

## ASET Science & Engineering Practices (SEP) Tool: Engaging in Argumentation from Evidence

Reviewer Name or ID:

Science Lesson/Unit Title:

Intended grade:

<b>SEP 7</b>	<p><b>Engaging in Argument from Evidence:</b> Argumentation is the process by which evidence-based conclusions and solutions are reached. In science and engineering, reasoning and argument based on evidence are essential to <b>identifying the best explanation</b> for a <b>natural phenomenon</b> or the best solution to a design problem. Scientists and engineers use argumentation to listen to, compare, and evaluate <b>competing ideas and methods</b>. Scientists and engineers engage in argumentation when <b>investigating</b> a phenomenon, <b>testing</b> a design solution, <b>resolving questions</b> about measurements, building models, and <b>evaluating</b> claims.</p>		
<b>Components of SEP</b> In this lesson/unit plan, it is clear that <b>students</b> have a structured opportunity to:	Mark with "x" if present in lesson	What teacher actions were taken to facilitate this component for students?	What are the students doing?
1) <b>Compare, and critique</b> two arguments based on the supporting evidence			
2) <b>Engage in discourse</b> around a scientific argument with peers			
3) <b>Construct and/or refine</b> an argument using evidence and reasoning to support a claim			
4) <i>[Engineering]</i> <b>Make, defend, and/or evaluate a claim about the effectiveness/merit</b> of an <b>object or design solution</b> using evidence			
<b>Notes on Context/Special Considerations</b> (part of school year, differentiation, student developmental considerations, etc.):			

## ASET Grade Band Criteria (*Grade Band: 6-8*)

### Science & Engineering Practices

**SEP 7: Engaging in Argument from Evidence:** Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).

*By the end of the grade band **students** will have had a structured opportunity to develop an understanding of each of these. Individual lessons or units should include opportunities for **students** to practice one or more of the following components .....*

<p>1) <b>Compare, and critique</b> two arguments based on the supporting evidence</p>	<p>Using two arguments on the same topic developed by students or presented by the instructor:</p> <ol style="list-style-type: none"> <li>a. Identify claims made in each argument</li> <li>b. Distinguish among facts (based on research findings) and speculation or opinion (not supported by objective information) used to support each claim</li> <li>c. Compare and critique claims made by these two arguments on the same topic:               <ol style="list-style-type: none"> <li>i. by identifying if they emphasize similar or different evidence.</li> <li>ii. and/or by comparing the interpretation of evidence.</li> <li>iii. and/or by considering the ethical issues of each</li> </ol> </li> </ol>
<p>2) <b>Engage in discourse</b> around a scientific argument with peers*</p>	<p>Respectfully provide and receive critiques <i>to/from peers</i> about one’s explanations, procedures, models and questions <i>by</i>:</p> <ol style="list-style-type: none"> <li>a. Citing relevant scientific evidence and</li> <li>b. Posing and responding to <i>specific</i> questions that elicit pertinent elaboration and detail.</li> </ol>
<p>3) <b>Construct and/or refine</b> an argument using evidence and reasoning to support a claim</p>	<ol style="list-style-type: none"> <li>a. Construct, use, and/or present an oral and written argument, to support or refute an explanation or a model for a phenomenon (science), or a solution to a problem (engineering), that is supported by:           <ol style="list-style-type: none"> <li>i. A claim or set of claims</li> <li>ii. <i>Relevant</i> empirical evidence (e.g., observations, data, and/or a model) to support the claim and,</li> <li>iii. Scientific reasoning (<i>Incorporate scientific principles, theories, and/or ideas</i>) to support evidence linked to claim</li> </ol> </li> <li>b. Refine claim or set of claims based on an evaluation of the evidence presented</li> </ol>
<p>4) [<i>Engineering</i>] <b>Make, defend, and/or evaluate a claim about the effectiveness/merit of an object or design solution</b> using evidence</p>	<ol style="list-style-type: none"> <li>a. Make and defend a claim (or set of claims) related to a design solution that:           <ol style="list-style-type: none"> <li>i. supports or refutes the advertised performance of a device, process, or system,</li> <li>ii. are based on empirical evidence about the effectiveness of a design solution (whether or not the technology meets relevant criteria and constraints)</li> <li>iii. reflects scientific knowledge, and student-generated evidence.</li> </ol> </li> <li>b. Evaluate competing design solutions based on jointly developed and agreed-upon design criteria</li> </ol>

\* Teaching methods instructors should consider use of discourse scaffolds or sentence frames to help guide this