Investigating the Microscopic World:

This "lesson" is appropriate for upper level high school students to learn not only about microscopy and the microscopic world, but about the nature of science and how science is done.

Supplies:

- 10 hand lenses
- 10 dissecting microscopes
- 10 compound microscopes
- Ideally, a digital image capture system for both a dissecting microscope and a compound microscope to collect data
- 10 plastic well slides
- Depression slides and cover slips
- Plastic transfer pipets
- 4-5 microscopic organisms such as euglena, snail eggs, vinegar eels, protists, daphnia, brine shrimp, mixed pond water

Directions:

Students should be introduced to microscopes before this lesson via the "Introduction to Microscopes" lesson from the HCC mMTH.

Following that, place a few drops of each organism or a few individuals in plastic well slides (so 2-3 slides of each organism). Allow students to get to know the organisms by observing structure and behavior. Each student group should get a chance to observe each different type of organism. The idea is for each group to come up with a question and propose a hypothesis based on their observations, then design an experiment, carry it out, and collect and interpret data.

Some organisms may need to be placed on a depression slide with cover slip in order to observe them at adequate magnification. Some groups may need additional equipment. Ideally, they should be able to take pictures and/or videos of their experiments.

You can tell students the names of the organisms, but they should do some background research. This lesson may involve a shorter introductory session followed by time allowed for research and then at least one more full session during which students conduct their experiments and collect data. A nice lab notebook page to model can be found here: http://www.greatscopes.com/journal.htm

Ideas on which to focus:

- Hypothesis
- Experimental design
- Control
- Repetition

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- Data analysis and drawing conclusions

Optional:

- Physiological significance
- Statistical significance
- Data representation

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