ASET Science & Engineering Practice (SEP) Tool: Planning and Carrying out Investigations

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 3	**Planning and Carrying out Investigations:** Scientists and engineers plan and carry out investigations in the field or laboratory, working collaboratively as well as individually. Their investigations are systematic and require clarifying what counts as data and identifying variables or parameters. Engineering investigations identify the effectiveness, efficiency, and durability of designs under different conditions.

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? What sensemaking or intellectual work are students doing?**
1) **Identify the phenomenon** to be investigated and **purpose** of the investigation			
2) Take appropriate **parameters** into account **when planning how to investigate** a scientific question or test a design solution			
3) Make **predictions** and/or **hypotheses** about the outcome of an investigation*			
4) **Conduct** an investigation			
5) **Collect data** to answer a scientific question or test a design solution			
6) **Evaluate** and/or **revise** an experimental design			

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

Science & Engineering Practices	
SEP 3: Planning and Carrying out Investigations: Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.	
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) **Identify the phenomenon** to be investigated and **purpose** of the investigation	Students **identify** the: a. **phenomenon** under investigation (from a given investigation plan or for a plan they will design) b. **purpose** of the investigation
2) Take appropriate **parameters** into account **when planning how to investigate** a scientific question or test a design solution	Students plan an investigation or test a design **individually and collaboratively,** to produce data to serve as the basis for evidence. and identify: a. independent and dependent **variables and controls** b. what **tools** are needed to do the gathering c. how measurements will be **recorded** d. how **many data** are needed to support a claim
3) Make **predictions** and/or **hypotheses** about the outcome of an investigation*	Students make **testable hypotheses** (specifying variables and outcome) a. based on prior experiences and/or observed patterns b. about what would happen if a variable changes.
4) **Conduct** an investigation	**Systematically carry out** the given/planned investigation and make observations and/or record data If the investigation plan was given to students, they will describe: a. the **data to be collected** and the evidence to be derived from the data b. how the **tools and methods** included in the experimental design will provide the evidence necessary to address the purpose of the investigation
5) **Collect data** to answer a scientific question or test a design solution	Students **collect/produce data** a. to serve as the **basis for evidence** to answer a scientific question [science] or test design solutions [engineering] under a range of conditions b. about the **performance of a proposed object**, tool, process, or system under a range of conditions [engineering] c. that **meet the specific goals** of an investigation.
6) **Evaluate** and/or **revise** an experimental design	Students should: a. evaluate the **accuracy of various methods** for collecting data to determine the most appropriate. b. **revise the experimental design**, if needed, to collect/produce data that meets the specific goals of the investigation

*This component is based on criteria required at the K-2 and 3-5 grade band. Making predictions/hypothesis may happen at the start of an experiment or towards the end depending on the level of experience students have with the content

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