



SUBJECT: SCIENCE Grade 7

Cliffside Park Public Schools

GRADE: 7

BOE APPROVAL: August 2018

Grade 7: Integrated Science



New Jersey
Student Learning Standards

SCIENCE



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Unit 1: Overview

Unit 1: From Cells To Organisms

Grade: 7

Content Area: Life Science

Pacing: 10 Weeks

Essential Question

What can you do to reduce the risk of catching an infectious disease?

Student Learning Objectives (Performance Expectations)

[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.](#)

[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.](#)

[MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.](#)

[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.](#)

Core Instructional Materials

Lab Aids: "From Cells to Organisms"

<https://portals.lab-aids.com/mylibrary.htm>

Supplemental Materials

www.newsela.com

www.sciencenews.com

NSTA Cells, Biology and Human Diversity Resources Page: <https://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=8>

Unit Summary

By exploring how infectious diseases affect people, students study microbiology. Students will focus on cell size, structure, function, permeability and the different systems of classification. They learn how to use a microscope, and then use it to gather data, building on their ability to conduct experiments. Students also explore the function of the immune system and the growth of antibiotic-resistant organisms through a series of laboratory activities and simulations. A project on disease provides students with an opportunity to develop research skills.

Technical Terms

Cell theory, structure, function, microbes, disease, virus, antibiotics, resistance, epidemiology, cell membrane, cytoplasm, cytoskeleton, chloroplast, eukaryotic, endoplasmic reticulum, prokaryotic, organelle, vacuole, lysosome, lipid bilayer, ribosome, Golgi apparatus, mitochondria, selectively permeable



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Formative Assessment Measures	
<i>Part A: How can you reduce the spread of an infectious disease?</i>	
Students who understand the concepts are able to: Discover how diseases spread and recommend ways to reduce the spread of the disease, both within and outside of a city. Recall what you know about viruses, as well as the information provided in this activity. Provide at least two recommendations to stop the spread of a fever. Support this with evidence and identify the trade-offs involved in your recommendation.	
<i>Part B: How do the functions of cells support an entire organism?</i>	
Students who understand the concepts are able to: Develop and use a model to describe the function of a cell as a whole. Develop and use a model to describe how parts of cells contribute to the cell's function. Develop and use models to describe the relationship between the structure and function of the cell wall and cell membrane.	
Summative Assessments	
From Cells to Organisms Unit Test Individual Project: Cell City	
Alternative Assessments	
Lab Report: Activity 3 - Investigating Microscopic Organisms	
Benchmarks	
Black Plague Article Based Test - Students will be able to read scientific text and use text content to answer questions about the plague, infectious diseases and the spread of disease.	
Interdisciplinary Connections	
NJSLS- ELA	NJSLS- Mathematics
WHST.6-8.1 WHST.6-8.2 WHST.6-8.7 WHST.6-8.8 WHST.6-8.9 RST.6-8.1 RST.6-8.2 RST.6-8.4	6.SP.B.4 6.SP.B.5



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RST.6-8.7 SL.8.1 SL.8.4 SL.8.5	
Core Instructional Materials	Can include: Textbooks Series, Lab Materials, etc.
21st Century Life and Careers	CRP2, CRP4, CRP5, CRP 6, CRP7, CRP8 ,CRP11,CRP12
Technology Standards	8.1.8.A.1, 8.1.8.A.2, 8.1.8.A.3, 8.1.8.A.4, 8.1.8.A.5, 8.1.8.D.2, 8.1.8.D.3, 8.1.8.D.4, 8.1.8.D.5, 8.2.8.A.2, 8.2.8.A.4, 8.2.8.A.5, 8.2.8.B.1,
Modifications	
Modifications to Support Our English Language Learners	Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)
“From Cells to Organisms” - Spanish Edition Leveled Articles through Newsela Student Vocabulary Log Intra-act Discussion Web Scaffolding Sentence/Paragraph Frames Google Translate Think and Read Alouds Highlight Key Vocabulary Annotation Guides Think-Pair-Share Visual Aids: Foam Cell Replicas, YouTube Animations of Living Bacteria Modeling: See Cell City Project	Word Walls Visual Aides Graphic Organizers (Venn Diagram, Frayer Model) Measurement Conversion Charts for Temperature, Graphing Practice Packet Vocabulary Images for Recall Multimedia- Illustrating the differences between plant and animal cells Leveled Readers - Newsela allows students to pick higher/lower reading levels according to their “comfort” level. Testing Accommodations: Assistive technology, Notes/summaries, Extended time, Answer masking, Answer eliminator, Highlighter, Color contrast
Modifications to Support Our Gifted and Talented	Curriculum Compacting Personal Vocabulary Log Discussion Web on Genetic and Health Trends (Chromosome Selection) Challenge Assignments- Habitat Challenge https://ngss.nsta.org/Resource.aspx?ResourceID=71 Enrichment Activities - The Gene Scene https://ngss.nsta.org/Resource.aspx?ResourceID=313 Tiered Activities Independent Research/Inquiry - DNA Mapping of My Family Collaborative teamwork: Debate (GMO’s) Higher level questioning Critical/Analytical Thinking Tasks Self-Directed Activities- Interview family members on family medical history and physical characteristics (phenotypes)



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5E Model	
Cell Biology and Disease	
<p>Engage Anticipatory Set</p>	<p>View and Reflect: <u>From One to Another</u>- Students view a video segment on the outbreak and investigation of bubonic plague in San Francisco, CA during the 1900s.</p> <p>Talking It Over: <u>The Story of Leprosy</u>: Students read about the history of leprosy before discussing societal responses to infectious disease</p> <p>Reading: <u>A Closer Look</u>- Students read about basic cell structures and their functions within plant and animal cells. On-line extensions show cell animations and electron micrographs.</p> <p>Reading: <u>The World of Microbes</u>- A reading about protists, bacteria, and viruses and how they are classified.</p> <p>View and Reflect: <u>Fighting Back</u>- Students view a video segment on the development of the first antibiotic: penicillin.</p>
<p>Exploration Student Inquiry</p>	<p>Modeling: <u>It's Catching</u>- As a class, students model and then analyze the spread of an infectious disease.</p> <p>Investigation: <u>Who Infected Whom?</u>- Students develop and test hypotheses about the path of disease transmission in a fictional situation.</p> <p>Laboratory: <u>A License to Learn</u>- After earning a microscope license, students use microscopes to examine everyday materials.</p> <p>Laboratory: <u>Looking for Signs of Microlife</u>- Students prepare a wet mount slide and use microscopes to search for microscopic life.</p> <p>Laboratory: <u>Microbes, Plants, and You</u>- Students stain plant cells and compare the structure to a microbial cell and a human cell.</p> <p>Laboratory: <u>Cells Alive</u>- Students investigate the ability of cells to respire using yeast.</p> <p>Modeling: <u>A Cell Model</u>- Students construct a cell model and explore the function of the cell membrane.</p> <p>Modeling: <u>A Cell so Small</u>- Students investigate why cells are small, using a model of carbon and blue dye.</p> <p>Laboratory: <u>Microbes Under View</u>- Students view prepared slides of protists and bacteria to help identify distinguishing characteristics.</p>



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	<p>Investigation: <u>Who's Who?</u>- Students classify cards containing images and information about different microbes using a dichotomous key.</p> <p>Investigation: <u>Disease Fighters</u>- Students view prepared slides of normal human blood and perform simulated tests for blood-type compatibility .</p> <p>Laboratory: <u>Reducing Risk</u>- Students investigate the effects of various antimicrobial solutions on the growth of common bacteria.</p>
<p>Explanation Concepts and Practices</p>	<p>Investigation: <u>Wash Your Hands, Please!</u>- Students design an experiment to reduce the number of microbes found on their hands after hand washing.</p> <p>Modeling: <u>The Full Course</u>- Students model the effects of antibiotics on the population of the disease - causing bacteria during an infection.</p>
<p>Elaboration Extension Activity</p>	<p>Role Play- <u>The History of the Germ Theory of Disease</u>- Students role-play different scientists and their contributions to developing ideas about disease.</p> <p>Role Play- <u>An Ounce of Prevention</u>- Students perform a role play on the use of vaccines and antibiotics in the treatment and prevention of infectious disease.</p> <p>Talking it Over: <u>Miracle Drugs- or Not?</u>- Students read about the use and misuse of antibiotics before discussing the responsibilities of patients.</p>
<p>Evaluation Assessment Tasks</p>	<p>Project: <u>The Range of Disease</u>- After a scavenger hunt, students begin researching a disease and eventually produce a public service announcement on disease.</p> <p>Investigation: <u>Modern Outbreaks</u>- Students collect data and develop hypotheses about disease transmission while playing a board game.</p>



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Unit 2: Overview

Unit 2: Body Systems

Grade: 7

Content Area: Life Science

Pacing: 7 Weeks

Essential Question

How do our choices affect our health?

Student Learning Objectives (Performance Expectations)

[MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.](#)

[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.](#)

[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.](#)

Core Instructional Materials

Lab Aids: Human Body Systems
<https://portals.lab-aids.com/mylibrary.htm>

Supplemental Materials

www.newsela.com
NSTA Human Body Systems Resource Page: <https://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=8>
Science News: <https://www.sciencenewsforstudents.org>
NSTA Alternative Classroom Resources: <https://ngss.nsta.org/Classroom-Resources.aspx>

Unit Summary

Students investigate concepts and issues related to sustaining personal health. A major goal of this unit is to provide a foundation for evidence-based decision-making about health issues such as the use of medication, nutrition, exercise, and heart disease. The unit focuses on the role of organ systems in providing nutrients and oxygen to the body, and also on transporting and eliminating wastes (maintaining internal balance). Students investigate the heart and circulatory system in depth, with an emphasis on the relationship between structure and function.



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Technical Terms

Structure, function, nervous system, stimuli, neurons, cell body, dendrites, axon, synapse, cerebrum, cerebellum, skeletal system, ligaments, marrow, muscular system, voluntary muscles, involuntary muscles, tendons, circulatory system, plasma, arteries, capillaries, atrium, ventricle, aorta, respiratory system, trachea, alveoli, digestive system, salivary glands, peristaltic, small intestines, pancreas, large intestines, excretory system, reproductive system

Formative Assessment Measures

Part A: How do lifestyle choices affect your health?

Students who understand the concepts are able to:

Explore the role of various organ systems in providing nutrients and oxygen to the body and transporting and eliminating wastes. An in-depth focus on the circulatory system is used as students investigate heart disease, nutrition, and exercise.

Part B: How do organisms receive and respond to information from their environment?

Students who understand the concepts are able to:

Gather, read, and synthesize information from multiple appropriate sources about sensory receptors' response to stimuli.

Assess the credibility, accuracy, and possible bias of each publication and methods used.

Describe how publications and methods used are supported or not supported by evidence.

Summative Assessments

Human Body Systems Unit Test

Group Project and Presentation: Systems of the Human Body WebQuest:

https://docs.google.com/document/d/10xOAUMAanLATzAvcps7slqj7baUgdgOLovstxtoQ_nw/edit?usp=sharing

Alternative Assessments

Human Body Writing Prompts:

<https://docs.google.com/document/d/13kuU-OsOE4000O5XaONZm6EING8oExNVr0zg4XnE5Bw/edit?usp=sharing>

Pedigree Project: My Family History

Benchmarks

Cognitive Article Based Test - Students will be able to read scientific text and use text content to answer questions about the the human brain, its cognitive ability and how it is the control center for all other actions/reactions within the human body.

99.99% Antibacterial Products and Natural Selection: <https://ngss.nsta.org/Resource.aspx?ResourceID=17>



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Core Instructional Materials	Can include: Textbooks Series, Lab Materials, etc.	
21st Century Life and Careers	CRP2, CRP4, CRP5, CRP 6, CRP7, CRP8 ,CRP11,CRP12	
Technology Standards	8.1.8.A.1, 8.1.8.A.2, 8.1.8.A.3, 8.1.8.A.4, 8.1.8.A.5, 8.1.8.D.2, 8.1.8.D.3, 8.1.8.D.4, 8.1.8.D.5, 8.2.8.A.2, 8.2.8.B.1	
Modifications		
Modifications to Support Our English Language Learners	Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)	Modifications to Support Our Gifted and Talented
“Human Body Systems” - Spanish Edition Leveled Articles through Newsela Student Vocabulary Log Intra-act Discussion Web Scaffolding Sentence/Paragraph Frames Google Translate Think and Read Alouds Highlight Key Vocabulary Annotation Guides Think-Pair-Share	Word Walls Visual Aides Graphic Organizers (Venn Diagram, Frayer Model) Measurement Conversion Charts for Temperature, Graphing Practice Packet Vocabulary Images for Recall Multimedia- Illustrating the differences between plant and animal cells Leveled Readers - Newsela allows students to pick higher/lower reading levels according to their “comfort” level. Testing Accommodations: Assistive technology, Notes/summaries, Extended time, Answer masking, Answer eliminator, Highlighter, Color contrast Reinforcement Lab: Junior’s Family Tree https://ngss.nsta.org/Resource.aspx?ResourceID=127	Curriculum Compacting Personal Vocabulary Log Challenge Assignments- Color Vision Receptors https://ngss.nsta.org/Resource.aspx?ResourceID=630 Enrichment Activities - Albinism Phenomenon https://ngss.nsta.org/Resource.aspx?ResourceID=1051 Tiered Activities Independent Research/Inquiry - The Human Genome Project Collaborative teamwork: Debate - Which body system is the most crucial and why?



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<p>Visual Aids: Foam Cell Replicas, YouTube Animations of Living Bacteria Modeling: See Cell City Project</p>		<p>Higher level questioning Critical/Analytical Thinking Tasks Self-Directed Activities- Drawing Bones of the Human Body https://docs.google.com/document/d/11OAJhBCgTf5QHepdyl6Fc0-xO9g_-1cpbqePWPjk1E4/edit?usp=sharing</p>
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5E Model	
Body Systems	
<p>Engage Anticipatory Set</p>	<p>Role Play: <u>Traffic Stop</u>- Students perform a role play that explores how alcohol affects the systems of the body.</p> <p>Role Play: <u>Living With Your liver</u>- Students perform a role play on the function of the liver.</p> <p>Reading: <u>Digestion- An Absorbing Tale</u>- Students read about functions and structures of the human digestive system.</p> <p>Role Play: <u>Great Aunt Lily's Will</u>- After performing a role play, students decide on the best use of limited funds to fight heart disease and promote public health.</p> <p>Reading: <u>Healing the Heart</u>- Students read about the history of heart surgery and explore challenges of past and future heart surgery.</p>
<p>Exploration Student Inquiry</p>	<p>Investigation: <u>What's Happening Inside</u>- Students learn about human body systems as they classify organs and develop a 3-dimensional model of several systems. [Includes an optional web-activity on Human Reproductive system.</p> <p>Laboratory: <u>Gas Exchange</u>- Students quantitatively measure the amount of carbon dioxide in their exhaled breath by using an indicator to perform a titration. [Includes web-activity about the nervous system for those using Unit B only.</p> <p>Modeling: <u>The Circulation Game</u>- As a class, students model the transport function of blood as it travels through the human circulatory system.</p> <p>Investigation: <u>Heartily Fit</u>- Students collect data on their heart rates and recovery times as a quantitative measure of physical fitness.</p>



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	<p>Laboratory: <u>Inside a Pump</u>- Students explore the role of valves in the heart by using different pumps as potential models.</p> <p>Laboratory: <u>The Heart-A Muscle</u>- Students investigate the strength of heart muscle as they attempt to pump water at the resting pulse rate.</p> <p>Modeling: <u>Round and Round</u>- In groups, students use pumps to design a working model of the human circulatory system.</p>
<p>Explanation Concepts and Practices</p>	<p>Laboratory: <u>Breakdown</u>- Students design an experiment to investigate the effect of mechanical breakdown on chemical breakdown during digestion.</p> <p>Laboratory: <u>The Pressure's On</u>- Students model the effects of high blood pressure on the circulatory system using clamps on the pump simulation.</p>
<p>Elaboration Extension Activity</p>	<p>Laboratory: <u>Support System: Bones, Joints, and Muscles</u>- After exploring the structure and function of bones, joints and muscles as they dissect a chicken wing, students read about different joints and how they work as levers with bones and muscles in the human body.</p> <p>Reading: <u>Heart Parts</u>- Students read about the structures and functions of the human circulatory system. [An optional sheep's heart dissection is described in the Teacher's Guide.</p> <p>Investigation: <u>Heart Sounds</u>- After an introduction to specific heart problems, students listen to normal and abnormal heart sounds.</p> <p>Reading: <u>Heart Problems</u>- Students read about the physiological causes of high blood pressure, heart disease, and heart attacks.</p>
<p>Evaluation Assessment Tasks</p>	<p>Project: <u>Helping Hearts</u>- After taking a heart risk quiz, students design a public health brochure about a risk factor for heart disease.</p>



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Unit 3: Overview

Unit 3: Reproduction

Grade: 7

Content Area: Life Science

Pacing: 7 Weeks

Essential Question

What are the ethical issues involved in using genetic information?

Student Learning Objectives (Performance Expectations)

[MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.](#)

[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.](#)

[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.](#)

[MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.](#)

Core Instructional Materials

Lab Aids: Reproduction

<https://portals.lab-aids.com/mylibrary.htm>

Supplemental Materials

www.newsela.com

NSTA : <https://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=8>

Science News: <https://www.sciencenewsforstudents.org>

NSTA: <https://ngss.nsta.org/Classroom-Resources.aspx>

Unit Summary

Students consider whether to be tested for a hereditary condition as they explore fundamental principles of Mendelian genetics. Laboratory activities and simulations allow students to examine the inheritance of traits through generations. Students investigate heredity among imaginary “critters,” pea plants, and humans. Other activities focus on the difference between asexual and sexual reproduction, the process of cell division, and the role of nature and nurture in determining traits. Near the end of the unit, students model the use of DNA technologies to solve real-world problems.

Technical Terms



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Allele, asexual reproduction, sexual reproduction, probability, nature, nurture, DNA, fingerprinting, diploid, dominant, egg, fertilization, gamete, genetic recombination, genotype, heredity, heterozygous, homozygous, hybrid, Law of Independent Assortment, Law of Segregation, meiosis, phenotype, pollination, recessive, reproduction,

Formative Assessment Measures

Part A: How do structural changes to genes (mutations) located on chromosomes affect proteins or affect the structure and function of an organism?

Students who understand the concepts are able to:

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.

Part B: How do asexual reproduction and sexual reproduction affect the genetic variation of offspring?

Students who understand the concepts are able to:

Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information.

Develop and use a model to describe why sexual reproduction results in offspring with genetic variation.

Use 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.

Summative Assessments

Reproduction End of Unit Test

Group Project: All about Genetics Webquest:

<https://docs.google.com/document/d/1qhgs9BSninUObE6xdTua3kACG-SGtYKVsLD3px284U/edit?usp=sharing>

Alternative Assessments

Lab Aids Practical "Test": Animal Behaviors and their Environment

Advising Joe Lab Report: <https://docs.google.com/document/d/12g1eQgL81kjkftWXATFOksO9mN7ep8te9XQ5b2NrElw/edit?usp=sharing>

Benchmarks

ReadWorks Article Based Test - Students will be able to read scientific text and use text content to answer questions about the how cells reproduce and how that connects with the reproductive abilities of asexual and sexual organisms.

Culminating Lab: The Genetics of Sesame Street Characters

<https://ngss.nsta.org/Resource.aspx?ResourceID=160>



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Core Instructional Materials	Can include: Textbooks Series, Lab Materials, etc.	
21st Century Life and Careers	CRP2, CRP4, CRP5, CRP 6, CRP7, CRP8 ,CRP11,CRP12	
Technology Standards	8.1.8.A.1, 8.1.8.A.2, 8.1.8.A.3, 8.1.8.A.4, 8.1.8.A.5, 8.1.8.D.1,8.1.8.D.2, 8.1.8.D.3, 8.1.8.D.4, 8.1.8.D.5, 8.2.8.A.2, 8.2.8.B.1	
Modifications		
Modifications to Support Our English Language Learners	Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)	Modifications to Support Our Gifted and Talented
“Reproduction” - Spanish Edition Leveled Articles through Newsela Student Vocabulary Log Intra-act Discussion Web Scaffolding Sentence/Paragraph Frames Google Translate Think and Read Alouds Highlight Key Vocabulary Annotation Guides Think-Pair-Share	Word Walls Visual Aides Graphic Organizers (Venn Diagram, Frayer Model) Measurement Conversion Charts for Temperature, Graphing Practice Packet Vocabulary Images for Recall Multimedia- Illustrating the differences between plant and animal cells Leveled Readers - Newsela allows students to pick higher/lower reading levels according to their “comfort” level. Testing Accommodations: Assistive technology, Notes/summaries, Extended time, Answer masking, Answer eliminator, Highlighter, Color contrast Reinforcement Lab: Pasta Genetics	Curriculum Compacting Personal Vocabulary Log Research about live birth reproduction vs. layin egg reproduction. Challenge Assignments- The Evolution of Zoe the Protozoa https://docs.google.com/document/d/1izvz26WZocG3nPayLCqi_Zbmz5jokO6sEim0-5HU2Zk/edit?usp=sharing Enrichment Activities - Dihybrid Cross Punnett Squares Independent Research/Inquiry - Mendel’s Peas - HOW did he do it all by himself? Collaborative teamwork: Human Adaptations Over Time Higher level questioning Critical/Analytical Thinking Tasks



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<p>Visual Aids: Foam Cell Replicas, YouTube Animations of Living Bacteria Modeling: Baby Mice https://ngss.nsta.org/Resource.aspx?ResourceID=676</p>	<p>https://ngss.nsta.org/Resource.aspx?ResourceID=773</p>	<p>Self-Directed Activities- Mendel’s Monster Factory - CReate your own monster through variations of traits and calculate the probability of those traits occurring for future generations.</p>
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5E Model	
Reproduction	
<p>Engage Anticipatory Set</p>	<p>View and Reflect: <u>Joe’s Dilemma</u>- After reading a fictional story about a child who may have the Marfan syndrome, students watch a video on this genetic disease.</p> <p>Reading: <u>Reproduction</u>- Students read about the differences between sexual and asexual reproduction at the cellular level.</p> <p>Reading: <u>Mendel, First Geneticist</u>- Students read about Gregor Mendel’s experiments with pea plants.</p> <p>Reading: <u>Show Me the Genes!</u>- Students read about the behavior of chromosomes and the function of DNA during sexual reproduction. (Optional web-based activity on Human Reproduction.)</p>
<p>Exploration Student Inquiry</p>	<p>Investigation: <u>Investigating Human Traits</u>- Students collect data on six human characteristics and discuss causes of human variation.</p> <p>Laboratory: <u>Plants Have Genes, Too!</u>- Students germinate seeds and use information about the parent plants to predict offspring color.</p> <p>Modeling: <u>Creature Features</u>- Students develop models to investigate the inheritance of a trait in imaginary creatures.</p> <p>Investigation: <u>Gene Combo</u>- Students model the inheritance of single – gene traits by collecting and analyzing data from coin tosses.</p> <p>Problem Solving: <u>Gene Squares</u>- Students use Punnett squares to predict the approximate frequencies of traits among offspring.</p> <p>Laboratory: <u>Nature and Nurture</u>- Students design an experiment to investigate the effect of the environment on seedling color.</p>



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	<p>Investigation: <u>Searching For the Lost Children</u>- After being introduced to a story about children lost during war, students apply blood group genetics to evaluating parent/child matches.</p>
<p>Explanation Concepts and Practices</p>	<p>Laboratory: <u>Analyzing Genetic Data</u>- Students quantify and analyze results of the seeds germinated in Activity 55. (Optional web-based activity on Life Cycles of Plants and Animals, including a flower dissection.)</p> <p>Talking it Over: <u>Should We?</u>- Students learn about the work of Dr. Mary-Claire King, who helped families in Argentina find their lost children and explore the ethics of using genetic information.</p>
<p>Elaboration Extension Activity</p>	<p>Investigation: <u>Breeding Critters- More Traits</u>- Students create imaginary critter offspring to model patterns of inheritance.</p> <p>Talking It Over: <u>What Would You Do?</u>- Students revisit the Marfan scenario from Activity 56 and discuss the tradeoffs of genetic testing.</p> <p>Investigation: <u>Finding The Lost Children</u>- Students use DNA fingerprints to gather additional evidence about the lost children introduced in Activity 68.</p>
<p>Evaluation Assessment Tasks</p>	<p>Problem Solving: <u>Patterns in Pedigrees</u>- Students use Punnett squares and pedigrees to analyze patterns of inheritance.</p> <p>Modeling: <u>Evidence From DNA</u>- Students perform a DNA fingerprinting simulation to generate different sized pieces of DNA.</p>



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Unit 4: Overview

Unit 4: The Chemistry of Materials

Grade: 7

Content Area: Physical Science

Pacing: 8 Weeks

Essential Question

What kinds of materials are products made of? What will happen to it when you no longer have a need for it?

Student Learning Objectives (Performance Expectations)

[MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures.](#)

[MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.](#)

[MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.](#)

[MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.](#)

[MS-PS1-5. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.](#)

Core Instructional Materials

Lab Aids: "Chemistry of Materials"

<https://portals.lab-aids.com/mylibrary.htm>

Supplemental Materials

www.newsela.com

NSTA : <https://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=10>

Science News: <https://www.sciencenewsforstudents.org>

NSTA: <https://ngss.nsta.org/Classroom-Resources.aspx>

Unit Summary

Students explore the life cycles of a variety of common materials from the acquisition of raw materials through to the end of the product's useful life. After learning about the basic building blocks of matter, elements, and the periodic table, students model the structures of several common compounds. Moving from the atomic level to the material level, students investigate what conservation of matter means in light of the product life cycle and how this can affect manufacturing decisions.

Technical Terms

atoms, molecule, subatomic, nucleus, proton, neutron, electron, particle, electron cloud, isotopes, atomic scale, molecular scale, physical and chemical properties, elements, compounds, The Periodic Table, chemical reactions, chemistry of materials, conservation of mass

Formative Assessment Measures

Part A: What materials are different products made of?



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Students who understand the concepts are able to:
 Develop a model of a simple molecule.
 Use the model of the simple molecule to describe its atomic composition.
 Develop a model of an extended structure.

Part B: Is it possible to tell if two substances mixed or if they reacted with each other?

Students who understand the concepts are able to:
 Analyze and interpret data to determine similarities and differences from results of chemical reactions between substances before and after they undergo a chemical process.
 Analyze and interpret data on the properties of substances before and after they undergo a chemical process.
 Identify and describe possible correlation and causation relationships evidenced in chemical reactions.
 Make logical and conceptual connections between evidence that chemical reactions have occurred and explanations of the properties of substances before and after they undergo a chemical process.

Summative Assessments

Chemistry of Materials Unit Test
Group Project: Investigating chemical vs. physical reactions.

Alternative Assessments

Lab Aids Adaptive Tests
Lab Report: Physical and Chemical Properties of Materials
 Interactive atom building https://phet.colorado.edu/sims/html/build-an-atom/latest/build-an-atom_en.html

Benchmarks

“Molecule Arrangement” article based test
“Recycling” article based test

Interdisciplinary Connections

NJSLS- ELA	NJSLS- Mathematics
RST.6-8.1	6.RP.A.1
RST.6-8.2	6.RP.A.3
RST.6-8.3	6.SP.8.4
RST.6-8.7	6.SP.8.5
WHST.6-8.1	7.RP.A.2
WHST.6-8.2	7.EE.B.3
WHST.6-8.7	MP.2
WHST.6-8.8	MP.4



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WHST.6-8.9 SL.8.1.		
Core Instructional Materials	Can include: Textbooks Series, Lab Materials, etc.	
21st Century Life and Careers	CRP2, CRP4, CRP5, CRP6, CRP7, CRP8 ,CRP11,CRP12	
Technology Standards	8.1.8.A.1, 8.1.8.A.2, 8.1.8.A.3, 8.1.8.A.4, 8.1.8.A.5, 8.1.8.D.2, 8.1.8.D.3, 8.1.8.D.4, 8.1.8.D.5, 8.2.8.A.2, 8.2.8.B.1,	
Modifications		
Modifications to Support Our English Language Learners	Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)	Modifications to Support Our Gifted and Talented
“Chemistry of Materials” - Spanish Edition Leveled Articles through Newsela Student Vocabulary Log Intra-act Discussion Web Scaffolding Sentence/Paragraph Frames Google Translate Think and Read Alouds Highlight Key Vocabulary Annotation Guides Think-Pair-Share Visual Aids: Periodic Tables, Atom Diagram	Word Walls Visual Aides Graphic Organizers (Venn Diagram, Frayer Model) Measurement Conversion Charts Vocabulary Images for Recall Multimedia- Interactive atom building https://phet.colorado.edu/sims/html/build-an-atom/latest/build-an-atom_en.html Leveled Readers - Newsela allows students to pick higher/lower reading levels according to their “comfort” level. Visual Aids: Periodic Tables, Atom Diagram Testing Accommodations: Assistive technology, Notes/summaries, Extended time, Answer masking, Answer eliminator, Highlighter, Color contrast	Curriculum Compacting Personal Vocabulary Log Discussion Web on recyclability of different materials Challenge Assignments- How do we recycle? Enrichment Activities - Create your own element Independent Research/Inquiry - Impact of plastics on society https://ngss.nsta.org/Resource.aspx?ResourceID=556 Collaborative teamwork: Model state changes Higher level questioning Critical/Analytical Thinking Tasks Self-Directed Activities- What steps does your family take to recycle?

5E Model	
The Chemistry of Materials	
Engage Anticipatory Set	<p>Reading: <u>Product Life Cycle</u>- Students construct a life cycle diagram after reading about the life cycle of glass, metal, and plastic drink containers.</p> <p>Reading: <u>Elements and the Periodic Table</u>- Students read about elements, their combination in compounds, and the development of the Periodic Table.</p> <p>Reading: <u>Polymer Parts</u>- Students read about synthetic polymers and the cross-linking process, which changes the chemical structure of a polymer.</p>



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	<p>Investigation: <u>Environmental Impact of Computers</u>- Students consider the material composition of a computer and its environmental impact by constructing a pie chart or graph.</p>
<p>Exploration Student Inquiry</p>	<p>Investigation: <u>Evaluating Materials</u>- Students compare aluminum, glass, and plastic in order to choose the best material for a soft drink container.</p> <p>Laboratory: <u>Physical and Chemical Properties of Material</u>- Students test and group 6 different materials based on their chemical and physical properties.</p> <p>Investigation: <u>Families of Elements</u>- Students group elements based on chemical and physical properties and then analyze families of elements.</p> <p>Modeling: <u>Modeling Molecules</u>-Students use models to explore the concepts of element, molecules, and compounds.</p> <p>Laboratory: <u>Properties of Plastics</u>- Students explore the properties of four common plastics to determine how these properties affect their uses of these plastics.</p> <p>Modeling: <u>Modeling Polymers</u>- Students study the structure and properties of polymer molecules by making different models of polymers.</p> <p>Laboratory: <u>Producing Circuit Boards</u>- Students simulate the etching of computer circuit boards and then read about their manufacture and the resulting waste.</p> <p>Laboratory: <u>Diluting the Problem</u>- Students explore the dilution method of treating used copper chloride from circuit board production. They then determine the concentration of copper in the waste solution.</p> <p>Laboratory: <u>Incinerating the Waste</u>- Simulated metal waste is burned. Students then test the smoke and ash for the presence of potential toxic metals.</p> <p>Laboratory: <u>Reclaiming the Metal</u>- Students investigate the use of metal replacement reactions to extract copper from the used solution.</p>



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<p>Explanation Concepts and Practices</p>	<p>Laboratory: <u>Conservation of Mass</u>- Students conduct two chemical reactions in closed containers in order to compare mass before and after a chemical reaction has taken place. They then compare the change in mass to the same reactions in open containers, and use this data to support the Law of Conservation of Mass.</p>
<p>Elaboration Extension Activity</p>	<p>Laboratory: <u>Creating New Materials</u>- Students observe and compare the properties of reactants and a product they cross-link producing a new polymer.</p>
<p>Evaluation Assessment Tasks</p>	<p>Laboratory: <u>Another Approach to Metal Reclamation</u>- Students precipitate copper compounds from used copper chloride, then decide upon a disposal method for the waste solution.</p> <p>Talking it Over: <u>The Green Computer Decision</u>- From four proposals, students recommend a computer purchase based on many factors including the environmental impact of the computer chosen.</p>



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Unit 5: Overview	
<u>Unit 5: Plate Tectonics</u>	
Grade: 7	
Content Area: Earth and Space Science	
Pacing: 5 Weeks	
Essential Question	
What do plate tectonics impact?	
Student Learning Objectives (Performance Expectations)	
<u>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.</u>	
<u>MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.</u>	
<u>MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.</u>	
<u>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.</u>	
Core Instructional Materials	
Lab Aids: "Plate Tectonics" <u>https://portals.lab-aids.com/mylibrary.htm</u>	
Supplemental Materials	
<u>www.newsela.com</u> NSTA : <u>https://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=10</u> Science News: <u>https://www.sciencenewsforstudents.org</u> NSTA: <u>https://ngss.nsta.org/Classroom-Resources.aspx</u>	
Unit Summary	
Students explore the structure of the earth - the core, mantle, and crust - and learn how the slow movements of large plates of the earth's surface help shape its features, including continents and oceans. They investigate earthquakes and volcanoes as they examine plans to deposit radioactive wastes in areas of relative seismic stability.	
Technical Terms	
Geoscience, earthquakes, volcanoes, plate tectonics, mountains, continental drift, core, mantle, crust, continent, ocean, radioactive waste, nuclear, seismic, valley glacier, continental glacier, scale, proportions, convection currents	



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Formative Assessment Measures

Part A: Where should we store our nuclear waste?

Students who understand the concepts are able to:

Choose a site to store nuclear waste.

Support their decision with evidence from class activities.

Discuss the tradeoffs of their decision.

Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

Part B: Do all of the changes to Earth systems occur in similar time scales?

Students who understand the concepts are able to:

Construct a scientific explanation for how geoscience processes have changed Earth's surface at varying time and spatial scales based on valid and reliable evidence obtained from sources (including the students' own experiments).

Construct a scientific explanation for how geoscience processes have changed Earth's surface at varying time and spatial scales based on the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.

Collect evidence about processes that 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).

Collect evidence about processes that change Earth's surface at time and spatial scales that can be 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.

Summative Assessments

Plate Tectonics Unit Test

Group Project: Measuring Earthquakes

Alternative Assessments

Lab Aids Adaptive Tests

Lab Report: Convection Currents

Benchmarks

Continental Drift article based test

Interdisciplinary Connections

NJSLS- ELA

NJSLS- Mathematics

RST.6-8.1

RST.6-8.7

7.RP.A.2



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RST.6-8.9 WHST.6-8.1 WHST.6-8.2 WHST.6-8.9 SL.8.5	
Core Instructional Materials	Can include: Textbooks Series, Lab Materials, etc.
21st Century Life and Careers	CRP2, CRP4, CRP5, CRP 6, CRP7, CRP8 ,CRP11,CRP12
Technology Standards	8.1.8.A.1, 8.1.8.A.2, 8.1.8.A.3, 8.1.8.A.4, 8.1.8.A.5, 8.1.8.D.1,8.1.8.D.2, 8.1.8.D.3, 8.1.8.D.4, 8.1.8.D.5, 8.2.8.A.2, 8.2.8.B.1,
Modifications	
Modifications to Support Our English Language Learners	Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)
"Plate Tectonics" - Spanish Edition Leveled Articles through Newsela Student Vocabulary Log Intra-act Discussion Web Scaffolding Sentence/Paragraph Frames Google Translate Think and Read Alouds Highlight Key Vocabulary Annotation Guides Think-Pair-Share Visual Aids: Plate boundaries map, earthquake and volcano diagrams Modeling: Continental Drift	Word Walls Visual Aides Graphic Organizers (Venn Diagram, Frayer Model) Measurement Conversion Charts Vocabulary Images for Recall Multimedia- Illustrating the differences between plant and animal cells Leveled Readers - Newsela allows students to pick higher/lower reading levels according to their "comfort" level. Visual Aids: Plate boundaries map, earthquake and volcano diagrams Modeling: Continental Drift Testing Accommodations: Assistive technology, Notes/summaries, Extended time, Answer masking, Answer eliminator, Highlighter, Color contrast
Modifications to Support Our Gifted and Talented	Curriculum Compacting Personal Vocabulary Log Discussion Web on Challenge Assignments- Tsunamis https://ngss.nsta.org/Resource.aspx?ResourceID=969 Enrichment Activities - Investigating and mapping current earthquakes and volcanoes Tiered Activities Independent Research/Inquiry - Site Risks Collaborative teamwork: Debate (Where to store nuclear waste?) Higher level questioning Critical/Analytical Thinking Tasks Self-Directed Activities- What type of plate do you live on?

5E Model	
Plate Tectonics	
Engage Anticipatory Set	Talking It Over: <u>Storing Waste</u> - Earthquakes and volcanoes are introduced as students analyze evidence related to the storing of nuclear waste.



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	<p>Reading: <u>Beneath The Earth’s Surface</u>- Students construct diagrams describing earth’s interior before and after they read about volcanoes and earth layers.</p> <p>Talking it Over: <u>Continental Drift</u>- Students consider the historical development of the idea of continental drift.</p> <p>View and Reflect: <u>The Theory of Plate Tectonics</u>- A short video is viewed on the history of the theory of plate tectonics beginning with Wegener’s idea of continental drift.</p>
<p>Exploration Student Inquiry</p>	<p>Modeling: <u>Volcanic Landforms</u>- Students consider the constructive nature of volcanoes as they model the effects of two different kinds of volcanic eruptions.</p> <p>Investigation: <u>The Continent Puzzle</u>- Students use puzzle pieces representing earth’s continents to begin to investigate continental drift.</p> <p>Modeling: <u>Measuring Earthquakes</u>- Students model how a seismograph records earthquakes.</p> <p>Modeling: <u>Convection Currents</u>- Students explore the mechanism behind plate motion as they investigate convection currents.</p>
<p>Explanation Concepts and Practices</p>	<p>Problem Solving: <u>Mapping Plates</u>- Students compare the sizes and shapes of continents to plates as they label major plates and use earthquake and volcano data to plot and draw missing plate boundaries.</p> <p>Reading: <u>Understanding Plate Boundaries</u>- Students read about how plate tectonics helps explain earthquakes, volcanoes, and mountain ranges.</p> <p>Computer Simulation: <u>Spreading Plates</u>- Students use a computer simulation to investigate what happens when earth’s plates move apart over time.</p> <p>Computer Simulation: <u>Other Types of Plate Motion</u>- Students use a computer simulation to investigate what happens when earth’s plates collide and slide past each other.</p>
<p>Elaboration Extension Activity</p>	<p>Investigation: <u>Earth Time</u>- Students are introduced to the age of earth as they place important events in earth’s history into one of four time periods.</p>
<p>Evaluation Assessment Tasks</p>	<p>Talking it Over: <u>Comparing Site Risk</u>- Students use what they learned to compare storing nuclear waste at three different sites, including Yucca Mountain.</p>



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