

**ASSESSMENT CRITERIA**  
**COLLEGE SCIENCE SKILLS**

<b>SKILL</b>	<b>HIGH SCHOOL LEVEL</b>	<b>COLLEGE LEVEL</b>
<i>Science Skill 1</i> Use Models	<ul style="list-style-type: none"> <li>• Interpret a diagram, graph, equation, physical representation, or summary.</li> <li>• Summarize key ideas and relationships depicted in a model.</li> </ul>	<ul style="list-style-type: none"> <li>• Construct your own model.</li> <li>• Evaluate the benefits and shortcomings of a model.</li> </ul>
<i>Science Skill 2</i> Apply Mathematics and Statistics	<ul style="list-style-type: none"> <li>• Calculate mean, median, and mode.</li> <li>• Solve problems using equations.</li> <li>• Describe the relationship between two variables.</li> </ul>	<ul style="list-style-type: none"> <li>• Construct your own summary equation.</li> <li>• Evaluate the assumptions and shortcomings of an equation.</li> </ul>
<i>Science Skill 3</i> Ask Scientific Questions	<ul style="list-style-type: none"> <li>• Pose a testable cause-and-effect question.</li> </ul>	<ul style="list-style-type: none"> <li>• Pose a question that connects outside knowledge to an experimental situation, data set, or model.</li> <li>• Pose an ethical question related to a biological phenomenon.</li> </ul>
<i>Science Skill 4</i> Collect Data	<ul style="list-style-type: none"> <li>• Design a controlled experiment.</li> <li>• Identify independent and dependent variables and control and experimental groups.</li> <li>• Control for extraneous variables.</li> <li>• Select an appropriate sample size.</li> </ul>	<ul style="list-style-type: none"> <li>• Design an investigation to yield quantitative data that are appropriate for statistical analysis.</li> <li>• Justify the selection of a positive or negative control.</li> <li>• Evaluate the impact of inherent experimental errors.</li> <li>• Select an appropriate model organism.</li> </ul>
<i>Science Skill 5</i> Analyze Data	<ul style="list-style-type: none"> <li>• Construct a table and a graph to display data.</li> <li>• Summarize trends from a graph or table.</li> </ul>	<ul style="list-style-type: none"> <li>• Select and justify the appropriate type of graph for a data set.</li> <li>• Construct error bars to represent confidence intervals.</li> <li>• Interpret confidence intervals.</li> <li>• Summarize trends from a non-traditional display of data.</li> <li>• Perform and interpret a chi-square test.</li> </ul>
<i>Science Skill 6</i> Construct Biological Explanations	<ul style="list-style-type: none"> <li>• Summarize a scientific theory.</li> <li>• Apply an explanation to construct a predictive experimental hypothesis.</li> </ul>	<ul style="list-style-type: none"> <li>• Apply multiple competing explanations to construct a null hypothesis and multiple alternative hypotheses.</li> <li>• Evaluate biological claims and explanations.</li> </ul>
<i>Science Skill 7</i> Draw Connections	<ul style="list-style-type: none"> <li>• Compare biological processes.</li> </ul>	<ul style="list-style-type: none"> <li>• Relate processes across the molecular, cellular, physiological, population, and ecosystem levels.</li> </ul>

**ASSESSMENT CRITERIA**  
**SCIENTIFIC COMMUNICATION SKILLS**

<b>SKILL</b>	<b>HIGH SCHOOL LEVEL</b>	<b>COLLEGE LEVEL</b>
Construct Scientific Arguments	<ul style="list-style-type: none"> <li>• State a claim based on a biological theory.</li> <li>• Compare data from a group of interest to a control group.</li> </ul>	<ul style="list-style-type: none"> <li>• State a claim that connects the underlying biology to complex cellular or ecological phenomena.</li> <li>• Refer to specific data points of interest without extraneous information.</li> <li>• Provide clear and concise reasoning that explains how the evidence supports the claim.</li> </ul>
Document Research	<ul style="list-style-type: none"> <li>• Describe the methods and findings of a research investigation.</li> <li>• Connect your findings to larger unsettled biological questions and claims.</li> <li>• Cite sources of information that inform an investigation.</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain a professionally-formatted laboratory notebook.</li> <li>• Present original research orally and through a professionally-formatted written laboratory report and scientific poster board.</li> <li>• Reference peer-review journal articles using correctly-formatted APA parenthetical citations and a references section.</li> </ul>
Solve Problems Collaboratively	<ul style="list-style-type: none"> <li>• Share new ideas and possible solutions with peers.</li> <li>• Listen and respond to peer contributions.</li> </ul>	<ul style="list-style-type: none"> <li>• Reconcile competing explanations.</li> <li>• Share positive feedback on and suggestions for refining peer work.</li> <li>• Ensure that all members of the work group felt listened to, supported, and appreciated.</li> </ul>
Contribute to Community Discussion	<ul style="list-style-type: none"> <li>• Loudly and clearly respond to whole-class peer and instructor questions.</li> <li>• Pose specific questions to request clarification on and satisfy curiosity around relevant concepts.</li> </ul>	<ul style="list-style-type: none"> <li>• Volunteer participation in whole-class discussion every class.</li> <li>• Share thoughts on whole-class questions while still grappling with the relevant concept.</li> <li>• Respond to the contributions of other participants in the class discussion.</li> </ul>
Self-Direct Learning and Assessment	<ul style="list-style-type: none"> <li>• Complete all assigned work on time.</li> <li>• Direct continuous, undivided attention towards learning during class.</li> </ul>	<ul style="list-style-type: none"> <li>• Self-assess areas for improvement and celebration.</li> <li>• Regularly practice using a variety of challenging questions and tasks.</li> </ul>

*Before enrolling in AP Biology, you are expected to be able to perform all these skills at the high school level. Upon completion of the course, you should be able to perform all skills at the college level.*