SCIENCE

Course Description

5

DREYFOUS

Table of Contents

Series Description

The EduSystem Science 4-6 series was developed and updated based on the curricular design Puerto Rico Core Standards and the Curriculum Framework created by the Department of Puerto Rico. In addition, the content has been improved with the study of curricular programs designed by other educational entities and private schools.

This series presents the content in a dynamic, innovative, and recreational manner. It also enables the students to build their knowledge through the cognitive development of scientific concepts, principles, and laws. This series also encourages the study of this discipline by placing scientific research, science skills, and the scientific method within students reach.

Conceptual Framework

The design and conceptualization of the Science 4-6 series is founded upon the following basic principles:

1. Emphasis on the need to:
   - Encouraging students to think logically and analytically to develop reasoning, interpretative and problem-solving skills, as well as reflection and decision making during the learning process.
   - Learning science by "doing science," through the completion of several activities, experimentation, and scientific research.
   - Promoting curricular integration and the application of scientific concepts to real life situations.
   - Systematically organizing the teaching process (in sequence, going from concrete to abstract).
   - Encouraging the development of multiple talents and the opportunity to express them in different ways.
   - Promoting the development of concepts, principles, laws, and scientific processes, and related skills in an articulated manner.
   - Providing strategies to address the individuality of each student that composes the school population.

2. The development of the activities integrates a constructivist approach that provides and encourages the student to participate more in the building of knowledge and the development of skills.

The Teacher's Guide is a manual intended to help during the teaching process, in making activities, and developing the concepts included in the lessons.

The Guide offers alternatives to use the lessons, adapted vocabulary, and dynamic activities to enrich the class.

General Objectives

- Promote learning through real life experiences.
- Encourage the use of information technology as a learning tool.
- Educate students on the protection and preservation of the environment.
- Promote reflection and self-evaluation during the learning process.
- Promotes experiences for the development of the values of science and the environment that surrounds us.
- Integrate different science disciplines such as chemistry, physics, biology, among others, with disciplines from other fields.
- Encourage the participation in scientific research and the development of concepts, skills, and scientific processes.
- Integrate science standards and expectations.
- Provide situations, activities, and exercises to actively build and apply knowledge to different situations.
- Work with concrete and abstract concepts.
- Contribute to the development of language as a means of individual and collective communication while incorporating scientific vocabulary.
- Enrich lessons with level appropriate readings, exercises, and activities.
- Highlight the scientific environment according to the level.

Course Structure

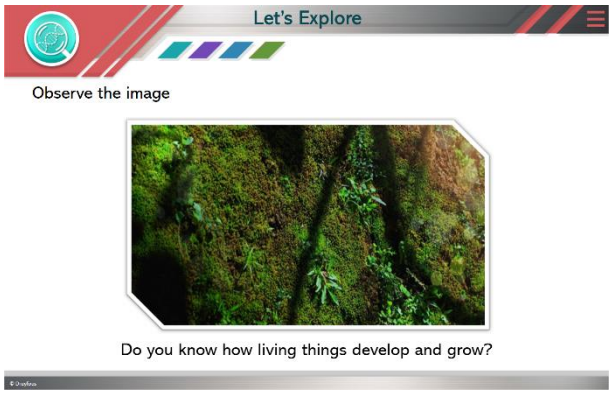
The course of **Science 5** is composed of thirteen units. Each unit is composed of lessons. Each lesson includes a presentation divided into sections that develop the topic to study. The lesson includes a descriptive log, activities, worksheets related to the topic, and as in most cases, website links and resources. It also proposes assessment exercises to help students in different tasks.

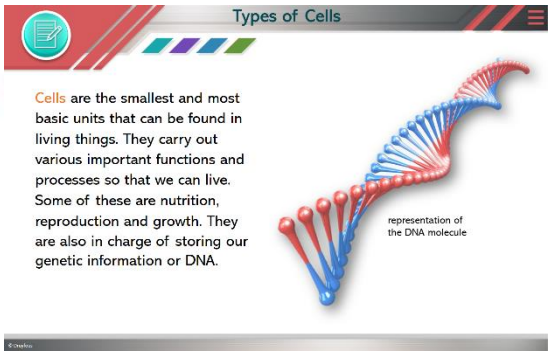
Here are some of the sections normally found in presentations and documents.

Presentation

Let's Explore

In this section, students will look at important details of an image. Additionally, they will discuss and answer questions that will increase their curiosity towards different topics that will be discussed in the lessons.





Topics

Concept development, where the content will be discussed based on the situation presented in the exploration and where other examples are given.

Icons

Each of the sections in our lessons is identified with an icon. These help both students and the teacher to complement their ideas and activities. Below, you will find the icon next to its concept and description.

Challenge Your Mind

A situation or an exercise for the students so that they can develop their critical thinking.

Connect What You Learned

Information that can be applied to daily life. It will also help the students understand what was studied in class.

Scientists in Action

Different assessment activities in which students can express themselves and apply what they learned about any topic discusses in class.

Link with…

In this lesson, students can relate the topics with other branches of science.

Think

The students will answer questions that will encourage them to think and give their opinion about the topic presented in the Link with... section

Interactive Icons

Let's Explore

Diagram

Images

Videos

Process

Answers

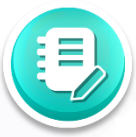
Content

Internet

Animation

Discover

Remember



Practice

Worksheets

Let's Research

This document presents a research activity in which students will learn science by "doing science", through participating in activities related to scientific research.

Did You Know …?

This document presents interesting scientific topics and fun facts to stimulate imagination.

Stimulate Your Mind

This document includes different fun activities that will help students to understand better the topics discussed in class.

Ecological Awareness

This document will prompt students to learn and actively contribute to the preservation of our environment.

Scientific Zone

This document presents a scientific concept related to a process in such a way that learning can be integrated along with a single scientific skill.

Complementary Documents

A variety of activities, exercises, and games related to the topics discussed in the lesson.

Vocabulary

Definitions of the most important keywords in the lesson.

Evaluation

Each lesson contains practical exercises to verify the learning process.

Unit Breakdown

Below is the division of each unit in lessons, including the name of each lesson with its corresponding objectives and keywords.

Unit I. Let's Research Science

At the end of the unit, the student will complete the objectives in the following lessons.

Lesson 1. Introduction to Science Laboratory

Code: C455G05U01L01

Objectives

- Identify the instruments commonly used in th laboratory and describe their function.
- Learn the skills to carry scientific processes.
- Identify the safety equipment needed to work in a laboratory.
- Describe the safety rules to worl in the laboratory and in the field.
- Learn the scientists who contributed in the invention of the light microscope.
- Identify the parts of the light microscope and their functions.
- Recognize the International System of Units as the measuring system used in science around the world.

Topics

- Scientific Instruments
- The Microscope
- Safety in Science
- Scientific Skills
- International System of Units

Keywords

- weighing scale, base, lab coat, funnel, illuminator, safety goggles, test tube rack, latex gloves, slide, flask, microscope, electron microscope, optical microscope, Bunsen burner, scientific method, mortar and pestle, objective lenses, eyepiece, stage clips, specimen stage, graduated cylinder, nose piece, coarse focus knob, fine focus knob, test tube, beaker

Lesson 2. Scientific Knowledge

Code: C455G05U01L02

Objectives

- Identify an information as scientific and non-scientific data.
- Distinguish what is science from pseudoscience.

Topics

- Common Knowledge and Scientific Knowledge
- Science and Pseudoscience

Keywords

- common science, empirical knowledge, scientific knowledge, science, pseudoscience

Lesson 3. The Scientific Method

Code: C455G05U01L03

Objectives

- Describe the history and origin of the scientific method.
- Identify the contribution of Galileo in the development of modern science.
- Describe the characteristics of the scientific method.
- Explain the steps of the scientific method.
- Develop a simple research following the scientific method.

Topics

- History and Origin
- Definition and Characteristics

Keywords

- scientific method, experimental method, logical method

Lesson 4. The Scientific Research

Code: C455G05U01L04

Objectives

- Describe the role of technology in scientific research.
- Identify and explain examples of scientific fraud.
- Distinguish reliable sources of information from those that are not.
- Identify the different classifications into which scientific research can be grouped.
- Identify the main characteristics that scientific research must have.

Topics

- The Truth and Change
- Technology and Mathematics
- Validity, Reliability, and Objectivity
- Fraud in Science

Keywords

- reliability, scientific knowledge, scientific fraud, research, objectivity, validity

Lesson 5. The Scientific Method Everywhere

Code: C455G05U01L05

Objectives

- Identify possible scenarios and situations where the scientific method can be used to carry out a research.
- Identify the scientific method as a way of research that anyone can use.
- Explain how the scientific method can be used in different research scenarios.

Topics

- The Scientific Method in Daily Life
- The Scientific Method... In the Garden?

Keywords

- Scientific method

Unit 2. Kingdoms of Life

At the end of the unit, the student will complete the objectives in the following lessons

Lesson 1. The Cells

Code: C455G05U02L01

Objectives

- Recognize the cell as the basic unit of life.
- Recognize that all living things are composed of cells.
- Mention different parts of the cell and explain that all those parts function together so that the cell lives.
- Explain that the union of many equal cells form tissues.
- Explain that tissues form organs.

Topics

- Discovery of the Cell and Cell Theory
- Types of Cells
- Classification Kingdoms
- Parts of the Cell

Keywords

- Cytoplasm, mitochondria, multicellular, organelles, cell wall, unicellular, vacuole

Lesson 2. Characteristics of Life

Code: C455G05U02L02

Objectives

- Describe the characteristics of life.
- Distinguish between a living, non-living, and dead body.
- Recognizes that the union of several organs form systems with a specific function in the body.

Topics

- Characteristics of Life
- Living or Non-Living
- Cells Work Together

Keywords

- Stimulus, metabolism, homeostasis, tissue, sexual reprodution, asexual reproduction

Lesson 3. Bacteria, Protists, and Viruses

Code: C455G05U02L03

Objectives

- Describe the characteristics of bacteria.
- Describes the characteristics of protists.
- Determine the similarities and differences between bacteria and protists.
- Recognize the importance of protists, bacteria, and fungi in different aspects.

Topics

- Bacteria and Their Reproduction
- Protists and Their Reproduction
- Importance of Bacteria and Protists
- What Are Viruses?
- Importance of Viruses

Keywords

- Archaebacteria, eubacteria, protist, virus

Lesson 4. The Fungi Kingdom

Code: C455G05U02L04

Objectives

- Identify the most common classifications of fungi.
- Recognize the presence of microscopic fungi.
- Explain the importance of fungi in ecosystem, medicine, and economy.

Topics

- Classification of Fungi
- Microscopic Fungi
- Life Cycle of Fungi
- Importance of Fungi

Keywords

- Spore, mycelium, mushrooms, mold, decomposer, yeast

Unit 3. Let's Get to Know the Plants

At the end of the unit, the student will complete the objectives in the following lessons.

Lesson 1. Parts of the Plants

Code: C455G05U03L01

Objectives

- Define root, stem, and leaf.
- Describe the function of the root, stem, and leaf of a plant.
- Identify and discover the parts of the different types of roots.
- Explain the movement of substances in vascular plants.
- Identify and describe the different types of stems.
- Classify leaves according to their shape and margin.
- Identify and describe the structures that form a leaf.

Topics

- The Structure of Plants
- Types of Roots
- The Stem
- Leaves: Functions and Types
- The Flower
- The Movement of Substances in Plants
- The Benefits of Plants

Keywords

- Canes, chlorophyll, stamen, stipe, phloem, shapes of the leaves, heart-shaped leaves, serrated leaves, lanceolate leaves, smooth leaves, oval leaves, palmate leaves, border, parts of the flower, parts of the leaves, leafstalk, root hairs, petals, pistil, taproots, tuberous roots, breathing, sepals, aerial stems, creeping stems, underground stems, types of roots, trunks, vein, xylem.

Lesson 2. Classification of Plants

Code: C455G05U03L02

Objectives

- Explain what a plant is.
- Distinguish between a bryophyte and a tracheophyte.
- Identify and describe non-vascular plants such as moss and liverworts.
- Identify and describe plants that do not produce seeds.

- Classify plants as gymnosperms and angyosperms.
- Identify plants as monocots and dicots.
- Explain what are herbaceous and woody stems.
- Mention some plants classified as annual, biennial, and perennial.

Topics

- The Scientific Classification of Plants
- Bryophytes or Non-Vascular Plants
- Tracheophytes or Vascular Plants
- Other Ways of Classifying Plants

Keywords

- Angyosperm, ring, annual, beinnal, bryophyte, classification, conifer, cotyledon, dicot, gymnosperm, livewort, monocot, moss, perennial, food plant, plant with seeds, medicinal plant, ornamental plant, herbaceous stem, woody stem, tracheophyte

Lesson 3. Diversity of Plants

Code: C455G05U03L03

Objectives

- Describe the importance of plants.
- Identify the importance of diversity in plants.

Topics

- Diversity of Plants
- Let's Travel Around the World
- Medicinal Plants
- Desert Plants
- Sequoias
- Prairie Plants

Keywords

- Adaptation, agave, chamomille, climate, competition, diversity, coneflower, lavandula, niche, common nettle, plant, prairie plant, desert plant, medicinal plant, aloe vera, sequoia

Lesson 4. Puerto Rico: Tropical Paradise

Code: C455G05U03L04

Objectives

- Identify and describe the geographical areas of Puerto Rico.
- Identify the flora in the geographical areas of Puerto Rico.
- Describe the flora of the coastal zone of Puerto Rico.
- Identify and describe the flora of the valleys and grasslands of Puerto Rico.
- Identify and describe the flora of the mountains of Puerto Rico.
- Identify some vines that exist in Puerto Rico.
- Describe the characteristics of medicinal plants in Puerto Rico.

Topics

- Puerto Rico: Tropical Paradise
- Flora in the Coastal Zone
- Flora in the Valleys and Grasslands of Puerto Rico
- Plants that Grow in the Mountains of Puerto Rico
- The Vines of Puerto Rico

Keywords

- Vines, bud, coast, fauna, flora, grassland, white mangrove, red mangrove, highland, valley, coastal zone, geographical areas, mountain areas

Unit 4. Diversity Within the Animal Kingdom

At the end of the unit, the student will complete the objectives in the following lessons

Lesson 1. Invertebrates: Benefits and Dangers

Code: C455G05U04L01

Objectives

- Classify the invertebrates in different groups.
- Explain the differences between segmented, flat, and round worms.
- Classify molluscs in three classifications.
- Identify the four types of arthropods.
- Explain the dangers caused to humans by some invertebrates.
- Identify some useful and dangerous invertebrates and their characteristics.
- Analyze the importance of invertebrates for the environment and life.

Topics

- Porifera, Cnidaria, and Echinoderms
- Worms
- Molluscs
- Arthropods
- Our Relationship With Invertebrates

Keywords

- exoskeleton, mutualism, nematocysts, pores, chitin, yolk

Lesson 2. The Marvelous World of Vertebrates

Code: C455G05U04L02

Objectives

- List the characteristics used to classify vertebrate animals.
- Classify vertebrate animals in five types.
- Contrast the differences between three types of fish.
- Mention and identify the variety of reptiles that exist.
- Compare the difference between reptiles and birds related to the care they give to their eggs and offsprings.
- Explain the differences between the three types of mammals, accroding to their way of reproduction.

Topics

- Fish

- Amphibians
- Reptiles
- Birds
- Mammals

Keywords

- Gills, cartilage, predatory, mammary glands, marsupials, metamorphosis, placenta

Lesson 3. The Survival of Vertebrates

Code: C455G05U04L03

Objectives

- Define adaptations and give examples.
- Describe the adaptations of vertebrates according to the environment they live in.
- Explain and identify the different types of adaptations of movements.
- Describe physiological adaptations of vertebrates.
- Explain and identify the different types of adapatations inn vertebrates related with food.

Topics

- The Survival of Vertebrates
- Changes of Structure
- Adaptations of Movements
- Physiological Adaptations
- Behavior Adaptations
- Making the Most Out of Resources of Adaptation

Keywords

- Heterotrophs, hybernation, metabolism, claws

Lesson 4. Know and Preserve the Fauna of Our Island

Code: C455G05U04L04

Objectives

- Explain the categories in which the species of our fauna are classified.
- Identify and classify the animal species that compose the Puerto Rican fauna.
- Identify and describe some amphibians and reptiles of the Puerto Rican fauna.
- Identify the river and marine fauna.
- Describe some mammals from the Puerto Rican fauna.
- Mention the animal special that are in danger of extinction.
- Identify some birds from the Puerto Rican fauna.

Topics

- Know and Preserve the Fauna of Our Island
- Our Wildlife
- Our Reptiles
- Amphibians Like the Coquí
- River and Marine Fauna
- Knowing Our Birdlife

Keywords

- Carrion, fauna, guano, symbiontic

Unit 5. The Ecosystems

At the end of the unit, the student will complete the objectives in the following lessons.

Lesson 1. Interactions in the Ecosystems

Code: C455G05U05L01

Objectives

- Describe the characteristics of producers and consumers.
- Explain how does the energy of ecosystems flows.
- Analyze how balance can be preserved in ecosystems.

Topics

- Producers
- Consumers
- Flow of Energy in Ecosystems
- Preserving the Balance in Ecosystems

Keywords

- Food chains, food webs, producers, consumers, primary consumer, secondary consumer, autotroph, heterotroph, decomposers, carnivore, herbivore, omnivore

Lesson 2. Types of Ecosystems

Code: C455G05U05L02

Objectives

- Classify the terrestrial and aquatic biomes according to present abiotic factors.
- Descrobe the adaptations of the flora and fauna in each biome.

Topics

- Terrestrial Biomes
- Aquatic Biomes
- Adaptations

Keywords

- Adaptation, biome, alpine, rainforest, temperate forest, chaparral, desert, temperate grasslands, savannah, taiga, tundra, coral reef, estuary, wetlands

Lesson 3. Changes in the Ecosystems

Code: C455G05U05L03

Objectives

- Explain the main changes in ecosystems.
- Describe the impact of humans in the ecosystems.
- Analyse the polluting effects of the human presence in ecosystems.
- Design solutions to reduce the human impact in ecosystems.

Topics

- Main Changes in Ecosystems
- The Human Impact in Ecosystems
- Pollution and Preservation of Ecosystems

Keywords

- Antropogenic effect, climate change, dessertification, preservation, biodiversity

Unit 6. All That Exists is Matter

At the end of the unit, the student will complete the objectives in the following lessons.

Lesson 1. Properties of Matter

Code: C455G05U06L01

Objectives

- Mention and define the properties of matter.
- Classify observations as quantitative and qualitative.
- Define and explain the physical properties of matter.
- Describe the physical properties of some objects or substances.
- Describe and determine mathematically the volume of an object.
- Define density.
- Define and explain the chemical properties of matter.

Topics

- Properties of Matter
- How Do You Perceive Me? I'm Matter!
- Measuring Matter
- Matter and Space
- Density of Matter
- Formula for New Substances

Keywords

- Atom, proton, neutron, electron, chemical change, qualitative, quantitative, density, mass, weight, properties of matter, temperature, volume

Lesson 2. States of Matter

Code: C455G05U06L02

Objectives

- Identify the states of matter and their main characteristics.
- Recognize the disposition of molecules in each of the states of matter.
- Recognize the effects of heat on the states of matter.
- Observe events when adding or removing heat to the matter that produces changes in its state.
- Analyze how heat is absorbed or released in each change of the states of matter.
- Define solidification, evaporation, and condensation.

Topics

- States of Matter
- Solid as Rocks
- Changes of State in Solids
- Liquid Like Rain
- When Liquid Changes State
- I'm a Gas Like the Air
- Changes of State in Gases
- The Fourth State of Matter
- Energy in Changes of States

Keywords

- Change of phase, condensation, thermal energy, states, evaporation, cohesive force, repulsive force, gas, liquid, matter, freezing point, boiling point, melting point, solidification, solid

Lesson 3. Interactions of the Matter

Code: C455G05U06L03

Objectives

- Describe pure substances and mention their characteristics.
- Describe the elements and describe their characteristics.
- Give examples of compound elements and mixtures.
- Mention the differences between, elements, compounds, and mixtures.
- Decribe the characteristics of homogeneous and heterogeneous mixtures.
- Compare and contrrast the differences between homogeneous and heterogeneous mixtures.

Topics

- Interactions of Matter
- Raw Material
- Homogeneous Mixtures
- Solutions
- Heterogeneous Mixtures
- Methods for Separating Mixtures

Keywords

- Colloid, compounds, decantation, destilation, elements, filtration, chromatography, raw matter, mixtures, homogeneous mixtures, heterogeneous mixtures, solutions, solute, suspension, solvent

Lesson 4. Organization of Matter

Code: C455G05U06L04

Objectives

- Define matter and how it is composed and organized.
- Mention different characteristics of matter.
- Define atoms and analyze the relationship between atoms and molecules.
- Describe the structure of an atom and use it to build a model.
- Describe the parts and particles of an atom.
- Know the characteristics of atoms and their charges when their electrons are transfered.

Topics

- Organization of Matter
- Modeling Matter
- Atomic Structure
- Periodic Table
- Forms Acquired by Matter
- Tunderstorms are Similar to…

Keywords

- Atoms, compounds, electrons, matter, molecules, neutrons, nucleus, protons

Unit 7. Force, Work, and Movement

At the end of the unit, the student will complete the objectives in the following lessons

Lesson 1. Force

Code: C455G05U07L01

Objectives

- Define force and explain its effects on objects.
- Recognize the different uses of the term work and its meaning to science.
- Establish the relationship between force, work, and energy.
- Mention different sources of energy that allow us to work.
- Define and explain the difference between the force of pulling and pushing.
- Define and explain other forces in nature such as pressure, gravity, and friction.

Topics

- How Does Force Works?
- Push or Pull?
- What is the Work?
- Energy and Work
- Types of Force

Keywords

- Pushing, energy, friction, force, gravity, pulling, pressure, work

Lesson 2. Motion

Code: C455G05U07L02

Objectives

- Recognize and define the terms of position and motion.
- Describe the position and motion of objects.
- Know the Newton's first law of motions and apply it in different situations.
- Define what is velocity and establish the relationship between velocity, distance, and time.
- Determine mathematically the speed of objects in motion.
- Know Newton's second law of motion and apply it in different situations.
- Know Newton's third law of motion and apply it in different situations.

Topics

- Motion
- The First Law of Motion

- Speed
- Velocity
- Acceleration and Newton's Second Law
- Desacceleration
- Newton's Third Law of Motion

Keywords

- Action, acceleration, distance, inertia, motion, position, first law of motion, speed, reaction, second law of motion, third law of motion, time, velocity

Lesson 3. Magnetic Force

Code: C455G05U07L03

Objectives

- Describe the characteristics of a magnet and the force it may exerts.
- Define magnetic force and magnetic field.
- Describe the use of electromagnets.
- Mention some uses of magnets at home and in the industry.
- Explain how magnetic force has been applied in the construction of some instruments.
- Explain how is the compass build and how it works.

Topics

- Planet Earth: A Powerful Magnet
- The Compass and Planet Earth
- Magnets in Our Daily Life
- The Electromagnet: A Strong Magnet
- Curiosities About Electricity and Electromagnets

Keywords

- Compass, magnetic field, electromagnet, magnetic force, magnet, magneto

Lesson 4. Machines and Energy

Code: C455G05U07L04

Objectives

- Describe the use of machines.
- Define what are simple machines and identify their different types.
- Recognize how simple machines help to do the job.
- Define machine, lever, pulley, inclined plane, wheel and axis, and compound machine.
- Distinguish between a simple machine and a compound machine.
- Offer examples of compound machines.
- Build functional models of compound machines.

Topics

- Machines and Energy
- More Force With the Lever
- The Pulley
- Wheel and Axis
- The Inclined Plane, Wedge, and Screw: Simple Machines
- Learn More About Simple Machines
- Energy and Mechanical Advantage

Keywords

- Wedge, axis, energy, machine, compound machine, simple machine, lever, inclined plane, pulley, wheel, screw

Unit 8. Let's Talk Energy

At the end of the unit, the student will complete the objectives in the following lessons

Lesson 1. Forms of Energy

Code: C455G05U08L01

Objectives

- Know and fedine energy and its diverse variants.
- Compare and contrast energy and work.
- Mention the types of energy.
- Define the different classes of energy.
- Recognize that calories are potencial chemical energy contained in food.

Topics

- Kinetic Energy and Potencial Energy
- Forms of Energy
- Electrical Energy
- Radiant Energy

Keywords

- Calories, electricity, static electricity, kinetic energy, mechanical energy, chemical energy, radiant energy, thermal energy, visible light, ultraviolet radiation, x-rays, work

Lesson 2. Energy Transformation

Code: C455G05U08L02

Objectives

- Define source of energy and power receiver.
- Describe the energy transference from a source to a receiver.
- Define energy transformation.
- Know the energy transformations that happen in a flashlightg.
- Describe the transformations of electrical energy to other forms of energy.
- Identify and describe closed circuit and open circuit.
- Identify and differentiate a series circuit and a parallel circuit.

Topics

- Energy Transformation
- Transferences of Radiant Energy
- Chain Reactions
- Electrical Current Flow
- Electrical Energy Trasformations

Keywords

- cable, electrical circuit, conduction, conductor, convection, electric current, source of energy, parallel, radiation, energy receiver, series, energy transference, energy transformation

Lesson 3. Alternative Sources of Energy

Code: C455G05U08L03

Objectives

- Define fossil fuel and describe its origin.
- Describe the origin, characteristics, and uses of coal, petroleum, and natural gas.
- Describe the use of fossil fuel as a source of energy.
- Recognize the importance of searching alternative sources of energy.
- Mention and identidy different sources of energy as alternatives to obtain energy.
- Describe alternative sources of energy: wind, water, geothermal, solar, and nuclear.
- Mention advantages and disadvantages of the alternative sources of energy.

Topics

- Alternative Souces of Energy
- Development and Use of Fossil Fuel
- The Environmental Impact of Using Fossin Fuel
- Eureka! There Are Alternatives for the Use of Energy!
- Use of Wind Energy
- Is Water Only for Drinking?
- Geothermal Energy
- The Brightest Energy: The Sun!
- Alternative of Nuclear Energy

Keywords

- Coal, co-generator, solar collectors, fossil fuel, nuclear energy, nuclear fission, thermonuclear fission, alternative sources of energy, natural gas, geothermal, hydrooelectric, acid rain, methane, petroleum, nuclear reactors, non-renewable resources

Unit 9. Weather and Climate

At the end of the unit, the student will complete the objectives in the following lessons.

Lesson 1. Weather and Climate

Code: C455G05U09L01

Objectives

- Define climate and how it influences in the life of humans and other organisms.
- Identify and define the factors that determine the climate.
- Identify the factors that determine the climate in a specific region.
- Recognize the importance of climatology and meteorology.
- Mention and recognize the effects of wind and water on the charasteristics of Earth.

Topics

- Earth's Climate
- Other Atmospheric Factors That Have Influence on Climate
- Interactions Between Climatic Factors
- Wind and Water Change the Surface of Earth

Keywords

- Atmosphere, climate, climatology, climatic factors, humidity, meteorlogy, precipitation, solar radiation, temperature, thermometer, wind

Lesson 2. Types of Climate

Code: C455G05U09L02

Objectives

- Describe the impact of sunrays on Earth.
- Mention and classify the climate zones.
- Identify and describe the climate zones.
- Mention the different types of climate such as: warm and rainy, dry, humid, mild, cold and humid, and polar.
- Mention how the types of climates are subdivided by regions.
- Describe the outstanding features of each type of climate.

Topics

- Types of Climate
- Learning the Types of Climate
- Dry Climates
- Humid Temperate Climates
- Humid Cold Climates
- Polar Climates
- Highland Climates

Keywords

- Climate, arid climate, humid continental climate with hot summers, tropical savanna climate, desert climate, rainforest climate, rainy climate, maritime weather, Mediterranean climate (dry subtropical), subartic climate, climatic zone

Lesson 3. Air Masses in the Changing Atmosphere

Code: C455G05U09L03

Objectives

- Evaluate how air masses move in the coasts.
- Describe the sea breeze and the land breeze.
- Describe the characteristics and movement of air masses in the atmosphere.
- Describe a front of air.
- Classify and describe the diffeernt types of fronts that can form.
- Classify and describe air masses in groups, according to the region they come from.

Topics

- Air Masses in the Changing Atmosphere
- The atmosphere is dynamic!
- Air Masses That Collide
- Fronts and More Fronts
- The Classification of Air Masses

Keywords

- Sea breeze, land breeze, convection currents, warm front, stationary front, cold front, occluded fronts, air masses, continental air masses, maritime air masses, tropical air masses

Lesson 4. Weather and Atmosphere

Code: C455G05U09L04

Objectives

- Describe the characteristics of the atmosphere.
- Identify and describe the regions in which the atmosphere is divided.
- Determine the temperature of the air using a thermometer.
- Identify the different tools used for measuring the different properties of the air.
- Describe atmospheric pressure and how it affects humans.
- Define air humidity and describe how it is produced and how it appears.
- Define precipitation and describe how it is produced and how it appears.

Topics

- Our Sweater: The Atmosphere
- The Different Features of Weather
- The Air Temperature
- The Atmospheric Pressure
- The Air Humidity
- Precipitation

Keywords

- Atmosphere, climate, degrees, mercury, nitrogen, precipitation, atmospheric pressure, weather, troposphere

Lesson 5. Climate in Puerto Rico

Code: C455G05U09L05

Objectives

- Identify and describe the factors that influence in the Puerto Rican climate.
- Identify and describe the elements that make the climate of the island.
- Recognize the importance and function of the National Weather Service in Puerto Rico.
- Identify the factors that determine the climate in a specific region.
- Identify and describe the climatic regions of Puerto Rico.
- Compare the climatic regions of Puerto Rico in terms of the temperature and precipitation that predominate in them.

Topics

- Factors that Influence in the Puerto Rican Climate
- Elements that Form the Puerto Rican Climate E

- Puerto Rico: Tropical Island
- Climatic Region of Puerto Rico

Keywords

- Height, exposition, latitude, sea level, orientation, precipitation, eastern region, western region, humid mountain region, northern humid region, southern dry region, temperature, winds

Unit 10. Our Planet Earth

At the end of the unit, the student will complete the objectives in the following lessons.

Lesson 1. Earth's Structure

Code: C455G05U10L01

Objectives

- Describe our planet Earth and explain its origin.
- Recognize how artificial satelites contribute to study Earth.
- Describe the use of models by scientists to conduct studies.
- Mention and describe Earth's outer layers.
- Describe the characteristics and composition of the hydropshere.
- Mention and describe Earth's internal layers.

Topics

- Ideas About Planet Earth
- The Creation of Our Planet
- Earth's Solid Layer
- Water Sphere
- A Great Layer: The Atmosphere
- The Internal Layers of Earth

Keywords

- Atmosphere, biosphere, layers, earth's crust, erosion, hydrosphere, lithosphere, models, mantle, core, tectonic plates, planet Earth, artificial satellites, sedimentation, troposphere

Lesson 2. Continental Movement

Code: C455G05U10L02

Objectives

- Describe the motions of earth's crust and their origin.
- Describe the Pangea theory about the origin of the continents.
- Mention and describe the evidence about the idea of the continental drift.
- Recognize that the plate tectonics theory explain the changes that happen on earth's crust.
- Recognize the seismic movements and how they happen.
- Describe the relationship between volcanos and earthquakes.
- Value the importance of community aid, especially when emergencies caused by earthquakes happen.

Topics

- The Primitive Supercontinent
- Theory of the Continental Drift
- Do Plates Move?
- Forces in Action!

Keywords

- Convergent, continental drift, divergent, fault, intensity, lava, magma, magnitude, Pangea, tectonic plates, seismograph, plate tectonic, transforming

Lesson 3. The Earth's Surface is Changing

Code: C455G05U10L03

Objectives

- Mention and identify the elements that produce changes on the earth's surface.
- Describe the erosive agents that act on earth's surface and modify it.
- Describe how gravity and wind cause soil erosion.
- Recognize how surface and ground water cause soil erosion.
- Describe rhe erosive effect of glaciers.
- Recognize the importance of preserving the soil and indicate ways of using it correctly.

Topics

- Effects of Gravity on the Landscape
- The Erosive Force of Wind
- I Travel in the Water
- Ground Water
- The Effect of Glaciers

Keywords

- Aquifer, dunes, erosion, erosive, glacier, gravity, rain, sedimentation, earth;s surface, wind

Lesson 4. Geographical Features

Code: C455G05U10L04

Objectives

- Identify ladscape features.
- Recognize the nstural agents that intervene in the changes that happen in the landscape of a place.

- Mention the characteristics of a mountanious landscape.
- Describe the ladscape of rivers and beaches.
- Describe caves and caverns.

Topics

- Landscape Features
- Water Towers
- Freshwater, Saltwater
- Prehistoric Housing

Keywords

- Cliff, tributary, sand, creek, canyon, waterfall, cavern, column, mountain range, coast, cave, delta, stalactite, stalagmite, erosion, estuary, landforms, lake, meander, mountain, plateau, landscape, beach, stream, river, sinkhole, sink, valley

Lesson 5. Landscapes of Puerto Rico

Code: C455G05U10L05

Objectives

- Identify the features of the Puerto Rican landscapes.
- Recognize the natural agents that intervene in the changes that happen in the landscape of a place.
- Mention characteristics of the mountanous landscape of the island.
- Describe the ladscape of rivers and beacher in Puerto Rico.
- Describe the caves and caverns as part of the ladscape in the island.
- Mention the cgaracteristics of the types of forests that exist in the island.

Topics

- Borinquen: The Mansion of All Good
- Our Central Mountain Range
- The Northern Karst Region
- Mudslide Plain
- Water, Divine Treasure
- Forests: Lungs of the World

Keywords

- Mudslide, reef, Borinquen, northern karst, hill, cave, mountain range, speleologist, geomorphic, plain, mangrove, mogote, mountain, Tierruca

Unit 11. The Universe

At the end of the unit, the student will complete the objectives in the following lessons.

Lesson 1. Origin and Composition of the Universe

Code: C455G05U11L01

Objectives

- Recognize the relationship between the Big Bang theory and the origin of the universe.
- Describe the nebular theory and the theory of tides about the origin of the solar system.
- Define and shows the theory of the big cloud of gas and dust.
- Describe the origin of Earth.
- Describe the motions of Earth and their effects on the seasons of the year.
- Recognize the origin of earth's crust, the amosphere, and oceans.
- Describe las características de la atmósfera primitiva de la Tierra.

Topics

- The Origin of the Solar System
- Stars, Nebula, and Galaxies in Space
- The Solar System
- The Earth
- The Primitive Atmosphere

Keywords

- Asteroids, atmosphere, Big Bang, meteor, asteroid belt, celestial bodies, star, photosphere, galaxy, hydrosphere, lava, Moon, magma, meteoroid, meteorite, planets, satellite, solar system, universe

Lesson 2. The Celestial Bodies That Form Our Solar System

Code: C455G05U11L02

Objectives

- Identify the components of the solar system.
- Describe how the solar system is organized.
- Recognize and describe the planets.
- Describe the motion of the planets.
- Identify and describe the terrestrial and outer planets.

Topics

- Knowing the Terrestrial Planets
- Outer Planets
- More Planets!

Keywords

- Asteroid, celestial body, gravity, Jupiter, Moon, Mars, Mercury, Neptune, orbit, planets, outer planets, terrestrial planets, Pluto, satellite, Earth, universe, Uranus, Venus

Lesson 3. Humans Looking at the Cosmos

Code: C455G05U11L03

Objectives

- Explain how humans learn about the cosmos.
- Mention some astronomical instruments that humans have invented to learn more about the universe.
- Explain the importance of space exploration for humans.
- Identify and describe some types of spacecrafts that humans have developed for space exploration.
- Describe the characteristics of a space shuttle.

Topics

- Observatories and Astronomical Instruments
- Humans and Space Explorations
- Projectiles and Spacecrafts
- Space Shuttles Today

Keywords

- Cosmos, observatorym telescope, technology, astronomy, rockets, ships, space satellites

Lesson 4. Celestial Vault

Code: C455G05U11L04

Objectives

- Describe the Sun and its characteristics as part of what we see in the daytime sky.
- Explain what are sun spots and solar flares.
- Describe the different classes of clouds.
- Mention and describe the Moon phases.
- Define what are eclipses.

- Explain how lunar and solar eclipses happen.
- Describe the stars and constellations as part of what we see in the nightime sky.

Topics

- Daytime Sky: The Sun
- Daytime Sky: The Clouds
- Nightime Sky: The Moon
- Eclipses: Solar and Lunar
- Nightime Sky: The Stars and Constellations

Keywords

- Altocumulus, celestial vault, Cassiopeia, Cepheus, cycle of water, sky, cirrus, constellations, crescent moon, waning gibbous, clusters, eclipse, lunar eclipse, solar eclipse, solar flares, stratum, stars, Moon, full moon, new moon, sun spots, clouds, Big Dipper, Little Dipper, Sun

Unit 12. Protecting Our Environment

At the end of the unit, the student will complete the objectives in the following lessons.

Lesson 1. Air, Water, and Soil: Components of Our Environment

Code: C455G05U12L01

Objectives

- Explain what are natural resources.
- Define and establish the differences between renewable and non-renewable resources.
- Explain and analyze the importance of the main elements of our environment: air, water, and soil.
- Describe the characteristics and composition of wate and explain its uses as a natural resource.
- Explain the characteristics and composition of air.
- Describe the composition of soil and its uses as a natural resource.

Topics

- Composition of Natural Resources
- The Precious Liquid
- Air as Natural Resource
- The Soil Resource

Keywords

- Water, air, environment, soil, natural resources, renewable resources, non-renewable resources

Lesson 2. The Natural Balance of Our Environment

Code: C455G05U12L02

Objectives

- Analyze in what consists the balance of nature.
- Explain how plants help to keep the balance in ecosystems.
- Analyse how animals intervene in the balance of ecosystems.
- Explain the role of fungi in the balance of ecosystems.
- Describe what happens when there are sudden changes in nature.
- Mention and explain how humans can alter the balance in ecosystems.
- Explain how deforestation is a danger for the flora.
- Explain why is important to promote reforestation.

Topics

- Environment On Thin Ice
- The Green Helpers
- Animals Help in Balance
- How Do We Alter the Natural Balance?
- Other Ways for Environmental Control
- Humans and Environment
- Are There Non-Renewable Resources?

Keywords

- Environment, balance, photosynthesis, animals, fungi, decomposer, forestation, renewable resources, non-renewable

Lesson 3. Ecological Initiatives in Puerto Rico: Everyone's Commitment

Code: C455G05U12L03

Objectives

- Mention the government agencies created in Puerto Rico to protect the environment and natural resources.
- Explain the Law #9 about Environmental Public Policy.
- Describe the job of the private organization Puerto Rico Industrial Mission.
- Mention cities where there are examples of environmental movements.
- Explain whar is recycling and its advantages.
- Mention materials that can be recycled.
- Distinguish between a collection center and a drop-off center.

Topics

- Functions of Environmental Protection Agencies
- Oh God, That's Up to the Government!
- Environmental Movements
- Alternatives to Protect the Environment
- Recycling is an Option
- Advantages of Recyclable Materials

Keywords

- Commitment, environmental protection agencies, recycling, preservation

Unit 13. The Human Body

At the end of the unit, the student will complete the objectives in the following lessons.

Lesson 1. Our Senses

Code: C455G05U13L01

Objectives

- Identify the importance of the senses.
- Explain how the senses help us to know the world around us.
- Identify and describe the parts of the eye.
- Explain how the eyes work and how we should take care of them.
- Identify the parts and function of the nose.
- Explain how our tongue and skin work.
- Explain how our ears functions and how we should take care of them.

Topics

- Our Senses
- Sight
- Smell
- Taste
- Touch
- Hearing

Keywords

- Hearing, ear canal, cornea, turbinates, lens, dermis, epidermis, stimulus, nostrils, taste, nerve impulse, irism tongue, nose, auditory nerve, ear, inner ear, middle ear, eye, smell, tastebuds, skin, pores, pupil, receivers, retina, saliva, sound, septum, touch, passage, sight

Lesson 2. Bones and Muscles: The Body Supports

Code: C455G05U13L02

Objectives

- Describe the importance of bones and the skeleton in the human body.
- Explain how is the strusture of bones.
- Identify and describe the different classes of joints.
- Infer the functions of each part of the skeleton.
- Identify the main parts of the human skeleton.
- Analyze the importance of muscles in humans and the need to take care of them to have a good health.

- Distinguish between voluntary and involuntary muscles.

Topics

- The Skeleton: Our Body Armor
- Let's Research the Structure of Bones
- Joints: The Base of Movements
- The Muscles and Bones are a Team
- Muscles and Bones in Action

Keywords

- Joints, hinge joint, ball joint, fixed joint, socket joint, rotary joint, bicep, spine, skull, compact bone, cancellous bone, ligament, bone marrow, involuntary muscles, voluntary muscles, synovia, skeletal system, muscular system, tendon, torax, limbs

Lesson 3. Circulatory System

Code: C455G05U13L03

Objectives

- Describe the different nutrient transport mechanisms that living things have.
- Describe the composition of blood.
- Mention and describe the organs of the circulatory system.
- Explain how the organs in the circulatory system work.
- Explain how does greater and lesser circulation happen.
- Predict the effect of exercise on the pulse.
- Explain the illnesses that affect the circulatory system and how we should take care of it.

Topics

- Know the Transportation of Nutrients
- The Ciculatory System and Its Parts
- The Circulation of Blood in Our Body
- Taking Care of the Circulatory System

Keywords

- Arteries, arteriosclerosis, greater circulation, lesser circulation, heart, hemorrhage, illnesses, white blood cells, red blood cells, heart attack, platelet, plasma, septum, circulatory system, capillaries, veins

Lesson 4. The Nervous System

Code: C455G05U13L04

Objectives

- Mention and identify the function of the different classes of nerve cells.
- Identify and describe the structures that form the central nervous system.
- Describe the peripheral nervous system and its functions.
- Describe the autonomous nervous system and its functions.
- Explain what is the reflex arc and how it functions.
- Analyze the importance of each component of the nervous system and why we must take care of it.
- Define balanced diet.

Topics

- The Nervous System
- The Central Nervous System
- The Peripheral Nervous System
- The Autonomous Nervous System
- The Reflex Arc
- Taking Care of Our Nervous System
- Recreation and Rest
- Balanced Diet

Keywords

- Reflex arc, nerve cells, motor cells, cerebellum, brain, balanced diet, stimulus, spinal cord, neurons, food pyramid, response, autonomous nervous system, central nervous system, peripheral nervous system, brain stem

Lesson 5. The Digestive and Respiratory Systems

Code: C455G05U13L05

Objectives

- Identify the organs and functions of the digestive system.
- Mention strategies to keep the digestive system healthy.
- Identify the organs and functions of the respiratory system.
- Describe some ways to keep the digestive and respiratory systems healthy.

Topics

- Ingestion and Digestion
- Am I sick?
- Taking Care of Your Digestive Sytem

- Inhale, Exhale
- How Do I Breathe?
- Illnesses… How Do I Take Care?

Keywords

- Digestion, ingestion, small intestine, large intestine, oxidation, hair

Lesson 6. The Immune System

Code: C455G05U13L06

Objectives

- Explain how vaccines help the immune system in making its job.
- Describe the importance of following the vaccines schedule.
- Identify the different cells that work in the immune system and describe their functions.
- Identify and locate the organs that compose the immune system.
- Indicate different ways to keep our immune system healthy.
- Compare and contrast the innate immune response and the acquired immune response.
- Describe how does the immune system acts when facing an antigen.

Topics

- The Immune System
- Functioning of the Immune System
- Teamwork With the Immune System

Keywords

- Antibody, antigens, phagocyte, leukocyte, lymphocyte B, lymphocyte T, adaptative response, acquired response, immune respose, innate response, immune system

Lesson 7. Nutrition

Code: C455G05U13L07

Objectives

- Define balanced diet.
- Design a menu based on a balanced diet.
- Explain the consequences of not keeping a balanced diet.
- Identify the food that must be consumed to have a good nutrition.

Topics

- Balanced Diet

- Nutrients
- The Food Pyramid

Keywords

- Calories, balanced diet, fats, minerals, nutrients, food pyramid, proteins, vitamins

Lesson 8. Development of the Human Body

Code: C455G05U13L08

Objectives

- Mention and describe the stages of the human development.
- Identify important characteristics of each human development stage.
- Compare the changes that happen to boys during adolescence with those that happen to girls.
- Explain the importance of having healthy habits during all stages of the human development.

Topics

- The Human Body and Its Development Stages
- Characteristics of Each Stage of Development of the Human Body

Keywords

- Adolescence, adulthood, development of the human body, childhood, youth, prenatal, old age