<table>
<tr><td></td><td colspan="2">Science Foundations: Life Science
This course is for beginning level students who have acquired minimal or no English language skills.
Students will study the scientific method, cell biology, genetics, and ecology. Students will cover the concepts of biology with accommodations made to incorporate English language skills and content and academic vocabulary through the sheltered instruction approach.

1 year
Unit One: Introduction to Biology, Science as Inquiry, Lab Safety, Measurement and Symbolic Representation (August-September)</td></tr>
<tr><td>Essential Questions</td><td colspan="2">• Why is science important?
• How do we make scientific discoveries?</td></tr>
<tr><td>Standards</td><td colspan="2">SIS1. Make observations, raise questions, and formulate hypotheses
SIS2. Design and conduct scientific investigations
SIS3. Analyze and interpret results of scientific investigations</td></tr>
<tr><td>Concepts and Skills</td><td>• Differentiate between qualitative and quantitative observations
• Distinguish between dependent and independent variables
• Identify the steps scientists often use to solve problems (scientific method)
• Name the prefixes used in SI and indicate what multiple of ten each one represents
• Identify the SI units and symbols for length, volume, mass, density, time and temperature</td><td>SIS1. Make observations, raise questions, and formulate hypotheses.
SIS2. Design and conduct scientific investigations.
SIS3. Analyze and interpret results of scientific investigations.
SIS4. Communicate and apply the results of scientific investigations.
Common Core Reading Standards

CCRSL.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

CCRSL.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

CCWSL.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Common Core Math Standards

CCSS.Math.Content.7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

CCSS.Math.Content.7.SP.C.6 approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the</td></tr>
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		approximate relative frequency given the probability. CCSS.Math.Content.8.SP.A.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. CCSS.Math.Content.8.SP.A.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
Content Objectives	• scientific inquiry: Analyze theories and scientific laws, make hypotheses, and make observations. • Measurement and Symbolic Representation: Manipulate and analyze quantitative data using the SI system.	
Assessments/ Products/Practices	Labs/Demonstrations/Projects/Practices: • Intro to microscopes Lab – yeast and crystals • Heart rate lab • Science Foundations Common Assessment **Notebooks:** ➢ **Content Notes (every day or close to it):** Students will identify topics; identify the main ideas and most important details and examples associated with each topic; include summaries as well as student-generated follow-up questions and answers, reflections, visualizations, and responses to the content, using higher order thinking skills (e.g., predict, connect, infer, analyze, evaluate, categorize, synthesize). ➢ **Vocabulary**: Students will highlight additional, key vocabulary in their notebooks; they will build an understanding of the vocabulary using vocabulary-development exercises (e.g., word webs, Frayer Model), as well as use the vocabulary in their daily work and conversations. ➢ **Narrative and Explanatory Essay (in response to one or more Essential and Guiding Questions)/Investigation Reports:** Student work will include evidence of planning: graphic organizers, brainstorming lists; editing of language, vocabulary, grammar, structure; organized and developed ideas utilizing precise and domain specific language; student sharing, student and teacher feedback, and revisions based on these conversations. Argumentative essays/investigation reports will include an explicit claim, scientific evidence in support of the claim (from reports, data, observations, etc.), and an explanation of how the evidence connects to and verifies the claim. ➢ **Other Sample Products:** KWL Charts. Venn Diagrams, Concept Maps, H.O.T. Boxes, Others?	

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<tr><td>Texts, Materials, and Resources</td><td colspan="2">• Select lab equipment to be used during the year
• Gateway to Science textbook and workbooks
• Heart Rate/Music Lab materials
• Yeast lab materials</td></tr>
<tr><td></td><td colspan="2">Science Foundations: Life Science
1 year
Unit 2: Cell Biology (September/October)</td></tr>
<tr><td>Essential Questions</td><td colspan="2">What are cells?
What is the difference between prokaryotic and eukaryotic cells
How do cells function?
How do cells make organisms?</td></tr>
<tr><td>Standards</td><td colspan="2">2.1 Relate cell parts/organelles to their functions. Explain the role of cell membranes as a highly selective barrier.

2.2 Compare and contrast, at the cellular level, the general structures and degrees of complexity of prokaryotes and eukaryotes.

2.3 Use cellular evidence (e.g., cell structure, cell number, cell reproduction) and modes of nutrition to describe the six kingdoms (Archaebacteria, Eubacteria, Protista, Fungi, Plantae, Animalia).</td></tr>
<tr><td>Concepts and Skills</td><td>➢ Describe the major structures of a cell and their functions.
➢ Classify cells as prokaryotic or eukaryotic based on their characteristics.</td><td>SIS1. Make observations, raise questions, and formulate hypotheses.
SIS2. Design and conduct scientific investigations.
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Content Objectives	• Understand the structure and function of cells • Discover that all living organisms are made of one or more cells. • Recognize the accomplishments of Robert Hooke. • Differentiate between prokaryotic and eukaryotic cells. • Match the organelles in a eukaryotic cell with their respective functions. • Locate organelles in plant and animal cells. • Identify how organisms are organized (cells, tissues, organs, organ systems, organisms) • Compare and contrast plant and animal cells.	
Assessments/ Products/Practices	**Quick Labs/Demonstrations/Practices** Inquiry Lab: Salty Cells **Extended Labs:** Using a Microscope Lab Plant Cell Lab Science Foundation Common Assessment **Notebooks:** ➢ **Content Notes (every day or close to it):** Students will identify topics; identify the main ideas and most important details and examples associated with each	

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Texts, Materials, and Resources	Slides of organisms to look at under microscope. Cheek cells Yeast TEDEducation: The Wacky History of Cell Theory Gateway to Science textbook and workbook BrainPOP	
	Science Foundations: Life Science **1 year** **Unit 3: Plant Structure and Function (October/November)**	
Essential Questions	*How are plants important for life on earth?* *How are plants different from animals?*	
Standards	2. (6-8) Identify the structures in plants (leaves, roots, flowers, stem, bark, wood) that are responsible for food production, support, water transport, reproduction, growth, and protection.	
Concepts and Skills	➢ Identify the characteristics that all plants share ➢ Outline the life cycle of a plant	SIS1. Make observations, raise questions, and formulate hypotheses. SIS2. Design and conduct scientific investigations. SIS3. Analyze and interpret results of scientific investigations. SIS4. Communicate and apply the results of scientific investigations. **Common Core Reading Standards** CCRSL.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a

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Content Objectives	• Identify seeds as dormant, living embryo of a plant. • Observe plant growth from seed to germination. • Match plant parts to its function (stem, seed, petal, roots, leaves). • Determine what happens to (colored) water in a celery stalk and white flowers. • Identify that the xylem is a system of tubes important for water transport in (vascular) plants. • Recognize that stomates are opening in leaves that are important in the process of transpiration. • Label the flower parts that are important for reproduction. • Identify the eggs in the ovary and pollen on the anthers as the cells that combine during sexual reproduction to form an embryo. • Identify the different methods for seed dispersal and pollination.	

Assessments/ Products/Practices	Quick Labs/Demonstrations/Practices • Seed predictions\observations • Science Foundation Common Assessment **Notebooks:** • **Content Notes (every day or close to it):** Students will identify topics; identify the main ideas and most important details and examples associated with each topic; include summaries as well as student-generated follow-up questions and answers, reflections, visualizations, and responses to the content, using higher order thinking skills (e.g., predict, connect, infer, analyze, evaluate, categorize, synthesize). • **Vocabulary**: Students will highlight additional, key vocabulary in their notebooks; they will build an understanding of the vocabulary using vocabulary-development exercises (e.g., word webs, Frayer Model), as well as use the vocabulary in their daily work and conversations. • **Narrative and Explanatory Essay (in response to one or more Essential and Guiding Questions)/Investigation Reports:** Student work will include evidence of planning: graphic organizers, brainstorming lists; editing of language, vocabulary, grammar, structure; organized and developed ideas utilizing precise and domain specific language; student sharing, student and teacher feedback, and revisions based on these conversations. Argumentative essays/investigation reports will include an explicit claim, scientific evidence in support of the claim (from reports, data, observations, etc.), and an explanation of how the evidence connects to and verifies the claim. • **Other Sample Products:** KWL Charts. Venn Diagrams, Concept Maps, H.O.T. Boxes, Others?
Texts, Materials, and Resources	Discovery Education Videos Gateway to Science Book (p.35-37) Gateway to Science Workbook (p.33-35) Science Enrichment Worksheets (Plant Parts, What's Blooming, More Flowers, Gold Dust) Brainpop Video FOSS Transpiration FOSS Plant Reproduction Brainpop Activity (Transpiration – Celery)
	Science Foundations: Life Science **1 year** **Unit 4: Cell Biology – Photosynthesis and Respiration (November/December)**
Essential Questions	*How do organisms obtain energy at a cellular level?* *What is the difference between photosynthesis and respiration?*

<table>
<tr><td>Standards</td><td colspan="2">2.4 Identify the reactants, products, and basic purposes of photosynthesis and cellular respiration in the cells of photosynthetic organisms

2.5 Explain the important role that ATP serves in metabolism.</td></tr>
<tr><td>Concepts and Skills</td><td>➢ Write out the photosynthesis reaction using words or chemical symbols.
➢ Write out the respiration reaction using words or chemical symbols.
➢ Contrast photosynthesis and respiration in terms of reactants and products.
➢ Explain how photosynthesis and cell respiration are interrelated.
➢ Describe the role of ATP in metabolism.</td><td>SIS1. Make observations, raise questions, and formulate hypotheses.
SIS2. Design and conduct scientific investigations.
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Common Core Reading Standards

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Content Objectives	• Explain how photosynthesis is the way plants use energy from the sun to make food. • Identify the plant cell organelle that is responsible for photosynthesis: chloroplast. • Identify the basic reactants and products of photosynthesis in plants. • Understand photosynthesis and cellular respiration are complementary processes. • Understand that during cellular respiration, cells produce energy, carbon dioxide, and water.	
Assessments/ Products/Practices	**Suggested Lessons/Labs/Demonstrations/Practices:** **Quick Labs:** Inferring Leaf Function Products of Photosynthesis Quick Lab Extended Labs: Cellular Respiration Lab **Inquiry Lab:** Conditions that Favor Cell Respiration Science Foundation Common Assessment **Notebooks:** ➢ **Content Notes (every day or close to it):** Students will identify topics; identify the main ideas and most important details and examples associated with each topic; include summaries as well as student-generated follow-up questions and answers, reflections, visualizations, and responses to the content, using higher order thinking skills (e.g., predict, connect, infer, analyze, evaluate, categorize, synthesize). ➢ **Vocabulary**: Students will highlight additional, key vocabulary in their notebooks; they will build an understanding of the vocabulary using vocabulary-development exercises (e.g., word webs, Frayer Model), as well as use the vocabulary in their daily work and conversations. ➢ **Narrative and Explanatory Essay (in response to one or more Essential and Guiding Questions)/Investigation Reports:** Student work will include evidence of planning: graphic organizers, brainstorming lists; editing of language, vocabulary, grammar, structure; organized and developed ideas utilizing precise and domain specific language; student sharing, student and teacher feedback, and revisions based on these conversations. Argumentative essays/investigation reports will include an explicit claim, scientific evidence in support of the claim (from reports, data, observations, etc.), and an explanation of how the evidence	

	connects to and verifies the claim. ➢ **Other Sample Products:** KWL Charts. Venn Diagrams, Concept Maps, H.O.T. Boxes, Others?	
Texts, Materials, and Resources	Gateway to Science Book (p, 42-44) Gateway to Science Workbook (p.41-42)	
	Science Foundations: Life Science **1 year** **Unit 5: Cellular Reproduction – Mitosis (January)**	
Essential Questions	*What are the phases of the eukaryotic cell cycle?* *What are the four stages of mitosis?* *How does cytokinesis occur?*	
Standards	2.6 Describe the cell cycle and the process of mitosis. Explain the role of mitosis in the formation of new cells, and its importance in maintaining chromosome number during asexual reproduction	
Concepts and Skills	➢ Describe the five phases of the cell cycle ➢ List in order the four stages of mitosis and the changes that occur during each stage. ➢ Compare the products of cytokinesis.	SIS1. Make observations, raise questions, and formulate hypotheses. SIS2. Design and conduct scientific investigations. SIS3. Analyze and interpret results of scientific investigations. SIS4. Communicate and apply the results of scientific investigations. **Common Core Reading Standards** CCRSL.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. CCRSL.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. CCWSL.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **Common Core Math Standards** CCSS.Math.Content.7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size

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Content Objectives	• Identify the cell cycle, which is a typical process a cell goes through consisting of growth, development, and reproduction. • Identify the following stages of Mitosis: prophase, metaphase, anaphase, and telophase. (PMAT) • Match images/slides of cells to its stage of mitosis based on the specific characteristics of each stage. • Label the stages of mitosis in onion tips. • Recognize mitosis produces two genetically identical cells.	
Assessments/ Products/Practices	**Suggested Lessons/Labs/Demonstrations/Practices:** Extended Labs: Mitosis in Plant Cells Lab Mitosis in Plant/Animal Cells Lab Science Foundation Common Assessment **Notebooks:** ➢ **Content Notes (every day or close to it):** Students will identify topics; identify the main ideas and most important details and examples associated with each topic; include summaries as well as student-generated follow-up questions and answers, reflections, visualizations, and responses to the content, using higher order thinking skills (e.g., predict, connect, infer, analyze, evaluate, categorize, synthesize). ➢ **Vocabulary**: Students will highlight additional, key vocabulary in their notebooks; they will build an understanding of the vocabulary using vocabulary-development exercises (e.g., word webs, Frayer Model), as well as use the vocabulary in their daily work and conversations. ➢ **Narrative and Explanatory Essay (in response to one or more Essential and Guiding Questions)/Investigation Reports:** Student work will include evidence of	

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Texts, Materials, and Resources	Gateway to Science Book (p, 62-65) Gateway to Science Workbook (p.61-62)	
	Science Foundations: Life Science **1 year** **Unit 6: Cellular Reproduction – Meiosis (January)**	
Essential Questions	*How can heredity be explained?*	
Standards	2.7 Describe how the process of meiosis results in the formation of haploid cells. Explain the importance of this process in sexual reproduction, and how gametes form diploid zygotes in the process of fertilization. 2.8 Compare and contrast a virus and a cell in terms of genetic material and reproduction 4.6 Recognize that the sexual reproductive system allows organisms to produce offspring that receive half of their genetic information from their mother and half from their father, and that sexually produced offspring resemble, but are not identical to, either of their parents.	
Concepts and Skills	➢ Summarize the different phases of meiosis ➢ Explain how the function of meiosis differs from the function of mitosis	SIS1. Make observations, raise questions, and formulate hypotheses. SIS2. Design and conduct scientific investigations. SIS3. Analyze and interpret results of scientific investigations. SIS4. Communicate and apply the results of scientific investigations. **Common Core Reading Standards** CCRSL.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. CCRSL.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

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Content Objectives	➢ Recognize meiosis occurs in sexual reproduction. ➢ Identify the following stages of Meiosis 1 and 2: prophase, metaphase, anaphase, and telophase. (PMAT) ➢ Explain the purpose and products of meiosis. ➢ Develop a model that shows the various phases of meiosis. ➢ Contrast mitosis and meiosis. ➢ Explain how fertilization results in a diploid zygote. ➢ Explain how males and females produce gametes. ➢ Explain why offspring appearance is not exactly like their mother or father.	
Assessments/ Products/Practices	Labs/Demonstrations/Projects/Practices Gametes Inquiry Lab Science Foundation Common Assessment **Notebooks:** ➢ **Content Notes (every day or close to it):** Students will identify topics; identify the main ideas and most important details and examples associated with each	

	topic; include summaries as well as student-generated follow-up questions and answers, reflections, visualizations, and responses to the content, using higher order thinking skills (e.g., predict, connect, infer, analyze, evaluate, categorize, synthesize). ➢ **Vocabulary**: Students will highlight additional, key vocabulary in their notebooks; they will build an understanding of the vocabulary using vocabulary-development exercises (e.g., word webs, Frayer Model), as well as use the vocabulary in their daily work and conversations. ➢ **Narrative and Explanatory Essay (in response to one or more Essential and Guiding Questions)/Investigation Reports:** Student work will include evidence of planning: graphic organizers, brainstorming lists; editing of language, vocabulary, grammar, structure; organized and developed ideas utilizing precise and domain specific language; student sharing, student and teacher feedback, and revisions based on these conversations. Argumentative essays/investigation reports will include an explicit claim, scientific evidence in support of the claim (from reports, data, observations, etc.), and an explanation of how the evidence connects to and verifies the claim. ➢ **Other Sample Products:** KWL Charts. Venn Diagrams, Concept Maps, H.O.T. Boxes, Others
Texts, Materials, and Resources	Gateway to Science Book (p, 66-67) Gateway to Science Workbook (p.65-67)
	Science Foundations: Life Science **1 year** **Unit 7: DNA Structure and Function (February/March)**
Essential Questions	*What is genetic material composed of?* *How is information organized in a DNA molecule?* *How does DNA make a copy of itself?* *What is the role of DNA mutation in the diversity of life on earth?*
Standards	3.1 Describe the basic structure (double helix, sugar/phosphate backbone, linked by complementary nucleotide pairs) of DNA, and describe its function in genetic inheritance. 3.2 Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic code. Explain the basic processes of transcription and translation, and how they result in the expression of genes. Distinguish among the end products of replication, transcription, and translation. 3.3 Explain how mutations in the DNA sequence of a gene may or may not result in phenotypic change in an organism. Explain how mutations in gametes may result in phenotypic changes in offspring.

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<td>Concepts and Skills</td>
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Identify the substance that makes up genetic material.
Draw the shape of a DNA molecule
Relate the structure of DNA to the function of DNA as a carrier of information

</td>
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SIS1. Make observations, raise questions, and formulate hypotheses.
SIS2. Design and conduct scientific investigations.
SIS3. Analyze and interpret results of scientific investigations.
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<td>Content Objectives</td>
<td colspan="2">
Recognize that structure of DNA is a double helix.
Match complementary nucleotide pairs.
Describe the structure of DNA.
Explain how DNA is passed down from parent to offspring.
Describe how all body cells in an organism have the same DNA.
</td>
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Assessments/ Products/Practices	**Labs/Projects/Demonstrations/Practices:** *Make a DNA model* Science Foundation Common Assessment Extended Lab: DNA Extraction Lab Web-based Activities: DNA, RNA, and Gene Expression Virtual Lab (my.hrw.com) Genes in Action (my.hrw.com) Gene Technologies (my.hrw.com) Create a DNA Fingerprint at PBS Teachers' Domain Putting DNA to Work includes several interactive activities at the Koshland Science Museum website. How do cells make proteins? at PBS Teachers' Domain. Gene Cloning at PBS Teachers' Domain Website**:** Genetic Science Learning Center – educational website at the University of Utah Genetic Science Learning Center **Notebooks:** ➢ **Content Notes (every day or close to it):** Students will identify topics; identify the main ideas and most important details and examples associated with each topic; include summaries as well as student-generated follow-up questions and answers, reflections, visualizations, and responses to the content, using higher order thinking skills (e.g., predict, connect, infer, analyze, evaluate, categorize, synthesize). ➢ **Vocabulary**: Students will highlight additional, key vocabulary in their notebooks; they will build an understanding of the vocabulary using vocabulary-

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Texts, Materials, and Resources	Gateway to Science Book (p, 70-71) Gateway to Science Workbook (p.69)
	Science Foundations: Life Science **1 year** **Unit 8: Inheritance (March)**
Essential Questions	*How does genotype relate to phenotype?* *Why do you only have some but not all of the traits of your parents?* *How can a Punnett square be used in genetics?*
Standards	3.4 Distinguish among observed inheritance patterns caused by several types of genetic traits (dominant, recessive, codominant, sex-linked, polygenic, incomplete dominance, multiple alleles) 3.6 Use a Punnett square to determine the probabilities for genotype and phenotype combinations in monohybrid crosses.
Concepts and Skills	➢ Describe the patterns that Mendelian theory explains. ➢ Summarize the law of segregation. ➢ Relate genotype to phenotype. ➢ Describe how a Punnett square is used in genetics.	SIS1. Make observations, raise questions, and formulate hypotheses. SIS2. Design and conduct scientific investigations. SIS3. Analyze and interpret results of scientific investigations. SIS4. Communicate and apply the results of scientific investigations. **Common Core Reading Standards** CCRSL.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. CCRSL.3 Follow precisely a complex multistep procedure when carrying out experiments, taking

		measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. CCWSL.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **Common Core Math Standards** CCSS.Math.Content.7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. CCSS.Math.Content.7.SP.C.6 approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. CCSS.Math.Content.8.SP.A.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. CCSS.Math.Content.8.SP.A.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
Content Objectives	• Recognize that genotype describes the genetic makeup of an organism and the phenotype describes the organism's appearance based on its genes. • Match the words genotype and phenotype to its definitions. • Recognize when one allele masks the effect of another, that allele is called dominant, and the other recessive. • Match the words homozygous and heterozygous to its definitions. • Describe causes and effects of somatic (body cell) and sex cell mutations. • Demonstrate heredity patterns using Punnett Squares. • Interpret Punnett Squares to determine the probability for genotype and phenotype combinations in monohybrid crosses.	
Assessments/ Products/Practices	**Labs/Demonstrations/Projects/Practices:** Genetic Science Learning Center – educational website at the University of Utah Genetic Science Learning Center How do cells make proteins? at PBS Teachers' Domain. Science Foundation Common Assessment	

	Notebooks: ➢ **Content Notes (every day or close to it):** Students will identify topics; identify the main ideas and most important details and examples associated with each topic; include summaries as well as student-generated follow-up questions and answers, reflections, visualizations, and responses to the content, using higher order thinking skills (e.g., predict, connect, infer, analyze, evaluate, categorize, synthesize). ➢ **Vocabulary**: Students will highlight additional, key vocabulary in their notebooks; they will build an understanding of the vocabulary using vocabulary-development exercises (e.g., word webs, Frayer Model), as well as use the vocabulary in their daily work and conversations. ➢ **Narrative and Explanatory Essay (in response to one or more Essential and Guiding Questions)/Investigation Reports:** Student work will include evidence of planning: graphic organizers, brainstorming lists; editing of language, vocabulary, grammar, structure; organized and developed ideas utilizing precise and domain specific language; student sharing, student and teacher feedback, and revisions based on these conversations. Argumentative essays/investigation reports will include an explicit claim, scientific evidence in support of the claim (from reports, data, observations, etc.), and an explanation of how the evidence connects to and verifies the claim. ➢ **Other Sample Products:** KWL Charts. Venn Diagrams, Concept Maps, H.O.T. Boxes, Others?
Texts, Materials, and Resources	Gateway to Science Book (p, 71-72) Gateway to Science Workbook (p.70) Gateway to Science Book (p, 73) Gateway to Science Workbook (p.71) "Inherited Traits" Group Work (Gateway p. 72)
	Science Foundations: Life Science **1 year** **Unit 10: Evolution (April)**
Essential Questions	*What is the evidence for evolution?* *Why is life on earth so diverse?*
Standards	5.1 Explain how evolution is demonstrated by evidence from the fossil record, comparative anatomy, genetics, molecular biology, and examples of natural selection. 5.3 Explain how evolution through natural selection can result in changes in biodiversity through the increase or decrease of genetic diversity within a population.

	5.2 Describe species as reproductively distinct groups of organisms. Recognize that species are further classified into a hierarchical taxonomic system (kingdom, phylum, class, order, family, genus, species) based on morphological, behavioral, and molecular similarities. Describe the role that geographic isolation can play in speciation.	
Concepts and Skills	➢ Outline Darwin's theory of evolution by natural selection through four logical steps (overproduction, variation, selection, adaptation)	SIS1. Make observations, raise questions, and formulate hypotheses. SIS2. Design and conduct scientific investigations. SIS3. Analyze and interpret results of scientific investigations. SIS4. Communicate and apply the results of scientific investigations. **Common Core Reading Standards** CCRSL.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. CCRSL.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. CCWSL.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **Common Core Math Standards** CCSS.Math.Content.7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. CCSS.Math.Content.7.SP.C.6 approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. CCSS.Math.Content.8.SP.A.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. CCSS.Math.Content.8.SP.A.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
Content	➢ Explain how fossils provide evidence for evolution.	

Objectives	➢ Compare limb structure in related organisms. ➢ Explain how anatomy, genetics, and molecular biology can be used to determine relatedness between organisms. ➢ Analyze amino acid sequences to determine relatedness between species. ➢ Give examples of natural selection that provide evidence for evolution. ➢ Explain how evolution affects genetic diversity. ➢ Explain how scientists determine that two organisms are the same or different species.
Assessments/ Products/Practices	**Quick Labs/Demonstrations/Projects/Practices** Limb Structure Quick Lab Natural Selection Quick Lab Random Sampling Lab Classification Systems Lab Cladogram Construction Lab **Extended Labs:** Insect Camouflage Lab Amino Acid Analysis Lab Dichotomous Keys Lab Science Foundation Common Assessment **Notebooks:** ➢ **Content Notes (every day or close to it):** Students will identify topics; identify the main ideas and most important details and examples associated with each topic; include summaries as well as student-generated follow-up questions and answers, reflections, visualizations, and responses to the content, using higher order thinking skills (e.g., predict, connect, infer, analyze, evaluate, categorize, synthesize). ➢ **Vocabulary**: Students will highlight additional, key vocabulary in their notebooks; they will build an understanding of the vocabulary using vocabulary-development exercises (e.g., word webs, Frayer Model), as well as use the vocabulary in their daily work and conversations. ➢ **Narrative and Explanatory Essay (in response to one or more Essential and Guiding Questions)/Investigation Reports:** Student work will include evidence of planning: graphic organizers, brainstorming lists; editing of language, vocabulary, grammar, structure; organized and developed ideas utilizing precise and domain specific language; student sharing, student and teacher feedback, and revisions based on these conversations. Argumentative essays/investigation reports will include an explicit claim, scientific evidence in support of the claim (from reports, data, observations, etc.), and an explanation of how the evidence connects to and verifies the claim. ➢ **Other Sample Products:** KWL Charts. Venn Diagrams, Concept Maps, H.O.T. Boxes, Others?

Texts, Materials, and Resources	**Web-based Activities:** Evolution and Natural Selection Population Genetics Virtual Lab Classification Virtual Lab (my.hrw.com) Darwin's Diary at PBS Teachers' Domain. Riddle of the Bones at PBS Teachers' Domain. Discover with Darwin at Scholastic.com includes several interactive activities involving the Galapagos Islands. Evolution Library at PBS Teachers' Domain. Gateway to Science textbook and workbook	
	Science Foundations: Life Science **1 year** **Unit 11: Kingdoms and Subdivisions (April/May)**	
Essential Questions	*How is life organized?*	
Standards	1. (6-8) Classify organisms into the currently recognized kingdoms according to characteristics that they share. Be familiar with organisms from each kingdom. 2.3 Use cellular evidence (e.g., cell structure, cell number, cell reproduction) and modes of nutrition to describe the six kingdoms (Archaebacteria, Eubacteria, Protista, Fungi, Plantae, Animalia).	
Concepts and Skills	➢ Explain why biologists have systems for naming and grouping organisms. ➢ Describe the structure of a scientific name for a species ➢ List the categories of the modern Linaean system of classification in order from general to specific.	SIS1. Make observations, raise questions, and formulate hypotheses. SIS2. Design and conduct scientific investigations. SIS3. Analyze and interpret results of scientific investigations. SIS4. Communicate and apply the results of scientific investigations. **Common Core Reading Standards** CCRSL.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a

		complex process, phenomenon, or concept; provide an accurate summary of the text. CCRSL.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. CCWSL.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **Common Core Math Standards** CCSS.Math.Content.7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. CCSS.Math.Content.7.SP.C.6 approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. CCSS.Math.Content.8.SP.A.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. CCSS.Math.Content.8.SP.A.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
Content Objectives	• Define a microbe. • Identify character traits. • Organize organisms into categories based on physical traits. • List organisms from each kingdom.	
Assessments/ Products/Practices	**Quick Labs/Demonstrations/Projects/Practices:** Classification Systems Lab Cladogram Construction Lab **Extended Lab:** Dichotomous Key Lab	

	Web Based Activity: Classification Virtual Lab (my.hrw.com) Science Foundation Common Assessment **Notebooks:** ➢ **Content Notes (every day or close to it):** Students will identify topics; identify the main ideas and most important details and examples associated with each topic; include summaries as well as student-generated follow-up questions and answers, reflections, visualizations, and responses to the content, using higher order thinking skills (e.g., predict, connect, infer, analyze, evaluate, categorize, synthesize). ➢ **Vocabulary**: Students will highlight additional, key vocabulary in their notebooks; they will build an understanding of the vocabulary using vocabulary-development exercises (e.g., word webs, Frayer Model), as well as use the vocabulary in their daily work and conversations. ➢ **Narrative and Explanatory Essay (in response to one or more Essential and Guiding Questions)/Investigation Reports:** Student work will include evidence of planning: graphic organizers, brainstorming lists; editing of language, vocabulary, grammar, structure; organized and developed ideas utilizing precise and domain specific language; student sharing, student and teacher feedback, and revisions based on these conversations. Argumentative essays/investigation reports will include an explicit claim, scientific evidence in support of the claim (from reports, data, observations, etc.), and an explanation of how the evidence connects to and verifies the claim. ➢ **Other Sample Products:** KWL Charts. Venn Diagrams, Concept Maps, H.O.T. Boxes, Others?
Texts, Materials, and Resources	FOSS Diversity of Life Investigation 10 "Kingdoms of Life" FOSS Observing Fungi Activity Gateway "Classification Systems" (p. 78-81) Gateway Workbook (p. 77-79) Group Work "Classifying Organisms" Activity p.80
	Science Foundations: Life Science **1 year** **Unit 12: Population Size (May/June)**
Essential Questions	*What is interdependence and why is it necessary?*

Standards	6.1 Explain how birth, death, immigration, and emigration influence population size. 12. Relate the extinction of species to a mismatch of adaptation and the environment. 6.2 Analyze changes in population size and biodiversity (speciation and extinction) that result from the following: natural causes, changes in climate, human activity, and the introduction of invasive, non-native species.	
Concepts and Skills	➢ Explain the importance of studying populations. ➢ Identify abiotic factors that affect populations ➢ Explain how science and technology have affected human population growth.	SIS1. Make observations, raise questions, and formulate hypotheses. SIS2. Design and conduct scientific investigations. SIS3. Analyze and interpret results of scientific investigations. SIS4. Communicate and apply the results of scientific investigations. **Common Core Reading Standards** CCRSL.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. CCRSL.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. CCWSL.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **Common Core Math Standards** CCSS.Math.Content.7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. CCSS.Math.Content.7.SP.C.6 approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. CCSS.Math.Content.8.SP.A.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. CCSS.Math.Content.8.SP.A.3 Use the equation of a linear model to solve problems in the context of

		bivariate measurement data, interpreting the slope and intercept.
Content Objectives	• Match the words death, immigration and emigration to its definitions. • Understand that organisms with certain genetic variations will be favored to survive and pass their variations on to the next generation. • Determine why organisms are suited for specific habitats. • Describe extinction as a natural process. • Distinguish between artificial and natural extinction.	
Assessments/ Products/Practices	**Suggested Lessons/Labs/Demonstrations/Projects/Practices** Quick Labs/Demonstrations: Population Growth Quick Lab Population Size Inquiry Lab **Extended Lab:** Yeast Population Lab Pine Cone Lab Science Foundation Common Assessment **Notebooks:** ➢ **Content Notes (every day or close to it):** Students will identify topics; identify the main ideas and most important details and examples associated with each topic; include summaries as well as student-generated follow-up questions and answers, reflections, visualizations, and responses to the content, using higher order thinking skills (e.g., predict, connect, infer, analyze, evaluate, categorize, synthesize). ➢ **Vocabulary**: Students will highlight additional, key vocabulary in their notebooks; they will build an understanding of the vocabulary using vocabulary-development exercises (e.g., word webs, Frayer Model), as well as use the vocabulary in their daily work and conversations. ➢ **Narrative and Explanatory Essay (in response to one or more Essential and Guiding Questions)/Investigation Reports:** Student work will include evidence of planning: graphic organizers, brainstorming lists; editing of language, vocabulary, grammar, structure; organized and developed ideas utilizing precise and	

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Texts, Materials, and Resources	Populations and Ecosystems Investigation 8, Parts 1-2 Investigation 10, Parts 1-3	
	Science Foundations: Life Science **1 year** **Unit 13: Symbiosis and Interdependence (May/June)**	
Essential Questions	*What is interdependence and why is it important?*	
Standards	13. (6-8) Give examples of ways in which organisms interact and have different functions within an ecosystem that enable the ecosystem to survive. 14. (6-8)Explain the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web. 6.3 Use a food web to identify and distinguish producers, consumers, and decomposers, and explain the transfer of energy through trophic levels. Describe how relationships among organisms (predation, parasitism, competition, commensalism, mutualism) add to the complexity of biological communities. 15. Explain how dead plants and animals are broken down by other living organisms and how this process contributes to the system as a whole. 16. Recognize that producers (plants that contain chlorophyll) use energy from sunlight to make sugars from carbon dioxide and water through a process called photosynthesis. This food can be used immediately, stored for later use, or used by other organisms. 17. Identify ways in which ecosystems have changed through geologic time in response to physical conditions, interactions among organisms, and the actions of humans. Describe how changes may be catastrophes such as volcanic eruptions or ice storms. 8. Recognize that hereditary information is contained in genes located in the chromosomes of each cell. A human cell contains about 30,000 different genes on 23 different chromosomes. 7. Recognize that every organism requires a set of instructions that specifies its traits. These instructions are stored in the organism's chromosomes. Heredity is the passage of these instructions from one generation to another.	
Concepts and Skills	➢ Explain how an ecosystem responds to change. ➢ Describe how energy flows in an ecosystem. ➢ Describe the difference between an herbivore, a carnivore, and an omnivore.	SIS1. Make observations, raise questions, and formulate hypotheses. SIS2. Design and conduct scientific investigations. SIS3. Analyze and interpret results of scientific investigations. SIS4. Communicate and apply the results of scientific investigations. **Common Core Reading Standards** CCRSL.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a

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Content Objectives	• Describe how organisms relate to their physical environment. • Describe factors that affect biodiversity. • Recognize that the amount of resources is limited and impacts the carrying capacity (or amount) of all organisms in the ecosystem. • Understand that a habitat is a place where the organism lives. • Create and read a food chain. • Create and read a food web. • Match the words producer, consumer, and decomposer to its definitions.. • Explain how food is energy-rich organic matter that organisms need to conduct their life processes. • Describe how energy moves from one trophic level to another in an ecosystem. • Discuss how the process of photosynthesis makes energy available to organisms. • Explain how organisms get the energy they need for life.	

	• Describe reproductive potential as the theoretical unlimited growth of a population over time. • Explain how adaptations help organisms survive in an environment • Describe how a population can change over time in response to environmental factors. • Describe how environmental factors put selective pressure on populations. • Identify genes as the basic units of heredity and that they are carried by chromosomes. • Locate chromosomes in the nucleus of every cell. • Understand that genes code for features of an organism. • State that humans have 23 different chromosomes. • Define a trait as the way a feature is expressed in an individual organism, such as eye color, fur pattern, or timing of migration. • Explain heredity as the passage of DNA from one generation to another.
Assessments/ Products/Practices	**Labs/Projects/Demonstrations/Practices:** **Quick Labs:** Soil Erosion Quick Lab Carbon Cycle Quick Lab Greenhouse Effect Inquiry Lab **Extended Lab:** Owl Pellets Lab Biotic Factors Lab Science Foundation Common Assessment **Notebooks:** ➢ **Content Notes (every day or close to it):** Students will identify topics; identify the main ideas and most important details and examples associated with each topic; include summaries as well as student-generated follow-up questions and answers, reflections, visualizations, and responses to the content, using higher order thinking skills (e.g., predict, connect, infer, analyze, evaluate, categorize, synthesize). ➢ **Vocabulary**: Students will highlight additional, key vocabulary in their notebooks; they will build an understanding of the vocabulary using vocabulary-development exercises (e.g., word webs, Frayer Model), as well as use the vocabulary in their daily work and conversations. ➢ **Narrative and Explanatory Essay (in response to one or more Essential and Guiding Questions)/Investigation Reports:** Student work will include evidence of planning: graphic organizers, brainstorming lists; editing of language, vocabulary, grammar, structure; organized and developed ideas utilizing precise and domain specific language; student sharing, student and teacher feedback, and revisions based on these conversations. Argumentative essays/investigation reports will include an explicit claim, scientific evidence in support of the claim (from reports, data, observations, etc.), and an explanation of how the evidence

	connects to and verifies the claim. ➢ **Other Sample Products:** KWL Charts. Venn Diagrams, Concept Maps, H.O.T. Boxes, Others?
Texts, Materials, and Resources	Populations and Ecosystems Investigation 3, Parts 1-3 Investigation 4, Parts 1-2 Investigation 7, Part 1 Populations and Ecosystems Investigation 3, Part 3 Investigation 4, Parts 1-2 Investigation 5, Parts 1-4 Populations and Ecosystems Investigation 5, Parts 1-4 Populations and Ecosystems Investigation 6, Parts 1-3 Populations and Ecosystems Investigation 9, Parts 1-4 Populations and Ecosystems: Investigation 9 parts 1-4