



MAY 8, 2020 WEBINAR

Virtual Labs

The webinar will begin at 11:00 a.m.

Use the chat window if you have questions during the webinar

Your microphone has been muted (please do not enable video)

If you experience any issues please email:

epcallesis@northcarolina.edu



WELCOME TO THE DIGITAL LEARNING INITIATIVE WEBINAR

Virtual Labs

James Garner Ptaszynski, Ph.D.
Vice President, Digital Learning
jimp@northcarolina.edu

May 8, 2020





DIGITAL LEARNING INITIATIVE

OVERVIEW OF VIRTUAL LABS

In the vast shift to online teaching caused by the new coronavirus, one of the most common questions raised was: But what about lab classes? Is it even possible to move a lab course quickly online and still meet your learning objectives?





How to Quickly (and Safely) Move a Lab Course Online

By Heather R. Taft | MARCH 17, 2020



Getty Images

<https://www.chronicle.com/article/how-to-quickly-and-safely/248261>

UC Berkeley

Berkeley News Research ▾ People ▾ Campus & community

CAMPUS & COMMUNITY, CAMPUS NEWS, WORK LIFE

Coronavirus forces hands-on learning to go online and hands-off

By Robert Sanders, Media relations | MARCH 23, 2020

[Tweet](#) [Share 463](#) [Email](#) [Print](#)

Andy Lin (top right) interacting with GSI colleagues as he prepares for online 'virtual' office hours using Zoom. (UC Berkeley image by Andy Lin)

<https://news.berkeley.edu/2020/03/23/coronavirus-forces-hands-on-learning-to-go-online-and-hands-off/>



How to Rethink Science Lab Classes

John D. Loike and Marian Stoltz-Loike have identified five objectives for online labs that are critical to any science laboratory experience and lend themselves well to online teaching.

By John D. Loike and Marian Stoltz-Loike // April 8, 2020

16 COMMENTS

The rapid transition from college classrooms to online classes in the wake of COVID-19 has given faculty members little to no time for planning and preparation. Challenging pedagogical issues must still be addressed, particularly regarding the best way to educate undergraduates in online science laboratory courses. Science labs at the undergraduate level can be taught effectively online, however, with some modifications -- and some of these modifications may be valuable even after academic life returns to normal.

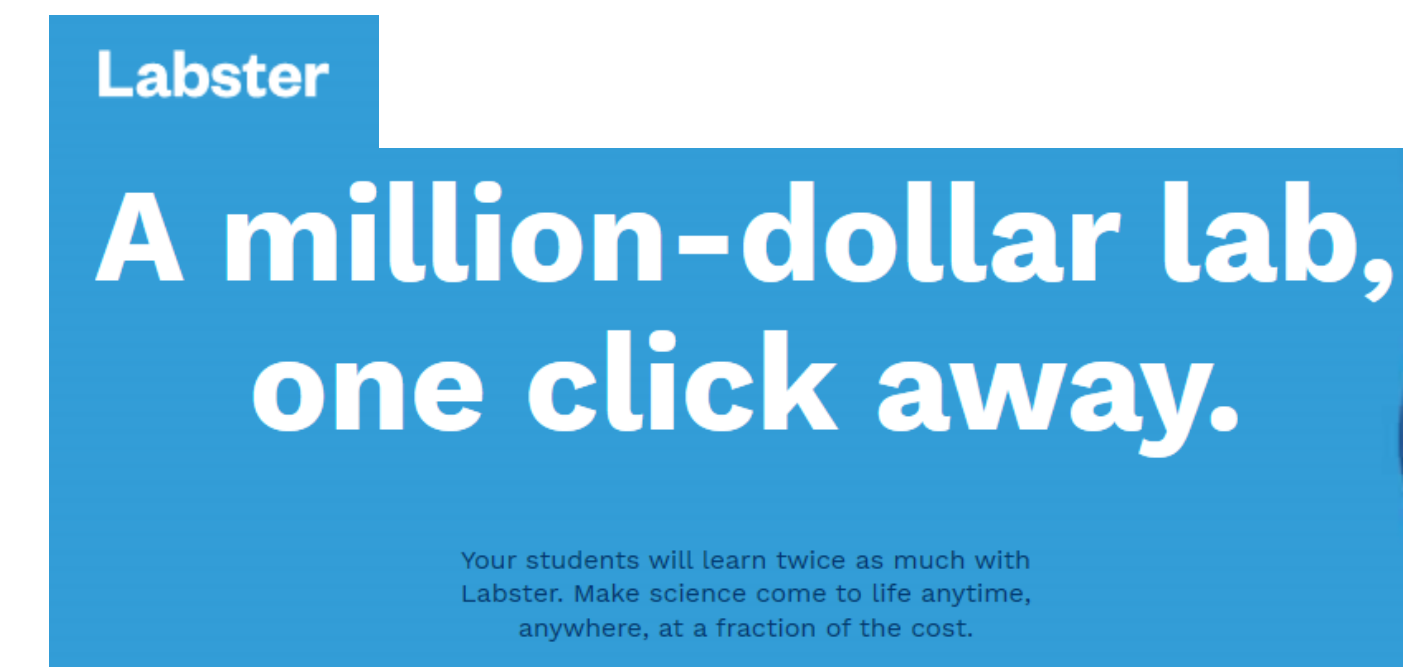
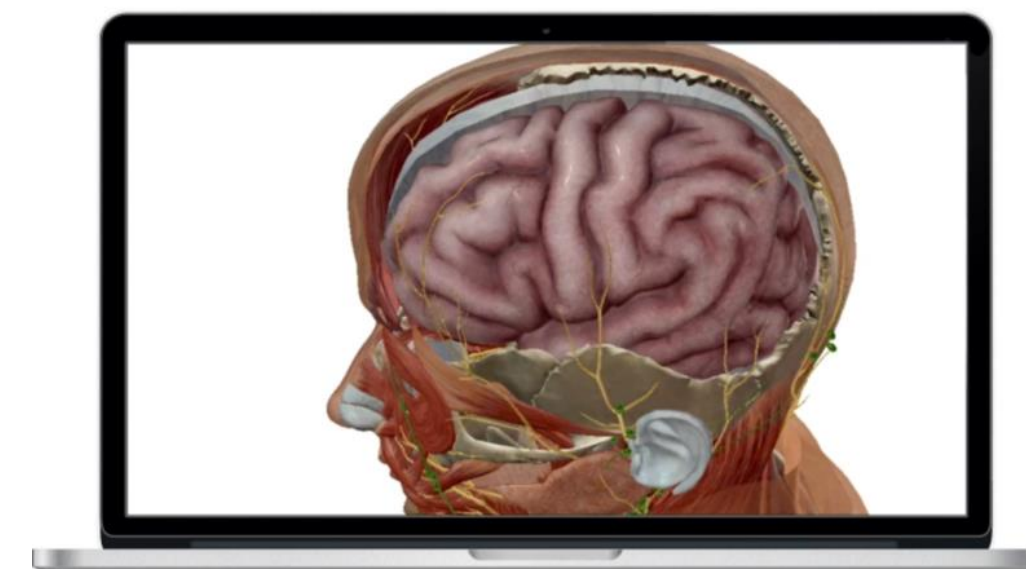
Touro College, with two decades of experience in online education, routinely provides rigorous training to faculty who teach our asynchronous online courses. During this current transition, we have used that expertise to help



ISTOCKPHOTO.COM/VECTORCOOKIES

<https://www.insidehighered.com/advice/2020/04/08/five-objectives-online-science-labs-lend-themselves-virtual-teaching-opinion>

- **Instructor Created Labs**
- **Lab Kits**
- **Virtual Labs**
- **Simulations**



UNC System Digital Learning Webinar

Special Edition: Virtual Labs Landscape

May 8, 2020, 11:00 AM – 12:00 PM

11:15 AM – 11:25 AM

Labster and McGraw-Hill Connect Virtual Labs



Sarah Arrington, Ph.D.
Program Director / Lecturer,
General Biology



Tom Van Gilder
Director, Learning Technology Services,
Center for Academic Excellence

11:35 AM – 11:45 AM

Commercial Products and Publisher Offerings



Bill Prensky
Chief Executive Officer



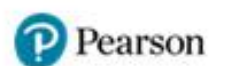
Ani Simon-Hart
Head of Operations



Benoit Buyse
Head of Product
Development and
Innovation



Dolly Womack
Executive Director,
Strategic Partnerships



11:25AM – 11:35 AM

Campus Developed Virtual Labs



Cathi Dunnagan
Senior Instructional
Designer



John Gordon
Associate Director,
Instructional Media
Productions



David Howard
Director of Instructional
Innovation Services



David Tredwell
Team Lead, Multimedia
Development

- The **alternatives you considered** - did you come up with any check-lists or rubrics when considering solutions or commercial products before rolling your own?
- Any **changes** you had to make in the f2f learning objectives in order to move from a physical class to online?
- Overall, **how difficult** was it to create these virtual labs and was the effort worth it? What is the **cost**?
- Other **lessons learned**?



DIGITAL LEARNING INITIATIVE

VIRTUAL LAB OVERVIEW

**Presented by Sarah Arrington, Ph.D. & Tom Van Gilder, Director LTS
Appalachian State University**



WHY GO VIRTUAL?

1. To provide greater access to general education laboratory courses
2. To supplement in-class laboratory experiences
3. To allow development of hybrid lab courses to provide better on-campus space utilization
4. To provide continuity of instruction when access to campus is not accessible or for circumstantial reasons

Virtual Labs \neq Hands-on Experience

OPTIONS EXPLORED

Labster

- Pilot: Fall 2019 - Spring 2020
- F19: ~290 Students
- Sp20: ~290 Students
- Majors & Non-Majors Biology
- 6 Virtual Lab Simulations
- Total Cost: \$ 17,472 (pilot)

To Continue with Labster

- \$65 - \$85/student
- 6 lab simulations

connect

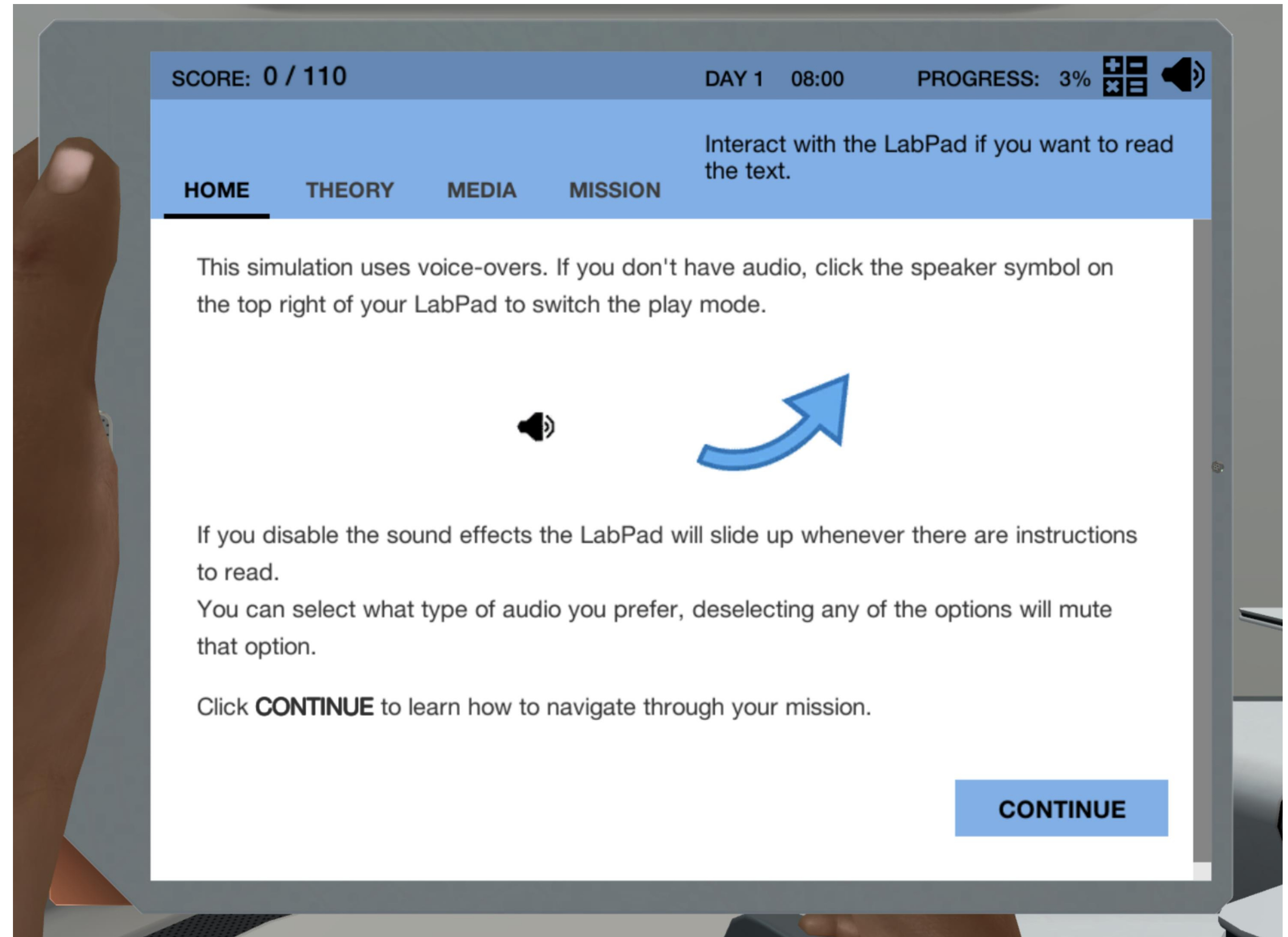
- Covid: Sp20 last 8 weeks
- Sp20: ~588 Students
- Majors & Non-Majors Biology
- 6 Virtual Lab Simulations
- Total Cost: \$ 0 (pilot)

To Continue with Connect

- \$60/student – part of textbook rental program
- Unlimited lab simulations

At the start of each lab, students are provided instructions about how Labster simulations work. They are given the option to turn off the narration.

Labster DEMO



▶ Labster DEMO

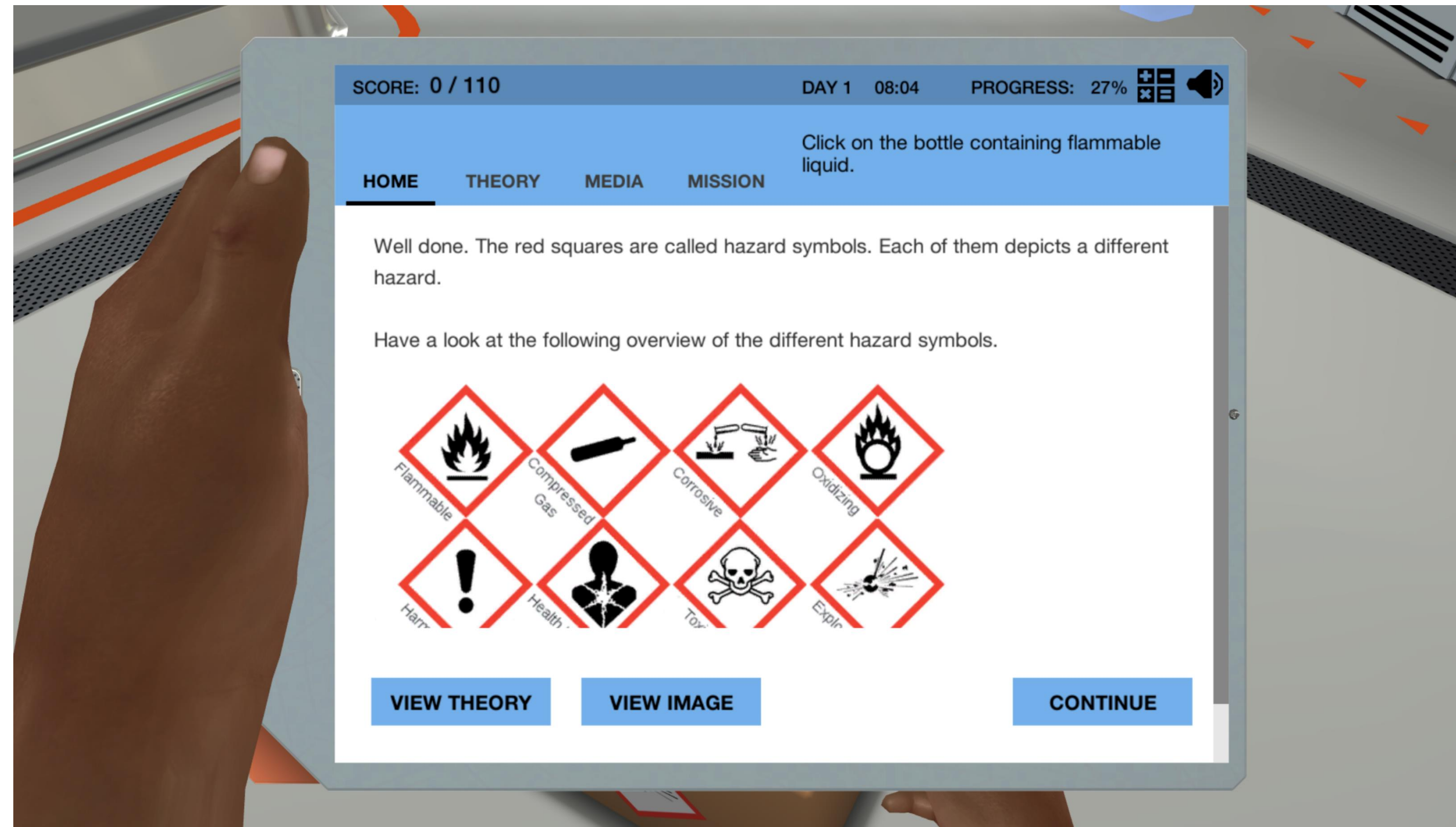
Excellent graphics that allow students to navigate around the lab.

The instructions of what to do are shown in the bottom left corner as well as being verbally expressed by the narrator.



Students are introduced to real-world applications, such as the GHS labeling system.

▶ Labster DEMO



Periodically throughout the simulation students are presented with questions to check their understanding. These scores can be recorded in your LMS grade book.




Labster DEMO

SCORE: 0 / 110 DAY 1 08:04 PROGRESS: 28%

Click on your LabPad to answer the quiz question.

HOME THEORY MEDIA MISSION

Which symbol depicts an oxidizing reagent?


a  b  c  d 

a) Far left
b) Center left
c) Center right
d) Far right

VIEW THEORY VIEW IMAGE

Each lab starts with an overview of what will be covered along with key concepts that they will need to know.

← LAB SAFETY • PERSONAL SAFETY


FEEDBACK
SUBMIT

INTRODUCTION

LABORATORY SIMULATION

Key Concepts

Several types of personal protective equipment are available for use in various situations in the laboratory.

Personal protective equipment may include:

- Lab coat or apron
- Gloves
- Goggles or lab safety glasses
- Closed toe and covered heel shoes
- Long hair should be tied up to meet proper laboratory safety protocols.

Overview

This simulation is meant to describe the most strict laboratory precautions.

You should learn the reason for each of these precautions but follow the rules set by your own lab instructor or supervisor.


Before you begin

In this simulation, you will see a student entering the laboratory.

You will be able to see the materials on the lab bench and assess potential hazards in the lab scenario.

You should determine which precautions are available and necessary for three specific scenarios.

- Rat dissection
- pH testing
- Microbial staining



CONTINUE TO:
 Laboratory Simulation >

Students are guides through the exercises, referred to as phases, by the navigation panel on the right.

LAB SAFETY • PERSONAL SAFETY

INTRODUCTION LABORATORY SIMULATION

PHASE 1:
Rat dissection hazards

Complete the following steps:

- 1 Zoom in on lab bench to view the items and identify potential dangers. Zoom out when finished
- 2 Look at student's shoes. Return to overview when finished
- 3 Select item student has that should not be brought into a lab
- 4 Select the safety precautions that should be used for personal safety in this lab

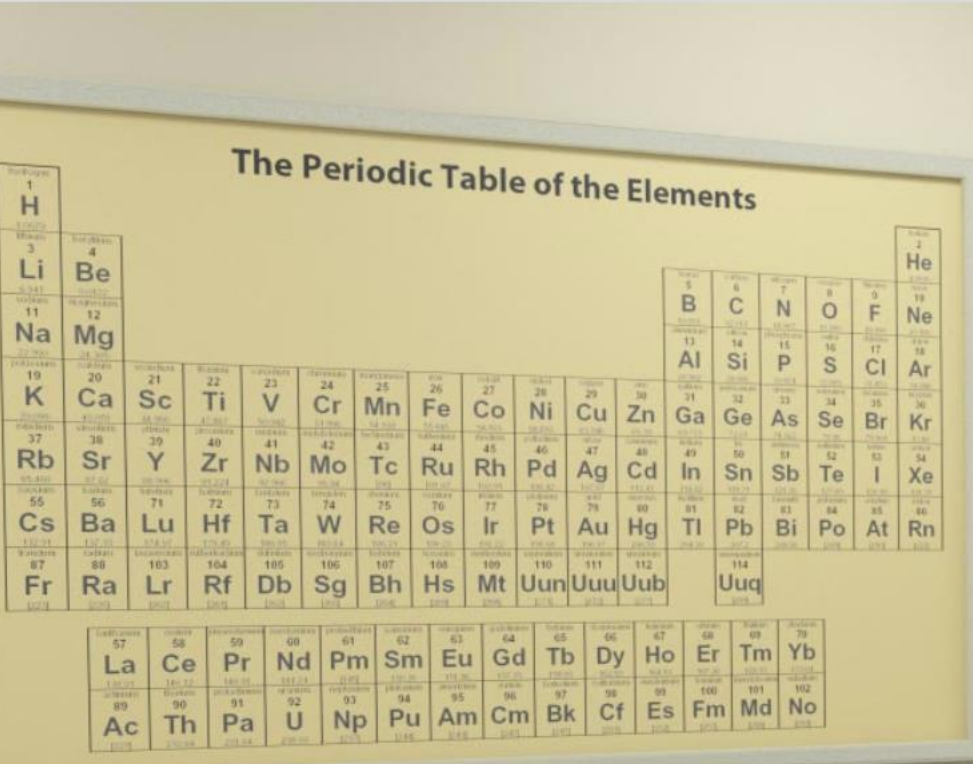
LOOK AT SHOES

METHODS RESET MY NOTES SHOW LABELS

Frequently throughout the simulation students are asked questions about the lab they are performing. They cannot advance until they get the answer correct.

LAB SAFETY • PERSONAL SAFETY
FEEDBACK
SUBMIT

INTRODUCTION
LABORATORY SIMULATION



Question

Which of the following items in this dissection exercise are potentially dangerous to the student?

Select all of the correct statements.

A. Beaker

B. Scalpel

C. Rat

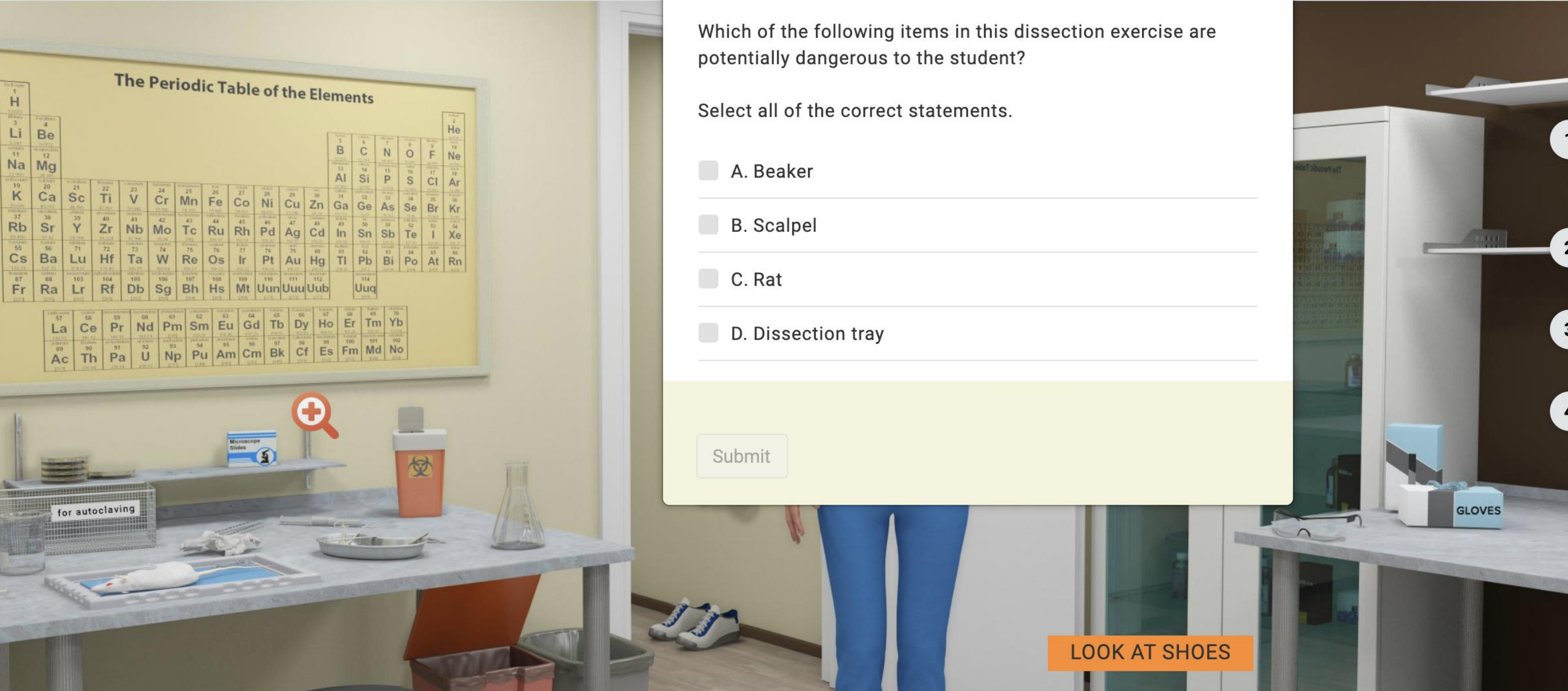
D. Dissection tray

Submit

**PHASE 1:
Rat dissection hazards**

Complete the following steps:

- 1** Zoom in on lab bench to view the items and identify potential dangers. Zoom out when finished
- 2** Look at student's shoes. Return to overview when finished
- 3** Select item student has that should not be brought into a lab
- 4** Select the safety precautions that should be used for personal safety in this lab



LOOK AT SHOES

At the end of the simulation, learners are asked questions that require them to apply what they have learned.

INTRODUCTION

LABORATORY SIMULATION

Generally speaking, what types of hazards should you protect yourself from in the laboratory?

Select all that apply

- A. Sharp objects
- B. Splattering
- C. Spills
- D. Flame
- E. Corrosive chemicals

PHASE 4:

Apply what you have learned

Complete the following steps:

- 1 Answer the lab safety summary question

The last phase of each simulation provides a summary of what was covered, and will include any lab notes, graphs, and data collected throughout the simulation.

← LAB SAFETY • PERSONAL SAFETY

FEEDBACK
SUBMIT

INTRODUCTION
LABORATORY SIMULATION

Student: Sarah

Lab Summary:
 What types of hazards should you protect yourself from in the laboratory?

- Sharp objects
- Splattering
- Spills
- Flame
- Corrosive chemicals

PRINT

PHASE 5: Save Lab Data

Relevant Lab Data will be available if you return to this laboratory simulation. It can also be saved for personal reference.

Options include:

Copy & paste

Print or save pdf
 Windows 10 and OS X both have native "print to pdf" capabilities. Implementation differs slightly by browser.

CONGRATULATIONS
 You have finished this lab and it has been automatically submitted.

ADDITIONAL RESOURCES: OPEN SOURCE

LabXchange™
Browse ▾

Library catalog > Tools & Techniques in Biotechnology: Micropipetting
6/7

6. MICROPIPETTING SOLUTIONS

About this simulation ☆ Favorite ⋮

This simulation allows users to practice using a micropipette in a virtual lab setting. Skills emphasized in this simulation include dispensing different volumes of liquid with a P20 micropipette and using the first and second stop. [more](#)

Uploaded July 22, 2019



Created with support from **AMGEN** Foundation

<https://www.labxchange.org/library/pathway>

This content is from **LabXchange**.

Learn more

Content Type	Simulation
Language	English
Subject	Biotechnology, Techniques (Biology)
Background Knowledge	None
License	LabXchange Standard License
Favorites	0
Views	2
Remixes	36 (1 Public, 35 Private)

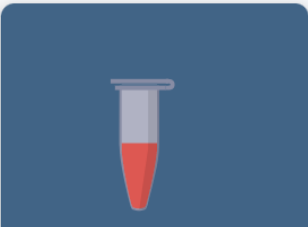
Preview next

7. Life in the Lab: Working in a DNA Sequencing Pipeline

< Back
Next >

REAGENTS


Chemicals that can be used in this experiment




Red Dye Solution

MICROPIPETTING EQUIPMENT


Used to measure small volumes




P2 Pipette




P20 Pipette




P200 Pipette




P1000 Pipette




P2 Tip Box



P20 Tip Box



P200 Tip Box




P1000 Tip Box


OTHER EQUIPMENT

A	B	C	D
○	○	○	○

Blotting Paper



Trash


 LAB NOTEBOOK
Using a micropipette

- CONTEXT
- 2 MATERIALS
- PREDICTIONS
- PROTOCOL
- RESULTS
- REFLECTION
- SUMMARY


Next section

ADDITIONAL RESOURCES: OPEN SOURCE

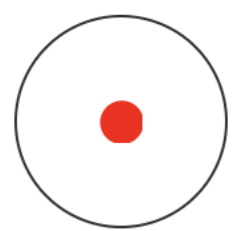
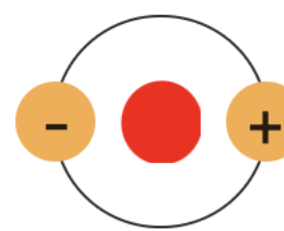
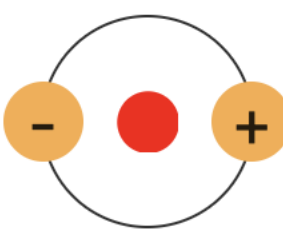
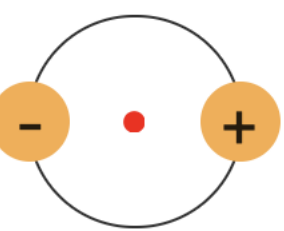
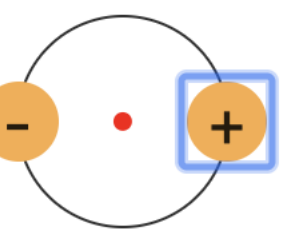
3. PREDICTIONS

During this simulation, you will be dispensing different volumes of liquid red dye with a micropipette onto a blotting paper. How do you think the different volumes will influence the size of red circles you expect to see on the blotting paper? Make your predictions here by adjusting the controls to make each circle larger or smaller.

Estimate the size of each blot if you set the micropipette to:


 LAB NOTEBOOK
Using a micropipette

- CONTEXT
- MATERIALS
- 3 PREDICTIONS
- PROTOCOL
- RESULTS
- REFLECTION
- SUMMARY

10µl	20µl	15µl	7.5µl	2µl
				
SAMPLE	A	B	C	D

ADDITIONAL RESOURCES: OPEN SOURCE



BioNetwork
NC Community Colleges
Creating Success in Life Science

PIPETTING

CONGRATULATIONS!

YOU'VE JUST BEEN HIRED AS A QUALITY ASSURANCE INSPECTOR FOR A RESEARCH TESTING COMPANY. YOUR JOB IS TO TALK TO EMPLOYEES AND IDENTIFY CAPA, CORRECTIVE AND PREVENTATIVE ACTIONS, THAT YOUR COMPANY CAN TAKE. KEEP AN EYE ON YOUR COMPLIANCE SCORE. YOUR COMPLIANCE SCORE WILL INCREASE AS YOU HELP EMPLOYEES IMPROVE A PROCESS. BUT, BE CAREFUL - MAKE MISTAKES AND YOUR COMPLIANCE SCORE GOES DOWN.

READY TO BEGIN? CLICK NEXT.

NEXT →



BioNetwork
NC Community Colleges
Creating Success in Life Science

Microscope Overview

SLIDE (2 of 13):

Eyepiece:
These lenses, also known as ocular lenses, are typically 10x, but also come in 5x, 15x and 20x varieties. The eyepiece lens is what you actually look through to see your specimen. The interocular distance is adjustable so that you can keep both eyes open when looking into the microscope.

PREV **Reference Menu** **NEXT**

HOW TO DECIDE WHAT TO GO WITH

1. Who is your audience?
2. Will the simulations be used to supplement a hands-on lab or will it be used as a stand alone learning resource?
3. Are the products accessible? Think ADA compliance, software application requirements, etc.
4. What is your budget? Who will pay for the virtual labs?

CONTACT INFORMATION

- Appalachian State University: Sarah Arrington
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- Labster: <https://www.labster.com/pricing/>
- McGraw-Hill Connect: Britney Ross,
britney.ross@mheducation.com
- LabXchange: <https://www.labxchange.org/>
- NC BioNetwork: <https://www.ncbionetwork.org/educational-resources>



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SUMMER SUPPORT

- NC State Distance Education and Learning Technologies (DELTA) reached out to summer faculty to offer support.
 - What can we do to help in a few weeks? Consultations, online resources and existing solutions were the focus.
- Asked Associate Deans what courses were a priority. (This turned into an open call for support that got distributed through department heads.)
- Proactively emailed faculty with large courses
 - Sections with 75+ students (that weren't already planned for online delivery)
 - Courses where all sections totaled 100+ students
- **Proactively emailed faculty teaching labs**

TIPS FOR PIVOTING LABS

- Based on Long Term Production Projects to create DE Labs
- Separate the in-person lab into its component parts
 1. Pre-lab
 2. Instrument, Equipment, Technique and Safety
 3. Experiment
 4. Analysis
 5. Assessment

PARTS OF A LAB

1. Pre-lab

- Lab overview / introduction [*Idea: TA with whiteboard*]

2. Instrument, Equipment, Technique, and Safety

- Separate videos that can be reused in multiple labs
- Require viewing as pre-lab activity

PARTS OF A LAB

3. Experiment

- “Perfect lab” taught by “perfect TA”
 - Eliminate need for branching into all possible outcomes
 - Preserve known typical accidents and sources of error
- First-person POV in lab coat and gloves; hide physical attributes
 - Help viewer see themselves as the “virtual scientist / analyst / technician”
- Minimize video locations
 - **Lab Station** – begin with all equipment and chemicals within reach
 - **Instrument Room** – begin in place with all equipment within reach

PARTS OF A LAB

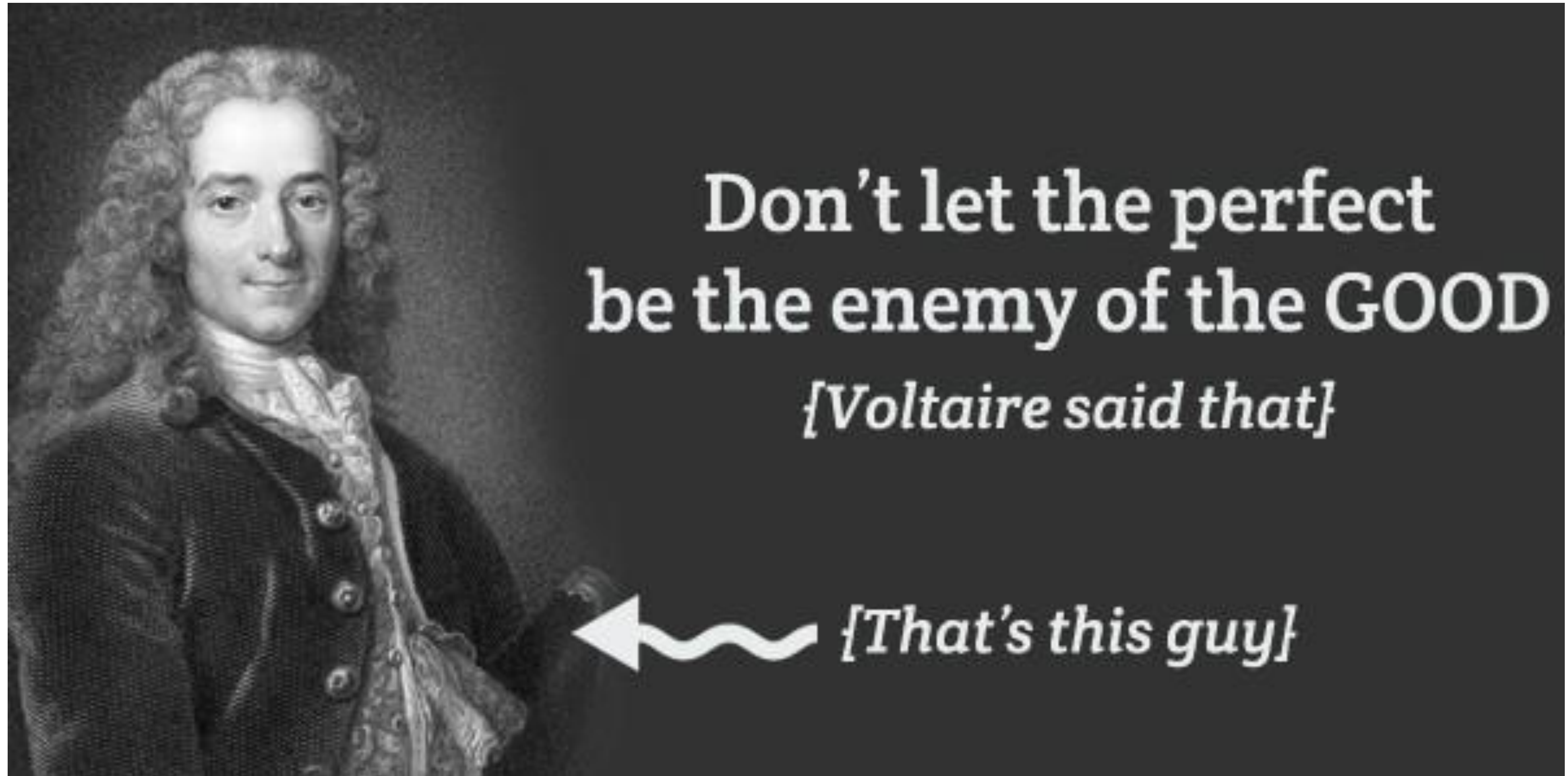
4. Analysis

- Option: TA with whiteboard explains experiment results
- Option: Zoom session to discuss results

5. Assessment

- Pre-lab Assessment – Quiz or Worksheet
- Post-lab Assessment – Worksheet
 - Case study approach: *Data required for analysis is presented as part of the lab content and students must do analysis and turn in, as usual*

REDEFINE PERFECTION



DON'T DISTRACT FROM LEARNING

- Provide best AUDIO possible. More important than video.
- Keep camera in focus. Avoid auto-focus.
- Review footage before moving forward

EDITORS EDIT

- Try to find someone to edit your material

WHAT IS THE ONE THING?

- Name one thing your students will know after watching...
 - ... AND GIVE IT TO THEM
- Don't distract from the ONE thing
- Make two videos if there are TWO things, etc.

SHOOT EACH VIDEO THREE TIMES

- Wide Shot with key audio
- Wide Shot but NO talking

CLOSE-UPS

- Direct attention to what's important (graphics, close-ups, call-out)

YOU ARE YOUR BEST SELF

- Be honest
- Be yourself
- Be the Genuine you.



INTERACTIVE VIDEO

- Online tools can transform existing videos into different kinds of activities
- Content
 - Annotations
 - Instructor commentary
 - Additional imagery
 - Key point highlights
- Interactions
 - Pauses
 - Time jumps
 - Questions
 - Discussions

ORGANIC CHEMISTRY VR

- Developed over the last two years, used with select students
- In mid-March, all Organic Chemistry students pivoted to these labs
- **Free and Available** to use!!!

[GO.NCSU.EDU/VRLABS-ORGCHEM](https://go.ncsu.edu/vrlabs-orgchem)

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A VIRTUAL ENVIRONMENT DESIGNED FOR LEARNING

Ani Simon-Hart | Benoit Buyse | Bill Prensky



Real-time immersion for virtual learning

GUIDING FACULTY INTO REMOTE TEACHING AND OPERATING IN THE “NEWISH” NORM



Jennifer Cutts, Ed.D.
Director, Curriculum and Innovation
Kenan-Flagler Business School
UNC Chapel Hill



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

CONNECTING THE DOTS: LEVERAGING CONNECTIVISM TO SUPPORT COMPETENCY BASED LEARNING



Sheri Conklin, Ed.D.
Assistant Professor
UNC Wilmington



Eric L. Richardson, Ph.D., MPH, MBA, PHR, SHRM-CP, CHHR, ACHE
Program Coordinator, Master of Healthcare Administration (MHA)
Assistant Professor | School of Health and Applied Human Sciences
UNC Wilmington



Nikki Strawn, M.S.
Instructional Designer
UNC Wilmington



NEXT WEBINAR FRIDAY MAY 22

**Comments or suggestions for future webinars?
Please contact:**

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or

jjfalchi@northcarolina.edu

Remember to checkout the Digital Learning Initiative Blog

dli.northcarolina.edu