KeepOnTeaching: Science Labs

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Objectives

You’ll be able to...

• Articulate the essential learning goals of laboratory activities
• Access resources related to teaching labs in alternative formats
• Evaluate alternatives that meet your learning goals well enough
The Challenge

Separating what is best from what can work

We can’t let perfect get in the way of good enough!
Distill each lab activity into the most important learning goals.
If the primary goal is for students to learn and apply techniques to a given experiment:

Scenarios

- What is wrong with this approach? (common technical errors)
- When would you....

Online simulations may cover all or part of a protocol

- Planning/sequencing steps
- May allow for experimental manipulation
- E.g. Lab XChange

Video Demonstrations
If the primary goal is for students to reinforce concepts learned in lecture in a more applied context:

- **Video demonstrations**
  - Journal of Visualized Experiments—science education links

- **Virtual labs**
  - Virtual fetal pig dissection
  - Virtual microscope
  - Physical Geology labs

- **Case studies**
  - National Center for Case Study Teaching in the Sciences
If the primary goal is for students to interpret or analyze experimental results:

- Provide students with data to analyze
  - Data obtained in previous courses
  - Published datasets
    - USGS (mapping, remote sensing, energy data, etc)
    - Open Access Directory (data repositories)
- Have students graph data, interpret graphs
- Provide students with other visual results to analyze (gels, images, etc)
- Online simulations may allow modification of variables to generate data
If the primary goal is for students to understand and conduct scientific research:

Shift student effort to having students write up other sections of final report

Ask students to analyze results they have already collected

Ask students to make predictions about results and produce graphs, tables, discussion, etc for outcomes where hypothesis is supported (and perhaps alternatives)

Consider having students write a grant proposal

Ask students to serve on a “review panel” or review a journal article
Additional Recommendations

• If you are having students use web resources, test them out yourself with a variety of browsers and see what plug-ins are required.

• Show students where/how to download plug-ins or apps
  • Perhaps use Kaltura video stepping through the process

• If asking students to do something completely unfamiliar to them, you may want to give an example or talk through expectations
  • Perhaps use Blackboard Collaborate Ultra to discuss

• Remember that you aren’t going to be able to replicate the lab experience perfectly—practice compassion for yourself and students and let good enough be good enough
Resources: kent.edu/onlineteaching/teaching-strategies

Select drop-down: Do you typically do demonstrations...

Select KSU Remote Instruction Science Laboratory Resources to download the excel sheet.
Q & A

(Recording off)
Thank You.

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