

# Through the Microscope (SCOP)

## CTY Course Syllabus

**Required Text: Complete Book of the Microscope – Kirsteen Rodgers**

**Supplementary Text: The Microscope Book – Shar Levine & Leslie Johnstone**

Day	Objectives	Activities
<b>Day 1 Monday</b>	<ul style="list-style-type: none"> <li>• Group Introductions</li> <li>• Safety</li> <li>• Organizing Notebooks</li> <li>• Scientific Method</li> <li>• Introduction to Magnification</li> <li>• Mystery Slides</li> </ul>	<p>9:00 – 10:15</p> <ul style="list-style-type: none"> <li>• Name tags</li> <li>• “mystery pictures”</li> <li>• Course Syllabus</li> </ul> <p>10:25 – 11:30</p> <ul style="list-style-type: none"> <li>• Safety Rules and Contract</li> <li>• Safety cartoon</li> <li>• Keeping a Lab notebook</li> <li>• Investigating Lenses</li> </ul> <p>12:30 – 1:30</p> <ul style="list-style-type: none"> <li>• Microscope Pre-Assessment</li> <li>• Introduction of the Scientific Research Assignment.</li> </ul> <p>1:40 -2:30</p> <ul style="list-style-type: none"> <li>• Magnifying with water</li> <li>• Journal Writing – Learning Log</li> <li>• <b>Homework: (KW) L</b></li> </ul>
<b>Day 2 Tuesday</b>	<ul style="list-style-type: none"> <li>• Learn the parts of a microscope</li> <li>• Become familiar with focusing a microscope</li> <li>• General use and handling of a microscope</li> <li>• Make a wet mount</li> <li>• Understand how to calculate magnification</li> <li>• Learn about the history of the microscope and contributors</li> </ul>	<p>9:00 – 10:15</p> <ul style="list-style-type: none"> <li>• W/up : Instruments used for Scientific Observations</li> <li>• Discuss (KW)L</li> <li>• “Using a Microscope” pgs. 10 -11</li> <li>• Microscope video/optional Microscope PPt.</li> </ul> <p>10:25 – 11:30</p> <ul style="list-style-type: none"> <li>• Look at the letter “e”</li> <li>• Investigating color comics</li> </ul> <p>12:30 – 1:30</p> <ul style="list-style-type: none"> <li>• Early microscopes pgs. 80 -84</li> <li>• Mystery slide # 1 Introduction - observations and predictions</li> </ul> <p>1:40 -2:30</p> <ul style="list-style-type: none"> <li>• Microscope part/function worksheet</li> <li>• Journal writing - Learning log</li> <li>• <b>Homework: Reading about microscopes</b></li> </ul>

Day	Objectives	Activities
<b>Day 3 Wednesday</b>	<ul style="list-style-type: none"> <li>• Explore and learn about the applications of optics</li> <li>• Make a permanent mount</li> <li>• Understand depth of field</li> </ul>	9:00 – 10:15 <ul style="list-style-type: none"> <li>• Work with partners to compile and organize information for projects (Computer Lab )</li> </ul> 10:30 – 11:30 <ul style="list-style-type: none"> <li>• W/up: Steps for using a microscope</li> <li>• Investigating paper: form and function (<b>12-13</b>)</li> </ul> 12:30 – 1:30 <ul style="list-style-type: none"> <li>• Looking at threads (<b>sew long 25-26</b>)</li> <li>• Mystery slide # 2 observations and predictions</li> </ul> 1:40 2:30 <ul style="list-style-type: none"> <li>• Microscope matching cards with partners)</li> <li>• Journal writing – Learning log</li> <li>• <b>Homework:</b> Items from home</li> </ul>
<b>Day 4 Thursday</b>	<ul style="list-style-type: none"> <li>• Making wet mounts</li> <li>• Determine what a cell is</li> </ul>	9:00 – 10:15 <ul style="list-style-type: none"> <li>• w/up – share items from home with classmates</li> <li>• Observe items from home under the microscope- observations and comments on microscope data sheet</li> </ul> 10:30 – 11:30 <ul style="list-style-type: none"> <li>• Microscope Quiz</li> <li>• Cells – video (23 mins)</li> </ul> 12:30 – 1:30 <ul style="list-style-type: none"> <li>• Comparing living and dead cells –(onion and cork cells)</li> </ul> 1:40 – 2:30 <ul style="list-style-type: none"> <li>• Looking at plants (pgs.40 – 41)</li> <li>• Mystery slide # 3 observation and prediction</li> <li>• <i>Prepare celery for tomorrow's lab</i></li> <li>• Journal writing - Learning log</li> </ul> <b>Homework:</b> microscope matching
<b>Day 5 Friday</b>	<ul style="list-style-type: none"> <li>• Determine the parts and function of a plant cell</li> </ul>	9:00 – 10:15 <ul style="list-style-type: none"> <li>• Label and color plant cell diagram</li> <li>• Plant cell organelle identification/matching</li> </ul> 10:30 – 11:30 <ul style="list-style-type: none"> <li>• Looking at Elodea Lab</li> </ul> 12:30 – 1:30 <ul style="list-style-type: none"> <li>• Plant Food pgs. 42- 43</li> <li>• Looking at celery transport system Lab</li> </ul> 1:40 -2:30 <ul style="list-style-type: none"> <li>• Discuss progress of projects</li> <li>• Mystery slide # 4 observation and prediction</li> <li>• Journal Writing – Learning log</li> </ul>

Day	Objectives	Activities
<b>Day 6 Monday</b>	<ul style="list-style-type: none"> <li>• Determine the parts and function of an animal cell</li> <li>• Determine the differences between plant and animal cells.</li> <li>• Understanding the functions of Staining</li> </ul>	<p>9:00 – 10:15</p> <ul style="list-style-type: none"> <li>• Label and color animal cell diagram</li> <li>• Cell parts matching activity</li> <li>• Inside a body cell pgs. 28 - 29</li> </ul> <p>10:30 – 11:30</p> <ul style="list-style-type: none"> <li>• Body cells pgs. 26 - 27</li> <li>• Looking at cheek cells</li> </ul> <p>12:30 - 1:30</p> <ul style="list-style-type: none"> <li>• Discuss cell model project (3D) - types of materials to use</li> <li>• Observe prepared slides</li> </ul> <p>1: 40 -2:30</p> <ul style="list-style-type: none"> <li>• Work on projects – books from library</li> <li>• Mystery slide # 5 observation and prediction</li> <li>• Journal writing – Learning log</li> </ul> <p><b>Homework:</b> cell organelles</p>
<b>Day 7 Tuesday</b>	<ul style="list-style-type: none"> <li>• Characteristics of protists</li> </ul>	<p>9:00 - 10;15</p> <ul style="list-style-type: none"> <li>• Review plant and animal cells</li> <li>• Discuss characteristics of protests</li> <li>• Protists –video (23 mins)</li> <li>• Water Plants pgs. 46 -47</li> </ul> <p>10:30 – 11:30</p> <ul style="list-style-type: none"> <li>• Field-Trip to school grounds pond to collect water samples</li> <li>• Aquatic Protists Lab</li> </ul> <p>12:30 – 1:30</p> <ul style="list-style-type: none"> <li>• Continue Aquatic Protists Lab</li> <li>• Compare water samples</li> </ul> <p>1:40 – 2:30</p> <ul style="list-style-type: none"> <li>• Observe prepared slides of protists and other simple water life forms</li> <li>• Mystery slide # 6, observation and prediction</li> <li>• Journal Writing - Learning Log</li> </ul>

Day	Objectives	Activities
<b>Day 8 Wednesday</b>	<ul style="list-style-type: none"> <li>To extract deoxyribonucleic acid from plant cells</li> <li>To make animal and plant cell models</li> </ul>	<p>9:00 – 10:15</p> <ul style="list-style-type: none"> <li>W/up share materials used to make models</li> <li>Make plant and animal cell models (3D)</li> </ul> <p>10:30 – 11:30</p> <ul style="list-style-type: none"> <li>Complete models</li> <li>Presentation of models</li> </ul> <p>12: 30 -1:30</p> <ul style="list-style-type: none"> <li>“Inside a Nucleus” pgs. 30 – 31</li> <li>Extract DNA from strawberries/kiwi or bananas</li> </ul> <p>1:40 - 2:30</p> <ul style="list-style-type: none"> <li>Prepare wet mount of DNA, observe under microscope</li> <li>QUIZ</li> <li>Mystery slide # 7 observation and prediction</li> <li>Journal writing - Learning log</li> </ul>
<b>Day 9 Thursday</b>	<ul style="list-style-type: none"> <li>Become familiar with the characteristics and function of bacteria</li> </ul>	<p>9:00 – 10:15</p> <ul style="list-style-type: none"> <li>Bacteria pgs. 32 -33</li> <li>“Active cultures”( yeast, yogurt, sauerkraut).</li> <li>Set up microfossils Lab –(pgs. 66 – 67)</li> </ul> <p>10:30 – 11:30</p> <ul style="list-style-type: none"> <li>Yeast, yogurt, sauerkraut Lab</li> </ul> <p>12:30 – 1:30</p> <ul style="list-style-type: none"> <li>Bacteria – video (23 mins)</li> </ul> <p>1:40 – 2:30</p> <ul style="list-style-type: none"> <li>“Microbiology Agar plates/gelatin bouillon plates Lab (part 1)</li> <li>Mystery slide # 8 observation and prediction</li> <li>Journal writing – Learning Log</li> </ul>
<b>Day 10 Friday</b>	<ul style="list-style-type: none"> <li>Explore Materials of interest</li> </ul>	<p>9:00 – 10:15</p> <ul style="list-style-type: none"> <li>Campus field –trip to find articles of interest to make slides</li> </ul> <p>10:30 – 11:30</p> <ul style="list-style-type: none"> <li>Document items and prepare slides</li> <li>Whole group Slide-sharing</li> </ul> <p>12:30 – 1:30</p> <ul style="list-style-type: none"> <li>Continue slide sharing</li> </ul> <p>1:40 – 2:30</p> <ul style="list-style-type: none"> <li>Mystery slide # 9 observation and prediction</li> <li>Journal writing – Learning Log</li> </ul>

Day	Objectives	Activities
<b>Day 11 Monday</b>	<ul style="list-style-type: none"> <li>To explore the Scanning Electron Microscope</li> </ul>	9:00 – 10:15 <ul style="list-style-type: none"> <li>Review bacteria</li> <li>Look at Agar plates previously prepared record findings</li> <li>Complete microfossil Lab – pgs. 66 - 67</li> </ul> 10:30 -11:30 <ul style="list-style-type: none"> <li>Computer lab – Scanning Electron Microscope (SEM) Slideshow and animation.</li> </ul> 12:30 -1:30 <ul style="list-style-type: none"> <li>Making things Look Bigger pgs. 8 - 9</li> <li>Discuss SEM</li> <li>Work on projects</li> </ul> 1:40 – 2:30 <ul style="list-style-type: none"> <li>Continue working on projects</li> <li>Mystery slide # 10</li> <li>Journal Writing – Learning Log</li> </ul>
<b>Day 12 Tuesday</b>	<ul style="list-style-type: none"> <li>To examine evidence left at the scene of a crime through the microscope</li> </ul>	9:00 – 10:15 <ul style="list-style-type: none"> <li>“Solving Crimes” pg. 20</li> <li>Making fingerprints using a inkpad, Categorizing fingerprints</li> <li>Observing fingerprints under the microscope</li> </ul> 10:30 – 11:30 <ul style="list-style-type: none"> <li>“ On your Head” pg.22</li> <li>Observing Hair under the microscope</li> </ul> 12:30 – 1:30 <ul style="list-style-type: none"> <li>Observing fabric fibres under the microscope</li> <li>“Odds and Ends” pgs. 16 – 17</li> </ul> 1:40 – 2:30 <ul style="list-style-type: none"> <li>Mystery slide #11</li> <li>Journal Writing – Learning Log</li> </ul>
<b>Day 13 Wednesday</b>	<ul style="list-style-type: none"> <li>Exploring crystals and their characteristics</li> </ul>	9:00 – 10:15 <ul style="list-style-type: none"> <li>Discussion of characteristics of atoms, molecules, and minerals.</li> <li>Characteristics of crystals. Pgs 68 - 68</li> <li>Groups prepare saturated solutions of table salt, Epsom salts, sugar, copper sulfate, potassium iodide, brown sugar.</li> </ul> 10:30 – 11:30 <ul style="list-style-type: none"> <li>Students observe crystals formed</li> </ul> 12:30 – 1:30 <ul style="list-style-type: none"> <li>crystal worksheet</li> </ul> 1:40 – 2:30 <ul style="list-style-type: none"> <li>work on projects</li> <li>Final Mystery slide</li> <li>Journal Writing - Learning Log</li> </ul>

Day	Objectives	Activities
<b>Day 14 Thursday</b>	<ul style="list-style-type: none"> <li>• Examine various insects and their diversity</li> <li>• Determine the size of objects under the microscope</li> </ul>	9:00 -1015 <ul style="list-style-type: none"> <li>• Outside nature walk to gather insects.</li> </ul> 10:30 – 11:30 <ul style="list-style-type: none"> <li>• Insect watching pgs. 53 - 53</li> <li>• Look at insects in bug jar, and under microscope</li> </ul> 12:30 – 1:30 <ul style="list-style-type: none"> <li>• Continue observing insects</li> <li>• Measuring the size of insect parts</li> </ul> 1:40 -2:30 <ul style="list-style-type: none"> <li>• Complete projects</li> <li>• Journal writing – Learning Log</li> </ul>
<b>Day 15 Friday</b>	<ul style="list-style-type: none"> <li>• Reflections – Students, Teachers, TAs</li> </ul>	9:00 – 10:15 <ul style="list-style-type: none"> <li>• Mystery Slide answers</li> <li>• Complete KWL</li> <li>• Discuss KWL</li> </ul> 10:30 – 11:30 <ul style="list-style-type: none"> <li>• Post assessment</li> </ul> 12:30 – 1:30 <ul style="list-style-type: none"> <li>• Presentation of final projects</li> </ul> 1:40 – 2:30 <ul style="list-style-type: none"> <li>• Review notebooks</li> <li>• Evaluations</li> <li>• Closing Activities</li> </ul>