

Biology A

SCOPE OF COURSE

This course is divided into two semesters of study (A & B) comprised of five units each. The first half of the course (A) provides a comprehensive exploration of the definition of life, the scientific method, cell structure, the chemical processes for energy production, life at the cellular and multicellular levels, and the various body systems that work together to sustain life. Laboratory activities embedded within each unit allow for hands-on, practical applications of various concepts and the interrelationships that exist at different levels within the living world.

SEQUENCE OF SKILLS

UNIT 1 – The Science Called Biology

- Introduction to Biology
- Problem Solving: The Scientific Method
- Laboratories:
 - Investigating the Scientific Method
 - Investigating Measurement
 - Investigating Changes in a Biological Material
 - Investigating the Compound Light Microscope
- Making, Organizing, and Analyzing Observations
- Line Graphs
- Bar Graphs
- Circle Graphs / Pie Charts
- Interview

UNIT 2 –The Characteristics of Life

- The Definition of Life
- Using Life's Characteristics to Define It
- Organizing the Characteristics of Life
- The Scientific Definition of Life
- Properties of Life
- Life Activities:
 - Nutrition
 - Respiration
 - Synthesis, Growth, Reproduction
 - Transport
 - Laboratory Activity: Investigating the Transport of Water in a Living Organism
 - Excretion
 - Regulation
- Are Viruses Alive?

UNIT 3 – The Chemistry of Life

- The Chemical Nature of Life
- What Are Living Things Made Of?
- The Making of Chemical Compounds:
 - Ionic Bonding
 - Covalent Bonding
- A Study of pH
- An Example of the Importance of pH to the Living World
- Acid Rain
- The Organic Compounds of Life
- Testing for the Compounds of Life
- Enzymes
- Investigating Enzyme Activity
- The Bag of Chemicals

Biology A

SEQUENCE OF SKILLS

UNIT 4 – The Cell

- Cells: The Basic Unit of Life
- Our City’s Outer Wall—The Cell Membrane
- Moving Around the City—Osmosis and Diffusion
- Laboratories:
 - Osmosis/Diffusion
 - Looking at Cells
 - Modeling Mitosis (Cell Division)
- How Cells Make Energy:
 - Step 1: Glycolysis
 - Step 2: The Mitochondrion
- Using ATP—The Making and Breaking of the City’s Energy Chips
- The City’s Factory and Packaging Plant—The Endoplasmic Reticulum and Golgi Apparatus
- The City’s Government Building and Control Center—The Nucleus
- The Reason Why Our City Is Small
- The Many Different Jobs of Cells

UNIT 5 – Life at the Cellular and Multicellular Levels

- Introduction
- Nutrition
- Transport
- Blood
- Respiration
- Excretion
- Regulation
 - Nervous System
 - Endocrine System
- Locomotion
 - Skeletal System
 - Muscular System
- Integumentary System
- Human Anatomy

Biology B

SCOPE OF COURSE

This course is divided into two semesters of study (A & B) comprised of five units each. The second half of the course (B) provides a comprehensive exploration of reproduction, genetics, classification of various organisms, evolution, and ecology. Laboratory activities embedded within each unit allow for hands-on, practical applications of various concepts and the interrelationships that exist at different levels within the living world.

SEQUENCE OF SKILLS

UNIT 1 – Reproduction

- Introduction
- Asexual vs. Sexual Reproduction
- Asexual Reproduction
- Sexual Reproduction in Plants
- Investigating a Typical Flower
- Plant Growth and Development
- Investigating Seed and Plant Development
- Sexual Reproduction
- Male Reproductive System
- Female Reproductive System
- Development and Embryology
- Reproductive Technology

UNIT 2 – Genetics

- Genetics – What Makes Us Each Unique?
- Determining Phenotypes
- Asexual Reproduction
- Sexual Reproduction
- Meiosis and Sexual Reproduction
- Laboratories:
 - Meiosis
 - DNA Separation Simulation
 - Karyotyping
- Components of DNA – The Stuff We Are Made Of
- Constructing a DNA Model
- Genes to Proteins
- DNA Mutations
- Genetic Engineering

UNIT 3 – Classification

- The Need for Classification
- What is Biological Classification?
- Naming Organisms: The Principles of Taxonomy
- How to Classify: Use a Classification Key
- Classifying Trees by Using Their Leaves
- Laboratory: Animal Classification
- More Applications of the Animal Classification Lab
- Modern Taxonomy: Biosystematics
- Biosystematics Today
- A Species Problem: Are the wolf and dog members of the same species?
- The Science of Biosystematics: Evidences of Relationship
- Modern Classification: Problem Solving

Biology B

SEQUENCE OF SKILLS

UNIT 4 – Evolution

- Where It All Began
- Evidence of Evolution From Fossils
- Evolution: Change Over Time
- Evidence of Evolution In the Fossil Record
- Laboratories:
 - Finch
 - Comparative Similarities
 - Constructing a Cladogram
- Modern Evolution
- Natural Selection of Alleles
- Mechanisms of Change
- The Peppered Moth - Survival of the Fittest
- Comparative Similarities of Evolution
- Path of Humans

UNIT 5 – Ecology

- Levels of Organization
- Laboratories:
 - Biodiversity
 - Foreign Invaders: Ecological Succession
 - Saving a Habitat
 - Ecosystem in a Bottle
 - Ecosystem Damage
- Energy Systems
- Competition Shapes Communities
- Cycling of Ecosystem Materials
- Limits to Growth
- Human Impact
- Dangers to the Ecosystem

Glossary of Biology Terms/Glosario de Términos de Biología

OBJECTIVE

This supplemental resource was developed for those students whose primary language is Spanish in order to help them in gaining a clearer understanding of the specialized vocabulary associated with the study of biology. This offering contains those terms given in the glossaries found at the end of each unit of the NPC-developed, two-semester Biology A/B course. It may be used in conjunction with that course, or to provide additional support for students taking biology in a traditional school setting.