

## UNIT OF STUDY

<b>Title:</b> Teaching Process Skills	<b>Subject/Course:</b> Biology	<b>Length:</b> 1 week
<b>Topic:</b> Nature of Science	<b>Grade:</b> 10 <sup>th</sup> Grade	<b>Designer:</b> Woods
<b>UNIT GOALS AND EXPECTATIONS</b>		
<p><b>IMPORTANT CONCEPTS/UNDERSTANDINGS:</b>            Students shall demonstrate an understanding that science is a way of knowing. Students shall design and safely conduct scientific inquiry. Students shall use mathematics, science equipment, and technology as tools to communicate and solve life science problems. Students will be able to identify living things and place them in the correct category of study.</p>	<p><b>ESSENTIAL QUESTIONS:</b>            What is science: pure science vs. applied science?            How do scientists use pure science in the applied sciences?            What equipment, technology, and units of measurement are used in biology?            What are the characteristics of living things? How is life organized for study?</p>	
<p><b>STUDENT LEARNING EXPECTATIONS:</b>            NS.10.B.1 Explain why science is limited to natural explanations of how the world works.            NS.10.B.2 Compare and contrast <i>hypotheses</i>, <i>theories</i>, and <i>laws</i>            NS.10.B.4 Summarize the guidelines of science:</p> <ul style="list-style-type: none"> <li>▪ <i>explanations</i> are based on observations, evidence, and testing</li> <li>▪ <i>hypotheses</i> must be testable</li> <li>▪ understandings and/or conclusions may change with additional empirical data</li> <li>▪ scientific knowledge must have peer review and verification before acceptance</li> </ul> <p>NS.11.B.1 Develop and explain the appropriate procedure, controls, and variables (dependent and independent) in scientific experimentation            NS.11.B.2 Research and apply appropriate safety precautions (refer to ADE Guidelines) when designing and/or conducting scientific investigations</p>	<p>NS.11.B.3 Identify sources of bias that could affect experimental outcome            NS.11.B.5 Formulate valid conclusions without bias            NS.11.B.6 Communicate experimental results using appropriate reports, figures, and tables            NS.11.B.4 Gather and analyze data using appropriate summary statistics            NS.13.B.1 Collect and analyze scientific data using appropriate mathematical calculations, figures, and tables            NS.13.B.2 Use appropriate equipment and <i>technology</i> as tools for solving problems (e.g., microscopes, centrifuges, flexible arm cameras, computer software and hardware)            NS.13.B.3 Utilize <i>technology</i> to communicate research findings</p>	
<p><b>SPECIFIC DECLARATIVE KNOWLEDGE (KNOW)</b>            Explain what the goal of science is.            Explain what a hypothesis is.            Describe how scientists test hypotheses.            Explain how a scientific theory develops.            Describe some characteristics of living things.            Explain how life can be studied at different levels.            Describe the measurement system that most scientists use.            Explain how light microscopes and electron microscopes are similar and different.            Explain why it is important to work safely in biology.</p>	<p><b>SPECIFIC PROCEDURAL KNOWLEDGE – (DO)</b>            Use SI units to measure volume, mass, and length, using appropriate lab equipment            Form hypotheses and conclusions at appropriate times during a scientific investigation.            Clearly communicate lab results using appropriate tables, charts, and graphs            Independently use a microscope to make observations.</p>	
<b>UNIT ASSESSMENTS</b>		
(Include tasks related to Dimensions 3 and 4 and Bloom’s Taxonomy)		
<p>Oral Questioning of students to assess experimental setup-determined by rubric            Lab Report-“Hot Hand”            Lab Report-“Metric Measurement”            Lab Report- “Microscope Observations”</p>		

Open Response from current media	
<b>Traditional Assessments:</b> Written Quizzes Written Test	<b>Other Evidence of Learning:</b> Bellringers Note book entries
ACTIVITIES AND LEARNING EXPERIENCES	
Notebook setup Internalizing-Characteristics of Living Things Analyzing Perspectives-bioethics K-W-L <a href="#">Systems Analysis of the scientific method--</a> <a href="http://sps.k12.ar.us/massengale/identifying_controls_and_variabl.htm">http://sps.k12.ar.us/massengale/identifying_controls_and_variabl.htm</a> <a href="https://glacier.gc.maricopa.edu/biology/scientific_method/index.cfm">https://glacier.gc.maricopa.edu/biology/scientific_method/index.cfm</a> <a href="#">Establish Habits of Mind for Science in Critical Thinking, Creative thinking, and Self Regulated Thinking</a> Vocabulary Strategy Daily Notebook Entries Note-taking powerpoints	<b>Resources</b> Prentice Hall Textbook: Biology TI-83's and CBL's with temperature probes Internet Powerpoint Smartboard Lab Equipment
Career Connections	
Lab technician	