



High School Biology Curriculum Map

Unit 1 – Biology Basics

1-1 Nature of Science and the Scientific Method

1-2 Hypotheses, Theories and Scientific Law

1-3 Technological Design Process

1-4 Chemistry of Life

- *HS-LS1-6*. Construct and revise an explanation based on evidence for how carbon, hydrogen and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

1-5 Properties of Water

- *HS-ESS2-5*. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface process.

1-6 Macromolecules

- *HS-LS1-6*. Construct and revise an explanation based on evidence for how carbon, hydrogen and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.



Unit 2 – Cells

2-1 Cell Theory

- **HS-LS1-2.** Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.

2-2 Prokaryotic and Eukaryotic Cells

- **HS-LS1-1.** Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.
- **HS-LS1-2.** Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.

2-3 Cell Organelles

- **HS-LS1-2.** Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.

2-4 Passive Cellular Transport

- **HS-LS1-2.** Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.

2-5 Active Cellular Transport

- **HS-LS1-2.** Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.

2-6 Stem Cells

- **HS-LS1-1.** Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.

2-7 Cell Cycle (Mitosis)

- **HS-LS1-4.** Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

2-8 Regulation of the Cell

- **HS-LS1-4.** Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.



Unit 3 – Classification and Taxonomy

3-1 Cladograms and Dichotomous Keys

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

3-2 Carolus Linnaeus System for Classifying Organisms

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

3-3 The Six Kingdoms of Life

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

Unit 4 – Ecology

4-1 Characteristics of Life

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

4-2 Ecological Niche

- **HS-LS2-2.** Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

4-3 Ecological Organization

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

4-4 Community Patterns

- **HS-LS2-2.** Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
- **HS-LS2-6.** Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions but changing conditions may result in a new ecosystem.



4-5 Relationships between Organisms

- *HS-LS2-8.* Evaluate evidence for the role of group behavior on individual and species' chances to survive and reproduce.

4-6 Population Growth Patterns

- *HS-LS2-1.* Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.
- *HS-LS2-6.* Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

4-7 Sampling Communities

- *HS-LS2-2.* Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

4-8 Human Impacts on the Environment

- *HS-LS2-7.* Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

Unit 5 – Energy Flow

5-1 Producers vs. Consumers

- *HS-LS2-3.* Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.
- *HS-LS2-4.* Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

5-2 ATP

- *HS-LS2-4.* Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

5-3 Photosynthesis

- *HS-LS1-5.* Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.



5-4 Cellular Respiration

- *HS-LS1-7.* Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed, resulting in a net transfer of energy.

5-5 Food Webs

- *HS-LS2-4.* Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

5-6 Trophic Pyramids

- *HS-LS2-4.* Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

5-7 Nutrient Cycling

- *HS-LS2-4.* Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
- *HS-LS2-5.* Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

Unit 6 – Genetics

6-1 DNA and RNA Structure

- *HS-LS1-1.* Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.

6-2 DNA Replication

- *HS-LS1-1.* Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.

6-3 Meiosis

- *HS-LS3-2.* Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.



6-4 Protein Synthesis

- *HS-LS1-1.* Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.

6-5 Enzymes

- *HS-LS1-1.* Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.

6-6 Mutations

- *HS-LS3-2.* Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors

6-7 Genetic Engineering

- *HS-LS3-2.* Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

Unit 7 – Heredity

7-1 Mendelian Genetics

- *HS-LS3-1.* Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

7-2 Monohybrid Inheritance

- *HS-LS3-3.* Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

7-3 Dihybrid Inheritance

- *HS-LS3-3.* Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.



7-4 Modified Mendelian Ratios

- *HS-LS3-3.* Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

7-5 Pedigrees

- *HS-LS3-2.* Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

7-6 Genetic Disorders

- *HS-LS3-2.* Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

Unit 8 – Evolution

8-1 Evolutionary Theory Pre-Darwin

- *HS-LS4-1.* Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.

8-2 Evidence for Evolution

- *HS-LS4-1.* Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.

8-3 Evolutionary Agents

- *HS-LS4-1.* Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.

8-4 Principles of Natural Selection

- *HS-LS4-2.* Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number,



(2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

8-5 Modes of Natural Selection

- **HS-LS4-3.** Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.
- **HS-LS4-4.** Construct an explanation based on evidence for how natural selection leads to adaptation of populations.

8-6 Phylogenetic Trees

- **HS-LS4-1.** Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.

8-7 The Species Concept

- **HS-LS4-4.** Construct an explanation based on evidence for how natural selection leads to adaptation of populations
- **HS-LS4-5.** Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.

8-8 Patterns in Macroevolution

- **HS-LS4-5.** Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.



Unit 9 – Human Body Systems

9-1 Integumentary System

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

9-2 Skeletal System

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

9-3 Muscular System

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

9-4 Digestive System

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

9-5 Circulatory System

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

9-6 Lymphatic System

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

9-7 Respiratory System

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

9-8 Urinary System

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.



9-9 Endocrine System

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

9-10 Reproductive System

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

9-11 Nervous System

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.