PHYSICAL SCIENCE

Course Overview

DREYFOUS

Contents

Course Description

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

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 science 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

Physical Science course is composed of eight 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 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 Earth and Space Science course.

Units are made up of the following sections:

Lesson 0

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:

- **Evaluate My Progress** Reflective exercise regarding the subject studied in the lesson.
- **Descriptive Log** The lesson plan. This includes specific lesson objectives, 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 several assorted activities and scientific research.

- **Did You Know...?** Very interesting topics and scientific curiosities that will stimulate student's imagination are presented.
- **Supplementary Projects** A variety of activities, exercises, games, and manipulatives related to the topics presented in the lesson.
- **Vocabulary** New terms are defined.
- **Knowledge Check** Various activities that 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 Physical Science

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

Lesson 1: How Do We Study the Subject?

Code: C464G0SU01L01

Objectives:

- Explain what Physical Science is and how it has developed.
- Describe how Science and scientific reasoning are present in all the activities we do.
- Explain the Scientific Method and how we apply it to our daily life.
- Establish relations between science and technology.

Key Terms

- biotechnology, control group, deductive reasoning, dependent or responding variable, energy, entomologist, experimental group, hypothesis, independent or manipulated variable, inductive reasoning, insulin, matter, medical ultrasound, physicists, qualitative observation, quantitative observation, sedentary lifestyle, technology

Lesson 2: The Measurement of Matter

Code: C464G0SU01L02

Objectives:

- Understand the different methods of measuring.
- Learn the history of the creation of the International System of Units (SI).
- Define the International System of Units.
- Learn the concepts of mass, weight, volume, time, and temperature.
- Understand the concept of conversion.

- Define concepts such as mass, weight, length, time, temperature, volume, and density.
- Solve problems involving conversions of measurements given in a particular unit into other units.
- Build graphs to represent the relationship between variables in an accurate manner.

Key Terms

- Idensity, dependent or responding variable, independent or manipulated variable, liter, length, mass, Newton, precision, SI, significant figures, unit, volume, weight

Lesson 3: The Matter

Code: C464G0SU01L03

Objectives:

- Classify matter in terms of its purity, as pure substances (elements and compounds) and mixtures.
- Identify and describe the states of matter.
- Explain the changes in the state of the matter.
- Explain and compare the physical and chemical changes matter goes through.
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Key Terms

- chemical changes, compound, diatomic elements, element, evaporation, extensive physical properties, freezing, gaseous, heterogeneous mixture, homogeneous mixture, intensive physical properties, liquids, matter, melting, mixture, monatomic elements, physical changes, physical properties, plasma, pure substances, solids, solution, sublimation, surface tension, viscosity, volatile, volume

Unit 2. The structure of matter

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

Lesson 1: The Particles of Matter

Code: C464G0SU02L01

Objectives:

- Describe the contribution of different scientists to the study of the composition of matter, up to and covering atomic theory.
- Explain the principles of the atomic theory and describe the atomic model and its subatomic particles.
- Explain how to differentiate the atoms of elements from each other based on their atomic number and mass number.
- Explain the difference between elements and compounds in terms of their composition
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Key Terms

- alchemist, alchemy, allotropes, allotropy, anion, atom, atomic mass, atomic number, atomic theory, compound, diatomic elements, diatomic molecules, electron cloud, element, ion, isotopes, law of conservation of mass, law of definite proportions, law of multiple proportions,
- molecule, molecule, monatomic ions, neutron, oxidation number, polyatomic ions, polyatomic molecule, pseudoscientists, symbol

Lesson 2: Atoms and Elements

Code: C464G0SU02L02

Objectives:

- Describe the contribution of different scientists to the organization and classification of elements based on their characteristics, including covering the periodic table.
- Explain that the periodic table is based on the principle that the physical and chemical properties of elements are a periodic function of their atomic number.
- Classify and describe the elements, according to the groups in the periodic table, as metals, nonmetals, and metalloids.

- Describe the characteristics and properties of the diverse groups of elements that make up the periodic table.

Key Terms

- actinide family, alkali metals (group IA), alkaline earth metals (group IIA), Arabic numerals, atomic mass, atomic number, atomic number, atomic structure, atomic weight, boron family (group IIIA), carbon family (group IVA), cation, halogens (group VIIA), hydrogen family, lanthanide family, metalloids, metals, modern periodic law, nitrogen family (group VA), noble gases (group VIIIA), nonmetals, oxygen family (group VIA), periodic law, periodic table, representative elements, transition elements, transition elements, valence

Lesson 3: Chemical Bonds and Compounds

Code: C464G0SU02L03

Objectives:

- Explain how chemical bonds are formed to produce compounds.
- Describe the types of bonds formed by the elements to produce compounds.
- Explain what the oxidation number is and how it engages in the formation of the compounds.

Key Terms

- anion, cation, chemical bond, covalent bond, crystals, electron affinity, electron cloud, energy layers, energy levels, ionic bond, ionization energy, Lewis structures, metallic bond, non-polar covalent bond, octet rule, oxidation number, oxidation state, period, polar covalent bond, row, valence electrons, valence

Lesson 4: Nomenclature of Inorganic Compounds

Code: C464G0SU02L04

Objectives:

- Describe what organic compounds and inorganic compounds are.
- Explain how a chemical formula expresses the exact composition of a compound.
- Write chemical formulas using monatomic and polyatomic ions.
- Accurately name compounds by their chemical formulas.

Key Terms

- binary compounds, chemical formula, coefficients, compound, empirical formula, inorganic compounds, monatomic ions, nomenclature, organic compounds, polyatomic ions, subscript, symbol, ternary compound

Lesson 5: States of Matter

Code: C464G0SU02L05

Objectives:

- Identify and describe the characteristics of the states of matter.
- Explain the laws that govern the behavior of gases.
- Describe the effect of pressure, temperature, and volume on states of matter.
- Explain the energy changes that occur when matter changes state.

Key Terms

- Amedeo Avogadro, atmospheric pressure, atomic solid, barometer, bipolar molecule, Blaise Pascal, boiling point, Boyle's law, capillary action, condensation, crystal lattice, crystal, diffusion, Evangelista Torricelli, evaporation, fusion, gas laws, gas, intermolecular forces, ionic solids, Jacques Charles, Joseph Louis Gay-Lussac, kinetic molecular theory, liquefaction, liquid, matter, melting point, metallic solids, molecular solids, pascal, plasma, pressure, Robert Boyle, Rudolph Clausius, solid, solidification, sublimation, surface tension, thermochemistry, vaporization, viscosity

Unit 3. The periodic table

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

Lesson 1: Nonmetals

Code: C464G0SU03L01

Objectives:

- Identify nonmetals in the periodic table and describe their properties.
- Explain what allotropes are and their characteristics.
- Explain the diverse ways in which nonmetal elements chemically react.
- Explain what noble gases are and describe the characteristics that distinguish them.

Key Terms

- acids, allotropes, argon, carbon, chemical properties, combustion, covalent bond, covalent oxides, density, diamond, electron affinity, electronegativity, gases, graphite, halogens, helium, Henry Cavendish, inert, insulator, interhalogens, ionization energy, Linus Pauling, metal, metalloids, neon, nitrogen family, noble gases, nonmetals, oxide, oxygen family, ozone, periodic table of elements, peroxide, phosphorus oxides, radioactive, radiotherapy, radon, Rayleigh, red phosphorus, superoxide, white phosphorus, William Ramsay, xenon

Lesson 2: Metals

Code: C464G0SU03L02

Objectives:

- Identify the alkali and alkaline earth metals in the periodic table.
- Explain the characteristics that distinguish the diverse groups of alkali metals and alkaline earth metals and their uses.
- Identify the diverse groups of transition metals in the periodic table and explain their overall characteristics and uses.
- Describe some of the typical reactions of metals and the formation of alloys.

Key Terms

- actinides, alkali metals, alkaline earth metals, alloy, beryl, chlorophyll, excited electrons, flame test, ionic bonds, lanthanides, lime, magnesium, melting, metals, mortar, oxidation numbers, photosensitive, rare-earth elements, reactivity, released energy, steel, transition elements, X-rays

Lesson 3: Organic and Biochemical Compounds

Code: C464G0SU03L03

Objectives:

- Explain what organic compounds are and how they are formed.
- Explain the difference between the molecular formula and the structural formula of some organic compounds and the bonds they form.
- Describe and explain what hydrocarbons are and the diverse types of hydrocarbons that are formed.
- Describe what biochemical compounds are and explain their characteristics and functions in living organisms.

Key Terms

- alcohol, alkane, alkene, alkyne, amine, amino acids, antibody, aromatic hydrocarbon, benzene, biochemical compound, carbohydrate, carbon, carboxylic acid, cholesterol, covalent bonds, cyclic hydrocarbon, cycloalkane, deoxyribonucleic acid (DNA), double bond, essential amino acids, ester, fructose, functional group, glucose, halocarbon, hemoglobin, hydrocarbon, inorganic compound, isomer, lactose, lipids, maltose, molecular formula, nucleic acid, oil, open-chain hydrocarbon, organic compound, proteins, ribonucleic acid (RNA), saturated hydrocarbon, single bond, structural formula, substituted hydrocarbon, sucrose, triple bond, unsaturated hydrocarbon

Unit 4. The changes of matter

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

Lesson 1: The Solutions

Code: C464G0SU04L01

Objectives:

- Describe what solutions are, their parts, and the types of solutions that can be formed.
- Explain the concept of solubility, the dissolution process, and the changes in temperature and energy that occur.
- Mention and explain the factors that affect the solubility of diverse types of substances.
- Mathematically determine the concentration of a solution and express it in diverse ways.

Key Terms

- alloys, aqueous solution, concentrate, concentration, diluted, dissolve, electrode, filtration, gaseous solution, hydration, hydrogen bond hydrophilic, hydrophobic compound, immiscible, insoluble, liquid solution, miscible, mixture, moisture, percent by mass, saturated, solid solution, solubility, soluble, solute, solution, solvent, supersaturated, universal solvent, unsaturated

Lesson 2: Chemical Reactions

Code: C464G0SU04L02

Objectives:

- Express simple chemical reactions using word equations and chemical equations.
- Apply the Law of Conservation of Mass to balance simple chemical equations.
- Identify and explain the diverse types of chemical reactions, such as synthesis, decomposition, single displacement, and double displacement.
- Explain what endothermic and exothermic chemical reactions are.

Key Terms

- activation energy, ATP hydrolysis, ATP, balanced equation, carbohydrates, cellular respiration, chemical equation, chemical reaction, coefficient, condensation, crystallization
- decomposition, degradation, distillation column, distillation, double displacement, electrolysis, endothermic reaction, exothermic reaction, lactic acid fermentation, Law of Conservation of Mass, miscible, physical state, precipitate, produce, products, reactants, single displacement, synthesis, word equation

Lesson 3: Acids, Bases, and Salts

Code: C464G0SU04L03

Objectives:

- Explain how acids are formed and describe their characteristics.
- Explain how bases are formed and describe their characteristics.
- Explain what the pH of a substance is and describe the use of indicators and a pH meter to measure the pH of a solution.
- Explain the neutralization process, the formation of salts, and their characteristics.

Key Terms

- acid, alkaline solution, amines, ammonia, antacid, base, burette, coagulation, electrolysis, equivalence point, hydrogen ion, hydronium ion, indicator, litmus paper, methyl violet, neutral, neutralization, nitrogen fixation, pH meter, pH scale, phenolphthalein, reversible reaction, salt, saponification, self-ionization of water, soap, strong acid, strong base, titration curve, titration, weak acid, weak base

Unit 5. The movement

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

Lesson 1: Rectilinear Movement

Code: C464G0SU05L01

Objectives:

- Describe the diverse ways in which an object may move.
- Define and explain the difference between concepts such as speed, velocity, distance, and displacement.
- Describe the rectilinear motion of an object using the graphical method.
- Define and explain the difference between concepts such as speed, velocity, distance, displacement, and acceleration.
- Mathematically determine the speed of an object, the distance it travels, the time it takes to travel a given distance, and its acceleration.

Key Terms

- acceleration, average speed, average velocity, constant speed, constant velocity, conversion, deceleration, dependent variable, distance, final velocity, frames of reference, free-falling objects, friction, horizontal component, independent variable, inertia, initial velocity, instantaneous speed, instantaneous velocity, interval, kinematics, kinetics, mechanics, meter per second squared, negative acceleration, position-time graph, relative motion, simple harmonic motion, speed, static, time, trajectory, units, velocity, vertical component, x-axis, y-axis

Lesson 2: The Forces

Code: C464G0SU05L02

Objectives:

- Describe and explain what a force is, the diverse types of forces that exist, and their effects on objects.
- Explain what a spring is and apply Hooke's law to determine its elongation when a force is applied.
- Explain Newton's Law of Universal Gravitation and apply it to determine the force of attraction between two bodies.

- Explain Newton’s laws of motion and apply the second law to determine the force, mass, and acceleration of an object.

Key Terms

- centripetal force, dynamometer, elasticity, electromagnetism, final elongation, final force, force of attraction, force of gravity, force of repulsion, force, friction, Hooke's law, inertia, initial elongation, initial force, Law of Universal Gravitation, magnetic force, magnetic poles, magnetism, magnitude, Newton, Newton's first law of motion, Newton's second law of motion, Newton's third law of motion, strong nuclear force, weak nuclear force

Lesson 3: Work and Energy

Code: C464G0SU05L03

Objectives:

- Explain what work and power are and mathematically determine them using the corresponding equations and units.
- Identify and describe the different known types of energy and the uses given to each one.
- Explain the Law of Conservation of Energy.
- Explain the concepts of kinetic and potential energy, and how they relate.
- Mathematically determine the kinetic energy and potential energy of an object.

Key Terms

- chemical energy, electromagnetic spectrum, eolic or wind energy, force, geothermal energy, geysers, hydroelectric energy, joule, kinetic energy, Law of Conservation of Energy, light energy or light, newton, nuclear energy, nuclear reactor, potential energy, power, solar energy, thermal energy, tidal energy, watt, work

Unit 6. Energy

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

Lesson 1: Heat and Temperature

Code: C464G0SU06L01

Objectives:

- Explain the difference between heat and temperature and explain how heat produces the thermal expansion of the three states of matter.
- Explain what specific heat is, the application of specific heat to determine the heat gained or lost by an object, and how to mathematically determine the heat gained or lost by an object when its temperature changes.
- Explain what a calorimeter is, its operation and its uses, and mathematically determine the final temperature reached in an isolated system, such as a calorimeter.
- Explain the relationship between chemical reactions and thermal energy and what the heat of reaction is.

Key Terms

- absorbed energy, Anders Celsius, caloric theory, calories, calorimeter, Celsius scale, chemical equation, chemical reactions, combustion calorimeter, endothermic reaction, equation, exothermic reaction, expansion, Fahrenheit scale, Gabriel Fahrenheit, heat of reaction, heat, internal energy, joules, Kelvin scale, kinetic energy, Lord Kelvin, mercury, molecular kinetic theory, potential energy, specific heat, system, temperature scale, temperature, temperature, thermal energy, thermal energy, thermal equilibrium, thermal expansion, thermochemistry, volume, water

Lesson 2: Electricity

Code: C464G0SU06L02

Objectives:

- Explain what electric charges are and apply Coulomb's law to describe and mathematically determine the force of attraction between two charges and the magnitude of an electric charge.
- Describe electrical conduction in varied materials and explain what to charge by induction and by conduction means.

- Describe an electrical circuit and its parts and mathematically determine the intensity of the current, the voltage, and the power consumed by an appliance.
- Explain Ohm's law and use it to determine the intensity of the current, resistance, and voltage in a circuit.

Key Terms

- ammeter, ampere, atom, charge by conduction, charge, circuit, conductors, coulomb, Coulomb's law, electric current, electrically polarized, electricity, electrons, electroscope, friction, generator, George Ohm, induction, insulators, ion, ionic solids, negative charge, neutrons, Ohm's law, parallel circuit, positive charge, potential difference, potential energy, protons, resistance, semiconductors, series circuit, solar cell, solid conductor, superconductors, volt, voltage, voltaic cell, voltmeter

Lesson 3: Radioactivity and Nuclear Energy

Code: C464G0SU06L03

Objectives:

- Explain what radioactive elements are and describe the uses of radioactivity.
- Describe nuclides, ionizing radiation, and the interaction between ionizing radiation and matter.
- Define the units for measuring nuclear radiation, describe the harmful effects of nuclear radiation, and explain nuclear fusion and fission.
- Explain the diverse types of radioactive decay, express a nuclear reaction through a nuclear equation, and explain what the half-life of radioactive elements is.

Key Terms

- activity, agricultural research, alpha particles, beta particles, chain reaction, chemotherapy, chromosomes, cosmic radiation, depleted uranium, diagnosis, gamma rays, genetic mutations, half-life, immune system, ionization, ionizing radiation, isotopes, neutrons, nuclear fission, nuclear radiation, nuclear reaction, nuclear reactors, nuclides, radiation, radioactive decay, radioactive elements, radioactive isotopes, radioactivity, radiotherapy, rem, stable nuclei, strong nuclear force, thermonuclear reactions, transmutation, unstable nuclei, weapons of war, X-rays

Unit 7. Image and sound

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

Lesson 1: The Waves

Code: C464G0SU07L01

Objectives:

- Mention and explain the characteristics of waves.
- Mathematically determine the frequency and period of a wave.
- Explain the relationship between the waves and the energy they carry.
- Explain what the electromagnetic spectrum is and the types of radiation that constitute it.

Key Terms

- absorption, amplitude, angle of incidence, angle of reflection, beams, broadcasting, collisions, constructive interference or reinforcement, crest, destructive interference or cancellation, elastic factor, electromagnetic spectrum, electromagnetic waves, frequency, gamma rays, inertial factor, infrared radiation, infrared, interference, ionosphere, kinetic energy, law of reflection, longitudinal wave, mechanical waves, medium, period, perpendicular, photon, radiant energy, radiation, random, reflection, refraction, resistance, superposition principle, surface wave, terrestrial radiation, transverse wave, ultraviolet, valleys, wave pulse, wave train, wave, wavelength, X-rays

Lesson 2: Color

Code: C464G0SU07L02

Objectives:

- Describe the evolution of color theory and explain what the color spectrum is and our ability to see.
- Explain how secondary color of light and secondary pigments are formed, and the differences between them.
- Describe and explain the color of objects when they are illuminated by lights of assorted colors.
- Explain what the spectrum of the elements is and how it helps identify them.

Key Terms

- beams, colors of light, complementary color, concentric layers, continuous spectrum, dispersive prisms, electrical impulses, electromagnetic energy, eye structure, hues, light energy, line spectrum, mixtures, nanometer, pigment, primary, prism, range of colors, retina, secondary, selective reflection, spectroscope, spectrum, suspensions, transparent media, visible light, visual sensation, wave

Lesson 3: The Light

Code: C464G0SU07L03

Objectives:

- Explain the theories about the nature of light and describe its behavior.
- Describe the types of lenses, the images they form, and their uses in different devices.
- Describe what a laser is and its uses.
- Describe the parts of a camera, explain how it works, and compare it with the human eye.

Key Terms

- aberrations, artificial luminous, chromatic aberration, compound microscopes, concave lens, convex lens, corpuscular theory, hologram, illuminated, laser, natural luminous, opaque, projector, real image, spectroscopy, spherical aberration, telescope, translucent, transparent, viewfinders, virtual image, virtually, wave theory

Lesson 4: The Sound

Code: C464G0SU07L04

Objectives:

- Explain what sound is, describe the characteristics of sound waves, and mathematically determine wave speed, frequency, and wavelength.
- Describe the behavior of sound in the ocean and how dolphins use their sonar and echolocation abilities.
- Explain the Doppler effect and its uses and applications.

- Describe what acoustics is, mention the parts of the ear, and explain how this work so we can listen.

Key Terms

- aerodynamic, echolocation, hypersonic, protuberance, sonar, sounds, subsonic, supersonic, Doppler effect, Doppler ultrasound, probe, receiver, sender, ultrasound, acoustics, decibels, inner ear, grooves, middle ear, outer ear, threshold of audibility, acoustics, aerodynamic, decibels, Doppler effect, Doppler ultrasound, echolocation, grooves, hypersonic, inner ear, middle ear, outer ear, probe, protuberance, receiver, sender, sonar, sounds, subsonic, supersonic, threshold of audibility, ultrasound

Unit 8. Physical Sciences and the environment

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

Lesson 1: The Terrestrial Environment

Code: C464G0SU08L01

Objectives:

- Explain what biogeochemical cycles are.
- Differentiate between the water, carbon, and nitrogen cycles.
- Explain the concept of climate and describe the factors that determine climate.
- Explain what biomes are and describe some of them.
- Describe how different activities related to agriculture affect the environment.

Key Terms

- adaptation, aerobic bacteria, ATP, biogeochemical cycles, biological transfer, biomagnification, biome, carbon cycle, carbon dioxide, carnivores, chlorinated hydrocarbons, climate, condensation, DDT, denitrification, desert, El Yunque, evaporation, extinction, fauna, fertilizer, flora, herbivores, humidity, nitrification, nitrogen cycle, nitrogen, pesticides, pests, phosphorus, photosynthesis, prairie, precipitation, precipitation, predator, radiant energy, rainforest, savanna, temperature, transpiration, tropical rainforest, water cycle, wet season, winds

Lesson 2: The Aquatic Environment

Code: C464G0SU08L02

Objectives:

- Describe the chemical and physical properties of water.
- Describe water pollutants and the sources that produce them and explain how they pollute water.
- Mention and explain the factors that determine water quality.
- Explain the processes of drinking water production and wastewater treatment.

Key Terms

- acidic substances, alkalinity, biodegradability, BOD test, carcinogen, chemical oxygen demand, chlorides, cohesion, DDT, decomposers, desalination, drinking

water, filtration plant, filtration, flocculators, fluorides, heat of condensation, heat of vaporization, heavy metals, hydrogen bond, ion exchange, mining industry, non-persistent pollutant, organic compounds, organic matter, persistent pollutant, pollutant, polymer, potable, primary treatment plant, production, properties, raw water, safe water, salinity, sedimentation tanks, silt, surface tension, surfactants, suspended solids, thermal pollution, toxics, turbidimeter, turbidity, universal solvent, wastewater, water

Lesson 3: The Atmospheric Environment

Code: C464G0SU08L03

Objectives:

- Describe the characteristics of the atmosphere.
- Explain the composition of the different layers of the atmosphere.
- Describe air pollutants and the sources that produce them and explain how they pollute the atmosphere.
- Explain how the acids that pollute the atmosphere are formed, how these form acid rain, and the harmful effects of acid rain.

Key Terms

- acid rain, acidify, asbestos, atmospheric environment, atmospheric pollution, electromagnetic spectrum, exosphere, industrialization, ionosphere, mesopause, mesosphere, nitrogen oxides, oxidizing agent, ozone, particulate, peroxyacetyl nitrate, photochemical smog, primary pollutants, secondary pollutants, stratopause, stratosphere, sulfur dioxide, tropopause, troposphere, ultraviolet radiation, ultraviolet region, volatile organic compounds, volatile