



TOMS RIVER REGIONAL SCHOOLS

Science Department

6th Grade

Date created: May 2021

Board Approval: August 2022

Revised: July 2022

Philosophy, Mission and Vision

Philosophy:

Our philosophy includes the following:

1. To provide a safe and encouraging learning environment for all students that is aligned to the NJDOE Standards for Science Education
2. To prepare students for a successful and positive high school experience
3. To create opportunities for discussion about future career choices and goals
4. To promote, encourage and develop students' critical thinking and problem solving skills to enable future success in a technologically advanced world
5. To instill in our students the concept that Science surrounds us everywhere and in everything we see, feel, hear, smell, touch and do.
6. To encourage curiosity about the world we live in, our planet and its solar system, our natural resources and how to protect them and recycle, our varied habitats and the creatures living in each, and, most importantly, how to think "like a scientist" and formulate conclusions based on factual information gathered.

Mission: to provide a strong academic foundation in Science and to challenge students to think critically as they explore essential questions and topics and connect them to their own lives and the real world around them.

Vision: to promote independent thinking and encourage students to become lifelong learners who are curious about the world around them and who can connect their experiences with STEM (Science, Technology, Engineering and Math) and Project-Based Learning to be successful and productive members of a digital and global society.

Course description and/or program overview:

Students will be immersed in various scientific topics, including: Engineering & Design, Earth's Place in the Universe, Weather & Climate, Waves & Information Technology, and Systems, Reproduction & Growth. Students will be introduced to 21 st century skills including: critical thinking, creativity, collaboration, communication, information literacy, media literacy, technology literacy, leadership, productivity, social skills, and flexibility.

UNITS	PACING GUIDE
Introduction to Engineering and Design	Pacing: 10 days
Earth's Place in the Universe	Pacing: 45 days
Weather and Climate	Pacing 45 days
Waves and Information Technology	Pacing: 40 days
Systems, Reproduction, and Growth	Pacing: 40 days

Overview

Earth's Place in the Universe

Unit Summary: Students examine the Earth's place in relation to the solar system, Milky Way galaxy, and universe. There is a strong emphasis on a systems approach, using models of the solar system to explain astronomical and other observations of the cyclic patterns of eclipses, tides, and seasons. There is also a strong connection to engineering through the instruments and technologies that have allowed us to explore the objects in our solar system and obtain the data that support the theories that explain the formation and evolution of the universe. The crosscutting concepts of patterns; scale, proportion, and quantity; systems and system models; and interdependence of science, engineering, and technology are called out as organizing concepts for these disciplinary core ideas.

Enduring Understandings:

Students will understand that...

- Observable, predictable patterns of movement in the Sun, Earth, Moon system occur because of gravitational interaction and energy from the Sun.
- The Universe is made up of galaxies, each of which is composed of solar systems, having the same elements and governed by the same laws.
- 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.
- The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design.
- A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. Models of all kinds are important for testing solutions. The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution.

Essential Questions:

- What predictable, observable patterns occur as a result of the interaction between the Earth, Moon and Sun?
- What types of celestial bodies encompass our Universe?

Standards

MS-ESS1-1; MS-ESS1-2; MS-ESS1-3; ESS1.A; ESS1.B; MS-ESS2-1, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4

[NJ Science Standards](#)

Interdisciplinary Connections
[Other Cross-Curricular Opportunities](#)
Opportunities for [SEL](#)

21st Century Life and Careers

- creativity and innovation
- critical thinking and problem solving
- communication
- collaboration
- information literacy
- media literacy
- information and communications technology (ICT)
- literacy
- flexibility and adaptability
- initiative and self direction
- social and cross cultural skills
- productivity and accountability
- leadership and responsibility

Technology**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-ESS1-3)

Unit Objectives:

Students will know...

- how distance and mass affect gravitational attraction
- the difference between rotation and revolution
- the 3 laws for planetary motion.
- the current theory of the origin of the Earth's moon
- the causes of the phases of the Earth's moon, eclipses, daily and monthly tides
- the factors that combine to explain the changes in the length of the day and seasons

Skills:

- Distinguish between Earth's rotation and Earth's revolution
- Model how the Sun strikes Earth's surface.
- Model how solar energy spreads out over Earth's surface throughout the year.
- Simulate how the Moon moves around the Earth.
- Illustrate and demonstrate a solar eclipse and lunar eclipse.
- Design and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
- Model the different phases of the moon.
- Demonstrate the gravitational pull between the Sun and a planet.
- Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
- Construct a scale model of our solar system.
- Analyze and interpret data to determine scale properties of objects in the solar system.
- Differentiate the sun as it relates to other stars in the universe.
- Determine one's own individual responsibility from personal actions and contributions to group activities.
- Demonstrate leadership skills, cooperative learning strategies, and community building strategies when participating in classroom laboratory activities.
- Demonstrate the ability to understand inferences.

Student Learning					
Core Instructional Materials and Resources	Supplemental Instructional Materials and Resources				
Savvas Realize Consumable Workbook and etext Link: Earth's Place in the Universe Online Textbook	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">Google Classroom</td> <td style="width: 50%; text-align: center;">Learning management system</td> </tr> <tr> <td style="text-align: center;">Online Textbook</td> <td style="text-align: center;">Savvas Realize Consumable workbook and etext</td> </tr> </table>	Google Classroom	Learning management system	Online Textbook	Savvas Realize Consumable workbook and etext
Google Classroom	Learning management system				
Online Textbook	Savvas Realize Consumable workbook and etext				

Google Sites	Simple website design platform
Google Slides	Presentation and design tool
Google Meet	Video conferencing tool
Google Forms	Quiz and survey tool

Additional Online Resources/Tools	
Seesaw	Learning management system
EdPuzzle	Interactive video lessons
Jamboard	Online, collaborative whiteboard
Flipgrid	Video discussion tool
Padlet	Online, collaborative discussion tool
Quizlet	Digital flash card review
Quizizz	Student paced formative assessments
Flippity	Google Sheet game tool
Achieve3000	Differentiated reading instruction
Vocabulary.com	Vocabulary assistance
ReadWorks	Teacher/student comprehension texts

YouTube	Media resources
Kahoot! Learning games Make learning awesome!	Interactive review game
Padlet	Live sharing
Lino - Sticky and Photo Sharing for you	Live sharing

Accommodations/Modifications
 (ELL, Students with IEPs, 504s, Gifted Learners, At Risk)
Each group must be listed separately

Assessment
(All forms must be identified)

At Risk modifications:

- Follow all IEP modifications/504 plan
- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction

Presentation accommodations allow a student to:

- Listen to audio recordings instead of reading text
- Learn content from audiobooks, movies, videos and digital media instead of reading print versions
- Work with fewer items per page or line and/or materials in a larger print size
- Have a designated reader
- Hear instructions orally
- Record a lesson, instead of taking notes
- Have another student share class notes with him
- Be given an outline of a lesson
- Use visual presentations of verbal material, such as word webs and visual organizers
- Be given a written list of instructions

Response accommodations allow a student to:

- Give responses in a form (oral or written) that's easier for him
- Dictate answers to a scribe
- Capture responses on an audio recorder

Formative

- 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
- Summative
 - Unit Tests
 - Chapter Tests
- Benchmark
 - Quarterly Exam
- Alternative
 - Labs
 - Projects
 - Portfolio Assessments
 - RST - Research Simulation Task

- Use a spelling dictionary or electronic spell-checker
- Use a word processor to type notes or give responses in class
- Use a calculator or table of “math facts”

Setting accommodations allow a student to:

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher)
- Use special lighting or acoustics
- Take a test in small group setting
- Use sensory tools such as an exercise band that can be looped around a chair’s legs (so fidgety kids can kick it and quietly get their energy out)

Timing accommodations allow a student to:

- Take more time to complete a task or a test
- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling accommodations allow a student to:

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order
- Take a test at a specific time of day

Organization skills accommodations allow a student to:

- Use an alarm to help with time management
- Mark texts with a highlighter
- Have help coordinating assignments in a book or planner
- Receive study skills instruction

Assignment modifications allow a student to:

- Complete fewer or different homework problems than peers
- Write shorter papers
- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum modifications allow a student to:

- Learn different material (such as continuing to work on multiplication while classmates move on to fractions)
- Get graded or assessed using a different standard than the one for classmate

ELLs modifications

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction

Presentation accommodations allow a student to:

- Listen to audio recordings instead of reading text
- Learn content from audiobooks, movies, videos and digital media instead of reading print versions
- Work with fewer items per page or line and/or materials in a larger print size
- Have a designated reader
- Hear instructions orally
- Record a lesson, instead of taking notes
- Have another student share class notes with him
- Be given an outline of a lesson
- Use visual presentations of verbal material, such as word webs and visual organizers
- Be given a written list of instructions

Response accommodations allow a student to:

- Give responses in a form (oral or written) that's easier for him
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a dictionary from their native/home language or electronic spell-checker including home language or textbook glossary
- Use a word processor to type notes or give responses in class
- Use a calculator or table of "math facts"

Setting accommodations allow a student to:

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher)
- Take a test in small group setting

Timing accommodations allow a student to:

- Take more time to complete a task or a test
- Have extra time to process oral information and directions

Scheduling accommodations allow a student to:

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order

Organization skills accommodations allow a student to:

- Mark texts with a highlighter
- Have help coordinating assignments in a book or planner
- Receive study skills instruction

Assignment modifications allow a student to:

- Complete fewer or different homework problems than peers
- Write shorter papers
- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum modifications allow a student to:

- Learn different material (such as continuing to work on multiplication while classmates move on to fractions)
- Get graded or assessed using a different standard than the one for classmates

Gifted And Talented modifications

- 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 of 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:

- Flexible seating
- Student choice in seating/grouping

Timing accommodations allow a student to:

- Flexible pacing in terms of content, assignments, and assessments
- Allow students to explore extended activities

Scheduling accommodations allow a student to

- Establishing a timeline from completing a project
- 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
- Citing text evidence
- Create alternate projects or assignments, student developed rubrics, student choice when completing a project, alternate labs,

Curriculum modifications allow a student to:

- Use topics of interest to the student, relevant to how the world works, complex and worthwhile
- Supplemental reading materials matched to individual student lexiles
- Provide opportunities for open-ended, self-directed activities
- Get graded or assessed using a different standard than the one for classmates

Unit Summary: Students construct and use models to develop an understanding of the factors that control weather and climate. They take a systems approach to examining the feedback between systems as energy from the sun is transferred between systems and circulates through the ocean and atmosphere. The crosscutting concepts of cause and effect, systems and system models, and stability and change are called out as organizing concepts for these disciplinary core ideas.

Enduring Understandings:

Students will understand that...

- Earth's components form systems. These systems continually interact at different rates of time, affecting the Earth regionally and globally.
- Earth systems can be broken down into individual components which have observable measurable properties.
- Technology enables us to better understand Earth's systems and the impact of Earth's systems on human activity.
- Climate varies over space and time through both natural and man-made processes.
- Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization and precipitation, as well as downhill flows on land.
- The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. Because these patterns are so complex, weather can only be predicted probabilistically.
- Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms and living things. These interactions vary with latitude, altitude and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time and globally redistributing it through ocean currents.
- Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities.
- The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. Although one design may not perform the best across all tests, identifying the characteristics of the design

that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design.

- A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. Models of all kinds are important for testing solutions. The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution.

Essential Questions:

- How do changes in one part of an Earth system affect other parts of the system?
- How does understanding the properties of Earth materials and the physical laws that govern behavior lead to predictions of Earth?
- How does technology extend human senses and understanding of Earth?

Standards

MS-ESS2-5; MS-ESS2-6; MS-ESS3-5; ESS2.C; ESS2.D; ESS3.D, MS-ESS2-4; MS-ESS2-5; MS-ESS2-6, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4

[NJ Science Standards](#)

Interdisciplinary Connections

[Other Cross-Curricular Opportunities](#)

Opportunities for [SEL](#)

21st Century Life and Careers

- creativity and innovation
- critical thinking and problem solving
- communication
- collaboration
- information literacy
- media literacy
- information and communications technology (ICT)
- literacy
- flexibility and adaptability

Technology

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-ESS1-3)

<ul style="list-style-type: none"> ● initiative and self direction ● social and cross cultural skills ● productivity and accountability ● leadership and responsibility 	
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--

Unit Objectives:

Students will know...

- interactions of air masses as they relate to weather
- the impact that air pressure systems have on the weather
- how hurricanes develop
- compare different types of winter storms
- how thunderstorms develop and the effects of thunderstorms on weather
- the effects of tornadoes as well as the mechanisms involved in their formation
- the various instruments used by meteorologists to forecast weather
- isobars, recognize them on a weather map and determine the type of weather each represents and differentiate weather from climate
- the geographic factors that affect climate as well as the six major climate zones
- how oceans affect climate

Skills:

Students will be able to...

- Infer from an experiment how density affects colliding air masses.
- Read a weather map to answer a series of questions.
- Observe through a demonstration two air masses with different densities.
- Create a model of the hydrologic cycle that focuses on the transfer of water in and out of the atmosphere.
- Apply the model to different climates around the world.

Student Learning			
Core Instructional Materials and Resources		Supplemental Instructional Materials and Resources	
Savvas Realize Consumable Workbook and etext Link: Weather & Climate Online Textbook		Google Classroom	Learning management system
		Online Textbook	Savvas Realize

	Consumable workbook and etext
Google Sites	Simple website design platform
Google Slides	Presentation and design tool
Google Meet	Video conferencing tool
Google Forms	Quiz and survey tool

Additional Online Resources/Tools	
Seesaw	Learning management system
EdPuzzle	Interactive video lessons
Jamboard	Online, collaborative whiteboard
Flipgrid	Video discussion tool
Padlet	Online, collaborative discussion tool
Quizlet	Digital flash card review
Quizizz	Student paced formative assessments
Flippity	Google Sheet game tool
Achieve3000	Differentiated reading instruction
Vocabulary.com	Vocabulary assistance

ReadWorks	Teacher/student comprehension texts
YouTube	Media resources
Kahoot! Learning games Make learning awesome!	Interactive review game
Padlet	Live sharing
Lino - Sticky and Photo Sharing for you	Live sharing

Accommodations/Modifications
 (ELL, Students with IEPs, 504s, Gifted Learners, At Risk)
Each group must be listed separately

Assessment
(All forms must be identified)

At Risk modifications:

- Follow all IEP modifications/504 plan
- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction

Presentation accommodations allow a student to:

- Listen to audio recordings instead of reading text
- Learn content from audiobooks, movies, videos and digital media instead of reading print versions
- Work with fewer items per page or line and/or materials in a larger print size
- Have a designated reader
- Hear instructions orally
- Record a lesson, instead of taking notes
- Have another student share class notes with him
- Be given an outline of a lesson
- Use visual presentations of verbal material, such as word webs and visual organizers
- Be given a written list of instructions

Response accommodations allow a student to:

- Formative
- 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
 - Summative
 - Unit Tests
 - Chapter Tests
 - Benchmark
 - Quarterly Exam
 - Alternative
 - Labs
 - Projects
 - Portfolio Assessments
 - RST - Research Simulation Task

- Give responses in a form (oral or written) that's easier for him
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a spelling dictionary or electronic spell-checker
- Use a word processor to type notes or give responses in class
- Use a calculator or table of "math facts"

Setting accommodations allow a student to:

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher)
- Use special lighting or acoustics
- Take a test in small group setting
- Use sensory tools such as an exercise band that can be looped around a chair's legs (so fidgety kids can kick it and quietly get their energy out)

Timing accommodations allow a student to:

- Take more time to complete a task or a test
- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling accommodations allow a student to:

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order
- Take a test at a specific time of day

Organization skills accommodations allow a student to:

- Use an alarm to help with time management
- Mark texts with a highlighter
- Have help coordinating assignments in a book or planner
- Receive study skills instruction

Assignment modifications allow a student to:

- Complete fewer or different homework problems than peers
- Write shorter papers
- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum modifications allow a student to:

- Learn different material (such as continuing to work on multiplication while classmates move on to fractions)
- Get graded or assessed using a different standard than the one for classmate

ELLs modifications

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction

Presentation accommodations allow a student to:

- Listen to audio recordings instead of reading text
- Learn content from audiobooks, movies, videos and digital media instead of reading print versions
- Work with fewer items per page or line and/or materials in a larger print size
- Have a designated reader
- Hear instructions orally
- Record a lesson, instead of taking notes
- Have another student share class notes with him
- Be given an outline of a lesson
- Use visual presentations of verbal material, such as word webs and visual organizers
- Be given a written list of instructions

Response accommodations allow a student to:

- Give responses in a form (oral or written) that's easier for him
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a dictionary from their native/home language or electronic spell-checker including home language or textbook glossary
- Use a word processor to type notes or give responses in class
- Use a calculator or table of "math facts"

Setting accommodations allow a student to:

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher)
- Take a test in small group setting

Timing accommodations allow a student to:

- Take more time to complete a task or a test
- Have extra time to process oral information and directions

Scheduling accommodations allow a student to:

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order

Organization skills accommodations allow a student to:

- Mark texts with a highlighter
- Have help coordinating assignments in a book or planner
- Receive study skills instruction

Assignment modifications allow a student to:

- Complete fewer or different homework problems than peers
- Write shorter papers
- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum modifications allow a student to:

- Learn different material (such as continuing to work on multiplication while classmates move on to fractions)
- Get graded or assessed using a different standard than the one for classmates

Gifted And Talented modifications

- 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 of 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:

- Flexible seating
- Student choice in seating/grouping

Timing accommodations allow a student to:

- Flexible pacing in terms of content, assignments, and assessments
- Allow students to explore extended activities

Scheduling accommodations allow a student to

- Establishing a timeline from completing a project
- 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
- Citing text evidence
- Create alternate projects or assignments, student developed rubrics, student choice when completing a project, alternate labs,

Curriculum modifications allow a student to:

- Use topics of interest to the student, relevant to how the world works, complex and worthwhile
- Supplemental reading materials matched to individual student lexiles
- Provide opportunities for open-ended, self-directed activities
- Get graded or assessed using a different standard than the one for classmates

Overview

Waves and Information Technology

Unit Summary:

What are the characteristic properties of waves and how can they be used?

Students are able to describe and predict characteristic properties and behaviors of waves when the waves interact with matter. Students can apply an understanding of waves as a means to send digital information. The crosscutting concepts of patterns and structure and function are used as organizing concepts for these disciplinary core ideas. These performance expectations focus on students demonstrating proficiency in developing and using models, using mathematical thinking, and obtaining, evaluating and communicating information; and to use these practices to demonstrate an understanding of the core ideas

Enduring Understandings:

Students will understand that...

- Mechanical waves transfer energy from particle to particle in matter.
- Electromagnetic waves transfer energy through either matter or empty space.
- The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design.
- A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. Models of all kinds are important for testing solutions. The iterative process of

testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution.

Essential Questions:

- What is the difference between electromagnetic waves and mechanical waves as they relate to the transfer of energy?
- Explain how knowledge of waves helps us understand our world better and improve the quality of our lives?

Standards

MS-ESS2-5,ESS2.C,ESS2.D,MS-ESS2-6,MS-ESS3-5, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4

[NJ Science Standards](#)

Interdisciplinary Connections
[Other Cross-Curricular Opportunities](#)
Opportunities for [SEL](#)

21st Century Life and Careers

- creativity and innovation
- critical thinking and problem solving
- communication
- collaboration
- information literacy
- media literacy
- information and communications technology (ICT)
- literacy
- flexibility and adaptability
- initiative and self direction
- social and cross cultural skills
- productivity and accountability

Technology

- 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-ESS1-3)

- leadership and responsibility

Unit Objectives:

Students will know...

- how light interacts with matter
- the properties of sound waves
- how waves are produced
- the ways in which waves interact with matter
- how light differs from other forms of electromagnetic waves
- the difference between electromagnetic and mechanical waves
- the factors that affect the strength of electric and magnetic forces (properties of waves)
- The factors that influence global climate change including the burning of fossil fuels

Skills:

Students will be able to...

- Design an invention or model that uses two or three different kinds of electromagnetic waves.
- Produce sound at different pitches and investigate how changing wavelength and frequency changes pitch.
- Distinguish between mechanical and electromagnetic waves and their role in the transfer of energy through models.
- Conduct an experiment to interpret the interactions between mechanical waves.
- Demonstrate how waves transfer energy

Student Learning							
Core Instructional Materials and Resources	Supplemental Instructional Materials and Resources						
Savvas Realize Consumable Workbook and etext Link: Waves and Information Technology Online Textbook	<table border="1"> <tr> <td>Google Classroom</td> <td>Learning management system</td> </tr> <tr> <td>Online Textbook</td> <td>Savvas Realize Consumable workbook and etext</td> </tr> <tr> <td>Google Sites</td> <td>Simple website design platform</td> </tr> </table>	Google Classroom	Learning management system	Online Textbook	Savvas Realize Consumable workbook and etext	Google Sites	Simple website design platform
	Google Classroom	Learning management system					
	Online Textbook	Savvas Realize Consumable workbook and etext					
Google Sites	Simple website design platform						

Google Slides	Presentation and design tool
Google Meet	Video conferencing tool
Google Forms	Quiz and survey tool

Additional Online Resources/Tools	
Seesaw	Learning management system
EdPuzzle	Interactive video lessons
Jamboard	Online, collaborative whiteboard
Flipgrid	Video discussion tool
Padlet	Online, collaborative discussion tool
Quizlet	Digital flash card review
Quizizz	Student paced formative assessments
Flippity	Google Sheet game tool
Achieve3000	Differentiated reading instruction
Vocabulary.com	Vocabulary assistance
ReadWorks	Teacher/student comprehension texts
YouTube	Media resources

Kahoot! Learning games Make learning awesome!	Interactive review game
Padlet	Live sharing
Lino - Sticky and Photo Sharing for you	Live sharing

Accommodations/Modifications
 (ELL, Students with IEPs, 504s, Gifted Learners, At Risk)
Each group must be listed separately

Assessment
(All forms must be identified)

At Risk modifications:

- Follow all IEP modifications/504 plan
- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction

Presentation accommodations allow a student to:

- Listen to audio recordings instead of reading text
- Learn content from audiobooks, movies, videos and digital media instead of reading print versions
- Work with fewer items per page or line and/or materials in a larger print size
- Have a designated reader
- Hear instructions orally
- Record a lesson, instead of taking notes
- Have another student share class notes with him
- Be given an outline of a lesson
- Use visual presentations of verbal material, such as word webs and visual organizers
- Be given a written list of instructions

Response accommodations allow a student to:

- Give responses in a form (oral or written) that's easier for him
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a spelling dictionary or electronic spell-checker

Formative

- 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
- Summative
 - Unit Tests
 - Chapter Tests
- Benchmark
 - Quarterly Exam
- Alternative
 - Labs
 - Projects
 - Portfolio Assessments
 - RST - Research Simulation Task

- Use a word processor to type notes or give responses in class
- Use a calculator or table of “math facts”

Setting accommodations allow a student to:

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher)
- Use special lighting or acoustics
- Take a test in small group setting
- Use sensory tools such as an exercise band that can be looped around a chair’s legs (so fidgety kids can kick it and quietly get their energy out)

Timing accommodations allow a student to:

- Take more time to complete a task or a test
- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling accommodations allow a student to:

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order
- Take a test at a specific time of day

Organization skills accommodations allow a student to:

- Use an alarm to help with time management
- Mark texts with a highlighter
- Have help coordinating assignments in a book or planner
- Receive study skills instruction

Assignment modifications allow a student to:

- Complete fewer or different homework problems than peers
- Write shorter papers
- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum modifications allow a student to:

- Learn different material (such as continuing to work on multiplication while classmates move on to fractions)
- Get graded or assessed using a different standard than the one for classmate

ELLs modifications

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction

Presentation accommodations allow a student to:

- Listen to audio recordings instead of reading text
- Learn content from audiobooks, movies, videos and digital media instead of reading print versions
- Work with fewer items per page or line and/or materials in a larger print size
- Have a designated reader
- Hear instructions orally
- Record a lesson, instead of taking notes
- Have another student share class notes with him
- Be given an outline of a lesson
- Use visual presentations of verbal material, such as word webs and visual organizers
- Be given a written list of instructions

Response accommodations allow a student to:

- Give responses in a form (oral or written) that's easier for him
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a dictionary from their native/home language or electronic spell-checker including home language or textbook glossary
- Use a word processor to type notes or give responses in class
- Use a calculator or table of "math facts"

Setting accommodations allow a student to:

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher)
- Take a test in small group setting

Timing accommodations allow a student to:

- Take more time to complete a task or a test
- Have extra time to process oral information and directions

Scheduling accommodations allow a student to:

- Take more time to complete a project

- Take a test in several timed sessions or over several days
- Take sections of a test in a different order

Organization skills accommodations allow a student to:

- Mark texts with a highlighter
- Have help coordinating assignments in a book or planner
- Receive study skills instruction

Assignment modifications allow a student to:

- Complete fewer or different homework problems than peers
- Write shorter papers
- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum modifications allow a student to:

- Learn different material (such as continuing to work on multiplication while classmates move on to fractions)
- Get graded or assessed using a different standard than the one for classmates

Gifted And Talented modifications

- 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 of 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:

- Flexible seating
- Student choice in seating/grouping

Timing accommodations allow a student to:

- Flexible pacing in terms of content, assignments, and assessments
- Allow students to explore extended activities

Scheduling accommodations allow a student to

- Establishing a timeline from completing a project
- 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
- Citing text evidence
- Create alternate projects or assignments, student developed rubrics, student choice when completing a project, alternate labs,

Curriculum modifications allow a student to:

- Use topics of interest to the student, relevant to how the world works, complex and worthwhile
- Supplemental reading materials matched to individual student lexiles
- Provide opportunities for open-ended, self-directed activities
- Get graded or assessed using a different standard than the one for classmates

Overview

Systems, Reproduction, & Growth

Unit Summary: Students plan and carry out investigations to develop evidence that living organisms are made of cells and to determine the relationship of organisms to the environment. Students use their understanding of cell theory to develop physical and conceptual models of cells. They construct explanations for the interactions of systems in cells and organisms and how organisms gather and use information from the environment. Students understand that all organisms are made of cells, that special structures are responsible for particular functions in organisms, and that for many organisms the body is a system of multiple interacting subsystems that form a hierarchy from cells to the body. Crosscutting concepts of cause and effect, structure and function, matter and energy are called out as organizing concepts for these core ideas.

Enduring Understandings:

Students will understand that...

- Living organisms are composed of cellular units (structures) that carry out functions required for life.
- Cellular units are composed of molecules, which also carry out biological functions.
- 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.
- The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design.

- A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. Models of all kinds are important for testing solutions. The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution.

Essential Questions:

- How do the structures of organisms contribute to life's functions?
- What do all living things have in common?

Standards

MS-LS1-1; MS-LS1-2; MS-LS1-3; MS-LS1-8; LS1.D, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4

[NJ Science Standards](#)

Interdisciplinary Connections

[Other Cross-Curricular Opportunities](#)

Opportunities for [SEL](#)

21st Century Life and Careers

- creativity and innovation
- critical thinking and problem solving
- communication
- collaboration
- information literacy
- media literacy
- information and communications technology (ICT)
- literacy
- flexibility and adaptability
- initiative and self direction
- social and cross cultural skills
- productivity and accountability
- leadership and responsibility

Technology

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-ESS1-3)

Unit Objectives:

Students will know...

- the parts and use of a compound microscope
- know the major contributors to cell theory
- cell structure and specialized function of each organelle in a plant and animal cell
- multicellular organisms begin as a single cell.
- organisms grow and develop as a result of cell division.
- the levels of organization within an organism
- that each sense receptor responds to different inputs (electromagnetic, mechanical, chemical) transmitting them as signals that travel along the nerve cells to the brain resulting in immediate behaviors and memories

Skills:

Students will be able to...

- Demonstrate how to correctly use the compound microscope.
- Describe the structure and function of each organelle in a plant and animal cell.
- Compare and contrast structures of different types of cells and relate the structures to the functions the different cells perform.
- Understand the different levels of organization within an organism.

Student Learning

Core Instructional Materials and Resources

Savvas Realize Consumable Workbook and etext Link:
Systems, Reproduction, and Growth [Online Textbook](#)

Supplemental Instructional Materials and Resources

Google Classroom	Learning management system
Online Textbook	Savvas Realize Consumable workbook and etext
Google Sites	Simple website design platform
Google Slides	Presentation and design tool

Google Meet	Video conferencing tool
Google Forms	Quiz and survey tool

Additional Online Resources/Tools	
-----------------------------------	--

Seesaw	Learning management system
EdPuzzle	Interactive video lessons
Jamboard	Online, collaborative whiteboard
Flipgrid	Video discussion tool
Padlet	Online, collaborative discussion tool
Quizlet	Digital flash card review
Quizizz	Student paced formative assessments
Flippity	Google Sheet game tool
Achieve3000	Differentiated reading instruction
Vocabulary.com	Vocabulary assistance
ReadWorks	Teacher/student comprehension texts
YouTube	Media resources
Kahoot! Learning games Make learning awesome!	Interactive review game

Padlet	Live sharing
Lino - Sticky and Photo Sharing for you	Live sharing

Accommodations/Modifications
 (ELL, Students with IEPs, 504s, Gifted Learners, At Risk)
Each group must be listed separately

Assessment
(All forms must be identified)

At Risk modifications:

- Follow all IEP modifications/504 plan
- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction

Presentation accommodations allow a student to:

- Listen to audio recordings instead of reading text
- Learn content from audiobooks, movies, videos and digital media instead of reading print versions
- Work with fewer items per page or line and/or materials in a larger print size
- Have a designated reader
- Hear instructions orally
- Record a lesson, instead of taking notes
- Have another student share class notes with him
- Be given an outline of a lesson
- Use visual presentations of verbal material, such as word webs and visual organizers
- Be given a written list of instructions

Response accommodations allow a student to:

- Give responses in a form (oral or written) that's easier for him
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a spelling dictionary or electronic spell-checker
- Use a word processor to type notes or give responses in class
- Use a calculator or table of "math facts"

Formative

- 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

- Summative
 - Unit Tests
 - Chapter Tests
- Benchmark
 - Quarterly Exam
- Alternative
 - Labs
 - Projects
 - Portfolio Assessments
 - RST - Research Simulation Task

Setting accommodations allow a student to:

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher)
- Use special lighting or acoustics
- Take a test in small group setting
- Use sensory tools such as an exercise band that can be looped around a chair's legs (so fidgety kids can kick it and quietly get their energy out)

Timing accommodations allow a student to:

- Take more time to complete a task or a test
- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling accommodations allow a student to:

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order
- Take a test at a specific time of day

Organization skills accommodations allow a student to:

- Use an alarm to help with time management
- Mark texts with a highlighter
- Have help coordinating assignments in a book or planner
- Receive study skills instruction

Assignment modifications allow a student to:

- Complete fewer or different homework problems than peers
- Write shorter papers
- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum modifications allow a student to:

- Learn different material (such as continuing to work on multiplication while classmates move on to fractions)
- Get graded or assessed using a different standard than the one for classmate

ELLs modifications

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction

Presentation accommodations allow a student to:

- Listen to audio recordings instead of reading text
- Learn content from audiobooks, movies, videos and digital media instead of reading print versions
- Work with fewer items per page or line and/or materials in a larger print size
- Have a designated reader
- Hear instructions orally
- Record a lesson, instead of taking notes
- Have another student share class notes with him
- Be given an outline of a lesson
- Use visual presentations of verbal material, such as word webs and visual organizers
- Be given a written list of instructions

Response accommodations allow a student to:

- Give responses in a form (oral or written) that's easier for him
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a dictionary from their native/home language or electronic spell-checker including home language or textbook glossary
- Use a word processor to type notes or give responses in class
- Use a calculator or table of "math facts"

Setting accommodations allow a student to:

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher)
- Take a test in small group setting

Timing accommodations allow a student to:

- Take more time to complete a task or a test

- Have extra time to process oral information and directions

Scheduling accommodations allow a student to:

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order

Organization skills accommodations allow a student to:

- Mark texts with a highlighter
- Have help coordinating assignments in a book or planner
- Receive study skills instruction

Assignment modifications allow a student to:

- Complete fewer or different homework problems than peers
- Write shorter papers
- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum modifications allow a student to:

- Learn different material (such as continuing to work on multiplication while classmates move on to fractions)
- Get graded or assessed using a different standard than the one for classmates

Gifted And Talented modifications

- 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 of 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:

- Flexible seating
- Student choice in seating/grouping

Timing accommodations allow a student to:

- Flexible pacing in terms of content, assignments, and assessments
- Allow students to explore extended activities

Scheduling accommodations allow a student to

- Establishing a timeline from completing a project
- 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
- Citing text evidence
- Create alternate projects or assignments, student developed rubrics, student choice when completing a project, alternate labs,

Curriculum modifications allow a student to:

- Use topics of interest to the student, relevant to how the world works, complex and worthwhile
- Supplemental reading materials matched to individual student lexiles
- Provide opportunities for open-ended, self-directed activities
- Get graded or assessed using a different standard than the one for classmates