

Science and Engineering Practices (SEP)

What students are ***DOING?***

How students ***ENGAGE*** in science?

- Asking Questions Defining Problems**
 - Students are asking questions to clarify their thinking, make sense, or seek more info
 - Students are asking questions that can be investigated within the scope of the class
 - Students are asking questions to identify/clarify evidence or premise of an argument
 - Students are defining problems that can be solved by development of a process
- Developing & Using Models**
 - Students are developing models (picture, diagram, graph, words, formula) to show their understanding, explain, and make predictions about phenomena
 - Students label what is unobservable to explain what is observable
 - Students revise their model using new evidence and learnings
 - Students can evaluate the limitations of a model
- Planning & Carrying Out Investigations**
 - Students generate a scientifically testable question.
 - Students identify variables and constraints to an investigation
 - Students make decision about what data will be collected
 - Data collected can be used to as evidence to answer a scientific question
- Analyzing & Interpreting Data**
 - Students construct/use tables and graphs to display and analyze data
 - Analyze and interpret data to make sense of phenomena
 - Students analyze the performance of a design under a range of conditions
 - Apply concepts of statistics and probability (mean, median, mode, range)
- Using Mathematics & Computational Thinking**
 - Decide what to use qualitative vs quantitative data
 - Organize data sets to reveal patterns that suggest relationships
 - Students are using technology to analyze large data sets
 - Students are describing, measuring, estimating quantities
- Constructing Explanations & Designing Solutions**
 - Students are explaining their understanding and thinking about a phenomenon or focus question using models, writing, or student talk using based on the evidence they have collected
 - Students are drawing on prior knowledge and experience
 - Apply scientific reasoning to show why the evidence is adequate for the explanation
 - Students are designing solutions to problems that meets specific design criteria and constraints
- Engaging in Argument from Evidence**
 - Students construct oral/written arguments supported by evidence
 - Students build on each other's ideas and make connections to prior learning
 - Respectfully provide and receive critiques from peers about a proposed explanation
 - Students discuss/collaborate with peers in search of the best explanation based on evidence
- Obtaining, Evaluating & Communicating Information**
 - Students critically read scientific texts to obtain scientific/technical information
 - Students are reading multiple sources of information, deriving meaning, and developing summaries
 - Communicate scientific information orally or in written formats
 - Gather, read, synthesize information from multiple sources

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