

Long Beach Island Consolidated School District Curriculum Guide

Grade: 6	Content Area: Science
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Introduction

Students in sixth grade integrate a range of practices to construct evidence-based explanations of compelling yet challenging phenomena centered on Engineering, Life Science, Physical Science and Earth Science concepts ranging from cells to organisms and body systems, weather and Earth's systems, and light and matter. Students conduct investigations, analyze data, construct explanations, and develop and use models through relevant, meaningful real-world events to support understanding of these concepts and core ideas.

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Revised by: C. McBride
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Revised by: C. McBride

Recommended Pacing Guide	
Unit 1: Cells	30 Days
Unit 2: Body Systems	25 Days
Unit 3: Earth's Systems (Plate Tectonics and Rock Cycling)	35 Days
Unit 4: Earth and Human Activity	25 Days
Unit 5: Weather, Climate, and Water	30 Days
Unit 6: Light and Matter	25 Days

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Alignment with State Mandates

The following colors are used throughout this document to indicate areas in which the curriculum is aligned with the following NJSA requirements:

Holocaust and genocides (N.J.S.A. 18A:35-28)

History and contributions of African-Americans (Amistad Law) (N.J.S.A. 18A:35-4.43)

Highlight and promote diversity and inclusion (Diversity & Inclusion Law) (N.J.S.A. 18A:35-4.36a)

Climate Change - to prepare students to understand how and why climate change happens, the impact it has on our local and global communities and to act in informed and sustainable ways. Please click here [New Jersey Climate Education Hub](#) for specific examples.

WIDA English Language Development Standards (N.J.S.A. 18A:35-15 to 26) are integrated with Science Standards

WIDA English Language Development Standard 3 [WIDA English Language Development Standards Framework, 2020 Edition](#)

“New Jersey remains committed to supporting multilingual learners through policies and practices that promote access, equity, and academic success. The English Language Development Standards provide a framework for ensuring that multilingual learners receive the instruction and support necessary to develop English language proficiency while meeting the expectations of the New Jersey Student Learning Standards. Implementation of these standards across all content areas supports inclusive learning environments and advances New Jersey’s commitment to preparing all students for success beyond graduation. The English Language Development Standards are a shared responsibility across all content areas and support inclusive and equitable learning environments. The English Language Development standards are a foundational component of standards-aligned instruction, guiding educators in designing learning experiences that make the NJSLs accessible to all students. The English Language Development Standards are designed to be implemented by all educators who work with multilingual learners. Classroom teachers, ESL and bilingual educators, specialists, and administrators share responsibility for ensuring that multilingual learners receive appropriate linguistic and academic support. Educators are encouraged to use these resources alongside the full framework when planning instruction, identifying language expectations, and designing opportunities for multilingual learners to engage meaningfully with grade-level content.”

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Unit 1: Cells

Duration: 35 days

Science Standards with Integrated WIDA Standards

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

ELD-SC.6-8.Explain.Interpretive Interpret scientific explanations by • Defining investigable questions or design problems based on observations, information, and/or data about a phenomenon • Determining central ideas in complex evidence and information to help explain how or why a phenomenon occurs • Evaluating scientific reasoning that shows why data or evidence adequately supports conclusions

MS-LS1-2: Develop and use a model to describe the function of a cell as a whole and ways the 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

ELD-SC.6-8.Argue.Expressive Construct scientific arguments that • Introduce and contextualize topic/ phenomenon in issues related to the natural and designed world(s) • Support or refute a claim based on data and evidence • Establish and maintain a neutral or objective stance • Signal logical relationships among reasoning, evidence, data, and/or a model when making or defending a claim or counterclaim

MS-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Disciplinary Core Ideas

LS1.A: Structure and Function

- All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (MS-LS1-1)
- Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2)
- In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (MS-LS1-3)

Science and Engineering Practices

SEP.2: Developing and Using Models Develop a model to describe phenomena. (MS-LS1-2)

SEP.3: Planning and Carrying Out Investigations Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation. (MS-LS1-1)

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SEP.7: Engaging in Argument from Evidence Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. (MS-LS1-3)

SEP.8: Obtaining, Evaluating, and Communicating Information Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence.

Crosscutting Concepts

CCC.3: Scale, Proportion, and Quantity Phenomena that can be observed at one scale may not be observable at another scale. (MS-LS1-1)

CCC.6: Structure and Function Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS1-2)

CCC.4: Systems and System Models Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3)

Connections to Engineering, Technology, and Applications of Science

Science Is a Human Endeavor Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (MS-LS1-3)

Interdependence of Science, Engineering, and Technology

Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-LS1-1)

Technology Standard(s)

8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).

8.2.8.ED.1: Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.

8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.

8.2.8.ED.5: Explain the need for optimization in a design process.

8.2.8.ED.6: Analyze how trade-offs can impact the design of a product.

8.2.8.ED.7: Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches).

Interdisciplinary Standard(s)

ELA/Literacy

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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. (MS-LS1-3)

RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. (MS-LS1-3)

RST.6-8.4 - Make meaning. Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. Students write to explain why science attitudes are important when doing science and make predictions about how bias could affect scientists' work (MS-LS1-3)

SL.8.5 - Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence (MS-LS1-2)

WHST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. (MS-LS1-3)

WHST.6-8.8 - Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

ELA Connection to SEP: Obtaining, Evaluating and Communicating Information

RI.MF.6.6. Integrate information when presented in different media or formats (e.g., visually, quantitatively) to develop a coherent understanding of a topic or issue.

W.IW.6.2. Write informative/explanatory texts (including the narration of historical events, scientific procedures/ experiments, or technical processes) to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

(Clarification Statements: Informative writing informs the reader by presenting facts, details, and descriptions about a topic. Explanatory writing explains a process, idea, or concept by showing how or why something happens.)

ELA Connection to SEP: Planning and Carrying Out Investigations

RI.CI.6.2. Determine the central idea of an informational text and explain how it is supported by key details; provide a summary of the text distinct from personal opinions or judgments.

W.WR.6.5. Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.

SL.II.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

ELA Connection to SEP: Engaging in Argument With Evidence

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RI.AA.6.7. Trace the development of and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.

W.AW.6.1. Write arguments on discipline-specific content (e.g., social studies, science, math, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence

Mathematics

6.EE.C.9 - Use variables to represent two quantities, such as the number of cells that make up an organism and units representing the size or type of the organism and determine the relationship between these two variables. Use variables to help determine the ratio of the cell's surface area to its volume. (MS-LS1-1), (MS-LS1-2), (MS-LS1-3)

Comprehensive Health and Physical Education

2.1.8.PGD.2: Analyze how genetics and family history can impact personal health. (MS-LS1-1, MS-LS1-2, MS-LS1-3)

2.3.8.HCDM.2: Determine the role of genetics in being susceptible to disease and health conditions and identify the types of behavior that might reduce the risk factors. (MS-LS1-1, MS-LS1-2, MS-LS1-3)

2.1.8.CHSS.6: Develop an advocacy plan regarding a health issue and share this information in an appropriate setting. (MS-LS1-1, MS-LS1-2, MS-LS1-3)

2.1.8.CHSS.7: Collaborate with other students to develop a strategy to address health issues related to climate change. (MS-LS1-1, MS-LS1-2, MS-LS1-3)

Career Readiness, Life Literacies, and Key Skills Practices

The following skills are encouraged and taught:

Demonstrate creativity and innovation.

Utilize critical thinking to make sense of problems and persevere in solving them.

Consider the environmental, social and economic impacts of decisions.

Use technology to enhance productivity, increase collaboration and communicate effectively.

Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies, and Key Skills Standards

9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (MS ETS1-4, 6.1.8.CivicsDP.1).

9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (MS-ETS1-1, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).

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Enduring Understandings

Students will understand that...

Cells are the smallest unit of life that can be said to be alive.

All living things are made of cells, either one cell or many different numbers and types of cells.

Nonliving things can be composed of cells from once-living things that have died.

Organisms may consist of one single cell (unicellular) or many different types and numbers of cells (multicellular).

The cell functions as a whole system.

Within cells, special structures are responsible for particular functions (organelles-nucleus, chloroplasts, mitochondria, cell membrane, golgi apparatus, endoplasmic reticulum, etc.).

Within cells, the cell membrane forms the boundary that controls what enters and leaves the cell.

Engineering advances have led to important discoveries in the field of cells.

Complex and microscopic structures and systems in cells can be visualized, modeled, and used to describe how the function of the cell depends on the relationship among its parts.

A model can be used to describe the function of a cell as a whole.

A model can be used to describe how parts of cells contribute to the cell's function.

The structures of the cell wall and cell membrane are related to their function.

All plants share certain characteristics however, vascular and nonvascular plants differ.

The structure and function of roots, stems and leaves are specialized to carry out specific life functions.

Chronic diseases can be inherited through genetics.

Clean water is important in the prevention of infectious disease prevention.

Climate change can affect human health.

Vector-borne diseases can affect human health.

Essential Questions

What evidence is there that all living things are made of cells?

Where do living things come from?

What do living things need to stay alive, grow and reproduce?

What is a cell and what is The Cell Theory?

What do the traits of cells tell you about their jobs?

How do the parts of a cell work?

How do the functions of cells support an entire organism?

How can we design a model of a virus to develop a solution to a problem?

How can we model the process of disease inheritance?

How can we advocate for the importance of clean water in disease prevention?

How does climate change affect public health?

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Student Learning Goals/Objectives	
<i>Students will know:</i> Cells are the smallest unit of life. All living things are made of cells, either one or many. Cells that can be observed at one scale may not be observable at another scale. Nonliving things can be composed of cells from once-living things that have died. Engineering advances have led to the important discoveries in cell theory. Every organelle in a cell is responsible for particular functions. The cell functions as a whole system. How traits for disease can be inherited. How safe drinking water is important for infectious disease prevention. How penicillin is used to treat diseases. How climate change can affect public health. Careers in the field of microbiology. How cells repeatedly divide to make more cells for growth and repair. How vector-borne diseases can threaten human health.	<i>Students will be able to:</i> Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. MS-LS1-1 Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. MS-LS1-2 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. MS-LS1-3 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. MS-ETS1-1
Assessment Evidence	
Performance Tasks Conduct an investigation to provide evidence that supports all living things are made of cells Identify and describe evidence that explains what all living things are made of Conduct an investigation to provide evidence that explains what living things need to stay alive, grow, and reproduce Conduct an investigation to provide evidence that describes characteristics of viruses, bacteria, protists and fungi Construct explanations that explain how viruses, bacteria, protists and fungi interact with nature and people.	Other Assessments Formative: ● Lesson quizzes, and reviews ● Student investigations and models ● Language Arts writing activities ● Graphic Organizers & Guided Note Taking ● Directed Reading ● Cooperative Group Learning ● Homework ● Journal Entries ● Exit Tickets

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Distinguish between living and nonliving things Observe different types of cells that can be found in the makeup of living things. Compare a cell to a real-life working system, using a model to describe the function of a cell as a whole (ie: a factory, amusement park, school, etc.) Develop and use a model to describe the parts of a cell with each corresponding function and their interdependence. Compare and contrast animal and plant cells Design, build and test a model of a virus. Conduct research of careers in microbiology. Conduct investigation to model inheritance of genetic traits related to chronic disease. Investigate and advocate for safe drinking water. Investigate how climate change can affect public health and advocate for a specific climate adaptation strategy related to public health. Model how microbes grow and divide and multiply exponentially. WIDA Language Functions <i>Science examples:</i> Construct a scientific claim about the impact of human activity on natural resources. Support claims with empirical evidence gathered from lab observations, data tables, or scientific diagrams. Distinguish between fact and opinion when evaluating external sources regarding global climate change. Justify conclusions or hypotheses using logical reasoning connectors (<i>because, therefore, as a result, that means</i>) WIDA Sample Sentence Frames	• Polls/ Surveys with self evaluation component • Jigsaw • Think, Pair, Share • Quizzes Alternative: • Modified tests and quizzes • Group work • Peer assessments • Labs • Projects • Portfolio Assessments Summative • Unit Test/Topic Test • Unit Project • Performance Assessment/Tasks • Engineering projects Benchmark Assessments: • Unit pre-test • Beginning of the year, mid year, and end of the year SGO

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Clarify mechanisms of how cell organelles function together to keep a cell alive Cells and Organelles: WIDA Levels 1-2: The organelle ____ is like a ____ because ____. Plants have ____ structure but animal cells do not. The ____ helps the cell by (verb-ing). WIDA Levels 3-4 The function of the ____ in a cell is to ____ which allows the cell to ____. Both plant and animal cells have ____ but only plant cells have ____. ----- Cell Theory Claims WIDA Levels 1-2 My claim is that this specimen is alive/not alive. My evidence is that I see ____. Cells are important because ____. WIDA Levels 3-4 Based on the Cell Theory, I argue that the specimen is ____. The data from the microscope supports the evidence that ____.	
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Core Instructional & Supplemental Materials	
Suggested Activities/Resources:	Varied Levels of Text: • leveled readers

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● Savvas Realize “Elevate Science: Course 1” ○ Lesson explorations ○ Hands-on activities ○ Virtual Labs ○ Video based projects ○ Performance tasks ○ Engineering projects ○ Student investigations ○ Microbiology Career Research p.468 ○ Develop a proposal for a solution to a real-world problem that includes a model: ‘Virus Engineering Design Project’ (p.471) with Technology Presentation Bacteriophage Builder Challenge - Maker Challenge - TeachEngineering ○ The Deadliest Being on Planet Earth – The Bacteriophage ○ Fighting Infection with Phage https://why.pbslearningmedia.org/resource/id-ptv11.sci.life.reg.basic.d4kbld/blood/ ● Research diverse scientists in life science field such as Kizzmekia Corbett (immunologist) George Washington Carver and Ernest Everett Just ● How does our skin heal? ● Blood Bank advocacy project with real data ● Amistad Activity about Dr. Charles Drew (1904–1950). Explain that before WWII, blood could not be stored long-term, meaning many	● Newsela “History of the Cell; Discovering the Cell”, “All the Cells in your Body”, “Cells and the Versatile Functions of Their Parts”, “How the Cell Membrane Works” ● “The Universe in You: A Microscopic Journey” Jason Chen ● Storyworks articles ● The Secret Garden of George Washington Carver by Gene Barretta and Frank Morrison ● The Vast Wonder of the World: Biologist Ernest Everett Just by Mélina Mangal and Luisa Uribe ● Robert Hooke ● Robert Hooke ● Can viruses save lives? - Science Journal for Kids and Teens with introductory video https://youtu.be/DlvceL_UiHs “Can Viruses Save Lives?” ● Meet-a-Scientist: Tiffany Luong - Science Journal for Kids and Teens ● How can bacteria stop dengue? - Science Journal for Kids and Teens ● How can we use genetic engineering to get rid of malaria for good? ● How can we find oil-eating bacteria to clean up the sea? - Science Journal for Kids ● “Gregor Mendel: The Friar Who Grew Peas” by C. Bardoe ● Mistakes that Worked: 40 Familiar Inventions & How they Came to Be by Charlotte Foltz Jones ● STEM Lesson Essentials by JoAnne Vasquez, Cary Sneider & Michael Comer
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people died from blood loss. Dr. Drew discovered how to separate red blood cells from plasma, allowing blood to be frozen, stored ("Blood Banks"), and shipped. Despite saving thousands of lives during WWII, Dr. Drew resigned from the American Red Cross because the military ordered that blood from Black and White donors be segregated—a policy with zero scientific basis. [Charles Richard Drew - Kids](#)

Additional Activities/Resources

- **Morphemes in Science:**
<https://irrc.education.uiowa.edu/sites/irrc.education.uiowa.edu/files/2026-04/High-Frequency-Morphemes-in-Science.pdf>
- [Is Yeast Alive?](#)
- [Cells Unit: Modeling Cell Structure and Function – SEPUP](#)
- [Amazing Cells](#)
- [Virtual Microscope](#)
- [Nova: The Universe Within - YouTube](#)
- www.cellsalive.com
- A Busy Factory
<http://www.slcschools.org/departments/curriculum/science/grade-7-to-8/grade-7/documents/s3-o2-lessoncell-as-a-factory-website-pdf.pdf>
- Cell Structure Lab (Argument Driven Inquiry)
- [Engineering Design Process](#)
- [Engineering Design Process | NASA](#)
- [What is Engineering?](#)
- [Lab: Using a Microscope](#)
- [Video: Trillions as One](#)
- [Interactive: Organ Systems at Work](#)
- [Game: Cell-or-System](#)

- [E+S Integrating Engineering and Science in Your Classroom](#) NSTA Press Edited by Eric Brunsell
- Article about Dr. Charles Drew
[Charles Richard Drew - Kids](#)

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• On Guard—Germs vs. the Immune System • Scene: The Tiniest Food Factories • HudsonAlpha iCell • Project: Clone the Clippy Cell • https://why.pbslearningmedia.org/resource/odys08.sci.life.gen.discovery/the-discovery-of-penicillin/ • https://why.pbslearningmedia.org/resource/odys08.sci.life.gen.producing/producing-penicillin/ • https://www.youtube.com/watch?v=zwibgNGe4aY What is DNA and How Does it Work? • Family Health History with Pick the Risk: The Polygenic Pedigree Challenge • CDCM PHA STEM Lesson - Making Water Safe David J. Sencer CDC Museum CDC • Lesson 4. Activity 3 Microbe Multiplication Magic (45 minutes) • https://njclimateeducation.org/lesson-plan/climate-change-and-public-health?queryID=b831f84e3eec0879723d4d607d11720b	
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Modifications and Accommodations
Multilingual Learners • Differentiate instruction and classroom assessment as guided by the WIDA English Language Development Standards Framework, 2020 Edition. • https://wida.wisc.edu/sites/default/files/resource/CanDo-KeyUses-Kindergarten.pdf • Follow the Individualized Educational Plans (IEP) for ML Special Education (SE) students. • Encourage the ML student to use oral language. Discussions, especially pair-work, allow students to expand language usage in listening and speaking. • Allow MLs to clarify ideas, make sense of their previous statements and elaborate on their views with specific explanations. • Use wait time for MLs to express their ideas in class. • Graphic organizers, color-coded anchor charts, word walls with visual imagery, and breakdown techniques for decoding dense mathematical word problems

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- Structured talk protocols (Think-Pair-Share, Numbered Talks) and word banks
- Provide pictures and well labeled models
- Speak slowly and gesture when necessary
- Pre-teach vocabulary words
- Extended time on assessments
- Small group for assessment
- Review Vocabulary
- Allow for alternate responses during activities and assessments
- Literacy and language support strategies including discourse
- Use a poster, slide, or picture to support student listening in science such as GLAD pictorial input chart
- Preview science texts with students, discussing salient text features such as tables, graphs, and photographs before they read it.
- Provide summaries and include native language texts.
- Provide sentence stems for all students to use, especially to support complex verbal practices like argumentation, explanation, and communication.
- Engage ELs in authentic vocabulary exploration as they try to make their thoughts meaningful to others through writing. Provide dictionaries or [Google Translate](#). Look beyond grammar and spelling to understand student ideas.
- Home culture connections

Special Education/504 Plans/Students with Disabilities:

- Follow specific IEP/504 accommodations and modifications
- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Allow alternate assignments and assessments
- Differentiated Instruction

Students at Risk of Failure:

- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Incorporate social/emotional discussions
- Encourage and monitor positive peer collaboration
- Provide academic resources for both home and school use
- Provide incentives to increase motivation and collaboration

Economically Disadvantaged:

- Provide clear, achievable expectations, do not lower academic requirements for them.
- Build a safe and nurturing atmosphere
- Be flexible with assignments
- Offer several alternatives from which all students can choose.
- Allow students to finish assignments independently, or give them the opportunity to complete tasks at their own pace.
- Use real-world examples and create mental models for abstract idea

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- Provide increased knowledge base and vocabulary use about real world experiences.
- Share the decision making in class.
- Maintain expectations while offering choice and soliciting input
- Connect concepts to students' sense of "place" as physical, historical, and sociocultural dimensions
- Ask questions that elicit students' funds of knowledge
- Use cultural artifacts that are meaningful
- Use project-based learning as a form of connected science
- Provide resources for science instruction

Culturally Diverse:

- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions
- Build in more group work to encourage interaction with peers
- Show photos, videos, and definitions when possible for culturally unique vocabulary
- Teach study skills
- Provide students with necessary academic resources and materials
- Allow for alternative assignments
- Provide visuals
- Assign peer tutor
- Support verbal explanations with non verbal cues: Gestures/ facial expressions Props, realia, manipulatives, concrete materials Visuals, graphs, pictures, maps
- Provide positive praise to increase motivation
- Provide real world connections and emphasize the value of education
- Communicate high expectations for the success of all students
- Use cultural artifacts that are meaningful relevant
- Integrate community involvement
- Include role models and mentors of similar racial or ethnic backgrounds

Gifted and Talented

- Peer mediated strategies
- Cooperative learning groups
- Differentiated instruction

Presentation accommodations allow a student to:

- Vary the method of presentation: lecture, small groups, large group, demonstration, individual experimentation
- Explore real world connections
- Use technology tools to enhance content

Response accommodations allow a student to:

- Turn and Talk
- Reward risk taking while encouraging students to think "outside of the box"

Setting accommodations allow a student to:

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- Use flexible seating
- Have choice in seating/grouping

Timing accommodations allow a student to:

- Have flexible pacing in terms of content, assignments, and assessments
- Explore extended activities

Scheduling accommodations allow a student to:

- Establish a timeline for completing a project
- Have rigorous Pacing

Organization skills accommodations allow a student to:

- Model executive functioning
- Utilize independent skills practices

Assignment modifications allow a student to:

- Complete enrichment tasks
- Write longer passages on essays and open ended responses including academic vocabulary
- Answer higher order thinking questions
- Cite text evidence
- Create alternate projects or assignments, student developed rubrics, student choice when completing a project or alternate labs

Curriculum modifications provide:

- Topics of interest to the student and/or relevant to how the world works
- Students access to supplemental reading materials matched to individual student lexiles
- Opportunities for open-ended, self-directed activities
- Opportunities to get graded or assessed using a different standard than the one for classmates

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Unit 2: Body Systems	Duration: 35 days
NJSLS-S integrated with WIDA Standards MS-LS1-3: Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells ELD-SC.6-8.Argue.Expressive Construct scientific arguments that • Introduce and contextualize topic/ phenomenon in issues related to the natural and designed world(s) • Support or refute a claim based on data and evidence • Establish and maintain a neutral or objective stance • Signal logical relationships among reasoning, evidence, data, and/or a model when making or defending a claim or counterclaim 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. ELD-SC.6-8.Explain.Expressive Construct scientific explanations that • Describe valid and reliable evidence from sources about a phenomenon • Establish neutral or objective stance in how results are communicated • Develop reasoning to show relationships among independent and dependent variables in models and simple systems • Summarize patterns in evidence, making trade-offs, revising, and retesting	
Disciplinary Core Ideas LS1.A: Structure and Function • In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (MS-LS1-3) LS1.D: Information Processing • Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories (MS-LS1-8)	
Science and Engineering Practices SEP.7: Engaging in Argument from Evidence Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. (MS-LS1-3) SEP.8: Obtaining, Evaluating, and Communicating Information Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (MS-LS1-8)	
Crosscutting Concepts CCC.2: Cause and Effect Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8)	

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CCC.4: Systems and System Models Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3)

Interdependence of Science, Engineering, and Technology Engineering advances have led to important discoveries in virtually every field of science and scientific discoveries have led to the development of entire industries and engineered systems. (MS-LS1-1)

Connections to Nature of Science Science is a Human Endeavor

Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (MS-LS1-3)

Technology Standards

8.2.8.ITH.2: Compare how technologies have influenced society over time (MS-LS1-8)

8.2.8.ITH.3: Evaluate the impact of sustainability on the development of a designed product or system.

Interdisciplinary Standard(s)

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. (MS-LS1-3)

RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. (MS-LS1-3)

SL.8.5 - Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-LS1-2)

WHST.6-8.8 - Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-LS1-8)

Comprehensive Health and Physical Education

2.2.8.N.2: Identify skills and healthy behaviors that can support adolescents in losing, gaining, or maintaining healthy weights.

2.2.8.N.3: Design sample nutritional plans for families with different lifestyles, resources, special needs, and cultural backgrounds; then consider the similarities and differences among the plans.

2.2.8.N.4: Assess personal nutritional health and consider opportunities to improve health and performance (e.g., sports drinks, supplements, balance nutrition)

2.3.8.HCDM.6: Explain how the immune system fights disease.

2.1.8.CHSS.6: Develop an advocacy plan regarding a health issue and share this information in an appropriate setting.

2.1.8.CHSS.7: Collaborate with other students to develop a strategy to address health issues related to climate change.

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Enduring Understandings

Students will understand that...

In multicellular organisms, the body is a system of multiple, interacting subsystems.

Subsystems are groups of cells that work together to form tissues.

Organs are groups of tissues that work together to form a particular body function.

Tissues and organs are specialized for particular body functions.

Systems may interact with other systems.

Systems may have subsystems and be part of larger complex systems.

Interactions are limited to the circulatory, excretory, digestive, respiratory, muscular and nervous system.

The immune system fights disease.

Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas.

Sense receptors respond to different inputs (electromagnetic, mechanical, chemical).

Sense receptors transmit responses as signals that travel along nerve cells to the brain.

Signals are then processed in the brain.

Brain processing results in immediate behaviors or memories.

Cause-and-effect relationships may be used to predict response to stimuli in natural systems.

Many factors can influence an individual's choices when selecting a balanced meal plan, which can affect nutritional wellness.

The environment and climate change can affect the health of our bodies.

Essential Questions

What are tissues and organs?

What constitutes a system?

What is the evidence that a body is actually a system of interacting subsystems composed of groups of interacting cells?

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

How have people contributed to the advancement of science and medicine?

How can we select balanced meals to enhance our nutritional wellness?

Career Readiness, Life Literacies, and Key Skills Practices

The following skills are encouraged and taught:

Demonstrate creativity and innovation.

Utilize critical thinking to make sense of problems and persevere in solving them.

Use technology to enhance productivity increase collaboration and communicate effectively

Work productively in teams while using cultural/global competence.

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Career Readiness, Life Literacies, and Key Skills Standards

9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (MS LS1-8, 6.1.8.CivicsDP.1).
 9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (MS-LS1-8, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).
 9.4.8.TL.4: Synthesize and publish information about a local or global issue or event (MS LS1-8, 6.1.8.CivicsPI.3).
 9.4.8.CI.4: Explore the role of creativity and innovation in career pathways and industries

Student Learning Goals/Objectives

Students will know:

In multicellular organisms, the body is a system of multiple, interacting subsystems. Cells form tissues, tissues form organs and organs form body systems.
 Tissues and organs are specialized for particular body functions.
 Systems may interact with other systems.
 Body systems include the circulatory, excretory, digestive, respiratory, muscular and nervous system.
 Sense receptors respond to different inputs (electromagnetic, mechanical, chemical).
 Sense receptors transmit responses as signals that travel along nerve cells to the brain.
 Signals are then processed in the brain.
 Brain processing results in immediate behaviors or memories.
 Many factors can influence an individual's choices when selecting a balanced meal plan, which can affect nutritional wellness.
 The degree to which an individual is impacted by a health condition or disease can be affected by their immune system and treatment strategies.

Students will be able to:

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

 Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. MS-LS1-8

Assessment Evidence

Performance Tasks

Conduct investigation to collect evidence for the interdependence of body systems during

Other Assessments

Formative:

- Lesson quizzes, and reviews

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exercise Conduct short term research on human anatomy and body systems, and explain how the systems interact Gather information about nervous system pathways Hypothesize and create stimulus/response pathways Diagram essential components of body systems such as circulatory, digestive, respiratory systems and their interactions Conduct research and read biographical information on the history of scientific advancements Conduct research on scientific careers in the field of medicine such as biomedical engineering Identify skills and healthy behaviors that can support adolescents in losing, gaining, or maintaining healthy weights. Design sample nutritional plans for families with different lifestyles, resources, special needs, and cultural backgrounds; then consider the similarities and differences among the plans. Assess personal nutritional health and consider opportunities to improve health and performance. Investigate and analyze daily activity to determine optimal movement. Explain how the immune system fights disease. Explain how the environment affects body systems. Explain tissue engineering.	● Student investigations and models ● Language Arts writing activities ● Graphic Organizers & Guided Note Taking ● Directed Reading ● Cooperative Group Learning ● Homework ● Journal Entries ● Exit Tickets ● Polls/ Surveys with self evaluation component ● Jigsaw ● Think, Pair, Share ● Quizzes Alternative: ● Modified tests and quizzes ● Group work ● Peer assessments ● Labs ● Projects ● Portfolio Assessments Summative ● Unit Test/Topic Test ● Unit Project ● Performance Assessment/Tasks ● Engineering projects Benchmark Assessments: ● Unit pre-test ● Beginning of the year, mid year, and end of the year SGO
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Core Instructional & Supplemental Materials	
Suggested Activities/Resources: Savvas Realize “Elevate Science: Course 1” ○ Lesson explorations ○ Hands-on activities ○ Virtual Labs	Varied Levels of Text: ● leveled readers ● CK-12 Life Science for Middle School (Human Body)

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○ Video based projects ○ Performance tasks ○ Engineering projects ○ Student investigations Research Virginia Man-Yee Lee (1945–Present): A renowned Taiwanese-American neurodegenerative disease researcher. She discovered TDP-43 protein pathologies, which are central to understanding Alzheimer's and ALS Research Ernest Everett Just (1883–1941): A pioneering Black American biologist and zoologist. He made foundational contributions to developmental biology, fertilization, and cell division through meticulous experiments at Howard University and the Marine Biological Laboratory Neuron and Neurotransmission models https://brainu.org/sites/brainu.org/files/lesson_s/tg_neurotransmission-rev04-220708.pdf Neuroscience for Kids - Models How the Body Works (Topic Center) (for Kids) Nemours KidsHealth A Science Odyssey: People and Discoveries: Joseph Goldberger Explore Human Anatomy, Physiology, and Genetics Innerbody Biomedical Engineering and the Human Body - Unit - TeachEngineering Cells and Body Systems Body & Brain Articles, Videos, & Interactives NOVA PBS PEC: Lesson Plans for Physical Education (pecentral.org) - KidsHealth in the Classroom	● “Meet Your Mighty Microbes” By Nicola Davies ● “Tiny Creatures: The World of Microbes” by Nicola Davies ● Newsela: “Learn About Nutrition Basics”, “Building Your Plate: Comparing the Newest Symbols of Healthy Eating” ● Storyworks articles ● Neuroscience Concepts & Activities by Grade Level: Middle School, Grades 7 - 8 BrainU

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https://why.pbslearningmedia.org/resource/midlit11.sci.splfood/nutrition-what-your-body-needs/ The 5 Fabulous Food Groups The Heart of the Matter - Lesson - TeachEngineering Put Your Heart into Engineering - Lesson - TeachEngineering Saving a Life: Heart Valve Replacement - Activity - TeachEngineering Cleaning the Air CDC https://njclimateeducation.org/lesson-plan/climate-change-and-public-health?queryID=b831f84e3eec0879723d4d607d11720b https://njclimateeducation.org/lesson-plan/how-ws-your-atmosphere?queryID=1228652a507ae587ba07821b01efa3ea What is Tissue Engineering? The heart makers (Bioengineering) Bone Density and Muscle Stress in Microgravity NASA Neuroscience For Kids - Experiments and Activities HEART RATE AND RESPIRATION LAB	
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Modifications and Accommodations
Multilingual Learners • Differentiate instruction and classroom assessment as guided by the WIDA English Language Development Standards Framework, 2020 Edition. • https://wida.wisc.edu/sites/default/files/resource/CanDo-KeyUses-Kindergarten.pdf • Follow the Individualized Educational Plans (IEP) for ML Special Education (SE) students. • Encourage the ML student to use oral language. Discussions, especially pair-work, allow students to expand language usage in listening and speaking. • Allow MLs to clarify ideas, make sense of their previous statements and elaborate on their views with specific explanations. • Use wait time for MLs to express their ideas in class. • Graphic organizers, color-coded anchor charts, word walls with visual imagery, and

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- breakdown techniques for decoding dense mathematical word problems
- Structured talk protocols (Think-Pair-Share, Numbered Talks) and word banks
- Provide pictures and well labeled models
- Speak slowly and gesture when necessary
- Pre-teach vocabulary words
- Extended time on assessments
- Small group for assessment
- Review Vocabulary
- Allow for alternate responses during activities and assessments
- Literacy and language support strategies including discourse
- Use a poster, slide, or picture to support student listening in science such as GLAD pictorial input chart
- Preview science texts with students, discussing salient text features such as tables, graphs, and photographs before they read it.
- Provide summaries and include native language texts.
- Provide sentence stems for all students to use, especially to support complex verbal practices like argumentation, explanation, and communication.
- Engage ELs in authentic vocabulary exploration as they try to make their thoughts meaningful to others through writing. Provide dictionaries or [Google Translate](#). Look beyond grammar and spelling to understand student ideas.
- Home culture connections

Special Education/504 Plans/Students with Disabilities:

- Follow specific IEP/504 accommodations and modifications
- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Allow alternate assignments and assessments
- Differentiated Instruction

Students at Risk of Failure:

- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Incorporate social/emotional discussions
- Encourage and monitor positive peer collaboration
- Provide academic resources for both home and school use
- Provide incentives to increase motivation and collaboration

Economically Disadvantaged:

- Provide clear, achievable expectations, do not lower academic requirements for them.
- Build a safe and nurturing atmosphere
- Be flexible with assignments
- Offer several alternatives from which all students can choose.

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- Allow students to finish assignments independently, or give them the opportunity to complete tasks at their own pace.
- Use real-world examples and create mental models for abstract idea
- Provide increased knowledge base and vocabulary use about real world experiences.
- Share the decision making in class.
- Maintain expectations while offering choice and soliciting input
- Connect concepts to students' sense of "place" as physical, historical, and sociocultural dimensions
- Ask questions that elicit students' funds of knowledge
- Use cultural artifacts that are meaningful
- Use project-based learning as a form of connected science
- Provide resources for science instruction

Culturally Diverse:

- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions
- Build in more group work to encourage interaction with peers
- Show photos, videos, and definitions when possible for culturally unique vocabulary
- Teach study skills
- Provide students with necessary academic resources and materials
- Allow for alternative assignments
- Provide visuals
- Assign peer tutor
- Support verbal explanations with non verbal cues: Gestures/ facial expressions Props, realia, manipulatives, concrete materials Visuals, graphs, pictures, maps
- Provide positive praise to increase motivation
- Provide real world connections and emphasize the value of education
- Communicate high expectations for the success of all students
- Use cultural artifacts that are meaningful relevant
- Integrate community involvement
- Include role models and mentors of similar racial or ethnic backgrounds

Gifted and Talented

- Peer mediated strategies
- Cooperative learning groups
- Differentiated instruction

Presentation accommodations allow a student to:

- Vary the method of presentation: lecture, small groups, large group, demonstration, individual experimentation
- Explore real world connections
- Use technology tools to enhance content

Response accommodations allow a student to:

- Turn and Talk

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- Reward risk taking while encouraging students to think “outside of the box”

Setting accommodations allow a student to:

- Use flexible seating
- Have choice in seating/grouping

Timing accommodations allow a student to:

- Have flexible pacing in terms of content, assignments, and assessments
- Explore extended activities

Scheduling accommodations allow a student to:

- Establish a timeline for completing a project
- Have rigorous pacing

Organization skills accommodations allow a student to:

- Model executive functioning
- Utilize independent skills practices

Assignment modifications allow a student to:

- Complete enrichment tasks
- Write longer passages on essays and open ended responses including academic vocabulary
- Answer higher order thinking questions
- Cite text evidence
- Create alternate projects or assignments, student developed rubrics, student choice when completing a project or alternate labs

Curriculum modifications provide:

- Topics of interest to the student and/or relevant to how the world works
- Students access to supplemental reading materials matched to individual student lexiles
- Opportunities for open-ended, self-directed activities
- Opportunities to get graded or assessed using a different standard than the one for classmates

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Unit 3: Earth's Systems (Plate Tectonics and Rock Cycling)	Duration: 35 days
NJSLS-S integrated with WIDA Standards	
MS-ESS2-1: Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	
MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	
ELD-SC.6-8.Explain.Expressive Construct scientific explanations that • Describe valid and reliable evidence from sources about a phenomenon • Establish neutral or objective stance in how results are communicated • Develop reasoning to show relationships among independent and dependent variables in models and simple systems • Summarize patterns in evidence, making trade-offs, revising, and retesting	
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.	
ELD-SC.6-8.Explain.Interpretive Interpret scientific explanations by • Defining investigable questions or design problems based on observations, information, and/or data about a phenomenon • Determining central ideas in complex evidence and information to help explain how or why a phenomenon occurs • Evaluating scientific reasoning that shows why data or evidence adequately supports conclusions	
Disciplinary Core Ideas	
ESS2.A Earth's Materials and Systems	
All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms.	
ESS2.C The Roles of Water in Earth's Surface Processes	
Water's movements- both on the land and underground- cause weathering and erosion, which change the land's surface features and create underground formations.	
Science and Engineering Practices	
SEP.2: Developing and Using Models Use models to predict and or describe phenomena	
Crosscutting Concepts	
CCC.2: Cause and Effect Cause and effect relationships may be used to predict phenomena in natural systems.	
CCC.5 Energy and Matter Recognize the role of energy in driving the cycling of matter within natural systems	

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CCC.7 Stability and Change Observe that stability in a system can be disturbed by sudden events or a series of gradual changes

Connections to Nature of Science Science is a Human Endeavor

Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (MS-LS1-3)

Technology Standard

8.2.8.ITH.2: Compare how technologies have influenced society over time (MS-LS1-8)

8.2.8.ITH.3: Evaluate the impact of sustainability on the development of a designed product or system.

8.2.8.ETW.3: Analyze the design of a product that negatively impacts the environment or society and develop possible solutions to lessen its impact.

8.2.8.ETW.4: Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best.

Interdisciplinary Standards

ELA/Literacy

SL.UM.6.5. Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.

RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS2-1)

RST.6-8.2 Determine the central ideas or conclusions of a text, provide an accurate summary of the text distinct from prior knowledge or opinions.(MS-ESS2-1, MS-ESS2-4)

RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g. in a flowchart, diagram, model, graph or table) (MS-ESS2-1)

RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video or multimedia sources with that gained from reading a text on the same topic. (MS-ESS2-4)

RH.6-8.5 Describe how a text presents information (eg. sequentially, comparatively, causally) (MS-ESS2-4)

RH.6-8.7 Integrate visual information (e.g. in charts, graphs, photographs, videos or maps) with other information in print and digital text. (MS-ESS2-4)

WHST.6-8.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments or technical processes.(MS-ESS2-1)

Mathematics

MP.2 Reason abstractly and quantitatively

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Enduring Understandings

Earth has four major subsystems or spheres that cycle matter and energy and shape Earth's surface; atmosphere, biosphere, hydrosphere and geosphere

The Earth system involves flows of matter and energy through different components and has two major sources of energy: heat from the sun and heat from Earth's interior

A system returns information about itself and that information results in change

There are a variety of landforms on Earth because Earth's surface is different from place to place

The topography of the land is constantly being created and destroyed by competing constructive and destructive forces.

The geosphere, atmosphere and biosphere interact to affect Earth

Computers create topographic and other maps from aerial photography and satellite imagery to model landforms.

The majority of Earth's freshwater is frozen and the remaining freshwater is found underground, in lakes and rivers and the atmosphere

The process of evaporation, condensation, and precipitation continually cycle water from Earth's surface to the atmosphere and back again

Essential Questions

What are the different components of the Earth system and how do they interact?

What are the sources of energy for the processes that affect Earth?

How can you model the cycling of matter in the Earth system?

What are the different landforms found on Earth?

What forces and energy make the different landforms?

What are the various ways to model landforms?

Career Readiness, Life Literacies, and Key Skills Practices

The following skills are encouraged and taught:

Demonstrate creativity and innovation.

Utilize critical thinking to make sense of problems and persevere in solving them.

Use technology to enhance productivity increase collaboration and communicate effectively

Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies, and Key Skills Standards

9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (MS ESS2-1, 6.1.8.CivicsDP.1).

9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (MS-ESS2-1, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).

9.4.8.TL.4: Synthesize and publish information about a local or global issue or event (MS

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ESS2-1, 6.1.8.CivicsPI.3).
9.4.8.CI.4: Explore the role of creativity and innovation in career pathways and industries

Student Learning Goals/Objectives	
<i>Students will know:</i> The different components of the Earth system (subsystems/spheres) The sources of energy for the processes that affect Earth are heat from the sun and heat from the Earth's interior How to model the cycling of and flow of matter in the Earth system including positive and negative system feedback The different landforms found on Earth such as mountains, coastlines and dunes. The forces and energy that make the different landforms The various ways to model landforms with topographic maps, aerial photography, satellite imagery, GPS and GIS The majority of Earth's freshwater is frozen and the remaining freshwater is found underground, in lakes and rivers and the atmosphere	<i>Students will be able to:</i> MS-ESS2-1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. 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. MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. Science is a Human Endeavor Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism and openness to new ideas
Assessment Evidence	
Performance Tasks Analyze and interpret data to describe evidence that Earth's landforms vary Construct explanations using reasoning to predict similar patterns by recognizing interactions among systems and forces affecting topography of land Develop and use models to demonstrate how to technology is used to model Earth's landforms Explore how maps can solve problems Analyze quantitative relationships among mountain heights	Other Assessments Formative: ● Lesson quizzes, and reviews ● Student investigations and models ● Language Arts writing activities ● Graphic Organizers & Guided Note Taking ● Directed Reading ● Cooperative Group Learning ● Homework ● Journal Entries ● Exit Tickets

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Analyze and interpret data to describe evidence of locations of Earth's freshwater Develop and use models to demonstrate water cycle processes Interpret line graphs to explain systems feedback Conduct research to plan the location of a reservoir Conduct research on careers involving Earth's systems Define problems related to humans' resources or impacts on living things to determine the necessary criteria and constraints for successful solutions, and use those criteria and constraints to evaluate proposed solutions. Brainstorm how we can improve technology to reduce effects on the environment	● Polls/ Surveys with self evaluation component ● Jigsaw ● Think, Pair, Share ● Quizzes Alternative: ● Modified tests and quizzes ● Group work ● Peer assessments ● Labs ● Projects ● Portfolio Assessments Summative ● Unit Test/Topic Test ● Unit Project ● Performance Assessment/Tasks ● Engineering projects Benchmark Assessments: ● Unit pre-test ● Beginning of the year, mid year, and end of the year SGO
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Core Instructional & Supplemental Materials	
Suggested Activities/Resources: ● Savvas Realize “Elevate Science: Course 1” ○ Lesson explorations ○ Hands-on activities ○ Virtual Labs ○ Video based projects ○ Performance tasks ○ Engineering projects ○ Student investigations “Modeling a Watershed”: Model the effects of pollution on a watershed. p.214 “Building a Reservoir”: Plan the location of a reservoir and design solutions p.203 How Do We Get Drinking Water From Fog? NSTA	Varied Levels of Text: ● leveled readers ● Newsela articles ● Storyworks articles ● CK12 articles ● Super Science ● Case Study: “The Case of the Shrinking Sea” p.209

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Modifications and Accommodations

Multilingual Learners

- Differentiate instruction and classroom assessment as guided by the [WIDA English Language Development Standards Framework, 2020 Edition](#).
- <https://wida.wisc.edu/sites/default/files/resource/CanDo-KeyUses-Kindergarten.pdf>
- Follow the Individualized Educational Plans (IEP) for ML Special Education (SE) students.
- Encourage the ML student to use oral language. Discussions, especially pair-work, allow students to expand language usage in listening and speaking.
- Allow MLs to clarify ideas, make sense of their previous statements and elaborate on their views with specific explanations.
- Use wait time for MLs to express their ideas in class.
- Graphic organizers, color-coded anchor charts, word walls with visual imagery, and breakdown techniques for decoding dense mathematical word problems
- Structured talk protocols (Think-Pair-Share, Numbered Talks) and word banks
- Provide pictures and well labeled models
- Speak slowly and gesture when necessary
- Pre-teach vocabulary words
- Extended time on assessments
- Small group for assessment
- Review Vocabulary
- Allow for alternate responses during activities and assessments
- Literacy and language support strategies including discourse
- Use a poster, slide, or picture to support student listening in science such as GLAD pictorial input chart
- Preview science texts with students, discussing salient text features such as tables, graphs, and photographs before they read it.
- Provide summaries and include native language texts.
- Provide sentence stems for all students to use, especially to support complex verbal practices like argumentation, explanation, and communication.
- Engage ELs in authentic vocabulary exploration as they try to make their thoughts meaningful to others through writing. Provide dictionaries or [Google Translate](#). Look beyond grammar and spelling to understand student ideas.
- Home culture connections

Special Education/504 Plans/Students with Disabilities:

- Follow specific IEP/504 accommodations and modifications
- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Allow alternate assignments and assessments
- Differentiated Instruction

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Students at Risk of Failure:

- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Incorporate social/emotional discussions
- Encourage and monitor positive peer collaboration
- Provide academic resources for both home and school use
- Provide incentives to increase motivation and collaboration

Economically Disadvantaged:

- Provide clear, achievable expectations, do not lower academic requirements for them.
- Build a safe and nurturing atmosphere
- Be flexible with assignments
- Offer several alternatives from which all students can choose.
- Allow students to finish assignments independently, or give them the opportunity to complete tasks at their own pace.
- Use real-world examples and create mental models for abstract idea
- Provide increased knowledge base and vocabulary use about real world experiences.
- Share the decision making in class.
- Maintain expectations while offering choice and soliciting input
- Connect concepts to students' sense of "place" as physical, historical, and sociocultural dimensions
- Ask questions that elicit students' funds of knowledge
- Use cultural artifacts that are meaningful
- Use project-based learning as a form of connected science
- Provide resources for science instruction

Culturally Diverse:

- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions
- Build in more group work to encourage interaction with peers
- Show photos, videos, and definitions when possible for culturally unique vocabulary
- Teach study skills
- Provide students with necessary academic resources and materials
- Allow for alternative assignments
- Provide visuals
- Assign peer tutor
- Support verbal explanations with non verbal cues: Gestures/ facial expressions Props, realia, manipulatives, concrete materials Visuals, graphs, pictures, maps
- Provide positive praise to increase motivation
- Provide real world connections and emphasize the value of education
- Communicate high expectations for the success of all students
- Use cultural artifacts that are meaningful relevant
- Integrate community involvement
- Include role models and mentors of similar racial or ethnic backgrounds

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Gifted and Talented

- Peer mediated strategies
- Cooperative learning groups
- Differentiated instruction

Presentation accommodations allow a student to:

- Vary the method of presentation: lecture, small groups, large group, demonstration, individual experimentation
- Explore real world connections
- Use technology tools to enhance content

Response accommodations allow a student to:

- Turn and Talk
- Reward risk taking while encouraging students to think “outside of the box”

Setting accommodations allow a student to:

- Use flexible seating
- Have choice in seating/grouping

Timing accommodations allow a student to:

- Have flexible pacing in terms of content, assignments, and assessments
- Explore extended activities

Scheduling accommodations allow a student to:

- Establish a timeline for completing a project
- Have rigorous Pacing

Organization skills accommodations allow a student to:

- Model executive functioning
- Utilize independent skills practices

Assignment modifications allow a student to:

- Complete enrichment tasks
- Write longer passages on essays and open ended responses including academic vocabulary
- Answer higher order thinking questions
- Cite text evidence
- Create alternate projects or assignments, student developed rubrics, student choice when completing a project or alternate labs

Curriculum modifications provide:

- Topics of interest to the student and/or relevant to how the world works
- Students access to supplemental reading materials matched to individual student lexiles
- Opportunities for open-ended, self-directed activities
- Opportunities to get graded or assessed using a different standard than the one for others

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Unit 4: Earth and Human Activity	Duration: 35 Days
NJSLS-S integrated with WIDA Standards 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. ELD-SC.6-8.Explain.Expressive Construct scientific explanations that • Describe valid and reliable evidence from sources about a phenomenon • Establish neutral or objective stance in how results are communicated • Develop reasoning to show relationships among independent and dependent variables in models and simple systems • Summarize patterns in evidence, making trade-offs, revising, and retesting	
Disciplinary Core Ideas ESS3.A: Natural Resources Humans depend on Earth’s land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geological processes. Renewable energy resources, and the technologies to exploit them, are being rapidly developed. Connections to other DCIs in Grades 6-8: MS.PS1.A , MS.PS1.B , MS.ESS2.D Articulation of DCIs across grade levels: 4.PS3.D , 4.ESS3.A , HS.PS3.B , HS.LS1.C , HS.ESS2.A , HS.ESS2.B , HS.ESS2.C , HS.ESS3.A	
Science and Engineering Practices Constructing Explanations and Designing Solutions Constructing explanations and designing solutions include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students’ own experiments) and 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	
Cross-Cutting Concepts Cause and effect relationships may be used to predict phenomena in natural or designed systems.	

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Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World

All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.

Technology Standards

8.2.8.ITH.2: Compare how technologies have influenced society over time (MS-PS1-2)

8.2.8.ITH.3: Evaluate the impact of sustainability on the development of a designed product or system. (MS-PS1-2)

8.2.8.ITH.4: Identify technologies that have been designed to reduce the negative consequences of other technologies and explain the change in impact. (MS-PS1-1)

8.2.8.ITH.5: Compare the impacts of a given technology on different societies, noting factors that may make a technology appropriate and sustainable in one society but not in another (MS-PS-1).

Interdisciplinary Connections

ELA

RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. (MS-PS1-1)

RST.6-8.4 Determine the meaning of symbols, key terms and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RSt.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g. in a flowchart, diagram, model, graph or table)

WHST.6-8.2.d Use precise language and domain-specific language to inform or explain about the topic. (MS-PS1-1)

RL.CR.6.1. Cite textual evidence and make relevant connections to support analysis of what a literary text says explicitly as well as inferences drawn from the text.

ELA Connections with SEP Constructing explanations and designing solutions

RI.CR.6.1. Cite textual evidence and make relevant connections to support analysis of what an informational text says explicitly as well as inferences drawn from the text.

RI.CT.6.8. Compare and contrast informational texts in different forms, by different authors, or from different genres (e.g., a memoir written by and a biography on the same person, historical novels and primary source documents, infographics and scientific journals) in terms of their approaches to similar themes and topics.

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W.IW.6.2. Write informative/explanatory texts (including the narration of historical events, scientific procedures/ experiments, or technical processes) to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

W.SE.6.6. 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.

Mathematics

6.G.A.2 Apply the formulas $V=l \times w \times h$ and $V= b \times h$ to find volumes of rectangular prisms in the context of solving real world and mathematical problems

6.RP.A.2 Understand the concept of a unit rate a/b associated with a ratio $a:b$ with b does not equal 0, and use rate language in the context of a ratio relationship.

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set

MP.2 Reason abstractly and quantitatively

MP.4 Model with mathematics.

Enduring Understandings

Earth's history dictates resource locations: The placement of mineral, energy, and groundwater resources is not random; it is the direct result of past and present geological processes like plate tectonics, volcanism, and weathering.

Resources are finite and non-renewable: Most essential natural resources form over millions of years through slow Earth systems, meaning human consumption vastly outpaces natural replenishment rates.

Human actions alter distribution: Human extraction and removal of resources significantly change where and how these materials are found, creating local shortages and environmental shifts.

Geoscience processes operate continuously: The physical forces shaping Earth today—such as water cycling, erosion, and tectonic activity—are the same fundamental processes that created resource deposits in the geologic past.

Essential Questions

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How do geological processes affect locations of Earth's resources?
 Why are Earth's resources located in specific places?
 How can we use clues from Earth's surface to predict what lies beneath it?
 How does Earth's geologic past affect human geography and economics?
 What is the time scale for geological processes?
 How do we extract resources?
 How can we run out of resources if Earth's processes are continuous?
 How can we use the terms finite and non-renewable to describe Earth's resources?
 How can humans affect natural resources and replenishment rates?
 What physical forces affect Earth's resources?

Career Readiness, Life Literacies, and Key Skills Practices

The following skills are encouraged and taught:

Demonstrate creativity and innovation.
 Utilize critical thinking to make sense of problems and persevere in solving them.
 Use technology to enhance productivity increase collaboration and communicate effectively
 Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies, and Key Skills Standards

9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (MS ESS2-1, 6.1.8.CivicsDP.1).
 9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (MS-ESS2-1, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).
 9.4.8.TL.4: Synthesize and publish information about a local or global issue or event (MS ESS2-1, 6.1.8.CivicsPI.3).
 9.4.8.Cl.4: Explore the role of creativity and innovation in career pathways and industries

Student Learning Goals/Objectives

Students will know:

The Earth's resources are formed as a result of past and current geologic processes.

The environment or conditions that formed the resources are specific to certain areas and/or times on Earth, thus identifying why those resources are found only in those specific places/periods.

As resources are used, they are depleted from the sources until they can be replenished, mainly through geologic processes.

Students will be able to:

Explain:

-the uneven distributions of the Earth's mineral, energy, and groundwater resources are the results of past and current geologic processes.

-resources are typically limited and nonrenewable due to factors such as the long amounts of time required for some resources to form or the environment in which resources were created forming once or only rarely in the Earth's history.

-type and distribution of an example of each

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Because many resources continue to be formed in the same ways that they were in the past, and because the amount of time required to form most of these resources (e.g., minerals, fossil fuels) is much longer than timescales of human lifetimes, these resources are limited to current and near-future generations. Some resources (e.g., groundwater) can be replenished on human timescales and are limited based on distribution. The extraction and use of resources by humans decreases the amounts of these resources available in some locations and changes the overall distribution of these resources on Earth	type of Earth resource: mineral, energy, and groundwater. -evidence for the past and current geologic processes (e.g., volcanic activity, sedimentary processes) that have resulted in the formation of each of the given resources Describe natural resources, explore their modern human uses, and discover that they are highly unevenly distributed across the globe.
Assessment Evidence	
Performance Tasks Students take on the role of consulting geologists hired by a resource management firm. They are given maps showing specific geological features such as ancient lakebeds, fault lines, or tectonic plate boundaries. -Students write a professional site proposal recommending where to dig for a specific resource (either copper ore, petroleum, or a clean groundwater aquifer). -The proposal includes a Claim - Evidence - Reasoning explanation that includes geoscience processes that formed the particular resource.	Other Assessments Formative: • Lesson quizzes, and reviews • Student investigations and models • Language Arts writing activities • Graphic Organizers & Guided Note Taking • Directed Reading • Cooperative Group Learning • Homework • Journal Entries • Exit Tickets • Polls/ Surveys with self evaluation component • Jigsaw • Think, Pair, Share • Quizzes Alternative: • Modified tests and quizzes • Group work • Peer assessments • Labs • Projects

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	• Portfolio Assessments Summative • Unit Test/Topic Test • Unit Project • Performance Assessment/Tasks • Engineering projects Benchmark Assessments: • Unit pre-test • Beginning of the year, mid year, and end of the year SGO
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Core Instructional & Supplemental Materials	
Suggested Activities/Resources: • Savvas Realize “Elevate Science: Course 1” ○ Lesson explorations ○ Hands-on activities ○ Virtual Labs ○ Video based projects ○ Performance tasks ○ Engineering projects ○ Student investigations • Investigate Smartphone materials to figure out why they are only found in certain locations on Earth. Interpret maps of plate tectonics and mine locations (Google Earth) to explain Earth’s resource distribution • Research Dr. Dawn Wright (American Marine Geographer and Oceanographer): A prominent Black scientist and Chief Scientist at Esri who uses Geographic Information Systems (GIS) to map the deep ocean floor. Ideal for units on plate tectonics, ocean topography, and mapping technologies	Varied Levels of Text: • leveled readers • Newsela articles • Storyworks articles • CK12 articles • Super Science • <i>Treasures of the Earth: Rocks, Minerals, Crystals, and Gems</i> by DK Publishing • <i>Rocks and Minerals Ultimate Handbook</i> by Devin Dennie (DK) • Exploring Earth's Minerals (From the <i>Let's Rock!</i> Series) • <i>Rocks and Minerals: Get the Dirt on Geology</i> by Chris Eboch

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- Melody Sandifer (Geotechnical Engineer): An African American engineer specializing in subsurface evaluation, soil mechanics, and foundation stabilization during natural hazards. Great for connecting rock/soil properties to real-world structural engineering
- Dr. Franek Hasiuk (Economic/Environmental Geologist): A geoscientist featured in public media education who studies the interior matrix of carbonate rocks and geodes, showing the vibrant diversity of modern working geologists. Useful for mineralogy and the rock cycle
- Dr. Josh West geologist who investigates how natural resources can be disrupted by human activity and how resource extraction impacts the surrounding ecosystem's water safety

Modifications and Accommodations

Multilingual Learners

- Differentiate instruction and classroom assessment as guided by the [WIDA English Language Development Standards Framework, 2020 Edition](#).
- <https://wida.wisc.edu/sites/default/files/resource/CanDo-KeyUses-Kindergarten.pdf>
- Follow the Individualized Educational Plans (IEP) for ML Special Education (SE) students.
- Encourage the ML student to use oral language. Discussions, especially pair-work, allow students to expand language usage in listening and speaking.
- Allow MLs to clarify ideas, make sense of their previous statements and elaborate on their views with specific explanations.
- Use wait time for MLs to express their ideas in class.
- Graphic organizers, color-coded anchor charts, word walls with visual imagery, and breakdown techniques for decoding dense mathematical word problems
- Structured talk protocols (Think-Pair-Share, Numbered Talks) and word banks
- Provide pictures and well labeled models
- Speak slowly and gesture when necessary
- Pre-teach vocabulary words

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- Extended time on assessments
- Small group for assessment
- Review Vocabulary
- Allow for alternate responses during activities and assessments
- Literacy and language support strategies including discourse
- Use a poster, slide, or picture to support student listening in science such as GLAD pictorial input chart
- Preview science texts with students, discussing salient text features such as tables, graphs, and photographs before they read it.
- Provide summaries and include native language texts.
- Provide sentence stems for all students to use, especially to support complex verbal practices like argumentation, explanation, and communication.
- Engage ELs in authentic vocabulary exploration as they try to make their thoughts meaningful to others through writing. Provide dictionaries or [Google Translate](#). Look beyond grammar and spelling to understand student ideas.
- Home culture connections

Special Education/504 Plans/Students with Disabilities:

- Follow specific IEP/504 accommodations and modifications
- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Allow alternate assignments and assessments
- Differentiated Instruction

Students at Risk of Failure:

- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Incorporate social/emotional discussions
- Encourage and monitor positive peer collaboration
- Provide academic resources for both home and school use
- Provide incentives to increase motivation and collaboration

Economically Disadvantaged:

- Provide clear, achievable expectations, do not lower academic requirements for them.
- Build a safe and nurturing atmosphere
- Be flexible with assignments
- Offer several alternatives from which all students can choose.
- Allow students to finish assignments independently, or give them the opportunity to complete tasks at their own pace.
- Use real-world examples and create mental models for abstract idea
- Provide increased knowledge base and vocabulary use about real world experiences.
- Share the decision making in class.
- Maintain expectations while offering choice and soliciting input
- Connect concepts to students' sense of "place" as physical, historical, and sociocultural dimensions

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- Ask questions that elicit students' funds of knowledge
- Use cultural artifacts that are meaningful
- Use project-based learning as a form of connected science
- Provide resources for science instruction

Culturally Diverse:

- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions
- Build in more group work to encourage interaction with peers
- Show photos, videos, and definitions when possible for culturally unique vocabulary
- Teach study skills
- Provide students with necessary academic resources and materials
- Allow for alternative assignments
- Provide visuals
- Assign peer tutor
- Support verbal explanations with non verbal cues: Gestures/ facial expressions Props, realia, manipulatives, concrete materials Visuals, graphs, pictures, maps
- Provide positive praise to increase motivation
- Provide real world connections and emphasize the value of education
- Communicate high expectations for the success of all students
- Use cultural artifacts that are meaningful relevant
- Integrate community involvement
- Include role models and mentors of similar racial or ethnic backgrounds

Gifted and Talented

- Peer mediated strategies
- Cooperative learning groups
- Differentiated instruction

Presentation accommodations allow a student to:

- Vary the method of presentation: lecture, small groups, large group, demonstration, individual experimentation
- Explore real world connections
- Use technology tools to enhance content

Response accommodations allow a student to:

- Turn and Talk
- Reward risk taking while encouraging students to think "outside of the box"

Setting accommodations allow a student to:

- Use flexible seating
- Have choice in seating/grouping

Timing accommodations allow a student to:

- Have flexible pacing in terms of content, assignments, and assessments

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- Explore extended activities

Scheduling accommodations allow a student to:

- Establish a timeline for completing a project
- Have rigorous Pacing

Organization skills accommodations allow a student to:

- Model executive functioning
- Utilize independent skills practices

Assignment modifications allow a student to:

- Complete enrichment tasks
- Write longer passages on essays and open ended responses including academic vocabulary
- Answer higher order thinking questions
- Cite text evidence
- Create alternate projects or assignments, student developed rubrics, student choice when completing a project or alternate labs

Curriculum modifications provide:

- Topics of interest to the student and/or relevant to how the world works
- Students access to supplemental reading materials matched to individual student lexiles
- Opportunities for open-ended, self-directed activities
- Opportunities to get graded or assessed using a different standard than the one for others

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Unit 5: Weather, Climate and Water

Duration: 35 days

NJSLS-S Integrated with WIDA Standards

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.

ELD-SC.6-8.Explain.Expressive Construct scientific explanations that • Describe valid and reliable evidence from sources about a phenomenon • Establish neutral or objective stance in how results are communicated • Develop reasoning to show relationships among independent and dependent variables in models and simple systems • Summarize patterns in evidence, making trade-offs, revising, and retesting

MS-ESS2-5: Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.

ELD-SC.6-8.Explain.Interpretive Interpret scientific explanations by • Defining investigable questions or design problems based on observations, information, and/or data about a phenomenon • Determining central ideas in complex evidence and information to help explain how or why a phenomenon occurs • Evaluating scientific reasoning that shows why data or evidence adequately supports conclusions

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.

ELD-SC.6-8.Explain.Expressive Construct scientific explanations that • Describe valid and reliable evidence from sources about a phenomenon • Establish neutral or objective stance in how results are communicated • Develop reasoning to show relationships among independent and dependent variables in models and simple systems • Summarize patterns in evidence, making trade-offs, revising, and retesting

MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century

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.

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.

Disciplinary Core Ideas

ESS2.C The Roles of Water in Earth's Surface Processes

Water's movements- both on the land and underground- cause weathering and erosion, which change the land's surface features and create underground formations.

ESS2.D Weather and Climate Because these patterns are so complex, weather can only be predicted probabilistically

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ESS3.B Human Impacts on Earth's Systems: Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of species.

ESS3.B Human Impacts on Earth's Systems Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise

PS1.A Structure and Properties of Matter Gasses and liquids are made of molecules or inert atoms that are moving about relative to each other

PS1.A Structure and Properties of Matter In a liquid, the molecules are constantly in contact with others, in a gas they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations.

Science and Engineering Practices

SEP.2:Developing and Using Models Use models to predict and or describe phenomena

SEP.3 Planning and Carrying Out Investigations Evaluate the accuracy of data collection methods

SEP.4 Analyzing and Interpreting Data: Use graphical displays to identify temporal and spatial relationships in phenomena

Crosscutting Concepts

CCC.2: Cause and Effect Cause and effect relationships may be used to predict phenomena in natural systems.

CCC.4 Systems and System Models Recognize that models are limited because they can only represent certain parts of a system

CCC.5 Energy and Matter Recognize the role of energy in driving the cycling of matter within natural systems

Connections to Nature of Science Science is a Human Endeavor

Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (MS-ESS3-2)

Technology Standards

CS: Computer Science 8.1.8.CS.1, 8.1.8.CS.2, 8.1.8.CS.4

NI: Network and Internet 8.1.8.NI.1

IC: Impacts of Computing 8.1.8.IC.1

DA: Data & Analysis 8.1.8.DA.1, 8.1.8.DA.2, 8.1.8.DA.4, 8.1.8.DA.5, 8.1.8.DA.6

AP: Algorithms & Programming 8.1.8.AP.1, 8.1.8.AP.2, 8.1.8.AP.3, 8.1.8.AP.4, 8.1.8.AP.5, 8.1.8.AP.6, 8.1.8.AP.7, 8.1.8.AP.8, 8.1.8.AP.9

8.2 Design Thinking: All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world, as they relate to the individual, global society, and the environment.

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ED: Engineering Design 8.2.8.ED.1, 8.2.8.ED.2
ITH: Interaction of Technology and Humans 8.2.8.ITH.1,
8.2.8.ITH.2: Compare how technologies have influenced society over time (MS-ESS2-5),
8.2.8.ITH.3: Evaluate the impact of sustainability on the development of a designed product or system.
NT: Nature of Technology 8.2.8.NT.1
ETW: Effects of Technology on the Natural World 8.2.8.ETW.1, 8.8.5.ETW.3
EC: Ethics and Culture 8.2.8.EC.1

Interdisciplinary Standard(s)

ELA/Literacy

RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS2-5, MS-ESS2-6)

RST.6-8.2 Determine the central ideas or conclusions of a text, provide an accurate summary of the text distinct from prior knowledge or opinions. (MS-ESS2-5, MS-ESS2-6, MS-PS1-4)

WHST.6-8.2.d Use precise language and domain-specific language to inform or explain about the topic. (MS-ESS2-5, MS-ESS2-6)

Mathematics

MP.2 Reason abstractly and quantitatively

MP.4 Model with mathematics.

Enduring Understandings

The movement of water in the atmosphere influences local weather conditions
Because weather patterns are so complex, storm predictions are based on probabilities
Mapping the history of natural hazards such as floods can help forecast the locations of future events.

Essential Question(s)

What is the composition and structure of Earth's atmosphere?
How does energy from the sun affect Earth's atmosphere?
What processes make up the water cycle?
How does energy drive the water cycle?
How does the water cycle affect weather?
How do global patterns such as the jet stream affect air masses?
How do air masses interact to form fronts?
How do the interactions of air masses result in changes in weather?
How do meteorologists use the interactions of air masses to forecast changes in weather?

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How does technology aid in collecting and analyzing weather data?
 How do weather maps help to model current weather and predict future weather?
 What is the difference between weather and climate?
 What causes climate to change over time?

Career Readiness, Life Literacies, and Key Skills Practices

The following skills are encouraged and taught:
 Demonstrate creativity and innovation.
 Utilize critical thinking to make sense of problems and persevere in solving them.
 Use technology to enhance productivity increase collaboration and communicate effectively
 Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies, and Key Skills Standards

9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (MS ESS2-1, 6.1.8.CivicsDP.1).
 9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (MS-ESS2-1, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).
 9.4.8.TL.4: Synthesize and publish information about a local or global issue or event (MS ESS2-1, 6.1.8.CivicsPI.3).
 9.4.8.CI.4: Explore the role of creativity and innovation in career pathways and industries
 9.4.8.CI.1: Assess data gathered on varying perspectives on causes of climate change (e.g., cross cultural, gender-specific, generational), and determine how the data can best be used to design multiple potential solutions (MS-ESS2-1, RI.7.9, 6.SP.B.5, 7.1.NH.IPERS.6, 8.2.8.ETW.4)

Student Learning Goals/Objectives

Students will know:

The structure and layers of Earth's atmosphere
 The composition and characteristics of each layer in the atmosphere
 How to predict the stability and change caused by unequal heating of Earth's atmosphere by the sun
 The process of evaporation, condensation, and precipitation continually cycle water from Earth's surface to the atmosphere and back again

Students will be able to:

Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. (MS-ESS2-4)

Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions (MS-ESS2-5)

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

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Air masses are moved by prevailing winds and jet streams When air masses collide, a front forms Storms and changeable weather develop along fronts Types of fronts are dependent on characteristics of the air masses and direction in which they move Causes and effects of climate change.	(MS-ESS 2-6) Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. (MS-ESS3-5.) Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. (MS-ESS3-2) 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-PS1-4)
Assessment Evidence	
Performance Tasks Identify and synthesize data to construct explanation of structure and composition of Earth's atmosphere Use models and analyze information to predict the stability and change caused by unequal heating of Earth's atmosphere by the Sun Analyze and interpret data to describe evidence of how air masses move Develop and use models to demonstrate effects of colliding air masses Construct explanations using reasoning to predict similar patterns by recognizing effects of fronts on changes in weather. Develop and use models to demonstrate how meteorologists use observations, patterns and tools to predict the weather Construct explanations of technology use in weather data collection and prediction Research meteorology careers Get in the Game! Design a board game	Other Assessments Formative: • Lesson quizzes, and reviews • Student investigations and models • Language Arts writing activities • Graphic Organizers & Guided Note Taking • Directed Reading • Cooperative Group Learning • Homework • Journal Entries • Exit Tickets • Polls/ Surveys with self evaluation component • Jigsaw • Think, Pair, Share • Quizzes Alternative: • Modified tests and quizzes • Group work • Peer assessments • Labs • Projects • Portfolio Assessments

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involving weather concepts. WIDA Language Functions Identify and describe factors that influence local weather patterns and climate. Sequence the stages of a cycle (e.g., the water cycle, rock cycle) using sequential transition words (<i>first, subsequently, finally</i>). Establish causal relationships to explain how thermal energy transfers through conduction, convection, and radiation	Summative • Unit Test/Topic Test • Unit Project • Performance Assessment/Tasks • Engineering projects Benchmark Assessments: • Unit pre-test • Beginning of the year, mid year, and end of the year SGO

Core Instructional & Supplemental Materials	
Suggested Activities/Resources: • Savvas Realize “Elevate Science: Course 1” ○ Lesson explorations ○ Hands-on activities ○ Virtual Labs ○ Video based projects ○ Performance tasks ○ Engineering projects ○ Student investigations • Track and analyze weather data	Varied Levels of Text: • leveled readers • Newsela • Storyworks • Case Study: “The Case of the Runaway Hurricane” p.267 • “Watching the Clouds Go By” Career research • <i>Climate Change and Extreme Weather</i> • <i>Weather and Climate</i> • <i>Weather and Climate Change</i> • <i>The Extreme Climate</i> • <i>Extreme Weather</i> • <i>Climate Migrants</i> • <i>Palm Trees at the North Pole</i> • <i>Ada’s Violin</i> • <i>Flipflop</i> • <i>Climate Action</i>

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	• <i>The Girl Who Heard the Music</i> • <i>Oil</i> by J. Winter
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- <https://wida.wisc.edu/sites/default/files/resource/CanDo-KeyUses-Kindergarten.pdf>
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- Provide academic resources for both home and school use
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- Involve families in student learning
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- Respect cultural traditions
- Build in more group work to encourage interaction with peers
- Show photos, videos, and definitions when possible for culturally unique vocabulary
- Teach study skills
- Provide students with necessary academic resources and materials
- Allow for alternative assignments
- Provide visuals
- Assign peer tutor

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- Support verbal explanations with non verbal cues: Gestures/ facial expressions Props, realia, manipulatives, concrete materials Visuals, graphs, pictures, maps
- Provide positive praise to increase motivation
- Provide real world connections and emphasize the value of education
- Communicate high expectations for the success of all students
- Use cultural artifacts that are meaningful relevant
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- Explore extended activities

Scheduling accommodations allow a student to:

- Establish a timeline for completing a project
- Have rigorous Pacing

Organization skills accommodations allow a student to:

- Model executive functioning
- Utilize independent skills practices

Assignment modifications allow a student to:

- Complete enrichment tasks
- Write longer passages on essays and open ended responses including academic vocabulary
- Answer higher order thinking questions
- Cite text evidence

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- Create alternate projects or assignments, student developed rubrics, student choice when completing a project or alternate labs

Curriculum modifications provide:

- Topics of interest to the student and/or relevant to how the world works
- Students access to supplemental reading materials matched to individual student lexiles
- Opportunities for open-ended, self-directed activities
- Opportunities to get graded or assessed using a different standard than the one for others

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Grade: 6	Content Area: Science
Unit 6: Light and Matter	Duration: 35 days
NJSLS-S Integrated with WIDA Standards MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. ELD-SC.6-8.Explain.Expressive Construct scientific explanations that • Describe valid and reliable evidence from sources about a phenomenon • Establish neutral or objective stance in how results are communicated • Develop reasoning to show relationships among independent and dependent variables in models and simple systems • Summarize patterns in evidence, making trade-offs, revising, and retesting ELD-SI.4-12.Inform • Define and classify facts and interpretations; determine what is known vs. unknown • Report on explicit and inferred characteristics, patterns, or behavior • Describe the parts and wholes of a system • Sort, clarify, and summarize relationships • Summarize most important aspects of information ELD-SI.4-12.Explain • Generate and convey initial thinking • Follow and describe cycles and sequences of steps or procedures and their causes and effects • Compare changing variables, factors, and circumstances • Offer alternatives to extend or deepen awareness of factors that contribute to particular outcomes • Act on feedback to revise understandings of how or why something is or works in particular ways	
Disciplinary Core Ideas PS4.A: Wave Properties A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude. A sound wave needs a medium through which it is transmitted. PS4.B: Electromagnetic Radiation When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material and the frequency (color) of the light. The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends. Lenses and prisms are applications of this effect. A wave model of light is useful for explaining brightness, color, and the frequency-dependent bending of light at a surface between media (prisms). However, because light can travel through space, it cannot be a matter wave, like sound or water waves	
Science and Engineering Practices SEP.2:Developing and Using Models Use models to predict and or describe phenomena	

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Crosscutting Concepts Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.

Connections to Nature of Science Science is a Human Endeavor

Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (MS-ESS3-2)

Technology Standards

CS: Computer Science 8.1.8.CS.1, 8.1.8.CS.2, 8.1.8.CS.4

NI: Network and Internet 8.1.8.NI.1

IC: Impacts of Computing 8.1.8.IC.1

DA: Data & Analysis 8.1.8.DA.1, 8.1.8.DA.2, 8.1.8.DA.4, 8.1.8.DA.5, 8.1.8.DA.6

AP: Algorithms & Programming 8.1.8.AP.1, 8.1.8.AP.2, 8.1.8.AP.3, 8.1.8.AP.4, 8.1.8.AP.5, 8.1.8.AP.6, 8.1.8.AP.7, 8.1.8.AP.8, 8.1.8.AP.9

8.2 Design Thinking: All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world, as they relate to the individual, global society, and the environment.

ED: Engineering Design 8.2.8.ED.1, 8.2.8.ED.2

ITH: Interaction of Technology and Humans 8.2.8.ITH.1,

8.2.8.ITH.2: Compare how technologies have influenced society over time (MS-ESS2-5),

8.2.8.ITH.3: Evaluate the impact of sustainability on the development of a designed product or system.

NT: Nature of Technology 8.2.8.NT.1

ETW: Effects of Technology on the Natural World 8.2.8.ETW.1, 8.8.5.ETW.3

EC: Ethics and Culture 8.2.8.EC.1

Interdisciplinary Standard(s)

ELA/Literacy

RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS2-5, MS-ESS2-6)

RST.6-8.2 Determine the central ideas or conclusions of a text, provide an accurate summary of the text distinct from prior knowledge or opinions. (MS-ESS2-5, MS-ESS2-6, MS-PS1-4)

WHST.6-8.2.d Use precise language and domain-specific language to inform or explain about the topic. (MS-ESS2-5, MS-ESS2-6)

RI.MF.6.6. Integrate information when presented in different media or formats (e.g., visually, quantitatively) to develop a coherent understanding of a topic or issue.

W.SE.6.6. 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

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Mathematics

MP.2 Reason abstractly and quantitatively

MP.4 Model with mathematics.

Enduring Understandings

How to create models involving reflection, absorption, or transmission properties of different materials for light and matter waves.

Differences between how light and matter waves interact with different materials

Why materials with certain properties are well-suited for particular functions (e.g., lenses and mirrors, sound absorbers in concert halls, colored light filters, sound barriers next to highways).

Essential Questions

Where does visible light fall on the electromagnetic spectrum?

How does an object's material and light's frequency (color) affect the way light is reflected, absorbed, or transmitted?

How does the frequency of a light wave determine the color?

How do primary colors of light produce secondary and complementary colors?

How does amplitude of a light wave determine brightness?

What are types of waves and their properties?

What types of materials reflect, absorb and transmit waves?

What are the characteristics of waves after interacting with materials?

How does light travel and how do certain materials affect this path?

What is the difference between light and matter?

Career Readiness, Life Literacies, and Key Skills Practices

The following skills are encouraged and taught:

Demonstrate creativity and innovation.

Utilize critical thinking to make sense of problems and persevere in solving them.

Use technology to enhance productivity increase collaboration and communicate effectively

Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies, and Key Skills Standards

9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (MS PS1-1, 6.1.8.CivicsDP.1).

9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (MS-PS1-2, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).

9.4.8.TL.4: Synthesize and publish information about a local or global issue or event (MS PS1-1, 6.1.8.CivicsPI.3).

9.4.8.Cl.4: Explore the role of creativity and innovation in career pathways and industries

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Student Learning Goals/Objectives	
<i>Students will know:</i> -the types of waves and their properties -the types of materials that reflect, absorb and transmit waves. -that the specific type of matter an object is made of <i>causes</i> specific changes to the behavior and path of a light wave. -how to connect an object's microscopic or macroscopic structure to how it manipulates light for practical uses (e.g., tinted glass, sunglasses, or mirrors) -the characteristics of waves after interacting with materials. -how light travels and how certain materials affect this path. -the difference between light and matter.	<i>Students will be able to Explain:</i> -when light shines on an object, it is reflected (bounces off), absorbed (taken in as energy), or transmitted (passes through), depending on the material's properties -map the path of light traveling in straight lines until it hits a surface or boundary between different transparent materials. -categorize everyday matter as transparent (transmits most light), translucent (scatters transmitted light), or opaque (absorbs or reflects all light] -types of waves and their properties -types of materials that reflect, absorb and transmit waves. -characteristics of waves after interacting with materials. -how light travels and how certain materials affect this path. -the difference between light and matter.

Assessment Evidence	
Performance Tasks Use Phet "Bending Light" simulation to model light behavior. Test different materials (such as mirrors, clear plastic, and dark paper) using light sources to gather qualitative evidence of wave behavior Create explanatory model which includes: -types of waves and their properties -types of materials that reflect, absorb and transmit waves. -characteristics of waves after interacting with materials	Other Assessment Formative: ● Lesson quizzes, and reviews ● Student investigations and models ● Language Arts writing activities ● Graphic Organizers & Guided Note Taking ● Directed Reading ● Cooperative Group Learning ● Homework ● Journal Entries ● Exit Tickets

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-how light travels and how certain materials affect this path. -the difference between light and matter. Create labeled diagrams or physical box models to track and show the incoming, reflected, and outgoing paths of light rays -interpret patterns from observations—such as why a window shows both a reflection and an image of what is behind it—to explain complex phenomena Students will recognize that the specific type of matter an object is made of <i>causes</i> specific changes to the behavior and path of a light wave. Project Example: “The Biosphere Blackout” An underground colony's artificial sun fails. Students must design a system of tubes and materials to pipe natural sunlight from the surface down to the farms. WIDA Language Functions Examples Classify and categorize objects into groups based on shared properties Define technical vocabulary in context using objective, non-emotional language Summarize observations from a graphic organizer, chart, or scientific simulation. Describe physical properties of matter or tectonic plates using precise, nominalized word groups	● Polls/ Surveys with self evaluation component ● Jigsaw ● Think, Pair, Share ● Quizzes Alternative: ● Modified tests and quizzes ● Group work ● Peer assessments ● Labs ● Projects ● Portfolio Assessments Summative ● Unit Test/Topic Test ● Unit Project ● Performance Assessment/Tasks ● Engineering projects Benchmark Assessments: ● Unit pre-test ● Beginning of the year, mid year, and end of the year SGO

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Core Instructional & Supplemental Materials

- | | |
|---|--|
| <ul style="list-style-type: none">● Savvas Realize: <i>Elevate Science</i> textbook● Phet simulation: <i>Bending Light</i>● Generation Genius lessons● Science Buddies investigations● Light investigations/ station activities | <ul style="list-style-type: none">● Leveled readers● Newsela articles● Storyworks articles● CK12 articles |
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