

Science

Course: Advanced Biology

Science Inquiry and Process

Students will-

1. read scientific information
 2. understand and use the scientific method (1. state the problem; 2. research; 3. form a hypothesis; 4. gather materials; 5. carry, out a procedure; 6. gather data; 7. form conclusions and report) .
 - 3 . design and conduct investigations
 4. analyze and explain data; then modify the procedure to get better results (e.g. the scientific method is not always a linear process)
 5. interpret and communicate scientific results using mathematics and technology
 6. apply concepts and skills to everyday experiences
 7. choose appropriate tools for measurement; measure accurately with proper metric units
 8. investigate phenomena using technology appropriately and safely (such as balance scales, spring scales, thermometers, stopwatches, graduated cylinders, beakers, flasks and other glassware)
 9. know that science changes -
- To .develop these skills, students might be involved in such activities as: investigating mass, length, volume, and density; neutralizing acids/bases; simulating half-lives of radioactive isotopes; investigating velocity and acceleration with paper airplanes; developing student-build models for friction and motion; investigating models that demonstrate knowledge of Newton's laws of motion.

Introduction to Biology

Ecology

1. Demonstrate there is unity in diversity: that all forms of life have common features
2. Evolution explains the unity and diversity
3. Living organisms and their environments form interconnecting webs
4. Human culture enables humans with the power to change their environment
5. Read scientific information and dissect the contents

Taxonomy

1. Create and use a dichotomous key to classify organisms.
2. Identify organisms using the system of **Taxonomy**
3. Identify the scheme of organization of organisms

4. Identify the general characteristics and classify members of each kingdom

Microbiology

Biochemistry:

1. Identify the 25 chemical necessary for life
2. Identify the unique characteristics of atoms, isotopes, chemical bond, and water's polarity and their properties
3. Differentiate between acids and bases, and explain how life is affected by each of these
4. Identify the parts of a virus
5. Identify various human diseases and their viral agents
6. Explain how a vaccine is developed and how it works
7. Differentiate between the compositions of organic compounds (Monosaccharides, Disaccharides, Polysaccharides, Phospholipids, waxes, steroids, proteins, etc.)
8. Distinguish the functions of hormones

Genetics

1. Explain what DNA is, how it replicates, its role in protein synthesis and how it impacts human reproduction
2. Explain how cloning occurs and the moral or ethical issues that are involved
3. Recognize the relationship between DNA, RNA, and protein synthesis
4. Nucleotides (Uracil, Thymine, Adenine, Guanine, and Cytosine) make up DNA, RNA, and the sequences of these determine or contribute to a genetic trait and are called genes.
5. Identify the emergence of DNA Technology (the techniques, the moral concerns, transgenic plants and animals)

Cellular Biology

1. Differentiate between all unicellular organisms including (Bacteria- Archaeobacteria, Cyanobacteria; Prokaryotes, Eukaryote, Protozoans, etc.)
2. Diagram, identify, discuss, and differentiate between Monera and Protista
3. Distinguish between the different bacterial phyla (habitat, nutrition, reproduction, diseases)
4. Identify the harm and benefits bacteria provide humans
5. Identify major organelles of the cell and their functions
6. Diagram and explain how a cell processes and makes energy
7. Identify the chemical reactions that occur in cells. Identifying where these reactions take place, and the purpose for each.
8. Demonstrate that Enzymes catalyze both breakdown and synthesis in the cell

Botany and the study of Fungi

1. Identify the distinguishing characteristics that separate plants from other kingdoms
2. List the characteristics of the four major plant types
3. Diagram the different life cycles and reproduction cycles of each plant type
4. Identify the structures and functions of cells and tissues in plants
5. Describe the diagram photosynthesis, chemiosmosis, and the calvin cycle in plants
6. Demonstrate the ability to identify plant types (Monocot, Dicot)
7. Demonstrate the ability to use taxonomy to identify plant classes, orders, genus, species including (C4 and CAM)
8. Contrast fungi and plant characteristics
9. Identify how fungi absorb food
10. Diagram the life cycle of a fungus
11. Dissect and discuss the different reproductive cycles of fungi
12. Identify and classify different classes of fungi

Zoology

1. Identify characteristics that all animals have in common
2. Complete a major dissection of vertebrate and explain it to the rest of the class
3. Diagram the development of the human zygote from fertilization to birth
4. Diagram, identify, discuss, and be able to differentiate between:
Cnidarians, Sponges, Flatworms, Roundworms, Arthropods, Insects,
Chordates, Vertebrate, Fishes, Amphibians, Reptile, Birds, Mammals
5. Diagram the process of gaining energy through cellular respiration
6. Unify concepts of animal structure and function

Human Anatomy and Physiology

1. Identify the major bones of the human body
2. Describe the overall structure of bone and its role in our body
3. Identify the major muscles of the human body
4. Diagram the parts of a muscle and how they work together to contract
5. For each of the following systems: digestive, respiratory, circulatory, nervous, immune, and reproductive—distinguish the function, location and progression of the organs that are involved; how the system works in the human body; and major differences among major chordate groups in form or function
6. Discuss how organisms maintain homeostasis
7. Diagram the development of the human zygote from fertilization
8. Discuss the physiology of the human senses

