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

Name or ID:
Lesson/Unit Title:
Intended Grade:

Directions for use

Indicate if a component is present using Y (yes) or N (no) and then, if it is present, fill in the right 2 columns.
A single lesson will most likely not address each of the components below.
The numbering of these components is not meant to indicate they should be used in sequence, they are simply for reference.

SEP 7	**Engaging in Argument from Evidence:** 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 **identifying the best explanation** for a **natural phenomenon** or the best solution to a design problem. Scientists and engineers use argumentation to listen to, compare, and evaluate **competing ideas and methods**. Scientists and engineers engage in argumentation when **investigating** a phenomenon, **testing** a design solution, **resolving questions** about measurements, building models, and **evaluating** claims.

Components of SEP **In this lesson/unit plan, it is clear that *students* have a structured opportunity to:**	Present? **Y/N**	**What teacher actions were taken to facilitate this component for students?**	**What are the students doing?**
1) **Compare, and critique** two arguments based on the supporting evidence			
2) **Engage in discourse** around a scientific argument with peers			
3) **Construct and/or refine** an argument using evidence and reasoning to support a claim			
4) *[Engineering]* **Make, defend, and/or evaluate a claim about the effectiveness/ merit** of an **object or design solution** using evidence			

 Project Next Gen ASET was supported by a grant to the California State University East Bay by the National Science Foundation Discovery Research K12, Award No. DRL-1418440. PI: michele.korb@csueastbay.edu or contact corinne.lardy@csus.edu, michelle.sinapuelas@csueastbay.edu

Last Updated 5/22/2023

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 ……*	
1) **Compare, and critique** two arguments based on the supporting evidence	Using two arguments on the same topic developed by students or presented by the instructor: a. Identify claims made in each argument b. Distinguish among facts (based on research findings) and speculation or opinion (not supported by objective information) used to support each claim c. Compare and critique claims made by these two arguments on the same topic: i. by identifying if they emphasize similar or different evidence. ii. and/or by comparing the interpretation of evidence. iii. and/or by considering the ethical issues of each
2) **Engage in discourse** around a scientific argument with peers*	Respectfully provide and receive critiques *to/from peers* about one's explanations, procedures, models and questions *by:* a. Citing relevant scientific evidence and b. Posing and responding to *specific* questions that elicit pertinent elaboration and detail.
3) **Construct and/or refine** an argument using evidence and reasoning to support a claim	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: i. A claim or set of claims ii. *Relevant* empirical evidence (e.g., observations, data, and/or a model) to support the claim and, iii. Scientific reasoning (*Incorporate scientific principles, theories, and/or ideas)* to support evidence linked to claim b. Refine claim or set of claims based on an evaluation of the evidence presented
4) *[Engineering]* **Make, defend, and/or evaluate a claim about the effectiveness/ merit** of an **object or design solution** using evidence	a. Make and defend a claim (or set of claims) related to a design solution that: i. supports or refutes the advertised performance of a device, process, or system, ii. are based on empirical evidence about the effectiveness of a design solution (whether or not the technology meets relevant criteria and constraints) iii. reflects scientific knowledge, and student-generated evidence. b. Evaluate competing design solutions based on jointly developed and agreed-upon design criteria

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

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