SCI.5

Content Area:

- 5th Grade: Physical , Science, Life Science
- 6/8th Grade: ESS: Earth's Place in the Universe, Earth's Systems and Processes
- 7th Grade: LS: From Molecules to Organisms: Structures and Processes, LS: Ecosystems: Interactions, Energy, and Dynamics, LS: Heredity: Inheritance and Variation of Traits

Strand: Developing possible explanations of phenomena or designing solutions to engineering problems

Substrand: Developing and using models

Standard: Students will be able to develop, revise, and use models to represent their understanding of phenomena or systems as they develop questions, predictions, and/or explanations and communicate ideas to others.

Benchmark

- **5P.3.1.1 1 Develop and refine a model** to describe that matter is made of particles too small to be seen. (P: 2, CC: 3, CI: PS1) **Examples of evidence supporting a model** may include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating saltwater.
- **5P.3.1.1.2 Use models to describe** that energy in animals' food (used for body repair, growth, and motion and to maintain body warmth) was once energy from the sun. (P: 2, CC: 5, CI: PS3) Examples of models may include diagrams, and flow charts. **Examples of models may include diagrams, and flow charts.**
- **5L.3.1.1.3 Create an electronic visualization of the** movement of matter among plants, animals, decomposers, and the environment.** (P: 2, CC: 4, CI: LS2) Emphasis is on the idea that matter that is not food is changed by plants into matter that is food. Examples of systems through which matter cycles may include organisms, ecosystems, and the Earth. **Examples of an electronic visualization may include a computer program, simulation, or animation.**
- **6E.3.1.1.1 Develop and use scale models** of solar system objects to **describe the sizes of objects, the location of objects, and the motion of the objects;** and include the role that gravity and inertia play in controlling that motion. (P: 2, CC: 3, CI: ESS1) Emphasis is on the **regularity of the motion and accounting for Earth-based visual observations of the motion of these objects in our sky**. Emphasis is also on **recognizing the limitations of any of the models.** Examples may include physical models (such as the analogy of distance along a football field or computer visualizations of orbits) or conceptual models (such as mathematical proportions relative to the size of familiar objects such as students' school or state). **Not included are Kepler's Laws and retrograde motion of planets.**
- **6E.3.1.1.2 Develop a model, based on observational evidence,** to describe the **cycling and movement of Earth's rock material and the energy that drives these processes.** (P: 2, CC: 5, CI: ESS2) The emphasis of the practice is on using **observations of processes** like **weathering and erosion of soil and rock, deposition of sediment, and crystallization of lava to inform model development.** Emphasis of the **core idea is on how these processes operate over geologic time to form rocks and minerals through the cycling of Earth's materials.** Examples of models may be conceptual or physical.
- **6E.3.1.1.3 Develop a model, based on observational and experimental evidence**, to describe **the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.**

(P: 2, CC: 5, CI: ESS2) The emphasis of the **practice is on developing a way to represent the mechanisms of water changing state, the global movements of water and energy, and on how the observational and experimental evidence supports the model.** Examples of models may be conceptual or physical.

- **7L.3.1.1.1 Develop and use a model to describe** the **function of a cell as a whole and describe the way cell parts contribute to the cell's function.** (P: 2, CC: 6, CI: LS1) Emphasis is on the **cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.**
- **7L.3.1.1.2 Develop and use a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. (P: 2, CC: 5, CI: LS1) Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released. Examples may include models of sugar breakdown into molecules of glucose that power our bodies, or protein breakdown into amino acids that are later reassembled to create body structures.**
- **7L.3.1.1.3 Develop and use a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. (P: 2, CC: 5, CI: LS2). Emphasis is on describing the conservation of matter and the flow of energy into and out of various ecosystems.**
- **7L.3.1.1.4 Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. (P: 2, CC: 2, CI: LS3) Emphasis is on using models, such as Punnett squares, diagrams, and simulations to describe the cause and effect relationship of gene transmission from parent(s) to offspring and resulting genetic variations.**

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Learning Target: I can develop, revise, and use models to represent my understanding of phenomena or systems as I develop questions, predictions, and/or explanations and communicate ideas to others.

Application beyond standard	4	I can develop a model and explain its strengths and limitations.
Meeting the standard	3	I can develop, revise, and use models to represent my understanding of phenomena or systems as I develop questions, predictions, and/or explanations and communicate ideas to others.
Developing skills	2	I can develop models to represent my understanding of phenomena or systems and use it to explain or communicate ideas to others.
Basic skills	1	I can develop models or make observations of previously created models to represent my understanding of phenomena or systems.