

**West Essex Consortium Curriculum
Essex Fells
Fairfield
North Caldwell
Roseland
Science Department**

- I. **COURSE NAME:** Science 6
- II. **COURSE PREREQUISITES:** Science 5
- III. **GRADE LEVEL(S):** 6
- IV. **COURSE DESCRIPTION:**

The performance expectations in **Space Systems** help students formulate answers to the questions: "What is Earth's place in the universe?" and "What makes up our solar system and how can the motion of Earth explain seasons and eclipses?" Two sub-ideas from the NRC Framework are addressed in these performance expectations: ESS1.A and ESS1.B. Middle school students can examine 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 data that support the theories that explain the formation and evolution of the universe. 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. In the MS. Space Systems performance expectations, students are expected to demonstrate proficiency in developing and using models and analyzing and interpreting data and to use these practices to demonstrate understanding of the core ideas.

The performance expectations in **Weather and Climate** help students formulate an answer to the question, "What factors interact and influence weather and climate?" Three sub-ideas from the NRC Framework are addressed in these performance expectations: ESS2.C, ESS2.D, and ESS3.D. Students can construct and use models to develop an understanding of the factors that control weather and climate. A systems approach is also important here, examining the feedbacks between systems as energy from the sun is transferred between systems and circulates through the oceans 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. In the MS. Weather and Climate performance expectations, students are expected to demonstrate proficiency in asking questions, developing and using models, and planning and carrying out investigations and to use these practices to demonstrate understanding of the core ideas.

The Performance Expectations in **Structure, Function, and Information Processing** help students formulate an answer to the question, "How do the structures of organisms contribute to life's functions?" Middle school students can plan and carry out investigations to develop evidence that living organisms are made of cells and to determine the relationship of organisms

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to the environment. Students can use understanding of cell theory to develop physical and conceptual models of cells. They can construct explanations for the interactions of systems in cells and organisms and for how organisms gather and use information from the environment. By the end of their studies, 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 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.

The Performance Expectations in **Growth, Development, and Reproduction of Organisms** help students formulate an answer to the question, "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 can 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 in which humans can select for specific traits, the role of technology, genetic modification, and the nature of ethical responsibilities related to selective breeding. At the end of middle school, students can explain how select structures, functions, and behaviors of organisms change in predictable ways as they progress from birth to old age. Students can use the practices of analyzing and interpreting data, using models, conducting investigations, and communicating information. Crosscutting concepts of structure and function, change and stability, and matter and energy flow in organisms support understanding across this topic.

V. COURSE OBJECTIVES:

In Science 6, performance expectations focus on students developing an understanding of several scientific practices. These include asking questions and defining problems, planning and carrying out investigations, analyzing and interpreting data, developing and using models, constructing explanations and designing solutions, engaging in argument from evidence, using mathematics and computational thinking, and obtaining, evaluating, and communicating information. Students will use these practices to demonstrate understanding of the core ideas. Students are also expected to demonstrate understanding of several of engineering practices, including design and evaluation.

VI. TEXTS/RESOURCES

- A. Textbook
- B. www.NSTA.org
- C. www.nextgenscience.org

VII. EVALUATIONS/ASSESSMENTS

Students can demonstrate competency with tasks such as developing and refining models; generating, discussing and analyzing data; constructing spoken and written scientific explanations; engaging in evidence-based argumentation; and reflecting on their own understanding. A combination of formative and summative assessments will be utilized in this course including, but not limited to teacher observations, student work and reflections, projects, quizzes and tests, and writing tasks.

VIII. SCOPE AND SEQUENCE (see table below)

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This course has been designed with respect to and in compliance with the expectations set forth in the state-approved standards.

Scope and Sequence of Content and Skills for Science 6

Unit Name	Space Systems
Estimated Timeline	September-October
Essential Questions	<ul style="list-style-type: none"> • Why does the Sun's position change over time? • What causes the Sun's position to change during the year? • How does the position of the Earth and Sun affect seasonal patterns? • What causes the phases of the moon? • What causes solar and lunar eclipses? • What determines the gravitational pull on an object? • How does gravity hold planets in orbit? • How do objects in our solar system compare? • How do scientists study our solar system?
NGSS	MS-ESS1-1 MS-ESS1-2 MS-ESS1-3
Student Learning Objectives	<ul style="list-style-type: none"> • Generate and analyze evidence to explain why the Sun's apparent motion across the sky changes over the course of the year. • 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. • Develop and use a model that shows how gravity causes smaller objects to orbit around larger objects at increasing scales, including the gravitational force of the sun causes the planets and other bodies to orbit around it holding together the solar system. • Analyze and interpret data to determine scale properties of objects in the solar system. • Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
Suggested projects, activities, labs used to support content	<ul style="list-style-type: none"> • Students will use models to predict the lunar phase given the positions of Earth, Moon, and the Sun. Students will manipulate their models to show locations where a solar or lunar eclipse will take place. • Students will trace their shadows in the morning and afternoon, and compare the tracings. They will use this information to determine the position of the Sun as it appears to move throughout the day. • Students will use a light and moon model to determine the phases of the moon, and make a phases of the moon chart to summarize their results. • Winter Olympics Project - Students will use their knowledge relating to seasons, earth's tilt, and solar energy to determine which location would be the best option the 2026 Winter Olympics. • Students will use a model to describe that gravity is an inward pulling force that can keep smaller/less massive objects in orbit around

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	<p>larger/more massive objects. Given different scenarios, students will determine which scenario would have the greatest gravitational pull.</p> <ul style="list-style-type: none"> • Students will calculate how much they would weigh on other planets and how far they could jump on other planets. They will use this data to come to a conclusion about gravitational pull and mass. • Students will design a model or diagram that shows two ways gravitational pull exists between Earth and the Moon. • Students will organize data on solar system objects to design diagrams, graphs, or physical models. • Students will use quantitative analyses to describe similarities and differences among solar system objects by describing patterns of features. • Students will identify advances in solar system science made possible by improved engineering. • Students will interpret quantitative and qualitative data to draw their own conclusions about patterns in the solar system (ex.: outer planets have the greatest size).
<p>Suggested assessments</p>	<p>Students can demonstrate competency with tasks such as:</p> <ul style="list-style-type: none"> • developing and refining models • generating, discussing and analyzing data • constructing spoken and written scientific explanations • engaging in evidence-based argumentation • reflecting on their own understanding • notebook entries • response sheets • focus question answers • science and engineering practices checklist
<p>Suggested resources</p>	<ul style="list-style-type: none"> • NSTA Resources and Lesson Plans: http://ngss.nsta.org/DisplayStandard.aspx?view=topic&id=34 • Motion of the Sun: http://astro.unl.edu/naap/motion3/motion3.html • Seasons Interactive: http://highered.mheducation.com/sites/007299181x/student_view0/chapter2/seasons_interactive.html • Shadow Tracker: http://www.fossweb.com/delegate/ssi-wdf-ucm-webContent/Contribution%20Folders/FOSS/multimedia_2E/Solar_MM_2E/activities/whiteboard/shadowtracker/index.html • Seasons: http://www.fossweb.com/delegate/ssi-wdf-ucm-webContent/Contribution%20Folders/FOSS/multimedia/Planetary_Science/activities/seasons/index.html • Comparing Size and Distance: http://www.nasa.gov/pdf/622130main_SSML1Tchr.pdf • Gravity Interactive: https://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=648 • Gravity Interactive:

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	<p>http://phet.colorado.edu/en/simulation/gravity-and-orbits</p> <ul style="list-style-type: none"> • Pull of the Planets Activity: http://www.lpi.usra.edu/education/explore/solar_system/activities/bigKid/planetPull/ • Modeling Eclipses: http://lasp.colorado.edu/home/wp-content/uploads/2012/05/A4_Modeling_Eclipses.pdf • Bill Nye Phases of Moon Model Video: https://www.youtube.com/watch?v=eufP3v46zko • Phases of the Moon Review: http://teachers.henrico.k12.va.us/staffdev/clough_d/DragDrop/MoonMatch.swf • Phase Simulator: http://astro.unl.edu/naap/lps/animations/lps.swf • Eclipse Interactive: http://highered.mheducation.com/olcweb/cgi/pluginpop.cgi?it=swf::640::480::/sites/dl/free/007299181x/220730/eclipse_interactive.swf::Eclipse%20Interactive, http://highered.mheducation.com/sites/007299181x/student_view0/chapter9/eclipse_interactive.html# • Lunar Phases: http://aspire.cosmic-ray.org/Labs/LunarPhases/lunar_phases_main.html • Fossweb.com
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Unit Name	Weather and Climate
Estimated Timeline	November-January
Essential Questions	<ul style="list-style-type: none"> ● What is the difference between weather and climate? ● What is the sun's role in the water cycle and how does that affect us? ● How does energy from the Sun affect wind on Earth? ● What is air? ● What is the atmosphere? ● How does pressure affect air? ● What happens when two areas of air have different pressures? ● What factors do meteorologists use to forecast the weather? Why can't meteorologists predict weather with 100% certainty? ● What is density? ● What affects the direction that ocean water flows? ● How does weather differ between locations? ● How does the ocean affect climate on land? ● How does energy from the Sun affect weather and climate on Earth? ● How does latitude affect an area's weather and climate? ● How has climate changed over time? ● How do greenhouse gases in the atmosphere affect Earth's temperature? ● What can we do to prevent the continuation of global warming?
NGSS	MS-ESS2-5 MS-ESS2-6 MS-ESS3-5
Student Learning Objectives	<ul style="list-style-type: none"> ● Develop a conceptual model to explain the mechanisms for the Sun's energy to drive wind and the hydrologic cycle. ● Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. ● Explain how variations in density result from variations in temperature and salinity drive a global pattern of interconnected ocean currents. ● Use a model to explain the mechanisms that cause varying daily temperature ranges in a coastal community and in a community located in the interior of the country. ● 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. ● Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

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Suggested projects, activities, labs used to support content

- After watching a video of severe weather, students discuss in small groups and whole class reaches a consensus on the factors that constitute weather. Students begin monitoring local weather conditions, using tools.
- Students review local weather reports and determine the factors that combine to produce what we know as weather. They are introduced to, and use, a thermometer, barometer, hygrometer, compass, and anemometer. outdoors and develop a plan for acquiring daily data and sharing them with the class.
- Students work with syringes and tubing to discover that air takes up space and is compressible. They work in small groups to design demonstrations to show that air has mass. They study the atmosphere, a mixture of gases, using diagrams, photos, and a reading.
- Students investigate how the shape of Earth and its relationship to the Sun affect the weather around the world. They use light sources and globes to model the length of the day throughout the year.
- Students investigate what happens to different earth materials (sand, soil, water, air) when placed in sunshine and then in shade to show radiation. They set up an experiment and collect and analyze the data by observing the differential heating of earth materials, one factor that contributes to weather.
- Students observe two examples of heat transfer by conduction: movement of heat from a container of hot water to a container of cold water, and movement of heat from one end of a metal strip to the other.
- Students make a density column to investigate density of fluids by layering colored salt solutions in a straw. They determine the relative densities of the salt solutions by comparing the masses of equal volumes. They calculate the density of each solution, using the ratio of mass to volume.
- Students observe the interaction of colored water of different temperatures to determine that warm water rises and cold water descends.
- Students design investigations to show that water vapor is in the air around them. Materials are provided, and each group plans an investigation, conducts it, and reports to the class in a short presentation.
- Students measure temperature change that occurs during evaporation, using wet- and dry-bulb thermometers to be introduced to humidity as the measure of water vapor in the air.
- To explore the temperature at which water vapor condenses into drops of liquid water, students determine the dew-point temperature for their classroom and use wet-bulb and dry-bulb thermometers and a hygrometer to measure humidity.
- Students investigate the relationship between pressure and temperature, using 2-liter soda bottles and thermometer strips. They discover that, the greater the pressure in a gas, the higher the temperature. They use this understanding of pressure and temperature to explore cloud formation.
- Students observe a demonstration that shows how Earth's water is

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	<p>distributed. They participate in a game that simulates the travels of a water molecule through the water cycle. They compare the results of the game to their understanding of how the water cycle operates on Earth.</p> <ul style="list-style-type: none"> ● Students investigate the relationship between changing air pressure and wind. They assemble and explore a pressure indicator and learn about barometers. Using knowledge developed in previous investigations, they come up with models of wind. They build an anemometer to measure local wind and use pressure maps to make weather predictions. ● Students observe a solar hot-air balloon and consider it as a model for a warm air mass to introduce the concept how air masses form. ● Students consider severe weather in relation to air masses and fronts. Climate is introduced and climate regions are discussed. Students compare a water-cycle multimedia simulation with the global- warming variation, in which Earth's average temperature has increased 2–5°C. They analyze the results and make predictions of the continued effect of global warming on Earth. ● They compare different climate regions around the world, using a multimedia database. ● Students will model the Coriolis Effect to explain its influence on the wind and water current on earth, by using a balloon and a marker. One student turns the balloon, while the other tries to draw a straight line from the North Pole to the equator, and South Pole to the equator. ● Analyze an air pressure map. ● Research and analyze data for two cities of similar lat/long, one coastal, one inland. Look for patterns and draw a conclusion. ● Research and analyze data for groups of cities at different latitudes. Look for patterns and draw a conclusion. ● Students investigate the effect of the ocean on climate by observing the effects of the layering of warm and cold water and water that is more or less saline than the normal. They will do this by creating saline solutions of different colors that mimic ocean salinity, are more saline than ocean water, and are less saline than ocean water and pouring the different solutions into a basin that shows how the different solutions can model layering in the ocean. The student will combine the results of the two separate exercises and predict which of the conditions might prevail. ● Students map greenhouse gas emissions where they live by researching what greenhouse gasses are and using an online resource (website of the epa) to find the most common greenhouse gasses for where they live and their sources. They will graph the data. They will use their knowledge to determine ways that facilities can reduce their emissions and how they and their families can reduce their emissions.
<p>Suggested assessments</p>	<p>Students can demonstrate competency with tasks such as:</p> <ul style="list-style-type: none"> ● developing and refining models ● generating, discussing and analyzing data

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	<ul style="list-style-type: none"> • constructing spoken and written scientific explanations • engaging in evidence-based argumentation • reflecting on their own understanding • notebook entries • response sheets • focus question answers • science and engineering practices checklist
<p>Suggested resources</p>	<ul style="list-style-type: none"> • Difference between weather and climate: http://www3.epa.gov/climatechange/kids/documents/weather-climate.pdf • Weather vs Climate & video from NatGeo https://www.ck12.org/earth-science/Weather-versus-Climate/esson/Weather-versus-Climate/?referrer=concept_details • Layers of the atmosphere: Folding resource on atmosphere http://mjksciteachingideas.com/pdf/AtmosphereFoldable.pdf • Composition of Air at different atmospheric levels http://www.fossweb.com/delegate/ssi-wdf-ucm-webContent/Contribution%20Folders/FOSS/multimedia_ms_1E/WeatherandWater/atmosphericdata/elevator.html • Ocean Currents/Temperature Lab http://www.carolinacurriculum.com/premium_content/ebooks/catastrophic+events/pdfs/Lesson_7.pdf • Salinity Lab & Salinity at various latitudes http://mjksciteachingideas.com/pdf/SalinityLab.pdf • Salinity and Temperature (this says 9th - 12th, but it is still useful for 6th) http://oceanservice.noaa.gov/education/lessons/hot_cold_lesson.html • Earth's rotation and the movement of winds and water currents across the earth experiment for class (Coriolis Effect) http://www.carolina.com/teacher-resources/Interactive/modeling-the-coriolis-effect/tr10643.tr • "Four Cities" Sample Task from NextGen http://www.livebinders.com/play/play?id=1541676 under NGSS click sample classroom tasks, under Middle School, "Four Cities" • Multiple topics under weather and climate http://climatekids.nasa.gov/next-generation-standards/review/ • Mapping greenhouse gases http://www3.epa.gov/climatechange/kids/documents/mapping-emissions.pdf • climate change over time http://www3.epa.gov/climatechange/kids/documents/temp-and-co2.pdf and http://climate.nasa.gov/climate_resources/25/

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	<ul style="list-style-type: none">• analyzing tree rings to look at climate change over time http://www3.epa.gov/climatechange/kids/documents/tree-rings.pdf And http://climate.nasa.gov/climate_resources/25/• Foss Online www.fossweb.com• http://www.electronicfieldtrip.org/cascades/index.html Information and games on climate change
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Unit Name	Structure, Function and Information Processing
Estimated Timeline	February-March
Essential Questions	<ul style="list-style-type: none"> • What are the building blocks of life? • How does each part of a cell function? • How is the body a system of interacting subsystems composed of groups of cells? • What are the fundamental differences between animal and plant cells pertain to cell reproduction? • How do our sensory receptors send information to our brain?
NGSS	MS-LS1-1 MS-LS1-2 MS-LS1-3 MS-LS1-8
Student Learning Objectives	<ul style="list-style-type: none"> • Conduct an investigation to provide evidence that living things are made of cells: either one cell or many different numbers of cells • Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function • Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells • Develop a model to explain how senses change energy coming from the environment (light, sound waves, chemicals in gases or food, heat or touch/pressure) into electrical signals in the nerves that go into the brain and spinal cord • Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories
Suggested projects, activities, labs used to support content	<ul style="list-style-type: none"> • Students investigate cells using a compound microscope • Students use microscope to explore unicellular and multicellular organisms, and plant and animal cells. • Students use interactive website to explore the components within a cell and how they work together • Develop a model in which they identify the parts (components: nucleus, chloroplast, cell wall, mitochondria, cell membrane, the function of a cell as a whole) of cells • Project: "A cell is like a _____" Students create a poster/model to display their analogy relating each organelle to something in their project (<i>ex.city, park, school, etc</i>) • Students describe the relationships between the parts of cells in terms of their contributions to overall cellular function and the structure of the cell membrane or cell wall and its relationship to the

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	<p>function of the organelles and the whole cell.</p> <ul style="list-style-type: none"> ● Students use the model to identify key differences between plant and animal cells based on structure and function. Build models of both a plant and animal cell and be able to demonstrate key characteristics that define both ● Complexity of Life Card Sort (FOSSweb) (With addition of tissues, organs, organisms) ● Demonstrate key characteristics that define both ● Students use interactive website to "Build an organ" using different tissues ● Lab: "Dissecting a Chicken Wing"- Students will dissect a chicken wing to observe the different types of tissues present in a wing ● Project: Body Systems- Each group will research an assigned body system in order to create an informative poster about the body system and its function and display on poster. Each group will then use what they've learned to determine how body systems interact with each other. ● Lab: "Can You Trust Your Senses?"- Students will explore three of your sensory receptors: chemoreceptors (taste and smell) and photoreceptors (sight) ● Online Interactive: Students will play a game on Fossweb that tests their response time. ● Lab: Response Time: Students will conduct an experiment to test visual, auditory, and tactile reaction times using one ruler. ● Online Interactive: Students explore the process of synapse and how the brain receives and transmits messages.
<p>Suggested assessments</p>	<p>Students can demonstrate competency with tasks such as:</p> <ul style="list-style-type: none"> ● developing and refining models ● generating, discussing and analyzing data ● constructing spoken and written scientific explanations ● engaging in evidence-based argumentation ● reflecting on their own understanding ● notebook entries ● response sheets ● focus question answers ● science and engineering practices checklist
<p>Suggested resources</p>	<ul style="list-style-type: none"> ● https://njctl.org/courses/science/7th-grade-science/structure-and-function-information-processing/ <p>Link above includes:</p> <ul style="list-style-type: none"> → Cell Analogy Project and Rubric → Dissecting Wing Lab → Body System Project → Sense Lab <ul style="list-style-type: none"> ● http://learn.genetics.utah.edu/content/cells/insideacell/ (inside a cell interactive) ● https://www.centreofthecell.org/learn-play/games/explore-a-cell/

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	<p>(inside a cell interactive)</p> <ul style="list-style-type: none">• https://www.centreofthecell.org/learn-play/games/build-an-organ/ (build an organ interactive)• https://backyardbrains.com/experiments/reactiontime Response Time resources and lab• https://www.centreofthecell.org/learn-play/games/synapse/ Synapses Video• Card Sort- Found on Fossweb or in kit• Response Timer- Found on Fossweb
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Unit Name	Growth, Development, and Reproduction of Organisms
Estimated Timeline	April-June
Essential Questions	<ul style="list-style-type: none"> • How do organisms reproduce? • What is the difference between sexual and asexual reproduction? • How can an organism's behavior increase its chance of survival and reproduction? • What structures or mechanisms aid in plant reproduction? • How does the environment contribute to successful reproduction or growth? • How do genetic factors influence the growth of organisms? • How do natural differences in organisms increase survival and reproduction?
NGSS	MS-LS1-4 MS-LS1-5 MS-LS3-1 MS-LS3-2 MS-LS4-5
Student Learning Objectives	<ul style="list-style-type: none"> • 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. • Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. • Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may results in harmful, beneficial, or neutral effects to the structure and function of the organism. • 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. • Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
Suggested projects, activities, labs used to support content	<ul style="list-style-type: none"> • Students make a claim to support a given explanation of an adaptation/behavior (ex.: nest building, colorful plumage to attract mates, bright flowers). In their claim, students will include the idea that characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. Students will identify evidence, evaluate the evidence, and use reasoning to connect appropriate evidence to claim. • Students will articulate a statement that relates the given

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	<p>phenomenon to a scientific idea, including the idea that both environmental and genetic factors influence the growth of organisms. Students identify and describe evidence (e.g., from students' own investigations, observations, reading material, archived data) necessary for constructing the explanation.</p> <ul style="list-style-type: none"> • Students will research and develop a model to show how a mutation can have harmful, beneficial, or neutral effects. • Students will develop a model (e.g., Punnett squares, diagrams, simulations) for a given phenomenon involving the differences in genetic variation that arise from sexual and asexual reproduction. In the model, students identify and describe the relevant components. Students use the model to describe an account for why sexual and asexual reproduction result in different amounts of genetic variation in offspring relative to their parents. • Students will use cause-and-effect relationships found in the model between the type of reproduction and the resulting genetic variation to predict that more genetic variation occurs in organisms that reproduce sexually compared to organisms that reproduce asexually. • Students will gather information about at least two technologies that have changed the way humans influence the inheritance of desired traits in plants and animals through artificial selection by choosing desired parental traits determined by genes, which are then often passed on to offspring. Examples could include gene therapy, genetic modification, and selective breeding of plants and animals. • Students will dissect lima beans to explore structural adaptations of seeds that allow them to survive. • Students will investigate how increasing salinity affects the germination and growth of food crops. They will compare four grains to determine that the different grains have varying levels of salt tolerance (genetic factors). • Students will dissect flowers to learn about flower structures and sexual reproduction. • Students will observe flowers to identify adaptations that plants help to aid in pollination.
<p>Suggested assessments</p>	<p>Students can demonstrate competency with tasks such as:</p> <ul style="list-style-type: none"> • developing and refining models • generating, discussing and analyzing data • constructing spoken and written scientific explanations • engaging in evidence-based argumentation • reflecting on their own understanding • notebook entries • response sheets • focus question answers • science and engineering practices checklist
<p>Suggested</p>	<ul style="list-style-type: none"> • NSTA Resources and Lesson Plans:

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<p>resources</p>	<ul style="list-style-type: none"> • http://ngss.nsta.org/DisplayStandard.aspx?view=topic&id=32 • Various Traits/DNA Activities: http://teach.genetics.utah.edu/content/heredity/#item3 • Inventory of Traits: http://teach.genetics.utah.edu/content/heredity/files/InventoryOfTraits.pdf, http://learn.genetics.utah.edu/content/inheritance/observable/ • Effect of Environment on Plant Growth: http://www.apsnet.org/edcenter/K-12/TeachersGuide/PlantBiotechnology/Pages/Activity7.aspx • Mutations and Variations: http://www.cosee-west.org/AprilLectureMaterials/Activities/Mutations&Variation.pdf • Reproduction Lesson: http://ca.pbslearningmedia.org/resource/tdc02.sci.life.repro.lp_reproduce/reproduction/ • Genetics with a Smile: http://sciencespot.net/Media/gen_smilewkst1.pdf • Breeding Critters Activity • Investigating Reproductive Strategies: http://teach.genetics.utah.edu/content/evolution/files/ReproductiveStrategies.pdf • Pollinators Game: http://www.fossweb.com/delegate/ssi-wdf-ucm-webContent/Contribution%20Folders/FOSS/multimedia_ms_1E/DiversityofLife/media/pollinators.htm • Inherited Traits in Animals: http://cals.arizona.edu/fps/sites/cals.arizona.edu.fps/files/education/juniors_tree.pdf • Tomato Technology: http://archives.lessoncorner.com/e9f8ef1e4c901b193.pdf • Fossweb.com
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