ASET Science & Engineering Practices (SEP) Tool: Analyzing & Interpreting Data

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 4	**Analyzing and Interpreting Data:** Scientific investigations produce data that must be analyzed in order to derive meaning. Scientists use a range of tools-including tabulation, graphical interpretation, visualization, and statistical analysis- to identify sources of error in investigations and calculate the degree of certainty in the results. Engineering investigations include analysis of data collected in the tests of designs. This allows comparison of different solutions and determines how well each meets specific design criteria. Like scientists, engineers require a range of tools to identify patterns within data and interpret results.

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) Clearly **organize and display** data to represent phenomena.			
2) Identify and describe relevant and meaningful **patterns and relationships in data.**			
3) Use **statistical techniques** to analyze data to address a scientific question or design solution			
4) **Interpret data to** provide evidence for, predict, and/or draw conclusions about phenomena.			
5) Analyze and interpret **large data sets**.*			
6) Identify and address **variation and uncertainty** in data sets.*			

* Not present until 6-8 Grade Band

 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.
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ASET Grade Band Criteria *(Grade Bands: K-2, 3-5)*

Science & Engineering Practices		
SEP 4: Analyzing and Interpreting Data: Analyzing data in K-2 builds on prior experiences and progresses to collecting, recording, and sharing information. In 3-5 they build on K-2 experiences and progress to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations.		
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 ……		
	K-2 Grade Band	**3-5 Grade Band**
1) Clearly **organize and display** data to represent phenomena.	Students: a. record information (observations, thoughts and ideas) b. with guidance, organize (and sometimes share) given information (from data given or collected) using graphical or visual displays (e.g., pictures, pictographs, drawings, written observations, tables, charts)	**Students organize data** (e.g., from students' previous work, grade- appropriate existing datasets) using graphical displays (e.g., table, pictograph, chart, graph). This should include that they: a. decide on an optimal display b. label axes c. select appropriate intervals d. translate between representations (e.g. tables to graphs)
2) Identify and describe relevant and meaningful **patterns and relationships in data**.	Students describe **patterns and/or relationships** in the natural and designed world(s) in order to answer scientific questions and solve problems using their: a. **observations** (firsthand or from media) b. **organizatio**n of the given information c. analysis of **data from tests** of an object or tool to determine if it works as intended	Students identify and describe **patterns and/or relationships** from the organized data. This could include consideration of: **a. Causation vs correlation** b. The role of the **independent and dependent** variable **This could include** consideration of range (minimum & maximum), mode (what happens most often), comparisons (fewer than, greater than)
3) Use **statistical techniques** to analyze data to address a scientific question/design solution	**Not present until 6-8 Grade Band**	Students analyze and interpret data to **make sense of phenomena,** using logical reasoning, mathematics, and/or computation
4) **Interpret data** to provide evidence for, predict, and/or draw conclusions about phenomena.	Students: a. **compare predictions** (based on prior experiences) to what occurred (observable events) b. **describe the conclusions** they made [or provide rationale for their conclusions] based on the relationships they observed in the data c. use their organized data to **support or refute** their ideas about why the design of a specific object or tool is best suited for the given intended purpose	Students a. **use the organized data** to find and describe relationships within the datasets b. describe how **patterns provide evidence** to support or refute a given conclusion about phenomenon c. use data to evaluate and **refine design** solutions d. make **new predictions** based on data (beyond the dataset)

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5) Analyze and interpret **large data** sets.*	**Not present until 6-8 Grade Band**	**Not present until 6-8 Grade Band**
6) Identify and address **variation and uncertainty** in data sets.*	**Not present until 6-8 Grade Band**	**Not present until 6-8 Grade Band**

* Not present until 6-8 Grade Band

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