North Carolina Science

Grade 8

Matter and its Interactions

1 **Understand the properties of matter and changes that occur when matter interacts in open and closed systems.** PS.8.1

1 Construct an explanation to classify matter as elements, compounds, or mixtures based on how the atoms are arranged in various substances. PS.8.1.1

2 Use models to illustrate the structure of atoms in terms of the protons, electrons, and neutrons (using the location, charges and comparative size of these subatomic particles), without consideration of isotopes, ions, and energy levels. PS.8.1.2

3 Analyze and interpret data to explain how the physical properties of elements and their reactivity have been used to produce the current model of the Periodic Table of Elements. PS.8.1.3

4 Construct an explanation to classify changes in matter as physical changes (including changes in size, shape, and state) or chemical changes that are the result of a chemical reaction (including changes in energy, color, formation of a gas or precipitate). PS.8.1.4

5 Use models to illustrate how atoms are rearranged during a chemical reaction so that balanced chemical equations support the Law of Conservation of Mass (in both open and closed systems). PS.8.1.5

From Molecules to Organisms- Structures and Processes

2 **Understand the hazards caused by agents of diseases that affect living organisms.** LS.8.1

1 Construct an explanation to compare the basic characteristics of viruses, bacteria, fungi and parasites relating to the spread, treatment and prevention of disease. LS.8.1.1

2 Analyze and interpret data to explain the difference between epidemic and pandemic as it relates to the spread, treatment and prevention of disease. LS.8.1.2

Ecosystems-Interactions, Energy, and Dynamics

3 **Understand how organisms interact with and respond to the biotic and abiotic factors in their environment.** LS.8.2

1 Carry out investigations to explain how changing biotic and abiotic factors such as food, water, shelter, and space affect populations in an ecosystem. LS.8.2.1

2 Construct an explanation to summarize the relationships among producers, consumers, and decomposers including the positive and negative consequences of such interactions including: coexistence and cooperation, competition (predator/prey), parasitism, and mutualism. LS.8.2.2

3 Construct an explanation to summarize how food provides the energy and the building materials required for the growth and survival of all organisms (to include plants). LS.8.2.3

4 Use models to explain how the flow of energy within food webs is interconnected with the cycling of matter (water and carbon). LS.8.2.4

Biological Evolution-Unity and Diversity

4 **Understand the evolution of organisms over time based on evidence and processes.** LS.8.3

1 Analyze and interpret data to infer evolutionary relationships by using evidence drawn from fossils and comparative anatomy. LS.8.3

2 Use models to explain the process of natural selection, in which genetic variations in a population affect individuals' likelihood of surviving and reproducing in its environment. LS.8.2

Earth's Place in the Universe

5 **Understand the history of Earth and its life forms based on evidence of change recorded in fossil records and landforms.** ESS.8.1

1 Analyze and interpret data to conclude the relative age of Earth and relative age of rocks and fossils from index fossils and ordering of rock layers. ESS.8.2.1

2 Engage in argument from evidence to explain the use of fossils, composition of sedimentary rocks, faults, and igneous rock formations found in rock layers as evidence of the history of the Earth and its life forms. ESS.8.2.2

Earth's Systems

6 **Understand the hydrosphere including freshwater, estuarine, ocean systems.** ESS.8.2

1 Use models to explain the structure of the hydrosphere including: water distribution on earth, local river basins, estuaries, and water availability. ESS.8.2.1

2 Use models to explain how temperature and salinity drive major ocean currents and how these currents impact climate, ecosystems, and the distribution of nutrients, minerals, dissolved gases, and life forms. ESS.8.2.2

Earth and Human Activity

7 **Understand the reciprocal relationship between the hydrosphere and humans.** ESS.8.3

2 Engage in argument from evidence to explain that the good health of humans and the environment requires: monitoring of the hydrosphere, water quality standards, methods of water treatment, maintaining safe water quality, and stewardship. ESS.8.3.2

1 Analyze and interpret data to predict the safety and potability of water supplies in North Carolina based on physical and biological factors, including: temperature, dissolved oxygen, pH, nitrates and phosphates, turbidity, and bio-indicators. ESS.8.3.1

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8 **Understand the environmental implications associated with the various methods of obtaining, managing, and using energy resources.** ESS.8.4

1 Construct an explanation to classify the primary sources of energy as either renewable (Geothermal, Biomass, Solar, Wind, Hydroelectric) or nonrenewable (Coal, Petroleum, Natural Gas, Nuclear). ESS.8.4.1

2 Engage in argument from evidence to explain the environmental consequences of the various methods of obtaining, transforming, and distributing energy. ESS.8.4.2

3 Analyze and interpret data to illustrate the relationship between human activities and global temperatures since industrialization. ESS.8.4.3

4 Obtain, evaluate, and communicate information to compare the long term implications of the use of renewable and nonrenewable energy resources and the importance of stewardship and conservation. ESS.8.4.4