Alabama Science

Grades 6-8: Overview

Science and Engineering Practices (SEPs)

1. **Asking Questions and Defining Problems: Specifying relationships between variables, clarifying arguments, and models** 6-8.SEP.1
2. **Developing and Using Models: Developing, utilizing, and revising models to describe, test, and predict more abstract phenomena and to design systems.** 6-8.SEP.2
3. **Planning and Carrying Out Investigations: Designing and conducting investigations that use multiple variables and provide evidence to support explanations or solutions.** 6-8.SEP.3
4. **Analyzing and Interpreting Data: Extending quantitative analysis to investigations, distinguishing between correlation and causation, and employing basic statistical techniques of data and error analysis.** 6-8.SEP.4
5. **Using Mathematics and Computational Thinking: Identifying patterns in large data sets and using mathematical concepts to support explanations and arguments.** 6-8.SEP.5
6. **Constructing Explanations and Designing Solutions: Constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.** 6-8.SEP.6
7. **Engaging in Argument from Evidence: Constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).** 6-8.SEP.7
8. **Obtaining, Evaluating, and Communicating Information: Evaluating the merit and validity of ideas and methods.** 6-8.SEP.8

Crosscutting Concepts (CCCs)

1. **Patterns: Macroscopic patterns are related to the nature of microscopic and atomic-level structure. Patterns in rates of change and other numerical relationships can provide information about natural and human-designed systems. Patterns can be used to identify cause and effect relationships. Graphs, charts, and images can be used to identify patterns in data.** 6-8.CCC.1
2. **Cause and Effect: Mechanism and Prediction: Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation. Cause and effect relationships may be used to predict phenomena in natural or designed systems. Phenomena may have more than one cause, and some cause**

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and effect relationships in systems can be described only by using probability. 6-8.CCC.2

3 **Scale, Proportion, and Quantity: Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. The observed function of natural and designed systems may change with scale. Proportional relationships among different types of quantities (e.g., speed as the ratio of distance traveled to time taken) provide information about the magnitude of properties and processes. Scientific relationships can be represented through the use of algebraic expressions and equations. Phenomena that can be observed at one scale may not be observable at another scale.** 6-8.CCC.3

4 **Systems and System Models: Systems may interact with other systems; they may have sub-systems and may be part of larger complex systems. Models can be used to represent systems and their interactions (such as inputs, processes and outputs) and energy, matter, and information flow within systems. Models are limited in that they represent only certain aspects of the system under study.** 6-8.CCC.4

5 **Energy and Matter: Flows, Cycles, and Conservation: Matter is conserved because atoms are conserved in physical and chemical processes. Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. Energy may take different forms (e.g., energy in fields, thermal energy, energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system.** 6-8.CCC.5

6 **Structure and Function: Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures and systems can be analyzed to determine how they function. Structures can be designed to serve particular functions by taking into account the properties of different materials and how materials can be shaped and used.** 6-8.CCC.6

7 **Stability and Change: Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale. Small changes in one part of a system might cause large changes in another part. Stability might be disturbed either by sudden events or gradual changes that accumulate over time. Systems in a dynamic equilibrium are stable due to a balance of feedback mechanisms.** 6-8.CCC.7