NFC ACADEMY

PHYSICAL SCIENCE (800)
COURSE OVERVIEW

General Science II is a basic intermediate course intended to expose students to the designs and patterns in God's physical universe. This course expands on the Science 600 and the General Science I course, providing a set of basic scientific skills and a broad survey of the major areas of science. Some of the areas covered in General Science II include the history of science, structure and properties of matter, health and nutrition, types of energy, electricity and magnetism, work, energy, forces, simple machines, balance in nature, natural cycles and resources.

The course seeks to develop the student's ability to be aware of and participate in scientific inquiry. The units contain experiments and projects to capitalize on the students' natural curiosity. The student will explore, observe, and manipulate everyday objects and materials in their environment. Students at this level should show understanding of interrelationships between organisms and the environment, recognize patterns in systems, and expand their knowledge of cellular dimensions of living systems. Collectively, this should help students develop and build on their subject-matter knowledge base.

OBJECTIVES

- **SCIENCE AND SOCIETY:** Students will define science, describe its history, and use their main senses for observation of the world around them.

- **STRUCTURE OF MATTER (PART 1):** Students will describe elements and compounds in the terms of atoms and molecules.
- **STRUCTURE OF MATTER (PART 2):** Students will demonstrate a knowledge of the different changes in matter.
- **HEALTH AND NUTRITION:** Students will learn how to develop good health habits.
- **ENERGY (PART 1):** Students will explain and give examples of the different types of energy.
- **ENERGY (PART 2):** Students will define magnetism and electricity and describe their relationship.
- **MACHINES (PART 1):** Students will define force and work and evaluate the relationship that exists between work and energy.
- **MACHINES (PART 2):** Students will describe the different types of simple machines.
- **BALANCE IN NATURE:** Students will discuss the balance in nature regarding the different cycles.
- **SCIENCE AND TECHNOLOGY:** Student will review the other units and explore careers in science and technology.

CURRICULUM CONTENT AND SKILL FOCUS

UNIT 1: SCIENCE AND SOCIETY

- Define science and briefly describe the history of ancient and medieval scientists and their contributions
- Describe the evolutionary theory as proposed by de LaMarck and Darwin and the implications it had on scientific research
- Recognize the contributions of John Dalton and Louis Pasteur
- List and describe the steps involved in the scientific method, use the metric system, scientific notation, and significant figures
- Distinguish technology from pure science and provide examples of technology in each era
- Explore today's goals for technology in science and list some of the difficulties and problems that technology is faced with in today's society

UNIT 2: STRUCTURE OF MATTER (PART 1)

- Define and describe the fundamental properties of matter, and explain how to use mass and volume to find the density of an object
- Identify the three states of matter
- Describe the parts of atoms and their particles and define atomic mass
- Distinguish between elements, compounds, and mixtures
- Analyze the use of chemical formulas to name a compound

UNIT 3: STRUCTURE OF MATTER (PART 2)

- Describe and differentiate between physical and chemical changes and changes of state
- Distinguish between homogeneous and heterogeneous mixtures, solutions and mixtures, and colloids and suspensions
- Discuss chemical changes, explain the Law of Conservation of Mass, and interpret chemical equations
- Describe nuclear changes and differentiate between fission and fusion
- Describe the properties of acids, bases, and salts
- Classify substances as acids, bases and describe neutralization reaction

UNIT 4: HEALTH AND NUTRITION

- Examine the purpose of each of six types of nutrients and trace the path food takes through the digestive system
- Using My Plate, provide examples of a good diet consisting of the five different food groups
- Examine the importance of healthy foods, describe symptoms of vitamin deficiencies, and the relationship between allergic and addiction reactions
- Identify ways to control contagious diseases
- Demonstrate knowledge of good hygiene and proper health maintenance

UNIT 5: ENERGY (PART 1)

- Define energy, distinguish between kinetic and potential energy and compare force and work
- Discuss different forms of energy
- Distinguish between heat and temperature and the processes that transfer heat
- Describe how chemical reactions are used to produce heat and electrical energy
- State the Law of Conservation of Matter and Energy, and recognize that mass is converted to energy in a nuclear reaction
- Define entropy and discuss common energy conversions

UNIT 6: ENERGY (PART 2)

- Explain what is meant by a magnetic field and how to detect it and list some materials that can exert magnetic fields
- Calculate the strength of a magnetic force if strength and distance are known
- List the three electrostatic laws and explain the effects produced by the accumulation of a static electric charge
- Distinguish between direct and alternating current and list two factors that limit the amount of electric current that will flow through a simple circuit
- Use Ohm's law to calculate resistance in simple circuits
- Identify and describe conventional and alternative energy sources

UNIT 7: MACHINES (PART 1)

- Identify that the SI system (metric system) is based on multiples of ten
- Discus direct and indirect measurement
- Define force and gravity, stat Newton's three laws of motion, and use them to explain how objects move
- Distinguish between scalar and vector quantities, draw a force vector, and add and subtract vectors
- Define work and joule, and recognize situations when work is accomplished
- Evaluate the relationship that exists between work and energy and perform calculations to find power

UNIT 8: MACHINES (PART 2)

- Describe friction and its causes and identify when friction is helpful

- Calculate the coefficient of friction and describe strategies to reduce friction
- Describe a lever, differentiate between actual and ideal mechanical advantage, and calculate efficiency of a machine using the formula given
- Describe the wheel and axle, pulleys, and gears, use the formulas to calculate AMA and IMA and efficiency for each
- Describe the inclined plane and calculate the AMA, IMA, and efficiency of the inclined plane
- Describe the wedge and screw and provide examples

UNIT 9: BALANCE IN NATURE

- Explain the phases of photosynthesis and how it creates sugars stored in plants that can be used for food
- Discuss the history of food production and the importance of the Industrial Revolution to it
- Recognize the accomplishments of Gregor Mendel and Luther Burbank to the field of genetics
- Describe the organisms and components involved in the nitrogen and decay cycles
- Describe the organisms and components involved in the water and carbon-oxygen cycles
- Discuss how nature is balanced and what can disrupt that balance

UNIT 10: WORKING IN SCIENCE

- Recognize science and technology as a career choice
- Review the other units in this course

ADDITIONAL RESOURCES

All of the basic activities in this course, including daily lessons, periodic quizzes, and unit tests can be completed with online resources. All experiments for this course will be performed virtually with Smart Science Labs. General Science II also includes extra

alternate assignments, experiment/projects and tests for use in enhancing instruction or addressing individual needs as assigned.

GRADING INFORMATION

GRADING COMPONENTS

Lessons	35%
Quizzes	25%
Projects	10%
Tests	30%

GRADING SCALE

100-90	A
89-80	B
79-70	C
69-60	D
Below 60	F