Instructions on live-streamed lab activities.

Klaus Woelk - freshman Chem lab - Video of the process.

Dr. Klaus Woelk and his Graduate Students have developed a creative and workable system for sharing labs online with Zoom.

Students participate real-time with Zoom and participate in small group discussion using the Zoom Break out room functionality.

Dr. Woelk’s instructions:

After only a week of trying it out, we have become quite comfortable with this mode of instruction.

We basically need 4 individuals for this type of activity:

1. Course instructor: providing guidance to the students, reading the instructions, reading and repeating the values needed for the lab report or for calculations
2. First TA: conducting the experiment (essentially being the hands of the student)
3. Second TA: recording the experimental values, observations, and measurements as well as assisting in the experiment when more than two hands are needed
4. Camera person: Capturing all key moments of the experiment (essentially being the eye of the student)
We have established some basic guidelines for these four individuals:

a) The camera person has the right of way. TAs and instructor must move out of the way, if the camera person is trying to capture specific parts of the experiment.

b) The camera needs to move slowly and remain still for at least 3-5 seconds when a numerical value is read from an instrument. The value must be repeated (by the instructor) so that students with poor internet connection (i.e., where the video is buffering or skipping) can still record the observed value.

c) No shortcuts! Experiments take time, and that should be part of the online experience. Everything from the preparation of materials and supplies to clean-up and waste disposal, from waiting times while a reaction or process is going on to repeating measurements for statistical evaluations must be shown (i.e., no such thing as “we have prepared this for you already” or “we have conducted the same measurements three times and here are the results”). We wouldn’t allow this type of shortcuts in the real lab.

d) The chat is extremely important! Students are quite comfortable communicating with each other as well as with the instructor and TAs using the chat function. Hence, always observe the chat for comments and questions.

e) Students need ample time in the breakout rooms! During the time students are send to the breakout rooms, instructor and TAs often feel helpless (or useless or bored). The time students spend in the breakout rooms should be determined ahead of time (and communicated to the students) and strictly observed. This will create the reliable classroom or lab feeling that we try to emulate online.

There is probably more helpful guidelines and best practices that we will develop as we become more versed and more comfortable with the technology and pedagogy. For now, we doing what we can to keep the education at the high level that students can expect from an institution like Missouri S&T.

Dr. Klaus Woelk,
Associate Professor, Department of Chemistry, 145 Schrenk Hall
Missouri University of Science and Technology (Missouri S&T)
400 West 11th Street, Rolla, MO 65409-0010, USA
woelk@mst.edu