



Course Outline

Organisms

From giant redwoods to tiny algae, and from lumbering elephants to “no-see-‘em” gnats, the diversity of life on earth delights, startles, and amazes. But all living things share some common characteristics. What are the characteristics of life? What is the chemical basis for life? What molecules support life? In this course you’ll explore these questions and more.

- Introduction to Life Science
- Diversity of Life
- Challenges of Life
- Characteristics of Life
- Classification of Living Things
- Domains of Life
- Chemistry of Life
- Single-Celled Organisms
- Multicellular Organisms

Cells

They’re everywhere, and they control our lives. What are they? Alien invaders? No. They are cells. They are inside us and all around us, in every living thing on earth. They are constantly growing, reproducing, communicating, and using energy. They sense, respond, and adapt to their environment. You’ve probably never thought much about cells, but there’s much to discover about their intriguing lives.

- The Cell
- Differing Cells
- Cell Organelles
- Looking at Cells
- DNA Makes RNA Makes Proteins
- Plant and Animal Cells
- Cells and Energy
- Diffusion and Osmosis
- Cell Division
- Mitosis

Living Systems

Organisms must meet many challenges to survive. The systems in multicellular organisms are like the different parts of a computer. Just as all the parts of a computer must function individually so that the computer will work, all the systems in an organism work together in a coordinated manner to keep the organism alive. What are these systems? How are they related? This unit will explore living systems and how they function.

- From Cells to Organs
- Muscular and Skeletal Systems
- Respiratory System
- Circulatory System
- Digestive and Excretory Systems

- Immune System
- How Systems Work Together
- Comparison within Species
- Continuation of Species
- Cells for Reproduction
- Life Cycles

Interdependence of Life

Look at everything in an aquarium. How do you think each of the organisms in the aquarium survives? If you were to draw a diagram of the interactions that take place in an aquarium, you would see a complex series of relationships. In the living world, no organism can survive by itself. Living things depend on other organisms and their environment to supply them with their needs.

- Organisms and Their Needs
- Staying Balanced
- Responses
- Ecosystems
- Populations
- Cycles in Nature
- Energy Flow in Ecosystems
- Food Chains
- Food Webs
- Competitive Relationships
- Cooperative Relationships

Adaptation and Change

Every organism lives in a particular type of environment. In this unit, we will explore how populations change over time to survive in their environments, and what happens when the environment changes.

- Change Over Time
- Structural Adaptations
- Behavioral Adaptations
- Extinct or Endangered?
- Changes in Ecosystems
- Rates of Environmental Change
- Population Changes
- The Human Factor

Genetics

Individuals that reproduce sexually have many characteristics that make them different from each other. In this unit, you will learn about the mechanisms responsible for these differences.

- Mendel’s Pea Plants
- Genes and Alleles
- Inheritance
- Punnett Squares



- Similarities Among Organisms
- Chromosomes
- Meiosis
- Meiosis and Mitosis
- Mutations
- Genetic Engineering

History of Life on Earth

Galaxies teeming with stars. Mysterious black holes. Exploding supernovas. The far reaches of the universe are filled with wonders. Right here on our own planet, however, is perhaps the greatest wonder of all: life. Scientists currently know of no other place in the universe where life exists. This unit explores scientists' ideas about how life originated on earth and how it has changed over its long history.

- Origin of Life on Earth
- The Theory of Evolution
- Natural Selection
- Origin of New Species
- Development of Life

Science Investigation

- Scientific Methods
- Design and Set Up Your Experiment
- Data Collection
- Data Analysis
- Reporting Conclusions

Standard Curriculum Items

Graduated cylinder (100 mL)
Compound microscope
Radish seeds
Microscope slides (set of 12)
Slide cover slips (set of 12)
Transparencies (set of 12)
Petri dishes
Agar vials
Rhizobium bacteria
Green bean bush seeds
Blue Fescue grass seeds
Safety glasses
Magnifying glass
Advanced thermometer