Grades 3, 4, 5

Adopted 2013

Appendix G: Crosscutting Concepts

Patterns

1. Observe patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them. AG.1

1. Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena and designed products. 3-5.AG.1.1
2. Patterns of change can be used to make predictions. 3-5.AG.1.2
3. Patterns can be used as evidence to support an explanation. 3-5.AG.1.3

Cause and Effect: Mechanism and Prediction

2. Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering. AG.2

1. Cause and effect relationships are routinely identified, tested, and used to explain change. 3-5.AG.2.1
2. Events that occur together with regularity might or might not be a cause and effect relationship. 3-5.AG.2.2

Scale, Proportion, and Quantity

3. In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change. AG.3

1. Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods. 3-5.AG.3.1
2. Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. 3-5.AG.3.2

Systems and System Models

4. A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems. AG.4

1. A system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. 3-5.AG.4.1

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A system can be described in terms of its components and their interactions. 3-5.AG.4.2

Energy and Matter: Flows, Cycles, and Conservation

5. Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior. AG.5

1. Matter is made of particles. 3-5.AG.5.1
2. Matter flows and cycles can be tracked in terms of the weight of the substances before and after a process occurs. The total weight of the substances does not change. This is what is meant by conservation of matter. Matter is transported into, out of, and within systems. 3-5.AG.5.2
3. Energy can be transferred in various ways and between objects. 3-5.AG.5.3

Structure and Function

6. The way an object is shaped or structured determines many of its properties and functions. AG.6

1. Different materials have different substructures, which can sometimes be observed. 3-5.AG.6.1
2. Substructures have shapes and parts that serve functions. 3-5.AG.6.2

Stability and Change

7. For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand. AG.7

1. Change is measured in terms of differences over time and may occur at different rates. 3-5.AG.7.1
2. Some systems appear stable, but over long periods of time will eventually change. 3-5.AG.7.2