

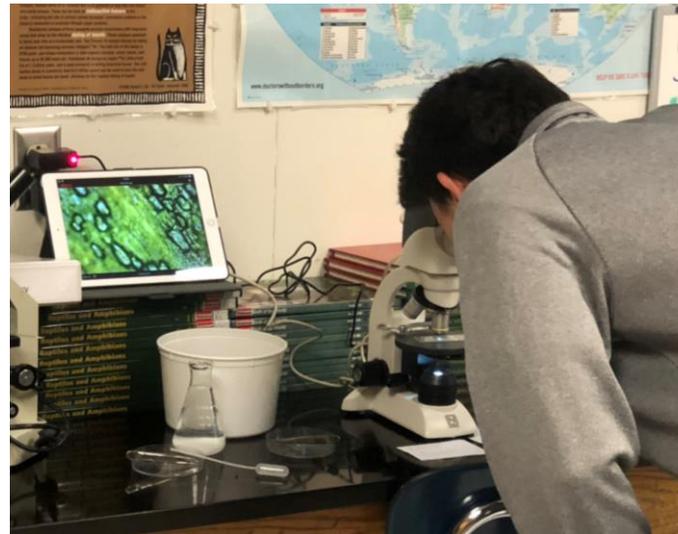
Thank you SAEF for the Digital Microscope Grant!



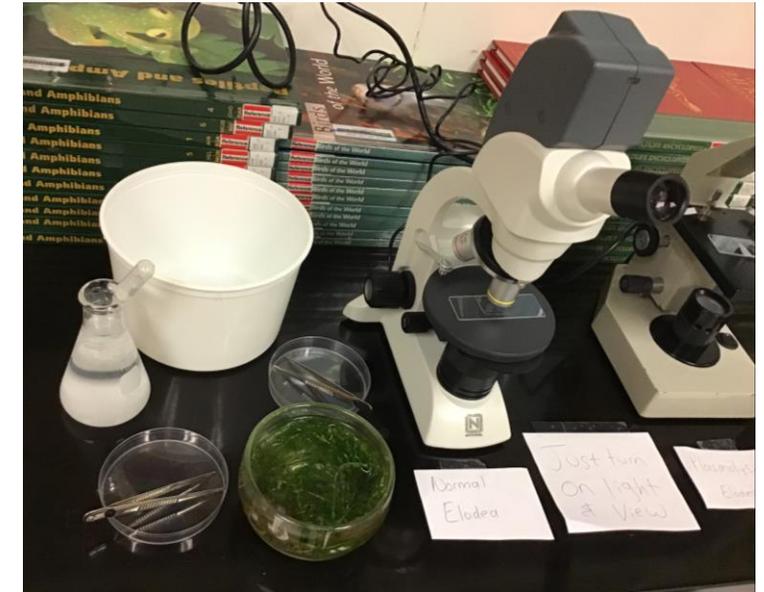
-Digital microscope was received week of Nov 15th. I set it up immediately with the help of Andrew Kraus and I began to use it. It came a day before the end of the cell unit.



-iPad screen shot from APP (free app) that allows user to capture live image on iPad screen. Image taken by Jade Leung. (Plasmolyzed elodea at 100x)



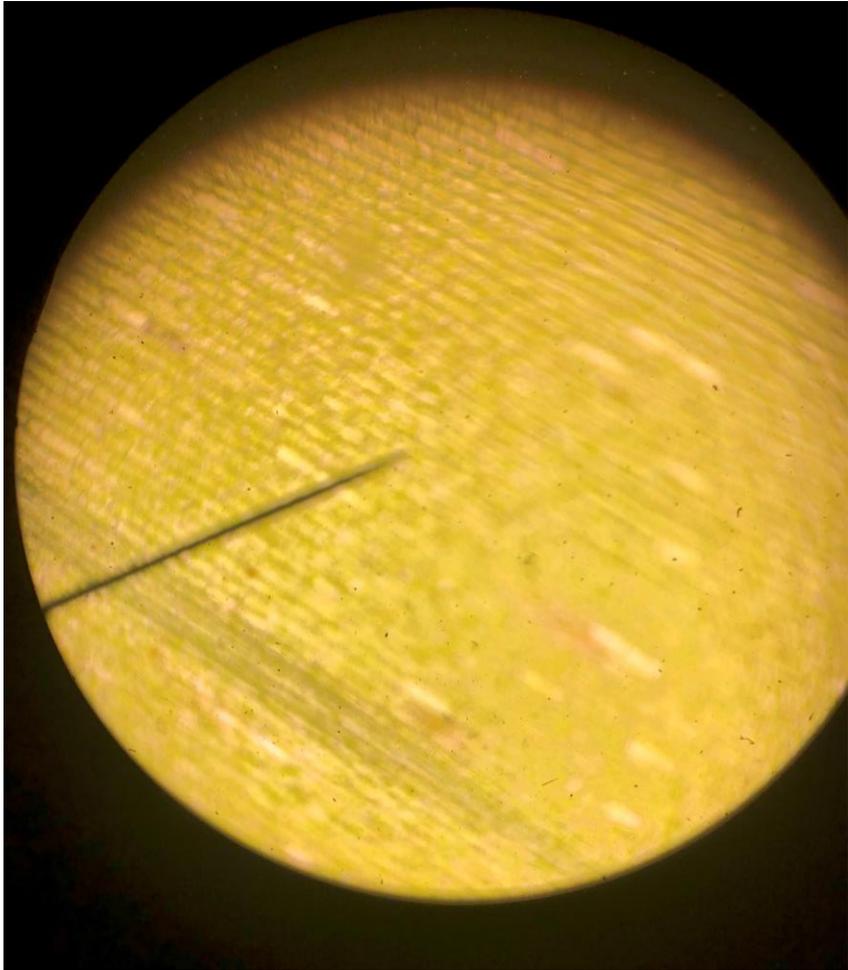
-Student working with digital scope. iPad in back shows live image so the rest of the lab group can see what the student is looking at under the microscope.



-Elodea plant lab demo setup with the new digital microscope. Setup the day the microscope was unpacked!

Microscope Image Quality

Annotations and scale bars can be directly added to images with the user friendly iPad software!



iPad image of Elodea Cells at 100x
-very hard to distinguish cells & details



Image with microscope from grant of Elodea Cells at 100x
-clear, crisp image with the ability to see cell details

Classroom use of Microscope & Software



Andrew and I tested the software out on our iPads before I presented the new technology to the students.



Students working with the new microscope and digital technology software



Students downloading the Motic camera app on their iPads

Advantages:

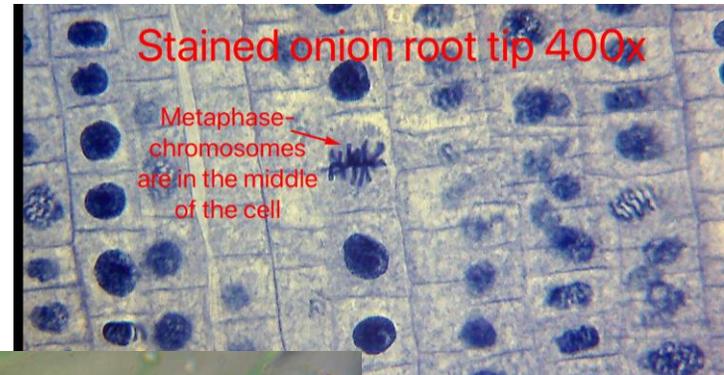
- Students can open their iPads and see the image I have under the microscope
- Absent students can catch up on missed labs
- Students can take their own images using their iPads and upload those in to lab reports or on to Google Classroom

Microscope Application in Biology

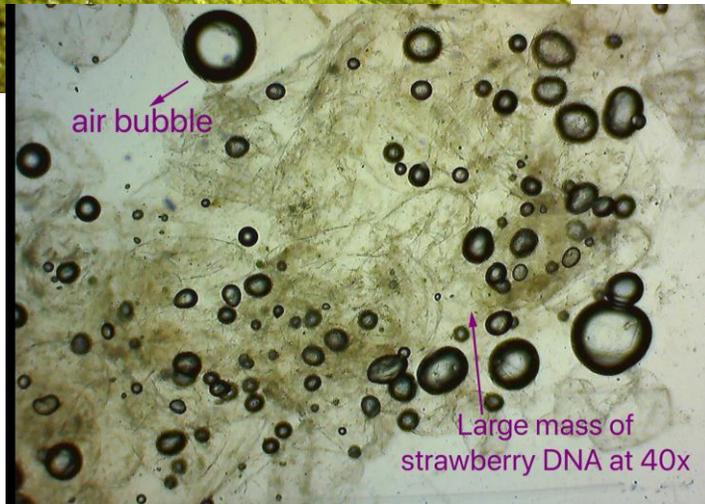
The microscope (\$458.10 from Carolina science supply company) was ordered immediately in August after I received confirmation of receiving the SAEF grant. The microscope arrived in November after the cell unit (unit with major microscope applications) but was used throughout the year in many units.



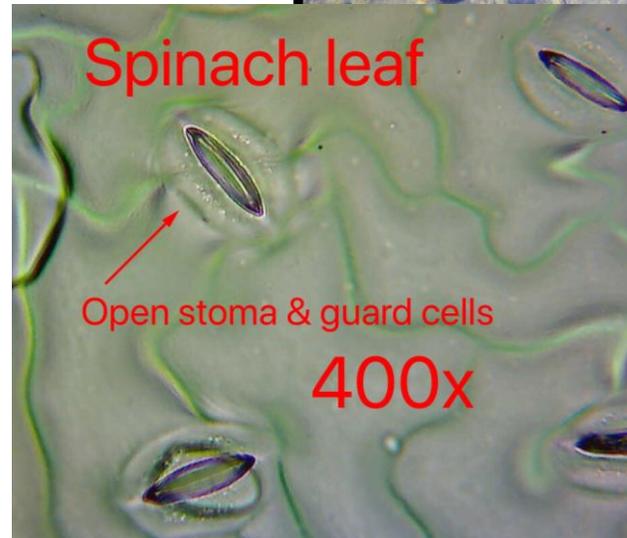
Photosynthesis Elodea
Plasmolysis Lab



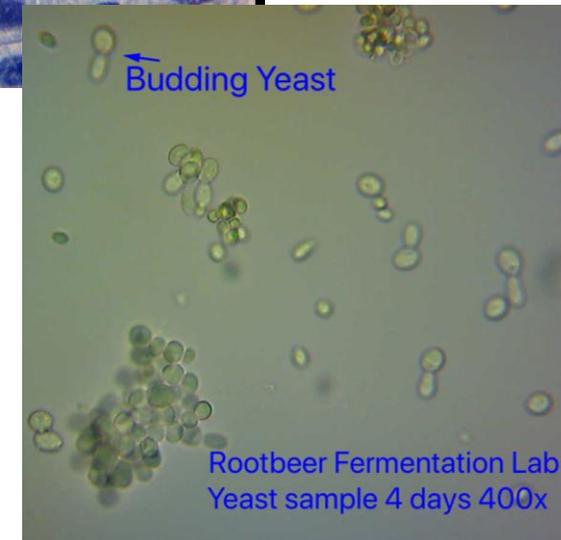
Cell Cycle Phases of
Mitosis Onion Root
Tip Lab



Strawberry DNA Extraction Lab



Spinach Leaf Tape Impression Guard Cell Lab

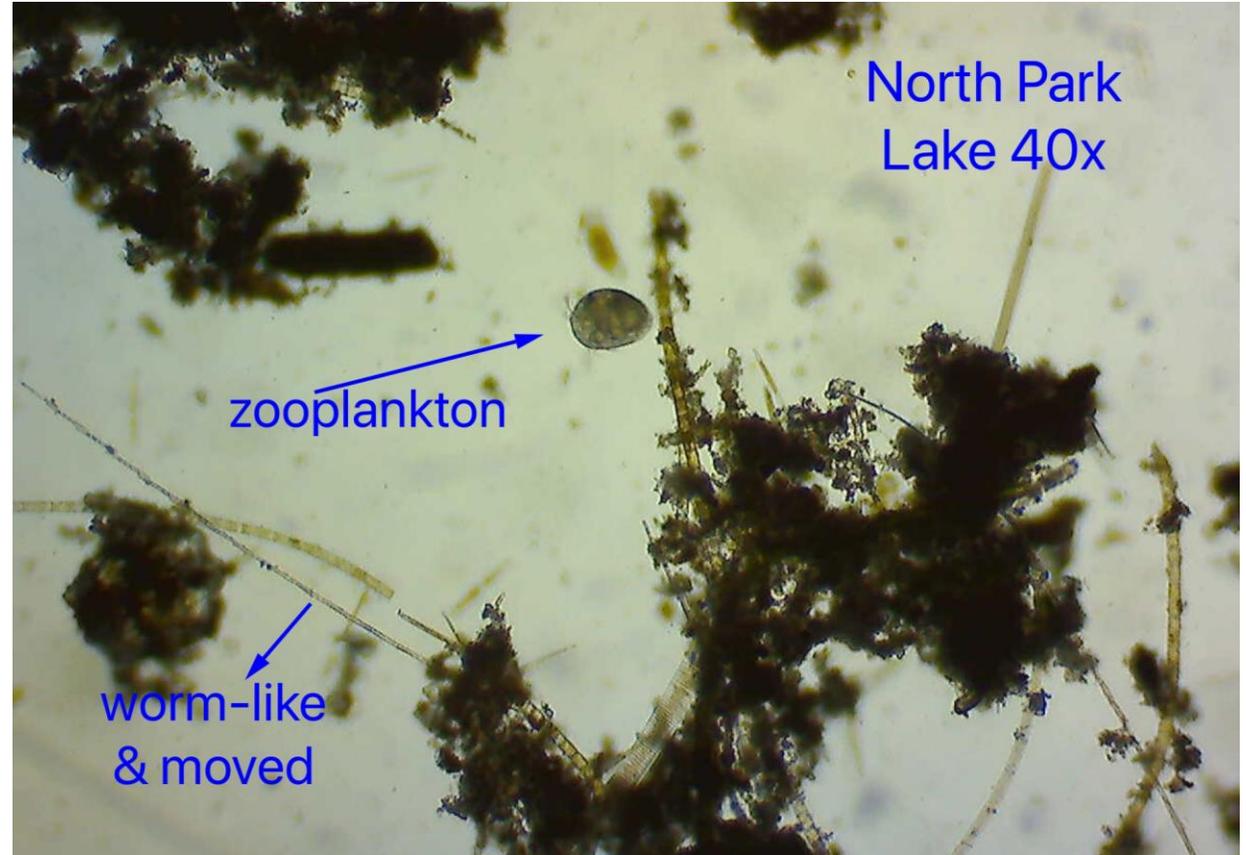


Rootbeer
Yeast
Fermentation
Lab

Ecology Unit Examples *(May 2019-added after original presentation date of March/April)*



Students are looking at North Park Lake water to identify protists as part of the aquatic ecosystem ecology lab. Students took pictures & videos of their samples.



As part of the pre-lab intro I showed students examples of things they would find- phytoplankton & zooplankton. Students could see real-time images of the samples. Images were also taken & labeled for students who were absent to complete the make up lab.

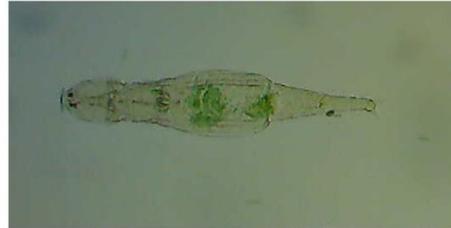
North Park Lake 40x -Example of Picture with Digital Camera



Freshwater macroinvertebrate

Water Bear Ecology Lab: Pre-lab Intro

Water Bear Lab Directions & Examples



- Though interesting, **these freshwater organisms ARE NOT Water bears!**
- To make your slide use a concave slide! (these have depressions to add a water drop on!)
- Use your pipet to get a sample that includes moss
- Add **ONLY 1-2 DROPS** to the depression on your slide & add the coverslip!
- Be patient and take your time to look for a water bear!

Powerpoint was prepared to help students understand what they were trying to find in the lab! I could also show them real-time examples of the water bear if they had trouble finding one in their sample

Water bears take on the color of their food and may appear brown, green, or clear!



Water bears are often found together. In the example above there is a brown water bear and greenish/clear colored water bear!

100x medium power samples, look closely to see the claws!

Water bears take on the color of their food and may appear brown, green, or clear!

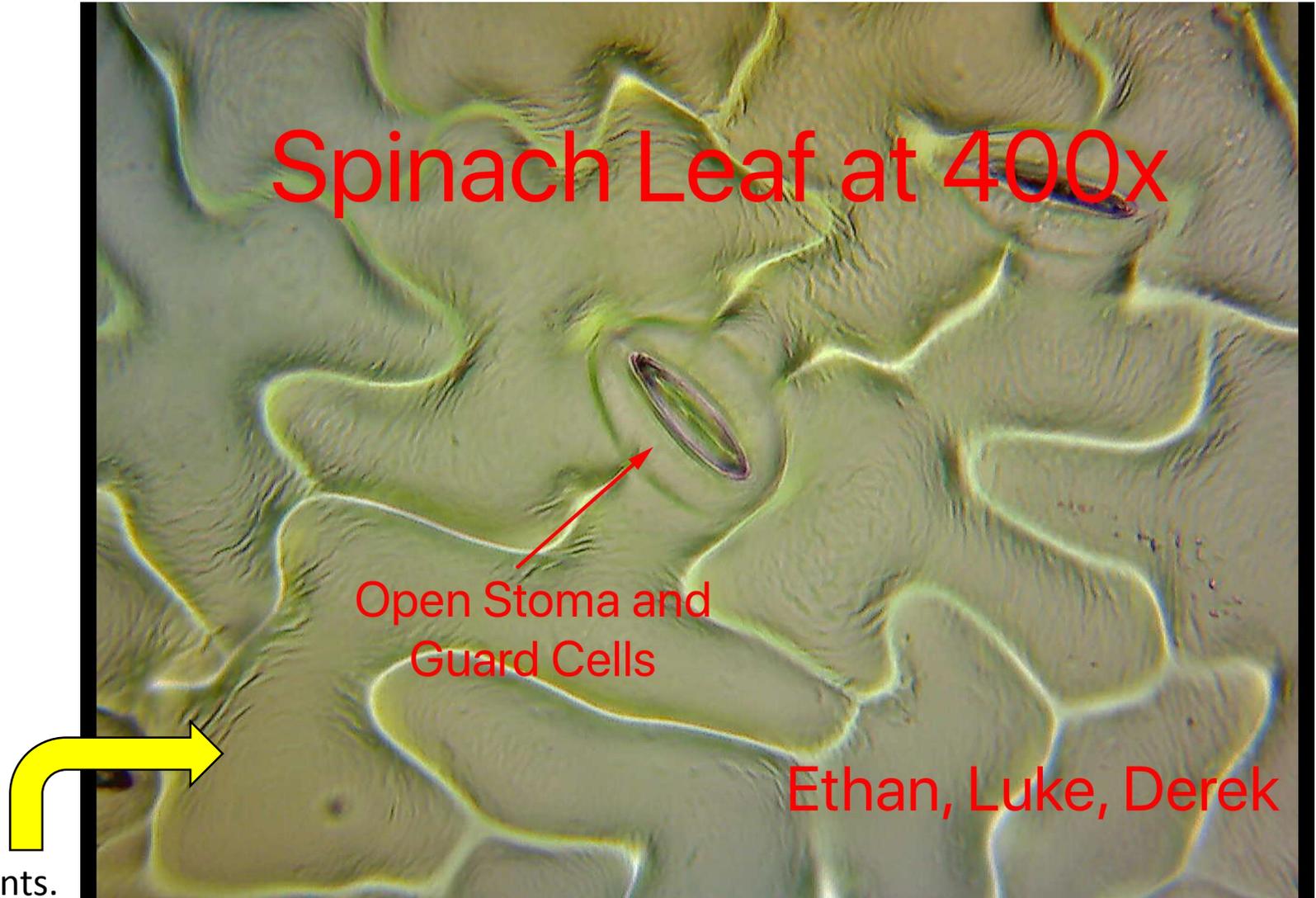


40x low power water bears.

You have to be patient and carefully look for movement. Water bears can be identified based on their claws!

Clear, crisp images are easily obtained from the digital microscope and can be shared with students. Live-footage from the microscope can be viewed by students on their iPads!

Thank you SAEF for the Digital Microscope Grant!



Example of image taken by 9th grade students.

Jade Leung's Honors Biology & Biology 9th and 10th grade students used the microscope throughout the year.

Microscope was also shared and made available to other high school science teachers.