North Carolina Science

Grade 6

Matter and its Interactions

1 **Understand the structure, states, and physical properties of matter.** PS.6.1

1 Use models to illustrate that matter is made of atoms and elements, and are distinguished from each other by the types of atoms that compose them. PS.6.1.1

2 Use models to explain the relationship between changes in thermal energy in a substance and the motion of its particles (including phase changes). PS.6.1.2

3 Carry out investigations to compare the physical properties of pure substances that are independent of the amount of matter present including density, melting point, boiling point and solubility to properties that are dependent on the amount of matter present to include volume, mass and weight. PS.6.1.3

Energy

2 **Understand characteristics of thermal and electrical energy transfer and interactions of matter and energy.** PS.6.2

1 Use models to compare the directional transfer of heat energy of matter through convection, radiation, and conduction. PS.6.2.1

2 Use models to explain how the transfer of heat and resulting change of temperature impacts the behavior of matter to include expansion, and contraction. PS.6.2.2

3 Carry out investigations to compare the transfer of thermal energy in insulated and non-insulated materials (examples could include insulated box, solar cooker, or styrofoam cup). PS.6.2.3

4 Engage in argument from evidence to classify materials as conductors and insulators of energy (both thermal and electrical). PS.6.2.4

5 Carry out investigations to explain the transfer of electrical energy in electrical circuits, to include how a circuit requires a complete loop through which an electrical current can pass. PS.6.2.5

Waves and Their Applications in Technologies for Information Transfer

3 **Understand the properties of waves and the wavelike property of energy in seismic, electromagnetic (including visible light), and sound waves.** PS.6.3

1 Use models of a simple wave to explain wave properties in seismic, light, and sound waves that include: waves having a repeating pattern with a specific amplitude, frequency, and wavelength, and the amplitude of a wave is related to the energy of the wave. PS.6.3.1

2 Carry out investigations to conclude the relationship between the electromagnetic spectrum (including visible light) and sight. PS.6.3.2

3 Carry out investigations to conclude the relationship between sound waves (including rate of vibration, the medium through which vibrations travel) and hearing. PS.6.3.3

4 Use models to explain that various waves (seismic, sound, electromagnetic, including visible light) are reflected, absorbed or transmitted through various materials. PS.6.3.4

From Molecules to Organisms- Structures and Processes

1 **Understand the structures, processes, and behaviors of plants that enable them to survive and reproduce.** LS.6.1

1 Use models to explain how the processes of photosynthesis, respiration, and transpiration work together to meet the needs of plants. LS.6.1.1

2 Construct an explanation to compare how vascular and nonvascular plants obtain, transport, and use nutrients and water necessary for survival. LS.6.1.2

3 Use models to summarize structural adaptations, processes, and responses that flowering plants use for defense, survival and reproduction. LS.6.1.3

Ecosystems- Interactions, Energy, and Dynamics

2 **Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment.** LS.6.2

1 Use models to summarize how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred to consumers and decomposers. LS.6.2.1

2 Analyze and interpret data to predict how the abiotic factors (such as temperature, water, sunlight, and soil quality) and biotic factors affect the ability of organisms to grow and survive in different biomes (freshwater, marine, temperate forest, rainforest, grassland, desert, taiga, tundra). LS.6.2.2

Earth's Place in the Universe

1 **Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe.** ESS.6.1

1 Use models to explain how the relative motion and relative position of the Sun, Earth and moon affect the seasons, tides, phases of the moon, and eclipses. ESS.6.1.1

2 Analyze and interpret data to compare the planets in our solar system in terms of: size and gravitational force relative to Earth, surface and atmospheric features, relative distance from the sun, and ability to support life. ESS.6.1.2

3 Use models to explain how the gravitational forces of the Sun and planets impact the structure of our solar system. ESS.6.1.3

4 Analyze and interpret data from historical and ongoing space exploration to illustrate the size and scale of the components of our solar system, galaxy, and universe. ESS.6.1.4

Earth's Systems

2 **Understand the lithosphere and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time.** ESS.6.2

1 Use models to summarize the structure of the earth, including the layers, the mantle and core based on the relative position, composition and density. ESS.6.2.1

2 Construct an explanation to illustrate how the movement of lithospheric plates can create geologic landforms and cause major geologic events such as earthquakes and volcanic eruptions. ESS.6.2.2

3 Use models to explain the rock cycle and its relationship to the formation of soil (including how different types of soil come from different types of rocks). ESS.6.2.3

Earth and Human Activity

3 **Understand the reciprocal relationship between the lithosphere and humans.** ESS.6.3

1 Engage in argument from evidence to explain that the good health of humans and the environment requires: monitoring of the lithosphere, maintaining soil quality and stewardship. ESS.6.3.1

2 Obtain, evaluate, and communicate information to compare the implications of sustainable and unsustainable land use practices (including agriculture and deforestation) and the importance of stewardship. ESS.6.3.2