

**Course Objectives/Course Outline**  
**Spokane Community College**

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**Course Title:** Biology for Elementary Education

**Prefix and Course Number:** BIOL 115

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**Course Learning Outcomes:**

**By the end of this course, a student should be able to:**

- Generate a question that can be answered through scientific investigation
- Design and conduct scientific investigations
- Synthesize evidence from scientific investigations to construct descriptions, explanations and predictions
- Apply modeling to investigate objects, events and/or processes.
- Record scientific procedures, investigations and explanations.
- Categorize plants and/or animals into groups according to how they accomplish life processes such as food production/consumption or reproduction and whether they are consumers, producers, or decomposers.
- Describe how specialized cells within multi-cellular organisms form different kinds of tissues, organs and organ systems to carry out life functions.
- Describe how organisms pass on genetic information as they reproduce and that an organism's characteristics are determined by both genetic and environmental factors.
- Describe how human life functions and the interconnecting organ systems necessary to maintain human life, including circulatory, digestive, excretory, respiratory, and the muscular-skeletal systems.
- Describe how individual organisms, including cells, use matter and energy for life processes and why the mechanisms accomplishing these processes are complex, integrated and regulated.
- Describe how organisms pass on genetic information as they reproduce and why natural selection, extinction and change in species occurs over time.
- Describe how organisms in ecosystems interact with and respond to their environment and other organisms as the organisms carry out life functions.
- Analyze how human societies' use of natural resources affects the quality of life and the health of ecosystems.

**Course Outline**

- I. Introduction to Course, EALR information, & Expectations of Teachers
- II. Introduction to Biology
  - A. The Scope and Diversity of Life
  - B. Characteristics of Life
- III. The Process of Science
  - A. Introduction to Scientific Method
  - B. Experimental Design
- IV. Levels of Organization
- V. Basic Chemistry
  - A. Atoms and Molecules
  - B. Chemical Reactions
  - C. Water and Life
- VI. Molecules of Life
  - A. Carbon Chemistry
  - B. Biological Molecules

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- C. Carbohydrates
- D. Lipids
- E. Proteins
- F. Nucleic Acids

VII. Cells

- A. Prokaryotic vs. Eukaryotic
- B. Organelles
- C. Plasma Membrane
  - Fluid Mosaic Model
  - Movement Across Membranes
- D. Cytoskeleton
- E. Microscopes as Windows to Cells

VIII. Basic Energy Concepts

- A. Conservation of Energy
- B. Forms of Energy & Energy Conversions
- C. ATP and Cellular Work
- D. Enzymes

IX. Cell Division

- A. Mitosis
- B. Meiosis

X. Molecular Biology

- A. Structure of DNA and RNA
- B. Flow of Genetic Information from DNA to RNA to Protein
- C. DNA Technology

XI. Plant Structure and Function

- A. Photosynthesis
- B. Diversity: Mosses, Conifers, & Flowering Plants

XII. Overview of Animal Structure and Function

- A. Form Follows Function
- B. Tissues

XIII. Human Digestive System

- A. Gastrointestinal Tract Anatomy
- B. Digestion and Absorption
- C. Nutrition

XIV. Human Respiratory System

- A. Respiratory System Anatomy
- B. Gas Exchange
- C. Transport of Gases

XV. Human Circulatory System

- A. Heart and Cardiovascular System Anatomy
- B. Cardiac Cycle
- C. Structure and Function of Blood

XVI. Human Skeletal System

- A. Structure of Bone
- B. Functions of Skeleton

XVII. Human Muscle System

- A. Muscle Contractions
- B. Movement and Muscle Actions

XVIII. Human Nervous System

- A. Nervous System Anatomy
- B. Nerve Signals and their Transmission

- XIX. Human Endocrine System
  - A. Hormones and Homeostasis
- XX. Mendelian Genetics
  - A. Principle of Segregation
  - B. Principle of Independent Assortment
  - C. Rules of Probability
- XXI. Evolution
  - A. Darwin's Theory of Natural Selection
  - B. Microevolution
  - C. Macroevolution
- XXII. Ecosystems
  - A. Communities
  - B. Abiotic Factors in Ecosystems
  - C. Energy Flow
  - D. Nutrient Cycling
- XXIII. Population Ecology
  - A. Growth Models
  - B. Human Population Growth
- XXIV. Human Impact on the Environment
  - A. Disturbance of Communities
  - B. Impact on Chemical Cycles
  - C. Loss of Biodiversity
  - D. Sustainability