

Life Science 7 Pacing Guide

2018-19



Subject/Grade Level: Life Science

Year: 2018-19

Author: Carol Kopp

Unit: LS.1 Scientific Investigation, Reasoning and Logic

Most of the SOLs in this unit will be covered throughout the semester, incorporated with the concepts and labs covered in each unit.

Weeks 1-2

Essential Knowledge and Skills	Key Resources	Assessment Plan	Strategies/Activities
<ul style="list-style-type: none">• Make connections between the components of the nature of science and their investigations and the greater body of scientific knowledge and research.			All units will cover this concept.
<ul style="list-style-type: none">• Design a data table to organize all components of an investigation in a meaningful way.		Completed lab worksheet.	Gummy Bear Experiment (LS.3)
<ul style="list-style-type: none">• Develop and use a classification system that uses numerous attributes to organize information and discern patterns.		Completed classification activity--	ESS Activity: "Classification of Organisms" (LS.4)

<ul style="list-style-type: none"> Select and use appropriate tools and techniques for collecting qualitative and quantitative data in classroom and field investigations. 	<p>BrainPop Video: Microscopes</p>	<p>Completed lab worksheets.</p>	<p>ESS Activity: “Photosynthesis and Cellular Respiration” (LS.5) “Osmosis, Diffusion, and Active Transport”</p> <p>Gummy Bear Experiment (LS.3)</p>
<ul style="list-style-type: none"> Create and use mental and physical models (including simulations) as ways to visualize explanations of ideas and phenomena. 	<p>Teacher made materials: “Biomes in a Bottle Activity Packet”</p>		<p>Biomes in a Bottle Activity to be set up week 2.</p> <p>ESS Activities: “Predator/Prey Simulation” (LS.8)</p>
<ul style="list-style-type: none"> Identify potential sources of error in the design of an experiment. 			<p>Gummy Bear Experiment (LS.3)</p> <p>ESS Activity: “Photosynthesis and Cellular Respiration” (LS.5)</p>
<ul style="list-style-type: none"> evaluate the design of an experiment and the events that occur during an investigation to determine which factors may affect the results of the experiment. This requires students to examine the experimental procedure and decide where or if they have made mistakes. 		<p>Completed lab worksheet</p>	<p>ESS Activity: “Photosynthesis and Cellular Respiration” (LS.5)</p> <p>Gummy Bear Experiment (LS.3)</p>

<ul style="list-style-type: none"> identify what is deliberately changed in the experiment and what is to be measured as the dependent variable. 		Completed experiment worksheets.	<p>ESS Activity: “Photosynthesis and Cellular Respiration” (LS.5), “Osmosis, Diffusion, and Active Transport” (LS.3)</p> <p>Gummy Bear Experiment (LS.3)</p>
<ul style="list-style-type: none"> analyze the variables in an experiment and decide which ones must be held constant (not allowed to change) in order for the investigation to represent a fair test. This requires students to comprehend what “variables” are and to apply that idea in new situations related to the <i>Life Science Standards of Learning</i> concepts. 		Completed experiment worksheets.	<p>ESS Activity: “Photosynthesis and Cellular Respiration” (LS.5), “Osmosis, Diffusion, and Active Transport” (LS.3)</p>
<ul style="list-style-type: none"> determine the specific component of an experiment to be changed as an independent variable and control the experiment by conducting trials for the experiment in which the independent variable is not applied. This requires the student to set up a standard to which the experimental results can be compared. The student must use the results of the controlled trials to determine whether the hypothesized results were indeed due to the independent variable. 		Completed experiment worksheets.	<p>ESS Activity: “Photosynthesis and Cellular Respiration” (LS.5), “Heat Loss from a Fur Insulated Animal” (LS.9), “Osmosis, Diffusion, and Active Transport” (LS.3)</p>
<ul style="list-style-type: none"> construct appropriate graphs, using data sets from investigations. This requires the student to recognize that a line graph is most appropriate for reporting continuous or real-time data. This also requires a student to 		Completed lab activity worksheets with completed graphs.	<p>ESS Activities: “Heat Loss from a Fur Insulated Animal” (LS.9), “Predator/Prey Simulations” (LS.8)</p> <p>Gummy Bear Experiment (LS.3)</p>

comprehend that points along the line that are not actual data points can be used to make predictions. Students should be able to interpret and analyze these graphs.			
<ul style="list-style-type: none"> distinguish between observational and experimental investigations. 			<p>Throughout all of the ESS Activities. ESS Activities: “Extracting DNA from Strawberries” (LS.12), “Amazing Plants” (LS.12),</p>
<ul style="list-style-type: none"> develop conclusions based on a data set and verify whether the data set truly supports the conclusion. This requires students to cite references to the data that specifically support their conclusions. 		Completed lab worksheets.	<p>ESS Activities: “Heat Loss from a Fur Insulated Animal” (LS.9)</p> <p>Gummy Bear Experiment (LS.3)</p>

Other LS objectives are incorporated in lessons given throughout the semester.

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Unit: LS.2 Cell Structure and Theory

Week 3-4			
Essential Knowledge and Skills	Key Resources	Assessment Plan	Strategies/Activities
<ul style="list-style-type: none"> distinguish among the following: cell membrane, cytoplasm, nucleus, cell wall, vacuole, mitochondrion, endoplasmic reticulum, and chloroplast. <p>Animal Cells Plant Cells</p>	<p>YouTube Video: Frank Gregorio “Introduction to Cells”</p> <p>BrainPop: Cells video and video quiz</p> <p>Internet Resources: “What Does an Animal Cell Look Like?” Images to compare. https://www.quora.com/What-does-an-animal-cell-look-like-under-an-electron-microscope</p> <p>Teacher made materials: “Animal Cell Structure”, “LS.2 Vocabulary Activity”, “Plant Cell”, “Plant Cell Diagram”, “Animal Cell Diagram”, “LS.2 Unit Review Packet” “Hexagon Game”</p> <p>Kahoot Exit Quiz</p>	<p>Test at end of Unit</p> <p>Animal Cell Structure Quiz</p> <p>Cell Structure Quiz a</p> <p>Plant Cell Structure Quiz</p>	<p>Question: What are the main organelles found in a plant and animal cell?</p> <p>Questions: What process do plant cells perform that is different from animal cells? What organelles make that possible?</p> <p>ESS Activity: “Plant and Animal Cells”—with organelle function cards, Cell Theory Graphic Organizer, Venn Diagram Plant/Animal Cell</p> <p>Differentiation: Students will be given a choice of products to illustrate cell organelles and their functions.</p>
<ul style="list-style-type: none"> correlate the structures of cell organelles with their functions. <p>Animal Cells Plant Cells</p>	<p>Teacher made materials: “Animal Cell Structure”, “Plant and Animal Cell Comparison Bell Work”, “LS.2 Unit Review Packet” “Cell Organelle and Function Matching Cards”</p>	<p>Animal Cell Structure Quiz</p> <p>Plant Cell Structure Quiz</p>	<p>Question: What are the functions of each type of organelle found in cells?</p> <p>Questions: What process do plant cells perform that is different from animal cells? What organelles make</p>

	BrainPops: Cells, Cell Structure Kahoot Exit Quiz		that possible? Lab Activity: ESS Activity: “Plant and Animal Cells”
<ul style="list-style-type: none"> compare and contrast examples of plant and animal cells, using the light microscope and images obtained from other microscopes. <p>Animal and Plant Cells</p>	<p>Teacher made materials: “Plant and Animal Comparison Bell Work”, “Comparing Cells” PowerPoint</p> <p>BBC Bitesize: “Cells to Systems” (How to make an onion cell slide) http://www.bbc.co.uk/education/guides/z9hyvcw/revision/2</p>	<p>Completed Venn Diagram from ESS activity comparing Plant and animal cells.</p>	<p>Questions: What process do plant cells perform that is different from animal cells? What organelles make that possible?</p> <p>ESS Activity: Plant and Animal Cells</p> <p>Students will make slides of onion cells and study them under the microscope.</p>
<ul style="list-style-type: none"> describe and sequence the major points in the development of the cell theory. <p>Cell Theory</p>	<p>Teacher made materials: “The Wacky History of Cell Theory” note sheet, “Cells Vocab Activity”, “Cell Theory Homework”, “LS.2 Unit Review Packet”, “Cell Structure and Review Grid”</p> <p>Kahoot Exit Quiz</p> <p>YouTube Video: “The Wacky History of Cell Theory”</p>	<p>Cell Theory Lesson Quiz</p> <p>Completed Cell Theory Graphic Organizer from ESS Activity</p> <p>Completed Cell Theory Homework</p>	<p>Question: What steps led to the development of the cell theory?</p> <p>ESS Activity: Plant and Animal Cells</p>

<ul style="list-style-type: none"> • identify the three components of the cell theory. <p>Cell Theory</p>	<p>Teacher made materials: “The Wacky History of Cell Theory” note sheet, “Cell Division Homework”, “Cell Structure and Theory Review Grid”</p> <p>BrainPop: Mitosis</p> <p>Kahoot Exit Quiz</p>	<p>Cell Theory Lesson Quiz</p>	<p>Question: What are the three main statements of the cell theory?</p> <p>ESS activity Cell Division – “Stages of Mitosis” worksheet, “Mitosis in Onion Cells” lab sheet, “Onion Cell Mitosis” worksheet.</p>
<ul style="list-style-type: none"> • sequence the steps in the cell cycle, including the phases of mitosis. <p>Cell Division</p>	<p>Teacher made materials: “Cell Division—Mitosis and Meiosis”, “Cell Division Homework” “Cell Structure and Theory Review Grid” “Mitosis Matching Cards”</p> <p>BrainPop: Mitosis</p>	<p>Mitosis Lesson Quiz</p> <p>Completed “Stages of Mitosis” worksheet and Onion Cell Mitosis worksheet</p>	<p>Question: What are the steps in the cell cycle? What are the main phases of mitosis?</p> <p>ESS Activity Cell Division – “Stages of Mitosis” worksheet, “Mitosis in Onion Cells” lab sheet, “Onion Cell Mitosis” worksheet.</p>
<ul style="list-style-type: none"> • differentiate between the purpose of mitosis and meiosis. <p>Cell Division</p>	<p>Teacher made materials: “Cell Division Homework”, “Cell Division—Mitosis and Meiosis”</p> <p>BrainPop: Mitosis</p> <p>Kahoot Exit Quiz</p>	<p>Mitosis Lesson Quiz</p>	<p>Question: Why is mitosis different from meiosis?</p>
<ul style="list-style-type: none"> • design an investigation from a testable question related to animal and plant cells. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis. An example of such a question is: “Do onion cells vary in shape or structure depending on where they are found in the plant?” 			<p>Question: What do the phases of mitosis look like in real cells?</p> <p>ESS Activity: Cell Division – “Stages of Mitosis” worksheet, “Mitosis in Onion Cells” lab sheet, “Onion Cell Mitosis” worksheet.</p>

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Subject/Grade Level: Life Science 7

Year: 2017-18

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Unit: LS.3 Cellular Organization and Systems

Week 5-6

Essential Knowledge and Skills	Key Resources	Assessment Plan	Strategies/Activities
<ul style="list-style-type: none"> • explain the relationship among cells, tissue, organs, and organ systems. <p>Levels of Organization</p>	<p>Teacher made materials: “Levels of Cellular Organization Class Notes”, “LS.3 Vocabulary Activity”, “Cellular Organization and Life Processes Unit Review Grid”</p> <p>BrainPops: “Human Body” Video and Graphic Organizer</p> <p>YouTube Video: Amoeba Sisters’ “Organ Systems” https://www.youtube.com/watch?v=gEUu-A2wfSE</p> <p>TedEd: “Making Sense of How Life Fits Together” to minute 3.16 https://www.youtube.com/watch?v=IYSIld-Ri7Q</p>	<p>Test at end of Unit</p> <p>Levels of Cellular Organization Quiz</p> <p>Completed cellular organization foldable (ESS Activity)</p>	<p>Question: What are the levels of organization in the human body?</p> <p>Lab Activity: ESS Activity: Levels of Cellular Organization</p>

<ul style="list-style-type: none"> • differentiate between unicellular organisms and multicellular organisms and name common examples of each. <p>Levels of Organization</p>	<p>Teacher made materials, “LS.3 Vocabulary Activity”, “Cellular Organization and Life Processes Unit Review Grid”</p>		<p>Question: What are some common examples of unicellular and multicellular organisms?</p>
<ul style="list-style-type: none"> • compare and contrast how unicellular and multicellular organisms perform various life functions. This includes the application of knowledge about systems in organisms. <p>Levels of Organization</p>	<p>Teacher made materials. “Cellular Organization and Life Processes Unit Review Grid”</p> <p>YouTube video: Amoeba Sister’s “Organ Systems” (https://www.youtube.com/watch?v=gEUu-A2wfSE)</p>		<p>Question: How are the functions carried out by the organelles in unicellular organisms carried out in multicellular organisms?</p>
<ul style="list-style-type: none"> • explain the role that each life function serves for an organism: ingestion, digestion and removal of waste, stimulus response, growth and repair, gas exchange, and reproduction. <p>Body Systems</p>	<p>Teacher made materials “LS.3 Vocabulary Activity”, “Cellular Organization and Life Processes Unit Review Grid”</p> <p>PowerPoint: “Levels of Cellular Organization”</p> <p>BrainPop: “The Human Body”</p>		<p>Question: How do the life functions within an organism support the organism?</p> <p>Differentiation: Students will be given a choice of product to demonstrate their mastery of this bullet.</p>
<ul style="list-style-type: none"> • explain that there is a specific range or continuum of conditions that will meet the needs of organisms. 	<p>Teacher made materials “LS.3 Vocabulary Activity”</p> <p>BrainPop: “Homeostases”</p> <p>TedEd: “What Would Happen If You Didn’t Drink Water?”</p>		<p>Question: How does an organism adjust to a range or continuum of conditions?</p>

<p>Osmosis, Diffusion, and Active Transport</p>	<p>https://www.youtube.com/watch?v=Mehz7tCxjSE</p>		
<ul style="list-style-type: none"> model how materials move into and out of cells in the processes of osmosis, diffusion, and selective permeability. This includes creating and interpreting three-dimensional models and/or illustrations demonstrating the processes involved. Students should be able to analyze the components of these models and diagrams and communicate their observations and conclusions. <p>Osmosis, Diffusion, and Active Transport</p>	<p>Teacher made materials: "Osmosis, Diffusion, and Active Transport Class Notes"</p> <p>BrainPop: "Passive Transport", "Diffusion"</p> <p>Internet Resource: Pearson explanation and dynamic illustration of concept. http://www.phschool.com/science/biology_place/biocoach/biomembrane1/permeability.html</p>	<p>Osmosis, Diffusion, and Passive Transport Quiz</p> <p>Whole class modeling of osmosis, diffusion, and selective permeability.</p> <p>Student created diagrams of processes.</p>	<p>Question: How can I observe in a model the processes of osmosis, diffusion, and active transport?</p> <p>ESS Osmosis, Diffusion, and Active Transport—"The Osmosis Egg-speriment"</p>
<ul style="list-style-type: none"> create plausible hypotheses about the effects that changes in available materials might have on particular life processes in plants and in animals. <p>Osmosis, Diffusion, and Active Transport</p>		<p>Student created hypotheses in experiment reports.</p>	<p>ESS Osmosis, Diffusion, and Active Transport—"The Osmosis Egg-speriment"</p> <p>Gummy Bear Experiment</p>
<ul style="list-style-type: none"> conduct basic investigations related to understanding cellular organization, with emphasis on observations of cells and tissue. This investigation should focus on the skills developed in LS.1. 			<p>ESS Osmosis, Diffusion, and Active Transport—"The Osmosis Egg-speriment"</p>

Osmosis, Diffusion, and Active Transport			
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Unit: LS.4 Classification

Week 6-8

Essential Knowledge and Skills	Key Resources	Assessment Plan	Strategies/Activities
<ul style="list-style-type: none"> classify organisms based on a comparison of key physical features and activities. <p>Classification Practice</p>	<p>Teacher made materials: “Introduction to Classification Domains”, “LS.4 Vocabulary Activity”, “Classification Unit Review Grid”</p> <p>Internet Resources: “Pamishan Classification Activity” The Biology Corner https://www.biologycorner.com/worksheets/pamishan.html</p>	<p>Test at end of Unit</p>	<p>Question: What are key physical features used to classify organisms?</p> <p>ESS Activity: Classification of Organisms</p>
<ul style="list-style-type: none"> arrange organisms in a hierarchy according to similarities and differences in features. <p>Classification Practice</p>	<p>Teacher made materials BrainPop: Classification</p>	<p>Taxonomy Quiz</p>	<p>Question: What key features can be used to classify specific organisms?</p>
<ul style="list-style-type: none"> categorize examples of organisms as representative of the three domains (Archaea, Bacteria and Eukarya) and recognize that the number of domains is subject to change as new data are collected. <p>Prokaryotes, Eukaryotes, and Domains</p>	<p>YouTube Video: “The Three Domains of Life”</p> <p>Kahoot exit quiz</p>	<p>Domains and Kingdoms Lesson Quiz</p>	<p>Question: What features are used to classify organisms in each of the current domains?</p>

<ul style="list-style-type: none"> • categorize examples of organisms as representative of the kingdoms and recognize that the number of kingdoms is subject to change as new data are collected. <p>Classification Kingdoms</p>	<p>BrainPop: Classification, The Six Kingdoms</p> <p>YouTube Video: “Prokaryotic vs. Eukaryotic Cells.” https://www.youtube.com/watch?v=RQ-SMCmWB1s .</p>		<p>Question: What types of organisms, with what features, are found in each kingdom?</p> <p>ESS Activity: Classification of Organisms</p>
<ul style="list-style-type: none"> • recognize examples of major animal phyla. <p>Animal Phyla</p>	<p>Teacher made materials: “Classify that Organism: Which Phyla?” worksheet, “Animal Phyla Matching Cards”</p> <p>BrainPop: Classification, The Six Kingdoms, Cnidarians,</p>	<p>Animal Phyla Quiz</p> <p>Animal Phyla Characteristics Quiz</p>	<p>Question: What are the characteristics of organism included in the four major animal phyla?</p> <p>ESS Activity: Animal Phyla and Plant Divisions</p>
<ul style="list-style-type: none"> • recognize examples of major plant divisions. <p>Plant Phyla</p>	<p>Teacher made materials</p> <p>BrainPops: Seed Plants, Seedless Plants</p>	<p>Plant Classification Quiz</p>	<p>Question: What are the characteristics of organism included in the four major plant divisions?</p>
<ul style="list-style-type: none"> • recognize scientific names as part of a binomial nomenclature. <p>Intro to Classification</p>	<p>Teacher made materials</p> <p>BrainPop: Classification</p>		<p>Question: How are organisms named in the binomial nomenclature system?</p>

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Unit: LS.5 Photosynthesis and Cellular Respiration

Week 9

Essential Knowledge and Skills	Key Resources	Assessment Plan	Strategies/Activities
<ul style="list-style-type: none"> describe the process of photosynthesis in terms of raw materials and products generated. <p>Photosynthesis</p>	BrainPop: Photosynthesis Teacher Made Materials: “Photosynthesis Info Sheet”, “LS.5 Vocabulary Activity” “Photosynthesis and Cellular Respiration Equation Cards”	Photosynthesis Lesson Quiz	<p>Question: What are the reactants and products in the process of photosynthesis?</p> <p>ESS Activity: Photosynthesis and Cellular Respiration</p>
<ul style="list-style-type: none"> identify and describe the cellular organelles involved in the process of photosynthesis. <p>Photosynthesis</p>	BrainPop: Photosynthesis Teacher Made Materials: “Photosynthesis Info Sheet”, “Photosynthesis and Cellular Respiration Equation Cards”	Photosynthesis Lesson Quiz	<p>Question: In what cell organelle does photosynthesis take place in and what does it look like?</p> <p>Differentiation: Students will be given a choice of product to demonstrate their mastery of this skill.</p>
<ul style="list-style-type: none"> explain how organisms utilize the energy stored from the products of photosynthesis. <p>Photosynthesis</p>	Teacher Made Materials: “Photosynthesis Info Sheet”,	Photosynthesis Lesson Quiz	<p>Question: How do organisms use the energy stored in the products of photosynthesis?</p>

<ul style="list-style-type: none"> • compare and contrast the processes of photosynthesis and cellular respiration. <p>Cellular Respiration</p>	<p>BrainPop: Photosynthesis, Cellular Respiration</p> <p>Teacher Made Materials “Cellular Respiration Info Sheet” “Photosynthesis and Cellular Respiration Equation Cards”</p>	<p>Cellular Respiration Quiz</p>	<p>Question: How are photosynthesis and cellular respiration related to each other?</p>
<ul style="list-style-type: none"> • relate the importance of photosynthesis to the role of producers as the foundation of food webs. <p>Food Chains and Webs</p>	<p>BrainPop: Food Chains, Energy Pyramid</p>		<p>Question: How does photosynthesis by producers contribute to a food web?</p>
<ul style="list-style-type: none"> • design an investigation from a testable question related to photosynthesis. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis. <p>Lab throughout unit</p>	<p>Teacher made materials: “Creation of Gases by Submerged Plants” packet</p>	<p>Completed experiment worksheets.</p>	<p>ESS Activity: Photosynthesis and Cellular Respiration</p> <p>Lab: Creation of a gas (oxygen) by submerged plants.</p>

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Unit: LS.6 Ecosystem Interdependence

Week 10-11

Essential Knowledge and Skills	Key Resources	Assessment Plan	Strategies/Activities
<ul style="list-style-type: none"> differentiate among key processes in the water, carbon, and nitrogen cycles and relate how organisms, from bacteria and fungi to third-order consumers, function in these cycles. <p>Nitrogen Cycle Carbon Cycle Water Cycle</p>	<p>Teacher made materials: “LS.6a Vocabulary Activity”, “LS.6 Unit Review”, “The Nitrogen Cycle Info Sheet”, “The Cycles of Nature Questions”, “The Carbon Cycle Info Sheet” (to be used with BrainPop)</p> <p>BrainPop: “Carbon Cycle”, “Nitrogen Cycle”, “Water Cycle”</p> <p>Internet Activity: Sheppard Software Producers, Consumers, Decomposers game http://www.sheppardsoftware.com/content/animals/kidscorner/games/producersconsumersgame.htm</p>	<p>Test at end of Unit</p> <p>Vocabulary Quiz</p> <p>Nitrogen Cycle Lesson Quiz</p> <p>Carbon Cycle Lesson Quiz</p>	<p>Question: How are biotic factors in an ecosystem related to the water, carbon, and nitrogen cycles?</p> <p>ESS Activity: Go with the Flow</p> <p>ESS Activity: The Cycles of Nature</p>
<ul style="list-style-type: none"> observe and identify common organisms in ecosystems and collect, record, and chart data concerning the interactions of these organisms (from observations and print and electronic resources). 		<p>Completed lab worksheet</p>	<p>ESS Activity: Freshwater Food Chains</p>
<ul style="list-style-type: none"> classify organisms found in local ecosystems as producers or first-, second-, or third-order consumers. Design and construct models of food webs with these organisms 	<p>Teacher made materials</p> <p>BrainPop: “Food Chains”, “Energy Pyramid”</p>	<p>Student constructed food webs.</p>	<p>Question: How do organisms found in our local ecosystem fit into a food web?</p> <p>Differentiation: Students will be given the choice of which biome they will use to create their food</p>

			web.
<ul style="list-style-type: none"> observe local ecosystems and identify, measure, and classify the living and nonliving components 	Teacher made materials		Question: What are the biotic and abiotic factors found in our local ecosystems? Lab Activity: Biomes in a Bottle
<ul style="list-style-type: none"> identify examples of interdependence in terrestrial, freshwater, and marine ecosystems. 	Teacher made materials BrainPop: Ecosystems		Question: How are the biotic and abiotic factors in terrestrial, freshwater, and marine ecosystems interdependent?
<ul style="list-style-type: none"> determine the relationship between a population's position in a food web and its size. 	Teacher made materials		Question: How does a population's position in a food web impact its size?
<ul style="list-style-type: none"> apply the concepts of food chains, food webs, and energy pyramids to analyze how energy and matter flow through an ecosystem. <p>Energy Flow through Energy Pyramid</p>	Teacher made materials: "LS.6b Vocabulary Activity", YouTube Video: Richard Kern "The Food Chain", https://www.youtube.com/watch?v=0Z0vqYypOuo&t=229s Naked Science Scrapbook—"What is a Fungus?" https://www.youtube.com/watch?v=b5rluxtABGA TedEd: "Dead Stuff: the Secret Ingredient in Our Food Chain" https://www.youtube.com/watch?v=KI7u_pcfAQE		Question: How can I demonstrate energy flow in a food chain, food web, and energy pyramid?
<ul style="list-style-type: none"> design an investigation from a testable question related to food webs. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis. 			
<ul style="list-style-type: none"> analyze and critique the experimental design of basic investigations related to food webs. 	Teacher made materials		

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Unit: LS.7 Intra-Population Interactions

Week 12-13

Essential Knowledge and Skills	Key Resources	Assessment Plan	Strategies/Activities
<ul style="list-style-type: none"> • differentiate between the needs of the individual and the needs of a population. 	Teacher made materials	Test at end of Unit	Question: How do the needs of the individual and the needs of a population shape their relationships?
<ul style="list-style-type: none"> • interpret, analyze, and evaluate data from systematic studies and experiments concerning the interactions among members of a population. 	Teacher made materials BrainPop:		
<ul style="list-style-type: none"> • determine the relationship between a population's position in a food web and the types of interactions seen among the individuals of the population. 	Teacher made materials		Question: How does a population's position in a food web affect the interactions of organisms within that population?

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Unit: LS.8 Inter-Population Interactions

Week 14-15

Essential Knowledge and Skills	Key Resources	Assessment Plan	Strategies/Activities
<ul style="list-style-type: none"> • identify the populations of producers, consumers, and decomposers and describe the roles they play in their communities. 	<p>Teacher made materials: “ Interactions and Relationships in a Salt Marsh” packet, LS.</p> <p>Internet Activity: Sheppard Software Producers, Consumers, Decomposers game http://www.sheppardsoftware.com/content/animals/kidscorner/games/producersconsumersgame.htm</p>	<p>Test at end of Unit</p> <p>Vocabulary Quiz</p>	<p>Question: What kinds of organisms are producers, consumers, and decomposers, and what role to they play in their communities?</p> <p>ESS Activity: A Salt Marsh Ecosystem</p>
<ul style="list-style-type: none"> • interpret, analyze, and evaluate data from systematic studies and experiments concerning the interactions of populations in an ecosystem. 	<p>Teacher made materials</p>		<p>ESS Activity: Predator-Prey Simulation</p>
<ul style="list-style-type: none"> • predict the effect of population changes on the food web of a community. 	<p>Teacher made materials</p>		<p>Question: How do population changes in a food web affect the members of the community?</p>

<ul style="list-style-type: none"> • generate predictions based on graphically represented data of predator-prey populations. 	<p>Teacher made materials:</p> <p>YouTube video: "The Wolves and Moose of Isle Royale"</p>		<p>Question: What predictions can be made on predator/prey relationships based on graphed data?</p> <p>ESS Activity: Predator-Prey Simulation</p>
<ul style="list-style-type: none"> • differentiate between the types of symbiosis and explain examples of each. 	<p>Teacher made materials: "Symbiosis Webquest"</p> <p>TedEd: "Symbiosis: A Surprising Tale of Species Cooperation", "You Are Your Microbes"</p>		<p>Question: What are the three main types of symbiosis and what are examples of each?</p> <p>ESS Activity: Organisms in Symbiosis</p>
<ul style="list-style-type: none"> • infer the niche of organisms from their physical characteristics. 	<p>Teacher made materials: "Ecological Niches Homework"</p>		<p>Question: How do physical traits support an organism within its niche?</p>
<ul style="list-style-type: none"> • design an investigation from a testable question related to interactions among populations. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis. 			
<ul style="list-style-type: none"> • observe and identify populations in ecosystems and collect, record, chart, and interpret data concerning the interactions of these organisms (from observations and print and electronic resources). 			
<ul style="list-style-type: none"> • categorize behaviors as examples of competition, cooperation, social hierarchy, or territorial imperative. 			<p>Question: What are some examples of competition, cooperation, social hierarchy, and territorial imperative?</p>

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Unit: LS.9 Biotic and Abiotic Factors in an Ecosystem

Week 16-18

Essential Knowledge and Skills	Key Resources	Assessment Plan	Strategies/Activities
<ul style="list-style-type: none"> differentiate between ecosystems and biomes. 	Teacher made materials BrainPop: Ecosystems	Test at end of Unit	Question: How are ecosystems related to biomes? ESS Activity: Biomes of the World
<ul style="list-style-type: none"> recognize and give examples of major biomes: desert, forest, grassland, and tundra. 	Teacher made materials BrainPop: “Land Biomes”		Question: What are some of the major types of biomes and what are their characteristics? ESS Activity: Biomes of the World Differentiation: Students will be given the opportunity to choose what type of product they will use to demonstrate their mastery of this concept.
<ul style="list-style-type: none"> compare and contrast the biotic and abiotic characteristics of land, marine, and freshwater ecosystems. 	Teacher made materials BrainPop: “Underwater World”		Question: What are the biotic and abiotic factors found in land, marine, and freshwater ecosystems? ESS Activity: Biomes of the World

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<ul style="list-style-type: none"> analyze and describe how specific adaptations enable organisms to survive in a particular ecosystem. 	<p>Teacher made materials “Animal Adaptations” activity with GoogleForms Assessment. Short URL ODCaXg “Animal Adaptations to Their Environment Internet Web Quest” “Readings and Activities about Adaptations”</p> <p>TedEd: “The Brilliance of Bioluminescence”</p>		<p>Question: What are some specific adaptations that enable organisms to survive in the type of ecosystem they live in?</p> <p>ESS Activity: A Designed Organism</p> <p>ESS Activity: Heat Loss from a Fur-Insulated Animal</p>
<ul style="list-style-type: none"> design an investigation from a testable question related to how specific adaptations of organisms allow them to survive in the presence of the biotic and abiotic factors in an ecosystem. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis. 			<p>ESS Activity: Heat Loss from a Fur-Insulated Animal</p>

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Unit: LS.10 Ecosystem Dynamics

Week 21-23

Essential Knowledge and Skills	Key Resources	Assessment Plan	Strategies/Activities
<ul style="list-style-type: none"> • relate the responses of organisms to daily, seasonal, or long-term events. 	Teacher made materials BrainPop: “Hibernation”	Test at end of Unit LS.10 Vocabulary Quiz	Question: What are some of the responses organism make to survive abiotic events in their ecosystem? ESS Activity: Amazing Plants
<ul style="list-style-type: none"> • differentiate between ecosystems, communities, populations, and organisms. 	Teacher made materials		Question: What is the relationship between organisms, populations, communities, and ecosystems? Differentiation: Students will be given a choice as to what product they will provide to demonstrate their mastery of this concept.
<ul style="list-style-type: none"> • predict the effect of climate change on ecosystems, communities, populations, and organisms. 	Teacher made materials BrainPop: “Climate Change”		Question: How can climate change impact organisms, populations, communities, and ecosystems? ESS Activity: Changes in Ecosystems

<ul style="list-style-type: none"> • predict the effect of eutrophication on ecosystems, communities, populations, and organisms. 	<p>Teacher made materials “Eutrophication Class Notes”, “Eutrophication Class Notes 2”,</p>	<p>Eutrophication Lesson Quiz</p>	<p>Question: How can eutrophication effect organisms, populations, communities, and ecosystems?</p>
<ul style="list-style-type: none"> • compare and contrast the factors that increase or decrease population size. 	<p>Teacher made materials</p>		<p>Question: What are some factors that can lead to an increase or decrease in population size?</p>
<ul style="list-style-type: none"> • classify the various types of changes that occur over time in ecosystems, communities, populations, and organisms, as long term, short term, or seasonal. 	<p>Teacher made materials: “Phototropism, Hibernation, and Dormancy” class worksheet, “Long-Term Changes to Ecosystems” web quest</p>	<p>Long-Term Ecosystem Changes Quiz</p>	<p>Question: What are some long-term, short-term, and seasonal changes that take place in ecosystems?</p>
<ul style="list-style-type: none"> • design an investigation from a testable question related to change over time in ecosystems, communities, populations, or organisms. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis. 	<p>Teacher made materials</p>		
<ul style="list-style-type: none"> • analyze and critique the experimental design of basic investigations related to change over time in ecosystems, communities, populations, and organisms. 	<p>Teacher made materials</p>	<p>Completed lab activity sheets.</p>	<p>Lecture/ presentation</p>

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Unit: LS.11 Ecosystem Dynamics and Human Activity

Week 24-26

Essential Knowledge and Skills	Key Resources	Assessment Plan	Strategies/Activities
<ul style="list-style-type: none"> • identify examples of ecosystem dynamics. 	Teacher made materials “LS.11 Vocabulary Activity”	Test at end of Unit LS.11 Vocabulary Quiz	Question: What are some examples of ecosystem dynamics? ESS Activity: Ecosystem Dynamics
<ul style="list-style-type: none"> • describe the relationship between human food harvest and the ecosystem. 			Question: How does human food harvest impact the ecosystem?
<ul style="list-style-type: none"> • debate the pros and cons of human land use versus ecosystem stability. 	BrainPop: “Humans and the Environment” Video: “The Lorax”		Question: How should ecosystem stability be considered in terms of human land use? ESS Activity: Ecosystem Dynamics

<ul style="list-style-type: none"> • compare and contrast population disturbances that threaten and those that enhance species survival. 	<p>“Debris Dilemmas” Jean-Michel Cousteau</p>		<p>Question: What are some examples of how population disturbances impacts species survival?</p>
<ul style="list-style-type: none"> • describe ways that human interaction has altered habitats positively and negatively. 	<p>Teacher made materials: “Human Impacts on the Ecosystem Web Quest”</p> <p>YouTube video: “The Epic Journey of the Plastic Ducks” https://www.youtube.com/watch?v=AvchlWftt80</p> <p>BrainPop: “Humans and the Environment”</p> <p>Video: “The Lorax”</p>		<p>Question: How has human interaction altered habitats positively and negatively?</p> <p>ESS Activity: Ecosystem Dynamics</p> <p>Differentiation: Students will be given the choice as to what product they will create to establish their mastery of this concept.</p>
<ul style="list-style-type: none"> • observe the effect of human interaction in local ecosystems and collect, record, chart, and interpret data concerning the effect of interaction (from observations and print and electronic resources). 	<p>Teacher made materials</p>		
<ul style="list-style-type: none"> • design an investigation from a testable question related to the relationships between ecosystem dynamics and human activity. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis. 	<p>Teacher made materials</p>		
<ul style="list-style-type: none"> • analyze and critique the experimental design of basic investigations related to the relationships between ecosystem dynamics and human activity. 	<p>Teacher made materials</p>		

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Unit: LS.12 Heredity and Genetics

Week 27-30

Essential Knowledge and Skills	Key Resources	Assessment Plan	Strategies/Activities
<ul style="list-style-type: none"> • recognize the appearance of DNA as double helix in shape. <p>Intro to DNA</p>	<p>Teacher made materials: “DNA Structure Class Notes”, “DNA Info Sheet”</p> <p>BrainPop: DNA, Genetics</p>	<p>Test at end of Unit LS.12 Unit Test</p> <p>Intro to DNA Quiz</p> <p>Vocabulary Quiz</p>	<p>Question: What is the structure of DNA?</p> <p>ESS Activity: Building a DNA Model</p> <p>Differentiation: Students will be given a choice of products to create to demonstrate their mastery of this concept.</p>
<ul style="list-style-type: none"> • explain that DNA contains coded instructions that store and pass on genetic information from one generation to the next. <p>Intro to DNA</p>	<p>Teacher made materials: “What Genes Are and What They Do”, “Genes and Chromosomes”</p> <p>BrainPop: Heredity</p>	<p>Genes and Chromosomes Lesson Quiz</p>	<p>Question: How does DNA store and pass on genetic information?</p> <p>ESS Activity: DNA Extraction from Strawberries</p> <p>ESS Activity: Passing Traits to Offspring</p>

<ul style="list-style-type: none"> • explain the relationship among genes, chromosomes, and alleles. <p>Chromosomes and Genes</p>	<p>Teacher made materials: "Chromosomes to DNA Info Sheet"</p>	<p>Where Genes Are Quiz</p>	<p>Question: How are genes, chromosomes and alleles related to each other?</p>
<ul style="list-style-type: none"> • demonstrate variation within a single genetic trait. 	<p>Teacher made materials</p>		<p>Question: What kind of variations can occur within a genetic trait?</p>
<ul style="list-style-type: none"> • distinguish between dominant and recessive traits. 	<p>Teacher made materials: "Genotypes, Phenotypes, and Punnett Squares"</p> <p>BrainPop: "Heredity"</p>		<p>Question: What are some dominant and recessive traits?</p>
<ul style="list-style-type: none"> • distinguish between genotype and phenotype. <p>Genotype, Phenotype, and Punnett Squares</p>	<p>Teacher made materials: "Genotypes, Phenotypes, and Traits Class Notes", "Genotypes, Phenotypes, and Punnett Squares"</p>	<p>Genotype and Phenotype Lesson Quiz</p>	<p>Question: What is the difference between genotype and phenotype?</p>
<ul style="list-style-type: none"> • use Punnett squares to predict the possible combinations of inherited factors resulting from single trait crosses. <p>Genotype, Phenotype, and Punnett Squares</p>	<p>Teacher made materials: "Genotype, Phenotype, and Punnett Squares"</p> <p>TedEd "How Mendel's Pea Plants Helped Us Understand Genetics" https://www.youtube.com/watch?v=Mehz7tCxjSE</p>		<p>Question: How can I use a Punnett Square to predict the possible outcomes that can result from single trait crosses?</p>
<ul style="list-style-type: none"> • differentiate between characteristics that can be inherited and those that cannot be inherited. 	<p>Teacher made materials: "Genotypes, Phenotypes, and Traits Class Notes"</p>		<p>Question: What are some examples of non-inherited traits and inherited traits?</p>
<ul style="list-style-type: none"> • identify aspects of genetic 	<p>Teacher made materials: "Genetic</p>		<p>Question: What are some examples</p>

<p>engineering and supply examples of applications. Evaluate the examples for possible controversial aspects.</p> <p>Genetic Engineering</p>	<p>Engineering Web Quest”, “History of Genetics Timeline Template”, “History of Genetics Info Sheet”</p> <p>BrainPop: <i>Cloning, Dolly the Sheep</i></p>		<p>of applications of genetic engineering?</p>
<ul style="list-style-type: none"> describe the contributions of Mendel, Franklin, Watson, and Crick to our basic understanding of genetics. <p>History of Genetics</p>	<p>Teacher made materials: “Genetic Engineering Web Quest”, “History of Genetics Timeline Template”, “History of Genetics Info Sheet”</p>	<p>History of Genetics Quiz</p>	<p>Question: How did Mendel, Franklin, Watson, and Crick contribute to our understanding of genetics?</p>
<ul style="list-style-type: none"> analyze and evaluate data from investigations on variations within a local population. 			

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Unit: LS.13 Population Changes Over Time

Week 31-34

Essential Knowledge and Skills	Key Resources	Assessment Plan	Strategies/Activities
<ul style="list-style-type: none"> • interpret data from simulations that demonstrate selection for a trait belonging to species in various environments. 		<p>Test at end of Unit</p> <p>Vocabulary Quiz</p>	<p>ESS Activity: Evidence of Evolution</p> <p>ESS Activity: Owl Family Natural Selection</p>
<ul style="list-style-type: none"> • describe how changes in the environment can bring about changes in a species (adaptation, extinction) through natural selection. 	<p>Teacher made materials: “Mutations Web Quest” “Insectivores Adaptations Worksheet”</p> <p>BrainPop: Natural Selection, Genetic Mutations</p> <p>TedEd: “Myths and Misconceptions about Evolution” https://www.youtube.com/watch?v=Mehz7tCxjSE</p> <p>National Geographic video “The Human Family Tree” (owned on Amazon)</p>	<p>LS.13 Vocabulary Quiz 1</p> <p>LS.13 Vocabulary Quiz 2</p>	<p>Question: How does the environment impact changes in a species population?</p> <p>Differentiation: Students will be given a choice as to what product they will create to establish mastery of this concept.</p>

<ul style="list-style-type: none"> • explain the evidence for evolution from a variety of sources of scientific data. 	<p>Teacher made materials: “Evidence of Evolution Video Notes”, “BrainPop Evolution Notes”</p> <p>YouTube Video: “What Is the Evidence for Evolution” (Stated Clearly) https://www.youtube.com/watch?v=IIeO5KdPvg</p> <p>“Proof of Evolution You Can Find On Your Body” https://www.youtube.com/results?search_query=proof+of+evolution+that+you+can+find+on+your+body</p> <p>BrainPop: Charles Darwin, Human Evolution, Fossils</p>		<p>Question: What kind of evidence is available to support the theory of evolution?</p> <p>ESS Activity: Evident for Evolution</p>
<ul style="list-style-type: none"> • explain how genetic variations in offspring, which lead to variations in successive generations, can result from the same two parents. 			<p>Question: How can offspring of the same parents demonstrate variations in traits?</p>
<ul style="list-style-type: none"> • analyze and evaluate data from investigations on variations within a local population 			
<ul style="list-style-type: none"> • explain how environmental influences, as well as genetic variation, can lead to diversity of organisms. 			<p>Question: How can the environment work with genetic variation lead to a diversity of organisms?</p>