

## Grade 7 Science-Engineering/Technology

### Life Science

#### Characteristics of Organisms

*Students will be able to:*

- Discuss the history of taxonomy.
- Identify the seven levels of taxonomy.
- Identify and explain the kingdoms and their phyla.
- Discuss the discovery of the cell.
- Define and identify parts of the structure of a cell.
- Describe the transport of materials within the cell.
- Describe the energy process involved within a cell.
- Identify the cell reproduction process.
- Identify the parts of animal cells.
- Explain the functions of the parts of animal cells.
- Identify the parts of plant cells.
- Explain the functions of the parts of plant cells.
- Identify cell parts using a microscope.
- Explain the process of diffusion as performed by cells.
- Describe cell respiration.
- Explain the role of plant cells in the photosynthesis process.
- Describe and give examples of cell division.
- Explain the organization of living things.
- Identify structures such as tissues, organs, and systems.
- Explain the relationships of cells, tissues, organs, and systems.
- Identify the major components and functions of the following human body systems: digestion, excretion, circulation, respiration, nervous, endocrine, and reproduction.
- Explain how different body systems interact to enhance growth and improve control and coordination (bones and muscles).
- Explain how different systems interact to combat disease.

#### Life Cycles and Heredity

*Students will be able to:*

- Describe the role of DNA and chromosomes in heredity.
- Describe the role of genes and reproduction in heredity.
- Differentiate between sexual and asexual reproduction.
- Describe the difference in roles genes play in sexual and asexual reproduction.
- Describe how organisms respond to internal or environmental stimuli.
- Differentiate between inherited traits and those that result from interactions with the environment.
- Explain the formation of fossils.
- Explain how fossils can support the theory of evolution of different species, such as the

horse, the bird, or the human species.

- Describe the effects of adaptation and assimilation on a species' evolution or extinction.
- Discuss the role of humans in the extinction of species due to habitat destruction or by extensive killing.

### **Organisms and Their Environment**

*Students will be able to:*

- Describe the characteristics of an ecosystem and its related species.
- Demonstrate the relationship between organ systems, whole organisms, and ecosystems.
- Identify examples of symbiotic relationships within the animal kingdom.
- Demonstrate the effects of changes in resources and energy on populations and ecosystems.
- Explain the importance and dependence of the predator/prey interaction on the population of a species.
- Explain the role of lower-level organisms, such as fungi and bacteria, on the energy transfer process in the food web.
- Explain how rotting logs and decaying leaf matter are examples of recycled nutrients (carbon cycle, nitrogen cycle).
- Describe how organisms act as decomposers in the recycling of nutrients process.
- Describe photosynthesis process and energy involved.
- Explain how the presence of species is related to the presence of other species, (the disappearance of the American buffalo with the expansion of the West; the return of coyotes or beavers to a region as reforestation occurs).
- Explain the current theories that led to the extinction of dinosaurs and other prehistoric species.
- Describe how glaciations and long-term weather damage can affect ecosystems.
- Discuss the evolution of a new species.
- Investigate the time period necessary for evolution to occur.

### **Technology/Engineering**

#### **Materials and Tools**

*Students will be able to:*

- Identify, explain, and demonstrate the safe use of appropriate measuring tools, hand tools, and power tools used to hold, lift, carry, fasten, and separate.
- Identify, explain, and demonstrate the safe use of measuring tools, hand tools, and machines (band saw, drill press, sanders, hammer, screwdriver, pliers, tape measure, screws, nails, and other mechanical fasteners) by constructing a prototype of an engineering design.

#### **Engineering Design Process**

*Students will be able to:*

- Identify and explain the steps of the engineering process: identify the need or problem; research the problem; develop possible solutions; select the best possible solution(s); test and evaluate; communicate the solution(s); and redesign.

- Demonstrate methods of representing solutions to a design problem, (sketches, orthographic projections, and multi-view drawings).
- Identify appropriate materials, tools, and machines needed to construct a prototype of a given engineering design.
- Apply the five elements of a universal systems model: goal, inputs, processes, outputs, and feedback.
- Describe and explain parts of a structure: foundation, flooring, decking, wall, and roofing system.
- Identify and describe three major types of bridges: arch, beam, truss, and suspension and their appropriate uses (site, span, resources, and load).
- Explain how the forces of tension, compression, torsion, bending, and shear affect the performance of bridges as the prototype is tested.
- Describe and explain the effects of loads and structural shapes on bridges.
- Identify and describe examples of adaptive or assistive devices (prosthetic devices, wheelchairs, eyeglasses, grab bars, hearing aids, lifts, and braces).
- Identify and describe adaptive and assistive bio-engineered products (food, bio-fuels, irradiation, and integrated pest management).