You can draw here

Physics 111 - Class 13B
Final Exam Logistics

Do not draw in/on this box!

December 1, 2021

You can draw here

You can draw here

Class Outline

- Reminders
- A gift for you all...
- Review of Teaching Pedagogy and Growth mindset
- Final Exam Format
- Student Experience of Teaching
- Suggestions for how to study for the Final Exam

Reminders

Reminders

- Today: Final Exam stuff
- Friday: Diagnostic (for bonus marks)
  - Part 1 (at the beginning of the term): +0.5%
  - Part 2 (at the end of the term): +0.5%
- Monday & Wednesday next week: Student hours from 8-9 AM
  - Bring your questions!
- Final Exam!

Review of Teaching Pedagogy and Growth mindset

npj | science of learning

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Article | Open Access | Published: 12 November 2021

Interleaved practice enhances memory and problem-solving ability in undergraduate physics

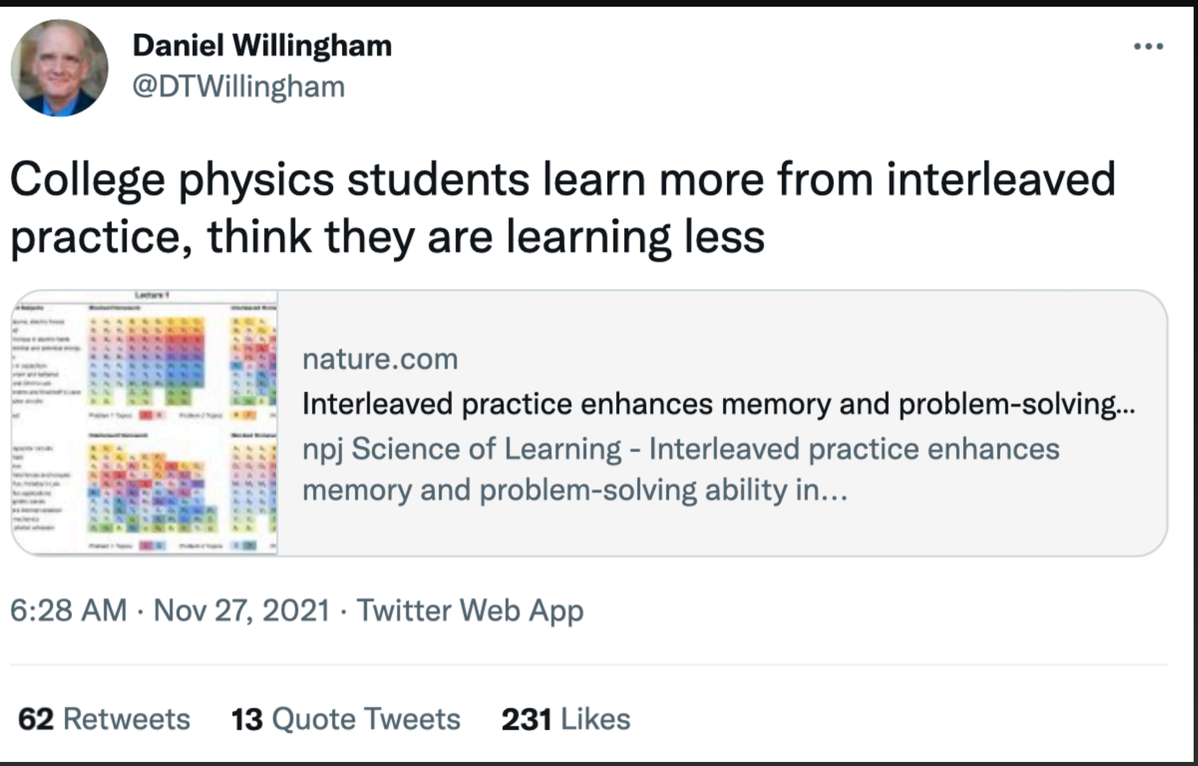
Joshua Samani & Steven C. Pan

npj Science of Learning **6**, Article number: 32 (2021) | Cite this article

2998 Accesses | **86** Altmetric | Metrics

Abstract

We investigated whether continuously alternating between topics during practice, or interleaved practice, improves memory and the ability to solve problems in undergraduate physics. Over 8 weeks, students in two lecture sections of a university-level introductory physics course completed thrice-weekly homework assignments, each containing problems that were interleaved (i.e., alternating topics) or conventionally arranged (i.e., one topic practiced at a time). On two surprise criterial tests containing novel and more challenging problems, students recalled more relevant information and more frequently produced correct solutions after having engaged in interleaved practice (with observed median improvements of 50% on test 1 and 125% on test 2). Despite benefiting more from interleaved practice, students tended to rate the technique as more difficult and incorrectly believed that they learned less from it. Thus, in a domain that entails considerable amounts of problem-solving, replacing conventionally arranged with interleaved homework can (despite perceptions to the contrary) foster longer lasting and more generalizable learning.



Course Learning Outcomes

1. Introduce the conceptual framework of classical mechanics and confront any misconceptions you might hold (encouraging “Newtonian” thinking).

2. Explore the power and simplicity of effective model building.

3. Develop the following skills: proportional reasoning, dimensional analysis, physical reasoning, pictorial representations (free-body diagrams), reading for understanding (asking why is this true?), that are critical for every upper year science course.

4. Develop advanced problem-solving, written and verbal communication skills.

5. Nurture the development of graphical approaches to understanding areas and slopes.

6. Understand and appreciate the crucial role that experiment plays in the scientific method.

7. Show you that physics is everywhere, and excite you about its relevance to your area of study and life

Growth Mindset

Slides from University System of Georgia Centre for Teaching and Learning (GA-CTL). Link to original slides here.

Why Does Mindset Matter?

Designed by GA-CTL Workgroup: Crystal Edenfield
Rhonda Porter
Deborah Walker
Joyce Weinsheimer
Lisa Yount

Slides from University System of Georgia Centre for Teaching and Learning (GA-CTL). Link to original slides here.

What is mindset?

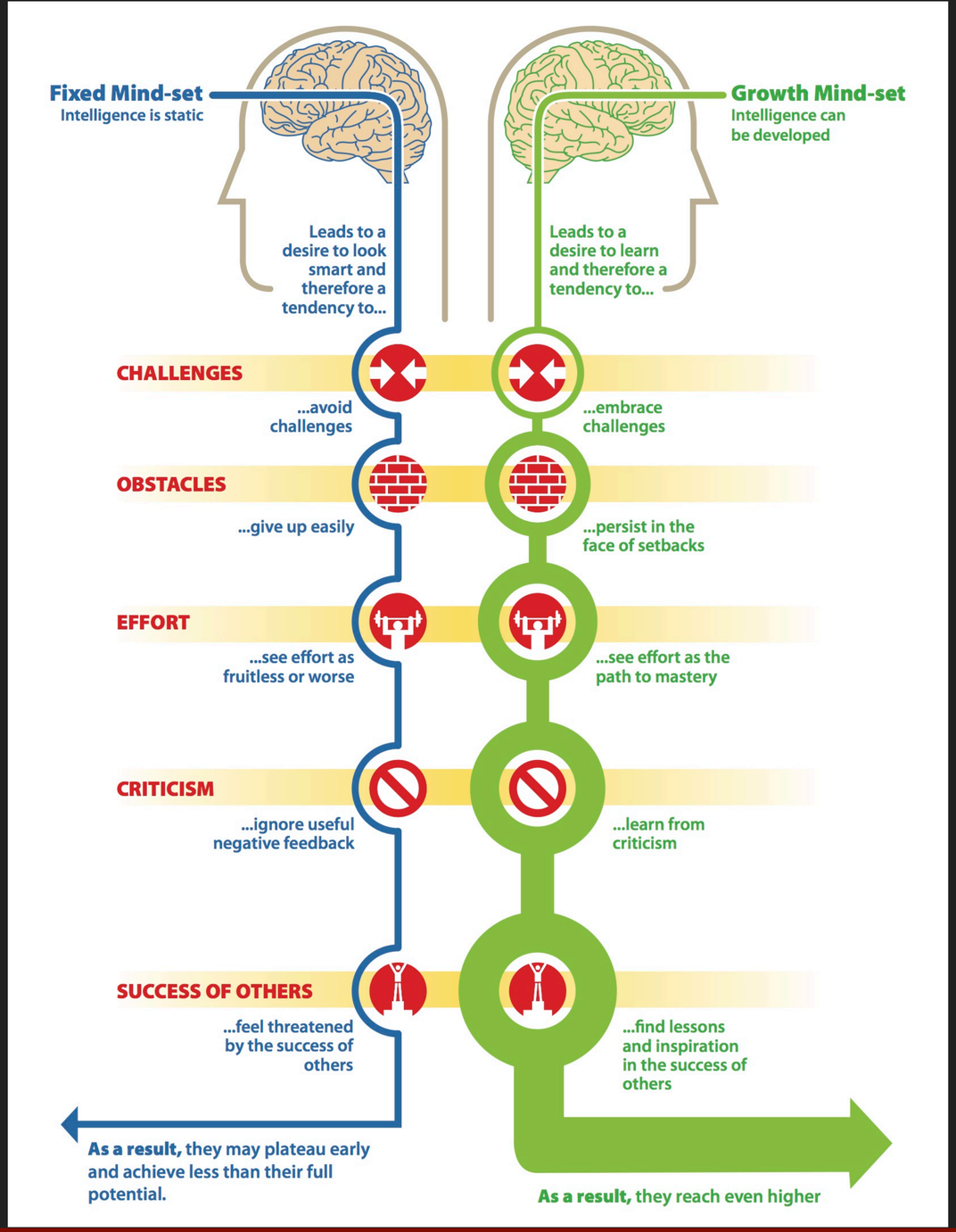
Mindsets are beliefs and perceptions about learning.

Fixed vs. Growth

- A fixed mindset is based on the belief that your qualities are carved in stone

- A growth mindset is based on the belief that your basic qualities are things you can cultivate through your **efforts**, your **strategies**, and **help from others**

Dweck, 2016



By Nigel Holmes based on the work of Carol Dweck

Why does mindset matter?

Resources

Books

- Dweck, C. (2016). Mindset: The new psychology of success. Penguin Random Hofuse, New York, New York.
- Major, C. H., Harris, M. S., & Zakrajsek, T. (2016). Teaching for learning: 101 intentionally designed educational activities to put students on the path to success. Taylor & Francis, New York, New York.
- McGuire, S. Y. (2015). Teach students how to learn: Strategies you can incorporate into any course to improve student metacognition, study skills, and motivation. Stylus Publishing, Sterling, Virginia.

Websites

- https://www.mindsetkit.org/topics/about-growth-mindset/what-is-growth-mindset
- http://mindsetscholarsnetwork.org/

A gift for you all...

LL 11

- Learning Log 11 will be available at the end of this week
  - We will take the 10 best Learning Logs
- Final chance to reflect on the course!
  - You should do it :-)

HW 11

- Homework 11 is an OPTIONAL assignment
- It contains a random set of 20 questions from HW2 - HW10
- If you complete HW11, it will replace your WORST homework score
  - We will take your 8 best scores on HW2 - HW11.
- Remember, you cannot get over 100% on the homework portion of the course, and extra marks do not transfer anywhere

HW 11

*(Note: for full disclosure, I am **definitely** tricking you into doing more physics problems for extra marks so you can be more prepared for the final so you can get a better mark!)*

This is OPTIONAL! If you have other courses you're struggling more in, obviously spend this time there rather than trying to get an extra few marks on HW.

Final Exam Format

Final Exam Format

90% PrairieLearn
(like the tests)

Part 1: Conceptual and Short multiple choice

Part 2: Medium length numerical input problems

New!

Part 3: Long worked problems (submit work)

Choose 5 of 8 problems

10% Reflection
(like LLs)

Submit Work for Part 3

Q1

Q2

Q3

90% PrairieLearn

90% PrairieLearn
(like the tests)

Part 1: Conceptual and Short multiple choice

Part 2: Medium length numerical input problems

Part 3: Long worked problems (submit work)

Choose 5 of 8 problems

Tension In Rope

The tension in rope 2 is:

- (a) equal to the tension in rope 1
- (b) less than the tension in rope 1
- (c) greater than the tension in rope 1

90% PrairieLearn

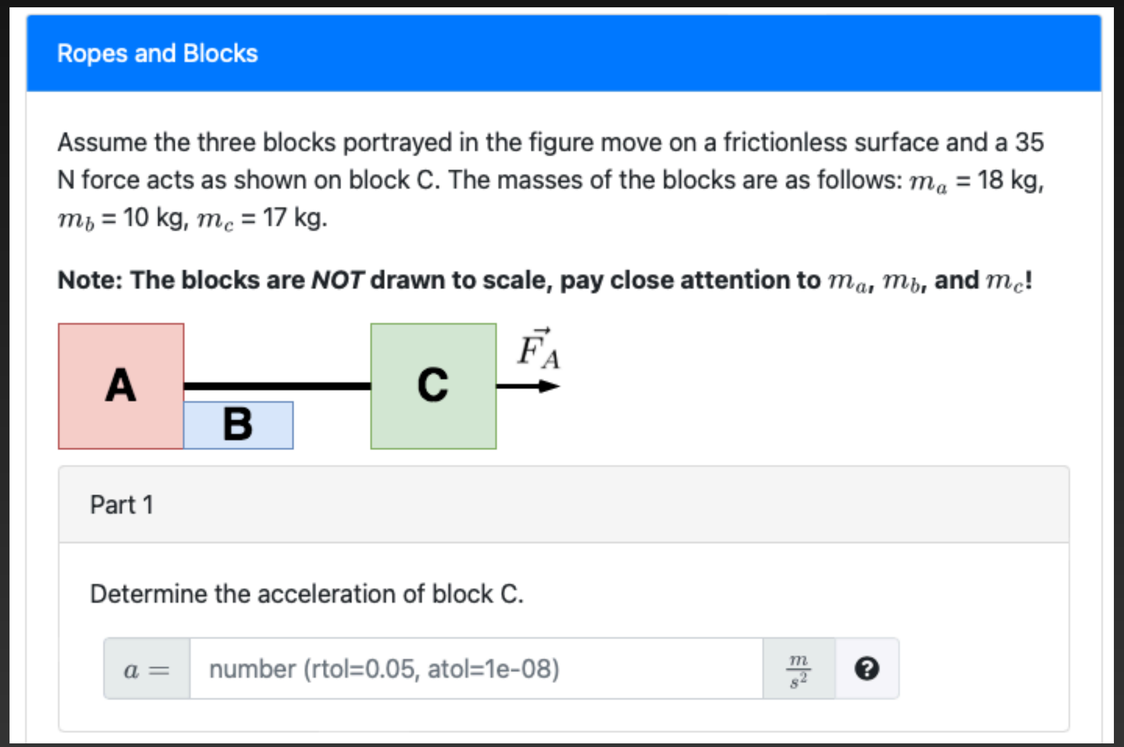
90% PrairieLearn
(like the tests)

Part 1: Conceptual and Short multiple choice

Part 2: Medium length numerical input problems

Part 3: Long worked problems (submit work)

Choose 5 of 8 problems



Ropes and Blocks

Assume the three blocks portrayed in the figure move on a frictionless surface and a 35 N force acts as shown on block C. The masses of the blocks are as follows: m_a = 18 kg, m_b = 10 kg, m_c = 17 kg.

Note: The blocks are *NOT* drawn to scale, pay close attention to m_a, m_b, and m_c!

Part 1

Determine the acceleration of block C.

$a =$ number (rtol=0.05, atol=1e-08) $\frac{m}{s^2}$

90% PrairieLearn

90% PrairieLearn
(like the tests)

Part 1: Conceptual and Short multiple choice

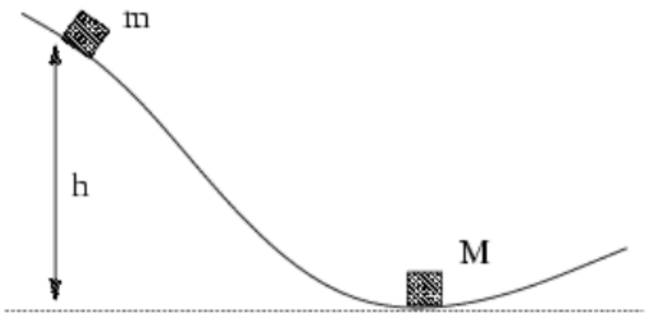
Part 2: Medium length numerical input problems

Part 3: Long worked problems (submit work)

Choose 5 of 8 problems

A frictionless ski jump is designed such that at the bottom of the hill, there is a short flat section; after the flat section, the slope continues into a ramp of vertical height 1.0 m angle 20°. The top of the ski slope is 5.0 m high.

An object of mass 20.0 kg sits at the flat section of the slope. A second object of mass 10.0 kg is released from the top of the slope so that it slides down and makes a perfectly elastic collision with the other object causing it to move up the ramp and undergoes projectile motion before landing some distance away from the ramp.

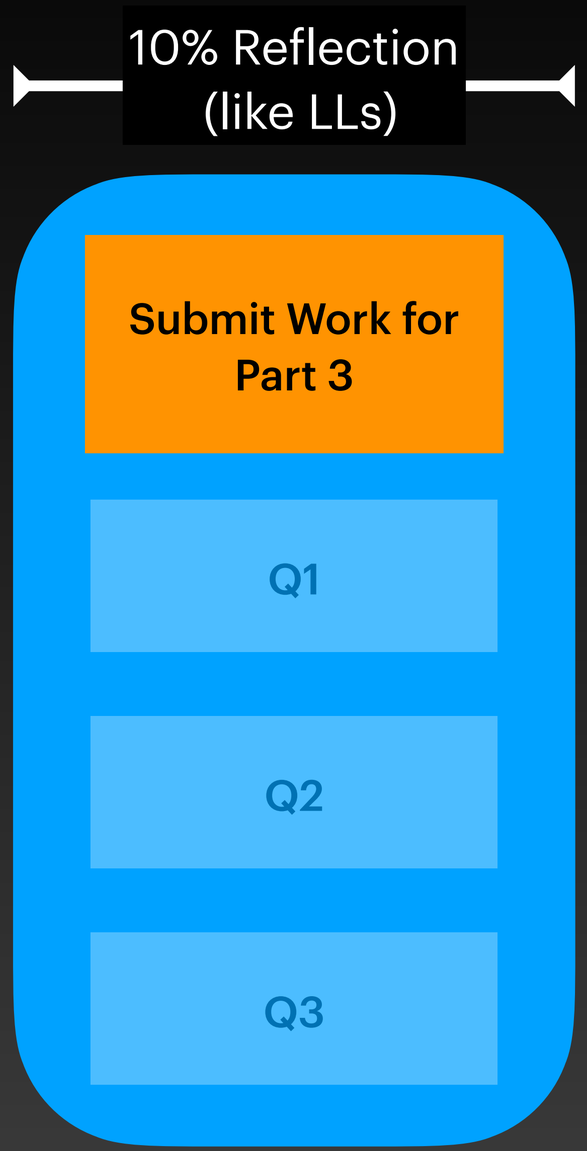


A) What is the speed of the (initially) stationary block after the collision ?

B) How far away from the ramp does the block end up after it goes off the ramp?

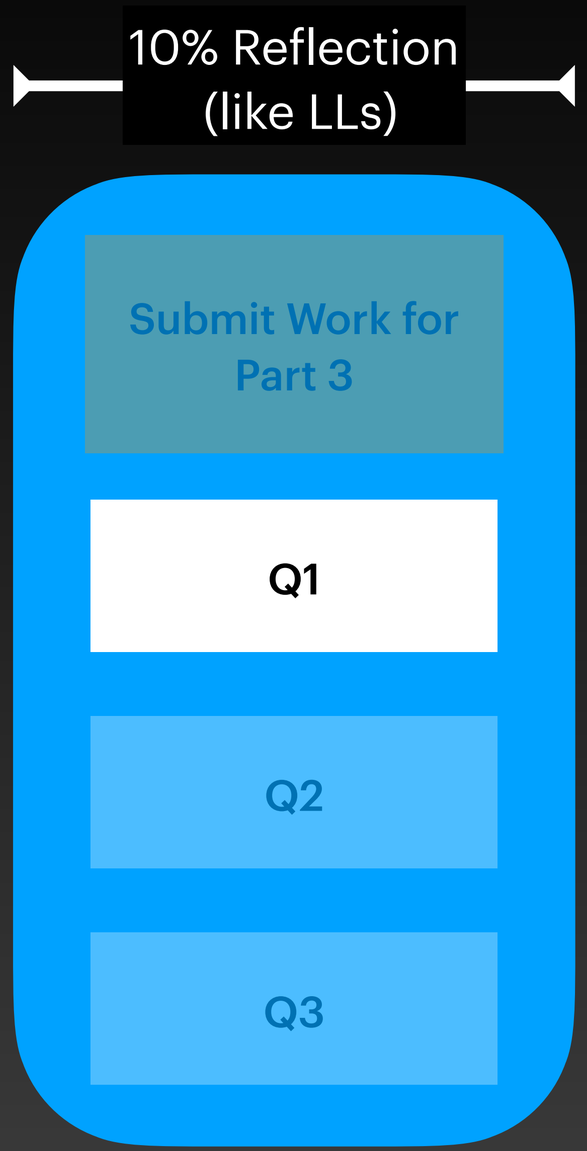
10% Reflection

Q: Submit an image or PDF of your worked solution for each of the 5 problems you chose for Part C of the exam.



10% Reflection

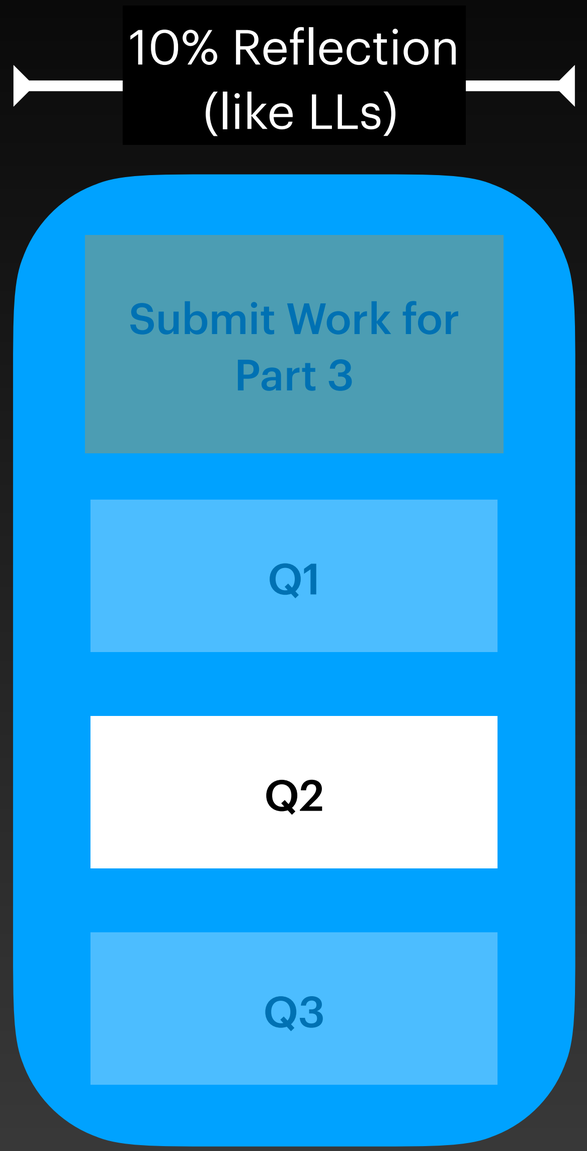
Q1. What grade do you think you deserve on this exam? In 2-3 sentences, justify your choice.



10% Reflection

Q2: Think of one concept from this class that you found awesome, cool, or beautiful.

Describe the concept briefly, and explain why you think that (3-5 sentences).



10% Reflection

Q3: As an educator, I am very aware that learning is not easily measured by scores on labs, tests, and exams. There are many other ways and sources of learning, and I admit that not everything can be captured by the assessments that I give you.

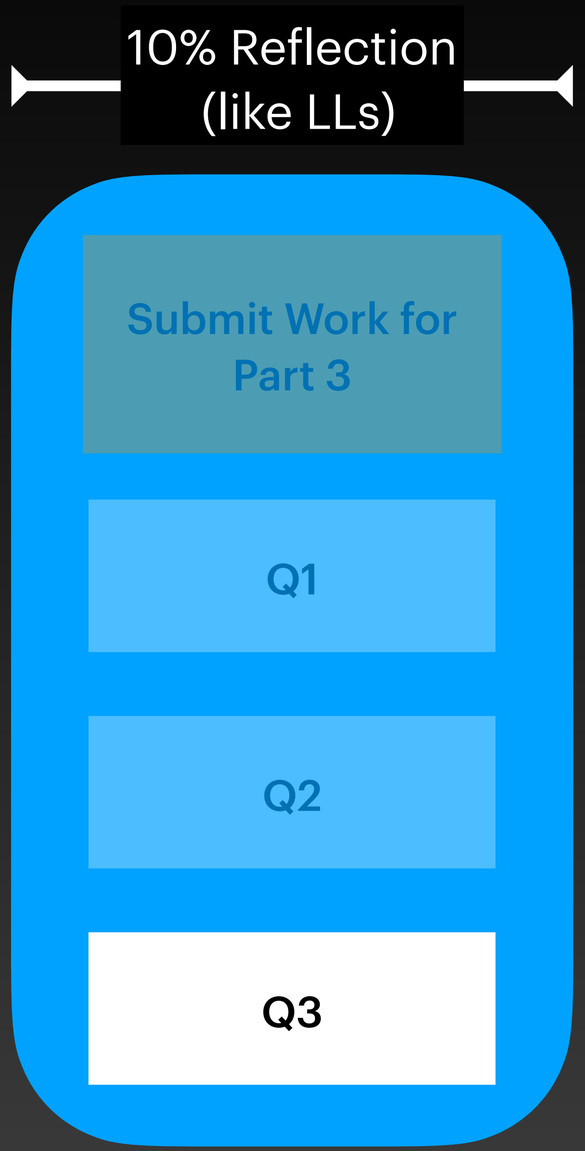
Pretend that there were no guidelines in the syllabus for calculating your final grade. Based on the work that you have done all semester, and the learning goals for the course, what grade (out of 100) do you think you have earned?

Here are the learning goals for this course: <See slide earlier about course learning goals>

Try NOT to focus on calculating your earned grade and avoid mentioning or referring to average grades on the labs, tests, homework, or even the posted grade with your grade before the final exam.

What is some other evidence of your learning? Consider not just what you have learned, but how much effort you put into the course (and whether that effort was productive or not), and honestly assess how much of the material you feel truly comfortable with.

<u>Pretend that there were no guidelines in the syllabus for calculating your final grade</u>. Based on the work that you have done all semester, and the learning goals for the course, what grade (out of 100) do you think you have earned and why? 5-7 sentences



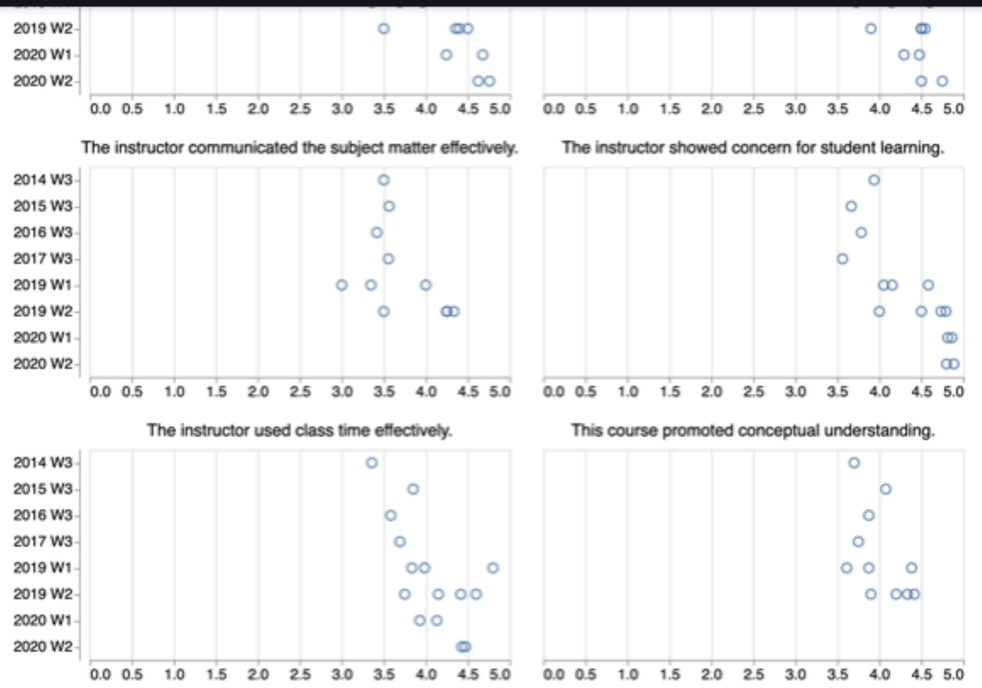
Workflow

- Join the Zoom meeting 15 minutes before exam starts
- At the exam start time, I will make announcements and give instructions for 5 minutes
- Once I am done that, I will randomly put you all into breakout rooms
- Cameras and microphones are not needed, but you MUST be present in the Zoom room for the duration of the exam!
- Once you submit your exam on PrairieLearn, you may leave.
- Submit the reflection and your work on Gradescope

Student Experience of Instruction (SEI)

Search...

Past Courses



I am a strong believer in transparency and openness so on this page, I will also be sharing my full teaching evaluations. This is definitely a moment of vulnerability as these are often considered private. However, I think that students should know exactly what they're walking into when they take my course. I am not the perfect instructor, and my teaching is constantly evolving. I also read and reflect upon every comment that I receive so also keep in mind these comments are from the past. I have definitely made mistakes in the past, and am always seeking to improve and better my teaching, as well as your learning.

Without further ado, my teaching evaluations from the past few terms (I will continue adding to this list as time permits):

- Physics 111, Winter 2020 Term 1 (Online)
- Data 301, Winter 2020 Term 1 (Online)

You should have received an email that the "Student Experience of Instruction" (SEI) is now open for this course.

Research shows that SEI are flawed because they are influenced by unconscious and unintentional biases.

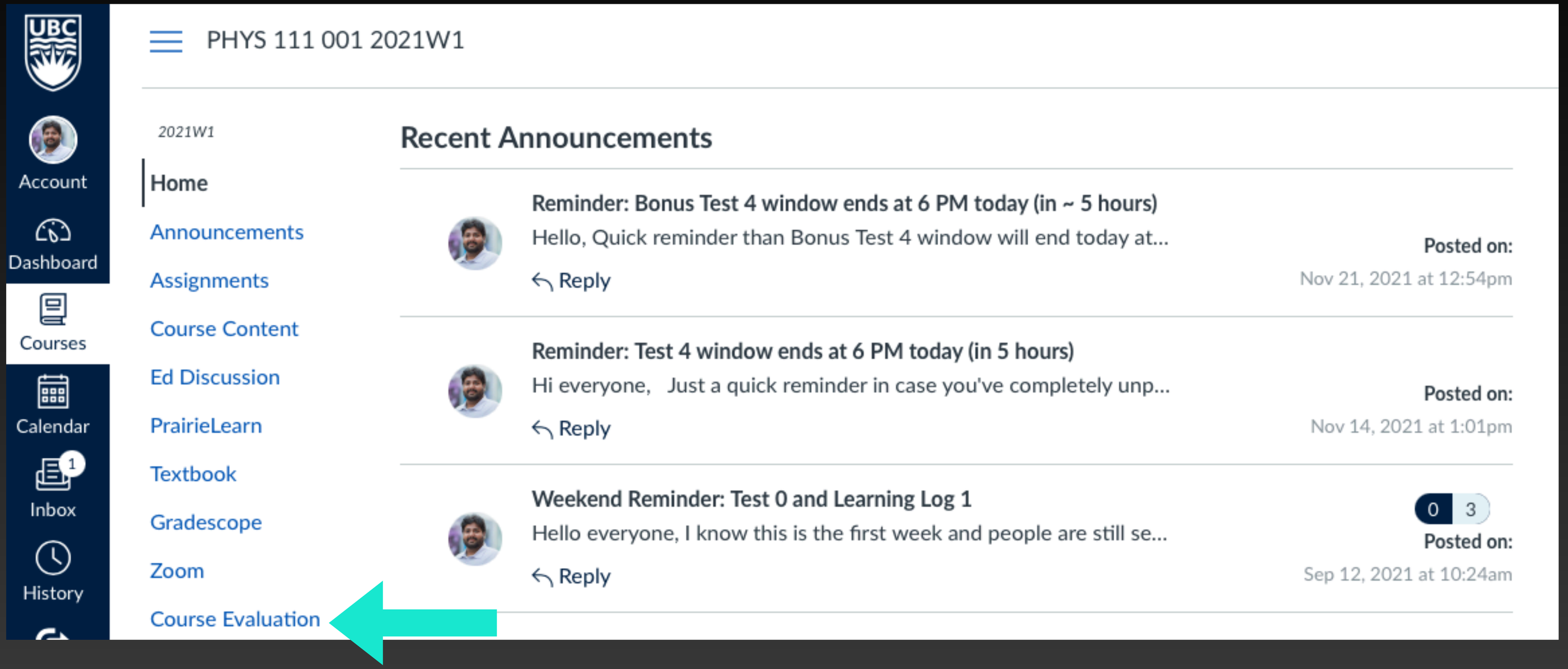
Despite their flaws, SEIs are used by departments to:

- Make decisions on Tenure and Promotion
- Decide which courses instructors teach
- Rate/rank grant applications and awards

More important to me however, is how you felt about the course content, the structure, and me as an instructor.

I want to hear from you!

My goal is to get at least a 70% response rate on the SEI, the more the merrier!


PHYS 111 001 2021W1
Account
Dashboard
Courses
Calendar
Inbox
1
History
2021W1
Home
Announcements
Assignments
Course Content
Ed Discussion
PrairieLearn
Textbook
Gradescope
Zoom
Course Evaluation
Recent Announcements
Reminder: Bonus Test 4 window ends at 6 PM today (in ~ 5 hours)
Hello, Quick reminder than Bonus Test 4 window will end today at...
Reply
Posted on:
Nov 21, 2021 at 12:54pm
Reminder: Test 4 window ends at 6 PM today (in 5 hours)
Hi everyone, Just a quick reminder in case you've completely unp...
Reply
Posted on:
Nov 14, 2021 at 1:01pm
Weekend Reminder: Test 0 and Learning Log 1
Hello everyone, I know this is the first week and people are still se...
Reply
0
3
Posted on:
Sep 12, 2021 at 10:24am

Suggestions for how to study for the final exam

- Review all the tests and bonus tests!
    - Try new variants! Your score won't change
- Review all the homework questions!
    - Try new variants! Your score won't change
- Do the Tutorial problems (posted on course website)
- Try HW 11
- Do all the weekly suggested practice questions from the textbook
- Do more conceptual questions from the back of each chapter

Assessing the 1st year physics program

Research Study

To improve physics teaching at UBCO, we are doing a two-part diagnostic to:

- help us stay current on what students know coming into the course
- understand the impact of different teaching methods
- assess the quality of the program
- understand how the program serves different populations

Your instructor (me) will not see the results until final exam grades have been submitted!

This diagnostic is NOT FOR MARKS!

You do NOT need to study as this is just a baseline for how you think.

Incentive: 0.5% per diagnostic

Diagnostic (Part 2) will happen in class on Friday (about 45 mins)

See you on the final exam!

(And maybe, in COSC 123 next term?)

Attribution

This resource was significantly adapted from the Open Stax Instructor Slides provided by Rice University. It is released under a CC-BY 4.0 license.

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