جامعة قطر
QATAR UNIVERSITY

The 13th Excellence Day:
Education Through the Pandemic & Beyond

Microlearning Ideas

Three (mostly) Simple Tools I've Used in my Labs

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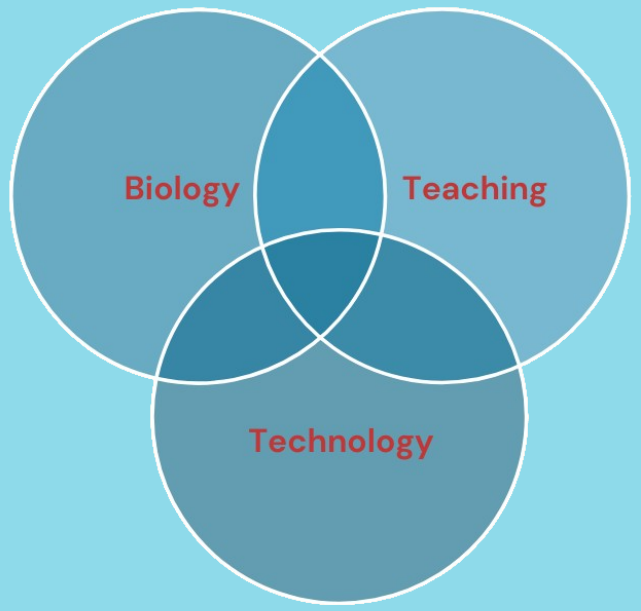
My Interests:



This Session:

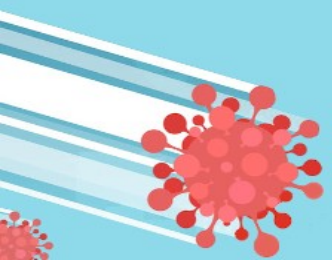
Three Examples of Microlearning

What is Microlearning?

Microlearning

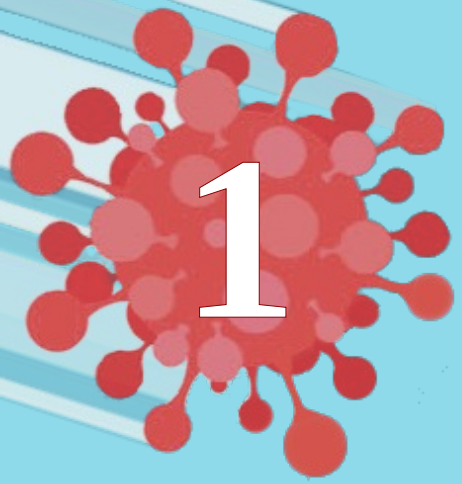
- Focus on a single objective/topic
- Short learning time

- Contexts
  - "Traditional" Instructional Session
  - Preparation for an Instructional Session
  - Post-instruction "Learning Boost"
  - Performance Support ("Just-in-time Learning")

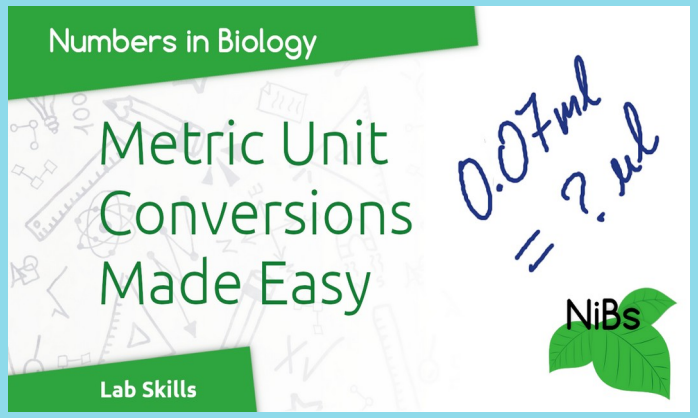


Concept Videos

Pre-Lab Preparation

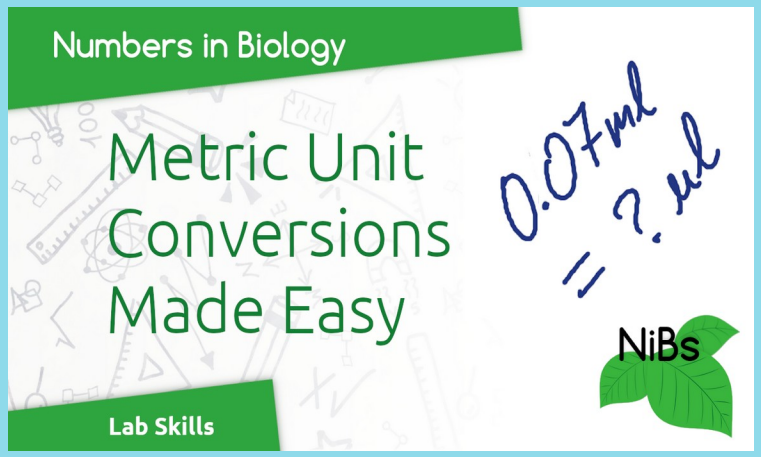


SI Unit Conversions



- **My Reasoning**
  - Commonly needed skill
    - Micropipetting
    - Weighing out reagents
- **My Aims**
  - No Calculators
  - Quick and correct
- **Results**
  - Total of 57 views from QU
  - Total of 35 students
  - It worked well...

SI Unit Conversions - Analysis

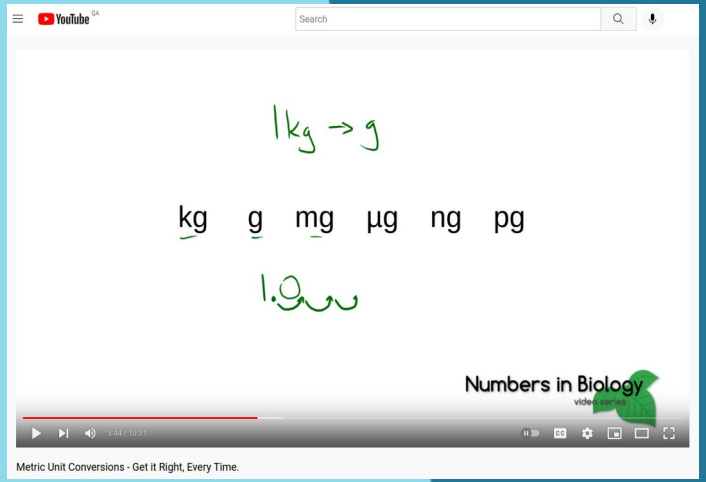


- Same question on the Midterm for the past 4yrs
  - Analyzed that question
- **In 2018** (25 Students)
  - Avg_{Total} = 1.28 / 2
  - Avg_{BelowC} = 1.036 / 2
- **In 2021** (35 Students)
  - Avg_{Total} = 1.80 / 2
  - Avg_{BelowC} = 1.667 / 2

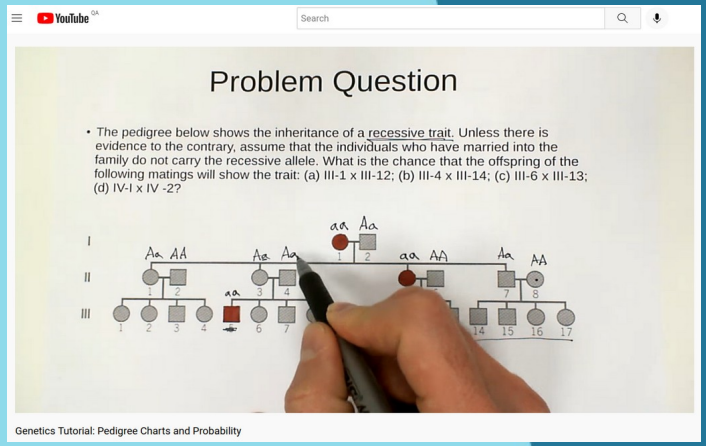
Tips for implementation

- Target a small topic / skill
- Give opportunit**ies** to use it afterwards

- Fancy equipment is not necessary
  - Your laptop:
    - Write on PPT slides
    - https://openboard.ch/
  - Your phone:
    - Great camera
    - Good quality mic



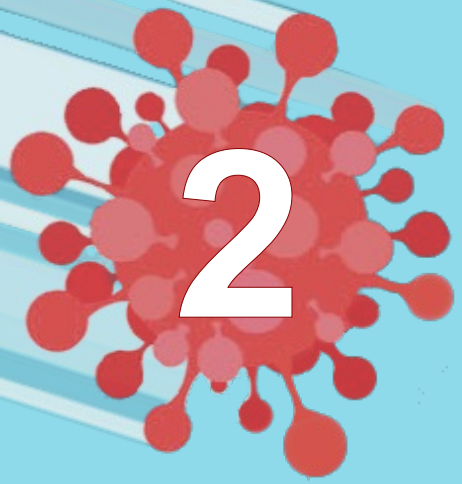
Metric Unit Conversions - Get it Right, Every Time.



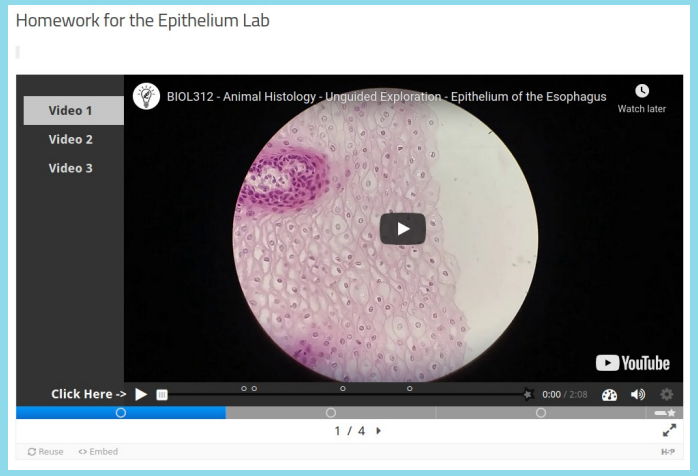
Genetics Tutorial: Pedigree Charts and Probability

Interactive Homework

Post-Lab Learning Boost

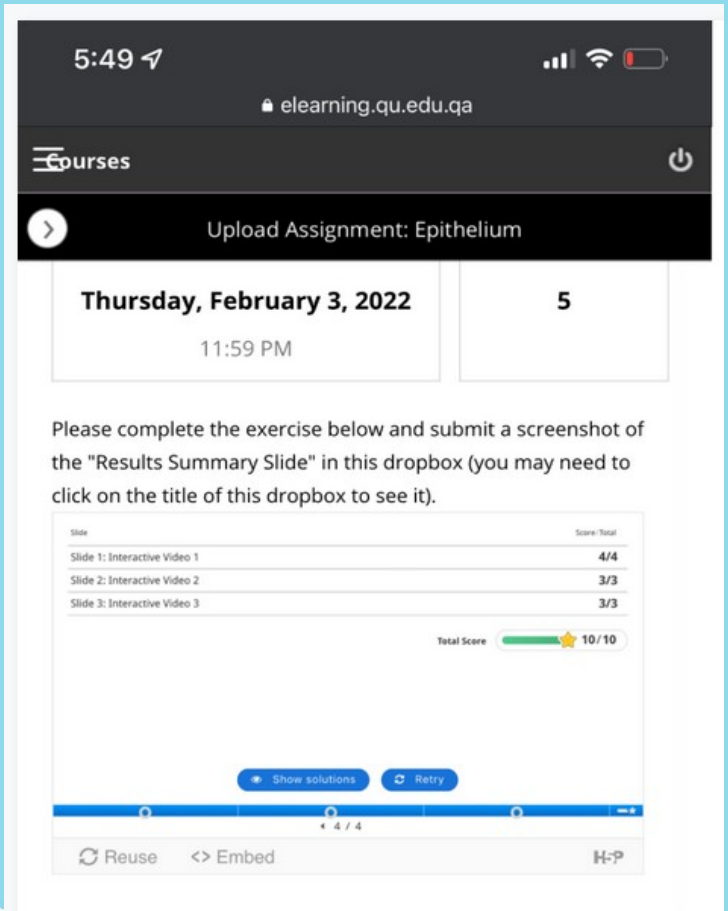


Virtual Histology Slides



- **My Reasoning**
  - Histology is very visual
  - Histology is a “language course”
  - Students need practice
- **My Aims**
  - Correct ID on Weekly Quiz
  - Correct ID on Exams
- **Implementation**
  - Students complete lab
  - Homework due on Sat evening
  - HW is an **interactive** H5P activity
  - Students submit screenshot of summary screen

Virtual Histology Slides – Analysis

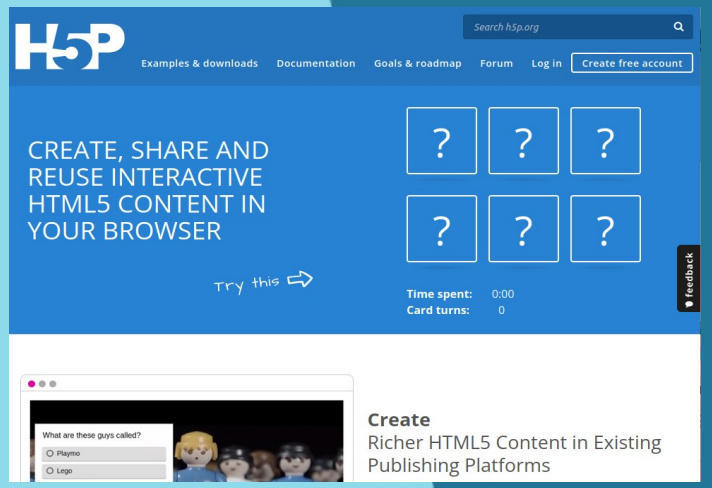


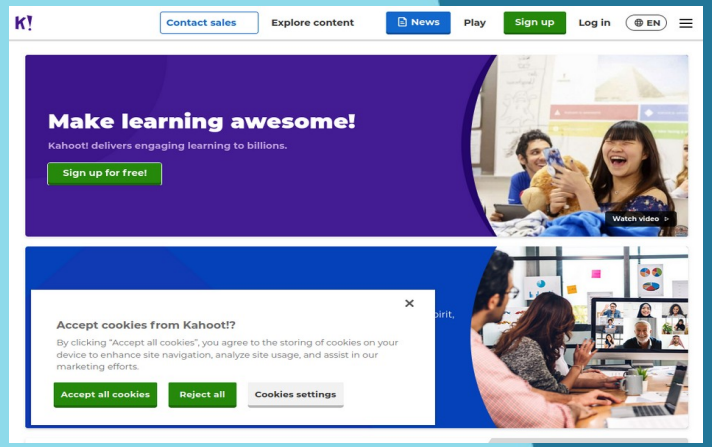
- **Testing**
  - Weekly Quiz includes 1-2 slides
  - Midterm is a slideshow
  - Final exam contains a slideshow

- **Results**
  - No HW = Low Quiz Grade
  - Non-completion lowers class average by 2-3%
  - Midterm grades are ~10% higher compared to Spring 2019 ***

Tips for Implementation

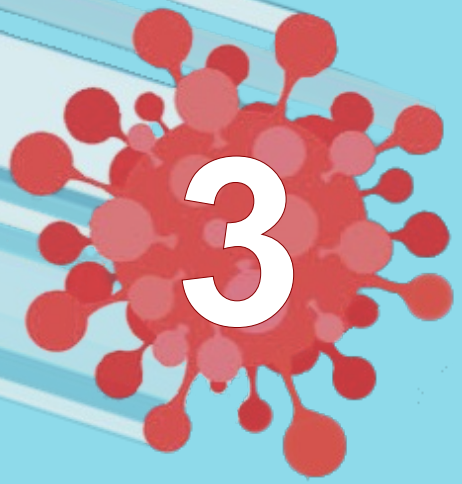
- Keep it short and simple
  - It's a practice opportunity
- This will be self-paced
  - Find something that will **give immediate feedback**
- Make it easy on you
  - Some tools:
    - H5P (https://h5p.org)
    - Kahoot (https://kahoot.com)
    - Quizlet (https://quizlet.com)





Two-Stage Cooperative Quizzes

Performance Support (just-in-time-learning)



Two Stage Cooperative Quizzes

Tips for Running Two Stage exams from University of British Columbia [PDF]

- **My Reasoning**
  - Ready to teach vs. ready to learn
  - My explanations are not universal
- **My Aims**
  - Learning will take place as needed
- **Implementation**
  - Students write the quiz twice
    - First, alone
    - Then, as a group

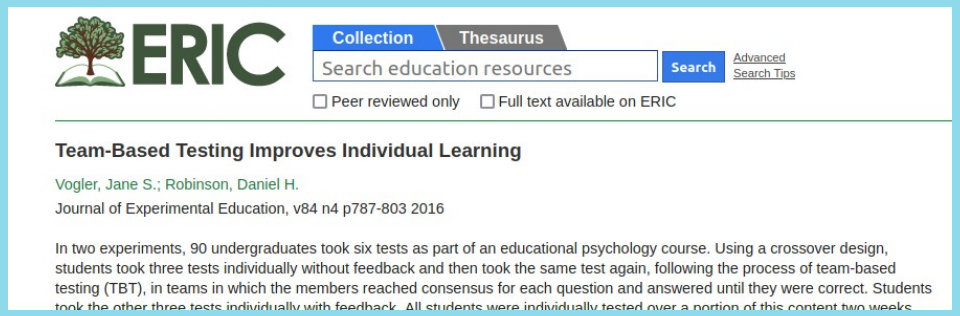
Sample Questions:

a. How much of the above sample would you use to make 2ml of a protein solution at 1mg/ml of Substance X? **(1 mark)**

3. Why is it important to obtain the protein concentration of your samples before performing a marker enzyme assay? **(2 marks)**

4. You want to run two samples of proteins on an SDS-PAGE gel, but you forgot to add BME (beta-merkaptoethanol) to one of the samples. How will the migration of the two protein samples on the gel differ? **(1 mark)**

Two Stage Cooperative Quizzes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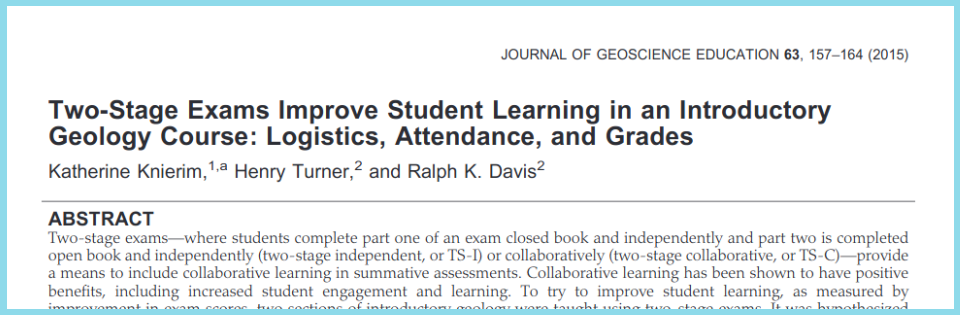
Team-Based Testing Improves Individual Learning

Vogler, Jane S.; Robinson, Daniel H.

Journal of Experimental Education, v84 n4 p787-803 2016

In two experiments, 90 undergraduates took six tests as part of an educational psychology course. Using a crossover design, students took three tests individually without feedback and then took the same test again, following the process of team-based testing (TBT), in teams in which the members reached consensus for each question and answered until they were correct. Students took the other three tests individually with feedback. All students were individually tested over a portion of this content two weeks

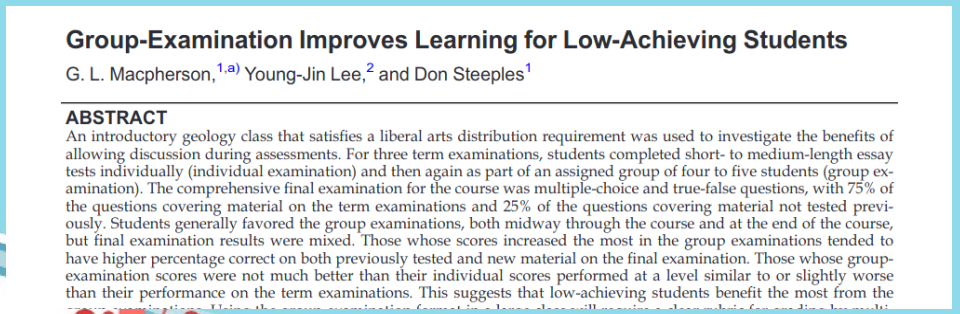

JOURNAL OF GEOSCIENCE EDUCATION **63**, 157–164 (2015)

Two-Stage Exams Improve Student Learning in an Introductory Geology Course: Logistics, Attendance, and Grades

Katherine Knierim,[1,a] Henry Turner,[2] and Ralph K. Davis[2]

ABSTRACT

Two-stage exams—where students complete part one of an exam closed book and independently and part two is completed open book and independently (two-stage independent, or TS-I) or collaboratively (two-stage collaborative, or TS-C)—provide a means to include collaborative learning in summative assessments. Collaborative learning has been shown to have positive benefits, including increased student engagement and learning. To try to improve student learning, as measured by improvement in exam scores, two sections of introductory geology were taught using two-stage exams. It was hypothesized


Group-Examination Improves Learning for Low-Achieving Students

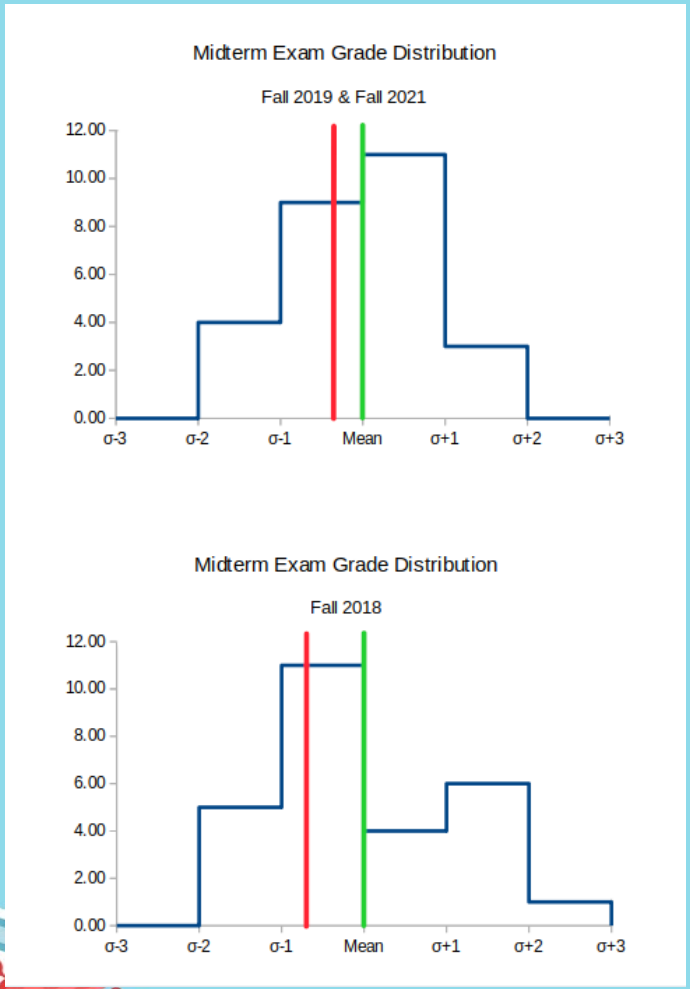
G. L. Macpherson,[1,a)] Young-Jin Lee,[2] and Don Steeples[1]

ABSTRACT

An introductory geology class that satisfies a liberal arts distribution requirement was used to investigate the benefits of allowing discussion during assessments. For three term examinations, students completed short- to medium-length essay tests individually (individual examination) and then again as part of an assigned group of four to five students (group examination). The comprehensive final examination for the course was multiple-choice and true-false questions, with 75% of the questions covering material on the term examinations and 25% of the questions covering material not tested previously. Students generally favored the group examinations, both midway through the course and at the end of the course, but final examination results were mixed. Those whose scores increased the most in the group examinations tended to have higher percentage correct on both previously tested and new material on the final examination. Those whose group-examination scores were not much better than their individual scores performed at a level similar to or slightly worse than their performance on the term examinations. This suggests that low-achieving students benefit the most from the group examinations. Using the group examination format in a large class will require a clear rubric for grading by multi

- **The Research**
  - Improvement in learning / retention
  - Good formative assessment
  - Helps struggling students
- **Student Response**
  - Students like them
    - Quizzes tend to be lively sessions

Two Stage Cooperative Quizzes



- Started the new quiz format in BIOL211 in 2019
  - Averages of struggling students shown in red
  - Class average in green

Midterm Results

- **Fall of 2019 & 2021**
  - 27 students total (2 sec. in 2021, 1 sec. 2019)
  - Difference is 1/3 of a Std. Dev.
- **Fall of 2018**
  - 27 students total (2 sections)
  - Difference is 2/3 of a Std. Dev.

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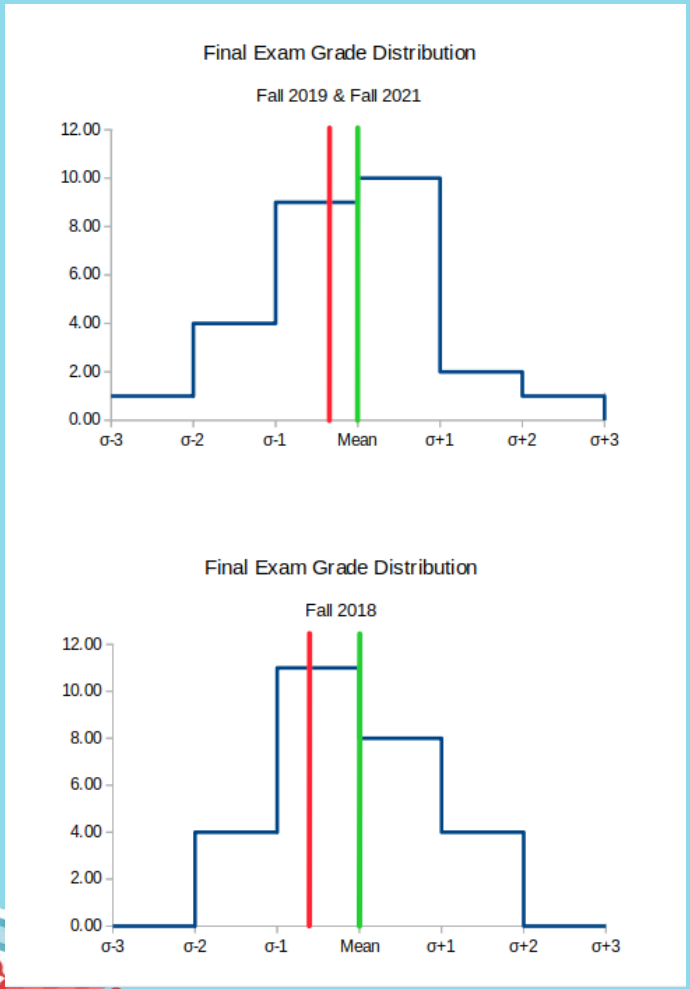
Two Stage Cooperative Quizzes



- Started the new quiz format in BIOL211 in 2019
  - Averages of struggling students shown in red
  - Class average in green

Final Exam Results

- **Fall of 2019 & 2021**
  - 27 students total (2 sec. in 2021, 1 sec. 2019)
  - Difference is >1/3 of a Std. Dev.
- **Fall of 2018**
  - 27 students total (2 sections)
  - Difference is 2/3 of a Std. Dev.

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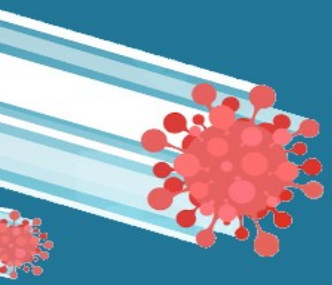
Tips for Implementation

- Explain to class how this will work
  - Point out reasons to still prepare
- Allow about twice the time
  - Give shorter quizzes
  - Allow some time for the “transition”
- Give only one sheet per group for part 2
- Encourage talking in part 2
- Studens can choose their partners, but...

Summary

- Focus on a single objective/topic
- Short time (5-10min)
- Something that could be re-visited as needed
- Instant feedback is key

- **Opportunities for Use in your Teaching:**
  - Preparation for an Instructional Session
  - Post-instruction “Learning Boost”
  - Performance Support (“Just-in-time Learning”)



Thank You

for your time and attention

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