

ACS SUMMER VIRTUAL WORKSHOP SERIES

Adventures in Triage: Pandemic Lessons for Robust and Flexible Course Design in the Natural Sciences (and Beyond!)

Drs. Kimberly McArthur, Katie Ann Skogsberg, Andrew Bell

Summary

The pandemic forced us to radically rethink our approach to course design. Incorporating flexibility helped make courses robust to disruptions and applying these pandemic lessons in flexibility can strengthen our post-pandemic pedagogy. However, managing flexibility poses a unique challenge when curriculum is sequenced



and students expect a more traditional approach to assessment. In this workshop, we will discuss models of flexible course design and assessment strategies. The workshop organizers will present examples from natural science courses, but this workshop is intended for anyone interested in flexible course design. We will discuss best-practices for adapting existing courses, and participants (from all areas) will add to a flexible course design “toolbox.”

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AUTHENTIC ASSESSMENTS

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Goal: To develop flexible (pandemic proof) assignments & assessments

Before the pandemic, the primary grade determining assignments for my courses were traditional exams. Although they were rigorous and did a good job of creating a normal distribution of grades, I worried they weren't accurate representations of what the students really knew or could do. I had recently listened to Malcolm Gladwell's podcast episodes "[The Tortoise and the Hare](#)" and "[Puzzle Rush](#)," where he applied Daniel Kahneman's ideas about "[Thinking Fast and Slow](#)" to what he called his "Grand Unified Theory for fixing higher education" (See <https://www.pushkin.fm/episode/the-tortoise-and-the-hare/>). I began to question whether my exams were biased towards the "Hares" (those who excel on exams because they can think quickly using deductive reasoning and memorization) and penalizing the "Tortoises" (deep thinkers that need more time to work with and internalize the material). Additionally, I had found that my best research assistants were often not students who did well on my exams but rather those who asked the best questions in class. I wanted to get away from relying so much on exams and move towards assessments that gave "Tortoises" a fair shot at earning a good grade. I had hoped to wade in a little at a time, but the pandemic pushed me into the deep end.

What are Authentic Assessments?

Authentic assessments are those that are aligned with the student's interests and help prepare them for what they expect to do in their future professional lives or solve a real-world problem (APA Board of Educational Affairs, 2014; Bertram Gallant, 2017; Lombardi, 2008; Nilson, 2015). Rather than taking timed, high-stakes exams over the course content (which we rarely, if ever do in our real jobs), students instead create "**Artifacts**" that demonstrate not only what they have learned but how they can use or apply that knowledge to their future careers or a real-world problem that interests them. For example, a student in Economics may write a paper applying theories of how emotions influence decision-making to principles in economics (Bechara et al., 2000). Alternatively, the artifacts can be a vehicle to demonstrate understanding the material in the medium of their choice. For example, an artist may render an accurate model of the brain, or a computer scientist may write a code that demonstrates a simple neural network. Additionally, to ensure that students are becoming effective communicators, they must also

explain the artifact to a non-expert and how the artifact demonstrates their mastery of the material.

Implementation:

I implemented authentic assessments into two very different courses. The first was an Introduction to Psychology course that serves as a foundational course for Psychology (PSY) and Behavioral Neuroscience (BNS) majors and satisfying a Natural Science general education requirement for non-majors. Therefore I have a mix of eager, inexperienced first-year students and more ambivalent but experienced upper-level non-majors. The other course was an upper-level BNS course in Sensation and Perception that several PSY majors take to satisfy a BNS elective course requirement, creating a similar mix of eager (BNS) and ambivalent (PSY) students.

I planned both courses and assignments based on the concept of backward design (Wiggins & McTighe, 1998), by first asking myself what do I want my students to be able to *do* with the material? How might they use what they are learning in this course in their future careers, personal life, or real-world experiences? From there, I created a rubric to capture what I felt was also important. For example, I wanted them to demonstrate that they could accurately define and apply terms and concepts from the course. To simplify grading the more abstract submissions such as photography, artwork, film, and music, I required students to submit a glossary with each artifact that defined each term and explained how the term was used or applied in the artifact.

Examples:

Examples of my syllabi, and the rubrics used to assess the Artifacts can be found here: https://drive.google.com/drive/folders/1EErnLgOHu_OciDPStW4w-4OZyXueKjcs?usp=sharing

Examples of student artifacts can be found here: <https://drive.google.com/drive/folders/1y2Yb9hta2GLszNrVR50ViMqrapmbIcOO?usp=sharing>

Reflections:

My original intent had been to try using this approach to deal with the fact that I could no longer rely on using traditional exams during the pandemic. However, now that I have used this approach for two semesters, I do not intend to ever go back to my previous methods. Many of us know that grading is often the most time-consuming, monotonous, and emotionally exhausting part of teaching. In my experience, even though grading was still time-consuming, it was by far more interesting and occasionally even enjoyable. I also learned a lot more about my student's personalities and personal interests, as they expressed them through their assignments. The students reported that they found the artifacts challenging and time-consuming but also more enjoyable and subjectively felt that

they had learned more from doing them than they would from studying for a traditional exam. While I have yet to systematically assess whether the learning is more robust, this preliminary evidence is enough for me to want to continue using these assessments in the future.

References:

APA Board of Educational Affairs. (2014). *Strengthening the Common Core of the Introductory Psychology Course*: [Data set]. <https://doi.org/10.1037/e504222016-001>

Bechara, A., Damasio, H., & Damasio, A. R. (2000). Emotion, Decision Making and the Orbitofrontal Cortex. *Cerebral Cortex*, *10*(3), 295–307.
<https://doi.org/10.1093/cercor/10.3.295>

Bertram Gallant, T. (2017). Academic Integrity as a Teaching & Learning Issue: From Theory to Practice. *Theory Into Practice*, *56*(2), 88–94.
<https://doi.org/10.1080/00405841.2017.1308173>

Lombardi, M. M. (2008). Making the Grade: The Role of Assessment in Authentic Learning. *EDUCASE Review*.
<https://library.educause.edu/resources/2008/1/making-the-grade-the-role-of-assessment-in-authentic-learning>

Nilson, L. B. (2015). *Specifications Grading*. Stylus.
<https://styluspub.presswarehouse.com/browse/book/9781620362426/Specifications%20Grading>

Wiggins, G., & McTighe, J. (1998). *What is backward design?* (1st ed.). Merrill Prentice Hall.
https://web.archive.org/web/20160721163755/http://www.fitnyc.edu/files/pdfs/Backward_design.pdf

Additional Resources:

Brief online articles:

Authentic Assessments. (n.d.) Indiana University Bloomington, Centre for Innovative Teaching and Learning.

<https://citl.indiana.edu/teaching-resources/assessing-student-learning/authentic-assessment/index.html>

- Original source: Wiggins, Grant. (1998). Ensuring authentic performance. Chapter 2 in *Educative Assessment: Designing Assessments to Inform and Improve Student Performance*. San Francisco: Jossey-Bass, pp. 21 – 42. :
<https://eric.ed.gov/?id=ED418997>

Mueller, J. (2018). *What is it?* Toolbox for Authentic Assessment.

<http://jfmuller.faculty.noctrl.edu/toolbox/whatisit.htm>

Mueller, J. (2018). *How do you do it?* Toolbox for Authentic Assessment

<http://jfmuller.faculty.noctrl.edu/toolbox/howdoyoudoit.htm>

Darby, F. (2020, September 24). *Advice on 7 ways to assess students online and minimize cheating*. Chronicle of Higher Education.

https://www.chronicle.com/article/7-ways-to-assess-students-online-and-minimize-cheating?cid=gen_sign_in

Laura McLaughlin & Joanne Ricevuto (2021, June 2), *Assessments in a virtual environment: You won't need that lockdown browser!* Faculty Focus.

<https://www.facultyfocus.com/articles/online-education/online-assessment-grading-and-feedback/assessments-in-a-virtual-environment-you-wont-need-that-lockdown-browser/>

Books:

Flower Darby's "Small Teaching Online": <https://flowerdarby.com/>

Linda B. Nilson's "Specifications Grading":

<https://styluspub.presswarehouse.com/browse/book/9781620362426/Specifications-Grading>

Thomas J. Tobin & Kirsten T. Behling's "Reach Everyone, Teach Everyone: Universal Design for Learning": <https://muse.jhu.edu/book/62887>

FLEXIBLE COURSE GRADING

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Goal: Incorporate flexibility into the determination of course grades.

Given our learning objectives for the course, how do students earn their final grades in the course? **Flexible course grading means that we are providing students multiple paths to the same final course grade.** This empowers students to make substantive choices about their learning experience and its outcomes, to accommodate individual differences in student interests, motivations, obstacles, and life events.

Smaller changes: Flexible grading that won't break your syllabus

Which assignments count towards the course grade? If you already organize assignments into categories (like daily reading questions or weekly quizzes), consider providing students some flexibility in which assignments within a category actually count towards their course grade. For example, you might assign 12 weekly online quizzes, but only count the top 10 scores. One student might decide to attempt every quiz, then drop their lowest scores. Another student might decide not to attempt the fourth quiz at all, because they were having a really stressful week and needed that study time for something else. The point is that students get to make decisions about how to allot their effort and demonstrate their learning.

When do students submit assignments to count towards the course grade? If it is feasible for you to stagger your grading for a particular assignment, consider providing students some flexibility in when they submit their work for evaluation. For example, you might give each student a "free pass" to submit one course assignment late without penalty -- and give each student the opportunity to choose when to use their pass. Again, students get to make decisions about how to allow their effort in the course, but this is also easy to implement in an existing course (where it is feasible for you to grade some assignments a bit late).

How are students working to achieve and demonstrate learning objectives? For an existing assignment, consider if there are ways to make the details of the assignment more flexible, within the structure of the learning objective(s). *See section on Authentic Assessments for more resources and information about this topic.*

Bigger changes: Flexible grading that changes how you think about grades

If you're interested in redesigning your approach to course grading overall, there are several approaches and strategies to consider. In my experience, these approaches are highly interrelated, both conceptually and in practice. I would suggest using these approaches as jumping-off points, rather than rigid or mutually exclusive structures. You may find that you can repurpose old assignments within a new grading structure.

Specification or Specs Grading: Specifications grading focuses on minimum requirements to achieve learning objectives, either within each assignment or across assignments within a course. In a traditional grading system, students complete assignments, earn some fraction of the total possible points for each assignment, and then earn a final course grade based on the total points earned during the course. In a specifications grading system, students either meet specifications (and earn full credit) or fail to meet expectations (and either earn no credit or have an opportunity to revise). Typically, "meeting specifications" means performing well enough to earn a B or higher in a traditional grading scheme. Students earn their final course grade depending on how many assignments have met specifications or which assignments have met specifications (tied to specific learning objectives).

Contract Grading: Contract grading is an approach to framing course grades, centering student choice. The contract for the course clearly specifies how students will earn a particular grade -- often in the absence of point accumulation -- and students can choose which grade they'd like to earn. The contract can include both traditional assignments and patterns of behavior (like collegiality, integrity, or equitable contributions to group work). The contract may be standardized across all students, with flexibility incorporated into the elements of the contract (for example, by including assignments assessed by specs grading), or the contract may be negotiated with individual students. Clarity is critical in contract grading; students must understand the contract, in order to make choices that are right for them.

Ungrading: Ungrading refers to a general movement away from traditional grading (focused on evaluation of student work by the instructor) towards holistic assessment and self-assessment by the student. This movement focuses on the ways in which traditional grading can actually harm student learning, by emphasizing points and grades over improvement and mastery of learning objectives. Most institutions require instructors to issue a final course grade, so it is rare to see a complete absence of grades in higher ed courses. However, contending with the ideas in the ungrading movement can help us to minimize and mitigate the potential for harm in our grading systems.

Example: Contract + specifications grading in an upper-level biology course

During the workshop, I discussed my approach to flexible course grading in my developmental biology course, an upper-level lecture with laboratory elective course. This course had 18 students enrolled in Spring 2021, and I taught the course entirely online. You can view the annotated syllabus sample [here](#).

Select Resources about Flexible Course Grading

“The Case Against Grades” by Alfie Kohn (available at this link as a post on the author’s blog) <https://www.alfiekohn.org/article/case-grades/>

Schinske J, Tanner K. (2014) Teaching more by grading less (or differently). *CBE Life Sciences Education*, 13: 159-166.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4041495/pdf/159.pdf>

Facebook Group by Mark Barnes: Teachers Throwing Out Grades
<https://www.facebook.com/groups/teachersthrowingoutgrades/>

Ungrading: Why Rating Students Undermines Learning (and What to Do Instead), edited by Susan D. Blum (2020)
<https://wvupressonline.com/ungrading>

Teaching in Higher Ed podcast episode, Ungrading with Susan D. Blum
<https://teachinginhighered.com/podcast/ungrading/>

How an alternative grading system is improving student learning -- online article from Chemical & Engineering News about implementation of specifications grading in a chemistry course
<https://cen.acs.org/education/undergraduate-education/alternative-grading-system-improving-student/99/i15>

Ungrading: A Bibliography -- blog post by Jesse Stommel, with resources for ungrading
<https://www.jessestommel.com/ungrading-a-bibliography/>

“Yes, Virginia, There’s a Better Way to Grade” by Linda B. Nilson (2016) -- article describing specifications grading
<https://www.insidehighered.com/views/2016/01/19/new-ways-grade-more-effectively-essay>

COURSE ORGANIZATION AND LOGISTICS

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Goal: Incorporate flexibility into course organization and logistics.

1. Organized Online Course Content Facilitates Flexible Consumption

Methods of content distribution varied greatly prior to the pandemic: some faculty distributed physical copies of readings during class while others organized content by weeks on their learning management system (LMS). For many, these practices worked as a means to deliver the required information to students before the pandemic. The pandemic required many faculty to shift to more flexible and online-friendly methods of distributing content.

Tips for organized online course content to facilitate flexible consumption

- 1) Organize by modules not weeks
- 2) Organize modules around specific learning objectives
 - a) [Worksheet](#) for organizing modules
 - b) [Use concept maps](#) to complete your own worksheet
- 3) Use web links to course material when possible
- 4) Be *the only* place for course content

2. Collaborative documents Provide Flexible Platform for Group Learning Activities

In-class learning activities are a highly effective teaching tool but traditional methods of facilitating them can be unnecessarily inflexible. Using collaborative documents can help provide flexibility for learning activities by providing access to in-person, remote, and asynchronous students.

Tips for designing effective and flexible group learning activities

- 1) Complete [learning activities worksheet](#)
- 2) Explore the various ways you can [utilize collaborative documents](#) for group learning activities
- 3) Choose specific tools and strategies and replicate them throughout the semester
- 4) Link to the collaborative documents in pre-class announcement and/or email.

3. Virtual Office Hours Promote Flexible Student Engagement

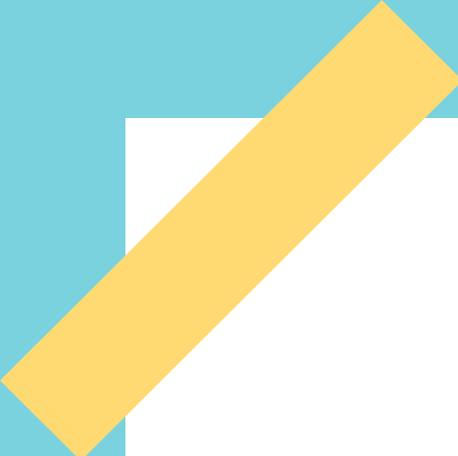
Creating avenues for student's to reach support for their course work is an important element of your course design. Office hours traditionally have been a key component of the support structure for students. In-person office hours are inflexible both in location and time and can be a logistical challenge when offering multiple time windows.

Creating virtual office hours via a scheduling assistant like youcanbook.me opens new flexible ways of supporting your students that can better fit your and your student's schedule.

[Read this tip sheet](#) to learn more about strategies for creating virtual office hours for your course.

Other Links from Workshop

[Six Strategies for Effective Learning](#) - Learningscientists.org

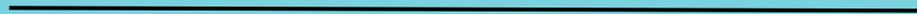
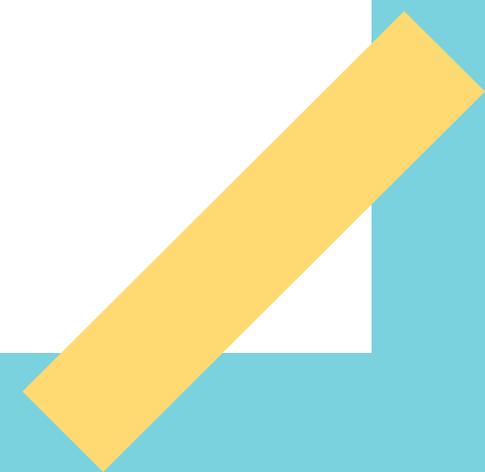
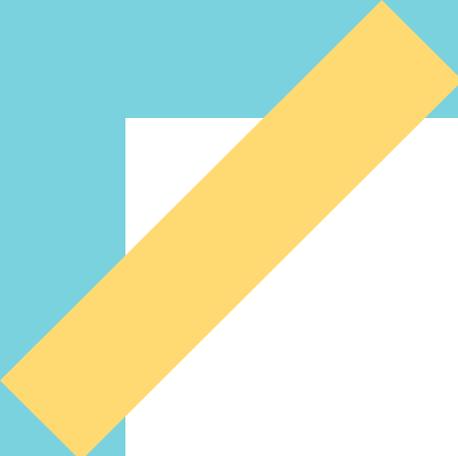


Adventures in Triage

Pandemic Lessons for Robust and Flexible Course Design in the Natural Sciences (and Beyond)

ACS Summer Virtual Workshop Series (June 23, 2021)

Hit record!



Adventures in Triage

Pandemic Lessons for Robust and Flexible Course Design in the Natural Sciences (and Beyond)

ACS Summer Virtual Workshop Series (June 23, 2021)

Welcome to the workshop!



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Okay ... what just happened?

The pandemic forced us to be flexible in our teaching.

What did we learn?

Flexibility supports a more robust and inclusive course design, but managing flexibility can be a challenge!



Workshop Goals:

- 1) Share our experiences incorporating flexibility into our courses.
- 2) Think ahead: how do we want to approach flexibility in our courses, going forward?





What do we mean by flexibility?

Flexibility in how we deliver course content, share course materials, and communicate with students.

Flexibility in how we inspire, facilitate, and assess student learning outcomes.

Flexibility in how students earn their final course grade.

Sharing Our Experiences ...



Dr. L. Andrew Bell

Flexible Course Logistics



Dr. KatieAnn Skogsberg

Flexible Assignments and Assessments



Dr. Kim McArthur

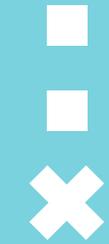
Flexible Course Grading

Flexible Course Logistics



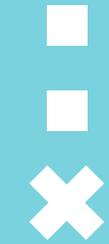
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Three Specific Areas to Create Flexibility in Your Course Logistics

- 1) Organized Course Content
- 2) Flexible Platforms for Group Learning Activities
- 3) Virtual Office Hours



Organized Online Course Content Facilitates Flexible Consumption

The screenshot shows a course management system interface. On the left is a dark sidebar with navigation options: 201810_17842 (THE NEUROSCIENCE OF PHOTOGRAPHY), Announcements, Syllabus, Course Materials, Course Blog, Assignments, Send Email, Check Grades, MyCoursEval, and UR Library. The main content area is titled 'Course Materials' and lists several items, each with a globe icon:

- Intro to Neuroscience**
David Hubel, *Eye, Brain and Vision* Ch. 1
Eric Kandel, *Reductionism in Art and Brain Science* Ch. 3
- Neuroscience of Vision**
Mark Bear, *Neuroscience: Exploring the Brain* Ch. 9-10
- Compare and Contrast: Brain vs Camera**
Klaus Stiefel, *The Camera and the Brain* Chs. Evolved and Engineered, Camera Sensors and the Retina, and Image Processing in Cameras
Basic Elements of Camera Technology
<https://www.lynda.com/SharedPlaylist/8baba3cc41fc4506b542f332a3dd5d3c?org=richmond.edu>
- Color Vision**
David Hubel, *Eye, Brain and Vision* Ch. 8 *Color Vision*

Mark Changizi, *The Vision Revolution*, Ch. 1 *Color Telepathy*

Bompas, et al, *Spotting fruit versus picking fruit as the selective advantage of human color vision*
- Perception and Consciousness**
Christof Koch - *What is Consciousness?* <https://www.scientificamerican.com/article/what-is-consciousness/>

At the bottom of the slide, the text 'PRE-COVID' is displayed in large yellow letters.

Organized Online Course Content Facilitates Flexible Consumption

- 1) Organize by modules
- 2) Organize modules around learning objectives
- 3) Use weblinks when possible
- 4) Be the *only* place for course content

AD905 (Responsive and Flexible Teaching)

Course Overview

Homepage: Start Here!

Q&A Forum

Modules

01 Online Essentials

02 Helping Students Learn

03 Assessment

04 Learning Activities

05 Content Production, Curation, & Organization

06 Facilitating Online Learning

Communication

Announcements

Contact the Faculty Hub

05 Content Production, Curation, & Organization



Introduction

This module is made of individual segments that can be consumed independently or together. It's your choice. We have designed this module for asynchronous participation, but some activities will be synchronous. Check each segment for details.

Module Learning Objectives:

- Provide multiple means of access to course content so all students can receive and engage with it.
- Develop a plan to include pre-recorded media to deliver content either in lieu of or in addition to live synchronous meetings.
- Understand how to appropriately integrate materials into course from campus providers (e.g. the Library) and/or other repositories which include pre-built materials.
- Design effective organization and delivery strategies for course materials.

Synchronous Session Dates/Times:

- **Faculty Panel: Organizing Content in Blackboard** with Erik Craft, Kristine Nolin, and John Zinn
 - Date / Time: Friday July 24, 10 - 11 a.m.
- **Office Hours: Content Production, Curation, and Organization** (ask Hub staff your questions!)
 - Date / Time: Monday July 27, 1:30 - 2:30 p.m.



Content Production

This segment will explore methods of content production faculty can use to deliver information asynchronously to students. We will especially focus on tools that the University of Richmond already provides, or that faculty may already have on hand.

Click on the link above to enter the Content Production folder, begin this topic's activities, and find the link for the synchronous Zoom session scheduled for July 27th.



Content Organization

This segment will discuss organizational strategies faculty can use to inform the design of their course's online components. We will especially focus on organizing content in Blackboard and Box, although these principles may also be used to organize content in other platforms.

Click on the link above to enter the Content Organization folder, begin this topic's activities, and find the link for the synchronous Zoom sessions scheduled for July 24th and 27th.



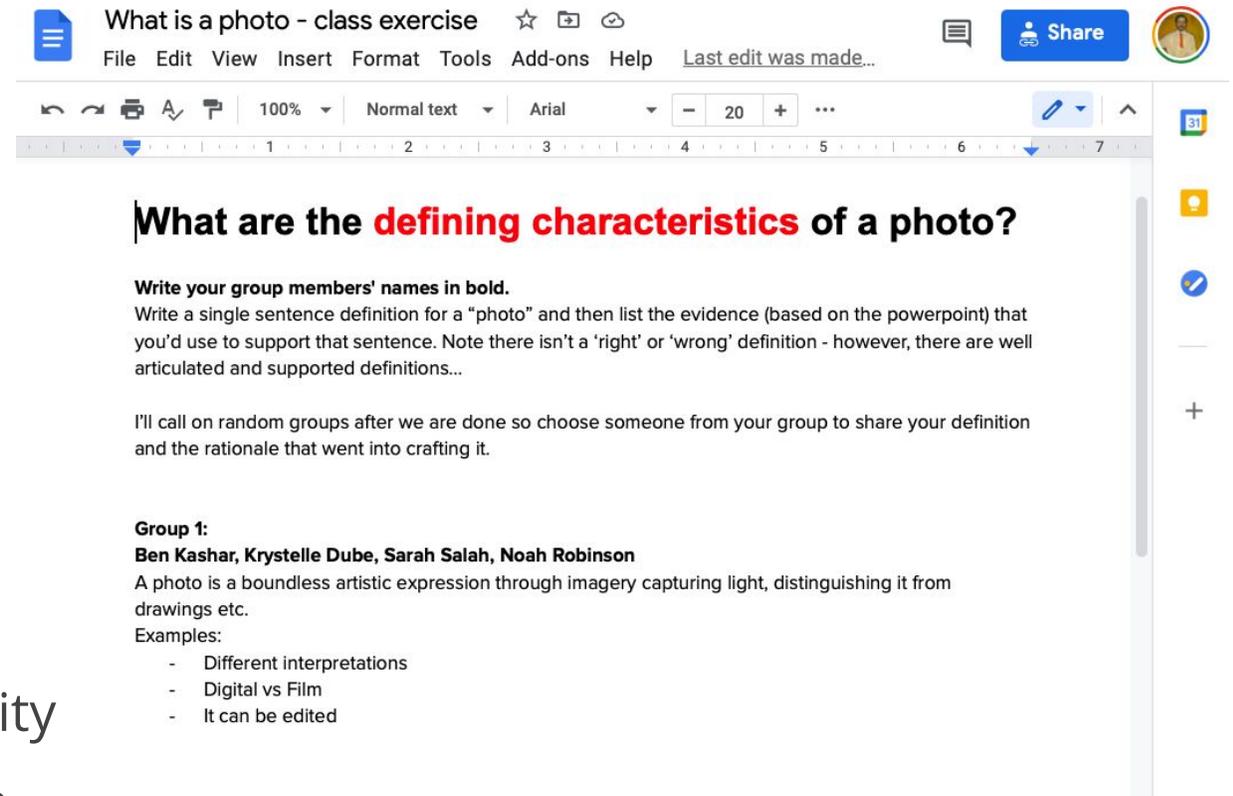
Collaborative Documents Provide Flexible Platform for Group Learning Activities



PRE-COVID

Collaborative Documents Provide Flexible Platform for Group Learning Activities

- 1) Identify objective of learning activity
- 2) Utilize collaborative documents to facilitate learning activity
- 3) Link to collaborative documents before class



The screenshot shows a Google Docs interface for a document titled "What is a photo - class exercise". The document content includes:

What are the defining characteristics of a photo?

Write your group members' names in bold.
Write a single sentence definition for a "photo" and then list the evidence (based on the powerpoint) that you'd use to support that sentence. Note there isn't a 'right' or 'wrong' definition - however, there are well articulated and supported definitions...

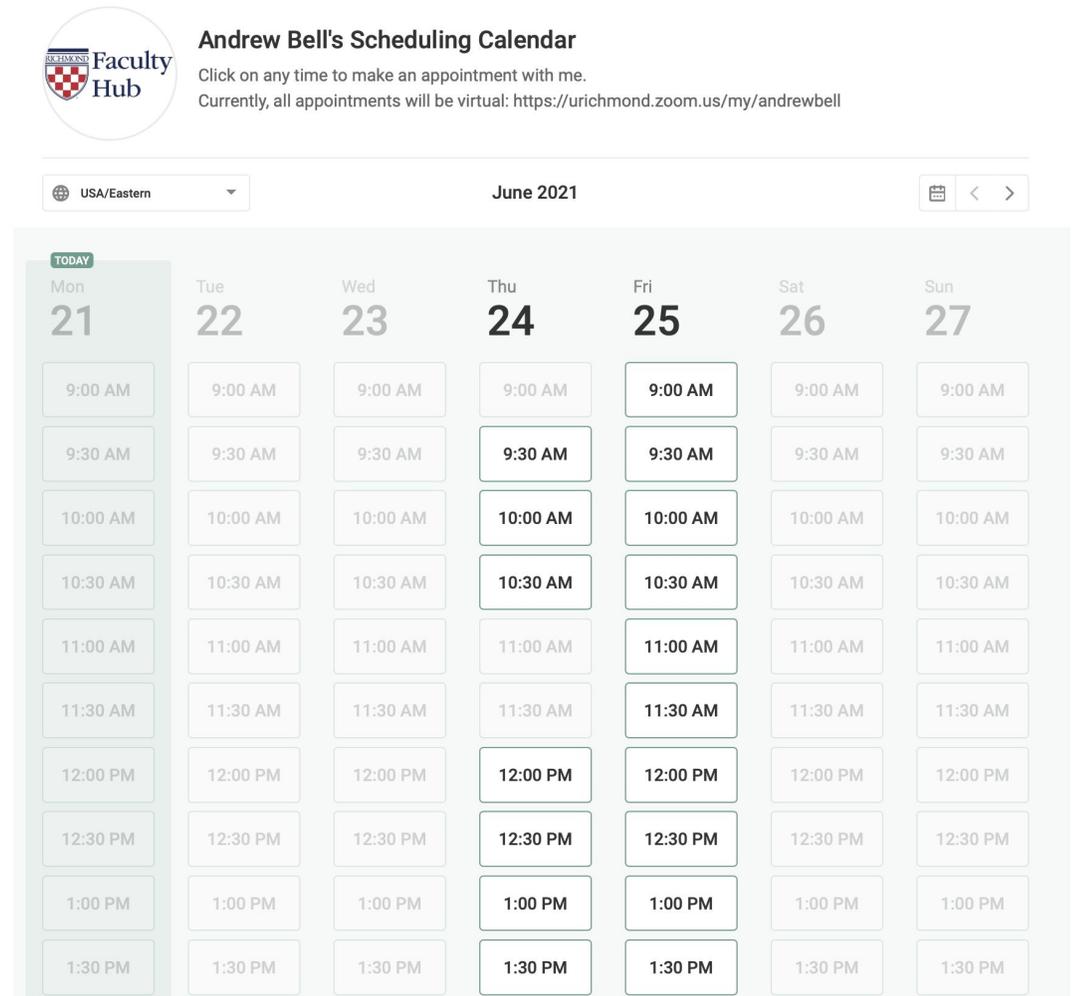
I'll call on random groups after we are done so choose someone from your group to share your definition and the rationale that went into crafting it.

Group 1:
Ben Kashar, Krystelle Dube, Sarah Salah, Noah Robinson
A photo is a boundless artistic expression through imagery capturing light, distinguishing it from drawings etc.
Examples:

- Different interpretations
- Digital vs Film
- It can be edited

Virtual Office Hours Promote Flexible Student Engagement

- 1) Communicate early and often
- 2) Use Personal Meeting room
- 3) Use a scheduling tool
- 4) Consider both individual and group hours



Andrew Bell's Scheduling Calendar
Click on any time to make an appointment with me.
Currently, all appointments will be virtual: <https://urichmond.zoom.us/my/andrewbell>

USA/Eastern June 2021

TODAY Mon 21	Tue 22	Wed 23	Thu 24	Fri 25	Sat 26	Sun 27
9:00 AM	9:00 AM	9:00 AM	9:00 AM	9:00 AM	9:00 AM	9:00 AM
9:30 AM	9:30 AM	9:30 AM	9:30 AM	9:30 AM	9:30 AM	9:30 AM
10:00 AM	10:00 AM	10:00 AM	10:00 AM	10:00 AM	10:00 AM	10:00 AM
10:30 AM	10:30 AM	10:30 AM	10:30 AM	10:30 AM	10:30 AM	10:30 AM
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11:30 AM	11:30 AM	11:30 AM	11:30 AM	11:30 AM	11:30 AM	11:30 AM
12:00 PM	12:00 PM	12:00 PM	12:00 PM	12:00 PM	12:00 PM	12:00 PM
12:30 PM	12:30 PM	12:30 PM	12:30 PM	12:30 PM	12:30 PM	12:30 PM
1:00 PM	1:00 PM	1:00 PM	1:00 PM	1:00 PM	1:00 PM	1:00 PM
1:30 PM	1:30 PM	1:30 PM	1:30 PM	1:30 PM	1:30 PM	1:30 PM

Authentic Assessments



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Authentic Assessments

- **Prior to Pandemic:**
 - Traditional Exams

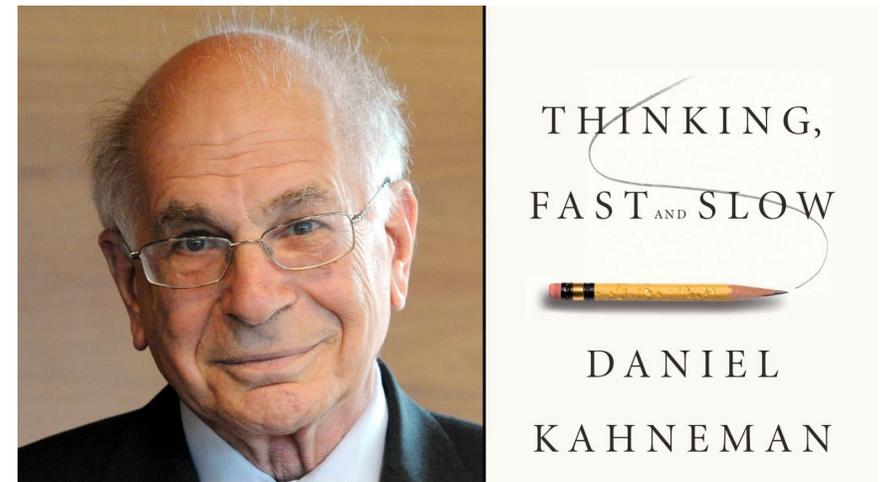


Photo by [Museums Victoria](#) on [Unsplash](#)

Authentic Assessments

- **Prior to Pandemic:**

- Traditional Exams
- Malcolm Gladwell's Revisionist History (Season 4)
 - Puzzle Rush & The Tortoise & the Hare
 - Daniel Kahneman's Thinking Fast & Slow



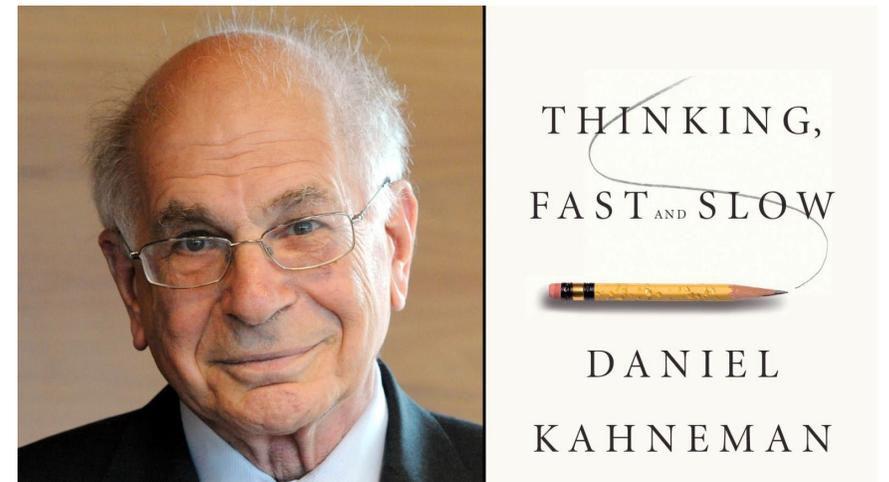
Authentic Assessments

- **Prior to Pandemic:**

- Traditional Exams
- Malcolm Gladwell's Revisionist History (Season 4)
 - Puzzle Rush & The Tortoise & the Hare
 - Daniel Kahneman's Thinking Fast & Slow

- **Questions:**

- Do my exams favor "Hares" and penalize the "Tortoises?"
- Are my assessments Authentic?



Authentic Assessments

- **Pandemic!**
 - Everything Online
 - No way to proctor exams or ensure integrity



Photo by [engin akyurt](#) on [Unsplash](#)

Authentic Assessments

- **Pandemic!**

- Everything Online
- No way to proctor exams or ensure integrity

- **Courses**

- **Introduction to Psychology:**

- Prerequisite for PSY and BNS majors, Gen-Ed for non-majors
- Eager First-Years to Ambivalent Seniors

- **Sensation & Perception (Neuroscience):**

- Elective for BNS majors, satisfies BNS requirement for PSY majors
- Eager BNS majors and Ambivalent PSY majors



Photo by [engin akyurt](#) on [Unsplash](#)

Authentic Assessments

- **Solution: “Artifacts”**
 - **Started with Backwards design**
 - What do I want them to be able to do?
 - **Demonstrate mastery of the topic** in a way that is personally relevant or applicable to real-world problems.
 - **How do I get non-majors interested and invested?**
 - **Any format:** film, photo, podcast, computer program, model, poetry, short-story.
 - **For those who needed structure:** Infographic, analysis paper, research proposal.

Examples

A Tough Pill to Swallow



A Tough Pill to Swallow shows the tragic reality of cigarette consumption and negative health outcomes and encourages the viewer to **think critically** about decisions regarding their health. The image depicts a **positive correlation** between the number of cigarettes consumed and the number of pills taken over time. This relationship shows that the use of cigarettes is correlated with the need for medical intervention. Additionally, the placement of the cigarettes and pills on a desk chair shows how one may feel stuck in place when experiencing health issues and fall into a trap of low exercise levels, which again feeds into health problems. The piece also begs the question of why so many people smoke. Forms of cognitive bias may influence the risk a smoker perceives in the moment. For example, if one is not experiencing a negative health impact in the current moment, they might fall into the trap of **confirmation bias**, where they assume that since the cigarettes are not showing problems yet they must be fine. Over time people develop major health problems because of falling into this trap.

Examples

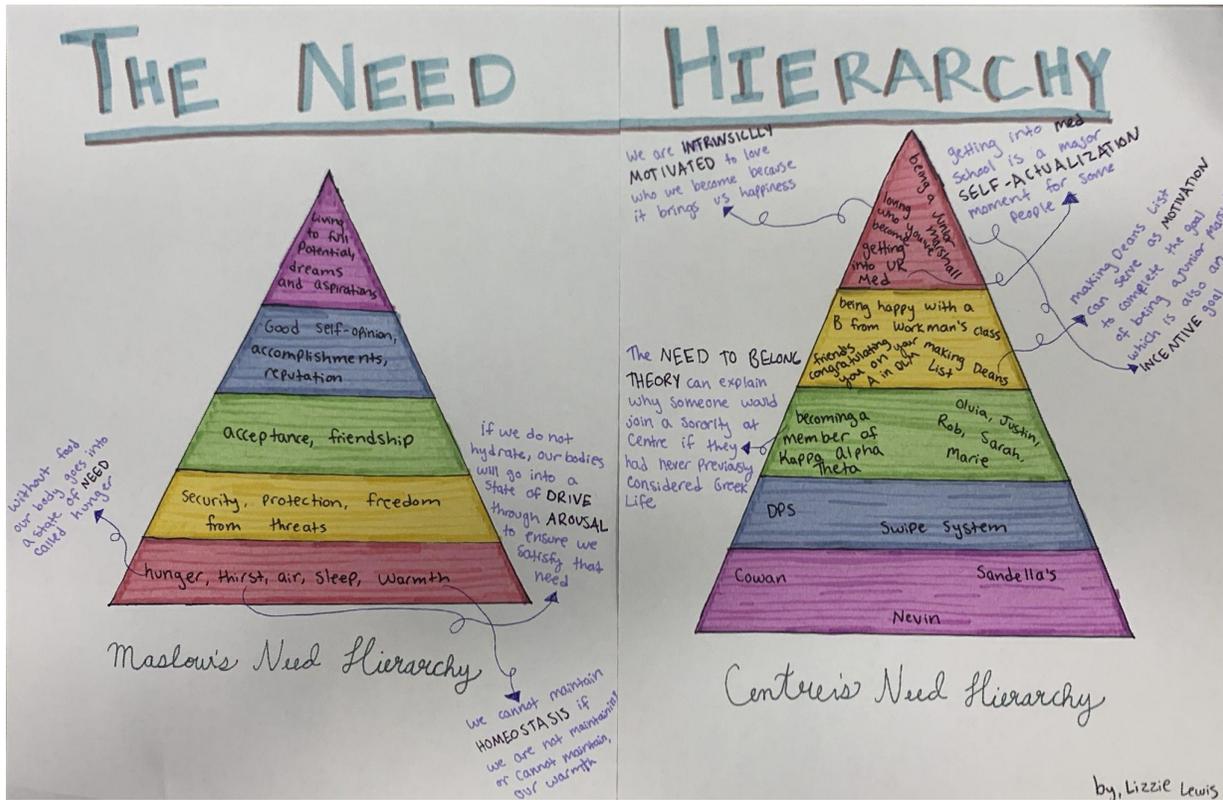
A Tough Pill to Swallow



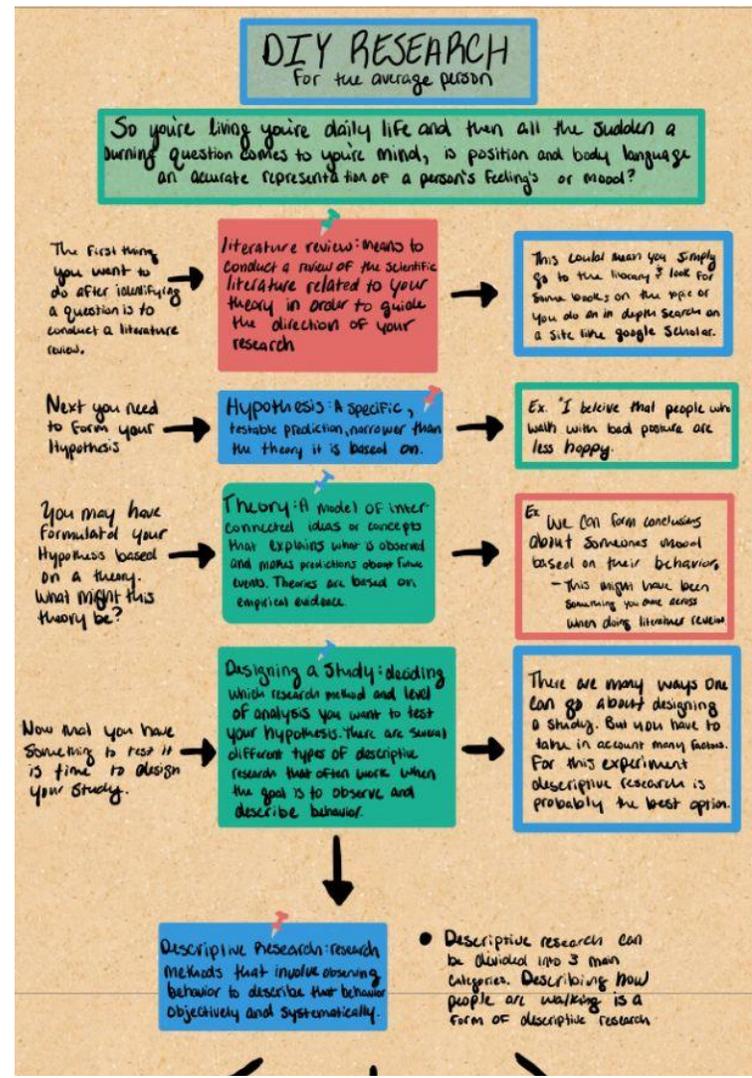
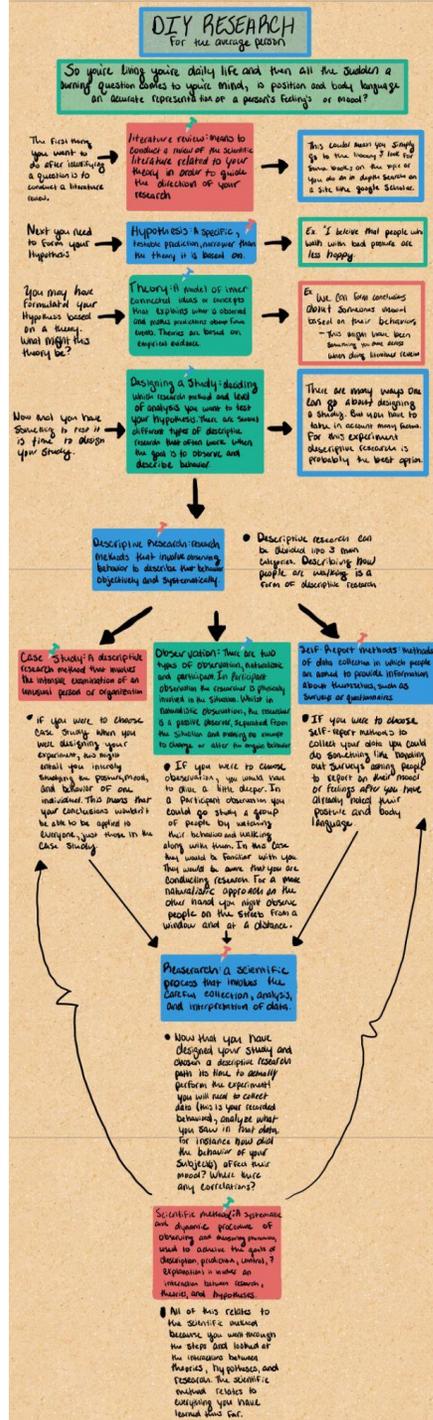
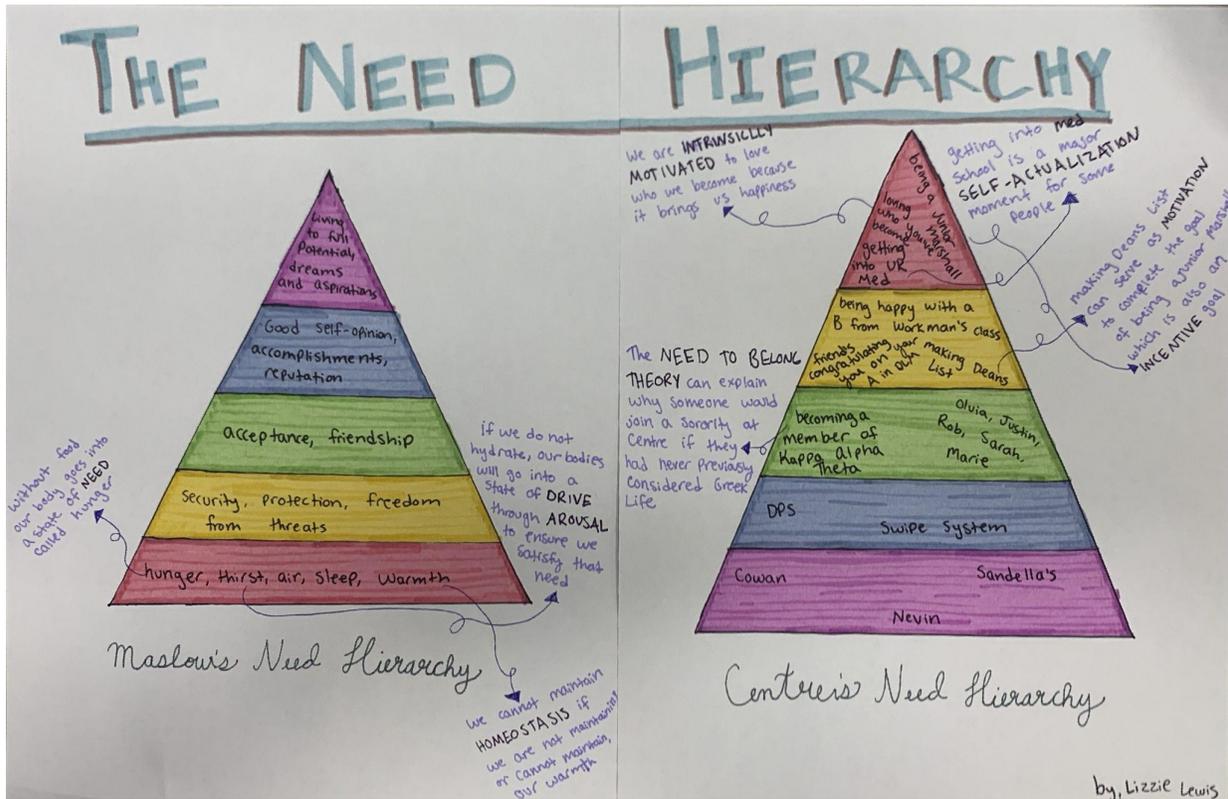
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Examples



Examples



Examples

Fechner's Law

The graph of Fechner's law curves sleepily at first like a lower lip inflated with grief, a calloused toe, the back of a stretching cat, the jawbone of a horse. But the surprise is in the asymptote that drifts off our margins. It's the part that flattens, plateaus into the infinite limits of our undetections. In a whisper, even taps of melting ice on the porch resound like explosions. But the louder you yell, the less I'm able to tell the difference, my difference thresholds dissolving. My neurons can only fire so fast, a sprinkler system of action potentials blocks the limits of my perceptions, builds a ceiling. When pushed with such great force, I can't tell the difference. We numb ourselves to change, stretching our bodies onto the leveled logarithm. Tell me this isn't the reason why five hundred thousand deaths means less to my brain than the grey and white fur flattened into the snow on the blacktop. How when we have so little, the impossible purr of a cat feels like the waking rumble of a universe ready to restore us. But in reality, amidst all the noise and pressure, all the signals go unnoticed. The line on Fechner's law flattens like the monitors besides hospital beds. From such sensory overload, it takes so much more to perceive. The truth is we have no idea the noise of the world. How much more bitter it was than last year. A lemon in the arch of my foot feels like comfort. As intensity grows, it takes more and more for that **just noticeable difference**. Adding a brick to the chimney on my chest feels no different, as the firing of my neurons has already become a conflagration.

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Weber's Law

How much dirt would I need to add to the coffee for you to taste it?
How much more can I turn the hot knob in the shower for you to feel it?
How much lower must the sun sink to notice it's getting dark?
How many days without showering will it take for you to smell me?

What I want
is an **absolute threshold**.

How much do you have to tighten the banjo string to hear the pitch rise?
How many textbooks do I have to stack on my head to feel my skull caving in?
How much lemon do I need to add to your sweet tea for you to taste my sourness?

Give me
difference Limen.

The truth is,
as the magnitude of a stimulus increases,
the difference threshold does too,
in a predictable proportion.

I sit
feeling the weight of my standards.

For most senses, its ratio
to the difference threshold remains constant.
Or at least, that's what the **Weber fractions** told me.

Oh, K.

But still I wonder,
serving up
muddy coffee and acidic black tea
in the hot water darkness
with sweaty crevices,
studying psychophysics
to the always out-of-tune banjo.

Authentic Assessments

- **Keys to making it work:**

- **Clear expectations** & having a **good rubric:**

- Terms defined & applied correctly, APA format, grammar & typos.
 - Glossary

- **Specifications Grading & 2nd Chances**

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- **Keys to making it work:**

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- **Specifications Grading & 2nd Chances**

- **Student Feedback:**

- Challenging & time consuming
 - More enjoyable than traditional exams or papers
 - Felt as though they learned more from making artifacts than studying for traditional exams.

Flexible Course Grading



Dr. Kim McArthur
Assistant Professor of Biology
Southwestern University
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Flexible Grading (Course-Wide)

- Flexibility in how the final grade is earned, with multiple paths to the same course grade → contract grading
- Emphasis on feedback and self-assessment over points and static evaluations → “ungrading” or specifications grading

Upper-Level Biology Elective (Fall 2019)

Course Grading Overview

Lecture Exams (10/8 and 11/12):	2 x 100 pts each =	200 pts total (20%)
Lecture Discussion Preparation: Reflect on assigned readings, dev bio relevance prior to in-class discussions	4 x 50 pts each =	200 pts total (20%)
Semester-Long Project: Organogenesis Mini-Review		250 pts total (25%)
Proposal + annotated bibliography (75 pts)		
Partial draft: introduction, 3 subsections (75 pts)		
Final draft, due as final exam (100 pts)		
Lab Journal Club Presentations x 2 (group presentations)	50 + 100 pts =	150 pts total (15%)
Collegiality (lecture + lab)	100 pts (default!)	100 pts (10%)
Lab Portfolio (group work + contributions)		100 pts total (10%)



My Experience: Contract Grading in Spring 2021

- Goal #1: More fully align my approach to grading with course learning objectives
 - Time spent giving individual feedback vs. “one point or two?”
 - Accumulating points without achieving all learning objectives
- Goal #2: More fully align my grading scheme with my values as an instructor
 - Follow the money! Follow the points!
 - Assess where students end up, not where students begin

Upper-Level Biology Elective (Spring 2021)

**Assessed via
Learning
Notebooks and
Final
Self-Assessments**

**Assessed as Meets
Expectations or
Needs Revision**

Criterion	D-/D/D+	C-/C/C+	B-/B/B+	A-/A/A+
Consistently prepare for class, attend class, and actively participate during in-class activities	✓	✓	✓	✓
Conduct yourself at all times with collegiality and integrity	✓	✓	✓	✓
Maintain a contemporaneous learning notebook and electronic portfolio of all submitted work, with assignments completed in a timely manner	✓	✓	✓	✓
Stay in regular communication with the professor, and attend at least two one-on-one consultations during the semester	✓	✓	✓	✓
Make meaningful and equitable contributions to high-quality work in your lab group	✓	✓	✓	✓
Complete a final comprehensive self-assessment, reflecting on your work this semester and justifying your proposed earned grade	✓	✓	✓	✓
Complete organogenesis project draft		✓	✓	✓
Complete green category assignment draft		✓	✓	✓
Complete orange category assignment draft			✓	✓
Complete purple category assignment draft				✓

Q & A



Breakout Rooms

In small groups, use Jamboard prompts to discuss flexible course design.

Leave your ideas, comments, questions, and concerns on the Jamboards.

We'll discuss some questions in the main group at the end of the workshop, and we'll also address questions in an updated resource document post-workshop.



If you'd like to share resources or examples of flexible course design, please email your contributions to ...

Andrew Bell
abell4@richmond.edu

By Friday, June 25

