6TH – 8TH GRADE

# Earth Science

GRADE · DOMAIN · ESSENTIAL STANDARD NUMBER · CLARIFYING OBJECTIVE NUMBER

**6.E.1.1**

Elementary and Middle school standards are coded by Grade, Domain, Essential Standard Number and Clarifying Objective Number

| | GRADE 6 | GRADE 7 | GRADE 8 |
|---|---|---|---|
| Earth in the Universe | **6.E.1 Understand the Earth/Moon/Sun system, and the properties, structures and predictable motions of celestial bodies in the Universe.**<br>6.E.1.1 Explain how the relative motion and relative position of the Sun, Earth and Moon affect the seasons, tides, phases of the Moon, and eclipses.<br>6.E.1.2 Explain why Earth sustains life while other planets do not based on their properties (including types of surface, atmosphere and gravitational force) and location to the Sun.<br>6.E.1.3 Summarize space exploration and the understandings gained from them. | Intentionally left blank. | Intentionally left blank. |
| Earth Systems, Structures & Processes | **6.E.2 Understand the structure of the Earth and how interactions of constructive and destructive forces have resulted in changes in the surface of the Earth over time and the effects of the lithosphere on humans.**<br>6.E.2.1 Summarize the structure of the Earth, including the layers, the mantle and core based on the relative position, composition and density.<br>6.E.2.2 Explain how crustal plates and ocean basins are formed, move and interact using earthquakes, heat flow and volcanoes to reflect forces within the Earth.<br>6.E.2.3 Explain how the formation of soil is related to the parent rock type and the environment in which it develops.<br>6.E.2.4 Conclude that the good health of humans requires: monitoring the lithosphere, maintaining soil quality and stewardship. | **7.E.1 Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans.**<br>7.E.1.1 Compare the composition, properties and structure of Earth's atmosphere to include: mixtures of gases and differences in temperature and pressure within layers.<br>7.E.1.2 Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to the weather patterns on Earth.<br>7.E.1.3 Explain the relationship between the movement of air masses, high and low pressure systems, and frontal boundaries to storms (including thunderstorms, hurricanes, and tornadoes) and other weather conditions that may result.<br>7.E.1.4 Predict weather conditions and patterns based on information obtained from: weather data collected from direct observations and measurement (wind speed and direction, air temperature, humidity and air pressure); weather maps, satellites and radar; cloud shapes and types and associated elevation.<br>7.E.1.5 Explain the influence of convection, global winds and the jet stream on weather and climatic conditions.<br>7.E.1.6 Conclude that the good health of humans requires: monitoring the atmosphere, maintaining air quality and stewardship. | **8.E.1 Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans.**<br>8.E.1.1 Explain the structure of the hydrosphere including: water distribution on Earth, local river basin and water availability.<br>8.E.1.2 Summarize evidence that Earth's oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms: estuaries, marine ecosystems, upwelling, behavior of gases in the marine environment, deep ocean technology and understandings gained.<br>8.E.1.3 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, bio-indicators.<br>8.E.1.4 Conclude that the good health of humans requires: monitoring of the hydrosphere, water quality standards, methods of water treatment, maintaining safe water quality, stewardship. |
| Earth History | Intentionally left blank. | Intentionally left blank. | **8.E.2 Understand the history of Earth and its life forms based on evidence of change recorded in fossil records and landforms.**<br>8.E.2.1 Infer the age of Earth and relative age of rocks and fossils from index fossils and ordering of rocks layers (relative dating and radioactive dating).<br>8.E.2.2 Explain the use of fossils, ice cores, composition of sedimentary rocks, faults, and igneous rock formations found in rock layers as evidence of the history of the Earth and its changing life forms. |

6TH – 8TH GRADE

# Life Science

GRADE · DOMAIN · ESSENTIAL STANDARD NUMBER · CLARIFYING OBJECTIVE NUMBER

**6.L.1.1**

Elementary and Middle school standards are coded by Grade, Domain, Essential Standard Number and Clarifying Objective Number

| | GRADE 6 | GRADE 7 | GRADE 8 |
|---|---|---|---|
| Structures and Functions of Living Organisms | **6.L.1 Understand the structures, processes and behaviors of plants that enable them to survive and reproduce.**<br>6.L.1.1 Summarize the basic structures and functions of flowering plants required for survival, reproduction and defense.<br>6.L.1.2 Explain the significance of the processes of photosynthesis, respiration and transpiration to the survival of green plants and other organisms. | **7.L.1 Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life.**<br>7.L.1.1 Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including: euglena, amoeba, paramecium, volvox.<br>7.L.1.2 Compare the structures and functions of plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, chloroplasts, mitochondria, and vacuoles).<br>7.L.1.3 Summarize the hierarchical organization of multi-cellular organisms from cells to tissues to organs to systems to organisms.<br>7.L.1.4 Summarize the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, and excretion) and ways that these systems interact with each other to sustain life. | **8.L.1 Understand the hazards caused by agents of diseases that affect living organisms.**<br>8.L.1.1 Summarize the basic characteristics of viruses, bacteria, fungi and parasites relating to the spread, treatment and prevention of disease.<br>8.L.1.2 Explain the difference between epidemic and pandemic as it relates to the spread, treatment and prevention of disease.<br>**8.L.2 Understand how biotechnology is used to affect living organisms.**<br>8.L.2.1 Summarize aspects of biotechnology including: specific genetic information available, careers, economic benefits to North Carolina, ethical issues, implications for agriculture. |
| Ecosystems | **6.L.2 Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment.**<br>6.L.2.1 Summarize how energy derived from the Sun is used by plants to produce sugars (photosynthesis) and is transferred within food chains and food webs (terrestrial and aquatic) from producers to consumers to decomposers.<br>6.L.2.2 Explain how plants respond to external stimuli (including dormancy and forms of tropism) to enhance survival in an environment.<br>6.L.2.3 Summarize how the abiotic factors (such as temperature, water, sunlight, and soil quality) of biomes (freshwater, marine, forest, grasslands, desert, Tundra) affect the ability of organisms to grow, survive and/or create their own food through photosynthesis. | Intentionally left blank. | **8.L.3 Understand how organisms interact with and respond to the biotic and abiotic components of their environment.**<br>8.L.3.1 Explain how factors such as food, water, shelter, and space affect populations in an ecosystem.<br>8.L.3.2 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, mutualism.<br>8.L.3.3 Explain how the flow of energy within food webs is interconnected with the cycling of matter (including water, nitrogen, carbon dioxide and oxygen). |
| Evolution and Genetics | Intentionally left blank. | **7.L.2 Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance and external factors to potential variation among offspring.**<br>7.L.2.1 Explain why offspring that result from sexual reproduction (fertilization and meiosis) have greater variation than offspring that result from asexual reproduction (budding and mitosis).<br>7.L.2.2 Infer patterns of heredity using information from Punnett squares and pedigree analysis.<br>7.L.2.3 Explain the impact of the environment and lifestyle choices on biological inheritance (to include common genetic diseases) and survival. | **8.L.4 Understand the evolution of organisms and landforms based on evidence, theories and processes that impact the Earth over time.**<br>8.L.4.1 Summarize the use of evidence drawn from geology, fossils, and comparative anatomy to form the basis for biological classification systems and the theory of evolution.<br>8.L.4.2 Explain the relationship between genetic variation and an organism's ability to adapt to its environment. |
| Molecular Biology | Intentionally left blank. | Intentionally left blank. | **8.L.5 Understand the composition of various substances as it relates to their ability to serve as a source of energy and building materials for growth and repair of organisms.**<br>8.L.5.1 Summarize how food provides the energy and the molecules required for building materials, growth and survival of all organisms (to include plants).<br>8.L.5.2 Explain the relationship among a healthy diet, exercise, and the general health of the body (emphasis on the relationship between respiration and digestion). |

6TH – 8TH GRADE

# Physical Science

GRADE · DOMAIN · ESSENTIAL STANDARD NUMBER · CLARIFYING OBJECTIVE NUMBER

**6.P.1.1**

Elementary and Middle school standards are coded by Grade, Domain, Essential Standard Number and Clarifying Objective Number

| | GRADE 6 | GRADE 7 | GRADE 8 |
|---|---|---|---|
| Forces and Motion | **6.P.1 Understand the properties of waves and the wavelike property of energy in earthquakes, light and sound waves.**<br>6.P.1.1 Compare the properties of waves to the wavelike property of energy in earthquakes, light and sound.<br>6.P.1.2 Explain the relationship among visible light, the electromagnetic spectrum, and sight.<br>6.P.1.3 Explain the relationship among the rate of vibration, the medium through which vibrations travel, sound and hearing. | **7.P.1 Understand motion, the effects of forces on motion and the graphical representations of motion.**<br>7.P.1.1 Explain how the motion of an object by can be described by its position, direction of motion, and speed with respect to some other object.<br>7.P.1.2 Explain the effects of balanced and unbalanced forces acting on an object (including friction, gravity and magnets).<br>7.P.1.3 Illustrate the motion of an object using a graph to show a change in position over a period of time.<br>7.P.1.4 Interpret distance versus time graphs for constant speed and variable motion. | Intentionally left blank. |
| Matter: Properties and Change | **6.P.2 Understand the structure, classifications and physical properties of matter.**<br>6.P.2.1 Recognize that all matter is made up of atoms and atoms of the same element are all alike, but are different from the atoms of other elements.<br>6.P.2.2 Explain the effect of heat on the motion of atoms through a description of what happens to particles during a change in phase.<br>6.P.2.3 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. | Intentionally left blank. | **8.P.1 Understand the properties of matter and changes that occur when matter interacts in an open and closed container.**<br>8.P.1.1 Classify matter as elements, compounds, or mixtures based on how the atoms are packed together in arrangements.<br>8.P.1.2 Explain how the physical properties of elements and their reactivity have been used to produce the current model of the periodic table of elements.<br>8.P.1.3 Compare physical changes such as size, shape and state to chemical changes that are the result of a chemical reaction to include changes in temperature, color, formation of a gas or precipitate.<br>8.P.1.4 Explain how the idea of atoms and a balanced chemical equation support the law of conservation of mass. |
| Energy: Conservation and Transfer | **6.P.3 Understand characteristics of energy transfer and interactions of matter and energy.**<br>6.P.3.1 Illustrate the transfer of heat energy from warmer objects to cooler ones using examples of conduction, radiation and convection and the effects that may result.<br>6.P.3.2 Explain the effects of electromagnetic waves on various materials to include absorption, scattering, and change in temperature.<br>6.P.3.3 Explain the suitability of materials for use in technological design based on a response to heat (to include conduction, expansion, and contraction) and electrical energy (conductors and insulators). | **7.P.2 Understand forms of energy, energy transfer and transformation and conservation in mechanical systems.**<br>7.P.2.1 Explain how kinetic and potential energy contribute to the mechanical energy of an object.<br>7.P.2.2 Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).<br>7.P.2.3 Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.<br>7.P.2.4 Explain how simple machines such as inclined planes, pulleys, levers and wheel and axles are used to create mechanical advantage and increase efficiency. | **8.P.2 Explain the environmental implications associated with the various methods of obtaining, managing and using energy resources.**<br>8.P.2.1 Explain the environmental consequences of the various methods of obtaining, transforming, and distributing energy.<br>8.P.2.2 Explain the implications of the depletion of renewable and nonrenewable energy resources and the importance of conservation. |