ASET Science & Engineering Practices (SEP) Tool: Using Mathematics and Computational Thinking

Name or ID:

Lesson/Unit Title: **Intended grade:**

SEP 5	**Using Mathematics and Computational Thinking:** In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; solving equations exactly or approximately; and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable scientists and engineers to predict the behavior of systems and test the validity of predictions.

Components of SEP **In this lesson/unit plan, it is clear that _students_ 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) Identify mathematical and/or computational representation(s) that can be used to interpret and make sense of phenomena or assess solutions to design problems			
2) Apply mathematical and/or computational representation(s) of the phenomenon to identify relationships in the data and/or simulations			
3) Use analysis of the mathematical and/or computational representation(s) as evidence to explain phenomena or assess solutions to design problems			
Notes on Context/Special Considerations (part of school year, differentiation, student developmental considerations, etc.):			

Science & Engineering Practices		
SEP 5: Using Mathematics and Computational Thinking: Mathematical and computational thinking in K-2 builds on prior experiences and progresses to recognizing that mathematics can be used to describe the natural and designed world(s). In 3-5 they build on K–2 experiences and progress to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative 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 ……		
	K-2 Grade Band	**3-5 Grade Band**
1) Identify mathematical and/or computational representation(s) that can be used to interpret and make sense of phenomena or assess solutions to design problems	Students describe, measure, and/or compare quantitative attributes of different objects and display the data using simple graphs	Along with K-2 skills, students create best representations to support a phenomenon
2) Apply mathematical and/or computational representation(s) of the phenomenon to identify relationships in the data and/or simulations	Students use counting and comparing numbers to identify and describe patterns in the natural and designed world(s).	Along with K-2 skills, students organize simple data sets to reveal patterns that suggest relationships (e.g., cause and effect, structure and function, correlations)
3) Use analysis of the mathematical and/or computational representation(s) as evidence to explain phenomena or assess solutions to design problems	Students use identified patterns or quantitative data: a. as evidence to explain a given phenomenon b. to compare two alternative solutions to a problem	Students: a. describe, measure, estimate, and/or graph quantities such as area, volume, weight, and time to address scientific and engineering questions and problems b. create and/or use graphs and/or charts generated from simple algorithms to compare alternative solutions to an engineering problem

Last Updated 8/26/2020