

# Natural Sciences



Each General Education category is grounded in a set of learning outcomes. For the full set of learning outcomes for Natural Sciences courses see: [www.gened.umd.edu](http://www.gened.umd.edu)

This rubric is designed as a tool to assess activities aimed at student gains in the follow learning outcome(s) for the Natural Sciences General Education Category:

*At the completion of this course, students will be able to:*

- Solve complex problems requiring the application of several scientific concepts.

Criterion for review of student work	Descriptions of levels of student performance			
	Advanced	Proficient	Beginning	Unacceptable
<b>The Approach</b> Define/Set up the approach	The approach to the problem: <ul style="list-style-type: none"> <li>• Is concise, systematic, complete</li> <li>• Includes a justified, detailed prediction/estimate/hypothesis</li> <li>• Includes fluent use of discipline appropriate language (including symbolic, algebraic etc.)</li> <li>• Reflects an analysis of issues/factors/context that contribute to the complexity of the problem</li> <li>• Recognizes the constraints (limits) that may affect how the problem may be solved</li> <li>• Accurately reflects the principles and methods of the course discipline</li> </ul>	The approach to the problem: <ul style="list-style-type: none"> <li>• Is organized but lacks clarity or intentional structure, is viable,</li> <li>• Includes a justified, broad prediction/estimate/hypothesis</li> <li>• Includes suitable use of discipline appropriate language (including symbolic, algebraic etc.)</li> <li>• Reflects a search for or knowledge of issues/factors/context that contribute to the complexity of the problem</li> <li>• Acknowledges some of the constraints (limits) that may affect how the problem may be solved</li> <li>• Includes few mistakes in presenting the principles and methods of the course discipline</li> </ul>	The approach to the problem: <ul style="list-style-type: none"> <li>• Is present, inefficient, ineffective</li> <li>• Includes an obvious or trivial prediction/estimate/hypothesis or guess</li> <li>• Is presented with awkward and imprecise use of discipline appropriate language (including symbolic, algebraic etc.)</li> <li>• Reflects a consideration of issues/factors/context that contribute to the complexity of the problem that is narrow, and focused on the intuitively obvious</li> <li>• Does not identify the constraints (limits) that may affect how the problem may be solved</li> <li>• Includes a naïve, inconsistent or inappropriate use of the principles and methods of the course discipline</li> </ul>	The approach to the problem: <ul style="list-style-type: none"> <li>• Is not defined</li> <li>• Does not include a prediction</li> <li>• Does not use language that is appropriate to the discipline</li> </ul>

<p><b>The Concepts</b> Identify the concepts to be employed in solving the problem</p>	<p>Concepts are relevant to the specific problem. Selection is complete (all relevant and necessary concepts are identified) Concept selection reflects a broad consideration of the theories, laws, approaches, and models of the course discipline and of other disciplines (where appropriate) and supports the derivation of a best solution</p>	<p>Concepts are relevant to the specific problem. Selection is complete (all relevant and necessary concepts are identified) but may contain extraneous information Concept selection reflects a consideration of the theories, laws, approaches, and models of the course discipline and of other disciplines (where appropriate) and supports the derivation of a solution</p>	<p>Not all concepts are relevant to the specific problem. Selection is not complete (all relevant and necessary concepts are not identified) Concept selection reflects a limited consideration of the theories, laws, approaches, and models of the course discipline and of other disciplines (where appropriate) and does not directly lead to a viable solution.</p>	<p>Relevant scientific concepts that would enable the problem to be solved are not identified</p>
<p><b>The Solution</b> Apply the concepts in a manner that provides a solution to the problem</p>	<p>Concepts are applied accurately, and in a manner appropriate to the course discipline Reflects an awareness of context and limits. Solution is fully reconciled with prediction/estimate/hypothesis</p>	<p>Concepts are applied accurately, and in a manner appropriate to the course discipline Reflects a partial awareness of context and limits. Solution is partially reconciled with prediction/estimate/hypothesis</p>	<p>Concepts are applied imprecisely, incorrectly and in a manner that is inconsistent with the course discipline Does not reflect an awareness of context and limits. Solution is superficially reconciled with prediction/estimate/hypothesis</p>	<p>Concepts are not applied in a manner that allows for a solution to the problem</p>

The Natural Sciences Rubric was developed by the Natural Sciences Faculty Board, supported by the Office of Undergraduate Studies and the Office of Institutional Research, Planning, and Assessment with the Natural Sciences instructors upon review of the AAC&U VALUE rubrics and according to standards determined by the Natural Sciences Faculty Board for student performance in the General Education Natural Sciences courses. The rubric defines the standards for student performance in Natural Sciences courses at the University of Maryland.