

# Science

## Course Description



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## Series Description

This EduSystem's Science K-6 series was developed based on the curricular design Puerto Rico Core Standards and the Curriculum Framework created by the Department of Education of Puerto Rico. Additionally, the content has been enriched with curricular frameworks developed by other educational entities and private schools.

This series presents the content in a dynamic, stimulating, innovative and recreational manner. The series gives the students the opportunity to build their knowledge through the cognitive development of scientific keywords, principles, and laws. The series also encourages the study of this discipline by putting scientific research, science skills, and the scientific method within the student's reach.

## Conceptual Framework

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

1. The need for emphasis on:
  - ▶ Encouraging students to think logically and analytically to develop reasoning and interpretive skills used for problem solving during the learning process.
  - ▶ Learning science by “doing science” through the completion of various activities, experiments, and scientific inquiry.
  - ▶ Promoting curricular integration and the application of scientific keywords to real life situations.
  - ▶ Systematically organizing the learning process (in sequence, going from the concrete to the abstract).
  - ▶ Encouraging the development of multiple talents and the opportunity to express them in different ways.
  - ▶ Promoting the development of keywords, principles, laws, scientific processes, and related skills.
  - ▶ Providing strategies to address the individuality of each student
2. The activities integrate a constructivist approach by encouraging more student participation in the building of knowledge and the development of skills.

## General Objectives

The objectives of this Series are to:

- ▶ Promote learning through real life experiences.
- ▶ Encourage the use of information technology as a learning tool.
- ▶ Educate students on the protection and conservation of the environment.
- ▶ Promote reflection and self-evaluation during the learning process
- ▶ Promotes experiences for the development and appreciation of science and the world around us
- ▶ Integrate the different scientific disciplines, such as chemistry, physics, and biology, among others with disciplines from other fields.
- ▶ Encourage participation in scientific inquiry and the development of keywords, skills and scientific processes.
- ▶ Integrate standards and grade level expectations. Encourage students to work with both concrete and abstract keywords.
- ▶ Provide situations, activities, and exercises to actively build and apply knowledge to different situations.
- ▶ Encourage students to work with both concrete and abstract keywords.
- ▶ Contribute to the development of language as a means of individual and collective communication while incorporation of scientific vocabulary.
- ▶ Enrich the lessons with level appropriate documents, activities, and exercises.
- ▶ Highlight the scientific environment in accordance with grade level.

## Course Structure

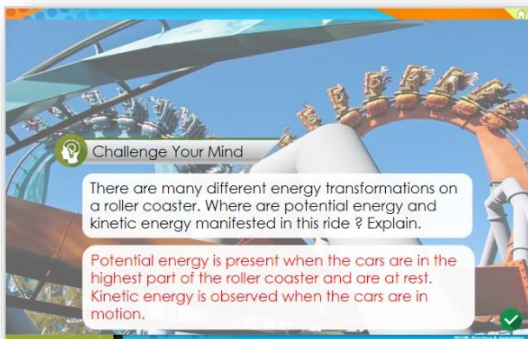
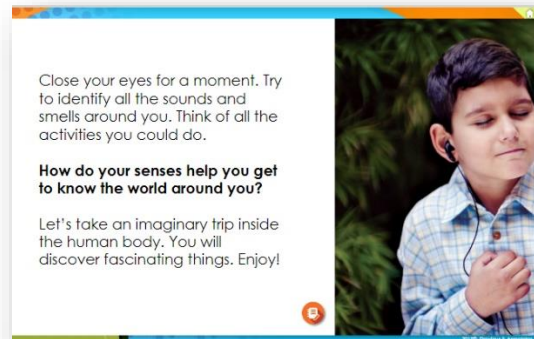
The course Science 6 is composed of ten units. Each unit is composed of lessons. Each lesson is divided into sections that develop their individual topics. Each lesson contains a descriptive log, activities, worksheets and handouts that are related to the content and, as in most cases, website links and resources. It also proposes assessment exercises in order to help the students in different tasks.

Here are some of the sections normally found in each lesson's presentation and documents.

### Presentation

#### Let's Explore

In this section, the students will look at important details of a photograph. Additionally, they will discuss and answer questions geared toward increasing their curiosity towards different topics that will be discussed in the lessons.



#### Topics

Concept development, where the content will be discussed using specific situations for exploration while presenting other examples

## Icons

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



### Challenge Your Mind

A situation or an exercise Will be presented to the students so they can develop their critical thinking skills.



### Connect What You Have Learned

that can be applied to daily life. This will also help them understand what was studied in class.



### Scientists in Action

Diverse assessment activities in which the students can express themselves and apply what they have learned about any topic discussed in class.



### Link with...

In this section, students will be able to 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 **Link with...** section.

## Interactive Icons



**Audio**



**Diagram**



**Images**



**Videos**



**Games**



**Answers**



**Lecture**



**Internet**



**Animation**



**Steps**



**Information**



**Writing  
Assignments**



**Music**



**Let's Solve  
Together**

## Handouts and Worksheets

### Let's Investigate

This document presents an inquiry activity in which the students will learn science by “doing science” and participate in activities related to scientific investigation.

### Did you know?

This document presents intriguing scientific topics and trivia to stimulate students' imaginations

### Stimulate your mind

This document includes a number of stimulating activities that will help students better understand the topics discussed in class.

### Ecological Awareness

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

### Scientific Zone

This document presents a scientific concept related to a specific 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

Practical exercises to verify the student's learning process.

The lessons 00 contain unit documents that may be used at the beginning, during, or after discussing the corresponding unit.



## Unit Breakdown

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

### Unit 0. Let's investigate Science

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

#### Lesson 0. Basic Concepts

Code: C417G06U00L00

##### Objectives

- ▶ Identify instruments that are commonly used in the laboratory and describe their function.
- ▶ Recognize the skills for carrying out scientific processes.
- ▶ Identify the safety equipment necessary to work in the laboratory.
- ▶ Describe the safety rules for working in the laboratory and in the field.
- ▶ Recognize the scientists that contributed to the invention of the light microscope.
- ▶ Identify the parts of the light microscope and their functions.
- ▶ Recognize the International System of Units as the system of measurements used in science in the whole world.

##### Topics

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

##### Keywords

- |                      |                     |                     |
|----------------------|---------------------|---------------------|
| ▶ arm                | ▶ coat              | ▶ safety goggles    |
| ▶ base               | ▶ latex gloves      | ▶ scale             |
| ▶ beaker             | ▶ lighter           | ▶ scientific skills |
| ▶ coarse focus       | ▶ microscope        | ▶ stage             |
| ▶ fine focus         | ▶ microscope slide  | ▶ stage clips       |
| ▶ flask              | ▶ mortar and pestle | ▶ test tube         |
| ▶ funnel             | ▶ objective lenses  | ▶ test tube rack    |
| ▶ graduated cylinder | ▶ ocular lens       | ▶ tube              |
| ▶ illuminator        |                     |                     |
| ▶ laboratory         |                     |                     |

## Lesson 1. Scientific Knowledge

Code: C417G06U00L01

### Objectives

- ▶ Identify information as scientific or non-scientific data.
- ▶ Distinguish what science is from what pseudoscience is.

### Topics

- ▶ Common Knowledge and Scientific Knowledge
- ▶ Science and Pseudoscience

### Keywords

- ▶ common knowledge
- ▶ empirical knowledge
- ▶ pseudoscience
- ▶ science
- ▶ scientific knowledge

## Lesson 2. The Scientific Method

Code: C417G06U00L02

### Objectives

- ▶ Describe the history and origin of the scientific method.
- ▶ Identify Galileo's role in the development of modern science.
- ▶ Describe the characteristics of the scientific method.
- ▶ Explain the stages of the scientific method.
- ▶ Develop a simple investigation following the scientific method.

### Topics

- ▶ History and Origin
- ▶ Definition and Characteristics

### Keywords

- ▶ experimental method
- ▶ logical method
- ▶ scientific method

### Lesson 3. Scientific Research

Code: C417G06U00L03

#### Objectives

- ▶ Describe the role of technology in scientific research.
- ▶ Identify and explain examples of scientific fraud.
- ▶ Distinguish reliable sources of information from ones 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

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

### Lesson 4. The Scientific Method Everywhere

Code: C417G06U00L04

#### Objectives

- ▶ Identify possible scenarios and situations in which the scientific method can be used to conduct research.
- ▶ Identify the scientific method as a way of researching that can be used by anyone.
- ▶ Explain how the scientific method can be used in different investigative scenarios.

#### Topics

- ▶ The Scientific Method in Daily Life
- ▶ The Scientific Method, in the Garden?

#### Keywords

- ▶ scientific method

## Unit I. Classifying living things

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

### Lesson 0. Classifying living things

**Code:** C417G06U01L00

Unit's documents: Scientific zone, Let's investigate, Scientists in action, Evaluation, My Scientific Journal

### Lesson 1. Characteristics of living things

**Code:** C417G06U01L01

#### Objectives

- ▶ Distinguish between living things and matter.
- ▶ Mention the characteristics of living things.
- ▶ Describe the process of life: growth, energy uses, responses to a stimulus, and reproduction.
- ▶ Describe the process of photosynthesis.
- ▶ Explain the relation between mitosis and growth.
- ▶ Point out the differences and the similarities between an asexual reproduction and a sexual reproduction.
- ▶ Compare the structures of a plant cell and an animal cell.
- ▶ Build models of a plant cell and an animal cell.

#### Topics

- ▶ Characteristics of living things
- ▶ Growth of living things
- ▶ We need energy!
- ▶ Living things respond to a stimulus
- ▶ Reproduction of living things
- ▶ What are living things made of?
- ▶ Functions of a cell structure

## Keywords

- ▶ adaptation
- ▶ Anthony van Leewenhoek
- ▶ asexual reproduction
- ▶ cell
- ▶ cell membrane
- ▶ cell wall
- ▶ chloroplast
- ▶ cytoplasm
- ▶ energy
- ▶ fertilization
- ▶ growth
- ▶ life processes
- ▶ microscope
- ▶ mitochondria
- ▶ mitosis
- ▶ nucleus
- ▶ organelle
- ▶ photosynthesis
- ▶ Robert Hooke
- ▶ sexual reproduction
- ▶ stimulus

## Lesson 2. The Kingdoms of nature

Code: C417G06U01L02

### Objectives

- ▶ Explain the importance of classifying living things.
- ▶ Mention and describe the five kingdoms in which living things are classified.
- ▶ Describe the levels that are used to classify living things.
- ▶ Develop a classification diagram.
- ▶ Define autotroph and heterotroph.
- ▶ Explain how a scientific name is given to a living thing.

### Topics

- ▶ Is it important to classify living things?
- ▶ Characteristics used to classify living things
- ▶ The kingdoms of nature
- ▶ Learning about protists!
- ▶ Fungi kingdom

### Keywords

- ▶ Alexander Fleming
- ▶ animal
- ▶ autotrophs
- ▶ bacteria
- ▶ ciliates
- ▶ class
- ▶ classification
- ▶ consumers
- ▶ cyanobacteria
- ▶ decomposers
- ▶ diatoms
- ▶ eukaryote
- ▶ family
- ▶ flagella
- ▶ fungi
- ▶ genus
- ▶ heterotrophs
- ▶ invertebrates

- ▶ kingdoms
- ▶ microscope
- ▶ monera
- ▶ nonvascular plant

- ▶ order
- ▶ phylum
- ▶ plant
- ▶ produce

### Lesson 3. Our surroundings are full of microorganisms!

Code: C417G06U01L03

#### Objectives

- ▶ Define microorganism.
- ▶ Explain why some bacteria are beneficial and some are harmful.
- ▶ Summarize the benefits of nitrifying and saprophytic bacteria for living things and the environment.
- ▶ Describe the process of fermentation performed by certain bacteria briefly.
- ▶ Mention different examples of food that are produced through the process of fermentation.
- ▶ Explain the methods used to sterilize food.
- ▶ Mention and explain the importance of vaccines and antibiotics in order to fight diseases.

#### Topics

- ▶ Microorganisms: friends or foes?
- ▶ What do bacteria do?
- ▶ Nitrifying bacteria
- ▶ Microorganisms in our food
- ▶ Let's prevent microorganism growth!
- ▶ Can food be sterilized?
- ▶ Attacking microorganisms!
- ▶ Antibacterial substances

#### Keywords

- |                       |                        |
|-----------------------|------------------------|
| ▶ antibiotics         | ▶ food                 |
| ▶ antibodies          | ▶ fungicide            |
| ▶ antitoxins          | ▶ germs                |
| ▶ autoclaves          | ▶ hygiene              |
| ▶ bactericide         | ▶ microorganisms       |
| ▶ bioluminescence     | ▶ nitrifying bacteria  |
| ▶ contagious diseases | ▶ nitrogen fixation    |
| ▶ decomposition       | ▶ pasteurization       |
| ▶ dehydration         | ▶ saprophytic bacteria |
| ▶ disinfectants       | ▶ toxins               |
| ▶ fermentation        | ▶ vaccines             |

## Unit 2. Reproduction of living things

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

### Lesson 0. Reproduction of living things

**Code:** C417G06U02L00

Unit's documents: Scientific zone, Let's investigate, Scientists in action, Evaluation, My Scientific Journal

### Lesson 1. Microorganism reproduction

**Code:** C417G06U02L01

#### Objectives

- ▶ Differentiate between asexual reproduction (mitosis) and sexual reproduction (meiosis).
- ▶ Define prokaryotes and eukaryotes.
- ▶ Describe the forms of bacterial reproduction: binary fission, conjugation, and transformation.
- ▶ Describe the forms of protistic reproduction.
- ▶ Explain the reproduction of fungi.
- ▶ Describe the characteristics of viruses.
- ▶ Contrast the types of reproduction of microorganisms.

#### Topics

- ▶ Microorganism reproduction
- ▶ Varied reproduction
- ▶ Monera, a unique reproduction
- ▶ What a reproductive diversity!
- ▶ Protists: extraordinary beings
- ▶ Protozoa: animals or bacteria?
- ▶ A very effective reproduction?

#### Keywords

- ▶ algae protists
- ▶ amoeba
- ▶ archaeobacteria
- ▶ asexual reproduction
- ▶ bacteria
- ▶ binary fission
- ▶ bioluminescence
- ▶ bud
- ▶ budding
- ▶ cells
- ▶ chlorophyll
- ▶ chromosomes

- ▶ conjugation
- ▶ dinoflagellates
- ▶ euglena
- ▶ eukaryotes
- ▶ fragmentation
- ▶ fungi
- ▶ fungi kingdom
- ▶ fungi protists
- ▶ golden algae
- ▶ hypha
- ▶ meiosis
- ▶ microorganism
- ▶ moldy fungi

- ▶ Monera kingdom
- ▶ paramecium
- ▶ pili
- ▶ plasmoid
- ▶ prokaryotes
- ▶ protist kingdom
- ▶ protozoa
- ▶ reproduction
- ▶ sexual reproduction
- ▶ sporangium
- ▶ spores
- ▶ transformation
- ▶ unicellular

## Lesson 2. Plant reproduction

Code: C417G06U02L02

### Objectives

- ▶ Describe vascular and nonvascular plants.
- ▶ Define: xylem, phloem, angiosperms, and gymnosperms.
- ▶ Explain the forms of reproduction of: algae, bryophyte, ferns, angiosperm, and gymnosperm plants.
- ▶ Identify and describe the functions of the parts of a flower.

### Topics

- ▶ Plant reproduction
- ▶ An algae salad
- ▶ An old friendship between moss and hepatica
- ▶ Do all vascular plants reproduce the same way?
- ▶ Ferns are vascular plants, yet seedless
- ▶ Seeds for everybody

### Keywords

- |               |               |                     |
|---------------|---------------|---------------------|
| ▶ algae       | ▶ colony      | ▶ fronds            |
| ▶ angiosperm  | ▶ coniferous  | ▶ gametes           |
| ▶ anther      | ▶ conjugation | ▶ gametophyte       |
| ▶ antheridium | ▶ corolla     | ▶ gymnosperm        |
| ▶ archegonium | ▶ embryo      | ▶ hepatica          |
| ▶ briophytes  | ▶ ferns       | ▶ moss              |
| ▶ calyx       | ▶ filament    | ▶ nonvascular plant |



- ▶ petals
- ▶ pili
- ▶ pistil

- ▶ phloem
- ▶ pollen
- ▶ receptacles

- ▶ rhizoid
- ▶ rhizome

### Lesson 3. Animal reproduction

Code: C417G06U02L03

#### Objectives

- ▶ Explain the importance of animal reproduction.
- ▶ Describe the different forms of reproduction of invertebrates.
- ▶ Explain the sexual reproduction of vertebrates.
- ▶ Distinguish between internal and external fertilization.
- ▶ Define the different forms of sexual reproduction.
- ▶ Illustrate examples of fragmentation, budding, and binary fission in a diagram.

#### Topics

- ▶ An animal makes a new animal
- ▶ Animal reproduction
- ▶ Keep on reproducing!
- ▶ Animal fertilization

#### Keywords

- |                          |                          |
|--------------------------|--------------------------|
| ▶ amphibians             | ▶ internal fertilization |
| ▶ asexual reproduction   | ▶ invertebrates          |
| ▶ backbone               | ▶ Lamarck                |
| ▶ birds                  | ▶ mammals                |
| ▶ bud                    | ▶ meiosis                |
| ▶ budding                | ▶ mitosis                |
| ▶ crossbreeding          | ▶ multicellular          |
| ▶ egg                    | ▶ ovary                  |
| ▶ external fertilization | ▶ ovule                  |
| ▶ fertilization          | ▶ regeneration           |
| ▶ fish                   | ▶ reptiles               |
| ▶ fission                | ▶ sexual reproduction    |
| ▶ fragmentation          | ▶ sperm                  |
| ▶ gametes                | ▶ sterile                |
| ▶ gonads                 | ▶ testicles              |
| ▶ hermaphrodites         | ▶ vertebrates            |
| ▶ hydra                  | ▶ zygote                 |

## Lesson 4. Our marvelous reproductive system

Code: C417G06U02L04

### Objectives

- ▶ Describe the anatomy and physiology of the female reproductive system.
- ▶ Describe the anatomy and physiology of the male reproductive system.
- ▶ Explain the process of fertilization briefly.
- ▶ Point out the difference between zygote, blastocyst, embryo, fetus, and baby.
- ▶ Describe the stages of the life cycle of a human being.
- ▶ Distinguish between single and multiple pregnancies

### Topics

- ▶ A wonderful system
- ▶ Male reproductive system
- ▶ Female reproductive system
- ▶ Fertilization
- ▶ The great experience of being born
- ▶ Development of a child: a small and wise being
- ▶ Development of a teenager

### Keywords

- |                       |                       |                 |
|-----------------------|-----------------------|-----------------|
| ▶ adolescence         | ▶ ejaculation         | ▶ fertilization |
| ▶ androgens           | ▶ ejaculatory conduct | ▶ fetus         |
| ▶ belly button        | ▶ egg                 | ▶ follicles     |
| ▶ birth               | ▶ embryo              | ▶ gamete        |
| ▶ bladder             | ▶ endometrium         | ▶ gonad         |
| ▶ blastocyst          | ▶ epididymis          | ▶ hair          |
| ▶ bulbourethral gland | ▶ estrogen            | ▶ hormones      |
| ▶ cervix              | ▶ fallopian tubes     | ▶ hypophysis    |
| ▶ childhood           |                       |                 |

## Lesson 5. Inheriting traits

Code: C417G06U02L05

### Objectives

- ▶ Explain the relation between heredity and genetics.
- ▶ Explain why there are different amounts of chromosomes present in sex cells and from the rest of the body cells.
- ▶ Describe the importance of Mendel's experiments in the field of genetics.

- ▶ Describe a dominant and a recessive allele.
- ▶ Differentiate a phenotype from a genotype.
- ▶ Use a Punnett square to solve problems that contain a dominant and a recessive trait.
- ▶ Explain the concept of incomplete dominance.

### Topics

- ▶ Inheriting traits
- ▶ How are traits inherited?
- ▶ Heredity, such a great diversity!
- ▶ Genes, trait multipliers

### Keywords

- |                        |                               |
|------------------------|-------------------------------|
| ▶ allele               | ▶ meiosis                     |
| ▶ behavior adaptations | ▶ morphological adaptations   |
| ▶ carrier              | ▶ Multiple Factors Hypothesis |
| ▶ characteristics      | ▶ mutation                    |
| ▶ chromosomes          | ▶ Nilsson-Ehle                |
| ▶ cross pollination    | ▶ offspring                   |
| ▶ crossbreeding        | ▶ ovule                       |
| ▶ DNA                  | ▶ phenotype                   |
| ▶ dominant genes       | ▶ physiological adaptations   |
| ▶ egg                  | ▶ progenitor                  |
| ▶ gametes              | ▶ Punnett square              |
| ▶ generation           | ▶ recessive genes             |
| ▶ genetic manipulation | ▶ Reginald C. Punnett         |
| ▶ genetics             | ▶ selective breeding          |
| ▶ genotype             | ▶ self-fertilization          |
| ▶ Gregor Mendel        | ▶ self-pollination            |
| ▶ heredity             | ▶ sperm                       |
| ▶ hybrid               | ▶ trait                       |
| ▶ incomplete dominance | ▶ Walter Fleming              |
| ▶ Karl Correns         | ▶ Walter Sutton               |
| ▶ Louis Pasteur        | ▶ zygote                      |

## Unit 3. A journey through the body

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

### Lesson 0. A journey through the body

**Code:** C417G06U03L00

Unit's documents: Scientific zone, Let's investigate, Scientists in action, Evaluation, My Scientific Journal

### Lesson 1. The digestive system

**Code:** C417G06U03L01

#### Objectives

- ▶ Identify the parts of the digestive system.
- ▶ Describe the functions of the structures in the digestive system.
- ▶ Number the functions of essential nutrients.
- ▶ Define and describe the processes of ingestion, absorption, and reabsorption.
- ▶ Number the causes and effects of digestive disorders.
- ▶ Describe the systems of the human body that have an excretory function.
- ▶ Identify and describe the organs that make up the urinary system.

#### Topics

- ▶ What happened to what I ate?
- ▶ The digestive system: what is it and how does it work?
- ▶ Absorption and reabsorption
- ▶ The digestive system is sick!
- ▶ Let's get rid of our waste
- ▶ Sweat glands
- ▶ A team that eliminates waste
- ▶ Kidneys: a closer look

## Keywords

- ▶ absorption
- ▶ bile
- ▶ bladder
- ▶ blood
- ▶ sugars
- ▶ carbohydrate
- ▶ cavities
- ▶ constipation
- ▶ diarrhea
- ▶ digestion
- ▶ digestive enzymes
- ▶ digestive system
- ▶ enamel
- ▶ esophagus
- ▶ excretion
- ▶ fats
- ▶ fecal matter
- ▶ feces
- ▶ filtration
- ▶ gastric acids
- ▶ gastritis
- ▶ ingestion
- ▶ kidneys
- ▶ large intestine
- ▶ liver
- ▶ minerals
- ▶ nephrons
- ▶ nutrients
- ▶ pancreas
- ▶ pancreatic acid
- ▶ peristaltic movements
- ▶ proteins
- ▶ pyloric sphincter
- ▶ reabsorption
- ▶ salivary glands
- ▶ small intestine
- ▶ stomach
- ▶ sweat
- ▶ sweat glands
- ▶ teeth
- ▶ ulcers
- ▶ ureters
- ▶ urethra
- ▶ vitamins
- ▶ water

## Lesson 2. The respiratory system

Code: C417G06U03L02

### Objectives

- ▶ Distinguish between internal and external respiration.
- ▶ Explain the relationship between respiration and digestion.
- ▶ Identify the structures of the respiratory system.
- ▶ Describe the function of the parts or organs of the respiratory system.
- ▶ Describe the process of inhalation and exhalation.

### Topics

- ▶ Breathing is so important!
- ▶ What does the oxygen do?
- ▶ Organs found in the respiratory system
- ▶ What are the lungs like?
- ▶ Inhale and exhale
- ▶ How do the lungs help us eliminate wastes?

## Keywords

- ▶ air
- ▶ alveoli
- ▶ blood
- ▶ bronchi
- ▶ bronchioles
- ▶ capillaries
- ▶ carbon dioxide
- ▶ cells
- ▶ diaphragm
- ▶ energy
- ▶ epiglottis
- ▶ esophagus
- ▶ exhalation
- ▶ external respiration
- ▶ gas exchange
- ▶ gasses
- ▶ heart
- ▶ inhalation
- ▶ internal respiration
- ▶ larynx
- ▶ lungs
- ▶ nasal cavities
- ▶ nitrogen
- ▶ nose
- ▶ oxidation
- ▶ oxygen
- ▶ plasma
- ▶ platelets
- ▶ pulmonary artery
- ▶ pulse
- ▶ red blood cells
- ▶ right atrium
- ▶ right ventricle
- ▶ subclavian artery
- ▶ superior vena cava
- ▶ systole
- ▶ valves
- ▶ veins
- ▶ venous capillaries
- ▶ white blood cells

## Lesson 3. The circulatory system and circulation

Code: C417G06U03L03

### Objectives

- ▶ Describe the function of the circulatory system.
- ▶ Describe the function of the lymphatic system.
- ▶ Identify the structures or organs of the circulatory system.
- ▶ Illustrate the parts of the heart.
- ▶ Describe the organs of the blood system.
- ▶ Describe the components of blood.
- ▶ Explain the relationship between the circulatory, respiratory, and digestive systems.

### Topics

- ▶ Getting to know the heart
- ▶ The four chambers of the heart
- ▶ How does the blood come out of the heart?
- ▶ How does the blood go back to the heart?
- ▶ What is blood?
- ▶ How does the blood move through the body?
- ▶ What relation do the circulatory, respiratory, and the dig

## Keywords

- ▶ aorta artery
- ▶ arteries
- ▶ blood
- ▶ blood vessels
- ▶ bone marrow
- ▶ capillaries
- ▶ carbon dioxide
- ▶ coagulation
- ▶ coronary arteries
- ▶ diastole
- ▶ erythrocytes
- ▶ femoral artery
- ▶ heart
- ▶ hemoglobin
- ▶ inferior vena cava
- ▶ left atrium
- ▶ left ventricle
- ▶ leukocytes
- ▶ lungs
- ▶ lymph
- ▶ lymphatic system
- ▶ major blood circulation
- ▶ metabolism
- ▶ minor blood circulation
- ▶ muscles
- ▶ nutrients
- ▶ oxygen
- ▶ plasma
- ▶ platelets
- ▶ pulmonary artery
- ▶ pulse
- ▶ red blood cells
- ▶ right atrium
- ▶ right ventricle
- ▶ subclavian artery
- ▶ superior vena cava
- ▶ systole
- ▶ valves
- ▶ veins
- ▶ venous capillaries
- ▶ white blood cells

## Lesson 4. The nervous system and its functions

Code: C417G06U03L04

### Objectives

- ▶ Describe the function of the nervous system.
- ▶ Describe the function of the central nervous system and the autonomic nervous system.
- ▶ Define the function of the structures or organs of the nervous system.
- ▶ Illustrate the main parts of the nervous system.
- ▶ Identify and describe the parts of neurons.
- ▶ Contrast the three types of neurons.

### Topics

- ▶ The nervous system and its functions
- ▶ What makes up our nervous system?
- ▶ What is a neuron?
- ▶ The central nervous system
- ▶ Our body is full of neurons!
- ▶ A system that works automatically

## Keywords

- ▶ associative neurons
- ▶ autonomic nervous system
- ▶ axon
- ▶ brain
- ▶ brain stem
- ▶ cell body
- ▶ central nervous system
- ▶ cerebellum
- ▶ control systems
- ▶ dendrites
- ▶ encephalon
- ▶ endocrine system
- ▶ ganglia
- ▶ hemispheres
- ▶ hormones
- ▶ motor nerves
- ▶ motor neurons
- ▶ nerves
- ▶ nervous impulses
- ▶ nervous system
- ▶ neuron
- ▶ neurotransmitters
- ▶ peripheral nerves
- ▶ peripheral nervous system
- ▶ reflexes
- ▶ sensory nerves
- ▶ sensory neurons
- ▶ spinal cord
- ▶ thyroid
- ▶ vertebra
- ▶ vertebral column

## Lesson 5. The endocrine system and hormones

Code: C417G06U03L05

### Objectives

- ▶ Describe the function of the endocrine system.
- ▶ Identify the glands of the system.
- ▶ Describe the function and the location of the glands.
- ▶ Define hormone, in their own words.
- ▶ Contrast the female and the male endocrine systems.
- ▶ Explain how different diseases could affect the endocrine system.

### Topics

- ▶ What keeps our body under control?
- ▶ How does our endocrine system work?
- ▶ Getting to know the glands of the endocrine system
- ▶ How do hormones work?
- ▶ What causes disorders in the endocrine system?
- ▶ What relation do hormones have with the behavior of teenagers?



## Keywords

- ▶ adolescence
- ▶ adrenal
- ▶ adrenaline
- ▶ brain
- ▶ diabetes mellitus
- ▶ dwarfism
- ▶ endocrine system
- ▶ estrogen
- ▶ functional diseases
- ▶ gigantism
- ▶ glands
- ▶ goiter
- ▶ hormonal regulation
- ▶ hormones
- ▶ hyperthyroidism
- ▶ hypoglycemia
- ▶ hypophysis
- ▶ hypothyroidism
- ▶ insulin
- ▶ nerves
- ▶ ovaries
- ▶ pancreas
- ▶ parathyroid
- ▶ pituitary
- ▶ progesterone
- ▶ prolactin
- ▶ receptors
- ▶ testicles
- ▶ testosterone
- ▶ thyroid

## Unit 4. The environment and you

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

### Lesson 0. The environment and you

**Code:** C417G06U04L00

Unit's documents: Scientific zone, Let's investigate, Scientists in action, Evaluation, My Scientific Journal

### Lesson 1. Interactions

**Code:** C417G06U04L01

#### Objectives

- ▶ Describe the interdependence relationship between living things and the environment.
- ▶ Define the keywords: organism, population, and community.
- ▶ Contrast the habitat and the ecological niche of an organism.
- ▶ Describe some adaptations that are developed by animals in order to survive in their environment.
- ▶ Describe some adaptations that are developed by plants in order to survive in their environment.
- ▶ Mention and explain examples of organisms that can be found in the following relationships: mutualism, commensalism, and parasitism.
- ▶ Prepare food chains and webs and identify the producers, consumers, and decomposers.

#### Topics

- ▶ Your environment
- ▶ Organisms and their neighbors
- ▶ Where and how do they live?
- ▶ Surviving in the environment
- ▶ Keep on surviving!
- ▶ Who is getting the benefits?
- ▶ Other relationships
- ▶ What eats whom?
- ▶ Complications in the chain

## Keywords

- ▶ adaptation
- ▶ animals
- ▶ atmosphere
- ▶ biosphere
- ▶ cadmium
- ▶ camouflage
- ▶ carnivores
- ▶ commensalism
- ▶ community
- ▶ consumers
- ▶ cutin
- ▶ decomposers
- ▶ environment
- ▶ ecological niche
- ▶ ecosystem
- ▶ food chain
- ▶ food web
- ▶ habitat
- ▶ herbivores
- ▶ host
- ▶ individual
- ▶ insectivores
- ▶ interdependence
- ▶ lichens
- ▶ mutualism
- ▶ organisms
- ▶ parasitism
- ▶ plants
- ▶ population
- ▶ predators
- ▶ prey
- ▶ producers
- ▶ symbionts
- ▶ symbiosis

## Lesson 2. Ecosystems

Code: C417G06U04L02

### Objectives

- ▶ Define and mention abiotic and biotic factors.
- ▶ Describe examples of ecosystems.
- ▶ Describe the water cycle.
- ▶ Explain the oxygen – carbon dioxide cycle.
- ▶ Explain the function of nitrifying bacteria in the nitrogen cycle.
- ▶ Summarize the importance of the calcium and the phosphorous cycles in the health of humans.
- ▶ Illustrate the cycles in diagrams.

### Topics

- ▶ We depend on the environment
- ▶ Living together
- ▶ Over and over again
- ▶ Inhale and exhale
- ▶ Another element cycle
- ▶ An important element that keeps us healthy
- ▶ Phosphorus cycle

## Keywords

- ▶ abiotic
- ▶ atmosphere
- ▶ biological control
- ▶ biosphere
- ▶ biotic
- ▶ calcium cycle
- ▶ climate
- ▶ condensation
- ▶ ecology
- ▶ ecosystems
- ▶ evaporation
- ▶ food chain
- ▶ humidity
- ▶ hydrosphere
- ▶ interaction
- ▶ lithosphere
- ▶ macroscopic
- ▶ microscopic
- ▶ nitrates
- ▶ nitrifying bacteria
- ▶ nitrogen cycle
- ▶ oxygen – carbon dioxide cycle
- ▶ phosphate
- ▶ phosphorous cycle
- ▶ photosynthesis
- ▶ precipitation
- ▶ proteins
- ▶ soil temperature
- ▶ topography
- ▶ transpiration
- ▶ water cycle

## Lesson 3. Biomes

Code: C417G06U04L03

### Objectives

- ▶ Recognize that adaptation is a key factor for the survival of a specie.
- ▶ Define flora, fauna, and biome.
- ▶ Mention the 6 terrestrial biomes.
- ▶ Recognize the polar regions.
- ▶ Recognize that Earth consists of  $\frac{3}{4}$  of water.
- ▶ Mention and describe the aquatic biomes.
- ▶ Explain why photosynthesis does not occur at the bottom of the sea.
- ▶ Recognize that flora and fauna cannot exist without the photosynthesis process.

### Topics

- ▶ Climate is key
- ▶ Terrestrial biomes
- ▶ Aquatic biomes
- ▶ Biome diversity

## Keywords

- ▶ Antarctica
- ▶ aquatic biome
- ▶ Arctic zone
- ▶ biome
- ▶ Bosque Seco de Guánica
- ▶ climate
- ▶ coastal ocean
- ▶ coral reefs
- ▶ Death Valley
- ▶ deciduous
- ▶ desert
- ▶ dry
- ▶ dry forest
- ▶ El Yunque
- ▶ endemic
- ▶ estuaries
- ▶ fauna
- ▶ flora
- ▶ forest
- ▶ freshwater
- ▶ intertidal zone
- ▶ lagoon
- ▶ lake
- ▶ Lake Tahoe
- ▶ marine biome
- ▶ Napa Valley
- ▶ open ocean
- ▶ pampas
- ▶ permafrost
- ▶ plains
- ▶ polar
- ▶ polar regions
- ▶ ponds
- ▶ prairie
- ▶ precipitation
- ▶ rangelands
- ▶ rivers
- ▶ saltwater
- ▶ savanna
- ▶ sequoias
- ▶ soil
- ▶ steppes
- ▶ streams
- ▶ taiga
- ▶ temperate
- ▶ temperate rainforest
- ▶ terrestrial biome
- ▶ tropical
- ▶ tropical rainforest
- ▶ tundra
- ▶ wetlands
- ▶ xerophytic

## Lesson 4. Puerto Rico's biomes

Code: C417G06U04L04

### Objectives

- ▶ Mention the 3 geographical regions of Puerto Rico.
- ▶ Explain the concept of topography.
- ▶ Recognize a rainforest and mention the plants that live in them.
- ▶ Recognize El Yunque as a tropical rainforest and how important it is to protect it.
- ▶ Identify the Bosque Seco de Guánica as a subtropical dry forest.
- ▶ Recognize the endemic and endangered species found in the Bosque Seco de Guánica.
- ▶ Classify Puerto Rico's zones as plains, valleys, or hills.

### Topics

- ▶ Puerto Rico's biomes
- ▶ Visiting the forest
- ▶ Dry zones
- ▶ Plains, valleys, and hills

## Keywords

- ▶ alluvial
- ▶ dry
- ▶ dry forest
- ▶ epiphytes
- ▶ fauna
- ▶ flora
- ▶ hills
- ▶ plains
- ▶ precipitation
- ▶ rainforest
- ▶ relief
- ▶ topography
- ▶ tropical forest
- ▶ valleys
- ▶ vines
- ▶ xerophytic

## Unit 5. Matter

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

### Lesson 0. Matter

**Code:** C417G06U05L00

Unit's documents: Scientific zone, Let's investigate, Scientists in action, Evaluation, My Scientific Journal

### Lesson 1. Properties of matter

**Code:** C417G06U05L01

#### Objectives

- ▶ Describe and differentiate the physical and chemical properties of matter.
- ▶ Number and define the following physical properties: mass, volume, weight, density, and buoyant force.
- ▶ Contrast between mass and weight and measure the mass of different objects.
- ▶ Differentiate between solute and solvent.
- ▶ Define soluble, solubility, solute, and solvent.
- ▶ Mention and describe the chemical properties of oxidation, combustion, inflammability, and explosiveness.

#### Topics

- ▶ Properties of matter
- ▶ Physical properties of matter
- ▶ Is weight the same as mass?
- ▶ Density
- ▶ Solubility
- ▶ Chemical properties of matter

#### Keywords

- |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|
| ▶ buoyancy            | ▶ density             | ▶ inflammability      |
| ▶ buoyant force       | ▶ dynamometer         | ▶ liquid              |
| ▶ capacity units      | ▶ explosiveness       | ▶ matter              |
| ▶ chemical properties | ▶ gas                 | ▶ mass                |
| ▶ color               | ▶ gravitational force | ▶ oxidation           |
| ▶ combustion          | ▶ hardness            | ▶ oxide               |
|                       |                       | ▶ physical properties |

- |                  |              |                     |
|------------------|--------------|---------------------|
| ▶ physical state | ▶ solubility | ▶ test tube         |
| ▶ scale          | ▶ solution   | ▶ texture           |
| ▶ shape          | ▶ solute     | ▶ universal solvent |
| ▶ size           | ▶ solvent    | ▶ volume            |
| ▶ smell          | ▶ substances | ▶ weight            |
| ▶ solid          | ▶ taste      |                     |

## Lesson 2. When matter changes

Code: C417G06U05L02

### Objectives

- ▶ Describe a physical change.
- ▶ Mention and describe the changing states of matter.
- ▶ Explain the processes of fusion, evaporation, sublimation, solidification, and crystallization.
- ▶ Describe the characteristics of a chemical change.
- ▶ Compare the processes of oxidation and combustion.
- ▶ Classify physical or chemical changes in certain situations.
- ▶ Argue about the necessity of preventing waste burning in order to preserve the environment.

### Topics

- ▶ When matter changes
- ▶ Does matter suffer any changes?
- ▶ Processes that change matter
- ▶ Chemical changes
- ▶ Oxidation and combustion

### Keywords

- |                    |                |                       |
|--------------------|----------------|-----------------------|
| ▶ boiling point    | ▶ fusion point | changes               |
| ▶ chemical changes | ▶ fusion       | ▶ physical properties |
| ▶ combustion       | ▶ gas          | ▶ reversible          |
| ▶ condensation     | ▶ heat         | ▶ shape               |
| ▶ crystallization  | ▶ liquid       | ▶ solid               |
| ▶ evaporation      | ▶ matter       | ▶ solidification      |
| ▶ freezing point   | ▶ melting      | ▶ state changes       |
| ▶ freezing         | ▶ nature       | ▶ sublimation         |
|                    | ▶ oxidation    |                       |
|                    | ▶ physical     |                       |



### Lesson 3. Mixtures

Code: C417G06U05L03

#### Objectives

- ▶ Define mixture.
- ▶ Mention the most important characteristics of mixtures.
- ▶ Compare the characteristics of homogeneous and heterogeneous mixtures.
- ▶ Define solution, solute, and solvent.
- ▶ Explain the importance of water for the survival of living things.
- ▶ Contrast between the characteristics of diluted, concentrated, and saturated solutions.

#### Topics

- ▶ What are mixtures?
- ▶ Characteristics of mixtures
- ▶ Homogeneous and heterogeneous mixtures
- ▶ Solutions
- ▶ Water and dissolution
- ▶ Solutions can be concentrated

#### Keywords

- |                         |                      |
|-------------------------|----------------------|
| ▶ aqueous solution      | ▶ pure substance     |
| ▶ concentrated solution | ▶ saturated solution |
| ▶ diluted solution      | ▶ solid              |
| ▶ gas                   | ▶ solutes            |
| ▶ heterogeneous mixture | ▶ solution           |
| ▶ homogeneous mixture   | ▶ solvents           |
| ▶ homogenized           | ▶ Tyndall effect     |
| ▶ liquid                | ▶ universal solvent  |
| ▶ matter                |                      |

### Lesson 4. Separating mixtures

Code: C417G06U05L04

#### Objectives

- ▶ Identify different mixtures that exist in nature.
- ▶ Explain the techniques of sedimentation and decantation.
- ▶ Describe the technique of filtration.
- ▶ Compare the technique of evaporation and distillation.
- ▶ Explain how chromatography and magnetism are useful when separating mixtures.

- ▶ Mention different examples of mixtures and identify the most appropriate method of separation.
- ▶ Prepare a simple chromatography in order to separate the colors that make up an ink.

### Topics

- ▶ Nature is full of mixtures
- ▶ How can we separate mixtures?
- ▶ Filtration
- ▶ Evaporation
- ▶ Distillation
- ▶ Chromatography and magnetism

### Keywords

- ▶ boiling point
- ▶ chromatography
- ▶ decantation
- ▶ distillation
- ▶ evaporation
- ▶ filtration
- ▶ heterogeneous
- ▶ homogeneous
- ▶ magnetic properties
- ▶ magnetism
- ▶ petroleum
- ▶ residue
- ▶ salterns
- ▶ sedimentation
- ▶ separation techniques
- ▶ solubility
- ▶ thermometer
- ▶ volatile

## Lesson 5. Elements and compounds

Code: C417G06U05L05

### Objectives

- ▶ Define atom.
- ▶ Mention and describe the particles that make up an atom.
- ▶ Represent different model diagrams of atoms and molecules.
- ▶ Explain what is an element and a compound.
- ▶ Describe the arrangement of elements in the periodic table.
- ▶ Contrast between the characteristics of metal and nonmetal elements.
- ▶ Explain how compounds are formed.

## Topics

- ▶ Atoms
- ▶ Molecules
- ▶ Elements and the periodic table
- ▶ Metal and nonmetal elements
- ▶ Compounds
- ▶ How are compounds formed?

## Keywords

- ▶ anion
- ▶ atom
- ▶ atomic number
- ▶ carbon
- ▶ cation
- ▶ chemical bond
- ▶ chemical family
- ▶ chemical group
- ▶ compounds
- ▶ density
- ▶ electron
- ▶ electron cloud
- ▶ elements
- ▶ formula
- ▶ inorganic compounds
- ▶ ion
- ▶ Joseph Thompson
- ▶ Lord Rutherford
- ▶ leptons
- ▶ metals
- ▶ molecules
- ▶ neutron
- ▶ nonmetals
- ▶ nucleus
- ▶ organic compounds
- ▶ periodic table
- ▶ precious metals
- ▶ proton
- ▶ quark
- ▶ solubility
- ▶ symbol

## Unit 6. Energy and its uses

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

### Lesson 0. Energy and its uses

**Code:** C417G06U06L00

Unit's documents: Scientific zone, Let's investigate, Scientists in action, Evaluation, My Scientific Journal

### Lesson 1. Forms of energy

**Code:** C417G06U06L01

#### Objectives

- ▶ Define energy.
- ▶ Contrast between potential and kinetic energy.
- ▶ Describe the forms of electrical energy.
- ▶ Explain why the Sun is considered the main source of energy.
- ▶ Describe the relationship between solar energy and life on Earth.
- ▶ Explain the use of solar energy in the development of solar technology.

#### Topics

- ▶ Forms of energy
- ▶ Potential and kinetic energy
- ▶ Different forms of kinetic and potential energy
- ▶ Electrical energy
- ▶ Our main source of energy
- ▶ The one responsible for life on Earth
- ▶ An useful economic source
- ▶

#### Keywords

- ▶ battery
- ▶ chemical energy
- ▶ conductor
- ▶ elastic energy
- ▶ electric eel
- ▶ electric generator
- ▶ electrical energy
- ▶ electricity
- ▶ energy
- ▶ force
- ▶ gravitational energy
- ▶ kinetic energy
- ▶ mechanical energy
- ▶ photosynthesis
- ▶ potential energy
- ▶ radiant energy
- ▶ solar energy
- ▶ static

- ▶ Sun
- ▶ thermal energy
- ▶ Thomas Alva Edison
- ▶ ultraviolet rays

- ▶ velocity
- ▶ waves
- ▶ work

## Lesson 2. Light: A source of energy

Code: C417G06U06L02

### Objectives

- ▶ Describe the corpuscular and wave theories of light.
- ▶ Contrast between transparent, translucent, and opaque bodies.
- ▶ Explain the phenomena of mirror reflections.
- ▶ Describe refraction.
- ▶ Describe the composition of a white light.
- ▶ Mention and contrast the types of concave and convex lens.
- ▶ Explain how light is applied in our daily lives.

### Topics

- ▶ The nature of light
- ▶ The journey of light
- ▶ Bodies of light
- ▶ Light bounces
- ▶ Light deviation
- ▶ Lenses
- ▶ Light applications
- ▶ Light in a mixture of colors

### Keywords

- |                         |                      |
|-------------------------|----------------------|
| ▶ artificially luminous | ▶ light ray          |
| ▶ Christian Huygens     | ▶ magnifying glass   |
| ▶ colors                | ▶ mass               |
| ▶ concave lens          | ▶ mirror             |
| ▶ convex lens           | ▶ naturally luminous |
| ▶ corpuscular theory    | ▶ opaque             |
| ▶ focus                 | ▶ prism              |
| ▶ fossil fuels          | ▶ rainbow            |
| ▶ illuminated           | ▶ reflection         |
| ▶ Isaac Newton          | ▶ refraction         |
| ▶ lens                  | ▶ spectrum of colors |
| ▶ light                 | ▶ speed of light     |

- ▶ translucent
- ▶ transparent
- ▶ wave theory

- ▶ waves
- ▶ Wilhelm von Roentgen
- ▶ X-rays

### Lesson 3. Energy in fossil fuels

Code: C417G06U06L03

#### Objectives

- ▶ Contrast renewable and nonrenewable natural resources.
- ▶ Mention and describe fossil fuels.
- ▶ Explain how natural gas is formed and mention its uses.
- ▶ Define wind energy, geothermal energy, water energy, and nuclear energy.
- ▶ Define energy preservation.
- ▶ Identify and mention ways to save energy at home.
- ▶ Judge the impact of the improper use of different sources of energy for future societies.

#### Topics

- ▶ Natural resources
- ▶ Fossil fuels
- ▶ Solid fossil fuels
- ▶ Liquid fossil fuels
- ▶ Gas fossil fuels
- ▶ Fossil fuel supplies
- ▶ There are always other choices
- ▶ Other sources of alternative energy
- ▶ How can we save electric energy?

#### Keywords

- |                       |                   |
|-----------------------|-------------------|
| ▶ caloric value       | ▶ nonrenewable    |
| ▶ coal                | ▶ nuclear energy  |
| ▶ electricity         | ▶ nuclear reactor |
| ▶ energetic resources | ▶ petroleum       |
| ▶ energy              | ▶ radioactive     |
| ▶ fossil fuels        | ▶ recycling       |
| ▶ fusion              | ▶ renewable       |
| ▶ geothermal energy   | ▶ refinery        |
| ▶ mechanic energy     | ▶ slate           |
| ▶ natural gas         | ▶ water energy    |
| ▶ natural resources   | ▶ wind energy     |

## Unit 7. Electricity and magnetism

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

### Lesson 0. Electricity and magnetism

**Code:** C417G06U07L00

Unit's documents: Scientific zone, Let's investigate, Scientists in action, Evaluation, My Scientific Journal

### Lesson 1. Electric charges and magnets

**Code:** C417G06U07L01

#### Objectives

- ▶ Define electric charge.
- ▶ Mention examples of static electricity.
- ▶ Describe the use of the electroscope.
- ▶ Explain how lightning is formed.
- ▶ Contrast between lightning and thunder.
- ▶ Contrast between permanent and temporary magnets.
- ▶ Define magnetic field and line of forces.

#### Topics

- ▶ Electric charges
- ▶ An electricity that keeps still
- ▶ Look at that lightning!
- ▶ Magnets! Temporary or permanent?
- ▶ You can put balloons on a wall without using tape!

#### Keywords

- |                        |                           |                      |
|------------------------|---------------------------|----------------------|
| ▶ atoms                | ▶ repulsion               | ▶ permanent magnets  |
| ▶ attraction           | ▶ lightning               | ▶ poles              |
| ▶ discharges           | ▶ lightning rods          | ▶ protons            |
| ▶ electric charge      | ▶ lines of magnetic force | ▶ repulsion          |
| ▶ electrons            | ▶ magnet                  | ▶ static electricity |
| ▶ electroscope         | ▶ magnetic field          | ▶ temporary magnets  |
| ▶ forces of attraction | ▶ neutrons                | ▶ thunder            |
| ▶ forces of            |                           |                      |

## Lesson 2. Electric currents and magnetism

Code: C417G06U07L02

### Objectives

- ▶ Define electric current.
- ▶ Identify the measuring unit of current intensity.
- ▶ Classify different materials as an electrical conductor or insulator.
- ▶ Describe the parts of an electric circuit.
- ▶ Contrast a series circuit and a parallel circuit.
- ▶ Explain the relationship between magnetism and electricity.
- ▶ Define electromagnet.
- ▶ Evaluate the necessity of knowing and practicing safety measures while using electricity.

### Topics

- ▶ Electric currents and magnetism
- ▶ Conductors and nonconductors
- ▶ Electric circuits: series and parallel circuits

### Keywords

- |                     |                         |                    |
|---------------------|-------------------------|--------------------|
| ▶ ampere            | ▶ charge                | ▶ insulator        |
| ▶ appliances        | ▶ electric circuit      | ▶ magnetic effect  |
| ▶ Christian Oersted | ▶ electric current      | ▶ magnetism        |
| ▶ closed circuit    | ▶ electricity generator | ▶ open circuit     |
| ▶ compass           | ▶ electromagnet         | ▶ parallel circuit |
| ▶ conductor         | ▶ electromagnetic       | ▶ receptacle       |
| ▶ connector         | ▶ electrons             | ▶ series circuit   |
| ▶ current intensity |                         | ▶ short circuit    |
| ▶ devices           |                         | ▶ switch           |
| ▶ electric          |                         |                    |



### Lesson 3. Sound and its uses I

Code: C417G06U07L03

#### Objectives

- ▶ Recognize that sound is an undulatory phenomena that is produced through vibrations.
- ▶ Mention the states of matter through which sounds can be spread (solids, liquids, and gases).
- ▶ Describe how a voice is produced.
- ▶ Explain the way in which an intensity can distinguish hard and weak sounds.
- ▶ Recognize that sound depends on the amplitude or height of a wave.
- ▶ Explain the traits of a sound.
- ▶ Recognize the timbre as the tool that can help us differentiate voices and instruments that have the same wave intensity.
- ▶ Name and recognize the larynx, the vocal cords, outer, middle, and inner ear, the eardrum, and the cochlea.

#### Topics

- ▶ Sound and its applications
- ▶ Intense sounds and timbre
- ▶ Our voice and its mechanism
- ▶ Musical instruments

#### Keywords

- |             |                       |                |
|-------------|-----------------------|----------------|
| ▶ amplitude | ▶ middle ear          | ▶ strings      |
| ▶ brass     | ▶ musical instruments | ▶ timbre       |
| ▶ cochlea   | ▶ musical notes       | ▶ tone         |
| ▶ decibel   | ▶ outer ear           | ▶ vibration    |
| ▶ ear       | ▶ percussion          | ▶ vocal chords |
| ▶ eardrum   | ▶ pitch               | ▶ wave         |
| ▶ inner ear |                       | ▶ woodwinds    |
| ▶           |                       |                |

## Lesson 4. Sound and its uses II

Code: C417G06U07L04

### Objectives

- ▶ Recognize that sounds allow us to communicate with each other.
- ▶ Mention other ways of communication, such as sight, touch, and sign language.
- ▶ Explain how ultrasounds are used to observe internal organs and babies that are growing and developing in the womb.
- ▶ Mention means of communication that use sounds, such as radio, television, fax, modem, and iPod, among many others.
- ▶ Recognize that both the radio and television use antennas in order to receive a communication.
- ▶ Recognize the evolution of sound reproduction (playback).
- ▶ Define the concepts; recorder, microphone, speaker, phonograph, gramophone, LP, magnetic tape, compact disc, mp3, acoustic, and echo.
- ▶ Recognize the importance of preventing noise pollution.
- ▶ Mention the consequences of noise pollution.
- ▶ Mention noises and machinery that cause this type of pollution.

### Topics

- ▶ How is sound useful
- ▶ How are sounds reproduced
- ▶ Why is it so loud?

### Keywords

- ▶ 8-track
- ▶ acoustic
- ▶ antenna
- ▶ cassettes
- ▶ CD players
- ▶ communication
- ▶ compact disc (Blu-Ray, CD, CD-R, CD, RW, DVD)
- ▶ echo
- ▶ Emile Berliner
- ▶ gramophone
- ▶ Long Playing disc (LP)
- ▶ magnetic tape
- ▶ microphone
- ▶ mp3 player
- ▶ multitrack
- ▶ noise
- ▶ noise pollution
- ▶ Peter Carl Goodman
- ▶ phonograph
- ▶ sign language
- ▶ sonogram
- ▶ speaker
- ▶ Thomas Alva Edison
- ▶ ultrasound
- ▶ VHS
- ▶ Walkman

## Unit 8. Our Planet Earth

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

### Lesson 0. Our Planet Earth

**Code:** C417G06U08L00

Unit's documents: Scientific zone, Let's investigate, Scientists in action, Evaluation, My Scientific Journal

### Lesson 1. Earth: A planet in constant change

**Code:** C417G06U08L01

#### Objectives

- ▶ Know the internal and external layers that make up Earth.
- ▶ Know about the formation of the Earth's relief and how it may change.
- ▶ Recognize the Plate Tectonics Theory.
- ▶ Relate earthquakes and volcanoes to the movements of the tectonic plates.
- ▶ Comprehend the different layers that make up the terrestrial surface (soil).
- ▶ Learn about the different kinds of soil that can be found.
- ▶ Know about the formation and composition of rocks.
- ▶ Comprehend the different types of rocks available on Earth and their formation.

#### Topics

- ▶ The inner layers of Earth
- ▶ How were the outer layers of Earth formed?
- ▶ Earth's relief and the tectonic plates

#### Keywords

- |               |               |
|---------------|---------------|
| ▶ atmosphere  | ▶ earthquake  |
| ▶ bedrock     | ▶ epicenter   |
| ▶ chalky      | ▶ erosion     |
| ▶ cinder cone | ▶ eruption    |
| ▶ clay        | ▶ faults      |
| ▶ composite   | ▶ folding     |
| ▶ convergent  | ▶ geyser      |
| ▶ core        | ▶ horizon     |
| ▶ crust       | ▶ humus       |
| ▶ deposits    | ▶ hydrosphere |
| ▶ divergent   | ▶ igneous     |

- ▶ lava
- ▶ limestone
- ▶ lithosphere
- ▶ magma
- ▶ mantle
- ▶ metamorphic
- ▶ minerals
- ▶ Modified Mercalli Scale
- ▶ normal fault
- ▶ peaty
- ▶ Plates Tectonic Theory
- ▶ primitive atmosphere
- ▶ quakes
- ▶ relief
- ▶ reverse fault
- ▶ Richter Scale
- ▶ rocks
- ▶ sandy
- ▶ sedimentary
- ▶ sedimentation
- ▶ seismograph
- ▶ shield
- ▶ silt
- ▶ strike-slip fault
- ▶ subsoil
- ▶ topsoil
- ▶ transform
- ▶ tsunami
- ▶ volcano
- ▶ water
- ▶ wind

## Lesson 2. Geological eras and fossils

Code: C417G06U08L02

### Objectives

- ▶ Describe the continental drift theory.
- ▶ Contrast the supercontinent Pangaea and Earth's actual continents.
- ▶ Describe the formation of the atmosphere and oceans on Earth.
- ▶ Identify the origin of oxygen in the atmosphere.
- ▶ Describe the characteristics and the diverse organisms of the Archaeozoic, Proterozoic, Paleozoic, Mesozoic, and Cenozoic Eras.
- ▶ Describe the experimental evidence of the origins of life on Earth.

### Topics

- ▶ What is continental drift?
- ▶ Fossils: The tracks of Earth's past
- ▶ Geological eras
- ▶ Archaeozoic era
- ▶ Proterozoic era: The rise of multicellular organisms
- ▶ Paleozoic era: The rise of the first plants
- ▶ Mesozoic era: the era of the reptiles
- ▶ Cenozoic era: mammal diver

### Keywords

- ▶ Alfred L. Wegener
- ▶ Archaeozoic Era
- ▶ Cenozoic Era
- ▶ Continental Drift Theory
- ▶ Cretaceous
- ▶ fossil record
- ▶ fossils
- ▶ geological era
- ▶ Jurassic
- ▶ Mesozoic Era
- ▶ Neogene Period
- ▶ Paleozoic Era
- ▶ Pangaea
- ▶ Panthalassa
- ▶ Paleogene Period
- ▶ Proterozoic Era
- ▶ Quaternary Period
- ▶ Triassic
- ▶ trilobites

## Lesson 3. Water and the atmosphere

Code: C417G06U08L03

### Objectives

- ▶ Recognize the relationship between the water cycle and the atmosphere.
- ▶ Mention the characteristics of the atmosphere.
- ▶ Mention and describe the properties of water.
- ▶ Expose and evaluate Archimedes' principle.
- ▶ Describe the different uses of water.
- ▶ Relate atmospheric phenomena with water.
- ▶ Recognize the greenhouse effect and how it affects the environment.

### Topics

- ▶ Water and the atmosphere
- ▶ Characteristics of Earth's atmosphere
- ▶ What are the properties of water
- ▶ Other properties of liquids
- ▶ Archimedes' principle
- ▶ How can we use water?
- ▶ Atmospheric Phenomena and the action of water
- ▶ Phenomena caused by weather variations

### Keywords

- ▶ air mass
- ▶ air pressure
- ▶ Archimedes' principle
- ▶ atmosphere
- ▶ blizzard
- ▶ boiling point
- ▶ buoyant force
- ▶ capillarity

- ▶ climate
- ▶ Enhanced Fujita Scale
- ▶ exosphere
- ▶ flooding
- ▶ flow
- ▶ form
- ▶ freezing rain
- ▶ gravity
- ▶ greenhouse effect
- ▶ ground blizzards
- ▶ hail
- ▶ hurricanes
- ▶ ice storms
- ▶ ionosphere
- ▶ mesosphere
- ▶ mudslides
- ▶ organoleptic
- ▶ Saffir-Simpson scale
- ▶ sleet
- ▶ snowdrifts

- ▶ solubility
- ▶ storms
- ▶ stratosphere
- ▶ supercell
- ▶ surface tension
- ▶ thundersnow
- ▶ Tornado Alley
- ▶ tornadoes
- ▶ tropical depression
- ▶ tropical storms
- ▶ tropical wave
- ▶ troposphere
- ▶ typhoons
- ▶ volume
- ▶ water cycle
- ▶ waterspout
- ▶ weather
- ▶ whiteout
- ▶ winter storms

## Unit 9. The universe

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

### Lesson 0. The universe

**Code:** C417G06U09L00

Unit's documents: Scientific zone, Let's investigate, Scientists in action, Evaluation, My Scientific Journal

### Lesson 1. Let's study our universe

**Code:** C417G06U09L01

#### Objectives

- ▶ Explains the Big Bang theory which describes the creation of the universe.
- ▶ Describes the origin of the galaxies, stars and solar system.
- ▶ Defines components stars, planets, comets, meteorites and asteroids, operationally.
- ▶ Lists and describes different astronomical instruments.
- ▶ Mentions and points out the purpose of rockets and artificial satellites.
- ▶ Explains the relation between technology and the work carried out by astronauts.
- ▶ Recognizes the importance of space missions.
- ▶ Describes different manned and unmanned missions to space.
- ▶ Recognizes the historical impact of countries like United States and Russia in the study of the universe.
- ▶ Describes the purpose of the International Space Station.

#### Topics

- ▶ How did the universe originate?
- ▶ What is the universe composed of?
- ▶ Astronomical instruments
- ▶ Spaceships
- ▶ Space exploration
- ▶ International Space Station

#### Keywords

- ▶ antenna
- ▶ Alan Shepard Jr.
- ▶ Apollo
- ▶ Arecibo Observatory
- ▶ artificial satellites
- ▶ asteroid belt
- ▶ asteroids
- ▶ Atlantis

- ▶ Automated Transfer Vehicle (ATV)
- ▶ Big Bang Theory
- ▶ Big Dipper
- ▶ Bumper 2
- ▶ Cassini-Huygens
- ▶ Challenger
- ▶ Christa McAuliffe
- ▶ Columbia
- ▶ comets
- ▶ constellations
- ▶ crewed mission
- ▶ Curiosity
- ▶ Dawn
- ▶ Discovery
- ▶ Endeavour
- ▶ Enterprise
- ▶ Explorer 1
- ▶ Five-hundred meter Aperture Spherical Telescope (FAST)
- ▶ Friendship 7
- ▶ galaxies
- ▶ Galileo Galilei
- ▶ Hubble
- ▶ International Space Station
- ▶ John Glenn
- ▶ Juno
- ▶ Kuiper belt
- ▶ Little Dipper
- ▶ Lunik
- ▶ Mariner 10
- ▶ Mars Pathfinder
- ▶ Mercury 3
- ▶ meteorites
- ▶ meteors
- ▶ Milky Way
- ▶ Mir
- ▶ NASA
- ▶ Neil Armstrong
- ▶ New Frontiers
- ▶ New Horizons
- ▶ Odyssey
- ▶ Opportunity
- ▶ Orion
- ▶ Philae
- ▶ photometer
- ▶ Pioneer 10
- ▶ planets
- ▶ Project Gemini
- ▶ Project Mercury
- ▶ radio telescope
- ▶ reflective telescope
- ▶ refractive telescope
- ▶ rockets
- ▶ Rosetta
- ▶ Salyut
- ▶ Schmidt camera
- ▶ Shuttle-Mir
- ▶ Skylab
- ▶ Sojourner
- ▶ Solar System
- ▶ Soyuz
- ▶ space probes
- ▶ space shuttles
- ▶ Space Transportation System
- ▶ spectroscope
- ▶ Spirit
- ▶ Sputnik 1
- ▶ Sputnik 2
- ▶ stars
- ▶ telescope
- ▶ Ulysses
- ▶ uncrewed mission
- ▶ Viking 1 and 2
- ▶ Vostok 1
- ▶ Voyager 1 and 2
- ▶ Yuri Gagarin



## Lesson 2. The universe in motion

Code: C417G06U09L02

### Objectives

- ▶ Point out the similarities among the behavior of action – at – a – distance forces, magnets, and gravitational forces.
- ▶ Describe the laws of universal gravitation.
- ▶ Define elliptic orbit.
- ▶ Compare the movements of translation and rotation.
- ▶ Explain the relationship between the seasons of the year and the distance between the Earth and the Sun.
- ▶ Describe the relationship between tides and the Moon.
- ▶ Build models in order to explain solar and lunar eclipses.

### Topics

- ▶ What are the gravitational forces and how do they act?
- ▶ The laws of universal gravitation
- ▶ In orbit
- ▶ High or low tides?
- ▶ Eclipses

### Keywords

- ▶ aphelion
- ▶ apogee
- ▶ autumn
- ▶ day
- ▶ dynamometer
- ▶ elliptic orbit
- ▶ elliptical
- ▶ fall
- ▶ gravitational force
- ▶ hemispheres
- ▶ high tides
- ▶ Isaac Newton
- ▶ laws of universal gravitation
- ▶ low tides
- ▶ lunar eclipse
- ▶ night
- ▶ orbit
- ▶ perigee
- ▶ perihelion
- ▶ revolution
- ▶ rotation
- ▶ seasons
- ▶ solar eclipse
- ▶ spring
- ▶ spring tides
- ▶ summer
- ▶ total eclipse
- ▶ translation
- ▶ winter

## Lesson 3. The Solar System and its planets

Code: C417G06U09L03

### Objectives

- ▶ Mention the planets that make up the solar system.
- ▶ Classify the planets as interior or exterior.
- ▶ Describe the main characteristics of the planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.
- ▶ Define the concept dwarf planet.
- ▶ Compare the movements of rotation and translation of the planets.
- ▶ Identify why Mercury, Venus, Earth, and Mars are terrestrial planets.
- ▶ Describe asteroids and comets.
- ▶ Contrast meteors and meteorites.
- ▶ Recall the missions that are currently held by NASA and ESA.

### Topics

- ▶ Our Solar System
- ▶ The planets
- ▶ Dwarf planets
- ▶ Other Solar System components

### Keywords

- ▶ asteroid
- ▶ asteroid belt
- ▶ Astraea
- ▶ atmosphere
- ▶ Ceres
- ▶ Charon
- ▶ Clyde  
William  
Tombaugh
- ▶ coma
- ▶ comet
- ▶ Curiosity
- ▶ Dawn
- ▶ Draconids
- ▶ dwarf planets
- ▶ Earth
- ▶ Edmund  
Halley
- ▶ Encke
- ▶ Eris
- ▶ Eros
- ▶ ESA
- ▶ Giuseppe  
Piazzi
- ▶ Halley comet
- ▶ Haumea
- ▶ Hebe
- ▶ Hydra
- ▶ hydrosphere
- ▶ inner planets
- ▶ Juno
- ▶ Jupiter
- ▶ Kuiper belt
- ▶ Leonids
- ▶ lithosphere
- ▶ MakeMake
- ▶ Meteor  
Crater
- ▶ Mars
- ▶ Mercury
- ▶ meteorites
- ▶ meteors
- ▶ NASA
- ▶ Neptune
- ▶ New  
Horizons
- ▶ Nix
- ▶ nucleus
- ▶ Opportunity
- ▶ outer planets
- ▶ Pallas
- ▶ Pathfinder
- ▶ Philae
- ▶ Pluto

- ▶ Rosetta
- ▶ Saturn
- ▶ Spirit
- ▶ Sojourner
- ▶ tail
- ▶ Tombaugh Regio
- ▶ Uranus
- ▶ Venus
- ▶ Vesta

## Lesson 4. Stars, constellations, and galaxies

Code: C417G06U09L04

### Objectives

- ▶ Describe the origin of a star.
- ▶ Describe the stages of a star.
- ▶ Identify stars as supergiant, giant, and dwarfs, according to their size.
- ▶ Contrast novas and supernovas.
- ▶ Explain the importance of studying and recognizing constellations.
- ▶ Define spiral galaxies, elliptic galaxies, and irregular galaxies.
- ▶ Describe the characteristics of the Milky Way and other galaxies.

### Topics

- ▶ How are stars formed?
- ▶ Constellations
- ▶ Galaxies
- ▶ The Milky Way
- ▶ Other galaxies

### Keywords

- ▶ Andromeda
- ▶ Aquarius
- ▶ Aries
- ▶ Cancer
- ▶ Canis Major
- ▶ Capricorn
- ▶ Cassiopeia
- ▶ Centaurus
- ▶ constellations
- ▶ dwarfs
- ▶ elliptic galaxy
- ▶ Gemini
- ▶ giants
- ▶ International
- ▶ Astronomical Union
- ▶ irregular galaxy
- ▶ Leo
- ▶ Libra
- ▶ Lyra
- ▶ Magellanic Clouds
- ▶ Milky Way
- ▶ nebula
- ▶ nova
- ▶ Orion
- ▶ Perseus
- ▶ Pisces
- ▶ protostar
- ▶ Sagittarius
- ▶ Scorpio
- ▶ Southern Cross
- ▶ spiral galaxy
- ▶ star
- ▶ supergiants
- ▶ supernova
- ▶ Taurus
- ▶ Ursa Major
- ▶ Ursa Minor
- ▶ Virgo

## Unit 10. Preserving our planet

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

### Lesson 0. Preserving our planet

**Code:** C417G06U10L00

Unit's documents: Scientific zone, Let's investigate, Scientists in action, Evaluation, My Scientific Journal

### Lesson 1. Soil and water preservation

**Code:** C417G06U10L01

#### Objectives

- ▶ Identify and describe the different levels of the soil.
- ▶ Summarize the formation of the soil briefly.
- ▶ Describe the factors that affect the soil.
- ▶ Explain different techniques of soil preservation.
- ▶ Describe the water cycle and precipitation.
- ▶ Explain why there is a water supply crisis.
- ▶ Explain the importance of protecting and preserving karst regions.

#### Topics

- ▶ Soil and water preservation
- ▶ Soil formation
- ▶ Factors that affect the soil
- ▶ Soil preservation techniques
- ▶ The importance of preserving water
- ▶ The water cycle and precipitation
- ▶ Factors that affect the availability of water
- ▶ How can we help preserve water?

#### Keywords

- ▶ bedrock
- ▶ chemical fertilizers
- ▶ crops
- ▶ deep plowing
- ▶ erosion
- ▶ herbicides
- ▶ humus
- ▶ insecticides
- ▶ karst region
- ▶ organic matter
- ▶ pesticides
- ▶ pollution
- ▶ rotation
- ▶ sedimentation in the dams
- ▶ subsoil
- ▶ topsoil

## Lesson 2. Air preservation

Code: C417G06U10L02

### Objetives

- ▶ Contrast clean and polluted air.
- ▶ Mention and describe the main air pollutants.
- ▶ Identify and evaluate air quality index (AQI).
- ▶ Describe the effects of air pollution on living things.
- ▶ Classify air pollutants.
- ▶ Recognize that human beings can contribute to air preservation.
- ▶ Mention and describe the function of the government agencies that deal with environmental protection.

### Topics

- ▶ Clean air and polluted air
- ▶ How do some pollutants reach the air?
- ▶ How can you determine if the air is polluted?
- ▶ The AQI colors
- ▶ Air pollution and health
- ▶ Terrestrial organisms and air pollution
- ▶ How are air pollutants classified?
- ▶ Other air pollution effects
- ▶ H

### Keywords

- ▶ acid rain
- ▶ air quality index (AQI)
- ▶ artificial atmospheric pollution
- ▶ clean air
- ▶ Environmental Protection Agency (EPA)
- ▶ Environmental Quality Board (EQB)
- ▶ gases
- ▶ green
- ▶ maroon
- ▶ particles
- ▶ polluted air
- ▶ primary contaminants
- ▶ purple
- ▶ red
- ▶ secondary contaminants
- ▶ yellow

## Lesson 3. Possible solutions for environmental problems

Code: C417G06U10L03

### Objectives

- ▶ Define preservation.
- ▶ Describe the relationship that exists between natural resources preservation and the survival of living things.
- ▶ Summarize the relationship among knowledge and awareness and the possible solutions for environmental problems.
- ▶ Contrast between ecology and environmental science.
- ▶ Recognize the importance of reforestation.
- ▶ Mention some measurements that are based on sustainable development.
- ▶ Investigate if the reforestation and recycling alternatives are being applied in their communities.

### Topics

- ▶ Preservation as a first choice
- ▶ Let's combine knowledge and action
- ▶ How are ecology and environmental education related?

### Keywords

- ▶ agriculture
- ▶ Caribbean Petroleum Corporation (CAPECO)
- ▶ deforestation
- ▶ Ecology
- ▶ ecosystems
- ▶ environment
- ▶ Environmental Science
- ▶ preservation
- ▶ recycle
- ▶ recycling
- ▶ reduce
- ▶ reforestation
- ▶ reuse
- ▶ sustainable development