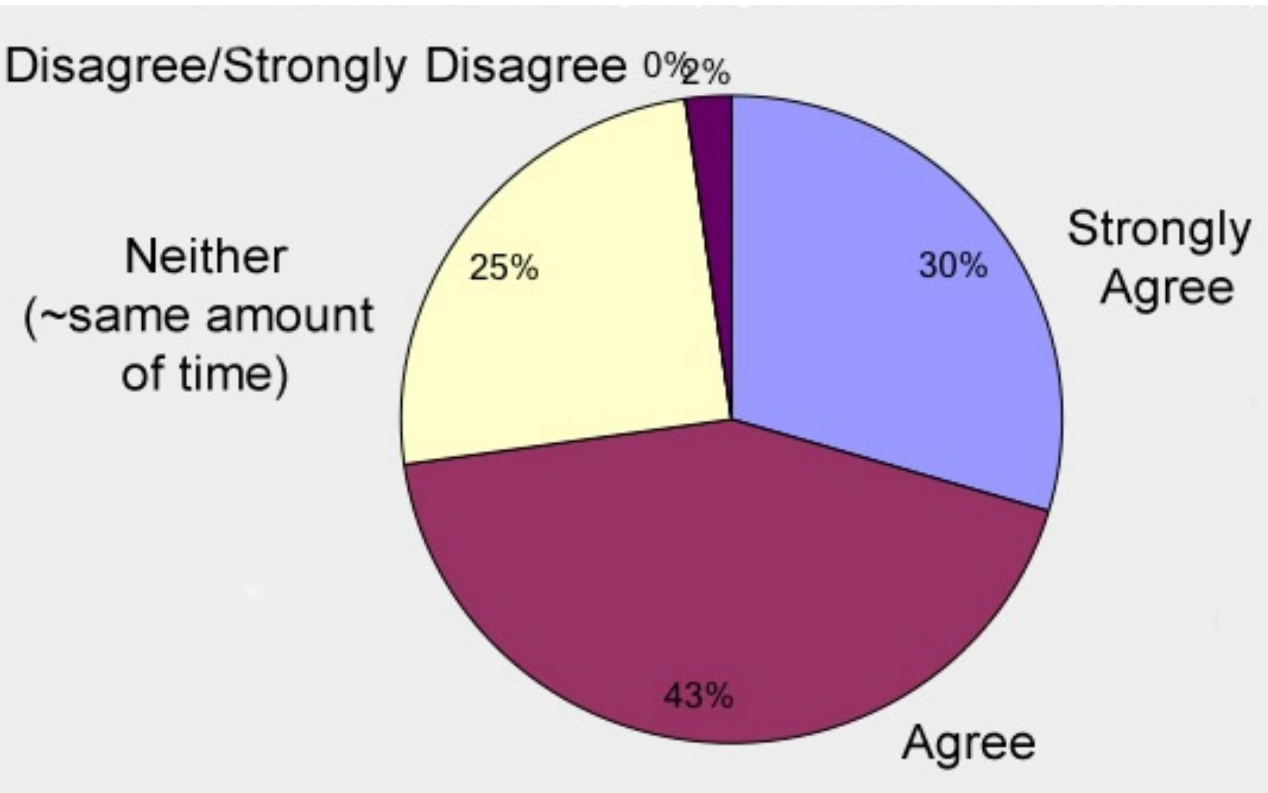


**Additional 4 points course credit if you turn in  
corrections for the problems you got wrong!**

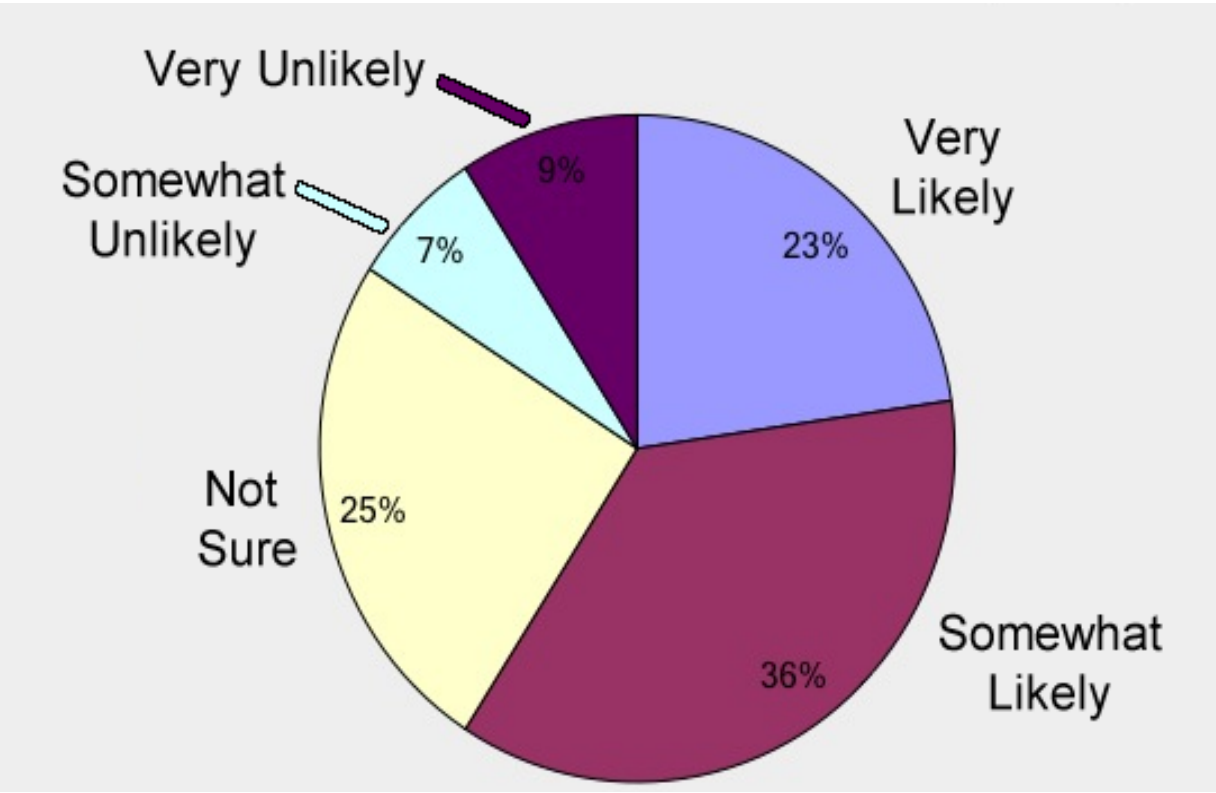
How to  
earn an  
"A"



# Exam Wrapper – Student Feedback



***Spent more time reviewing graded midterm?***



***Improved grade on second midterm?***

# Weekly “Friday Five” Reflection

1) Describe how you spent your time working on Organic Chemistry this past week.

2) Describe your plan for working on Organic Chemistry this coming week.

3) Various ...*promotes Purpose, Relevance, Value*  
*...and it's a wonderful way to connect!*

# Friday5 Prompts (Gradescope)

- Create a Concept Map
- Research/share Nanotech topic
- Start-Stop-Continue  
(mid-semester feedback)
- Mental Health check-in
- Career planning (explore REU)
- Upload a picture of your flash cards
- Celebrate National Chemistry Week (explore webpage)
- ACS celebrates Earth Day
- Favorite volunteer activities?  
YouTuber? Autumn activities?



# Friday5 Responses → Class “411” Announcements

The image displays a collection of hand-drawn concept maps and mind maps related to chemistry, specifically focusing on stereochemistry, chirality, and stereoisomers. The maps are arranged in a collage, with a central text overlay that reads "Amazing Concept Maps!".

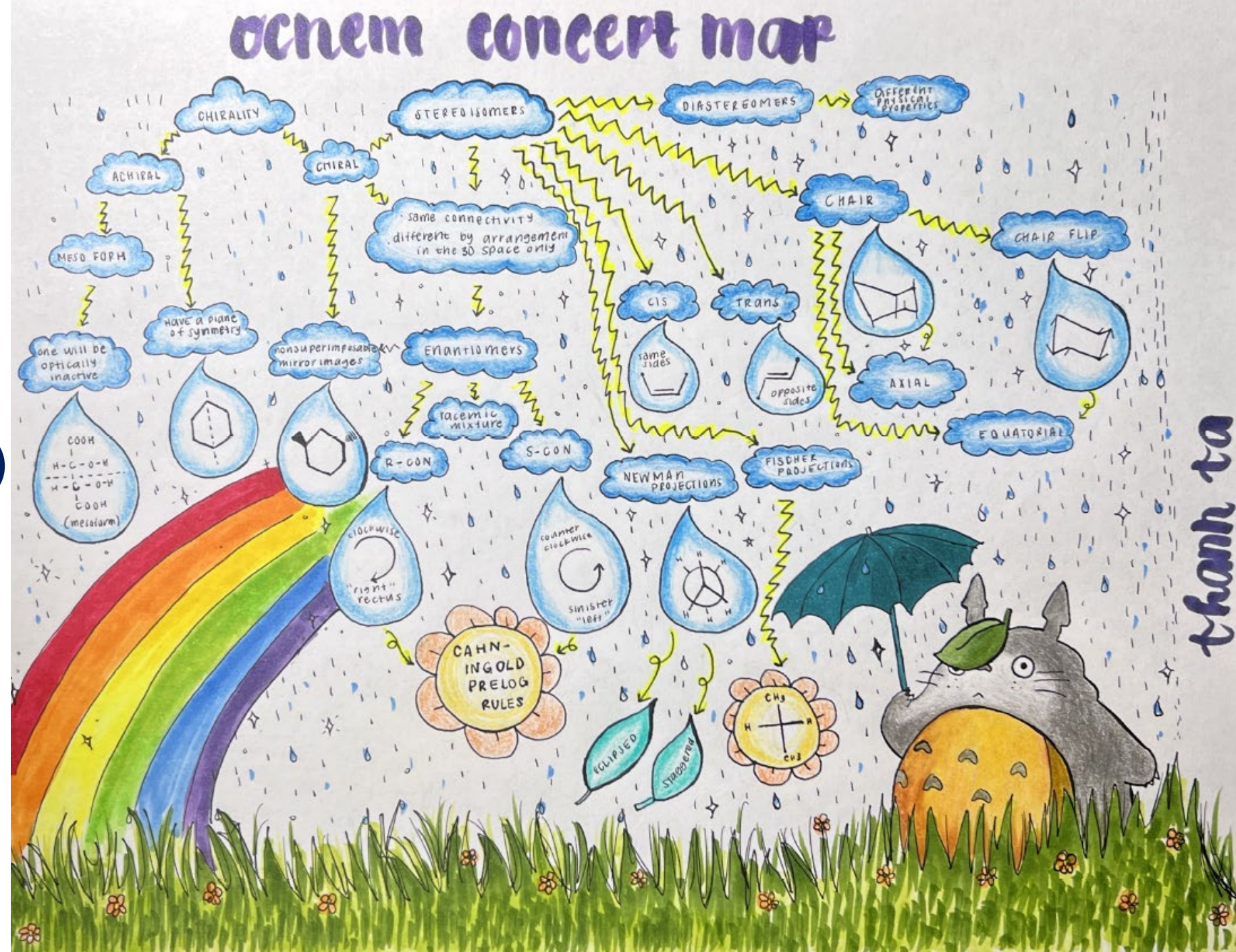
Key concepts and terms visible in the maps include:

- Stereochemistry**: A central theme, often branching into Chiral, Achiral, and Stereocenters.
- Chirality**: A major focus, with sub-topics like Chiral Centers, Chiral Molecules, and Chiral Pools.
- Stereoisomers**: A large category, often divided into Enantiomers (mirror images) and Diastereomers (non-mirror images).
- Enantiomers**: Often discussed in terms of optical activity, plane of symmetry, and physical properties.
- Diastereomers**: Often discussed in terms of different physical properties and meso forms.
- Meso Compounds**: A specific type of achiral molecule with stereocenters.
- Optical Activity**: A property of chiral molecules, often linked to the rotation of plane-polarized light.
- Plane of Symmetry**: A key concept for determining chirality.
- Asymmetric Carbons**: Another term for chiral centers.
- Priority Rules**: Often used to determine the configuration of chiral centers.
- Resolution**: The process of separating enantiomers.
- Diastereomeric Pairs**: A specific relationship between diastereomers.
- Enantiomeric Pairs**: A specific relationship between enantiomers.
- Meso Compounds**: A specific type of achiral molecule with stereocenters.
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- Priority Rules**: Often used to determine the configuration of chiral centers.
- Resolution**: The process of separating enantiomers.
- Diastereomeric Pairs**: A specific relationship between diastereomers.
- Enantiomeric Pairs**: A specific relationship between enantiomers.

The maps are highly detailed and colorful, often using different colors to distinguish between different levels of the hierarchy or different types of relationships. Some maps include small illustrations, such as a cartoon character with a flame on its head, and others use molecular models or diagrams to illustrate concepts.

**This Year's  
Stereoisomer  
Concept Map  
Winner!**

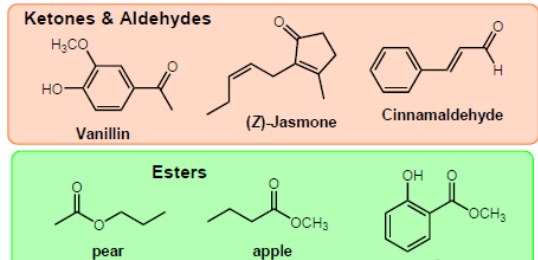
**(\$20 gift card)**



# GPS: Focusing on Purpose and Relevance

- Weekly reflection assignments
  - Find/share an interesting molecule
  - Tell me why this course matters to you
- Share stories of former students
- Provide “hooks” to grab attention

## Fragrant Carbonyl Compounds



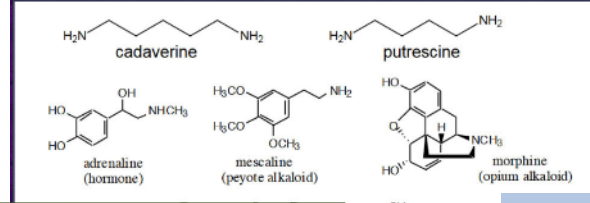
## Common Names of Carboxylic Acids

|                                      |  |                                     |                                       |                                    |  |                                    |                                       |                                    |  |
|--------------------------------------|--|-------------------------------------|---------------------------------------|------------------------------------|--|------------------------------------|---------------------------------------|------------------------------------|--|
| formic acid<br>found in ant stings   | acetic acid<br>found in vinegar        | propionic acid<br>found in cheese   | butyric acid<br>found in butter       | valeric acid<br>found in valerian  | caproic acid<br>found in goat milk       | heptanoic acid<br>found in caper   | octanoic acid<br>found in goat milk   | nonanoic acid<br>found in caper    | decanoic acid<br>found in caper        |
| 11 capric acid<br>found in goat milk | 12 lauric acid<br>found in coconut oil | 13 myristic acid<br>found in nutmeg | 14 palmitic acid<br>found in palm oil | 15 stearic acid<br>found in tallow | 16 arachidic acid<br>found in peanut oil | 17 behenic acid<br>found in tallow | 18 lignoceric acid<br>found in tallow | 19 cerotic acid<br>found in tallow | 20 linoic acid<br>found in linseed oil |
| 19 myristic acid<br>found in nutmeg  | 21 lauric acid<br>found in coconut oil | 22 myristic acid<br>found in nutmeg | 23 palmitic acid<br>found in palm oil | 24 stearic acid<br>found in tallow | 25 arachidic acid<br>found in peanut oil | 26 behenic acid<br>found in tallow | 27 lignoceric acid<br>found in tallow | 28 cerotic acid<br>found in tallow | 29 linoic acid<br>found in linseed oil |
| 29 myristic acid<br>found in nutmeg  | 30 lauric acid<br>found in coconut oil | 31 myristic acid<br>found in nutmeg | 32 palmitic acid<br>found in palm oil | 33 stearic acid<br>found in tallow | 34 arachidic acid<br>found in peanut oil | 35 behenic acid<br>found in tallow | 36 lignoceric acid<br>found in tallow | 37 cerotic acid<br>found in tallow | 38 linoic acid<br>found in linseed oil |

## Interesting Alcohols: Can you Match Structure & Description?

CCCCCCCCCCCCCO grain alcohol (beer, wine, margaritas)  
C12CCCC1CCCC2O sucrose (table sugar)  
CC1CCCC(C)CCCC1 cholesterol (strengthens cell walls)  
CC12CCCC3CCCC4C1CC2(C)C3 a pheromone (attracts female mice to male urine)  
OC1C(O)C(O)C(O)C(O)C1O Haldol  
OC1C(O)C(O)C(O)C(O)C1O (-)-

## Interesting Amines



## Smoke Taint in Wine

Lignin is found in the cell walls of wood and bark. The complex polymer breaks down into volatile phenols when burned.

Volatile phenols in smoke include guaiacol, 4-methyl guaiacol and cresols that may impart ashy flavors on wine.

The non-toxic volatile phenols bind to sugars in the grape skins and berries forming non-volatile glycoconjugates with no smoke flavor or aroma.

CC1=CC=C(C=C1)OC guaiacol  
CC1=CC=C(C=C1)OC 4-methyl guaiacol  
CC1=CC=C(C=C1)OC o-cresol  
OC1C(O)C(O)C(O)C(O)C1O glycoconjugates (2)

## Some Interesting Molecules!

Morphine: Treats excruciating pain  
 Sodium Benzoate: preservative  
 Theobromine: in chocolate (bad for dogs)  
 Caffeine: study aid & can defend against Alzheimer's and Parkinson's  
 Fructose: Fruit sugar  
 Biotin (B7): healthy hair/nails  
 Remdesivir: COVID drug by Gilead  
 Serotonin: Happy? Depressed?  
 Caffeine: study aid & can defend against Alzheimer's and Parkinson's  
 Bupropion: depression & anxiety treatment  
 Benzocaine: local anesthetic  
 Midazolam: sedative for exotic animals  
 Hemoglobin: Blood oxygen transport  
 Linezolid: antibiotic  
 4-Vinylanisole: Pheromone & Aromatic component of brandy  
 Gingerol (major component Anti-inflammatory)  
 Salicylic Acid: pro-drug for aspirin, acne treatment  
 Acrylic acid: polymers  
 Chlorophyll A: photosynthesis  
 Glycine (amino acid can treat metabolic disorders)  
 Maltotriose: Deadly plankton product  
 Dimethicone: shampoo, cosmetics, Silly Putty  
 Selenocysteine: Amino acid used in NMR/radiology  
 "Superbowl" Drug delivery

## CPP Grad & Veterinarian Kim De La Peza

- B.S. Animal Science CPP 2008
- D.V.M. Michigan State 2012
- Emergency Room Vet
- VCA Animal Hospital

What will your story be?



# GPS: Build Community, Sense of Belonging

*"Luke, you must learn the ways of the force"*



*"I'm ready, Obi Wan."*



## Jedi Training in 2020-21

*"Ooooookay. Let's see here. After you've logged in, you're gonna want to go to the student portal and click Jedi...."*



# GPS: Build Community, Sense of Belonging

## Redesigned syllabus

- Student-centered, you/I/we

## Introduction video

- Introduce yourself, share your passion

## Course Padlet

- Students can introduce themselves

## Encourage study groups

- Organic Learning Community (OLC)
- Offer credit for weekly report w/selfie pic Student testimonials

## Communicate: Discord Server, Google Voice (texting)





Welcome to Organic Chemistry!

# GPS: Build Community, Sense of Belonging

## OLC Reporting (Gradescope Online Assignment)

OLC report and photo 1

PROBLEM  Insert Images  Insert Field

Who did you get together with? When was the study session, and how did you meet up?

|\_\_\_\_|

What did your OLC work on during the study session?

|\_\_\_\_|

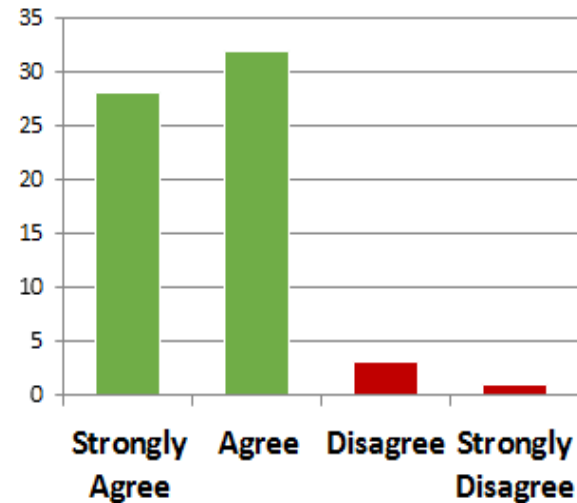
What did you contribute to the session?  
What did you learn?

|\_\_\_\_|

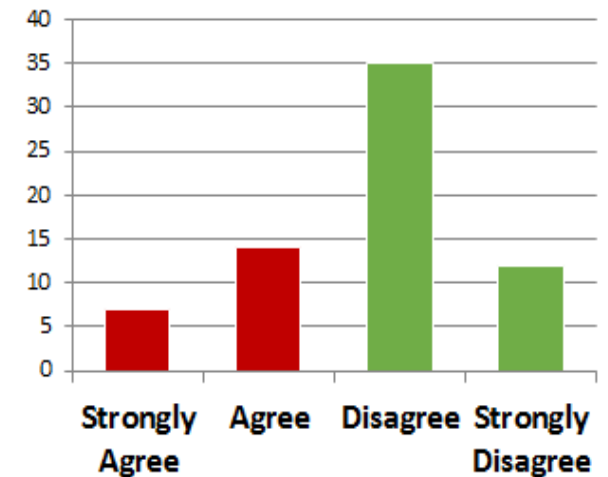
Please upload evidence of your study session (screenshot/photo/notes). Thank you, and have a great week!

|files|

Overall, I found the OLC to be a positive experience. (94% agreed)



I would have done just as well in this course without a study group. (69% disagreed)



# GPS: Build Community, Sense of Belonging

## Fostering Communication

- Discussion boards
- Google Voice (texting)
- Discord server
  - instructor/student Q&A posts
  - student/student
  - Familiar to gamers



<https://discord.gg/m6gQWE>

The screenshot shows a Discord server interface for 'Dr. Starkey's Organic Chemistry'. The server has several channels: 'welcome', 'course-questions', 'homework-questions', 'office-hour-times', 'class-schedule', 'lecture-notes', 'looking-for-study-groups', 'Study Group 1', 'Study Group 2', and 'SMACS'. The 'course-questions' channel is active, showing a message from LaurieStarkey with a YouTube link and a response from Canum asking for an ACS study guide. A pinned message from LaurieStarkey provides resources and materials, including links to WileyPLUS, EdExams, and ACS exams. The server has 16 online members listed on the right side.

# I am grateful for the relationships we have built!

Professor Starkey,

I know you are a cat mom so I thought I would share this photo of my kitten! I found her with my chemistry flashcards one morning in her favorite box. Not sure how she was able to pull that off. Hope you enjoyed



# Thank you! Any Questions?

[lsstarkey@cpp.edu](mailto:lsstarkey@cpp.edu)



[chemistryconnected.com](http://chemistryconnected.com)

Chat

From [redacted] to Everyone: 11:0  
can you explain again about how its more stable

From [redacted] to Everyone: 11:0  
Seeing whether or not I got a practice problem right is like watching the climax of a movie. Super suspenseful

From [redacted] to Everyone: 11:0  
and theres always a plot twist^

From [redacted] to Everyone: 11:0  
hahah

From [redacted] to Everyone: 11:0  
Yeah I thought I got it wrong  
Without irony this gets my adrenaline flowing

From [redacted] to Everyone: 10:40 AM  
yessss !!!! good job

From [redacted] to Everyone: 10:40 AM  
you're doing great! very cool

From [redacted] to Everyone: 10:40 AM  
The test will still 100% kill me

From [redacted] to Everyone: 10:40 AM  
same^

From [redacted] to Everyone: 10:40 AM  
^^^

From [redacted] to Everyone: 10:40 AM  
Yay! Same here lol

From [redacted] to Everyone: 10:40 AM  
same

From [redacted] to Everyone: 10:41 AM  
nooooo! good vibes guys we got this!

From [redacted] to Everyone: 10:41 AM  
But getting this question right makes my brain feel like it just expanded to galaxy size

From Me to Everyone: 10:42 AM  
awesome!