

Shenandoah Community School District
Science
Grade - 4

4.1 Earth and Space

4.1.1 (SCSD) Understand and apply knowledge of properties and uses of earth materials

- Know that the different physical and chemical properties of earth materials makes them useful in different ways
 - Building materials
 - Sources of fuel
 - For growing the plants we use as foods (Different growing conditions affect growth)
- Know that Earth has natural resources that are important for life, but are limited
 - Soil
 - Water (kinds)
 - Fresh Water
 - Saline Water (salt)
 - Air
 - Plants
 - Animals
- Know the ways to take care of Earth's natural resources
- Know and describe the structure of the earth
 - Crust
 - Mantle
 - Core

4.1.2 (SCSD) Understand and apply knowledge of processes and changes on or in the earth's land, oceans, and atmosphere

- Know that the surface of the earth changes
 - Understand evaporation, condensation, and the water cycle
 - Slow processes
 - Erosion
 - Weathering
 - Rapid Processes
 - Landslides
 - Volcanic Eruptions
 - Floods
 - Earthquakes
 - Glaciers
 - 🚧 Explain how they form and change the earth's surface
 - Describe how rocks change overtime and what can be learned from these changes

4.1.3 (SCSD) Understand and apply knowledge of fossils and the evidence they provide of past life on earth

- Know that fossils provide evidence of plants and animals that lived long ago and nature of the environment at that time
 - How fossils are formed
 - What fossils tell us about the past
- Understand extinction and the roll of humans in a population's extinction

4.1.4 (SCSD) Understand and apply knowledge of weather and weather patterns

- Know that weather is always changing and can be described by measurable quantities
 - Temperature
 - Wind direction
 - Speed
 - Precipitation
- Know that large masses of air with certain properties move across the surface of the earth. The movement and interactions of these air masses is used to forecast the weather
 - Describe air pressure and wind
 - Describe air masses and fronts
 - Describe a severe storm
- Know that climate is defined by weather pattern over a period of time
 - Describe climate

4.1.5 (SCSD) Understands and apply knowledge of the properties, movements, and locations of objects in our solar system




- Know that most objects in the solar system are in regular and predictable motion
 - Earth's rotation on its axis 24 hours (day and night)
 - The sun **appears** to move across the sky in the same way every day. Its apparent path changes slowly across the seasons
 - The moon's orbit around the earth once in about 28 days
 - Changes what part of the moon is lighted by the sun
 - Changes how much of that part can be seen from the earth (phases)
 - Eight planets and many other objects revolve around our Sun in predictable patterns
 - Planets and objects are composed of varied materials

4.2 Life Science

4.2.1 (SCSD) Understand and apply knowledge of organisms and their environment which include:

- 1) structures, characteristics, and adaptations of organisms that allow them to function and survive within their habitat (I,D,M)**
- 2) how individual organisms are influenced by internal and external factors**
- 3) the relationships among living and non-living factors in terrestrial and aquatic ecosystems**

- Know that plants make their own food
 - Describe plant cells
 - Describe photosynthesis
 - Describe roots, stems, and leaves
- Know that animals get food by eating other plants and animals
 - Describe food chains
 - Describe food webs
- Know that many kinds of animals have different structures that serve different functions
 - Classify living things
 - Identify animal kingdoms
 - Describe the structure and functions of cells, tissues, and organ systems in animals (I,D, M)
 - Explore that animals must reproduce for their species
 - Describe animal adaptations

- Know that an organism's pattern of behavior is related to the nature of that organism's environment
 - All organism live in ecosystems
 - Describe how populations survive
 - Kinds and numbers of organisms present
 - Availability of food and resources
 - Physical characteristics of the environment
 - Woodland
 - Rain forest
 - Desert
 - Arctic
 -  Tundra
 - Water habitats
 -  Freshwater
 -  Marine
 - Describe how ecosystems change
 - When environment changes some plants and animals
 - Survive
 - Reproduce
 - Move to a new location
 - Die
- Know that all organisms cause changes in the environment in which they live
 - Detrimental to themselves or other organisms
 - Beneficial to themselves or other organisms

4.2.2 (SCSD) Understand and apply knowledge of environmental stewardship (D)

- Know that humans change environment (D)
 - Detrimental to themselves or other organisms (D)
 - Beneficial to themselves or other organisms (D)

4.2.3 (SCSD) Understand and apply knowledge of basic human body systems and how they work together (I,D,M)

- Know that human organism has systems which interact with one another (I,D,M)
 - Circulatory (I,D,M)
 - Respiratory (I,D,M)
 - Digestive (I,D,M)
 - Musculoskeletal (I,D,M)

4.2.4 (SCSD) Understand and apply knowledge of personal health and wellness issues (D)

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

4.3 Physical Science

4.3.1 (SCSD) Understand and apply knowledge of how to describe and identify substances based on characteristic properties (D)

- Know that everything is made of matter
- Know that matter can be classified

- Element (a pure substance)
 - Identify elements
- Compound (a chemical union of elements)
 - Identify compounds
- Mixture (two or more different substances mixed together)
 - Identify mixtures
- Know that it may be necessary to use magnification to observe the component parts of some materials
- Know that a substance has characteristic properties (Physical or chemical property that helps identify and classify substances)
 - A mixture of substances often can be separated into the original substances using one or more of the characteristic properties
 - Freezing/melting point
 - Boiling/condensing point
 - Density
 - Magnetism
 - Solubility
- Know that properties of a substance can be measured by using tools and technology (D)
 - Ruler (D)
 - Balances (D)
 - Thermometers (D)
- Know that when a new material (compound) is made by chemically combining two or more materials, it has properties that are different from the original materials
 - Many different materials can be made from a small number of basic materials

4.3.2 (SCSD) Understand and apply knowledge of states of matter and changes in states of matter (D)

- Know that materials can exist in different states (D)
 - Solid (D)
 - Liquid (D)
 - Gas (D)
- Knows that some common materials can be changed from one state to another by heating and cooling
- Know that all substances can undergo physical and chemical changes
 - Describe physical properties
 - Describe chemical changes
 Describe matter and energy interactions

4.3.3 (SCSD) Understand and apply knowledge of the concepts of conservation of mass/matter (D)

- Know that when something is broken into parts, the parts have the same total mass as the original item (D)

4.3.4 (SCSD) Understand and apply knowledge of sound, light, electricity, magnetism, and heat (I,D,M)

- Know that energy is needed to do work and comes in:
 - Types (I,D,M)
 - Stored (potential) energy (I,D,M)
 - Working (kinetic) energy (I,D,M)
 - Forms of energy (I,D,M)
 - Heat (thermal)(I,D,M)

- Light (radiant)(I,D,M)
- Motion (kinetic) (I,D,M)
- Electrical(I,D,M)
- Chemical (I,D,M)
- Nuclear (I,D,M)
- Gravitational (I,D,M)
- Sources of energy
 - Renewable (solar, hydropower, and biomass from plants)(D,M)
 - Nonrenewable (coal, oil, and natural gas)(D,M)
- Compare how the six simple machines make work easier (I,D,M)
- Know that **sound** is produced when vibrations from objects travel through a medium and are received (I,D,M)
 - Sound can vary in volume (I,D,M)
 - The pitch of a sound can be varied by changing the rate of vibration (I,D,M)
- Know that **light** travels in a straight line until it strikes an object (I,D,M)
 - Light can be
 - Reflected by a mirror (I,D,M)
 - Refracted by a lens (I,D,M)
 - Absorbed by an object (I,D,M)
 - Explore colors of light (I,D,M)
- Know that **electricity** in circuits can produce light, heat, sound, and magnetic Effects (I,D,M)
 - Electricity can only flow through a closed circuit (I,M,D)
 - Identify the parts needed to make a circuit (I,D,M)
- Know that **magnets** attract and repel each other and certain kinds of materials (I,D,M)
- Know that **heat** can be produced in many ways (I,D,M)
 - Burning (I,D,M)
 - Rubbing (I,D,M)
 - Mixing substances (I,D,M)
 - Heat can move from one object to another by conduction (I,D,M)

4.3.5 (SCSD) Understand and apply knowledge of how forces are related to an object's motion

- Know that the motion of an object can be described
 - Position
 - Direction
 - Motion
 - Speed
- Know that motion can be measured and represented on a graph
- Know that changes in speed or direction are caused by force
 - The greater the force, the greater the change in motion
 - The more massive an object, the less effect a given force will have in changing its motion

4.4 (SCSD) Science as Inquiry

4.4.1 (SCSD) Identify and generate questions that can be answered through scientific investigations (D)

- Know how to ask questions that they can answer with scientific knowledge combined with their own observations (D)
- Know how to recognize that different questions lead to different types of investigations (D)

4.4.2 (SCSD) Recognize that scientists perform different types of investigations depending on the types of question they want to answer

- Describing objects, events and organisms (D)
- Classifying objects, events and organisms (D)
 - Categories objects by their composition and/or attributes and share results (D)
- Experimenting using a “fair test” (A “fair test” occurs when you change only one factor and keep all others conditions the same)(D)

4.4.3 (SCSD) Plan and conduct scientific investigations (D)

- Know how to engage in
 - systematic observations (D)
 - making accurate measurements (D)
 - identifying and controlling variables (D)
- Know the concept of a “fair test” (experiment) (D)
- Know how to follow appropriate safety procedures when conducting Investigations (D)

4.4.4 (SCSD) Uses appropriate tools and techniques to gather, process and analyze data (D)

- Know how to enhance their skills with tools (D)
 - Rulers (D)
 - Thermometers (D)
 - Balances (D)
 - Spring scales (D)
 - Magnifiers (D)
 - Microscopes (D)
- Know how to use tools for conducting investigations (D)
 - Computers (D)
 - Calculators (D)
- Know that the use of appropriate tools is guided by the questions asked and the investigations they design (D)

4.4.5(SCSD) Incorporate mathematics in scientific inquiry (D)

- Know that mathematics is used to:
 - Gather data (D)
 - Organize data (D)
 - Present data (D)
 - Construct convincing explanations (D)

4.4.6 (SCSD) Use evidence to develop reasonable explanations (D)

- Know what is evidence (D)
- Know how to judge the merits or strength of the data and information used to make explanations (D)
- Know that their explanations should reflect the evidence they have obtained in their investigations (D)
- Know how they should check their explanations against:
 - scientific knowledge (D)
 - their own experience (D)
 - observations of others (D)

4.4.7 (SCSD) Communicate scientific procedures and explanations (D)

- Know that with their work and the work of other students they should:
 - Communicate (D)

- Critique (to judge) (D)
- Analyze (to study relationships)(D)
- Know that they should share procedures and explanations through various means of communication (D)
- Know that scientific information can be gathered by a team and shared with others (D)

4.4.8 (SCSD) Know how to follow appropriate safety procedures when conducting investigations (D)