Shenandoah Community School District
Science
Grade - 6

6.1 Earth and Space

6.1.1 (SCSD) Understand and apply knowledge of the structure and processes of the earth system and the processes that change the earth and its surface (I, D, M)

- Know the solid earth consists of layer including: (I,D,M)
  - A lithosphere (*crust* and *upper mantle*) (I,D,M)
    - A hot, convecting *mantle* (I,D,M)
    - A dense metallic *core* (I,D,M)
- Know that the earth changed over time and continues to change (I,D,M)
- Know the uniqueness of the Earth and it's ongoing processes of development (I,D,M)
  - Energy for Earth's processes provided by: (I,D,M)
    - Heat inside the Earth (I,D,M)
    - Radiation from the Sun (I,D,M)
  - Matter and Energy Move among Earth's rocks and soil, atmosphere, waters and living things (I,D,M)
- Know that tectonic plates constantly move at rates of centimeters per year in response to movements in the mantle (I,D,M)
  - Major geological events occur as a result of these plate motions
    - Earthquakes (describe)(I,D,M)
      - Has changed over time and continues to change(I,D,M)
      - Release stress that has built up in rocks (I,D,M)
    - Volcanic eruptions (describe)(I,D,M)
    - Mountain building (describe)(I,D,M)
      - Form as tectonic plates move (I,D,M)
- Know that landforms are the result of a combination of:
  - Constructive forces (I,D,M)
    - Crustal deformation (I,D,M)
    - Volcanic eruption (I,D,M)
    - Deposition of sediment (I,D,M)
  - Destructive forces (I,D,M)
    - Weathering (I,D,M)
    - Erosion (I,D,M)
- Know and identify the earth's major land forms (I,D,M)
  - Plateaus (I,D,M)
  - Mountains (I,D,M)
  - Plains (I,D,M)
  - Hills (I,D,M)
  - Valleys (I,D,M)
- Know that some changes in the earth can be described as the "rock cycle"
  - Rocks at the earth's surface 1) weather 2) forming sediments that are buried and 3) then compacted, the forces on the earth sink them back down where they are heated and often re-crystallized into new rock. Eventually, those new rocks may be brought to the surface by the forces that drive plate motions (I,D,M)
- Know that soil consists of:
  - Weathered rock (I,D,M)
  - Decomposed organic matter (I,D,M)
    - Dead plants (I,D,M)
    - Animals (I,D,M)

        - Bacteria (I,D,M)
- Know how to use physical properties and chemical composition to classify rocks and minerals (I, D, M)
    - Can identify metamorphic, sedimentary, and igneous rocks (I,D,M)
    - Rocks, fossils, and other types of natural evidence tell Earth's story (I,D,M)
- Know that soils are often found in layers with each having a different chemical composition and texture (I, D, M)
- Know that living organisms have played many roles in the earth system (I,D,M)
    - Affects the composition of the atmosphere (I,D,M)
    - Produces some types of rocks (I,D,M)
    - Contributes to the weathering of rock (I,D,M)

6.1.2 (SCSD) Understand and apply knowledge of the water cycle, including considerations of events that impact groundwater quality (I, D, M)

- Know that water (understand importance), which covers the majority of the earth's surface, circulates through 1) crust 2) oceans and, 3) atmosphere in what is known as the "water cycle" (I, D, M)
    - Water Cycle (I,D,M)
        - Evaporates from the earth's surface (I,D,M)
        - Rises and cools as it rises to higher elevations (I,D,M)
        - Condenses as precipitation (I,D,M)
        - Falls to the surface where it collects in:
            - Lakes (I,D,M)
            - Oceans (I,D,M)
            - Soil (I,D,M)
            - Soil and rock underground (I,D,M)
- Know that water is a solvent (I,D,M)
    - As it passes through the water cycle (moves on the earth's surface and underground) it dissolves *minerals* and *gases* and carries them to: (I,D,M)
        - Oceans (I,D,M)
        - Rivers (I,D,M)
        - And other surface water (I,D,M)
- Know that natural and human forces can contribute to contamination of surface water and ground water (I, D, M)

6.1.3 (SCSD) Understand and apply knowledge of earth history based on physical evidence (I, D, M)

- Know that the earth processes we see today are similar to those that occurred in the past (I, D, M)
    - Erosion (I,D,M)
    - Movement of tectonic plates (I,D,M)
    - Changes in atmospheric composition (I,D,M)
- Know that earth history is also influenced by occasional catastrophes (I,D,M)
    - Impact of an asteroid (I,D,M)
    - Impact of a comet (I,D,M)
- Know that fossils provide important evidence of how life and environmental conditions have changed (I,D,M)
    - Know that society depends on natural resources from the Earth (I,D,M)

6.1.4 (SCSD) Understand and apply knowledge of the earth's atmospheric properties and how they influence weather and climate (I, D, M)

- Know that the earth's atmosphere is a blanket of gases that support and protect life (I,D,M)

- Know that the atmosphere is a mixture (I,D,M)
  - Nitrogen (I,D,M)
  - Oxygen (I,D,M)
  - Trace gasses that include water vapor (I,D,M)
- Know that the atmosphere has different properties at different elevations (I,D,M)
- Know that climates are long-term weather patterns that may change over time (I,D,M)
- Know that global patterns of atmospheric movement influence local weather (Some features of weather have predictable patterns) (I,D,M)
  - Oceans have a major effect on climate (I,D,M)
    - Water in the oceans holds a large amount of heat (I,D,M)
  - Clouds affect weather and climate (I,D,M)
    - Formed by the condensation of water vapor(I,D,M)
  - The interaction of air masses cause changes in weather (I,D,M)

6.1.5 (SCSD) Understand and apply knowledge of the components of our solar system (I, D, M)

- Know that the Earth is the third planet from the sun in a system that includes: (I,D,M)
  - The Moon (identify) (I,D,M)
  - The Sun (identify) (I,D,M)
    - An average star (I,D,M)
    - Central and largest body in the solar system (I,D,M)
  - Seven planets (identify) and their moons (I,D,M)
  - The Milky Way galaxy (I,D,M)
    - Identifies stars (I,D,M)
    - Explains galaxies and beyond (I,D,M)
    - Smaller objects (I,D,M)
      - Asteroids (I,D,M)
      - Comet (I,D,M)
- Know that physical forces, such as gravity, affect the movement of all mater on the Earth (I,D,M)
- Know that gravity is the force:
  - That keeps planets in orbit around the sun (I,D,M)
  - Governs the rest of the motion in the solar system (I,D,M)
  - Alone holds us to the earth's surface (I,D,M)
  - Explains the phenomena of the tides (I,D,M)
- Know that the sun is the major source of energy for processes on the Earth's surface (I, D, M)
  - Growth of plants (I,D,M)
  - Wind (I,D,M)
  - Ocean currents (I,D,M)
  - Water cycle (I,D,M)
  - Seasons (I,D,M)
    - Result from variations in the amount of the sun's energy hitting the surface, due to the tilt of the earth's rotation on its axis and the length of day (I, D, M)
- Know the most objects in the solar system are in regular and predictable motion (I,D,M)
  - Those motions explain such occurrences as:
    - The day (I,D,M)
    - The year (I,D,M)
    - Phases of the moon (I,D,M)
    - Eclipses (I,D,M)

- Know that people develop and use technology to explore and study space (I,D,M)

6.2 Life Science

6.2.7 (SCSD) Understand and apply knowledge of personal health and wellness issues (I)

- Know and demonstrate good health practices (I)
- Know and demonstrate good social skills (I)
- Know and demonstrate good decision making skills (I)
- Know and identify positive safety procedures and recognizes that media and others influences affect society (I)
- Know and practice healthy behaviors and physical activities (I)

6.4 (SCSD) Science as Inquiry

6.4.1 (SCSD) Identify and generate questions that can be answered through scientific investigations (I)

- Know how to refine and refocus broad and ill-defined questions (I)
  - Develop the ability to:
    - Clarify questions and inquiries and direct them toward objects and phenomena that can be (I)
      - Described (I)
      - Explained (I)
      - Predicted (I)
- Know how to connect their questions with scientific (I)
  - Ideas (I)
  - Concepts (I)
  - Quantitative relationships (I)
- Know that scientific investigations involve asking and answering a question and comparing the answer to what a scientist already knows about the world (I)
  - Explain the “Scientific Method” (I)
    - Ask a question (I)
    - Do background research (I)
    - Construct a Hypothesis (an educated guess about how things work)(I)
    - Test your hypotheses by doing an experiment(I)
    - Analyze your data and draw a conclusion (I)
    - Communicate your results (I)

6.4.2 (SCSD) Design and conduct different kinds of scientific investigations

- Know how to recognize that different questions lead to different types investigations (I)
- Know how to:
  - Make systematic observations (I)
  - Take accurate measurements (I)
  - Identify controlling variables (I)
- Know how to clarify ideas that are influencing and guiding inquiry and to understand how those ideas compare with current scientific knowledge (I)
- Know how to:
  - Formulate questions (I)
  - Design investigations (I)

    - Execute Investigations (I)
    - Interpret data (I)
    - Use evidence to generate explanations (I)
    - Propose alternative explanations (I)
    - Critique explanations and procedures (I)
- Know how to use appropriate safety procedures when conducting investigations (I)

6.4.3 (SCSD) Understand that different kinds of questions suggest different kinds of scientific investigations (I)

- Know that some investigations:
    - Involve observing and describing (I)
        - Objects (I)
        - Organisms (I)
        - Events (I)
    - Involve collecting specimens (I)
    - Experiments (I)
    - Seeking more information (I)
    - Discovery of new objects and phenomena (I)
    - Making models (I)

6.4.4 (SCSD) Selects and use appropriate tools and techniques to gather, process and analyze data (I)

- Know that the use of tools and techniques (including computers) will be guided by the questions and the investigations designed (I)
- Know how to use technology, equipment and tools (I)
    - Rulers (I)
    - Thermometers (I)
    - Magnifiers (I)
    - Microscopes (I)
    - Telescopes (I)
    - Calculators (I)
    - Cameras (I)
    - Computers (I)

6.4.5 (SCSD) Incorporate mathematics in scientific inquiry (I)

- Know that mathematics is used to:
    - Gather, organize and present data (I)
    - Construct convincing explanations (I)

6.4.6 (SCSD) Use evidence to develop descriptions, explanations, predictions, and models (I)

- Know that explanations should be based on observations (I)
- Know how to differentiate between description and explanations (I)
- Know that developing explanations establishes connections between the content of science and the contexts in which students develop new knowledge (I)
- Know that models are often used to think about processes that:
    - Happen too slowly (I)
    - Happen too quickly (I)
    - Are on too small a scale to observe directly (I)
    - Are too vast to be changed deliberately (I)
    - Are potentially dangerous (I)
- Know that different models can be used to represent the same thing (I)

6.4.7 (SCSD) Think critically and logically to make the relationships between evidence and explanations (I)

- Know how to decide what evidence should be used and develop the ability to account for data that is inconsistent from what is normal (I)
- Know how to:
  - Review data from an experiment (I)
  - Summarize the data (I)
  - Form a logical argument between cause and effect relationships (I)
- Know how to state some explanations in terms of relationships between two or more variables (I)

6.4.7 (SCSD) Recognize and analyze alternative explanations and predictions (I)

- Know how to:
  - Listen (I)
  - Respect the explanations proposed by students (I)
  - Remain open to and acknowledge different ideas and explanations (I)
  - Be able to accept the skepticism of others (I)
  - Consider alternative explanations (I)

6.4.8 (SCSD) Communicate and defend procedures and explanations (I)

- Have the skills to be:
  - Competent in communicating experimental methods (I)
  - Describing observations (I)
  - Summarizing the results of investigations (I)
- Know that explanations can be communicated through various methods (I)
- Know that scientific information can be gathered by a team and shared with others (I)
  - Communication in a team (I)
  - Use quality team process (I)
- Know that individuals with varied backgrounds, interests, and work settings communicate to encourage scientific inquiry (I)