Grade 7
Life Science

Grade 7 Life Science is designed to provide students with a foundation of scientific knowledge and ways of exploring the world. It provides an understanding of living organisms, from the smallest cells to complex ecosystems, allowing students to appreciate the diversity and complexity of life on Earth. Life Science not only imparts knowledge about the natural world but also nurtures critical thinking, ethical reasoning, and practical skills that are valuable in numerous aspects of life and future career paths. This course requires comprehensive learning and the use of reading, writing, and mathematics skills to enhance scientific literacy.

Life Science content focuses on the disciplinary core ideas in the life sciences domain. The first disciplinary core idea, "From Molecules to Organisms: Structures and Processes," focuses on cellular structures, energy, mitosis, and interaction of body systems necessary for growth, development, and maintenance of homeostasis, emphasizing how each system interacts with the others and with external stimuli. The concepts of mitosis and meiosis are presented separately to establish that meiosis is a process of inheritance. Detailed anatomy of organs will be taught in high school Human Anatomy and Physiology, which extends the content of Life Science.

The second disciplinary core idea, "Ecosystems: Interactions, Systems, and Dynamics," is a broad look at energy and ecosystem relationships that impact populations and environments. The third core idea, "Heredity: Inheritance and Variation of Traits," focuses on inheritance of traits, variations, meiosis, and biotechnology as a foundation for the details of nucleotide structure, DNA replication, base-pairing, and protein synthesis, which will come in high school Biology. The fourth core idea, "Unity and Diversity," illustrates classification of organisms and adaptations of organisms due to natural selection.

Embedded in the content standards are the disciplinary core ideas of the Engineering, Technology, and Applications of Science (ETS) domain, which require students to use design strategies in conjunction with knowledge and understanding of science and technology to solve practical problems. Engineering standards are denoted with a gear icon⚙. Through guided participation in the engineering design process, students will address real-world problems by designing possible solutions to maintain biodiversity and ecosystem services.

Each content standard completes the stem *"**Students will**…"*

From Molecules to Organisms: Structures and Processes		
Cell Structure and Processes	1. Develop and use a model to explain the functions of specific cell structures necessary for maintaining a stable environment, including the cell membrane, cell wall, chloroplasts, endoplasmic reticulum, golgi apparatus, mitochondria, nucleus, ribosomes, and vacuoles. a. Engage in argument from evidence to support claims of cell theory. b. Construct an explanation of how prokaryotic and eukaryotic cells differ in structure and function.	**Structure and Function**
	c. Plan and carry out an investigation to identify and explain features of a cell's semi-permeable membrane which enable it to control what enters and exits the cell.	**Stability and Change**
	2. Construct an explanation of how photosynthesis and cellular respiration cycle matter and establish the flow of energy into and out of an organism. a. Ask questions and construct an explanation of how anaerobic bacteria produce energy in environments with no oxygen.	**Energy and Matter**
Growth and Development	3. Construct an explanation of how the process of mitosis maintains complex organisms and ensures new cells with identical genetic information.	**Structure and Function**
	a. Ask questions and communicate information regarding how errors in mitosis may affect cell division. *Example: formation of cancer cells*	**Cause and Effect**

	4. Obtain, evaluate, and communicate information explaining how cells, tissues, and organs of various systems of the human body work together for specific functions, including the circulatory, digestive, muscular, nervous, respiratory, and skeletal systems. *Examples: responding to stimuli, moving, breaking down or transporting nutrients*	**Systems and System Models**
Ecosystems: Interactions, Energy, and Dynamics		
Matter and Energy Flow	5. Construct an explanation of how the cycling of matter between abiotic and biotic parts of ecosystems demonstrates the flow of energy and the conservation of matter, including the carbon, nitrogen, and water cycles.	**Energy and Matter**
Population Dynamics	6. Analyze and interpret data to predict how environmental conditions, genetic factors, and resource availability will impact the growth of individual organisms and populations of organisms in an ecosystem. *Examples: location, population size, weather*	**Cause and Effect**
	7. Analyze and interpret data to explain how density-independent and density-dependent limiting factors in an ecosystem can lead to shifts in populations. *Examples: deforestation, disease, drought, fire, human activities, invasive species, succession*	
Interdependent Relationships	8. Construct an explanation that predicts patterns of interactions between and among organisms in different ecosystems. *Examples: competition, predation, mutualism, commensalism, parasitism*	
Biodiversity	9. ⚙Design a solution to maintain biodiversity and ecosystem services in a given scenario.	

	Examples: considering economic and social factors when making decisions about purifying water, recycling nutrients, preventing soil erosion, improving conditions for threatened and endangered species	
	10. Obtain, evaluate, and communicate information about characteristic animal behaviors and specialized plant structures and their effect on the probability of successful reproduction. *Examples: building nest to protect young from cold, flower characteristics that attract pollinators*	
Heredity: Inheritance and Variation of Traits		
Genetics and Biotechnology	11. Develop and use models to demonstrate how genetic variations between parents and offspring result from differences in inherited genes located on chromosomes. *Examples: monohybrid crosses using Punnett squares, homozygous and heterozygous allele pairs, phenotypes and genotypes, variants*	**Cause and Effect**
	12. Develop and use models to explain how genes are expressed through the flow of genetic information from DNA to RNA to a functional protein.	
	13. Develop and use models to explain that meiosis results in new genetic combinations with increased variation.	
	a. Construct an explanation of the advantages and disadvantages of asexual and sexual reproduction. *Examples: budding and binary fission occurring quickly, but with little variation; sexual reproduction requiring two organisms, but with increased variation*	
	b. Construct an explanation from evidence of how genetic variants may result in harmful, beneficial, or neutral effects on the structure and function of an organism.	

	14. Obtain, evaluate, and communicate information on the use of technologies that impact the inheritance and appearance of traits in organisms. *Examples: genetic engineering, gene therapy, selective breeding, genetically modified organisms*	
Unity and Diversity		
Phylogenetics	15. Analyze and interpret data from examination of fossils, relict species, and modern organisms to determine patterns of change in anatomical structures over time. *Example: Use a cladogram or phylogenetic tree.*	**Patterns**
	16. Obtain, evaluate, and communicate evidence comparing patterns in the embryological development of multiple species to identify relationships not evident in the fully formed adult anatomy. *Example: Use pictorial evidence of development of different species.*	
Natural Selection	17. Ask questions to clarify how natural selection over generations may lead to changes in the frequency of specific traits to enhance survival and reproduction of a population.	**Cause and Effect**

GRADE 7 LIFE SCIENCE

Course Overview

1ST 9-WEEKS

Nature of Science
Unit 1: Structure and Function of Human Body Systems
Unit 2: Cell Structure and Function

2ND 9-WEEKS

Unit 3: Cellular Energetics
Unit 4: The Cell Cycle
Unit 5: DNA and Protein Synthesis
Unit 6: Meiosis and Genetic Diversity

3RD 9-WEEKS

Unit 7: Bioenergetics
Unit 8: Ecosystems

4TH 9-WEEKS

Unit 9: Unity and Diversity of Organisms

GRADE 7 LIFE SCIENCE

Course Overview

STANDARDS CROSSWALK This table matches the 2023 standards to the current Grade7 Life Science curriculum.				
ALCOS	**1ST 9-WEEKS**	**2ND 9-WEEKS**	**3RD 9-WEEKS**	**4TH 9-WEEKS**
1	X	X		
2		X	X	
3		X		
4	X			
5			Standard not fully met	
6				X
7				X
8			X	
9			X	
10	Standard not met			
11		X		
12		X		
13		X		
14		X		
15				X
16				X
17				X

GRADE 7 LIFE SCIENCE

Scope and Sequence 1st 9-Weeks

Nature of Science	UNIT 1: Structure and Function of Human Body System	UNIT 2: Cell Structure and Function

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
WEEK 1	Establish a Science Classroom	Lesson 1- Lab Safety	Lesson 2- Graphing	Graphing continued	Lesson 3- Scientific Investigation
WEEK 2	Scientific Investigation continued	Scientific Investigation continued	Scientific Investigation continued	Flex day	Flex day
WEEK 3	Human Body Systems	Human Body Systems continued	Human Body Systems continued	Human Body Systems continued	Human Body Systems continued
WEEK 4	Human Body Systems continued	Human Body Systems continued	Human Body Systems continued	Human Body Systems continued	Human Body Systems continued
WEEK 5	Lesson 1- Characteristics of Living Things/ Cell Theory	Characteristics of Living Things/ Cell Theory continued	Lesson 2- Microscope History and Use	Microscope History and Use continued	Microscope History and Use continued
WEEK 6	Lesson 3- Prokaryotic and Eukaryotic Cells	Lesson 4- Cell Organelles	Cell Organelles continued	Cell Organelles continued	Lesson 5- Plant Cells vs. Animal Cells
WEEK 7	Plant Cells vs. Animal Cells continued	Flex Day	Flex Day	Flex Day	Flex Day
WEEK 8	Open for flexibility in schedule				
WEEK 9	Open for flexibility in schedule				

GRADE 7 LIFE SCIENCE

Nature of Science Overview

Nature of Science	RECOMMENDED TIME FRAME: 2 weeks

UNIT OVERVIEW

Accurately conveying the nature of science is common to most science education curricula worldwide. There is a clear message that understanding the nature of science is crucial for effective science teaching, for valuable science learning, and for responsible participation in society. The A+ College Ready curriculum clearly and strongly emphasizes the importance of the nature of science by placing it as the introductory unit to science. Each of the skills in this unit may not be mastered in this time frame but should be practiced and reinforced throughout the course.

STANDARDS

- ✓ Obtaining, Evaluating, and Communicating Information
- ✓ Analyzing and Interpreting Data
- ✓ Engaging in Argument from Evidence
- ✓ Asking questions
- ✓ Constructing Explanations
- ✓ Planning and Conducting Investigations

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GRADE 7 LIFE SCIENCE

Unit 1 Overview

Structure and Function of Human Body Systems	RECOMMENDED TIME FRAME: 2 weeks

UNIT OVERVIEW

This unit is an introduction to the **"big picture"** of how organisms are structured and how each system contributes to its function. This unit serves as a "book" for the students to provide evidence as to how the human body is an organized group of systems. They will get an **overview** of each organ system with a focus on the big idea that all of the systems must work together for the body to work correctly as a whole. The goal is *not* for students to memorize parts of the body or study any of the systems in depth.

Keep in mind that students compartmentalize cells after studying them throughout the year and begin thinking of them as individual things and forget that they are what make up all of the parts of living things. Students also think that body systems work independently. It should be clear by the end of the unit that each system is dependent on the others.

STANDARDS

7.LS.4 Construct models and representations of organ systems (e.g., circulatory, digestive, respiratory, muscular, skeletal, nervous) to demonstrate how multiple interacting organs and systems work together to accomplish specific functions.

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Developing and Using Models	✓ From Molecules to Organisms: Structures and Processes	✓ Systems and System Models

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Unit 2 Overview

Cell Structure and Function	RECOMMENDED TIME FRAME: 3 weeks

UNIT OVERVIEW

How do we know if something is living or nonliving? Most children understand that they, their dog, and plants are alive. Older children understand that plants are living things. What about mosses, bacteria, plankton, lawn mower or viruses? How are living things defined?

When teaching students that cells are the basic unit of life it is necessary to first define living things. Characteristics of living things can be combined into as many as 5 characteristics or separated into up to nine characteristics. The following is a list divided into teachable chunks.

- All living things are made of one or more cells.
- All living things respond to stimuli in their environment
    - Discuss homeostasis as the ability of a living thing to maintain a constant internal environment.
    - Some relatable examples include temperature, salinity, pH, and sugar levels
- All living things reproduce
- All living things have DNA as the genetic material
- All living things use energy (discuss metabolism)
    - Lean toward the concept of eating food for energy, but it is important that they understand not all living things "eat" but they all use energy.
- All living things grow (get larger) and develop (change over time)
    - When students visualize themselves as a baby and then imagine themselves as a larger version of their baby selves it stresses the difference between simple growth and development.

STANDARDS

7.LS.1 Engage in argument from evidence to support claims of the cell theory.

7.LS.2 Gather and synthesize information to explain how prokaryotic and eukaryotic cells differ in structure and function, including the methods of asexual and sexual reproduction.

7.LS.3 Construct an explanation of the function (e.g., mitochondria releasing energy during cellular respiration) of specific cell structures (i.e., nucleus, cell membrane, cell wall, ribosomes, mitochondria, chloroplasts, and vacuoles) for maintaining a stable environment.

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Engaging in Argument from Evidence ✓ Obtaining, Evaluating, and Communicating Information	✓ From Molecules to Organisms: Structure and Processes	✓ Structure and Function

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Scope and Sequence 2nd 9-Weeks

UNIT 3: Cellular Energetics	UNIT 4: The Cell Cycle	UNIT 5: DNA and Protein Synthesis	UNIT 6: Meiosis and Genetic Diversity

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
WEEK 1	Cellular Energetics	Cellular Energetics continued	Cellular Energetics continued	Cellular Energetics continued	Cellular Energetics continued
WEEK 2	The Cell Cycle	The Cell Cycle continued	The Cell Cycle continued	The Cell Cycle continued	The Cell Cycle continued
WEEK 3	The Cell Cycle continued	The Cell Cycle continued	The Cell Cycle continued	Flex day	Flex day
WEEK 4	Lesson 1- DNA	DNA continued	Lesson 2- Protein Synthesis	Protein Synthesis continued	Flex day
WEEK 5	Lesson 1- Meiosis	Meiosis continued	Meiosis continued	Meiosis continued	Lesson 2- Genetic Variation
WEEK 6	Genetic Variation continued	Genetic Variation continued	Genetic Variation continued	Genetic Variation continued	Genetic Variation continued
WEEK 7	Genetic Variation continued	Lesson 3- Mutations	Mutations continued	Mutations continued	Mutations continued
WEEK 8	Lesson 4- Genetic Technologies	Genetic Technologies continued	Genetic Technologies continued	Flex day	Flex day
WEEK 9	Open for flexibility in schedule				

GRADE 7 LIFE SCIENCE

Unit 3 Overview

Cellular Energetics	RECOMMENDED TIME FRAME: 1 week

UNIT OVERVIEW

Prior to this unit, students should describe the functions of plant and animal cell organelles, especially that of the mitochondria and chloroplasts. This unit provides an opportunity to expand on the concepts from Units 1 and 2 to broaden students' understanding of the relationship between structure and function. One of the characteristics of life is the need for a constant source of energy for life-sustaining processes. Some organisms are able to harness energy from the sun and transform it into a usable form. Other organisms depend on these sun-harnessing producers as a food source to meet their energy needs. The chemical transformation of matter to both store and release energy is a major function of cells. Those transformations are the foundation of this unit.

The topics of cellular respiration and photosynthesis should be taught together focusing on the ENERGY and the CYCLING of MATTER between the two processes. Do not let the students get lost in memorizing the number of molecules of reactants or products.

This unit offers a tie to ecology through food webs and energy transfer through trophic levels. It is important that these cellular processes are addressed again in bioenergetics.

STANDARDS

7.LS.5 Examine the cycling of matter between abiotic and biotic parts of ecosystems to explain the flow of energy and the conservation of matter.

a. Obtain, evaluate, and communicate information about how food is broken down through chemical reactions to create new molecules that support growth and/or release energy as it moves through an organism.

b. Generate a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of organisms.

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Constructing Explanations ✓ Developing and Using Models	✓ Ecosystems: Interactions, Energy, and Dynamics	✓ Energy and Matter ✓ Cause and Effect

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Unit 4 Overview

The Cell Cycle	RECOMMENDED TIME FRAME: 1.5 weeks

UNIT OVERVIEW

Before the unit begins, students should have a basic understanding of cell types, organelles, and their functions (especially the nucleus). They should also have a general knowledge about the function of DNA in a cell.

This unit addresses the concept of cell division. Students will learn about cell division for body cells (mitosis). After the unit, students should be able to explain the cell cycle, including interphase (DNA replication), mitosis, and cytokinesis. They should make the connection of cell division to the statement from the cell theory "all cells come from pre-existing cells."

Students may think that organisms grow due to an increase in cell size. Be sure to explain that cell size may increase slightly, but the increase in the number of cells is responsible for the growth of a multicellular organism. Teachers may want to approach cell division from the perspective of the body's way to repair/regrow.

STANDARDS

7.LS.2 Gather and synthesize information to explain how prokaryotic and eukaryotic cells differ in structure and function, including the methods of **asexual** and sexual **reproduction**.

7.LS.1 Engage in arguments from evidence to support claims of the cell theory. (Cells arise from preexisting cells by cell division).

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Obtaining, Evaluating, and Communicating Information ✓ Engaging in Argument from Evidence	✓ From Molecules to Organisms: Structure and Processes	✓ Structure and Function ✓ Cause and Effect

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Unit 5 Overview

DNA and Protein Synthesis	RECOMMENDED TIME FRAME: 1 week

UNIT OVERVIEW

Prior to this unit, students should have knowledge about cell structures and functions. In this unit, students will describe the role DNA plays in the cell and the role of RNA in protein production. In the next unit, students will explain how proteins are responsible for an organism's traits.

STANDARDS

7.LS.3 Construct an explanation of the function (e.g., mitochondria releasing energy during cellular respiration) of specific cell structures (i.e., nucleus, cell membrane, cell wall, ribosomes, mitochondria, chloroplasts, and vacuoles) for maintaining a stable environment.

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Constructing Explanations ✓ Developing and Using Models	✓ From Molecules to Organisms: Structures and Processes	✓ Structure and Function ✓ Cause and Effect

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Unit 6 Overview

Meiosis and Genetic Variation	RECOMMENDED TIME FRAME: 4 weeks

UNIT OVERVIEW

The big idea of this unit is that living things pass traits to their offspring. That phenomenon happens through sexual reproduction (meiosis)-- typically half of the genes (genotypes) are given by each parent and the genes provide the offspring with different physical traits (phenotypes). They should also review that the fertilized cell with that genetic information continues to multiply until it forms a complete organism (mitosis). The students will describe the genetic mutations and determine whether they are harmful, beneficial, or neutral to the structure and function of an organism.

Common misconceptions:

- The process of meiosis is the same as mitosis except cell division occurs twice in meiosis.
- One set of alleles is responsible for determining each trait.
- Dominant traits are found at high frequencies in a population.
- Daughters inherit more traits from their mothers and sons inherit more traits from their fathers.
- Because there is a 50% chance of having a boy and 50% chance of having a girl, if you have four children, you will have 2 boys and 2 girls.
- Mutations in somatic cells will be passed onto offspring.

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Unit 6 Overview

STANDARDS

7.LS.2 Gather and synthesize information to explain how prokaryotic and eukaryotic cells differ in structure and function, **including the methods of** asexual and **sexual reproduction**.

7.LS.1 Engage in arguments from evidence to support claims of the cell theory. (Cells arise from preexisting cells by cell division).

7.LS.12 Construct and use models (e.g., monohybrid crosses using Punnett squares, diagrams, simulations) to explain that genetic variations between parent and offspring (e.g., different alleles, mutations) occur as a result of genetic differences in randomly inherited genes located on chromosomes and that additional variations may arise from alteration of genetic information.

7.LS.13 Construct an explanation from evidence to describe how genetic mutations result in harmful, beneficial, or neutral effects on the structure and function of an organism.

7.LS.14 Gather and synthesize information regarding the impact of technologies (e.g., hand pollination, selective breeding, genetic engineering, genetic modification, gene therapy) on the inheritance and/or appearance of desired traits in organisms.

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Engage in Argument from Evidence ✓ Developing and Using Models ✓ Constructing Explanations ✓ Obtaining, Evaluating, and Communicating Information	✓ Heredity: Inheritance and Variation of Traits	✓ Cause and Effect ✓ Structure and Function

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Scope and Sequence 3rd 9- Weeks

UNIT 7: Bioenergetics	UNIT 8: Ecosystems

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
WEEK 1	Lesson 1- Ecosystem Organization	Lesson 2- Energy Production	Lesson 3- Energy Flow	Energy Flow continued	Energy Flow continued
WEEK 2	Energy Flow continued	Energy Flow continued	Energy Flow continued	Flex day	Flex day
WEEK 3	Lesson 1- Introduction to Phenomenon	Lesson 2- Biomes and Ecosystems	Biomes and Ecosystems continued	Lesson 3- Classifying Living Things	Classifying Living Things continued
WEEK 4	Lesson 4- Biotic and Abiotic Factors	Lesson 5- Population Ecology	Population Ecology continued	Population Ecology continued	Lesson 6- Biodiversity
WEEK 5	Biodiversity continued	Biodiversity continued	Biodiversity continued	Biodiversity continued	Lesson 7- Ecological Succession
WEEK 6	Ecological Succession continued	Ecological Succession continued	Lesson 8- Biogeochemical Cycles	Biogeochemical Cycles continued	Biogeochemical Cycles continued
WEEK 7	Lesson 9- Human Impact on Ecosystems	Human Impact on Ecosystems continued	Flex day	Flex day	Flex day
WEEK 8	Open for flexibility in schedule				
WEEK 9	Open for flexibility in schedule				

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Unit 7 Overview

Bioenergetics	RECOMMENDED TIME FRAME: 2 weeks

UNIT OVERVIEW

Prior to this unit, students should be able to describe the function of plant and animal cell organelles, especially that of the mitochondria and chloroplasts. Furthermore, students should firmly comprehend the process of cellular respiration and photosynthesis. These organelles and processes would have been included in the earlier units on cells. Students should also have a keen understanding of the role of the cell membrane as it relates to the process of osmosis and homeostasis.

In this unit, students examine the movement of energy and matter through ecosystems. Students will explain the organization of living things in the environment, abiotic and biotic interactions in the environment, various processes for living things to acquire energy, and the relationship of these diverse processes between all living things in the environment.

STANDARDS

7.LS.5 Examine the cycling of matter between abiotic and biotic parts of ecosystems to explain the flow of energy and the conservation of matter.

7.LS.6 Analyze and interpret data to provide evidence regarding how resource availability impacts individual organisms as well as populations of organisms within an ecosystem.

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Constructing Explanations ✓ Analyzing and Interpreting Data ✓ Developing and Using Models	✓ Ecosystems: Interactions, Energy, and Dynamics	✓ Energy and Matter ✓ Cause and Effect

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Unit 8 Overview

ECOSYSTEMS	RECOMMENDED TIME FRAME: 4 weeks

UNIT OVERVIEW

Ecology is the branch of biology that deals with the relations of organisms to one another and to their physical surroundings. Students should be able to describe biotic and abiotic factors, and energy transfer from the previous unit. In this unit, students will explore the delicate balance of biotic and abiotic factors within an ecosystem. All living and nonliving things in an ecosystem are connected.

Students will use the activities in this unit to investigate the phenomenon/question, "What effect(s) do feral hogs have on the Alabama wildlife"? Students may also ask: 1. What are the conditions that lead to an overpopulation of pigs? 2. What are the effects on the ecosystem?

STANDARDS

7.LS.7 Use empirical evidence from patterns and data to demonstrate how changes to physical or biological components of an ecosystem (e.g., deforestation, succession, drought, fire, disease, human activities, invasive species) can lead to shifts in populations.

7.LS.8 Construct an explanation to predict patterns of interactions in different ecosystems in terms of the relationships between and among organisms (e.g., competition, predation, mutualism, commensalism, parasitism).

7.LS.9 Engage in argument to defend the effectiveness of a design solution that maintains biodiversity and ecosystem services (e.g., using scientific, economic, and social considerations regarding purifying water, recycling nutrients, and preventing soil erosion).

7.LS.10 Use evidence and scientific reasoning to explain how characteristic animal behaviors (e.g., building nests to protect young from cold, herding to protect young from predators, attracting mates for breeding by producing special sounds and displaying colorful plumage, transferring pollen or seeds to create conditions for seed germination and growth) and specialized plant structures (e.g., flower brightness, nectar, and odor attracting birds that transfer pollen; hard outer shells on seeds providing protection prior to germination) affect the probability of successful reproduction of both animals and plants.

7.LS.11 Analyze and interpret data to predict how environmental conditions (e.g., weather, availability of nutrients, location) and genetic factors (e.g., selective breeding of cattle or crops) influence the growth of organisms (e.g., drought decreasing plant growth, adequate supply of nutrients for maintaining normal plant growth, identical plant seeds growing at different rates in different weather conditions, fish growing larger in large ponds than in small ponds).

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Analyzing and Interpreting Data ✓ Constructing Explanations ✓ Engaging in Argument from Evidence	✓ Ecosystems: Interactions, Energy, and Dynamics	✓ Stability and Change ✓ Patterns ✓ Cause and Effect

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Unit 8 Overview

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Scope and Sequence 4th 9-Weeks

UNIT 9: Unity and Diversity of Organisms

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
WEEK 1	Lesson 1- Fossil Records	Fossil Records continued	Fossil Records continued	Lesson 2- Comparative Anatomy	Comparative Anatomy continued
WEEK 2	Comparative Anatomy continued	Comparative Anatomy continued	Lesson 3- Embryological Development	Embryological Development continued	Lesson 4- Adaptations and Natural Selection
WEEK 3	Adaptations and Natural Selection continued	Adaptations and Natural Selection continued	Adaptations and Natural Selection continued	Flex day	Flex day
WEEK 4	Open for flexibility in schedule				
WEEK 5	Open for flexibility in schedule				
WEEK 6	Open for flexibility in schedule				
WEEK 7	Open for flexibility in schedule				
WEEK 8	Open for flexibility in schedule				
WEEK 9	Open for flexibility in schedule				

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Unit 9 Overview

Unity and Diversity of Organisms	RECOMMENDED TIME FRAME: 3 weeks

UNIT OVERVIEW

Prior to this unit, students should understand that changes in an environment can affect the survival of individual organisms and their species. They will discover that similarities in organisms can be used to determine the degree of relatedness among organisms. Furthermore, they will conclude that individual organisms with certain traits are more likely to survive and have offspring. This leads populations to evolve over the course of time.

Some common misconceptions students may have are that all organisms were created at the same time. The fossil record shows that, over time, certain traits are naturally selected for. For example, rocks from more than 1 billion years ago contained only single-celled organisms. As time has progressed, the fossil records reveal animals that look more like the ones that are living today. Students may believe there is no evidence for evolution.

In this unit, students will explore how the fossil record reveals the similarity between species, sequential change over time, and linked groups. They will learn how common ancestors are discovered through the study of homologous structures. Finally, they will use cladograms to decipher relationships between species.

STANDARDS

7.LS.15 Analyze and interpret data for patterns of change in anatomical structures of organisms using the fossil appearance in rock layers.

7.LS.16 Construct an explanation based on evidence (e.g. cladogram, phylogenetic tree) for the anatomical similarities and differences among modern organisms and fossil organisms, including living fossils (e.g. alligator, horseshoe crab, nautilus, coelacanth).

7.LS.17 Obtain and evaluate pictorial data to compare patterns in the embryological development across multiple species to identify relationships not evident in the adult anatomy.

7.LS.18 Construct an explanation from evidence that natural selection acting over generations may lead to the predominance of certain traits that support successful survival and reproduction of a population and to the suppression of other traits.

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Analyzing and Interpreting Data ✓ Constructing Explanations	✓ Unity and Diversity	✓ Patterns ✓ Cause and Effect

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