CITY OF BURLINGTON PUBLIC SCHOOL DISTRICT CURRICULUM
Revision Date: 07/06/15
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Science Sixth Grade

An Integrated Approach for
Next Generation Science Standards
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COURSE OVERVIEW

The Next Generation Science Standards (NGSS) provide a consistent, clear understanding of what students are expected to learn, so teachers and parents know what they need to do to help them. The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need for success in college and careers. With American students fully prepared for the future, our communities will be best positioned to compete successfully in the global economy.

The Burlington City Science department has adopted and implemented the Next Generation Science Standards as the cornerstone of the curriculum. Areas of study within the Science department are designed to be rigorous, college-preparatory courses in which students will be exposed to a variety of nonfiction texts, science processing, laboratory skills along with communication and presentation skills.

The NJ Department of Education, in developing a Model Curriculum for middle school and high school science courses, has published the following:

**Mission:** Scientifically literate individuals possess the knowledge and understanding of scientific concepts and processes required for personal decision-making, participation in civic and cultural affairs, and economic productivity.

**Vision:** The science standards are designed to help realize a vision for education in the sciences and engineering in which students, over multiple years of school, actively engage in scientific and engineering practices and apply crosscutting concepts to deepen their understanding of the core ideas in these fields. The learning experiences provided for students should engage them with fundamental questions about the world and with how scientists have investigated and found answers to those questions. Throughout grades K-12, students should have the opportunity to carry out scientific investigations and engineering design projects related to the disciplinary core ideas (pp. 8-9, NRC, 2012).

The curriculum guide has been generated to not only help students achieve the Next Generation Science Standards, but to ensure that students will be prepared for college and career opportunities following high school graduation. It represents opportunities from cross-curricular collaboration and creative thinking skills. The diagram shown below illustrates the thought process to be employed for problem solving in all science classes. This model is an integral component of STEM education.
There are many standards included in this curriculum. The Next Generation Science Standards encourage multi-discipline approach to topics that encompass many standards in mathematics and English language arts. Standards overview for all these areas is provided in this document. As the curriculum is implemented, many of the activities and resources will be reviewed and revised as more information becomes available.

Activities in science classes may include, but not be limited to the following:

- Journal writing, science notebook, lab experiments, independent research, supplemental reading, projects, technology applications, assessments, performance tasks, presentations, and group activities.
Primary Resource(s)

Next Generation Science Standards http://www.nextgenscience.org/search-standards-dci
New Jersey Center for Teaching and Learning https://www.njctl.org/courses/science/
American Society for Engineering Education http://www.egfi-k12.org/about/
State of New Jersey Department of Education http://www.state.nj.us/education/aps/cccs/science/mc.htm
ReadWorks.org http://www.readworks.org/welcome-readworks
Project 2061 Atlas of Science Literacy, Volumes 1 and 2

Textbook Resource
Title: Science Explorer
Publisher: Prentice Hall
Copyright: 2002
Series Title If Applicable: Life Science, Earth Science and Physical Science

Supplemental/Other
Hurricanes by Seymour Simon
The Universe by Seymour Simon
Destination Space by Seymour Simon
Countdown to Space: Guion Bluford, A Space Biography by Laura S Jeffrey
The World at His Fingertips a Story about Louis Braille by Barbra O'Connor
Inside the Human Body by Joanne Cole & Bruce Decen
Exploring the Senses by Joanne Cole & Bruce Decen
Next Generation Science Standards Overview

MS-PS4 Waves and their Applications in Technologies for Information Transfer

Students who demonstrate understanding can:

MS-PS4-1. Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. [Clarification Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.] [Assessment Boundary: Assessment does not include electromagnetic waves and is limited to standard repeating waves.]

MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. [Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.] [Assessment Boundary: Assessment is limited to qualitative applications pertaining to light and mechanical waves.]

MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals. [Clarification Statement: Emphasis is on a basic understanding that waves can be used for communication purposes. Examples could include using fiber optic cable to transmit light pulses, radio wave pulses in wifi devices, and conversion of stored binary patterns to make sound or text on a computer screen.] [Assessment Boundary: Assessment does not include binary counting. Assessment does not include the specific mechanism of any given device.]

MS-ESS1 Earth's Place in the Universe

Students who demonstrate understanding can:

MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. [Clarification Statement: Examples of models can be physical, graphical, or conceptual.]

MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. [Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical (such as the analogy of distance along a football field or computer visualizations of elliptical orbits) or conceptual (such as mathematical proportions relative to the size of familiar objects such as students' school or state).] [Assessment Boundary: Assessment does not include Kepler's Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth.]

MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system. [Clarification Statement: Emphasis is on the analysis of data from Earth-based instruments, space-based telescopes, and spacecraft to determine similarities and differences among solar system objects. Examples of scale properties include the sizes of an object's layers (such as crust and atmosphere), surface features (such as volcanoes), and orbital radius. Examples of data include statistical information, drawings and photographs, and models.] [Assessment Boundary: Assessment does not include recalling facts about properties of the planets and other solar system bodies.]

MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. [Clarification Statement: Emphasis is on how analyses of rock formations and the fossils they contain are used to establish relative ages of major events in Earth's history. Examples of Earth's major events could range from being very recent (such as the last Ice Age or the earliest fossils of homo sapiens) to very old (such as the formation of Earth or the earliest evidence of life). Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.] [Assessment Boundary: Assessment does not include recalling the names of specific periods or epochs and events within them.]
MS-ESS2 Earth’s Systems

Students who demonstrate understanding can:

MS-ESS2-1. Develop a model to describe the cycling of Earth’s materials and the flow of energy that drives this process. [Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth’s materials.] [Assessment Boundary: Assessment does not include the identification and naming of minerals.]

MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales. [Clarification Statement: Emphasis is on how processes change Earth’s surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.]

MS-ESS2-3. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. [Clarification Statement: Examples of data include similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches).] [Assessment Boundary: Paleomagnetic anomalies in oceanic and continental crust are not assessed.]

MS-ESS2-4. Develop a model to describe the cycling of water through Earth’s systems driven by energy from the sun and the force of gravity. [Clarification Statement: Emphasis is on how water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.] [Assessment Boundary: A quantitative understanding of the latent heats of vaporization and fusion is not assessed.]

MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. [Clarification Statement: Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather (defined by temperature, pressure, humidity, precipitation, and wind) at a fixed location to change over time, and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within probabilistic ranges. Examples of data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through laboratory experiments (such as with condensation).] [Assessment Boundary: Assessment does not include recalling the names of cloud types or weather symbols used on weather maps or the reported diagrams from weather stations.]

MS-ESS2-6. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. [Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.] [Assessment Boundary: Assessment does not include the dynamics of the Coriolis effect.]

MS-ESS3 Earth and Human Activity

Students who demonstrate understanding can:

MS-ESS3-1. Construct a scientific explanation based on evidence for how the uneven distributions of Earth’s mineral, energy, and groundwater resources are the result of past and current geoscience processes. [Clarification Statement: Emphasis is on how these resources are limited and typically non-renewable, and how their distributions are significantly changing as a result of removal by humans. Examples of uneven distributions of resources as a result of past processes include but are not limited to petroleum (locations of the burial of organic marine sediments and subsequent geologic traps), metal ores (locations of past volcanic and hydrothermal activity associated with subduction zones), and soil (locations of active weathering and/or deposition of rock).]
MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. [Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards can be taken from interior processes (such as earthquakes and volcanic eruptions), surface processes (such as mass wasting and tsunamis), or severe weather events (such as hurricanes, tornadoes, and floods). Examples of data can include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies can be global (such as satellite systems to monitor hurricanes or forest fires) or local (such as building basements in tornado-prone regions or reservoirs to mitigate droughts).]

MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.* [Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).]

MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth’s systems. [Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth’s systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.]

MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. [Clarification Statement: Examples of factors include human activities (such as fossil fuel combustion, cement production, and agricultural activity) and natural processes (such as changes in incoming solar radiation or volcanic activity). Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane, and the rates of human activities. Emphasis is on the major role that human activities play in causing the rise in global temperatures.]

MS-LS1 From Molecules to Organisms: Structures and Processes

Students who demonstrate understanding can:

MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. [Clarification Statement: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living things, and understanding that living things may be made of one cell or many and varied cells.]

MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. [Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.][Assessment Boundary: Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical function of cells or cell parts.]

MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. [Clarification Statement: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.][Assessment Boundary: Assessment does not include the mechanism of one body system independent of others. Assessment is limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.]

MS-LS1-4. 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. [Clarification Statement: Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds, and creating conditions for seed germination and growth. Examples of plant structures could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.]
MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. [Clarification Statement: Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include large breed cattle and species of grass affecting growth of organisms. Examples of evidence could include drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds.] [Assessment Boundary: Assessment does not include genetic mechanisms, gene regulation, or biochemical processes.]

MS-LS1-6. 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. [Clarification Statement: Emphasis is on tracing movement of matter and flow of energy.] [Assessment Boundary: Assessment does not include the biochemical mechanisms of photosynthesis.]

MS-LS1-7. 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. [Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.] [Assessment Boundary: Assessment does not include details of the chemical reactions for photosynthesis or respiration.]

MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. [Assessment Boundary: Assessment does not include mechanisms for the transmission of this information.]

MS-LS3 Heredity: Inheritance and Variation of Traits

Students who demonstrate understanding can:

MS-LS3-1. 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. [Clarification Statement: Emphasis is on conceptual understanding that changes in genetic material may result in making different proteins.] [Assessment Boundary: Assessment does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.]

MS-LS3-2. 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. [Clarification Statement: Emphasis is on using models such as Punnett squares, diagrams, and simulations to describe the cause and effect relationship of gene transmission from parent(s) to offspring and resulting genetic variation.]

MS-LS4 Biological Evolution: Unity and Diversity

Students who demonstrate understanding can:

MS-LS4-1. 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. [Clarification Statement: Emphasis is on finding patterns of changes in the level of complexity of anatomical structures in organisms and the chronological order of fossil appearance in the rock layers.] [Assessment Boundary: Assessment does not include the names of individual species or geological eras in the fossil record.]

MS-LS4-2. 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. [Clarification Statement: Emphasis is on explanations of the evolutionary relationships among organisms in terms of similarity or differences of the gross appearance of anatomical structures.]

MS-LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. [Clarification Statement: Emphasis is on inferring general patterns of relatedness among embryos of different organisms by comparing the macroscopic appearance of diagrams or pictures.] [Assessment Boundary: Assessment of comparisons is limited to gross appearance of anatomical structures in embryological development.]
MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals’ probability of surviving and reproducing in a specific environment. [Clarification Statement: Emphasis is on using simple probability statements and proportional reasoning to construct explanations.]

MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. [Clarification Statement: Emphasis is on synthesizing information from reliable sources about the influence of humans on genetic outcomes in artificial selection (such as genetic modification, animal husbandry, gene therapy); and, on the impacts these technologies have on society as well as the technologies leading to these scientific discoveries.]

MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. [Clarification Statement: Emphasis is on using mathematical models, probability statements, and proportional reasoning to support explanations of trends in changes to populations over time.] [Assessment Boundary: Assessment does not include Hardy Weinberg calculations.]

Common Core Mathematics Standards and Practices for Sixth Grade Overview

Grade 6 Overview

Ratios and Proportional Relationships 6.RPA.1;2;3

- Understand ratio concepts and use ratio reasoning to solve problems.

The Number System
6.NS.A.1; 2; 3; 4; 5; 6; 7; 8

- Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
- Multiply and divide multi-digit numbers and find common factors and multiples.
- Apply and extend previous understandings of numbers to the system of rational numbers.

Expressions and Equations
6.EE.A.1; 2; 3; 4
6.EE.B.5; 6; 7; 8; 9

- Apply and extend previous understandings of arithmetic to algebraic expressions.
- Reason about and solve one-variable equations and inequalities.
- Represent and analyze quantitative relationships between dependent and independent variables.

Geometry
6.G.A.1; 2; 3; 4

- Solve real-world and mathematical problems involving area, surface area, and volume.
Statistics and Probability
6.SP.A.1; 2; 3;
6.SP.B.4; 5

- Develop understanding of statistical variability.
- Summarize and describe distributions.

Mathematical Practices
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Common Core Standards for English Language Arts for Sixth Grade

Key Ideas and Details:
CCSS.ELA-Literacy.RL.6.1
Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
CCSS.ELA-Literacy.RL.6.2
Determine a theme or central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.
CCSS.ELA-Literacy.RL.6.3
Describe how a particular story's or drama's plot unfolds in a series of episodes as well as how the characters respond or change as the plot moves toward a resolution.

Craft and Structure:
CCSS.ELA-Literacy.RL.6.4
Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of a specific word choice on meaning and tone
CCSS.ELA-Literacy.RL.6.5
Analyze how a particular sentence, chapter, scene, or stanza fits into the overall structure of a text and contributes to the development of the theme, setting, or plot.
CCSS.ELA-Literacy.RL.6.6
Explain how an author develops the point of view of the narrator or speaker in a text.
Integration of Knowledge and Ideas:

CCSS.ELA-Literacy.RL.6.7
Compare and contrast the experience of reading a story, drama, or poem to listening to or viewing an audio, video, or live version of the text, including contrasting what they "see" and "hear" when reading the text to what they perceive when they listen or watch.

CCSS.ELA-Literacy.RL.6.8
(RL.6.8 not applicable to literature)

CCSS.ELA-Literacy.RL.6.9
Compare and contrast texts in different forms or genres (e.g., stories and poems; historical novels and fantasy stories) in terms of their approaches to similar themes and topics.

Range of Reading and Level of Text Complexity:

CCSS.ELA-Literacy.RL.6.10
By the end of the year, read and comprehend literature, including stories, dramas, and poems, in the grades 6-8 text complexity band proficiently, with scaffolding as needed at the high end of the range.

Key Ideas and Details:

CCSS.ELA-Literacy.RI.6.1
Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

CCSS.ELA-Literacy.RI.6.2
Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.

CCSS.ELA-Literacy.RI.6.3
Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).

Craft and Structure:

CCSS.ELA-Literacy.RI.6.4
Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.

CCSS.ELA-Literacy.RI.6.5
Analyze how a particular sentence, paragraph, chapter, or section fits into the overall structure of a text and contributes to the development of the ideas.

CCSS.ELA-Literacy.RI.6.6
Determine an author's point of view or purpose in a text and explain how it is conveyed in the text.

Integration of Knowledge and Ideas:

CCSS.ELA-Literacy.RI.6.7
Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

CCSS.ELA-Literacy.RI.6.8
Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.

CCSS.ELA-Literacy.RI.6.9
Compare and contrast one author's presentation of events with that of another (e.g., a memoir written by and a biography on the same person).
Range of Reading and Level of Text Complexity:

**CCSS.ELA-Literacy.RI.6.10**
By the end of the year, read and comprehend literary nonfiction in the grades 6-8 text complexity band proficiently, with scaffolding as needed at the high end of the range.

Text Types and Purposes:

**CCSS.ELA-Literacy.W.6.1**
Write arguments to support claims with clear reasons and relevant evidence.

**CCSS.ELA-Literacy.W.6.1.a**
Introduce claim(s) and organize the reasons and evidence clearly.

**CCSS.ELA-Literacy.W.6.1.b**
Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.

**CCSS.ELA-Literacy.W.6.1.c**
Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.

**CCSS.ELA-Literacy.W.6.1.d**
Establish and maintain a formal style.

**CCSS.ELA-Literacy.W.6.1.e**
Provide a concluding statement or section that follows from the argument presented.

**CCSS.ELA-Literacy.W.6.2**
Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

**CCSS.ELA-Literacy.W.6.2.a**
Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.

**CCSS.ELA-Literacy.W.6.2.b**
Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.

**CCSS.ELA-Literacy.W.6.2.c**
Use appropriate transitions to clarify the relationships among ideas and concepts.

**CCSS.ELA-Literacy.W.6.2.d**
Use precise language and domain-specific vocabulary to inform about or explain the topic.

**CCSS.ELA-Literacy.W.6.2.e**
Establish and maintain a formal style.

**CCSS.ELA-Literacy.W.6.2.f**
Provide a concluding statement or section that follows from the information or explanation presented.

**CCSS.ELA-Literacy.W.6.3**
Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

**CCSS.ELA-Literacy.W.6.3.a**
Engage and orient the reader by establishing a context and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically.

**CCSS.ELA-Literacy.W.6.3.b**
Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters.
CCSS.ELA-Literacy.W.6.3.c
Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another.

CCSS.ELA-Literacy.W.6.3.d
Use precise words and phrases, relevant descriptive details, and sensory language to convey experiences and events.

CCSS.ELA-Literacy.W.6.3.e
Provide a conclusion that follows from the narrated experiences or events.

Production and Distribution of Writing:

CCSS.ELA-Literacy.W.6.4
Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1-3 above.)

CCSS.ELA-Literacy.W.6.5
With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (Editing for conventions should demonstrate command of Language standards 1-3 up to and including grade 6 here.)

CCSS.ELA-Literacy.W.6.6
Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.

Research to Build and Present Knowledge:

CCSS.ELA-Literacy.W.6.7
Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.

CCSS.ELA-Literacy.W.6.8
Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.

CCSS.ELA-Literacy.W.6.9
Draw evidence from literary or informational texts to support analysis, reflection, and research.

CCSS.ELA-Literacy.W.6.9.a
Apply grade 6 Reading standards to literature (e.g., "Compare and contrast texts in different forms or genres [e.g., stories and poems; historical novels and fantasy stories] in terms of their approaches to similar themes and topics").

CCSS.ELA-Literacy.W.6.9.b
Apply grade 6 Reading standards to literary nonfiction (e.g., "Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not").

Range of Writing:

CCSS.ELA-Literacy.W.6.10
Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
Comprehension and Collaboration:

**CCSS.ELA-Literacy.SL.6.1**
Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others’ ideas and expressing their own clearly.

**CCSS.ELA-Literacy.SL.6.1.a**
Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

**CCSS.ELA-Literacy.SL.6.1.b**
Follow rules for collegiate discussions, set specific goals and deadlines, and define individual roles as needed.

**CCSS.ELA-Literacy.SL.6.1.c**
Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.

**CCSS.ELA-Literacy.SL.6.1.d**
Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.

**CCSS.ELA-Literacy.SL.6.2**
Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.

**CCSS.ELA-Literacy.SL.6.3**
Delineate a speaker’s argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not.

Presentation of Knowledge and Ideas:

**CCSS.ELA-Literacy.SL.6.4**
Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.

**CCSS.ELA-Literacy.SL.6.5**
Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.

**CCSS.ELA-Literacy.SL.6.6**
Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 6 Language standards 1 and 3 for specific expectations.)

Conventions of Standard English:

**CCSS.ELA-Literacy.L.6.1**
Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

**CCSS.ELA-Literacy.L.6.1.a**
Ensure that pronouns are in the proper case (subjective, objective, possessive).

**CCSS.ELA-Literacy.L.6.1.b**
Use intensive pronouns (e.g., myself, ourselves).

**CCSS.ELA-Literacy.L.6.1.c**
Recognize and correct inappropriate shifts in pronoun number and person.*
CCSS.ELA-Literacy.L.6.1.d
Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).*

CCSS.ELA-Literacy.L.6.1.e
Recognize variations from standard English in their own and others’ writing and speaking, and identify and use strategies to improve expression in conventional language.*

CCSS.ELA-Literacy.L.6.2
Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

CCSS.ELA-Literacy.L.6.2.a
Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.*

CCSS.ELA-Literacy.L.6.2.b
Spell correctly.

Knowledge of Language:

CCSS.ELA-Literacy.L.6.3
Use knowledge of language and its conventions when writing, speaking, reading, or listening.

CCSS.ELA-Literacy.L.6.3.a
Vary sentence patterns for meaning, reader/listener interest, and style.*

CCSS.ELA-Literacy.L.6.3.b
Maintain consistency in style and tone.*

Vocabulary Acquisition and Use:

CCSS.ELA-Literacy.L.6.4
Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 6 reading and content, choosing flexibly from a range of strategies.

CCSS.ELA-Literacy.L.6.4.a
Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

CCSS.ELA-Literacy.L.6.4.b
Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., audience, auditory, audible).

CCSS.ELA-Literacy.L.6.4.c
Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

CCSS.ELA-Literacy.L.6.4.d
Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).

CCSS.ELA-Literacy.L.6.5
Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

CCSS.ELA-Literacy.L.6.5.a
Interpret figures of speech (e.g., personification) in context.

CCSS.ELA-Literacy.L.6.5.b
Use the relationship between particular words (e.g., cause/effect, part/whole, item/category) to better understand each of the words.

CCSS.ELA-Literacy.L.6.5.c
Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., stingy, scrimping, economical, unwasteful, thrifty).
CCSS.ELA-Literacy.L.6.6
Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Scope and Sequence

<table>
<thead>
<tr>
<th>Unit Description</th>
<th>Next Generation Science Standard(s)</th>
<th>Suggested Timeline</th>
<th>Pacing (must equal 165 days for full-year or 83 days for half-year course)</th>
<th>Benchmarking</th>
<th>Suggested Interdisciplinary Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit 1: Waves and Electromagnetic Radiation</strong></td>
<td>MS-PS4-1</td>
<td>30 Days</td>
<td>September - October</td>
<td>Baseline SGO</td>
<td>Career Education</td>
</tr>
<tr>
<td>What are the characteristic properties of waves and how can they be used?</td>
<td>MS-PS4-2</td>
<td></td>
<td></td>
<td>Benchmarking in September</td>
<td>- Research current career trends in science and generate a list of skills needed for a career path in the sciences.</td>
</tr>
<tr>
<td>Students are able to describe and predict characteristic properties and behaviors of waves when the waves interact with matter. Students can apply an understanding of waves as a means to send digital information. The crosscutting concepts of patterns and structure and function are used as organizing concepts for these disciplinary core ideas. These performance expectations focus on students demonstrating proficiency in developing and using models, using mathematical thinking, and obtaining, evaluating and communicating information; and to use these practices to demonstrate understanding of the core ideas. Essential Questions</td>
<td>Performance Assessment in September</td>
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<td></td>
<td>MS-PS4-3</td>
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<td></td>
<td>Unit quizzes &amp; tests</td>
<td>Health/PE</td>
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<td></td>
<td>SL.8.5</td>
<td></td>
<td></td>
<td>Lab reports</td>
<td>- Create movement with the body to demonstrate the properties of waves.</td>
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<td></td>
<td>MP 2</td>
<td></td>
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<td>Performance tasks</td>
<td>English Language Arts &amp; Literacy</td>
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<tr>
<td></td>
<td>MP 4</td>
<td></td>
<td></td>
<td>Notebook</td>
<td>- Use informational text to support authors’ claims in science regarding waves, including graphic organizers to compare the different kinds of waves</td>
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<tr>
<td></td>
<td>6.RP.A.1</td>
<td></td>
<td></td>
<td>Science journal</td>
<td>Math</td>
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<td></td>
<td>6.RP.A.3</td>
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<td>- Use proportional reasoning to compare the frequency length of various electromagnetic waves</td>
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<td>7.RP.A.2</td>
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<td>8.F.A.3</td>
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4. What are the different types of electromagnetic radiation?
5. What are the different types of reflection?
6. How does the absorption of light result in the different colors that we see?
7. How do objects refract through different mediums?

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<tr>
<th>Unit 2: Weather and Climate</th>
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<tbody>
<tr>
<td><strong>What factors interact and influence weather and climate?</strong></td>
<td>MS-ESS2-5</td>
<td>35 Days</td>
<td>November- December</td>
</tr>
<tr>
<td>Students construct and use models to develop understanding of the factors that control weather and climate. They take a systems approach to examining the feedbacks between systems as energy from the sun is transferred between systems and circulates through the ocean and atmosphere. The crosscutting concepts of cause and effect, systems and system models, and stability and change are called out as organizing concepts for these disciplinary core ideas.</td>
<td>MS-ESS2-6</td>
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<tr>
<td><strong>Essential Questions</strong></td>
<td>WHST.6-8.8</td>
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<tr>
<td>1. What factors affect weather and climate?</td>
<td>MP2</td>
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<td>SL.8.5</td>
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<td>6.EE.B.4</td>
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<th>-Research inventions of the flute.</th>
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<td>Technical Subjects</td>
<td>Develop word processing skills when writing a report, including</td>
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<td>World Languages/Culture</td>
<td>- The international radiation symbol (also known as trefoil) first appeared in 1946, at the University of California, Berkeley Radiation Laboratory. Why does this graphic symbolize radiation?</td>
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<th>-Discuss the effects of frost bite and hypothermia on the body.</th>
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<td>English Language Arts &amp; Literacy</td>
<td>-Compare the weather prediction of the Farmer's Almanac with weather prediction made by NOAA.</td>
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<td>Math</td>
<td>-Collect and graph data</td>
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</table>

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<thead>
<tr>
<th>Career Education</th>
<th>-Skype with a local meteorologist from the NOAA station in Mt. Holly, New Jersey.</th>
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</table>
related to precipitation is different regions of the country and/or world

**History/Social Studies**
- Identify the weather and climate factors that impaired the Ernest Shackleton expedition to the South Pole in 1914.

**Technical Subjects**
- Use Microsoft excel to create a weather data table.

**World Languages/Culture**
- Weather symbols are used on weather maps as shorthand for the conditions at weather observing stations and can be read by any meteorologist. It is a science “language.” Make a poster of weather symbols and create an original symbol to indicate a weather condition (i.e. great picnic day, glove weather, etc.)

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**Unit 3: Space Systems**

**What makes up our solar system and how can the motion of Earth explain seasons and eclipses?**

Students examine the Earth’s place in relation to the solar system, Milky Way galaxy, and universe. There is a strong emphasis on a systems approach, using models of the solar system to explain astronomical and other observations of the cyclic patterns of eclipses, tides, and seasons. There is also a strong connection to engineering through the instruments and technologies that have allowed us to explore the objects in our solar system and obtain the data that support the theories that explain the formation and evolution of the universe.

<table>
<thead>
<tr>
<th>Standards</th>
<th>Timeframe</th>
<th>Assessments</th>
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<tbody>
<tr>
<td>MS-ESS1-1</td>
<td>40 Days</td>
<td>January – February</td>
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<td>MS-ESS1-3</td>
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<td>Mid-year assessment</td>
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<td>MS-ESS1-2</td>
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<td>Unit quizzes &amp; tests</td>
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<td>SL.8.5</td>
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<td>Lab reports</td>
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<td>MP4</td>
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<td>Notebook</td>
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<tr>
<td>7.RP.A.2</td>
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<td>Science journal</td>
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</table>

**Career Education**
- Research current career trends in science and generate a list of skills needed for a career path in the sciences.

**Health/PE**
- Identify behaviors that put the human body at risk of illness and disease.

**English Language Arts & Literacy**
- Write a Letter to the Editor debating congressional budget cuts to the NASA space
The crosscutting concepts of patterns; scale, proportion, and quantity; systems and system models; and interdependence of science, engineering, and technology are called out as organizing concepts for these disciplinary core ideas.

Essential Questions

1. How did our universe form?
2. What holds our galaxy and solar system together?
3. What determined the brightness of a star, and what are the properties of our Sun?
4. What different types of objects can be found in our solar system?
5. Why do the objects in our solar system follow a curved path around our Sun?
6. What effects do the Moon and Sun have on us here on Earth?

Unit 4: Structure, Function, and Information Processing

How do the structures of organisms contribute to life’s functions?
Students plan and carry out investigations to develop evidence that living organisms are made of cells and to determine the relationship of organisms to the environment. Students use their understanding of cell theory to develop physical and conceptual models of cells. They construct explanations for the interactions of systems in cells and organisms and how organisms gather and use information from the environment.

Students understand that all organisms are made of cells, that special structures are responsible for particular functions in organisms, and that for many organisms the body is a system of multiple interacting

Math
- Use ratios to describe the relationship between two quantities when comparing celestial bodies, their mass or distance from the sun.

History/Social Studies
- Research the Greek and Roman gods associated with major constellation of the northern hemisphere.

Technical Subjects
- Use Prezi software to explain the distance between planets.

World Languages/Culture
- Relate how the planet and moon names were derived from Roman gods

Further resources or activities:

MS-LS1-1
MS-LS1-2
MS-LS1-3
MS-LS1-8
WHST.6-8.7
6.EE.C.9

30 days
March – April

SGO assessment
Unit quizzes & tests
Lab reports
Performance tasks
Notebook
Science journal

Career Education
- Research current career trends in genetically modified foods.

Health/PE
- Review the USDA Food Pyramid Guide.

English Language Arts & Literacy
- Compare how sense receptors transmit signals along nerve cells to the brain to how information is communicated from one source to another, such as from person to person; create
subsystems that form a hierarchy from cells to the body. Crosscutting concepts of cause and effect, structure and function, and matter and energy are called out as organizing concepts for these core ideas.

**Essential Questions**

1. What are the characteristics all living things share?
2. Why do scientists use controlled experiments to disprove the idea of spontaneous generation?
3. What do all living things need to survive?
4. What is the cell wall, cell membrane, and nucleus function?
5. What are organelles in the cell and describe their functions?
6. How do specialized cells function in many-celled organisms?
7. How are the levels of organization in the body established?
8. Why is homeostasis important to the body?
9. How do the senses function?

<table>
<thead>
<tr>
<th>Unit 5: Growth, Development, and Reproduction of Organisms</th>
<th>30 days</th>
<th>May - June</th>
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</thead>
<tbody>
<tr>
<td>How do organisms grow, develop, and reproduce? Students understand how the environment and genetic factors determine the growth of an individual organism. They also demonstrate understanding of the genetic implications for sexual and asexual reproduction. Students develop evidence to support their understanding of the structures and behaviors that increase the likelihood of successful reproduction by organisms. They have a beginning understanding of the ways humans can select for specific traits, the role of technology, genetic modification, and the nature of ethical responsibilities related to selective breeding. At</td>
<td>MS-LS1-4</td>
<td>Course summative assessment</td>
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<td>MS-LS1-5</td>
<td>Unit quizzes &amp; tests</td>
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<td>MS-LS3-1</td>
<td>Lab reports</td>
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<td>MS-LS3-2</td>
<td>Performance tasks</td>
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<td>MS-LS4-5</td>
<td>Notebook</td>
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<td>RST.6-8.1</td>
<td>Science journal</td>
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<td>RI.6.8</td>
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<td>WHST.6-8.1</td>
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<td>RST.6-8.1</td>
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<td>RST.6-8.4</td>
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<td>RST.6-8.7</td>
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<td>SL.8-5</td>
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</table>

Math - The diameter of a microscope’s field of view is estimated to be 0.9 mm. About how wide is an object that fills two thirds of the field?

History/Social Studies - Create a timeline of the development of microscopes.


World Languages/Culture - The word cell comes from the Latin word *cellula*, which means small compartment. Why is this an accurate description of a cell?

Career Education - Research the job requirement of a Crime Scene Investigator.

Health/PE - Identify behaviors that put the human body at risk of illness and disease.

English Language Arts & Literacy - Write a summary explaining the Citizens with Disabilities Act.

Math - Collect and evaluate data
the end of the unit, students can explain how selected structures, functions, and behaviors of organisms change in predictable ways as they progress from birth to old age.

**Essential Questions**

1. How do organisms reproduce?
2. What is the difference between sexual and asexual reproduction?
3. How can an organism’s behavior increase its chance of survival and reproduction?
4. What structures or mechanisms aid in plant reproduction?
5. How does the environment contribute to successful reproduction or growth?
6. How do genetic factors influence the growth of organisms?
7. How do natural differences in organisms increase survival and reproduction?

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<table>
<thead>
<tr>
<th>NGSS</th>
<th>Standard Performance Expectation</th>
<th>Student Learning Objectives (SLO)</th>
<th>References/Resources</th>
<th>Suggested Instructional Activities</th>
<th>Suggested Student Output</th>
<th>Assessments: Portfolios, Evaluations, &amp; Rubrics</th>
<th>Multimedia Integration</th>
<th>Accommodation of Special Needs Students (SE, ELL, 504, G&amp;T)</th>
</tr>
</thead>
</table>
| MS-PS4-1 | Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the | **Define waves and identify what causes them.**
**Identify and compare the three main types of waves.** | Science Explorer Physical Science TB
Science Explorer Physical Science Unit 4 Resources
Sound and Light | *What Are Waves? Section 15-1 Review and Reinforce pgs. 10-11* | Students will complete the Over and Over Again chapter project on pg. 471. Students will complete project | Project Rubric Assessment
Test
Lab Reflection Sheet | Video: [https://www.brainpop.com/science/energy/waves/](https://www.brainpop.com/science/energy/waves/)
*Leveled Reading* |

---

during the experiment process in order to create a graph in order to chart growth of an organism. Analyze factors that contribute to or hinder growth

**History/Social Studies**

- Discuss the changing attitudes of institutionalization of people with Down Syndrome over the past 100 years.

**Technical Subjects**

- Use software publishing tools to create diagrams of complex and microscopic structures and systems

**World Languages/Culture**

- Several companies now claim that for as little as $100 and a swab of the inner cheek, they can reveal a person's family tree and ancestral homeland. Research how accurate this process may or may not be.

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**Unit One: Waves & Electromagnetic Radiation**

- Define waves and identify what causes them.
- Identify and compare the three main types of waves.
- Over and Over Again chapter project on pg. 471. Students will complete project.
## Unit One: Waves & Electromagnetic Radiation

<table>
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<tbody>
<tr>
<td></td>
<td>energy in a wave.</td>
<td>List and describe the basic properties of waves.</td>
<td></td>
<td><em>Moon Waves</em> Section 15-2 Enrich pg. 16</td>
<td>worksheets 1 &amp; 2 pgs. 4-8</td>
<td>Science Notebook Entries</td>
<td>astic.com/studyjams/jams/science/energy-light-sound/light.htm</td>
<td>Passages *Modifications as outlined in student’s 504 and/or IEP *Student choice in enrichment activities</td>
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<tr>
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<td>Create a model that illustrates wave pulses.</td>
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<td>Online Review:</td>
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<td>Video: <a href="https://www.brainpop.com/science/energy/sound/">https://www.brainpop.com/science/energy/sound/</a></td>
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<td></td>
<td>MS-PS4-2</td>
<td>Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials</td>
<td></td>
<td>Science Explorer Physical Science TB</td>
<td>Students will construct a museum display of handmade musical instruments of various sounds and tones. Students will create a museum brochure of the installation.</td>
<td>Project Rubric Assessment</td>
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<td></td>
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<td>Define sound and explain how it travels.</td>
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<td>Science Explorer Physical Science Unit 4 Resources Sound and Light</td>
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<td>Brochure Test</td>
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<td></td>
<td></td>
<td>Categorize the various factors that affect the speed of sound.</td>
<td></td>
<td><em>Sharpen Your Skills Graphing Sound</em> pg. 501</td>
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<td>Lab Reflection Sheet</td>
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<td></td>
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<td>Describe what happens when an object moves faster than the speed of sound.</td>
<td></td>
<td><em>Measuring the Speed of Sound</em> Skills Lab pg. 503</td>
<td></td>
<td>Science Notebook Entries</td>
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<tr>
<td></td>
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<td>Compare how intensity and loudness are related.</td>
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<td><em>The Short Straw</em> Try This Activity pg. 506.</td>
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<td></td>
<td>Make connections about the relationship</td>
<td></td>
<td><em>Frequency &amp; Pitch</em> Try This Activity pg.</td>
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**Science Notebook Entries**

**Science Journal**

**Science Explorer Physical Science TB**

**Science Explorer Physical Science Unit 4 Resources Sound and Light**

**Sharpen Your Skills Graphing Sound** pg. 501

**Measuring the Speed of Sound** Skills Lab pg. 503

**The Short Straw** Try This Activity pg. 506.

**Frequency & Pitch** Try This Activity pg.

**Science Notebook Entries**

**Project Rubric Assessment**

**Brochure Test**

**Lab Reflection Sheet**

**Science Notebook Entries**

**Science Explorer Physical Science TB**

**Science Explorer Physical Science Unit 4 Resources Sound and Light**

**Sharpen Your Skills Graphing Sound** pg. 501

**Measuring the Speed of Sound** Skills Lab pg. 503

**The Short Straw** Try This Activity pg. 506.

**Frequency & Pitch** Try This Activity pg.
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<tr>
<td>MS-PS4-3</td>
<td>Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.</td>
<td>between frequency and pitch. <strong>Describe</strong> the apparent change in frequency observed in the Doppler effect. <strong>Explain</strong> how sonar and bats use reflection of sound waves to locate objects. <strong>Make a model</strong> of how ultrasound works and <strong>investigate</strong> examples of its application.</td>
<td>508. <em>Organizing Information</em> Concept Map pg. 529. <a href="http://www.webmd.com/dvt/doppler-ultrasound">http://www.webmd.com/dvt/doppler-ultrasound</a> Read the following article and write a summary.</td>
<td><a href="http://www.virginiasonline.com/test/light.htm">http://www.virginiasonline.com/test/light.htm</a></td>
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**Unit Two: Weather & Climate**

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| **MS-ESS2-6** | Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. | Identify the factors that influence temperature precipitation.  
 Explain what causes the seasons.  
 Identify factors used to define climates.  
 Describe the different types of climate regions. | Science Explorer Earth Science TB  
 Science Explorer Earth Science Unit 5 Resources Weather & Climate | *Climate Regions*  
 Section 18-2 Review and Reinforce pgs. 102-103.  
 *Factors That Affect Climate Regions*  
 Section 18-2 Enrich pg. 104 | Students will design and construct a micro-climate using 2 liter soda bottle.  
 Students will collect and record data for four weeks.  
 Students will present a power-point discussing the success and failures of the micro-climate bottle. | Micro-climate bottle data collection rubric and presentation rubric.  
 Test  
 Lab Reflection Sheet  
 Science Notebook Entries |                                |                                                                                                      |
| **MS-ESS3-5** | Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. | Identify how scientists can learn about ancient climates.  
 Describe how Earth’s Surface changes during an ice age.  
 Analyze and synthesize the theories that have been proposed to explain natural climate change.  
 Describe the greenhouse effect and formulate theories how human activities may be affecting the temperature of Earth’s atmosphere and the ozone layer. | Science Explorer Earth Science TB  
 Science Explorer Earth Science Unit 5 Resources Weather & Climate | *Long-Term Change in Climate*  
 Section 18-3 Review and Reinforce pgs. 106-107.  
 *The Bering Land Bridge*  
 Section 18-3 Enrich pg. 108.  
 *Global Changes in the Atmosphere*  
 Section 18-4 Review and Reinforce pgs. 110-110. | Students will complete the Cool Climate Graphs Real-World Lab Careers in Science pgs. 116-117 | Performance Assessment Rubric  
 Test  
 Lab Reflection Sheet  
 Science Notebook Entries |                                |                                                                                                      |
### Unit Two: Weather & Climate

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<td></td>
<td>Describe how human activities have affected the ozone layer.</td>
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### Unit Three: Space Systems

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<tr>
<td>MS-ESS1-1</td>
<td>Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons</td>
<td>Identify the effects of Earth’s rotation and revolution. Explain the causes of the seasons on Earth. Describe the cause of the moon’s phases. Create a model what causes solar and lunar eclipses. Identify the causes of the tides.</td>
<td>Science Explorer Earth Science TB Science Explorer Earth Science Unit 6 Resources Astronomy</td>
<td><em>Reasons for the Seasons</em> Skills lab – pgs. 644-645 <em>A Month of Phases</em> Skills lab – pgs. 652-653</td>
<td>Students will make daily observations of the moon and will keep track of the moon’s appearance and position in the sky. After collecting this information, students will analyze the data and look for patterns.</td>
<td>Project Rubric Assessment Test Lab Reflection Sheet Science Notebook Entries -----</td>
<td></td>
<td>Video: <a href="http://wn.com/moon_cycle">http://wn.com/moon_cycle</a> Whiteboard: <a href="http://exchange.smarttech.com/details.htm?id=ba4cad70-3b68-4200-93a8-9ae2d34dabca">http://exchange.smarttech.com/details.htm?id=ba4cad70-3b68-4200-93a8-9ae2d34dabca</a> Online Review: <a href="http://reviewgamezone.com/preview.php?id=12856">http://reviewgamezone.com/preview.php?id=12856</a> *Media &amp; Technology Audio CD English – Spanish 19-1 *Leveled Reading Passages *Modifications as outlined in student’s 504 and/or IEP *Student choice in enrichment activities</td>
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<td>MS-ESS1-3</td>
<td>Analyze and interpret data to determine scale properties of objects in the solar system. Identify and explain the two factors that keep planets in their orbits.</td>
<td>Science Explorer Earth Science TB Science Explorer Earth Science Unit 6</td>
<td><em>How Do Mass &amp; Speed Affect an Object’s Motion?</em> Discover Activity pg. 670.</td>
<td>Students will compare planet distance, diameter with planet size and rotation. Students will</td>
<td>Performance Assessment Vocabulary Quiz</td>
<td></td>
<td>Video: <a href="http://video.search.yahoon.com/video/play;v=ALgkQLjUyvJIVqam">http://video.search.yahoon.com/video/play;v=ALgkQLjUyvJIVqam</a> QANZEl0nIQ;vlu=X3oDMTBzNWN0ZJRv0HNIYwNzczR2yQ</td>
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<td>MS-ESS1-2</td>
<td>Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.</td>
<td>Classify the main characteristics of the inner planets and the gas giant planets. <strong>Compare</strong> Pluto with the other planets and <strong>analyze</strong> its differences. <strong>Describe</strong> how astronomers measure distances to nearby stars. <strong>Distinguish</strong> the attributes by which stars are classified. <strong>Describe</strong> how a star is formed. <strong>Draw conclusions</strong> from factors to determine how long a star will last. <strong>Explain</strong> what happens to a star when it runs out of fuel.</td>
<td>Resources Astronomy</td>
<td><em>The Inner Planets</em> Section 20-3 Review &amp; Reinforce pgs. 46-47. <em>The Outer Planets</em> Section 20-4 Review &amp; Reinforce pgs. 50-51. <em>The Orbits of Neptune &amp; Pluto</em> Section 20-4 Enrich pg. 52.</td>
<td>complete the chapter 20 project 1 &amp; 2 data collection worksheet.</td>
<td>Lab Reflection Sheet</td>
<td>DdmkBHZ0aWQDBGdwkJMDMlY-7b=planets&amp;vid=ag8ac1659ee49e5d335895be3663fa755&amp;url=http%3A%2F%2Ftt4.mmm.bing.net%2Ffh%3FD%3DN0N18NHhm7ay6poXiaQL4AGNw%26pid%3D1%2626%3D227%26w%3D300%26c%3D7%26sn%3D1&amp;url=https%3A%2F%2Fvimeo.com%2F14263322&amp;hl=Our+Solar+System+size+of+planets+&amp;text=bWhiteboard:<a href="http://solarsystem.nasa.gov/planets/index.cfm">http://solarsystem.nasa.gov/planets/index.cfm</a></td>
<td>Vimo: <a href="http://vimeo.com/14263322&amp;hl=Our+Solar+System+/size+of+planets+&amp;text=bWhiteboard">http://vimeo.com/14263322&amp;hl=Our+Solar+System+/size+of+planets+&amp;text=bWhiteboard</a>:</td>
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<td>Describe a star system.</td>
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<td><em>How are and How Fast</em> Section 21-5 Enrich pg.92</td>
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<td>Online Review: <a href="http://nineplanets.org">http://nineplanets.org</a></td>
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<td>Compare the three types of galaxies.</td>
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<td>Explain the big bang theory of how the universe was formed.</td>
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<td>Describe and cite evidence how the solar system was formed.</td>
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### Unit Four: Structure, Function, and Information Processing

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</table>
| MS-LS1-1 | Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. | List the characteristics all living things share. | Science Explorer Life Science TB Science Explorer Life Science Unit 1 Resource Cells & Heredity Science Explorer Life Science Laboratory Manual | *Is It Living or Nonliving?* Discover Activity pg. 18 *Comparing Reid with Pasteur* Venn Diagram pgs. 22-23 *Please Pass the Bread* Skills Lab Designing Experiment pg. 26. *The Microscope-Improvements Over Time* Science & | Students will complete Bacteria Counts Section 1-1 Enrich Activity pg. 18. Students will provide the opportunity to control variables in an investigation into what factors are necessary for bread molds to grow. | Performance Assessment Test Lab Reflection Sheet Science Notebook Entries | Video: http://studyjams.scholastic.com/studyjams/animals/animal-cells.htm http://studyjams.scholastic.com/studyjams/science/plants/plant-cells.htm Whiteboard: http://exchange.smarttech.com/details.htm | *Media & Technology Audio CD English – Spanish 1-1-4, 15-1, 20-1-2 *Leveled Reading Passages *Modifications as outlined in student’s 504 and/or IEP *Student choice in
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| **MS-LS1-2** | Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. | **Identify** the cell wall, cell membrane, and nucleus, and describe their functions.  
**Identify** other organelles in the cell and describe their functions.  
**Compare** bacterial cells with plant and animal cells.  
**Describe** the role of specialized cells in many-celled organisms. | Science Explorer Life Science TB  
Science Explorer Life Science Unit 1 Resource Cells & Heredity  
Science Explorer Life Science Laboratory Manual | *Looking Inside Cells* Section 1-3 Review and Reinforce pgs. 24-25.  
*Modeling Cell Structures* Section 1-3 Enrich pg. 26  
*A Magnified View Of Life* Skills Lab pg. 43 | Students will create a poster comparing the parts of an animal cell with a plant cell. | Poster Rubric  
Performance Assessment  
Test  
Lab Reflection Sheet  
Science Notebook Entries | m1?id=cfedbe72-de13-43e4-baae-227bf7858a1 | enrichment activities |
| **MS-LS1-3** | Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. | **Identify** the levels of organization in the body.  
**Identify and describe** the four basic types of tissues in the human body.  
**Apply the concept of homeostasis to support** a position on its importance to the body. | Science Explorer Life Science TB  
Science Explorer Life Science Unit 4 Resource Human Biology and Health  
Vocabulary Quiz  
Lab Reflection Sheet  
| **MS-LS1-8** | Gather and **Identify and analyze** | Science Explorer | *How Simple is a Trick* | Students will | Tricks and Illusions | |

**NGSS Standard Performance Expectation**

**Student Learning Objectives (SLO)**

**References/Resources**

**Suggested Instructional Activities**

**Suggested Student Output**

**Assessments: Portfolios, Evaluations, & Rubrics**

**Multimedia Integration**

**Accommodation of Special Needs Students (SE, ELL, 504, G&T)**
### Unit Four: Structure, Function, and Information Processing

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<td>synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.</td>
<td>the functions of the nervous system. <strong>Describe</strong> the structure of a neuron. <strong>List</strong> the three types of neurons and <strong>model</strong> how a nerve impulse travels. <strong>Identify</strong> the function of the central nervous system, <strong>describe</strong> its parts and <strong>assess</strong> activities that harm or protect it from injury. <strong>Identify</strong> the function of the peripheral nervous system and its parts. <strong>Describe</strong> the concept of reflex. <strong>Name</strong> the senses and state the overall function performed by the senses. <strong>Describe</strong> how eyes enable people to see. <strong>Describe</strong> how people hear sound and maintain balance. <strong>Construct</strong> a</td>
<td>Life Science TB Science Explorer Life Science Unit 4 Resource Human Biology and Health Science Explorer Life Science Laboratory Manual</td>
<td>Simple Task? Discover Activity pg. 622. <strong>Ready or Not</strong> Skills Lab Designing Experiment pg. 627. <strong>Divisions of the Nervous System</strong> Section 20-2 Review and Reinforce 146-147 <strong>Should People Be Required to Wear Bicycle Helmets?</strong> Science &amp; Society Persuasive Writing pg. 635 <strong>The Senses</strong> Section 20-3 Review and Reinforce pgs. 150-151. <strong>Color Vision, Colorblindness</strong> Section 20-3 Enrich pg. 152 <strong>Smell and Taste</strong> Sharpen your Skills Designing</td>
<td>complete Tricks and Illusions Project pgs.196-140, Students will complete chapter 20 worksheets 1-2. Students will present finds to the class.</td>
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### Unit Four: Structure, Function, and Information Processing

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**Scientific model to describe how people experience the sense of touch, taste, and smell.**

Experiments Activity pg. 642.

### Unit Five: Growth, Development, and Reproduction of Organisms

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<td><strong>MS-LS3-1</strong></td>
<td>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.</td>
<td><strong>Explain</strong> the meaning of the terms phenotype, genotype etc.</td>
<td>Laboratory Manual</td>
<td><strong>The Cell and Inheritance</strong> Section 3-3 Review and Reinforce pgs. 84-85.</td>
<td>Students will build a model that illustrates meiosis using Punnett squares.</td>
<td>ms?id=b5ef94e2-2bc2-4268-b23a-464105cd39f</td>
<td><a href="http://exchange.smarettech.com/details.html?id=22da7f65-4a97-4e2e-92cf-84e32b056ebc">http://exchange.smarettech.com/details.html?id=22da7f65-4a97-4e2e-92cf-84e32b056ebc</a></td>
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<td><strong>MS-LS3-2</strong></td>
<td>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.</td>
<td><strong>Explain</strong> multiple alleles and relate this to animal fur.</td>
<td>Science Explorer Life Science TB</td>
<td>Science Explorer Life Science Unit 1 Resource Cells &amp; Heredity</td>
<td>Science Explorer Life Science</td>
<td><strong>Can You Crack the Code?</strong> Discover Activity pg. 103</td>
<td>Article Review Rubric</td>
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<td><strong>Explain</strong> why some human traits show a large variety of phenotypes.</td>
<td><strong>Compare</strong></td>
<td>Science Explorer Life Science Unit 1 Resource Cells &amp; Heredity</td>
<td>Science Explorer Life Science</td>
<td>Science Explorer Life Science</td>
<td><em>Predicting</em> Sharpen Your Skills Activity pg. 109.</td>
<td>Debate Performance Assessment Test</td>
<td>Lab Reflection Sheet</td>
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<td><strong>Pedigree</strong> Exploring Activity pg. 124</td>
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| MS-LS4-5   | Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. | **Describe** the causes and symptoms of five human genetic disorders.  
**Research, describe and assess** the processes for diagnosing genetic disorders.  
**Research and describe** the role of a genetic counselor.  
**Describe** three ways in which people have developed organisms with desired traits.  
**Identify** some uses of DNA fingerprinting.  
**How Many Chromosomes?** Discover Activity pg. 125  
*Write a Help Wanted Ad for a genetic counselor pg. 129  
*Compare and Contrast Poster on the causes and symptoms of five human genetic disorders pgs. 126-128.  

- **Identify** what determines sex, and explains why some sex-linked traits are more common in males than in females.
- **Describe and give examples** how geneticists use pedigrees.

**Assessment:**
- **Performance Assessment:**
  - Test
  - Lab Reflection Sheet
  - Science Notebook Entries
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<td></td>
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<td>Relate the goals of the Human Genome Project to scientific collaboration.</td>
<td>pgs. 112-113.</td>
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<td>*Family Puzzles Real-World Lab Careers in Science</td>
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