



# LIFE SCIENCE Learning Objectives



## CELLS AND HEREDITY

### The learner will

- ☑ identify skills scientists use to learn about the world.
- ☑ explain what scientific inquiry involves.
- ☑ describe how to develop a hypothesis and design an experiment.
- ☑ describe the attitudes, or habits of mind, that are important in science.
- ☑ describe the goal of technology.
- ☑ explain how technology differs from science.
- ☑ explain how technology affects people in both positive and negative ways.
- ☑ explain why preparation is important when carrying out scientific investigations in the lab and in the field.
- ☑ describe what you should do if an accident occurs.

## LIVING THINGS

### The learner will

- ☑ list the characteristics all living things share.
- ☑ explain where living things come from.
- ☑ identify what all living things need to survive.
- ☑ tell why biologists classify organisms.
- ☑ relate the levels of organisms to the relationships between organisms.
- ☑ list characteristics used to classify organisms into groups, including domains and kingdoms.
- ☑ tell what cells are.
- ☑ explain how the invention of the microscope contributed to scientists' understanding of living things.
- ☑ state the cell theory.
- ☑ describe how microscopes produce magnified images.
- ☑ identify the role of the cell wall and the cell membrane in the cell.
- ☑ describe the functions of cell organelles.
- ☑ explain how cells are organized in many-celled organisms.
- ☑ define elements and compounds.
- ☑ explain how water is important to the function of cells.
- ☑ identify the four main kinds of organic compounds in living things.

## CELL PROCESSES AND ENERGY

### The learner will

- ☑ describe how most small molecules cross the cell membrane.
- ☑ explain why osmosis is important to cells.
- ☑ tell the difference between passive transport and active transport.
- ☑ explain how the sun supplies living things with the energy they need.
- ☑ describe what happens during the process of photosynthesis.
- ☑ describe the events that occur during respiration.
- ☑ tell what fermentation is.
- ☑ identify the events that take place during the three stages of the cell cycle.

## GENETICS

### The learner will

- ☑ explain how the structure of DNA helps account for the way in which DNA copies itself.
- ☑ describe the results of Mendel's experiments.
- ☑ identify what controls the inheritance of traits in organisms.
- ☑ define probability and describe how it helps explain the results of genetic crosses.
- ☑ explain what is meant by genotype and phenotype.
- ☑ tell what co-dominance is.
- ☑ describe the role chromosomes play in inheritance.
- ☑ identify the events that occur during meiosis.
- ☑ explain the relationship between chromosomes and genes.



## **GENETICS**

### **The learner will**

- ☑ explain what forms the genetic code.
- ☑ describe how a cell produces proteins.
- ☑ identify how mutations can affect an organism.
- ☑ identify two major causes for genetic disorders in humans.
- ☑ explain how geneticists trace the inheritance of traits.
- ☑ describe how genetic disorders are diagnosed and treated.
- ☑ identify some patterns of inheritance in humans.
- ☑ describe the functions of the sex chromosomes.
- ☑ explain the relationship between genes and the environment.
- ☑ describe three ways of producing organisms with desired traits.
- ☑ state the goal of the Human Genome Project.

## **VIRUSES, BACTERIA, PROTISTS AND FUNGI**

### **The learner will**

- ☑ list characteristics of viruses and state reasons why viruses are considered to be nonliving.
- ☑ describe the components of the basic structure of a virus.
- ☑ explain how both active and hidden viruses multiply.
- ☑ discuss how viral diseases are treated.
- ☑ name and describe structures, sizes and shapes of a bacterial cell.
- ☑ compare autotrophs to heterotrophs and explain how energy is released through respiration.
- ☑ describe the conditions under which bacteria thrive and reproduce frequently.
- ☑ explain the roles of bacteria in the production of oxygen and food, in environmental recycling and cleanup and in health and medicine.
- ☑ describe the characteristics of animal-like protists and give examples.
- ☑ describe the characteristics of plant-like protists and give examples.
- ☑ describe the characteristics of fungus-like protists and give examples.
- ☑ name the characteristics fungi share.
- ☑ explain how fungi reproduce.
- ☑ describe the roles fungi play in nature.

## **THE PLANT KINGDOM**

### **The learner will**

- ☑ identify the characteristics all plants share.
- ☑ name the things that a plant needs to live successfully on land.
- ☑ compare nonvascular and vascular plants.
- ☑ describe the stages of a plant's life cycle.
- ☑ name some nonvascular plants and list the characteristics they share.
- ☑ name some seedless vascular plants and list the characteristics they share.
- ☑ identify the characteristics that seed plants share.
- ☑ explain how seeds become new plants.
- ☑ describe the functions of roots, stems and leaves.
- ☑ identify the characteristics of gymnosperms and describe how they reproduce.
- ☑ describe the characteristics of angiosperms and their flowers.
- ☑ explain how angiosperms reproduce.
- ☑ describe two types of angiosperms.
- ☑ list products from seed plants.
- ☑ identify three stimuli that produce plant responses.
- ☑ describe how plants respond to seasonal changes.
- ☑ state how long different angiosperms live.



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## **THE ANIMAL KINGDOM**

### **The learner will**

- ☑ describe levels of organization in animal bodies.
- ☑ identify four functions that enable animals to meet their basic needs.
- ☑ explain how animals are classified.
- ☑ define Symmetry.
- ☑ infer general characteristics of an animal based on its symmetry.
- ☑ identify the characteristics of sponges.
- ☑ describe the characteristics of Cnidarians.
- ☑ explain the importance of coral reefs.
- ☑ identify the three main phyla of worms.
- ☑ describe the characteristics of each worm phylum.
- ☑ identify the main characteristics of mollusks.
- ☑ describe the major groups of mollusks and tell how they differ.
- ☑ identify the four major groups of arthropods and the main characteristics of arthropods.
- ☑ describe how crustaceans, arachnids and centipedes and millipedes differ.
- ☑ identify the main characteristics of insects.
- ☑ explain how insects are adapted to obtain food.
- ☑ name the two types of metamorphosis found in insects.
- ☑ explain why insects are important in food chains.
- ☑ name two other ways insects interact with their environment.
- ☑ describe some methods used to control pest insects.
- ☑ list the main characteristics of echinoderms.
- ☑ name the major groups of echinoderms.
- ☑ name the characteristics that chordates share.
- ☑ describe the main characteristics shared by all vertebrates.
- ☑ describe how vertebrates differ in the way they control body temperature.
- ☑ name the main characteristics of fishes.
- ☑ name the major groups of fishes and describe how they differ.
- ☑ describe amphibian characteristics.
- ☑ examine how adult amphibians are adapted for life on land.
- ☑ identify adaptations that allow reptiles to live on land.
- ☑ contrast the characteristics of each of the three main groups of reptiles.
- ☑ describe one adaptation that helped dinosaurs survive before they became extinct.
- ☑ identify the kind of rock in which fossils are frequently found.
- ☑ describe what scientists can learn by studying fossils.
- ☑ identify the common characteristics of birds.
- ☑ explain how birds are adapted to their environments.
- ☑ explain how a bird is able to fly.
- ☑ identify three type of flight birds use.
- ☑ describe the characteristics common to all mammals.
- ☑ list the three main groups of mammals.
- ☑ Know what is behavior.
- ☑ explain what causes animal behavior.
- ☑ describe what instincts are.
- ☑ describe four type of learned behavior.
- ☑ list the three main ways animals communicate.
- ☑ give examples of competitive and cooperative behaviors.
- ☑ describe cyclic behavior.
- ☑ explain how two electronic technologies help scientists track animals.
- ☑ explain the benefits of tracking animal migrations.

## **THE HUMAN BIOLOGY AND HEALTH**

### **The learner will**

- ☑ identify the levels of organization in the body.
- ☑ define homeostasis.
- ☑ describe the functions and the structure of the skin.
- ☑ identify habits that can help keep skin healthy.



# LIFE SCIENCE Learning Objectives



## THE HUMAN BIOLOGY AND HEALTH

### The learner will

- identify the functions of the skeleton.
- explain the role that joints play in the body.
- describe the characteristics of bone and how to keep bones strong and healthy.
- identify the types of muscles found in the body.
- explain why skeletal muscles work in pairs.
- explain why the body needs food.
- describe how the six nutrients needed by the body help carry out essential processes.
- explain how the Food Guide Pyramid and food labels can help in planning a healthy diet.
- describe the functions carried out in the digestive system.
- explain the roles of the mouth, esophagus and stomach in digestion.
- describe the digestive processes that occur in the small intestine and how other digestive organs are involved.
- explain the role of the large intestine in digestion.
- explain the functions of the cardiovascular system.
- describe the function and structure of the heart.
- sequence the path taken by blood through the cardiovascular system.
- describe the functions and structures of arteries, capillaries and veins.
- describe the components of blood.
- explain what determines the type of blood that a person can receive in a transfusion.
- name the structures and functions of the lymphatic system.
- identify some diseases of the cardiovascular system.
- describe behaviors that can help maintain cardiovascular health.
- describe the functions of the respiratory system.
- identify the structures that air passes through as it travels to the lungs.
- describe what happens during gas exchange and breathing.
- identify the harmful chemicals contained in tobacco smoke.
- explain how tobacco smoke affects a person's health over time.
- identify the structures and functions of the excretory system.
- state how the kidneys filter wastes from the blood.
- explain how excretion contributes to homeostasis.
- explain the relationship between pathogens and infectious disease.
- list the kinds of pathogens that cause infectious diseases in humans.
- identify four ways that pathogens can spread.
- explain how the body's first line of defense guards against pathogens.
- describe what happens during the inflammatory response.
- state how the immune system responds to pathogens.
- identify how HIV affects the immune system and how it spreads.
- describe how the body acquires active immunity.
- explain how passive immunity occurs.
- identify the cause of allergies.
- explain how diabetes affects the body.
- describe the effects of cancer on the body.
- identify the functions of the nervous system.
- describe the structure of a neuron and the kinds of neurons found in the body.
- explain how nerve impulses travel from one neuron to another.
- describe the structures and functions of the central nervous system.
- describe the structures and functions of the peripheral nervous system.
- explain what a reflex is.
- identify two ways in which the nervous system can be injured.
- describe how your eyes enable you to see.
- describe how you hear and maintain your sense of balance.
- explain how your senses of smell and taste work together.
- explain how your skin is related to your sense of touch.
- identify the immediate and long term effects of drug use.
- describe some commonly abused drugs and how each affects the body.
- explain how alcohol abuse harms the body.
- describe how the endocrine system controls body processes.
- identify the endocrine glands.
- explain how negative feedback controls hormone levels.



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## **THE HUMAN BIOLOGY AND HEALTH**

### **The learner will**

- define sexual reproduction.
- describe the structures and functions of the male reproductive system.
- describe the structures and functions of the female reproductive system.
- sequence the events that occur during the menstrual cycle.
- list the stages of human development that occur before birth.
- explain how the developing embryo is protected and nourished.
- describe what happens during childbirth.

## **RESOURCES**

Prentice-Hall Life Science

Supplementary materials