

## Alternatives for labs

Labs are among the hardest teaching activities to find alternatives for as university teaching is moved online in response to the Corona virus. In determining what alternative might work, it is critical to look at the intended learning outcomes for the lab. For example, common (generic) intended learning outcomes for labs:

Students will

- Operate equipment safely and competently
- Develop a technical skill to a particular standard
- Collect data and perform a confirmatory analysis (“cookbook labs”)
- Collect exploratory data and perform analyses (“exploratory labs”)
- Reinforce or apply lecture material to particular situations

*Alternatives for “Operate equipment safely and competently”*

- Expert modelling: Step by step how-to videos of staff talking through and demonstrating the equipment, addressing the most common issues have while learning to operate the equipment
- Computer simulations, if available

*Alternatives for “Develop a technical skill to a particular standard”*

- Expert modelling: Step by step how-to videos on how to perform the skill, addressing the most common problems students have while developing the skill
- High-resolution zoom-able online photos (e.g. for identification / microscope labs)
- Computer simulations, if available

*Alternatives for “Collect data and perform confirmatory analysis”*

- Share data from previous years with students to do the analysis
- Computer simulations, if available

*Alternatives for “Collect exploratory data and perform analyses”*

- Dry runs: students describe how they would set up the experiment design, data collection, and analysis procedures

*Alternatives for “Reinforce or apply lecture material to specific situations”*

- Computer simulations, if available
- Online tutorials / discussions with case studies

## Simulations and online labs

University level online lab resources

- [Phet interactive simulations](#) (Science and Mathematics)
- [Science Education Resource Center at Carleton College](#) (Earth sciences)
- [ComPADRE \(Physics\)](#)

High school online lab resources that may be adaptable for your needs

- [LabXchange](#)
- [Go-Lab](#)