



Shakopee Area Catholic School
Science: *Animal Diversity (C)*
Human Body Systems (D)
Grade Level: **7**

Scientific Thinking and Inquiry

Standard: The student will understand that science is a way of knowing about the world that is characterized by empirical criteria, logical argument and skeptical review.

1. Recognize how scientific knowledge is subject to change as new evidence becomes available, or as new theories cause scientists to look at old observations differently.
2. Explain natural phenomena by using appropriate physical, conceptual and mathematical models.

Standard: The student will design and conduct scientific investigations.

1. Formulate a testable hypothesis based on prior knowledge.
2. Recognize that a variable is a condition that may influence the outcome of an investigation and know the importance of manipulating one variable at a time.
3. Write a specific step-by-step procedure for a scientific investigation. A written plan can be incorporated into the following references.
4. Explain how classroom scientific investigations relate to established scientific principles.
5. Explain that when similar investigations give different results, further studies may help to show whether the differences are significant.
6. Explain why it is important to keep honest, clear, and accurate records.
7. Explain why research involving human subjects requires that potential subjects be fully informed about the risks and benefits associated with the research and that they have the right to refuse to participate.
8. Communicate the steps and results from an investigation in written reports and verbal presentations.
9. Incorporate circle charts, bar and line graphs, diagrams, scatter plots, and symbols into writing, such as lab or research reports, to serve as visual displays of evidence for claims and/or conclusions.
10. Question claims based on vague attributes or on authority, such as "leading doctors say", or based on statements made by celebrities or others outside the area of their particular expertise.

Standard: The student will know that science and technology are human efforts that both influence, and are influenced by, society.

1. Give examples of the development of technology influencing scientific knowledge, and investigation and scientific knowledge influencing the development of technology.

Standard: The student will understand how scientific discovery, culture, societal norms and technology have influenced one another in different time periods.

1. Cite examples of individuals throughout history who made discoveries and contributions in science and technology.
2. Cite examples of how culture influences scientific and technological advances.

Standard: The student will understand that living systems, at every level of organization, demonstrates the complementary nature of structure and function.

1. Explain that individuals are composed of specialized cells, tissues, organs and organ systems that perform specialized functions.
2. Recognize that an organism's body plan and its ability to regulate its internal environment enable it to make or find food, grow and reproduce in a constantly changing environment.

3. Recognize that behavioral responses of organisms may be determined by heredity and past experience.

Biological Classification

Standard: Similarities are used to classify organisms because they may be used to infer the degree of relatedness among organisms. As a basis for understanding this concept, students:

1. Recognize and describe that a key distinction among organisms is between autotrophs, such as green plants (which use energy from sunlight to make their own food), and heterotrophs, such as animals and fungi (which consume other organisms as food and harvest energy from them).
2. Recognize and describe that biological classifications are based on how organisms are related: Organisms are classified into a hierarchy of groups and subgroups, with species as the most fundamental unit.
3. Recognize and describe the definition of a species as a group or population of organisms closely resembling one another that can mate and breed to produce fertile offspring.
4. Describe how similarities among organisms are found in external and internal anatomical features, including specific characteristics as the cellular level, such as the number of chromosomes.

The Human Body

Standard: Human beings have body systems for obtaining and providing energy, defense, reproduction, and the coordination of body functions. As a basis for understanding this concept, students:

1. Describe the specific functions and roles of each major human body system, including the digestive, respiratory, excretory, reproductive, circulatory, nervous, endocrine, musculoskeletal, and immune systems.
2. Explain that human beings have many similarities and differences, and the similarities make it possible for human beings to donate blood and organs to one another.
3. Explain how the amount of food energy (usually measured in calories) that a person requires varies with body weight, age, sex, activity level, and metabolic rate.
4. Research and explain that regular exercise is important to maintain a healthy heart/ling (cardiovascular) system, good muscle tone, and strong structure.
5. Identify specific examples of how viruses, bacteria, fungi, and more complex parasites may infect the human body and interfere with normal body functions.
6. Explain how white blood cells engulf invaders or produce antibodies that attack invaders or mark the invaders for killing by other white blood cells. Know that these white cells are part of a larger system that produces "immunity" or the capacity to resist disease due to pathogens.
7. Know that antibodies produced in response to an invader can remain for long periods of time in the system and can fight off subsequent invaders of the same kind.
8. Recognize that the environment may contain dangerous levels of substances that are harmful to human beings. Therefore, the good health of individuals requires monitoring of the soil, air, and water, as well as taking steps to keep them safe.
9. Explain how fundamental changes in health practices have resulted from the establishment of the germ theory of disease.

Ecology

Standard: Organisms in ecosystems exchange energy and nutrients among themselves and the physical environment. As a basis for understanding this concept, students:

1. Recognize that in all environments, such as freshwater, marine, forest, desert, grassland, mountain, farms, cities, and others, organisms with similar needs and living strategies compete with one another for resources, including food, space, water, air, and shelter.
2. Describe how two types of organisms may interact in a competitive or cooperative relationship, such as producer/consumer, predatory/prey, parasite/hosts, or symbionts.
3. Create a food web to explain how energy and matter are transferred between producers, primary consumers, and secondary consumers.
4. Explain how dead plants and animals, broken down by other living organisms (especially microorganisms and fungi) contribute to the cycling of matter through the system as a whole.

5. Describe how, as any population of organisms grows, it is held in check by one or more environmental constraints (e.g., deplete of food or nesting sites, increased numbers of predators or parasites).
6. Describe that all organisms, including the human species, are part of and depend on two main interconnected global food webs; the ocean food web and the land food web.
7. Recognize that entire species may prosper in spite of the poor survivability or bad fortune of individuals.

Life Science

Standard: Students know and understand the characteristics of living things, the diversity of life, and how living things interact with each other and with their environment.

1. Construct and using classification systems based on the structure of organisms.
2. Describe the importance of plant and animal adaptations, including local examples.
3. Creating and interpreting food chains and food webs.
4. Explain the interaction and interdependence of nonliving and living components within ecosystems.
5. Describe how an environment's ability to provide food, water, space, and essential nutrients determines carrying capacity.

Standard: Students know and understand interrelationships of matter and energy in living systems.

1. Describe the basic processes of photosynthesis and respiration and their importance to life (for example, set up a terrarium or aquarium and make changes such as blocking out light).
2. Compare and contrasting food webs within and between different ecosystems (for example, grasslands, tundra, marine) and predicting the consequences of disrupting one of the organisms in a food web.
3. Describe ways (for example, digestion, transport of nutrients by circulatory system) that multicellular organisms get food and other matter to their cells;
4. Explain the recycling of materials by determining a pathway of a substance that is important for life (for example, trace water through an ecosystem); and
5. Describe the role of organisms in the decomposition and recycling of dead organisms (for example, bacteria's role in the decomposition and recycling of matter from a dead animal).

Standard: Students know and understand how the human body functions, factors that influence its structures and functions, and how these structures and functions compare with those of other organisms.

1. Describe the observable components and functions of a cell (for example, cell membrane, nucleus, cytoplasm, chloroplasts; movement of molecules into and out of cells);
2. Compare and contrast the basic structures and functions of different types of cells (for example, single-celled organisms in pond water, Elodea, onion cell, human cheek cell).
3. Describe the growth and development of several organisms (for example, embryonic development of a vertebrate).
4. Describe the structures and functions of human body systems.
5. Describe and give examples of noncommunicable diseases and communicable diseases (for example, heart disease and chicken pox).

Standard: Identify structural and behavioral adaptations.

1. Explain how an organism's behavior allows it to survive in an environment.
2. Describe how an organism can maintain a stable internal environment while living in a constantly changing external environment.
3. Determine characteristics of organisms that could change over several generations.
4. Describe the following factors that allow for the survival of living organisms: