DREYFOUS

Course Overview


# Life Science

# TABLE OF CONTENTS

# Course Description 7-9

EduSystem's 7-9 Science courses were developed and updated based on the curricular designs, content standards and grade-level expectations of the Department of Education of Puerto Rico (*Puerto Rico Core Standards*) and the Curriculum Framework. Furthermore, the content has been enriched by the study of curricular programs designed by other educational institutions and private schools.

The courses introduce their content in a dynamic, innovative and recreational way. Additionally, they allow the students to build on their own knowledge through the cognitive development of scientific concepts, principles, and laws. They also encourage the study of this discipline by presenting scientific research, skills, and science processes within accessible content.

**Basic Concepts and Conceptual Support Elements**

EduSystem's 7-9 Science courses are supported in their design and conceptualization by several basic principles.

1. 1. Emphasis on the need to:
    - Stimulate in the student the use of logical and analytical thinking for reasoning, interpreting, and solving problems, as well as reflection and decision-making throughout the process.
    - Learn Science while "doing Science" by carrying out various activities, experimentation, and scientific research.
    - Promote curriculum integration and the application of scientific concepts in real-life situations.
    - Structure the teaching process systematically (in sequence and from the concrete to the abstract).
    - Stimulate the development of multiple talents and the opportunity to express them in different ways.
    - Promote the development of science concepts, principles, laws, processes, and skills in an articulated way.

- Provide strategies to address the individual differences of the students that make up the school population.

2. The development of the activities integrates a constructivist focus which provides and promotes an environment for the students to play a bigger role in the construction of their knowledge and the development of their skills.

## General Objectives

- Promote learning through concrete experiences.
- Encourage the use of information technology as a learning scenario.
- Raise awareness in the students regarding the protection and conservation of the environment.
- Encourage reflection and self-assessment during the learning process.
- Promote experiences that develop the values of the sciences and our surrounding environment.
- Integrate scientific disciplines (Chemistry, Physics, Biology, among others) with other fields.
- Encourage participation in scientific research and in the development of science concepts, skills, and processes.
- Integrate science standards and expectations.
- Facilitate situations, activities, and exercises to actively build knowledge and apply it to different situations.
- Work with concrete and abstract concepts.
- Contribute to the development of language as a means of individual and collective communication and incorporate scientific vocabulary.
- Enrich the lessons with texts, exercises, and activities that are appropriate for the level.
- Highlight the scientific environment according to the level.

## Course Structure

Life Science is composed of twenty-six units plus an introductory unit. Within each unit, you will find the lessons that make up the unit. Each lesson consists of a presentation divided into sections that develop the topic of study. Each lesson includes work documents, and as a general rule, contains videos or web links.

We invite you to familiarize yourself with the sections of the presentations and the documents generally found in the lessons of the EduSystem Life Science course.

Units are made up of the following elements:

**Lesson 00**

This lesson consists of unit documents, a series of diagnostic, formative, and cumulative assessment documents that will be used before, during, and after the study of each unit. Other documents found on L00 are the following:

- **Activity** Varied and fun activities are carried out to verify what has been learned.
- **Ecological Commitment** Topics related to the ecological point of view and how the student can contribute to the conservation of the environment are introduced.
- **Assessment Exercises** Activities that verify the knowledge acquired in each unit.
- **Laboratory** Research activities are carried out by applying the scientific method. Subjects studied in class are applied during laboratory practice.

**Lessons**

Each unit consists of several lessons divided according to the topics to be studied. Likewise, each lesson consists of a presentation and the following documents:

- **Descriptive Log** The lesson plan. This includes the specific objectives of the lesson, standards and expectations, teaching strategies and resources, keywords, web links, references, among others.
- **Let's Do Science!** A research activity is developed in which the students can learn science by "doing science", through the execution of varied activities and scientific research.
- **Did You Know...?** Very interesting topics and scientific curiosities that will stimulate student's imagination are presented.
- **Ecological Commitment** Topics related to the ecological point of view and how the student can contribute to the conservation of the environment are introduced.
- **Additional Exercises** A variety of activities, exercises, games, and manipulatives related to the topics presented in the lesson are presented.
- **Assessing My Progress** Reflective activities about what was studied in the lesson.
- **Vocabulary** Defining new concepts.
- **Check Your Knowledge** Varied activities to check the knowledge acquired in each subject.

## Unit Breakdown

Below you will find the units divided by their lessons with detailed objectives and concepts for each of them.

### Unit 1. The Biosphere

At the end of this unit, the student will have completed the objectives found in the following lessons.

#### Lesson 0. The Biosphere

**Code:** C427G0SU01L00

Unit documents: Activity, Ecological Commitment, Assessment Exercises, Laboratory.

#### Lesson 1. Nature and Living Things

**Code:** C427G0SU01L01

**Objective**

- Define the distinctive characteristics of living organisms.

**Key Terms**

- adaptation
- cells
- interdependence
- metamorphosis
- mitosis
- multicellular organisms
- organisms
- reproduction
- unicellular organisms

#### Lesson 2. Energy and the Organization of Living Things

**Code:** C427G0SU01L02

**Objectives**

- Recognize the components of a food web.
- Classify the types of interactions that occur in nature.

**Key Terms**

- mutualism
- photosynthesis
- symbiosis

#### Lesson 3. The Scientific Method

**Code:** C427G0SU01L03

**Objective**

- Define the distinctive characteristics of living organisms.

**Key Terms**

- adaptation
- cells

- interdependence
- metamorphosis
- mitosis
- multicellular organisms
- unicellular organisms
- reproduction

**Unit 2. Molecules and Life**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Molecules and Life**

**Code:** C427G0SU02L00

Unit documents: Activity and Assessment Exercises.

**Lesson 1. Introduction to Chemistry**

**Code:** C427G0SU02L01

**Objective**

- Identify the elements that compose matter and some of its properties.

**Key Terms**

- atom
- compound
- conductors
- element
- metals
- molecule
- nonmetals

**Lesson 2. Chemical Bonds**

**Code:** C427G0SU02L02

**Objective**

- Identify the elements that compose matter and some of its properties.

**Key Terms**

- covalent bond
- ion

**Lesson 3. Acids and Bases**

**Code:** C427G0SU02L03

**Objective**

- Explain the properties of acids and bases.

**Key Terms**

- acid
- base

**Lesson 4. Chemical Reactions and Enzymes**

**Code:** C427G0SU02L04

**Objectives**

- Recognize the importance of chemical reactions and the presence of enzymes for the sustenance of living organisms.

- Identify the importance of water, vitamins, and minerals for the functioning of living organisms.

**Key Terms**

- bile
- carbohydrates
- cellulose
- digestion
- enzymes
- fats or lipids
- photosynthesis
- proteins
- water

**Unit 3. The Foundation of Life**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. The Foundation of Life**

**Code:** C427G0SU03L00

Unit documents: Activity, Assessment Exercises, and Laboratory.

**Lesson 1. The Cell: Its History and Discovery**

**Code:** C427G0SU03L01

**Objectives**

- Recognize the cell as the basic unit of structure and function of all living organisms.
- Explain the differences between the prokaryotic and eukaryotic cells, and between the animal cell and the plant cell.

**Key Terms**

- Antonie van Leeuwenhoek
- cell
- Cell theory
- Matthias Schleiden
- microscope
- organisms
- principle
- Robert Hooke
- Rudolf Virchow
- Theodor Schwann

**Lesson 2. The Microscope**

**Code:** C427G0SU03L02

**Objective**

- Use the compound light microscope and recognize its main parts.

**Key Terms**

- base
- arm
- diaphragm
- Ernst Abbe
- Ernst Abbe
- mirror
- Karl Zeiss
- Marcello Malpighi
- compound light microscope
- scanning electron microscope
- transmission electron microscope
- microscope
- revolving nosepiece
- high power objective
- low power objective
- eyepiece
- stage clips
- stage
- coarse focus adjustment knob

- fine focus adjustment knob
- body tube

**Lesson 3. Inside the Cell**

**Code:** C427G0SU03L03

**Objectives**

- Recognize the cell as the basic unit of structure and function of all living organisms.
- Explain the differences between the prokaryotic and eukaryotic cells, and between the animal cell and the plant cell.

**Key Terms**

- cell
- cell membrane
- cell wall
- cellular respiration
- cytoplasm
- cytosol
- chromosomes
- chloroplasts
- DNA
- eukaryotic cell
- Golgi apparatus
- lysosome
- organelle
- prokaryotic cell
- mitochondria
- nucleolus
- nucleus
- ribosome
- vacuole

**Lesson 4. Cell Transport**

**Code:** C427G0SU03L04

**Objectives**

- Recognize the cell as the basic unit of structure and function of all living organisms.
- Explain the differences between the prokaryotic and eukaryotic cells, and between the animal cell and the plant cell.

**Key Terms**

- active transport
- diffusion
- endocytosis
- exocytosis
- osmosis
- passive transport
- semipermeable

**Lesson 5. Photosynthesis**

**Code:** C427G0SU03L05

**Objective**

- Explain the importance of the process of photosynthesis for the sustenance of all living organisms.

**Key Terms**

- autotrophic organism
- cellulose
- chloroplasts
- glucose
- heterotrophic organism
- oxygen
- photosynthesis
- stoma

**Lesson 6. Cell Division**

**Code:** C427G0SU03L06

**Objective**

- Recognize the cell cycle process.

**Key Terms**

- cellular cycle
- cytokinesis
- interphase
- mitosis
- replication

## Unit 4. Bacteria and Viruses

At the end of this unit, the student will have completed the objectives found in the following lessons.

### Lesson 0. Bacteria and Viruses

**Code:** C427G0SU04L00

Unit documents: Activity, Venn diagram, and Assessment Exercises.

### Lesson 1. Bacteria

**Code:** C427G0SU04L01

**Objectives**

- Identify the structure and function of a bacteria.
- Recognize some diseases caused by bacteria and viruses.

**Key Terms**

- aerobic bacteria
- anaerobic bacteria
- bacilli
- binary fission
- coccus
- conjugation
- endospore
- flagellum
- Monera Kingdom
- spirillums

### Lesson 2. Viruses

**Code:** C427G0SU04L02

**Objectives**

- Identify the structure and function of a virus.
- Recognize some diseases caused by bacteria and viruses.

**Key Terms**

- antibody
- COVID-19
- host cell
- lymphatic system
- obligate intracellular parasite
- RNA
- retrovirus
- T cell
- virus

### Lesson 3. Other Functions of Viruses and Bacteria

**Code:** C427G0SU04L03

**Objective**

- Recognize the importance of bacteria and viruses for living organisms.

**Key Terms**

- biodegradable
- cloning

**Unit 5. Protists and Fungi**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Protists and Fungi**

**Code:** C427G0SU05L00

Unit documents: Activity and Assessment Exercises.

**Lesson 1. Protists**

**Code:** C427G0SU05L01

**Objectives**

- Identify the general characteristics of the protists.
- Classify protists according to their movement.

**Key Terms**

- autotrophs
- cilia
- decomposers
- heterotrophs
- malaria
- pseudopods
- spore

**Lesson 2. Fungi**

**Code:** C427G0SU05L02

**Objective**

- Recognize the importance of fungi in our ecosystem.

**Key Terms**

- fermentation
- hyphae
- lichen
- riboflavin
- saprophages
- soft scale insect
- sporangium
- zygospore

**Lesson 3. Diseases Caused by Fungi and Protists**

**Code:** C427G0SU05L03

**Objective**

- Identify some of the diseases caused by fungi and protists.

**Key Terms**

- fungi
- parasites
- protist

**Unit 6. Plants**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Plants**

**Code:** C427G0SU06L00

Unit Document: Activity

**Lesson 1. Simple Plants**

**Code:** C427G0SU06L01

**Objective**

- Classify the brown, red and green algae.

**Key Terms**

- alternation of general ions
- diploid
- gametophyte
- haploid
- sporophyte

**Lesson 2. Nonvascular Land Plants**

**Code:** C427G0SU06L02

**Objectives**

- Identify the characteristics of nonvascular land plants.
- Identify examples of nonvascular terrestrial plants and vascular plants.

**Key Terms**

- antheridium
- archegonium
- nonvascular plants
- protonema
- rhizoids
- vascular plants

**Lesson 3. Vascular Plants**

**Code:** C427G0SU06L03

**Objectives**

- Identify the characteristics of vascular plants.
- Identify examples of non-vascular terrestrial plants and vascular plants.

**Key Terms**

- fern
- fronds
- sorus
- stem
- vascular

**Unit 7. Seed Plants**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Seed Plants**

**Code:** C427G0SU07L00

Unit Document: Activity, Laboratory

**Lesson 1. Gymnosperms**

**Code:** C427G0SU07L01

**Objectives**

- Identify the characteristics of gymnosperms.
- Compare monocotyledonous plants from dicotyledons.

**Key Terms**

- cotyledon
- dicotyledon
- embryo
- gymnosperm
- humus
- monocotyledon
- seed
- tegument
- tracheophyte

**Lesson 2. Angiosperms**

**Code:** C427G0SU07L02

**Objectives**

- Identify the characteristics of angiosperms.
- Compare monocotyledonous plants from dicotyledons.

**Key Terms**

- angiosperm
- animal pollinators
- dicotyledon
- embryo
- fertilization
- flowers
- fruits
- gametophyte
- monocotyledon
- nectar
- ovule
- pollen
- seeds
- sperm

**Lesson 3. Roots and Stems**

**Code:** C427G0SU07L03

**Objective**

- Identify the structure and function of roots and stems.

**Key Terms**

- bark
- cambium
- epidermis
- fibrous root
- herbaceous stem
- meristem
- phloem
- root
- root hair
- stem
- taproot
- woody stem
- xylem

**Lesson 4. Leaves: Their Structure and Function**

**Code:** C427G0SU07L03

**Objective**

- Identify the structure and function of roots, stems, and leaves.

**Key Terms**

- abaxial
- adaxial
- branched veins
- chlorophyll
- chloroplast
- epidermis
- guard cells
- guardian cells
- leaves
- limbo
- palisade layer
- petiole
- plant cuticle
- plant tissues
- pore
- spongy mesophile
- stoma
- thylakoids

## Unit 8. Plant Reproduction

At the end of this unit, the student will have completed the objectives found in the following lessons.

### Lesson 0. Plant Reproduction

**Code:** C427G0SU08L00

Unit documents: Activity, Ecological Commitment, Assessment Exercises.

### Lesson 1. Asexual Reproduction

**Code:** C427G0SU08L01

**Objective**

- Identify the different types of asexual reproduction in plants.

**Key Terms**

- artificial propagation
- asexual reproduction
- bonds
- bud
- embryo
- enzyme
- gametophyte generation
- germination
- humidity
- meristem
- oxygen
- parenchyma
- rhizomes
- seed
- sporophyte generation
- stolons
- temperature
- vegetative reproduction

### Lesson 2. Sexual Reproduction

**Code:** C427G0SU08L02

**Objective**

- Describe the parts of the flower and the process of sexual reproduction.

**Key Terms**

- alternation of general ions
- animal pollinators
- anther
- color
- core fusion
- cross-pollination
- double fertilization
- fertilization
- filament
- fragrance
- fruit
- ovary
- ovum

- perfect flowers
- petals
- pistil
- pollen tube
- pollination
- self-pollination
- sepals
- sperm nuclei
- stamen

**Lesson 3. Plant Propagation**

**Code:** C427G0SU08L03

**Objective**

- Explain the difference between annual, biennial, and perineal plants.

**Key Terms**

- annual plants
- biennial plants
- bulb
- gravitropism
- perineal plants
- stimulus
- tropism

**Unit 9. Simple Invertebrates**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Simple Invertebrates**

**Code:** C427G0SU09L00

Unit Document: Activity

**Lesson 1. Sponges**

**Code:** C427G0SU09L01

**Objective**

- Identify and describe the general characteristics of sponges.

**Key Terms**

- *Calcarea*
- *Demospongiae*
- external skeleton
- hermaphrodites
- *Hexactinellid*
- inhaling pore
- osculus
- phylum Porifera
- pores
- *Sclerospongiae*
- sponge
- Spongia officinalis
- spongocoel

**Lesson 2. Cnidarians**

**Code:** C427G0SU09L02

**Objective**

- Identify and describe the general characteristics of cnidarians.

**Key Terms**

- anemone
- *Anthozoa*
- basal disc
- biodiversity
- brain coral
- *Chironex*
- clownfish
- cnidaria
- Cnidocyte
- coral reef
- *Fire coral (Millepora)*
- hydrocoral
- *Hydrozoa*
- Elkhorn coral
- jellyfish
- medusa
- nematocyst
- *Physalia*
- planula
- polyp
- Portuguese man o' war

- *Scyphozoa*
- sea fans
- sea flowers
- sea wasp
- sessile
- soft corals
- tentacle

**Lesson 3. Flatworms and Roundworms**

**Code:** C427G0SU09L03

**Objectives**

- Identify and describe the general characteristics of flatworms.
- Identify and describe the general characteristics of roundworms.

**Key Terms**

- *Ascaris*
- bilharzia
- *Digenea*
- ectoparasite
- elongated
- endoparasite
- host
- *Monogenea*
- *Nematoda*
- parasites
- planarian
- pork tapeworm
- taenia
- *Trematode*
- trichina
- Turbellaria

**Unit 10. Mollusks, Annelids, and Echinoderms**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Mollusks, Annelids, and Echinoderms**

**Code:** C427G0SU10L00

Unit Document: Activity, Let's do Science

**Lesson 1. Mollusks**

**Code:** C427G0SU10L01

**Objectives**

- Identify and classify mollusks.
- Describe mollusks' particular differences.

**Key Terms**

- bivalve
- cephalopods
- chromatophores
- ganglia
- gastropods
- nephridium
- radula
- siphon
- suction cups

**Lesson 2. Annelids**

**Code:** C427G0SU10L02

**Objectives**

- Identify and classify annelids.
- Identify the different types of annelids.

**Key Terms**

- annelid
- bristles
- cellulose
- clitellum
- cocoon
- fragmentation
- ganglia
- Hirudin
- Hirudinea
- leech
- nephridium
- nereis
- oligochaetes
- parapodium
- polychaetes
- pharynx
- segmented worms
- trochophore larva
- Tubifex worms
- worm

## Lesson 3. Echinoderms

**Code:** C427G0SU10L03

### Objectives

- Identify and classify echinoderms.
- Identify the different types of echinoderms.

### Key Terms

- *Asteroidea*
- cardiac stomach
- celoma
- *Crinoidea*
- crinoids
- *Echinoidea*
- echinoderm
- *Holothuroidea*
- *Ophiuroidea*
- Pedicellaria
- pentamerale
- predigest
- sea cucumber
- sea urchins
- starfish
- tube feet

**Unit 11. Arthropods**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Arthropods**

**Code:** C427G0SU11L00

Unit documents: Activity and Assessment Exercises.

**Lesson 1. Form and Function**

**Code:** C427G0SU11L01

**Objective**

- Identify the structure and function of arthropods.

**Key Terms**

- appendices
- arthropod
- cephalothorax
- Chelicerata
- chelceres
- chitin
- crustaceans
- cuticle
- exoskeleton
- insects
- molting period
- pedipalps

**Lesson 2. Classes of Arthropod**

**Code:** C427G0SU11L02

**Objectives**

- Classify the different types of arthropods.
- Identify the most important groups (orders) of insects.

**Key Terms**

- arachnid
- arthropod
- beetle
- brachiopod
- centipedes
- Chela
- cirriped
- cochineal
- copepod
- decapods
- diplomapod
- dipterous
- Hemiptera
- Hymenoptera
- isopod
- Lepidoptera
- odonate
- orthopter
- scorpion
- shrimp
- viviparous

**Lesson 3. Puerto Rican Arthropods**

**Code:** C427G0SU11L03

**Objective**

- Identify arthropods native to Puerto Rico.

**Key Terms**

- arthropod
- avicularia
- blue wasp
- cobalt milkweed beetle
- Epilobocera sinuatifrons
- grasshopper
- mantis
- phasmids
- pinacate beetles
- shrimps
- Tailless whip scorpions
- tarantula

**Unit 12. Fishes and Amphibians**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Fishes and Amphibians**

**Code:** C427G0SU12L00

Unit Document: Activity

**Lesson 1. Fishes**

**Code:** C427G0SU12L01

**Objectives**

- Identify the general characteristics of chordates.
- Understand the structure and function of jawless fish, cartilaginous fish, and bony fish.

**Key Terms**

- aquatic
- agnatha
- amphibians
- articulated jaw
- ascidians
- birds
- Cephalochordata
- Chondrichthyes
- Chordata
- cold blood
- dorsal nerve cord
- ectothermic
- external fertilization
- fins
- fishes
- gills
- internal fertilization
- mammals
- Marine
- marine epifauna
- notochord
- Osteichthyes
- oviparous
- ovoviviparous
- planktonic larva
- reptiles
- scales
- swim bladder
- Tunicates

**Lesson 2. Amphibians**

**Code:** C427G0SU12L02

**Objective**

- Identify the structure and function of the three types of amphibians: anura, caudates and anodes.

**Key Terms**

- Amphibians
- Anura
- anodes
- Caudata
- frog
- geckos

- guts
- Gymnophiona
- hydrophytic
- metamorphosis
- lungs
- salamanders
- tadpole
- toad

**Lesson 3. Fishes and Amphibians in Puerto Rico**

**Code:** C427G0SU12L03

**Objective**

- Identify the different species of fish and amphibians in Puerto Rico.

**Key Terms**

- Atlantic blue marlin
- barracuda
- blue shark
- Bufo marinus
- Common toad
- *Eleutherodactylus jasperi*
- *Eleutherodactylus portoricensis*
- *Galeocerdo cuvier*
- golden coquí
- Gunther's white-lipped frog
- incubation
- *Lactophrys bicaudalis*
- lane snapper
- *Leptodactylus albilabris*
- *Lutjanus synagris*
- *Makaira nigricans*
- mountain coquí
- *Peltophryme lemur*
- Puerto Rican crested toad
- Red mangrove tree
- spotted trunkfish
- *Sphyraena barracuda*
- *Thalassia*
- tiger shark

**Unit 13. Birds and Reptiles**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Birds and Reptiles**

**Code:** C427G0SU13L00

Unit Document: Activity

**Lesson 1. Reptiles**

**Code:** C427G0SU13L01

**Objectives**

- Identify the four main groups of reptiles: crocodiles, turtles, scaly, and tuataras.
- Describe the ecology, structure, and function of reptiles.

**Key Terms**

- amniotic
- crocodile
- Galapagos
- impermeable
- nictitating membrane
- neurotoxic
- oviparous
- ovoviviparous
- pharyngeal
- predators
- rattlesnake
- reptile
- serpent
- tortoise
- tutatara

**Lesson 2. Birds**

**Code:** C427G0SU13L02

**Objective**

- Identify the ecology, structure, and function of flying and non-flying birds.

**Key Terms**

- binocular vision
- birds of prey
- claws
- columbiform
- dimorphic
- egg
- endothermic
- feathers
- flightless bird
- flying bird
- galliform
- migration
- modified scales
- passerine
- psittaciform
- talons
- water bird

**Lesson 3. Reptiles and Birds of Puerto Rico**

**Code:** C427G0SU13L03

**Objective**

- Identify the different species of reptiles and birds in Puerto Rico.

**Key Terms**

- American kestrel
- boa
- broad-winged hawk
- caiman
- common nightingale
- endangered species
- endemic species
- exotic species
- garden snake
- gecko
- gray kingbird
- green iguana
- green sea turtle
- hawksbill sea turtle
- hummingbird
- introduced species
- iridescence
- knight anole
- leatherback sea turtle
- lizard
- loggerhead sea turtle
- mogotes
- nesting
- pearly-eyed thrasher
- Puerto Rican Ground Lizard
- Puerto Rican parrot
- Puerto Rican Racer snake
- Puerto Rican slider
- Puerto Rican screech owl
- Puerto Rican tody
- red-tailed hawk
- rhinoceros iguana
- short-eared owl
- spawn
- tortoise
- western green lizard

**Unit 14. Mammals**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Mammals**

**Code:** C427G0SU14L00

Unit documents: Activity and Assessment Exercises.

**Lesson 1. Introduction to Mammals**

**Code:** C427G0SU14L01

**Objectives**

- Identify the general characteristics of all mammals.
- Compare the main groups of mammals: monotremes, marsupials, and placentals.

**Key Terms**

- brain
- Cenozoic Era
- claws
- endothermic
- hooves
- horn
- mammary glands
- marsupial
- marsupium
- maternal behavior
- Mesozoic Era
- milk
- monotreme
- placenta
- placental
- placental mammals
- sudoriferous glands
- uterus

**Lesson 2. Present-Day Mammals**

**Code:** C427G0SU14L02

**Objectives**

- Compare the main groups of mammals: monotremes, marsupials, and placentals.
- Identify some aspects of their ecology, the structure, and function of mammals.

**Key Terms**

- cetaceans
- chiroptera
- convergent evolution
- ecological niche
- fossorial lifestyle
- herbivore
- prehensile tail
- pachyderm
- plankton
- primate
- rodent

## Lesson 3. The Mammals of Puerto Rico

**Code:** C427G0SU14L03

### Objective

- Identify the mammals introduced to Puerto Rico.

### Key Terms

- bat
- biological control
- Caribbean Stranding Network
- domestic
- domestic animal
- echolocation
- feral
- fossil
- frugivore
- histoplasmosis
- hutia
- livestock
- manatee
- nectarivore
- Puerto Rican nightjar
- sloth

**Unit 15. Exploring Our Body**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Exploring Our Body**

**Code:** C427G0SU15L00

Unit documents: Activity, Assessment Exercises, and Express Yourself.

**Lesson 1. Skeletal System**

**Code:** C427G0SU15L01

**Objective**

- Explain the main parts and function of the skeletal system.

**Key Terms**

- ball joint
- bone
- bone marrow
- cancellous bone
- cartilage
- cartilaginous end plate
- compact bone
- diaphysis
- embryonic stage
- epiphysis
- fixed joint
- hinge joint
- ligament
- osteoblasts
- osteoclasts
- red bone marrow
- rotary joint
- skeletal system
- synovial bursae
- yellow marrow

**Lesson 2. Muscular System**

**Code:** C427G0SU15L02

**Objective**

- Identify the three types of muscles and their function.

**Key Terms**

- cardiac muscle
- involuntary muscle
- muscle
- muscle spindles
- muscle tissue
- smooth muscle
- striated muscle tissue
- voluntary muscles

**Lesson 3. Skin, Hair, and Nails**

**Code:** C427G0SU15L03

**Objectives**

- Identify the importance and function of the skin.
- Explain the function of hair, nails, and accessory skin glands.

**Key Terms**

- blood supply
- blood vessels
- capillaries
- cooling system
- dehydration
- dermis
- epidermis
- exoskeleton
- fat cells
- germ cells
- habitat
- hair
- hair follicle
- keratin
- melanin
- peeling
- perspiration
- skin
- ultraviolet radiation

**Unit 16. Circulatory and Respiratory System**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Circulatory and Respiratory System**

**Code:** C427G0SU16L00

Unit documents: Activity and Assessment Exercises.

**Lesson 1. Circulatory System**

**Code:** C427G0SU16L01

**Objective**

- Name the blood components and their function.

**Key Terms**

- barrier defenses
- blood
- blood vessels
- circulatory system
- coagulation
- erythrocytes
- fibrin
- heart
- hemoglobin
- leukocytes
- plasma
- platelets
- red blood cells
- white blood cells

**Lesson 2. The Heart**

**Code:** C427G0SU16L02

**Objective**

- Identify the different types of blood vessels and heart components.

**Key Terms**

- aorta
- arteries
- atrium
- bypass
- capillaries
- cardiac cycle
- coronary artery
- diastole
- pacemaker
- pulmonary alveolus
- pulmonary artery
- pulmonary circuit
- stroke
- systemic circuit
- systole
- valves
- veins
- vena cava
- ventricle
- venules

**Lesson 3. Respiratory System**

**Code:** C427G0SU16L03

**Objective**

- Describe the structure and function of the respiratory system.

**Key Terms**

- aerobic respiration
- asthma
- basal
- bronchioles
- bronchi
- carbon dioxide
- diaphragm
- epiglottis
- larynx
- lungs
- metabolism
- pulmonary alveolus
- simple epithelium
- trachea

**Lesson 4. The Immune System**

**Code:** C427G0SU16L04

**Objective**

- Learn the importance and function of the body's defense system.

**Key Terms**

- adaptive immunity
- antibiotics
- antibody
- antigen
- colonies
- complement system
- disease
- host
- immune deficiency
- immune response
- immunity
- inflammation
- innate immunity
- inoculated
- interferon
- parasites
- parasitism
- pathogen
- phagocytes
- virulence factors

**Unit 17. The Digestive and Excretory System**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. The Digestive and Excretory System**

**Code:** C427G0SU17L00

Unit documents: Activity and Assessment Exercises.

**Lesson 1. Nutrition**

**Code:** C427G0SU17L01

**Objective**

- Identify the nutrients in the food you eat and their importance to the body.

**Key Terms**

- amino acids
- carbohydrates
- fat-soluble vitamins
- fats
- inorganic nutrients
- minerals
- nutrients
- nutrition
- nutritional table
- organic compounds
- proteins
- vitamins
- water soluble vitamins

**Lesson 2. The Digestive and Excretory System**

**Code:** C427G0SU17L02

**Objectives**

- Describe the structure and function of the digestive system.
- Describe the structure and function of the excretory system.

**Key Terms**

- anus
- bile
- bolus
- colon
- digestive system
- esophagus
- fibers
- gallbladder
- ingestion
- large intestine
- liver
- oral cavity
- pancreas
- peristalsis
- rectum
- salivary amylase
- small intestine
- sphincters

**Lesson 3. The Urinary System**

**Code:** C427G0SU17L03

**Objective**

- Explain in your own words the process of urine formation and excretion.

**Key Terms**

- bark
- bladder
- Bowman's capsule
- distal convoluted tubule
- filtration
- glomerulus
- kidneys
- marrow
- nephrons
- osmosis
- renal pelvis
- renal vein
- resorption
- urine
- waste
- ureter

**Unit 18. The Nervous System**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. The Nervous System**

**Code:** C427G0SU18L00

Unit documents: Activity and Assessment Exercises.

**Lesson 1. Our Nervous System**

**Code:** C427G0SU18L01

**Objective**

- Identify the parts and function of a neuron.
- Recognize the structures of the central nervous system and its function.

**Key Terms**

- autonomic nervous system
- axon
- brain
- brain stem
- central nervous system
- cerebellum
- dendrites
- ganglia
- hypothalamus
- limbic regions
- memory
- motor neurons
- nerves
- neurons
- peripheral nervous system
- spinal bulb
- spinal cord
- spinal nerves
- synapse
- thalamus

**Lesson 2. The Senses**

**Code** C427G0SU18L02

**Objective**

- Describe the structures related to the senses and their function.

**Key Terms**

- audition
- canes
- cones
- iris
- optic nerve
- mechanical energy
- pupil
- retina
- sound waves
- vision
- waves

## Lesson 3. Drugs and the Nervous System

**Code:** C427G0SU18L03

### Objective

- Recognize the effect of drugs on the nervous system.

### Key Terms

- addiction
- antibiotics
- drug
- drug abuse
- medicines
- overdose
- tolerance

**Unit 19. The Endocrine System and Hormones**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. The Endocrine System and Hormones**

**Code:** C427G0SU19L00

Unit documents: Activity and Assessment Exercises.

**Lesson 1. The Endocrine System Glands**

**Code:** C427G0SU19L01

**Objectives**

- Differentiate the endocrine and exocrine glands.
- Identify the location of the endocrine glands in the human body and the hormones they secrete.

**Key Terms**

- amino acids
- endocrine system
- glands
- hypothalamus
- hormones
- lobes
- ovaries
- nervous system
- pancreas
- parathyroid gland
- pituitary gland
- proteins
- steroids
- suprarenal gland
- testicles
- thyroid
- thyroxine

**Lesson 2. Hormone Function**

**Code:** C427G0SU19L02

**Objectives**

- Explain the function of different hormones in the human body.
- Explain the mechanisms of action of some hormones.

**Key Terms**

- carbohydrates
- cortisol
- diabetes
- feedback
- glucose
- hormonal secretion
- insulin
- lipid hormones
- melatonin
- pancreatic islets
- precursor cells
- prostaglandins
- protein hormones
- receptor
- testosterone
- thymus

**Unit 20. Reproduction and Development**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Reproduction and Development**

**Code:** C427G0SU20L00

Unit documents: Activity and Assessment Exercises.

**Lesson 1. Male Reproductive System**

**Code:** C427G0SU20L01

**Objective**

- Describe the structure and function of the male reproductive system.

**Key Terms**

- androgen
- bulbourethral glands
- ejaculation
- epididymis
- erection
- estrogen
- gonads
- hormones
- menstruation
- penis
- prostate
- puberty
- reproduction
- scrotum
- semen
- seminal vesicles
- seminiferous
- sperm
- testicles
- urethra

**Lesson 2. Female Reproductive System**

**Code:** C427G0SU20L02

**Objectives**

- Describe the structure and function of the female reproductive system.
- Describe the menstrual cycle, the ovulation cycle and the stages of pregnancy.

**Key Terms**

- cervix
- corpus luteum
- egg cell
- endometrium
- external genitals
- fallopian tubes
- fertilization
- fimbriae
- follicles
- hypophysis
- immature oocytes
- menopause
- ovaries
- ovulation

- pregnancy
- sex hormones
- urethral opening
- uterus
- vagina

**Lesson 3. Development**

**Code:** C427G0SU20L03

**Objective**

- Describe the menstrual cycle, the ovulation cycle, and the stages of pregnancy.

**Key Terms**

- birth
- cervix
- development process
- embryo
- endoderm
- fetus
- gestation
- lactation
- mesoderm
- placenta
- umbilical cord
- zygote

**Lesson 4. Sexually Transmitted Diseases**

**Code:** C427G0SU20L04

**Objective**

- Explain what sexually transmitted diseases are and give some examples.

**Key Terms**

- chancre
- disease
- gonorrhea
- herpes
- HIV
- sexually transmitted
- syphilis

**Unit 21. The Principle of Genetics**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. The Principle of Genetics**

**Code:** C427G0SU21L00

Unit documents: Activity and Assessment Exercises.

**Lesson 1. Genetics and Mendel's Discoveries**

**Code:** C427G0SU21L01

**Objective**

- Describe the experiments performed by Gregor Mendel and reflect on their importance in the study of genetic inheritance.

**Key Terms**

- cell
- dominant gene
- first filial generation
- parental generation
- pollination
- recessive gene
- second filial generation
- self-pollination

**Lesson 2. Genes and Mendel's Genetic Laws**

**Code:** C427G0SU21L02

**Objectives**

- Describe the experiments performed by Gregor Mendel and reflect on their importance in the study of genetic inheritance.
- Explain the differences between genotype and phenotype.

**Key Terms**

- alleles
- cell
- first filial generation
- genes
- genotype
- homozygous
- law of segregation
- phenotype
- Punnett square
- second filial generation

## Lesson 3. Genes and Chromosomes: Characteristics Linked to Gender

**Code:** C427G0SU21L03

### Objectives

- Describe the experiments performed by Gregor Mendel and reflect on their importance in the study of genetic inheritance.
- Describe what they are and identify the location of genes, chromosomes, and DNA.
- Develop notions of hereditary traits linked to gender.

### Key Terms

- alleles
- autosomes
- cells
- chromosomes
- DNA
- genes
- homologous chromosomes

**Unit 22. Human Genetics**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Human Genetics**

**Code:** C427G0SU22L00

Unit documents: Activity and Assessment Exercises, Let's do Science!

**Lesson 1. Chromosomes in Cell Division**

**Code:** C427G0SU22L01

**Objectives**

- Describe the way genetic information is organized within the cell.
- Describe the process through which gametes are produced (meiosis).

**Key Terms**

- diploid
- haploid
- mitosis

**Lesson 2. Genetic Material**

**Code:** C427G0SU22L02

**Objective**

- Describe the way genetic information is organized within the cell.

**Key Terms**

- DNA
- eukaryotic cells
- nucleotides

**Lesson 3. Genetic Changes**

**Code:** C427G0SU22L03

**Objectives**

- Explain the concept of mutation and identify some of the mechanisms by which different types of mutations occur.
- Describe genetic disorders in humans.

**Key Terms**

- monosomy
- mutations
- polyploidy

**Lesson 4. Human Genetics and Genetic Disorders**

**Code:** C427G0SU22L04

**Objective**

- Describe genetic disorders in humans.

**Key Terms**

- genetic disorders
- monosomy

**Lesson 5. Genealogies**

**Code:** C427G0SU22L05

**Objective**

- Describe genealogies in humans.

**Key Terms**

- genetics
- hereditary

**Unit 23. Evolution**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Evolution**

**Code:** C427G0SU23L00

Unit documents: Activity, Ecological Commitment, Assessment Exercises, Laboratory.

**Lesson 1. Theories of Evolution**

**Code:** C427G0SU23L01

**Objective**

- Identify some of the theories and evidences of evolution.

**Key Terms**

- antique
- biogenesis
- Charles Darwin
- evolution
- Francesco Redi
- Jean B. Lamarck
- Louis Pasteur
- Oparin
- theory

**Lesson 2. Fossils and Evolution**

**Code:** C427G0SU23L02

**Objective**

- Describe fossils and how they are formed.

**Key Terms**

- evolution
- fossils
- theory

**Lesson 3. Comparative Anatomy**

**Code:** C427G0SU23L03

**Objective**

- Identify some of the theories and evidences of evolution.

**Key Terms**

- anatomy
- embryo
- mutations

**Lesson 4. Biodiversity and Natural Selection**

**Code:** C427G0SU23L04

**Objectives**

- Identify some of the theories and evidences of evolution.
- Describe the differences between morphological, physiological and environmental factors.

**Key Terms**

- environmental factors
- morphological factors
- physiological factors

**Lesson 5. Adaptation and Survival**

**Code:** C427G0SU23L05

**Objectives**

- Identify some of the theories and evidences of evolution.
- Identify the importance of adaptation and survival in the natural selection process.

**Key Terms**

- adaptation
- survival
- theory

**Unit 24. Our Living Planet**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Our Living Planet**

**Code:** C427G0SU24L00

Unit documents: Activity and Assessment Exercises.

**Lesson 1. Weather and Life**

**Code:** C427G0SU24L01

**Objective**

- Describe the factors that affect the Earth's climate and how it affects the distribution of plants and animals.

**Key Terms**

- canopy
- latitude
- organisms
- species
- trade winds
- weather

**Lesson 2. Environment and Life**

**Code:** C427G0SU24L02

**Objective**

- Differentiate between the concepts of species, individual, population, community, ecosystem, niche, and habitat.

**Key Terms**

- abiotic factor
- biotic factor
- photosynthesis
- habitat

**Lesson 3. Earth Biomes**

**Code:** C427G0SU24L03

**Objectives**

- Identify the climatic zones and the Earth's biomes.
- Compare and contrast biotic and abiotic factors in the environment.

**Key Terms**

- aphotic areas
- biodiversity
- deserts
- tropical savannas

**Unit 25. Populations**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Populations**

**Code:** C427G0SU25L00

Unit documents: Activity and Assessment Exercises, Did You Know...?

**Lesson 1. Population Growth and the Carrying capacity**

**Code:** C427G0SU25L01

**Objectives**

- Identify factors that affect population growth.
- Distinguish between migration, emigration, and immigration.

**Key Terms**

- biotic potential
- migration
- population growth

**Lesson 2. Population Development**

**Code:** C427G0SU25L02

**Objective**

- Identify how evolution and the changes animals experience contributes to the development of their populations.

**Key Terms**

- evolution
- mutations
- genetic changes

**Lesson 3. Human Population**

**Code:** C427G0SU25L03

**Objective**

- Identify the factors that have affected the growth of human populations over time.

**Key Terms**

- demographic transition
- natural resources

**Unit 26. Bioconservation**

At the end of this unit, the student will have completed the objectives found in the following lessons.

**Lesson 0. Bioconservation**

**Code:** C427G0SU26L00

Unit documents: Activity, Ecological Commitment, Assessment Exercises.

**Lesson 1. The Conservation of Resources**

**Code:** C427G0SU26L01

**Objectives**

- Describe in your own words what are natural resources.
- Compare natural resources and non-renewable resources.

**Key Terms**

- nonrenewable resources
- pollution
- reforestation
- renewable resources
- water

**Lesson 2. Wildlife Conservation**

**Code:** C427G0SU26L02

**Objective**

- Identify the impact of human activities on the environment.

**Key Terms**

- aphrodisiac properties
- biodiversity
- species

**Lesson 3. The Pollution Problem**

**Code:** C427G0SU26L03

**Objective**

- Distinguish between biodegradable and non-biodegradable materials.

**Key Terms**

- biodegradables
- compost
- leachate
- non-biodegradable