

Clinton-Glen Gardner School District



Curriculum Management System

SCIENCE

Grade: 7

August 2016

*** For adoption by all regular education programs as specified and for adoption or adaptation by all Special Education Programs in accordance with Board of Education Policy #2200.**

Board Approved: August 24, 2016

CLINTON-GLEN GARDNER SCHOOL DISTRICT

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Acknowledgments

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**Writers' Names: Kate Lascelle
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Clinton-Glen Gardner School District

Mission

The Clinton-Glen Gardner School District is a community who values traditions. Our MISSION is to nurture and cultivate each child to be a compassionate, curious, and creative thinker, entrusted and empowered to build and lead the future.

Philosophy

Science, engineering, and technology influence and permeate every aspect of modern life. Some knowledge of science and engineering is required to engage with the major public policy issues of today as well as to make informed everyday decisions, such as selecting among alternative medical treatments or determining how to invest public funds for water supply options. In addition, understanding science and the extraordinary insights it has produced can be meaningful and relevant on a personal level, opening new worlds to explore and offering lifelong opportunities for enriching people's lives. In these contexts, learning science is important for everyone, even those who eventually choose careers in fields other than science or engineering.

The Next Generation Science Standards (NGSS) are K–12 science content standards. Standards set the expectations for what students should know and be able to do. The NGSS were developed by states to improve science education for all students.

A goal for developing the NGSS was to create a set of research-based, up-to-date K–12 science standards. These standards give local educators the flexibility to design classroom learning experiences that stimulate students' interests in science and prepares them for college, careers, and citizenship. The CPS Science Curriculum is designed to address the goals and philosophy of the New Jersey Next Generation Science Standards.

**Grade 7
Science
Scope and Sequence**

Quarter I	
Unit 1: Cell Structure and Function	Unit 2: Body Systems
(The ones that apply for these units are in bold)	
<u>21st Century Skills</u> <ol style="list-style-type: none"> 1. Creativity & Innovation 2. Critical Thinking & Problem Solving 3. Communication & Collaboration 4. Media Literacy 5. Information Literacy 6. Information, Communication & Technology 	<u>Cross Cutting Concepts</u> <ol style="list-style-type: none"> 1. Patterns 2. Cause and Effect 3. Scale, Proportion, and Quantity 4. Systems and System Models 5. Energy and Matter: Flows, Cycles, and Conservation 6. Structure and Function 7. Stability and Change
<u>21st Century Themes</u> <ol style="list-style-type: none"> 1. Global Awareness 2. Financial, Economic, Business and Entrepreneurial Literacy 3. Civic Literacy 4. Health Literacy 5. Environmental Literacy 	<u>Scientific and Engineering Practices</u> <ol style="list-style-type: none"> 1. Asking Questions and Defining Problems 2. Developing and Using Models 3. Planning and Carrying Out Investigations 4. Analyzing and Interpreting Data 5. Using Mathematics and Computational Thinking 6. Constructing Explanations and Designing Solutions 7. Engaging in Argument from Evidence 8. Obtaining, Evaluating, and Communicating Information
Technology Infusion	
http://www.state.nj.us/education/ , Internet, Web Quests, content-related websites, wireless laptop computers, computer laboratory, classroom computers, SMART Boards, CDs, DVDs, webinars, video streaming, podcasting	
Differentiation	
Refer to CPS Differentiation Tool Kit	

Assessment

District End of Quarter Performance Based Assessment

District End of Unit Tests

Various opportunities during projects and laboratory investigations for formative assessment and anecdotal notes

During Work Period adjust lessons for individual students and small groups of students based on formative and summative data (Go back and re-teach for those that did not meet standard on benchmark and plan accordingly for those that exceeded benchmark)

Quarter II

Unit 3: Organization for Matter and Energy Flow in Organisms

Unit 4: Matter and Energy in Organisms and Ecosystems

(The ones that apply for this unit are in bold)

21st Century Skills

- 1. Creativity & Innovation**
- 2. Critical Thinking & Problem Solving**
- 3. Communication & Collaboration**
4. Media Literacy
- 5. Information Literacy**
6. Information, Communication & Technology

Cross Cutting Concepts

1. Patterns
- 2. Cause and Effect**
3. Scale, Proportion, and Quantity
- 4. Systems and System Models**
- 5. Energy and Matter: Flows, Cycles, and Conservation**
- 6. Structure and Function**
7. Stability and Change

21st Century Themes

- 1. Global Awareness**
2. Financial, Economic, Business and Entrepreneurial Literacy
3. Civic Literacy
- 4. Health Literacy**
- 5. Environmental Literacy**

Scientific and Engineering Practices

1. Asking Questions and Defining Problems
- 2. Developing and Using Models**
3. Planning and Carrying Out Investigations
4. Analyzing and Interpreting Data
5. Using Mathematics and Computational Thinking
6. Constructing Explanations and Designing Solutions
- 7. Engaging in Argument from Evidence**
- 8. Obtaining, Evaluating, and Communicating Information**

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Differentiation

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District End of Quarter Performance Based Assessment
District End of Unit Tests

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Quarter III

Unit 5: Growth, Development, and Reproduction of Organisms

Unit 6: Inheritance and Variation of Traits

(The ones that apply for this unit are in bold)

21st Century Skills

- 1. Creativity & Innovation
- 2. **Critical Thinking & Problem Solving**
- 3. **Communication & Collaboration**
- 4. Media Literacy
- 5. **Information Literacy**
- 6. **Information, Communication & Technology**

Cross Cutting Concepts

- 1. **Patterns**
- 2. **Cause and Effect**
- 3. Scale, Proportion, and Quantity
- 4. **Systems and System Models**
- 5. **Energy and Matter: Flows, Cycles, and Conservation**
- 6. **Structure and Function**
- 7. Stability and Change

21st Century Themes

- 1. **Global Awareness**
- 2. Financial, Economic, Business and Entrepreneurial Literacy
- 3. Civic Literacy
- 4. **Health Literacy**
- 5. **Environmental Literacy**

Scientific and Engineering Practices

- 1. Asking Questions and Defining Problems
- 2. **Developing and Using Models**
- 3. Planning and Carrying Out Investigations
- 4. **Analyzing and Interpreting Data**
- 5. Using Mathematics and Computational Thinking

	6. Constructing Explanations and Designing Solutions 7. Engaging in Argument from Evidence 8. Obtaining, Evaluating, and Communicating Information
Technology Infusion	
http://www.state.nj.us/education/ , Internet, Web Quests, content-related websites, wireless laptop computers, computer laboratory, classroom computers, SMART Boards, CDs, DVDs, webinars, video streaming, podcasting	
Differentiation	
Refer to CPS Differentiation Tool Kit	
Assessment	
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Quarter IV	
Unit 7: Evidence of a Common Ancestry	Unit 8: Selection and Adaptation
(The ones that apply for these units are in bold)	
<u>21st Century Skills</u> 1. Creativity & Innovation 2. Critical Thinking & Problem Solving 3. Communication & Collaboration 4. Media Literacy 5. Information Literacy 6. Information, Communication & Technology	<u>Cross Cutting Concepts</u> 1. Patterns 2. Cause and Effect 3. Scale, Proportion, and Quantity 4. Systems and System Models 5. Energy and Matter: Flows, Cycles, and Conservation 6. Structure and Function 7. Stability and Change
<u>21st Century Themes</u> 1. Global Awareness 2. Financial, Economic, Business and Entrepreneurial Literacy 3. Civic Literacy	<u>Scientific and Engineering Practices</u> 1. Asking Questions and Defining Problems 2. Developing and Using Models 3. Planning and Carrying Out Investigations

- 4. Health Literacy
- 5. Environmental Literacy

- 4. Analyzing and Interpreting Data
- 5. Using Mathematics and Computational Thinking
- 6. Constructing Explanations and Designing Solutions
- 7. Engaging in Argument from Evidence
- 8. Obtaining, Evaluating, and Communicating Information

Technology Infusion

<http://www.state.nj.us/education/>, Internet, Web Quests, content-related websites, wireless laptop computers, computer laboratory, classroom computers, SMART Boards, CDs, DVDs, webinars, video streaming, podcasting

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Refer to CPS Differentiation Tool Kit

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District End of Quarter Performance Based Assessment

District End of Unit Tests

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During Work Period adjust lessons for individual students and small groups of students based on formative and summative data (Go back and re-teach for those that did not meet standard on benchmark and plan accordingly for those that exceeded benchmark)

Suggested days of Instruction	Curriculum Management System Subject/Grade Level: Grade 7 Science	Topic: Cell Structure and Function	
		Goal 1: The Cell Structure and Function Unit is designed to allow students to plan and carry out investigations to develop evidence that living organisms are made of cells. Students will be able to communicate an understanding of the cell theory. They will gather information to support explanations of the relationship between structure and function in cells and understand that certain structures are responsible for particular functions within the cell. The unit also provides students with the opportunity to plan and construct physical and conceptual models of cells.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
Sept.	1.1 Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. (MS-LS1-1) 1.2 Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. (MS-LS1-2) 1.3 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. (MS-ETS1-4)	Essential Questions: How are cells important to the structure and function of living things? What are the differences between single-celled organisms and multi-cellular organisms? What is the cell theory? What are the functions of the cell organelles? How does the structure of a plant cell compare with that of an animal cell? Conceptual Understandings: All living things are made of cells, which is the smallest unit of life. An organism can consist of one single cell (unicellular) or many different numbers and types of cells (multi-cellular). The cell theory states: <ul style="list-style-type: none"> • All living things are composed of cells. • Cells are the basic units of structure and function in living things. • All cells are produced from other cells. Within cells, the organelles are responsible for particular functions, for example, the cell membrane is responsible for controlling what enters and leaves the cell.	Learning Activities: Textbook Analysis Living vs. Nonliving exploration Introduction to Microscopes lab Use microscopes to observe various cells Create visual models of the structure of plant and animal cells Study the contributions of important scientists in the history of cells and their structure Cells Web Quests Study cell structure and function Cell structure analogies "Cell City" group project "Cell Survivor" activity Assessment Models: Comprehension questions Science Journal writing Tests and Quizzes Group Discussions Laboratory Investigations Label diagrams of plant and animal cells Compare/Contrast Essay Student-generated models of cells

Suggested days of Instruction	Curriculum Management System Subject/Grade Level: Grade 7 Science	Topic: Cell Structure and Function	
		Goal 1: The Cell Structure and Function Unit is designed to allow students to plan and carry out investigations to develop evidence that living organisms are made of cells. Students will be able to communicate an understanding of the cell theory. They will gather information to support explanations of the relationship between structure and function in cells and understand that certain structures are responsible for particular functions within the cell. The unit also provides students with the opportunity to plan and construct physical and conceptual models of cells.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
		<p>The animal and plant cell have all of the same organelles with the exception of the cell wall and chloroplasts in plants.</p> <p>The plant cell has a rigid shape and one large central vacuole, where as the animal cell has a rounded shape and several small vacuoles.</p>	<p>“Create an Organism” Project</p> <p>Additional Resources: “Afraid of the Dark” song Bill Nye “Cells” DVD <i>Cool Careers in Stem</i> book series</p> <p>Technology Resources: Interactive SmartBoard lessons www.cellsalive.com www.biology4kids.com www.nsta.org</p>

Suggested days of Instruction	Curriculum Management System	Topic: Body Systems	
	<u>Subject/Grade Level:</u> Grade 7 Science	Goal 2: The Body Systems Unit will allow students to develop a basic understanding of the role of cells in body systems and how those systems work to support the life functions of the organism. They will construct explanations for the interactions of systems in cells and organisms and for how organisms gather and use information from the environment.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's)	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
	The student will be able to:		
Oct./ Nov.	<p>2.1 Use the argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. (MS-LS1-3)</p> <p>2.2 Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. (MS-LS1-8)</p> <p>2.3 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (MS-ETS1-2)</p> <p>2.4 Analyze data from tests to determine similarities and differences among several</p>	<p>Essential Questions: How are specialized cells, tissues, organs, and organ systems related? How do systems of the human body work together?</p> <p>Conceptual Understandings: In multi-cellular organisms, specialized cells perform specific functions. Multi-cellular organisms are composed of and defined by interactions between their cells, tissues, organs, and systems. The body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. Multi-cellular organisms contain sense receptors that respond to different environmental inputs (<i>factors</i>) (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories.</p>	<p>Learning Activities: Textbook Analysis "Body Systems" rap Model structure and types of neurons Brain mini-unit Reaction Time labs How Memory Works Digestive system activity</p> <p>Assessment Models: Comprehension questions Science Journal writing Tests and Quizzes Group Discussions Laboratory Investigations Labeling organ systems Reaction/Reflex Scenario project Organ system group project</p> <p>Additional Resources: Reaction time video Bill Nye "Body Systems" video <i>Cool Careers in Stem</i> book series</p>

Suggested days of Instruction	Curriculum Management System Subject/Grade Level: Grade 7 Science	Topic: Body Systems	
		Goal 2: The Body Systems Unit will allow students to develop a basic understanding of the role of cells in body systems and how those systems work to support the life functions of the organism. They will construct explanations for the interactions of systems in cells and organisms and for how organisms gather and use information from the environment.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
	design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. (MS-ETS1-3)		Technology Resources: www.youtube.com www.biology4kids.com www.biologycorner.com

Suggested days of Instruction	Curriculum Management System Subject/Grade Level: Grade 7 Science	Topic: Organization for Matter and Energy Flow in Organisms	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
Dec.	<p>3.1 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. (MS-LS1-6)</p> <p>3.2 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. (MS-LS1-7)</p> <p>3.3 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (MS-ETS1-2)</p>	<p>Essential Questions: What is the source of all energy? How do cells obtain the energy they need to carry out all their functions? Why is photosynthesis essential to plants? What is the importance of cellular respiration?</p> <p>Conceptual Understandings: The Sun is the source of all energy. Plants, algae, and many microorganisms use the energy for light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use. Light is absorbed by the cell's chloroplasts, which also give plants, algae and some microorganisms their green color. Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules to support growth, or to release energy. This process is called cellular respiration. Overall, cells obtain energy through the processes of photosynthesis and respiration, which are carried out by the chloroplasts and mitochondria.</p>	<p>Learning Activities: Textbook Analysis Lab activities on Diffusion, Osmosis, Photosynthesis, and Respiration: "Diffusion In Action" "Smelly Balloons" "Gummy Bear" Osmosis "Fall Foliage" "Gases in Balance" Study photosynthesis and cellular respiration chemical equations "Egg-speriment" project</p> <p>Assessment Models: Comprehension questions Science Journal writing Tests and Quizzes Group Discussions Laboratory Investigations</p> <p>Additional Resources: "Energy Flow" web quest</p> <p>Technology Resources: www.biology4kids.com www.pbs.org</p>

Suggested days of Instruction	Curriculum Management System <u>Subject/Grade Level:</u> Grade 7 Science	Topic: Organization for Matter and Energy Flow in Organisms	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model

Suggested days of Instruction	Curriculum Management System <u>Subject/Grade Level:</u> Grade 7 Science	Topic: Matter and Energy in Organisms and Ecosystems	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
Jan.	<p>4.1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. (MS-LS2-1)</p> <p>4.2 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. (MS-LS2-3)</p> <p>4.3 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. (MS-LS2-4)</p> <p>4.4 Evaluate competing design solutions using a systematic process to determine how well</p>	<p>Essential Questions: How does a system of living and non-living things operate to meet the needs of the organisms in an ecosystem? How do organisms interact in an ecosystem? How is matter and energy cycled through a food web?</p> <p>Conceptual Understandings: Organisms and populations of organisms are dependent on their environmental interactions both with other living things and with non-living factors.</p> <p>In an ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources. This, in turn, affects their growth and reproduction.</p> <p>Growth of organisms and population increases are limited by access to resources.</p> <p>Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem.</p> <p>Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments.</p>	<p>Learning Activities: Textbook Analysis Modeling Ecosystems Food Chain Energy Flow game Study impact of population changes in ecosystems Building a Food Chain game</p> <p>Assessment Models: Comprehension questions Science Journal writing Tests and Quizzes Group Discussions Laboratory Investigations</p> <p>Additional Resources: “Energy Flow” web quest</p> <p>Technology Resources: www.discoveryeducation.com www.projectwild.org www.pbs.org</p>

Suggested days of Instruction	Curriculum Management System	Topic: Matter and Energy in Organisms and Ecosystems	
	Subject/Grade Level: Grade 7 Science	Goal 4: This unit focuses primarily on students gaining a deeper understanding of the cycling of matter, the flow of energy, and resources in ecosystems. They will also study patterns of the interactions among organisms within an ecosystem. In addition, students will consider the biotic and abiotic factors in an ecosystem and the effects these factors have on populations.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's)	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
	<p>The student will be able to:</p> <p>they meet the criteria and constraints of the problem. (MS-ETS1-2)</p> <p>4.5 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. (MS-ETS1-3)</p>	<p>The characteristics of an ecosystem can vary over time. Disruptions to any physical or biological component can lead to fluctuations in all its populations.</p>	

Suggested days of Instruction	Curriculum Management System <u>Subject/Grade Level:</u> Grade 7 Science	Topic: Growth, Development, and Reproduction of Organisms	
		Goal 5: The Growth, Development, and Reproduction of Organisms Unit is designed to allow students to construct an explanation for how environmental and genetic factors affect the growth of organisms. Students will be able to connect this to the role of animal behaviors in reproduction of animals as well as the dependence of some plants on animal behaviors for their reproduction. They will provide evidence to support their understanding of the structures and behaviors that increase the likelihood of successful reproduction by organisms.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
Feb.	<p>5.1 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. (MS-LS1-4)</p> <p>5.2 Construct a scientific explanation based on evidence for how environmental and genetic factors influence growth of organisms. (MS-LS1-5)</p> <p>5.3 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and</p>	<p>Essential Questions:</p> <p>What are the essential needs of all living things? How do all organisms reproduce? How does the environment play a role in the reproduction of plants?</p> <p>Conceptual Understandings:</p> <p>Most living things need water, air, food, and a place to live.</p> <p>Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring.</p> <p>Animals engage in characteristic behaviors that increase the odds of reproduction.</p> <p>Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction.</p> <p>Plants have physical structures that allow for reproduction.</p> <p>Genetic factors as well as local conditions affect the growth of the adult plant.</p>	<p>Learning Activities:</p> <p>Textbook Analysis Study Plant Life Cycles Flowering Plant dissection Modeling Mitosis and Meiosis Comparisons of Sexual and Asexual Reproduction</p> <p>Assessment Models:</p> <p>Comprehension questions Science Journal writing Tests and Quizzes Class Discussions Laboratory Investigations Mitosis Flipbooks</p> <p>Additional Resources:</p> <p><i>Cool Careers in Stem</i> book series “Photosynthesis,” “Cellular Respiration,” “Meiosis” and “Mitosis” videos</p> <p>Technology Resources:</p> <p>www.amoebasisters.com www.youtube.com www.biology4kids.com</p>

Suggested days of Instruction	Curriculum Management System Subject/Grade Level: Grade 7 Science	Topic: Growth, Development, and Reproduction of Organisms	
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	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
	<p>constraints of the problem. (MS-ETS1-2)</p> <p>5.4 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. (MS-ETS1-3)</p>	<p>The growth of plants and animals can be influenced by environmental factors.</p>	

Suggested days of Instruction	Curriculum Management System <u>Subject/Grade Level:</u> Grade 7 Science	Topic: Growth, Development, and Reproduction of Organisms	
		<u>Goal 5:</u> The Growth, Development, and Reproduction of Organisms Unit is designed to allow students to construct an explanation for how environmental and genetic factors affect the growth of organisms. Students will be able to connect this to the role of animal behaviors in reproduction of animals as well as the dependence of some plants on animal behaviors for their reproduction. They will provide evidence to support their understanding of the structures and behaviors that increase the likelihood of successful reproduction by organisms.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model

Suggested days of Instruction	Curriculum Management System <u>Subject/Grade Level:</u> Grade 7 Science	Topic: Inheritance and Variation of Traits	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
Mar.	<p>6.1 Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. (MS-LS3-1)</p> <p>6.2 Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. (MS-LS3-2)</p> <p>6.3 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.</p>	<p>Essential Questions: How do living organisms pass traits from one generation to the next? How can the probability of inheritance of traits be predicted? How are chromosomes, genes, proteins and traits related? How does a cell produce proteins? What are mutations and their effects?</p> <p>Conceptual Understandings: In sexual reproduction, each parent contributes half of their DNA (genes) to their offspring. Individuals have two of each chromosome and hence two alleles of each gene; one acquired from each parent. These alleles may be identical or differ from each other. A Punnett square is a chart used to determine all the possible combinations of alleles that an offspring can inherit from his/her parents. Genes are located on the chromosomes of cells, with each chromosome pair containing two forms of each of the many distinct genes. Each gene controls the production of specific proteins, which in turn determines the traits of the individual. In protein synthesis, the cell uses information from a gene</p>	<p>Learning Activities: Textbook Analysis Use of DNA model "Take a Class Survey" lab "Strawberry DNA Extraction" lab Construct Punnett Squares to explore probability and inheritance Protein Synthesis Simulation lab</p> <p>Assessment Models: Comprehension questions Science Journal writing Tests and Quizzes Group Discussions Laboratory Investigations "Genopet" project</p> <p>Additional Resources: <i>Cool Careers in Stem</i> book series</p> <p>Technology Resources: Bill Nye's "Genetics" DVD "Cracking the Code" DVD www.pbs.org</p>

Suggested days of Instruction	Curriculum Management System	Topic: Inheritance and Variation of Traits	
	<u>Subject/Grade Level:</u> Grade 7 Science	<u>Goal 6:</u> In the Inheritance and Variation of Traits unit students will develop and use models to describe how gene mutations and sexual reproduction contribute to genetic variation. Students will understand how genetic factors determine the growth of an individual organism. They will also demonstrate an understanding of the genetic implications of sexual and asexual reproduction and how gene structure determines differences in the functioning of organisms.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's)	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
	<p>The student will be able to:</p> <p>(MS-ETS1-4)</p>	<p>on a chromosome to produce a specific protein.</p> <p>Changes, called mutations, in genes can result in changes to proteins produced, which can affect the structures and functions of the organism and thereby change the organism's traits. Some changes are beneficial, others harmful, and some neutral to the organism.</p> <p>Variations of inherited traits between parent and offspring arise from genetic differences that result from the combination of genes inherited.</p>	<p>www.newsela.com</p>

Suggested days of Instruction	Curriculum Management System Subject/Grade Level: Grade 7 Science	Topic: Evidence of Common Ancestry	
		Goal 7: In this unit of study, students analyze graphical displays and gather evidence from multitudinous sources in order to develop an understanding of how fossil records and anatomical similarities of the relationships among organisms and species describe biological evolution. Students will have the opportunity to search for patterns in the evidence to support their understanding of the fossil record and how those patterns show relationships between modern organisms and their common ancestors.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
Apr.- May	<p>7.1 Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. (MS-LS4-1)</p> <p>7.2 Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. (MS-LS4-2)</p> <p>7.3 Analyze displays of pictorial data to compare patterns of similarities in the embryological development</p>	<p>Essential Questions: How do scientists infer evolutionary relationships among organisms? How can fossils be used to determine the biological evolution within a species? How do fossils form?</p> <p>Conceptual Understandings: Scientists rely on evidence from DNA, protein structure, fossils, early development, and body structure to determine evolutionary relationships among species.</p> <p>The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record.</p> <p>Most fossils form when organisms that die become buried in sediments.</p> <p>Anatomical similarities and differences among various organisms living today and between organisms in the fossil record enable the reconstruction of evolutionary descent.</p> <p>Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully formed anatomy.</p>	<p>Learning Activities: Textbook Analysis Examine fossil samples “Mold and Casts” Fossil-Making activity “Preservation in Ice” simulation Relative vs. Radioactive Dating techniques “Patterns in Time” activity “Telltale Molecules” lab</p> <p>Assessment Models: Comprehension questions Science Journal writing Tests and Quizzes Group Discussions Laboratory Investigations</p> <p>Additional Resources: <i>Science World</i> magazine</p> <p>Technology Resources: www.pbs.org www.youtube.com www.newsela.com</p>

Suggested days of Instruction	Curriculum Management System Subject/Grade Level: Grade 7 Science	Topic: Evidence of Common Ancestry	
		<u>Goal 7:</u> In this unit of study, students analyze graphical displays and gather evidence from multitudinous sources in order to develop an understanding of how fossil records and anatomical similarities of the relationships among organisms and species describe biological evolution. Students will have the opportunity to search for patterns in the evidence to support their understanding of the fossil record and how those patterns show relationships between modern organisms and their common ancestors.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
	<p>across multiple species to identify relationships not evident in the fully formed anatomy. (MS-LS4-3)</p> <p>7.4 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (MS-ETS1-2)</p> <p>7.5 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. (MS-ETS1-3)</p>		

Suggested days of Instruction	Curriculum Management System <u>Subject/Grade Level:</u> Grade 7 Science	Topic: Evidence of Common Ancestry	
		<u>Goal 7:</u> In this unit of study, students analyze graphical displays and gather evidence from multitudinous sources in order to develop an understanding of how fossil records and anatomical similarities of the relationships among organisms and species describe biological evolution. Students will have the opportunity to search for patterns in the evidence to support their understanding of the fossil record and how those patterns show relationships between modern organisms and their common ancestors.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model

Suggested days of Instruction	Curriculum Management System Subject/Grade Level: Grade 7 Science	Topic: Selection and Adaptation	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's)	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
	The student will be able to:		
May- June	<p>8.1 Construct an explanation on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. (MS-LS4-4)</p> <p>8.2 Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. (MS-LS4-5)</p> <p>8.3 Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations</p>	<p>Essential Questions: Who was Charles Darwin and what were his contributions to the study of evolution? What is natural selection? How do organisms change over time in response to changes in the environment? What is meant by the term "survival of the fittest"?</p> <p>Conceptual Understandings: Natural selection leads to the predominance of certain traits in a population, and the suppression of others. Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes. Individual organisms with certain traits are more likely than others to survive and have offspring in certain environments. Extinction of a species occurs when the environment</p>	<p>Learning Activities: Textbook Analysis "Bird Beak Adaptations" simulation Evolution by Natural Selection activities Charles Darwin game "Lizard Evolution" virtual lab</p> <p>Assessment Models: Comprehension questions Science Journal writing Tests and Quizzes Group Discussions Laboratory Investigations</p> <p>Additional Resources: <i>Science World</i> magazine</p> <p>Technology Resources: www.sciencechannel.com</p>

Suggested days of Instruction	Curriculum Management System Subject/Grade Level: Grade 7 Science	Topic: Selection and Adaptation	
		Goal 8: The Selection and Adaptation Unit is designed to allow students to construct explanations based on evidence to support fundamental understandings of natural selection and evolution. They will use ideas of genetic variation in a population to make sense of how organisms survive and reproduce, thus passing on the traits of the species.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
	<p>over time. (MS-ETS4-6)</p> <p>8.4 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. (MS-ETS1-1)</p> <p>8.5 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (MS-ETS1-2)</p> <p>8.6 Analyze data from tests to determine similarities and differences among several</p>	<p>changes and the characteristics of a species are insufficient to allow survival.</p>	

Suggested days of Instruction	Curriculum Management System <u>Subject/Grade Level:</u> Grade 7 Science	Topic: Selection and Adaptation	
		<u>Goal 8:</u> The Selection and Adaptation Unit is designed to allow students to construct explanations based on evidence to support fundamental understandings of natural selection and evolution. They will use ideas of genetic variation in a population to make sense of how organisms survive and reproduce, thus passing on the traits of the species.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
	design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. (MS-ETS1-3)		