## Through the Microscope (SCOP) - CTY Course Syllabus

**Primary text:** The Usborne Complete Book of the Microscope - Kirsteen Rogers  
**Supplementary Text:** A World in a Drop of Water: Exploring with a Microscope - Alvin and Virginia Silverstein.

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<th>DAY</th>
<th>GOALS AND OBJECTIVES</th>
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| Day 1 (Monday) | • To get to know each other  
• To establish class rules and lab safety rules  
• To provide a class overview  
• To define science  
• To highlight the importance of laboratory work and a lab notebook  
• To assess student’s knowledge and understandings | 9:00-10:20  
• Name tags- introduce inst. and PA  
• Ice breaker Activity (PA)  
• Honor code, Write class rules as a class & post them in the classroom  
10:20-10:30 Break  
10:30-12:00  
• Go over syllabus-sign technology form  
• Go over safety rules/contract  
• Define Science & post “what is science?” poster in the classroom  
• Discuss the importance of lab work in science & how to keep a lab notebook (notebook half lab notebook & half journal)  
12:00-1:00 Assembly/lunch/recess  
1:00-2:00  
• Pre-assessment  
2:00-2:10 break  
2:10-2:40  
• Pass Usborne books out & sign Usborne book contract  
• Bend and stretch demo & discussion.  
3:45-4:00  
• **HW:** reading Pages 8-13 (Usborne book) |
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| Day 2 (Tuesday) | • To learn about the history and types of microscopes  
• To develop an understanding of how a microscope works  
• To learn how to handle a microscope  
• To learn the parts of a microscope  
• To learn how to focus  
• To develop an understanding of how to calculate magnification. | 9:00-10:20  
  • Intro to microscope (history and types)  
  • How and why microscopes work.  
10:20-10:30 Break  
10:30-12:00  
  • Parts of the microscope  
  • How to use the microscope  
  • Explore microscope w/handout.  
  • Look at the letter “e” & comic strip w/handout  
12:00-1:00 Recess/lunch  
1:00-2:00  
  • “Yolk in you” activity  
2:00-2:10 Break  
2:10-2:40  
  • Look at prepared slide from “yolk in you” activity and do a formal lab entry.  
3:45-4:00  
  • **HW**: find something from home u want look at & write a prediction (3-5 sentences) of what they imagine it will look like. Read pages 64 and 65 from the Usborne book. |
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| Day 3 (Wednesday) | - To Introduce science research and their brine shrimp project  
- To make dry, wet, and concave slides.  
- To use the microscope to make observation and record specific details in their lab notebooks like the color, shape, and features of things such as dirt, and the object student brought from home. | 9:00-10:20  
  • Scientific Investigation & scientific practices  
  • Introduce brine shrimp & brine shrimp project, assign groups, plan, and set up.  
10:20-10:30- Break (collect some dirt)  
10:30-12:00  
  • Finish setting up brine shrimp experiment.  
  • Discuss how to prepare microscope slides (dry mount, wet mount, concave)  
12:00-1:00- recess/ lunch  
1:00-2:00  
  • Prepare a slide for dirt, look at it, and do a formal lab entry.  
2:00-2:10- Break  
2:10-2:40  
  • Prepare slides for object students brought from home, look at it, and do a formal lab entry. |
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| Day 4       | • To be able to determine and define what a cell is.                                 | 3:45-4:00  
|             | • To distinguish between living and non-living                                        | • **HW**: study for a microscope quiz, and write a short paragraph of how the thing they brought from home looked through the microscope vs what they thought it looked like. |
|             | • To distinguish between eukaryote and prokaryote organisms.                         | 9:00-10:20  
|             |                                                                                      | • Characteristics of living things  
|             |                                                                                      | • Non-living things  
|             |                                                                                      | • Make your own living organism activity & present to the class  
| (Thursday)  |                                                                                      | 10:20-10:30 Break  
|             |                                                                                      | 10:30-12:00  
|             |                                                                                      | • Cell theory  
|             |                                                                                      | • Prokaryotes  
|             |                                                                                      | • Eukaryotes  
|             |                                                                                      | 12:00-1:00 recess/lunch  
|             |                                                                                      | 1:00-2:00  
|             |                                                                                      | • Study for quiz  
|             |                                                                                      | • Quiz  
|             |                                                                                      | 2:10-2:10 Break  
|             |                                                                                      | 2:10-2:40  
|             |                                                                                      | • Prepare yeast and yogurt slides & observe them-lab notebook entry  
|             |                                                                                      | 3:45-4:00  
<p>|             |                                                                                      | • <strong>HW</strong>: Read pages 26-29 and 40-43. Write a short description of how you would prepare a slide for a cheek cell and an onion cell. |</p>
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| Day 5 (Friday) | • To distinguish between an animal and plant cell  
• To be able to identify different cell structures and their functions  
• To discuss the use and importance of models in science  
• To properly and accurately construct a model of a cell or animal cell. | 9:00-10:20  
• Plant & animal cells  
• Cell membrane activity w/handout  
10:20-10:30- Break  
10:30-12:00  
• Discuss models and why scientists use models  
• Model making of animal or plant cells with play-doh  
12:00-1:00- Recess/lunch  
1:00-2:00  
• Prepare elodea slides, look at it, and do a formal lab entry.  
• Look at prepared cheek cells slides, and do a formal lab entry.  
2:00-2:10- break  
2:10-2:40  
• Shrimp observations  
3:45-4:00  
• Study for a cell quiz (it includes prokaryotes, eukaryotes, animal and plant cells) |
| Day 6 (Tuesday) | • To distinguish between autotrophs and heterotrophs organisms  
• To understand and explain photosynthesis, who performs it, and why it is performed. | 9:00-10:20  
• Autotrophs  
• Heterotrophs  
• Photosynthesis demo  
10:20-10:30- Break  
10:30-12:00  
• Study for quiz  
• Cell quiz  
• Brine shrimp observations  
12:00-1:00- Recess/lunch  
1:00-2:00  
• Cyberlab (Zooplankton)  
2:00-2:10- Break  
2:10-2:40  
• Discuss Lab reports  
3:45-4:00  
**HW:** write mini report on brine shrimp experiment due Friday (2-3 pages including images and cover page) & read pages 30-31. |
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| Day 7    | • To discuss the discovery of DNA  
• To discuss the structure of DNA  
• To be able to extract DNA  
• To build properly and accurately a model of DNA  
• To compare and contrast model vs observations from DNA extraction | 9:00-10:20  
  • Discuss DNA  
10:20-10:30- Break  
10:30-12:00  
  • DNA model making & handout  
12:00-1:00- Recess/lunch  
1:00-2:00  
  • DNA extraction  
2:00-2:10- Break  
2:10-2:40  
  • Answer questions about reports  
3:45-4:00  
  • **HW**: DNA model vs DNA extraction (what helped you understand the structure better-short paragraph explanation) & read pg. 20, 22, 23 |
| Day 8    | • To understand the role of the microscope in forensic science                                                                                                                                                       | 9:00-10:20  
  • Gel electrophoresis & handout  
10:20-10:30- Break  
10:30-12:00  
  • Categorizing fingerprints  
  • Making ink fingerprints & handout  
  • Bullets and the microscope  
12:00-1:00- recess/lunch  
1:00-2:00  
  • Hair and fabric fibers under the scope discussion  
  • Looking at hair under the microscope  
2:00-2:10- Break  
2:10-2:40  
  • Looking at hair casting and fibers under the microscope  
3:45-4:00  
  • **HW**: work on report |
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<td>Day 9</td>
<td>• To explore planaria and some of its behaviors&lt;br&gt;• To become familiar with the characteristics and functions of bacteria, fungi, and protists.</td>
<td>9:00-10:20&lt;br&gt;  • Collect report&lt;br&gt;  • Flatworms and planaria&lt;br&gt; 10:20-10:30- Break&lt;br&gt; 10:30-12:00&lt;br&gt;  • Look at planaria&lt;br&gt;  • Planaria light experiment &amp; mini-lab report&lt;br&gt; 12:00-1:00 recess/lunch&lt;br&gt; 1:00-2:00&lt;br&gt;  • Discuss bacteria, fungi, protist&lt;br&gt; 2:00-2:10- Break&lt;br&gt; 2:10-2:40&lt;br&gt;  • Prepare slides and look at dicty and stained bacteria (yogurt) under the microscope- do formal lab entries.&lt;br&gt; 3:45-4:00&lt;br&gt;  • Quiz corrections for ½ credit.</td>
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<td>Day 10</td>
<td>• To explore protists</td>
<td>9:00-10:20&lt;br&gt;  • Introduce final project and assign organisms&lt;br&gt;  • Discuss amoeba and paramecium&lt;br&gt; 10:20-10:30 Break&lt;br&gt; 10:35-12:00&lt;br&gt;  • Prepare slides and look at amoeba and paramecium- lab entry&lt;br&gt;  • Start discussing algae and euglena&lt;br&gt; 12:00-1:00 recess/lunch&lt;br&gt; 1:00-2:00&lt;br&gt;  • Finish discussing algae and euglena&lt;br&gt;  • Prepare slides and look at euglena- lab notebook entry&lt;br&gt; 2:00-2:10- Break&lt;br&gt; 2:10-2:40&lt;br&gt;  • Prepare slides and look at algae- lab notebook entry&lt;br&gt; 3:45-4:00&lt;br&gt;  • HW: read about amoeba, paramecium, algae, euglena, rotifer, hydra. (depending on what you were assigned)</td>
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| Day 11     | • To explore protists  
• To explore tardigrades (water bears)  
• To appropriately use a computer for research | 9:00-10:20  
• Discuss hydra, rotifers, and water bears  
10:20-10:30 Break  
10:30-12:00  
• Prepare slides and look at rotifer, hydra, and water bears  
12:00-1:00 recess/lunch  
1:00-2:00  
• Computer research for final project  
2:00-2:10 Break  
2:10-2:40  
• Prepare slides and look at planaria, amoeba, paramecium, algae, or euglena (last chance)  
3:45-4:00  
• HW: Bring a draft of the assigned organism’s biography. |
| Day 12     | • To discuss and examine insects and their diversity  
• To identify pond organisms  
• To explore crystals and their characteristics  
• To review for post-assessment. | 9:00-10:20  
• Atoms, molecules, and minerals  
10:20-10:30 Break  
10:30-12:00  
• Let’s prepare microcrystals!  
12:00-1:00 recess/lunch  
1:00-2:00  
• Insects under the microscope or  
• Planaria regenerating under the microscope or  
• Pond mystery mix or  
• Hydra feeding  
2:00-2:10 Break  
2:10-2:40  
• Brainstorm on what we have learned & review for post-assessment/questions  
3:45-4:00  
• HW: Study for post-assessment & bring any materials that you think you might need for model/poster. (I’ll provide basics) |
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<tr>
<td>Day 13</td>
<td>• To assess student’s knowledge</td>
<td>9:00-10:20</td>
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<td>• To work on the protist final projects.</td>
<td>• Answer questions before post-assessment (15min)</td>
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<td>(Thursday)</td>
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<td>• Post-assessment</td>
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<td>• SPEs</td>
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<td>10:20-10:30- Break</td>
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<td>10:30-12:00</td>
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<td>• Work on posters for the final project</td>
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<td>12:00-1:00 recess/lunch</td>
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<td>• Work on models for the final project</td>
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<td>2:00-2:10- Break</td>
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<td>2:10-2:40</td>
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<td>• Lab notebook or</td>
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<td>• Finish poster/model or</td>
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<td>• Look at microcrystals from yesterday</td>
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<td>3:45-4:00</td>
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<td>• <strong>HW</strong>: Do final touches on the models/posters &amp; prepare for the presentation</td>
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<td>Day 14</td>
<td>• To present the protist final project.</td>
<td>9:00-10:20</td>
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<td>(Friday)</td>
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<td>• Amoeba, Paramecium, and algae presentation</td>
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<td>10:20-10:30- Break</td>
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<td>10:30-12:00</td>
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<td></td>
<td></td>
<td>• Euglena, rotifer, hydra presentation</td>
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<td>12:00-1:00 recess/lunch</td>
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<td>1:00-1:45</td>
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<td></td>
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<td>• Open house</td>
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