

Shenandoah Community School District
Science
Grade - 7

7.2 Life Science

7.2.1 (SCSD) Understand and apply knowledge of the basic components and functions of cells, tissues, organs, and organ systems (I,D,M)

- Know that living systems at all levels of organizations demonstrate the complementary nature of structure and functions (I,D,M)
 - Important levels of organization for structure and function
 - Cells (I,D,M)
 - ✚ Describe a cell (I,D,M)
 - ✚ Know the part of a cell (I,D,M)
 - ✚ Know the functions of a cell (I,D,M)
 - ❖ Characteristics of living things (I,D,M)
 - Bacteria (I,D,M)
 - Protists (I,D,M)
 - ❖ Not alive (I,D,M)
 - Viruses (I,D,M)
 - Organs (I,D,M)
 - Tissues (I,D,M)
 - Organ systems (I,D,M)
 - Whole organism (I,D,M)
- Know that all organisms are composed of cells (I,D,M)
 - Most are single celled (I,D,M)
 - Other are multi-cellular (I,D,M)
 - Humans (I,D,M)
 - DNA is a set of instruction for making cell parts (I,D,M)
- Know that cells carry on many functions needed to sustain life (I,D,M)
 - Grow and divide (produces more cells) (I,D,M)
 - Take in nutrients (I,D,M)
 - To provide energy for the work that cells do (I,D,M)
 - To make the materials that a cell or an organism needs (I,D,M)
- Know that specialized cells perform specialized functions in multi-cellular Organisms (I,D,M)
 - Specialize cells cooperate to form a tissue (I,D,M)
 - (Muscle)(I,D,M)
 - Tissues grouped together to form larger unit called organs (I,D,M)
 - Each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole (I,D,M)
 - Availability of food and resources (I,D,M)

7.2.2 (SCSD) Understand and apply knowledge of how different organisms pass on traits (heredity) (I,D,M)

- Know that every organism requires a set of instructions for specifying its traits (I,D, M)
 - Heredity is the passage of these instructions from one generation to another (I,D,M)
- Know that hereditary information is contained in genes, located in the chromosomes of each cell (describe genetics) (I,D,M)
 - Each gene carries a single unit of information (I,D,M)

- An inherited trait of an individual can be determined by one of by many genes (I,D,M)
- A single gene can influence more than one trait (I,D,M)
- A human cell contains many thousands of different genes (I,D,M)
- Genes are passed from parents to offspring in predictable patterns (I,D,M)
- DNA is a set of instruction for making cell parts (I,D,M)
- Know that the characteristics of an organism can be described in terms of a combination of traits (I,D,M)
 - Some traits are inherited and others result from interactions with the environment (I,D,M)
- Know the concept of sexual and asexual reproduction (I,D,M)
 - Genetic material from two parents is needed to produce an offspring in sexual reproduction (I,D,M)
 - Asexual reproduction requires only one individual (I,D,M)
 - Asexual and sexual reproduction occurs in plants and animals (I,D,M)

7.2.3(SCSD) Understand and apply knowledge of the complementary nature of structure and function and the commonalities among organisms (I,D,M)

- Know that living systems at all levels of organization demonstrate the complementary nature of structure and function (I,D,M)
 - Important levels of organization for structure and function (I,D,M)
 - Ecosystems (I,D,M)
 - ✚ Describe what comprises ecosystems (Dynamic interactions between plants, animals, and microorganisms and their environment working together as a functional unit)(I,D,M)
 - Biome (Describe)(I,D,M)
 - ✚ Tundra (I,D,M)
 - ✚ Taiga (cold climate forest) (I,D,M)
 - ✚ Temperate Forest (I,D,M)
 - ✚ Ocean (I,D,M)
 - Mountains (I,D,M)
 - ✚ Grasslands (I,D,M)
 - ✚ Desert (I,D,M)
 - ✚ Tropical rainforest (I,D,M)
 - ✚ Savannah (tropical grassland)(I,D,M)
 - Know that organisms are classified according to common characteristics (I,D,M)
 - Animals (I,D,M)
 - Vertebrate (I,D,M)
 - Invertebrate (I,D,M)

7.2.4 (SCSD) Understand and apply knowledge of: 1) interdependency of organisms, changes in environmental conditions, and survival of individuals and species, and 2) the cycling of matter and energy in ecosystems

- Know that plants are a diverse group of organisms that live in many land environments (I,D,M)
- Know that while living in a constantly changing external environment, all organism must be able to: (I,D,M)
 - Obtain and use resources (I,D,M)
 - Grow (I,D,M)
 - Reproduce (I,D,M)
 - Maintain stable internal conditions (I,D,M)
- Know that regulation of an organism's internal environment involves:
 - Sensing the internal environment (I,D,M)
 - Changing physiological activities to keep the conditions within the range required to survive (I,D,M)

- Know that behavior is one kind of response an organism can make to an internal or environmental stimulus (I,D,M)
 - A behavioral response requires coordination and communication on many levels including:
 - Cells (I,D,M)
 - Organ system (I,D,M)
 - Whole organism (I,D,M)
 - Behavioral response is a set of actions determined:
 - In part by heredity (I,D,M)
 - In part from experience (I,D,M)
- Know that species acquire many of their characteristics through biological adaptation (I,D,M)
 - Involves the selection of naturally occurring variations in populations (I,D,M)
 - Invertebrate animal have a variety of body plans and adaptations (I,D,M)
- Know that biological adaptations that enhance survival and reproductive success in a particular environment include changes in:
 - Structures (I,D,M)
 - Behaviors (I,D,M)
 - Physiology (functions and activities of life)(I,D,M)
- Know that for ecosystem, the major source of energy is sunlight (I,D,M)
 - Sunlight is transferred by producers into chemical energy through photosynthesis (process of converting light energy to chemical energy and storing it in the bonds of sugar)(I,D,M)
 - That energy passes from organism to organism in food webs (I,D,M)
 - Know that multicellular organism live in and get energy from a variety of environments (I,D,M)

7.2.5 (SCSD) Understand and demonstrate knowledge of the social and personal implications of environmental issues

- Know that all species ultimately depend on one another; interactions between two types of organism include: (I,D,M)
 - Producer/consumer (I,D,M)
 - Predator/prey (I,D,M)
 - Parasite/host (I,D,M)
 - Relationships that can be mutually beneficial or competitive (I,D,M)
- Know that an ecosystem consist of all the populations living together (community) and the physical factors with which they interact (I,D,M)
- Know that the number of organism an ecosystem can support depends on the resources available and abiotic (not biotic) factors, such as: (I,D,M)
 - Quantity of light and water (I,D,M)
 - Range of temperatures (I,D,M)
 - Soil composition (I,D,M)
- Know that populations (including humans) increase at rapid rates under the following conditions: (I,D,M)
 - Adequate biotic (life or living organisms) and abiotic resources (I,D,M)
 - No disease (I,D,M,)
 - No predators (I,D,M)
- Know what limits the growth of population in specific niches in the ecosystem: (I,D,M)
 - Lack of resources (I,D,M)
 - Predators (I,D,M)
 - Disease (I,D,M)
 - Climate (I,D,M)
- Know that extinction of species occurs when animals and plants cannot adapt to an environmental change (I,D,M)

7.2.6 (SCSD) Understand and apply knowledge of the functions and interconnections of the major human body systems including the breakdown in structure or function that disease causes

- Know that the human organism has systems for:
 - Digestion (I,D,M)
 - Respiration (I,D,M)
 - Reproduction (I,D,M)
 - Circulation (I,D,M)
 - Excretion (I,D,M)
 - Movement (I,D,M)
 - Control (I,D,M)
 - Coordination (I,D,M)
 - And for protection from disease (I,D,M)
- Know that systems interact with each other (I,D,M)
- Know that disease is a breakdown in structures and functions of organism (I,D,M)
 - Some diseases are the result
 - Intrinsic failures of the system (I,D,M)
 - Damage by infection by other organisms (I,D,M)

7.2.7 (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)

7.4 (SCSD) Science as Inquiry

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

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

- As technology advances, it enables scientists to view the world in a different way (D)

7.4.2 (SCSD) Design and conduct different kinds of scientific investigations (D)

- Know how to recognize that different questions lead to different types Investigations (D)
- Know how to:
 - Make systematic observations (D)
 - Take accurate measurements (D)
 - Identify controlling variables (D)
- Know how to clarify ideas that are influencing and guiding inquiry and to understand how those ideas compare with current scientific knowledge (D)
- Know how to:
 - Formulate questions (D)
 - Design investigations (D)
 - Execute Investigations (D)
 - Interpret data (D)
 - Use evidence to generate explanations (D)
 - Propose alternative explanations (D)
 - Critique explanations and procedures (D)
- Know how to use appropriate safety procedures when conducting investigations (D)

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

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

7.4.4 (SCSD) Select and use appropriate tools and techniques to gather, process and analyze data

- Know that the use of tools and techniques (including computers) will be guided by the questions and the investigations designed (D)
- Know how to use technology, equipment and tools (to access, gather, store, retrieve, and organize data)(D)
 - Rulers (D)
 - Thermometers (D)
 - Magnifiers (D)
 - Microscopes (D)
 - Telescopes (D)
 - Calculators (D)
 - Cameras (D)
 - Computers (hardware and software)(D)
- Know that technology:
 - Advances enables us to investigate in different ways than before (D)
 - Provides scientific observations which otherwise would be limited (D)
 - New advances drives scientific inquiry (D)

- And science can neither answer all questions nor solve all problems of mankind (D)

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

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

7.4.6 (SCSD) Use evidence to develop descriptions, explanations, predictions, and models (D)

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

7.4.7 (SCSD) Think critically and logically to make the relationships between evidence and explanations (D)

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

7.4.8 (SCSD) Recognize and analyze alternative explanations and predictions

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

7.4.9 (SCSD) Communicate and defend procedures and explanations (D)

- Have the skills to be:
 - Competent in communicating experimental methods (D)
 - Describing observations (D)
 - Summarizing the results of investigations (D)
- Know that explanations can be communicated through various methods (D)
- Know that scientific information can be gathered by a team and shared with others
 - Communication in a team (D)
 - Use quality team process (D)
- Know that individuals with varied backgrounds, interests, and work settings communicate to encourage scientific inquiry (D)
 - Understand that different populations have different ethical viewpoints which make it difficult to maintain a world wide standard (D)