Course Title:	Content Area:	Grade Level:	Credit (if applicable)
Grade 6 Science	Science	6	N/A (Middle School Course)

Course Description:

This course utilizes an inquiry-based framework grounded in national standards to foster advanced analytical and scientific literacy skills. Throughout the academic year, students engage in evidence-based scientific and engineering practices (including modeling phenomena, interpreting data, and constructing arguments) across four comprehensive disciplines of study.

This Grade 6 Science curriculum provides an integrated exploration of life, earth, and physical science through three comprehensive units: Ecosystems, Destructive Weather, and Waves (Sound, Light, and Technology). Students engage in inquiry-based learning, utilizing hands-on laboratory experiments, interactive simulations, and scientific modeling to investigate complex natural systems—ranging from the intricate energy flow within bio-bottles and symbiotic relationships to the mechanics of severe weather patterns and the fundamental properties of wave energy. By analyzing real-world case studies and leveraging data-driven investigations, students develop the skills to explain cause-and-effect relationships, interpret geographic and climate data, and understand the practical technological applications of wave physics in fields like communication and radio astronomy

Aligned Core Resources:	Connection to the ***BPS Vision of the Graduate***
Grade 6 - MS Science Instructional Guide Next Generation Science Standards (NGSS) Cluster/Item Specifications Specifications for Middle School • MS-LS2: Ecosystems: Interactions, Energy, and Dynamics • MS-ESS2: Earth's Systems • MS-PS4: Waves and their Applications in Technologies for Information Transfer	**Meaningfully Contribute to a Global Society** Collaboration during labs and inquiry related activities, social and cross-cultural skills during small and large group discussions and activities **Effectively Communicate in a Global Society** Media literacy through lab activities, investigations and projects, communication, information literacy **Demonstrate Academic Knowledge and Skills** Checking content mastery through labs and assessments, opportunities for critical thinking and problem solving during independent and group analysis
Additional Course Information: ***Knowledge/Skill Dependent courses/prerequisites***	**Link to *Completed Equity Audit***
N/A	Equity Curriculum Review Audit (Gr. 6-8 Science)

Standard Matrix

Standard		Unit 1	Unit 2	Unit 3
MS-LS2-1	Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	✔		
MS-LS2-2	Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	✔		
MS-LS2-3	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	✔		
MS-LS2-4	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	✔		
MS-LS1-6	Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.	✔		
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-ESS2-5	Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.		✔	
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.		✔	
MS-ESS3-3	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.		✔	

MS-PS4-1	Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.			✔
MS-PS4-2	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.			✔
MS-PS4-3	Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.			✔

Unit Links

Grade 6 Science
- Unit 1: Ecosystems
- Unit 2: Destructive Weather
- Unit 3: Sound, Light & Technology Waves

Use of Instructional Time (181 School Days)
- ➔ Maximum of 172 Content and Assessment Days
- ➔ 15 Flex Days
- ➔ 2 Culture and Climate Days at the start of the year
- ➔ 2 half-days before long school breaks
- ➔ 5 SBA/NGSS testing days

Unit Title
Unit 1: Ecosystems

Relevant Standards

MS-LS1-6: Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
MS-LS2-2: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
MS-LS2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

Essential Question(s)	Enduring Understanding(s)
• If nature is a competition for resources, how can so many different species live in the same space? • How does the sun's energy eventually end up inside a decomposer underground? • Is a 'healthy' ecosystem one that never changes, or one that knows how to break?	• The growth and survival of organisms are dependent on the availability of living and non-living resources; when these resources are limited, it dictates the "carrying capacity" of the entire environment • Matter cycles and energy flows through an ecosystem; while energy is eventually lost as heat, the atoms that make up organisms are recycled infinitely through the food web. • Ecosystems are dynamic and constantly shifting; their ability to maintain balance (homeostasis) depends on their biodiversity and their capacity to recover from disturbances.
Demonstration of Learning	**Pacing for Unit**

• MS-LS2-1: Pear Assessment CFA
• Formative: Creation and predictions of bio bottle
• MS-LS2-6: Pear Assessment CFA
• MS-LS2-2: Pear Assessment CFA
• MS-LS2-3: Pear Assessment CFA
• MS-LS2-4: Claim - Evidence - Reasoning response (CER)
• SBA Interim Assessment (IAB): Choose 1
  ○ IAB: Japanese Beetles
  ○ IAB: Hippopotamus/Oxpecker
  ○ IAB: Osprey and Trout
• End of Unit Summative Assessment
	Trimester 1

Family Overview (link below)	**Integration of Technology:**
Grade 6 Science - Family Overview	OpenSci Ed Virtual Labs Gizmos Demonstration PhEt Simulators
Unit-specific Vocabulary	**Aligned Unit Materials, Resources, and Technology (beyond core resources)**
NGSS Required - Algae, aquatic, atom, biodiversity, carbon, carbon dioxide, carnivore, chemical process, chemical reaction, competition, conservation, consumer, consumers, convert, decomposer, decomposers, disperse, ecological role, ecosystem, evolve, food chain/web, fungi, genetic, glucose, herbivore, host, hydrogen, infection, interdependent, microbe, microorganism, moisture, molecule, mutualism, mutually beneficial, mutually beneficial	See Instructional Guide - Grade 6 - MS Science Instructional Guide (rev. 2026)

interactions, nitrogen, nutrient, omnivore, organic, organic matter, organic waste, oxygen, parasite, photosynthesis, phytoplankton, predator, prey, producer, producers, product, reactant, reaction, relative, resource, stimulus, structure, sugar, tissue, transformation

BPS Additional - Biotic factor, Abiotic factor, Chlorophyll, Chloroplast, Phloem tubes, Xylem tubes, Transpiration, Stomata, Water Cycle, Scientific Drawing, Model, Primary Consumer (1st), Secondary Consumer (2nd), Tertiary Consumer (3rd)

Opportunities for Interdisciplinary Connections:

Common Core Standards Connections

ELA/Literacy

RST.6-8.1: Cite specific textual evidence to support analysis of science and technical texts.

WHST.6-8.1: Write arguments to support claims with clear reasons and relevant evidence.

Mathematics

MP.4: Model with mathematics.

6.RP.A.3: Use ratio and rate reasoning to solve real-world and mathematical problems.

Connections to Prior Units

Elementary School science bundles

Anticipated misconceptions

- Things that are dead are abiotic factors
- Predation is an example of a parasitic relationships
- Only plants rely on solar energy
- Plants need oxygen
- Food Chain arrows point to consumption

Connections to Future Units

- Cycling of Matter appears again in Unit 2 when the Water Cycle is discussed.
- Conservation appears again in Unit 2 when climate change and water consumption is discussed.
- Photosynthesis appears again when global temperature rises are discussed in unit 2.
- Carbon Dioxide appears when climate change is discussed in unit 2

Differentiation through *Universal Design for Learning*

	Engagement	Representation	Action & Expression
LT1	"Bio-Bottle Launch" building mini sealed bottle ecosystems and predicting how long plants can survive inside without opening them.	Closed-system diagram mapping how soil, water, air, and plant life interact within a sealed bottle environment.	Write a system breakdown or record a video explaining how the sealed bio-bottle provides all essential conditions for plant survival.
LT2	"Schoolyard Safari" exploring outdoor school habitats to spot, list, and categorize items into living and nonliving components.	T-chart and photo matrix comparing biotic factors (plants, animals, fungi, bacteria) vs. abiotic factors (sunlight, water, soil, air, temperature).	Sort physical or digital card sets into biotic/abiotic categories and write brief explanations defending tricky items (e.g., dead leaves, wood).
LT3	"Oh Deer!" ecosystem simulation game playing as animals competing for limited food, water, and shelter resources.	Population vs. Resource line graph illustrating how carrying capacity changes as resource availability fluctuates over time.	Analyze simulation data and write a Claim-Evidence-Reasoning (CER) statement detailing how resource availability limits animal population sizes.
LT4	Plant dissection lab taking apart real flowers and plants to examine roots, stems, leaves, and reproductive structures up close.	Labeled plant anatomy diagram detailing the specific photosynthesis role of each part (e.g., roots absorb water, leaves catch light/gas).	Draw and label a plant diagram or present a physical plant model explaining how each macroscopic structure supports photosynthesis.
LT 5	"Sunlight Solar Bank" demonstration placing plants in sunlight vs. dark closets to observe energy absorption and plant growth differences.	Energy flow diagram showing sunlight entering producer leaves, driving chemical energy creation, and passing to consumers.	Create an energy chain poster or explain in a short presentation why solar energy is the foundational power source for ecosystems
LT 6	Microscope lab creating leaf peels and celery cross-sections to directly observe stomata guard cells and vascular bundles (xylem/phloem).	Magnified cell diagrams showing stomata gas exchange (CO_2/O_2) alongside xylem (water transport) and phloem (sugar transport) pathways.	Sketch labeled microscope views of stomata and vascular tissue and write a short walkthrough of how these microscopic structures move materials.
LT 7	"Inside the Bottle" tracking gas and condensation cycles in a bio-bottle	Chemical equation diagram (Water + Carbon Dioxide + Light -> Sugar +	Build a visual bio-bottle photosynthesis model labeling input/output pathways

	under daylight and night conditions.	Oxygen) mapped directly onto the physical bio-bottle setup.	(light, H2O, CO2, O2, glucose) across the bottle system.
LT 8	Interactive food web and matter cycle simulation linking decomposers, producers, consumers, and abiotic nutrient pools.	Dual-model diagram showing one-way energy flow (sun to top predator) alongside circular matter cycling (carbon, water, nutrients).	Construct a comprehensive ecosystem web model (digital drawing, physical poster, or yarn-map) highlighting energy flow and matter cycling.
LT9	Ecosystem Collapse Mystery" analyzing real-world environmental change case studies (e.g., invasive species introduction, drought, deforestation).	Cause-and-effect flow chart detailing how a physical change (drought) or biological change (new predator) cascades through food webs.	Write a formal CER essay or record an argumentative presentation citing real data to show how a specific ecosystem disruption impacts populations.

Supporting Multilingual/English Learners (*CELP standards*)

	Emerging	Expanding	Bridging
LT1	I can label and match the living and non-living parts of a bio-bottle using picture cards and a word bank.	I can describe how soil, water, and air work together in a bio-bottle to help plants grow using sentence frames.	I can explain in detail how living and non-living elements in a closed bio-bottle interact and recycle resources to support plant life.
LT2	I can sort items into living (biotic) and non-living (abiotic) groups using pictures and word cards.	I can classify items as abiotic or biotic and explain my choices using sentence starters.	I can differentiate between abiotic and biotic factors across different ecosystems and justify tricky examples using scientific reasoning.
LT3	I can match resource pictures to animal needs and show if a population goes up or down using arrows or icons.	I can describe how changes in food, water, or shelter affect animal population sizes using cause-and-effect sentence frames.	I can analyze data and explain how limited resources control animal population growth and competition in an ecosystem.
LT4	I can label the main plant parts (roots, stem, leaves, flower) and match them to picture cards showing their jobs.	I can describe the job of each plant part during photosynthesis using sentence frames and labeled diagrams.	I can explain in detail how roots, stems, leaves, and flowers work together as a system to collect materials and make food through photosynthesis.
LT 5	I can order picture cards to show energy moving from the sun to plants and animals.	I can explain how energy from the sun moves through plants to animals using sentence starters and food chain templates.	I can explain in detail how producers capture sun energy and pass chemical energy to consumers in a food web.
LT 6	I can point to and label microscopic plant parts (stomata, xylem, phloem) on microscope images using a word bank.	I can describe the jobs of stomata, xylem, and phloem during plant growth using microscope notes and sentence frames.	I can explain using direct observations how stomata, xylem, and phloem work together at the microscopic level to move water, food, and gases for photosynthesis.
LT 7	I can place pre-made input and output cards on a bio-bottle picture to show photosynthesis.	I can draw and label a diagram showing how photosynthesis inputs and outputs move inside a bio-bottle using a guide.	I can create and explain a detailed model showing how energy and matter transform during photosynthesis inside a bio-bottle.
LT 8	I can trace energy flow and matter cycling on an ecosystem diagram using color-coded arrows and picture cards.	I can complete a model showing how energy flows and matter cycles through living and nonliving things using graphic organizers.	I can develop and defend a complex model comparing how energy flows in one direction while matter continuously cycles through an ecosystem.
LT9	I can select picture cards and simple claims to show if an ecosystem change helps or hurts an animal population.	I can write a simple CER (Claim, Evidence, Reasoning) argument using sentence frames to show how a physical or biological change affects a population.	I can construct a complete written argument supported by data and scientific evidence to prove how ecosystem changes impact populations over time.

Lesson Sequence	Learning Target	Success Criteria	Resources/Assessments/ Assured Learning Experiences See: Grade 6 - MS Science Instructional Guide
Learning Sequence 1: 10 Days			
1-4	**Learning Target 1**		**Phenomena Launch** • I can ask questions to better understand how the bio-bottle

	I can explain how the elements of a bio bottle create an ecosystem that supports plant life.	works • I can create a visual bio-bottle model including: how the plant will get food to grow, get water, and how other organisms contribute to the bottle's success. • I can construct a bio-bottle based on my predictions for how it works • I can make predictions for how the plant will change in the bio-bottle
5	**Learning Target 2** I can differentiate between Abiotic & Biotic Factors	• I can categorize things as being Living or Nonliving • I can dissect the words abiotic and biotic to further my understanding
6-7	**Learning Target 3** I can explain the relationship between the number of resources and living animals in an ecosystem	• I can make a prediction about the relationship between resources and animals • I can simulate the effects that resources have on population • I can analyze data to determine the relationship between the number of resources and the number of deer.
8	**Flex Day**	
9	**Assessment of MS-LS2-1**	
Learning Sequence 2: 16 Days		
11	**Learning Target 4** I can identify and describe the main parts of a plant (roots, stems, leaves, flowers) and explain how each part contributes to the process of photosynthesis.	• I can use text to create a systemic order for the events of photosynthesis • I can model the inputs and outputs of photosynthesis • I can model how the ingredients of photosynthesis travel into the leaf • I can create a model of photosynthesis within a bio-bottle • I can explain how the carbon cycle works within a biobottle, describing how plants, animals, decomposers, and the air interact to recycle carbon and maintain balance in a closed ecosystem. • I can design a successful bio-bottle
12	**Learning Target 5** I can explain the role of sunlight as an initial source of energy for most living things	• I can define what is means to be a primary source • I can explain how photosynthesis plays an energy role in an ecosystem
13-14	**Learning Target 6** I can identify and describe the microscopic parts of a plant (stomata, xylem, phloem) and explain their roles in the plant's growth and photosynthesis, using both direct observation and magnified views.	• Identify the microscopic plant parts through direct observation or with the aid of a microscope. • Explain the function of each plant part in relation to photosynthesis and overall plant growth.
15	**Flex Day**	
16	**Assessment of MS-LS1-6**	
Learning Sequence 3: 9 Days		
17-23	**Learning Target 7** I can create a model of photosynthesis within a bio-bottle	• I can compare how David Latimer's bio bottle and Jadav Payeng's forest support living things and stay balanced over time • I can differentiate between the 3 types of symbiotic relationships • I can collaboratively discover which plants and animals have symbiotic relationships and how this impacts each organism. • I can demonstrate my knowledge by completing symbiosis task cards

24	**Flex Day**	
25	**Assessment of MS-LS2-2**	
Learning Sequence 4: 11 Days		
25-33	**Learning Target 8** I can develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem	• I can dissect text to differentiate between the main roles of organism in an ecosystem • I can develop a model to show the movement of an energy in an ecosystem • I can create accurate food chains by analyzing relationships within a food web • I can develop a food web model for a Barn Owl's Menu
34	**Flex Day**	
35	**Assessment of MS-LS2-3**	
Learning Sequence 5: 5 Days		
36-39	**Learning Target 9** I can construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	• I can analyze data to draw conclusions about whether or not humans should intervene with Isle Royale • I can construct an explanation using data to support or not support the intervention of humans at Isle Royale
40-41	**Flex Days**	
42	**Assessment of MS-LS2-4**	
43	**Flex Day**	
44	**EOU Assessment**	
45	**IAB Practice**	

NOTE: *IAB can be given at a different point in the unit and all flex days can be used strategically throughout the unit if needed.*

Unit Title
Unit 2: Destructive Weather

Relevant 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.
MS-ESS2-5: Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.
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.
MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

Essential Question(s)	Enduring Understanding(s)
• How do solar energy and gravity drive the continuous movement of water through Earth's atmosphere and surface systems? • How do the collisions and complex interactions of different air masses cause sudden changes in local weather conditions? • How do the Earth's rotation and unequal heating by the sun create global atmospheric and oceanic patterns that dictate regional climates?	• Targets the water cycle as the baseline engine for weather, focusing on phase changes (evaporation, condensation, precipitation) powered by the sun and pulled by gravity. • Explores how variables like air pressure, temperature, and humidity change over time, and why weather can only be predicted within probabilistic ranges. • Connects individual weather events to broader climate scales, highlighting the Coriolis effect, convection cycles, and the ocean's role in redistributing solar energy across latitudes.
Demonstration of Learning	**Pacing for Unit**
Various models, quizzes, labs, tests, projects (see Lesson Sequence and Grade 6 - MS Science Instructional Guide)	Trimester 2
Family Overview (link below)	**Integration of Technology:**
Grade 6 Science - Family Overview	OpenSci Ed Virtual Labs Gizmos Demonstration PhEt Simulators
Unit-specific Vocabulary	**Aligned Unit Materials, Resources, and Technology (beyond core resources)**
Agriculture, Air mass, Air mass circulation, Air pressure, Altitude, Anemometer, Aquifer, Atmosphere, Atmospheric pressure, Barometer, Climate, Cloud, Cold front, Cold/warm front, Condensation, Conservation, Consumption, Convection, Coriolis effect, Crystallization, Current, Density, Development, Dew point, Economic, Evaporation, Fertile, Flow, Groundwater, Humidity, Industry, Land usage, Land use management, Latitude, Levee, Longitude, Material world, Mineral, Occluded front, Particle, Precipitation, Preservation, Pressure, Rain shadow, River delta, Runoff, Stationary front, Temperature, Thermometer, Transpiration, Vegetation, Warm front, Water cycle, Water usage, Wetland, Wind direction, Wind speed	See Instructional Guide - Grade 6 - MS Science Instructional Guide (rev. 2026)
Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions**
Common Core Standards Connections **ELA/Literacy** RST.6-8.1: Cite specific textual evidence to support analysis of science and technical texts.	• Weather and climate mean the same thing. • Air has no mass or pressure because it cannot be seen. • Air is just oxygen. • Wind is caused by temperature rather than differences in air pressure.

WHST.6-8.1: Write arguments to support claims with clear reasons and relevant evidence. **Mathematics** MP.2: Reason abstractly and quantitatively. MP.4: Model with mathematics. 6.NS.C.5: Positive and negative numbers in context	• Temperature and heat are the same thing. • The water cycle only includes evaporation and precipitation. • Fronts are storms instead of boundaries between air masses. • Warm fronts and cold fronts refer only to the temperature outside. • Wind speed and temperature measure the same thing. • Conservation and preservation mean the same thing. • Consumption only means eating food. • Currents only occur in oceans and not in air. • High pressure means warm temperatures. • Low pressure means cold temperatures..
Connections to Prior Units	**Connections to Future Units**
Elementary School science bundles	Grade 7 Mt. Everest unit Grade 8 Patterns in the Sky unit

Differentiation through *Universal Design for Learning*

	Engagement	Representation	Action & Expression
LT1	"Storm Chasers Lab" analyzing video footage and radar data from tornadoes, hurricanes, and blizzards to identify common storm triggers.	Graphic organizer detailing key severe weather ingredients: moisture, atmospheric instability, temperature contrast, and wind shear/lift.	Create a "Severe Weather Recipe" profile card or record a short forecast breakdown explaining the specific conditions needed for a hurricane or tornado.
LT2	"Before & After Disaster Audit" using satellite imagery to observe land changes caused by flash floods, hurricane surges, and coastal erosion over time.	Comparative scale matrix mapping rapid, localized changes (landslides, sinkholes) vs. slow, widespread changes (river delta shaping, barrier island migration).	Write a Claim-Evidence-Reasoning (CER) report or present a case study demonstrating how a severe weather event altered a specific landscape.
LT3	"Global Current Simulator" testing hot vs. cold water density currents in a tank and observing how spinning globes deflect wind paths (Coriolis Effect).	Labeled global atmospheric model displaying equatorial heating, convective air cells, wind belts (trade winds, westerlies), and ocean conveyor currents.	Construct a physical or digital circulation model and deliver a presentation detailing how ocean/wind currents shape a selected regional climate.
LT4	"Weather Station Tracking Lab" recording real-time temperature, humidity, air pressure, and wind direction as active weather fronts pass through.	Synoptic weather map visual mapping cold fronts, warm fronts, high/low pressure systems, and colliding air mass boundaries (maritime vs. continental).	Graph collected weather station data and write a weather forecast predicting upcoming weather shifts based on approaching air mass interactions.
LT5	"Community Resilience Challenge" evaluating local urban flood and erosion risks caused by paved surfaces and deforestation during heavy storms.	Engineering design blueprint and impact matrix evaluating solutions like permeable pavement, bioswales, rain gardens, and seawalls.	Design and present a prototype or engineered plan (e.g., flood runoff barrier or erosion monitor) to minimize human environmental impact during severe weather.

Supporting Multilingual/English Learners (*CELP standards*)

	Emerging	Expanding	Bridging
LT1	I can match picture cards and label basic factors (temperature, air pressure, moisture) that cause severe weather using a word bank.	I can identify and describe key factors (warm air masses, moisture, rapid pressure drops) that create severe weather using sentence frames.	I can explain in detail how complex interactions between air pressure, temperature, humidity, and wind conditions combine to form severe weather systems.
LT2	I can match pictures of fast and slow Earth changes (volcanoes, weathering, erosion) and place them on simple spatial and time scales using visual cards.	I can describe how different geoscience processes change Earth's surface over various sizes and timeframes using graphic organizers and sentence starters.	I can construct a written, evidence-based explanation demonstrating how large-scale and small-scale geoscience processes reshape Earth's surface across both fast and slow time scales.

LT3	I can label warm and cold areas on a globe model and use arrows to show how sunlight and Earth's rotation move air and water using visual guides.	I can use a model to describe how unequal solar heating and Earth's rotation drive ocean and air currents to form regional climates using sentence frames.	I can develop and explain a complex model illustrating how unequal heating and the Coriolis effect drive atmospheric and oceanic circulation patterns to shape global and regional climates.
LT4	I can record weather data (temperature, rain, air pressure) using visual charts and show how colliding air masses change local weather using icon cards.	I can collect and track weather data to explain how interactions between different air masses lead to predictable weather changes using structured data logs and sentence starters.	I can analyze original weather data to construct an evidence-based explanation detailing how the movement, density differences, and collisions of air masses generate specific weather conditions.
LT5	I can select solution pictures and label simple ways to track and reduce human pollution or damage to an environment using graphic organizers.	I can design a plan to monitor and minimize a specific human impact on the environment using a guided engineering template and sentence frames.	I can apply scientific concepts to design, evaluate, and defend a comprehensive method for continuously monitoring and reducing a human impact on an ecosystem.

Lesson Sequence	Learning Target	Success Criteria	Resources/Assessments/ Assured Learning Experiences See: Grade 6 - MS Science Instructional Guide
Learning Sequence 1: 2 Days			
1-2	**Learning Target 1** I can identify factors that create severe weather systems.	**Phenomena Launch** • I can ask questions about destructive weather. • I can generate ideas to explain the factors of destructive weather.	
Learning Sequence 2: 5 Days			
3-5	**Learning Target 2** I can construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales	• I can identify the steps of the water cycle. • I can identify the factors that influence the cycle of water. • I can describe the role gravity and the sun's energy play in the water cycle	
6	**Flex Day**		
7	**Water Cycle Quiz (MS-ESS2-4)**		
Learning Sequence 1: 13 Days			
8-18	**Learning Target 3** I can 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.	• I can analyze weather/climate data to make sense of it. • I can find locations that are on the same latitude. • I can describe the geography of 4 different locations across the United States at the same latitude. • I can describe how altitude and ocean current impact weather at various locations	
19	**Flex Day**		
20	**Common Formative or IAB Practice**		
Learning Sequence 1: 12 Days			
21-29	**Learning Target 3** I can 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.	• I can explore the relationship between wind patterns and ocean currents. • I can explain the role of water in climate for the two coastal locations. • I can draw a model to describe the movement of energy in creating severe weather/climate.	

30	**Flex Day**	
31	**Regional Climates Quiz (MS-ESS2-6)**	
Learning Sequence 1: 11 Days		
32-40	**Learning Target 4** I can collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions	• I can explore high and low pressure areas • I can explain the motions and interactions of different air masses. • I can use high and low pressure as predictors for weather conditions
41	**Flex Day**	
42	**Weather Conditions Quiz (MS-ESS2-5)**	
Learning Sequence 1: 11 Days		
43-53	**Learning Target 5** I can apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	• I can identify human actions that contribute to the greenhouse effect. • I can draw a model showing the impact of the greenhouse effect on weather and climate.
54	**Flex Day**	
55	**Human Impact Quiz ((MS-ESS3-3)**	
56	**Flex Day**	
57	**EOU Assessment**	
58	**IAB Practice**	

NOTE: *IAB can be given at a different point in the unit and all flex days can be used strategically throughout the unit if needed.*

Unit Title	
Unit 3: Sound, Light & Technology Waves	
Relevant Standards	
MS-PS4-1: Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. MS-PS4-2: Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. MS-PS4-3: Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.	
Essential Question(s)	**Enduring Understanding(s)**
• How do wave properties describe how energy moves and behaves? • What happens when light and sound waves encounter different materials and media? • How do living organisms use the physical properties of sound waves to communicate and survive in their environments? • How can waves be used to send messages, and why are digital signals more reliable than analog signals?	• Waves are repeating patterns of motion that transfer energy from place to place without transferring matter. A wave's amplitude determines the amount of energy it carries (greater amplitude = greater energy), while changes in frequency directly alter its wavelength, pitch, and physical shape. • Animals (such as whales) rely on the behavior of sound waves in physical media to send and receive messages over long distances, using variations in frequency, pitch, and amplitude to fulfill essential biological functions. • When waves meet different materials or travel through new media (solids, liquids, gases, or vacuums), their path and speed change as they are reflected (bounced), absorbed (taken in), or transmitted/refracted (passed through and bent). • Information can be encoded into wave patterns; however, converting continuous analog signals into discrete digitized signals (binary code) makes data transmission far more reliable, precise, and resistant to noise or degradation over long distances.
Demonstration of Learning	**Pacing for Unit**
Various models, quizzes, labs, tests, projects (see Lesson Sequence and Grade 6 - MS Science Instructional Guide)	Trimester 3
Family Overview (link below)	**Integration of Technology:**
Grade 6 Science - Family Overview	OpenSci Ed Virtual Labs Gizmos Demonstration PhEt Simulators
Unit-specific Vocabulary	**Aligned Unit Materials, Resources, and Technology (beyond core resources)**
Amplitude, barrier, bending, brightness, coded, color, communicate, computer, conversion/convert, crest, decode, device, digitize, electricity, electromagnetic, encode, filter, force, frequency, kinetic energy, lens, light wave, machine, mechanical waves, medium, mirror, path, prism, propagation, proportional, radio wave, ray, refracted, resting position, sound wave, speed, trough, transparent, visible light, wavelength	See Instructional Guide - Grade 6 - MS Science Instructional Guide (rev. 2026)
Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions**
Common Core Standards Connections **ELA/Literacy** RST.6-8.1: Cite specific textual evidence to support analysis of science and technical texts.	• High Frequency means high volume and vice versa • Sound travels fastest in air because there are fewer particles in the way. • Absorbed light simply disappears inside an object. • Light requires a physical medium (like air) to travel, just

WHST.6-8.1: Write arguments to support claims with clear reasons and relevant evidence. 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. WHST.6-8.9: Draw evidence from informational texts to support analysis, reflection, and research. **Math** MP.2: Reason abstractly and quantitatively. MP.4: Model with mathematics. 6.NS.C.5: Positive and negative numbers in context 6.RP.A.1 & 3/7.RP.A.2 Understanding and using ratios and proportions	like sound waves do. • Loudness/amplitude and pitch/frequency are dependent on each other • In the Doppler Effect, the moving object itself changes the actual frequency/pitch it is producing. • Waves move physical matter from one location to another. • Analog signals are automatically inferior in every scenario because they are older technology.
Connections to Prior Units	**Connections to Future Units**
N/A	High School Physical Science

Differentiation through *Universal Design for Learning*

	Engagement	Representation	Action & Expression
LT1	"Mystery of the Ocean Song" listening to underwater whale vocalizations and investigating how sound travels vast distances through dark water.	Structural diagram illustrating sound wave propagation through a water medium, from whale sound source to receiving whale.	Draw an initial conceptual diagram or construct a digital model mapping how whale sound waves travel through ocean water to convey messages.
LT2	"Slinky & Rope Energy Lab" shaking springs with varying force to observe how input energy changes wave height (amplitude).	Wave anatomy visual (crest, trough, wavelength, amplitude) paired with proportional energy charts showing Energy = Amplitude^2 relationships.	Graph wave amplitude data collected from simulations or slinky labs and write a mathematical description linking wave height to total energy.
LT3	"Soundproofing & Light Box Challenge" shining light and sending sound through mirrors, clear glass, black felt, cardboard, and water.	Ray and wave behavior diagrams showing reflection (bouncing back), absorption (energy captured), and transmission (passing through).	Build a physical or digital interaction model illustrating how light or sound waves behave when hitting different material barriers.
LT4	"Static vs. Binary Challenge" comparing sound distortion on fuzzy vinyl records/landlines against clear digital audio streams and pixel codes.	Comparative signal chart contrasting continuous analog waves (vulnerable to noise and degradation) with discrete digital binary codes (0s and 1s).	Write a Claim-Evidence-Reasoning (CER) argument or construct a technical comparison poster explaining why digitized signals offer more reliable data transfer.

Supporting Multilingual/English Learners (*CELP standards*)

	Emerging	Expanding	Bridging
LT1	I can draw a simple diagram showing sound waves traveling through water between two whales using pre-made labels and arrows.	I can create a labeled model to describe how whale sound waves travel through ocean water to send messages, using sentence frames.	I can construct and explain a detailed initial model illustrating how sound wave emission, transmission through water, and reception enable whale communication over distances.
LT2	I can count wave height (amplitude) on a simple grid and match higher waves to "more energy" picture cards.	I can use a grid graph to measure wave amplitude numbers and describe how higher amplitude means higher energy using sentence frames.	I can use mathematical ratios and graphical models to quantify and prove the non-linear relationship between wave amplitude and wave energy.
LT3	I can match picture cards to show light or sound waves bouncing (reflecting), stopping (absorbing), or passing through (transmitting) different materials.	I can build and use a model to describe how waves reflect, absorb, or transmit through various materials using a structured chart and sentence starters.	I can develop and explain a comprehensive model demonstrating how wave energy is reflected, absorbed, or transmitted depending on the physical properties of different materials.
LT4	I can sort cards showing analog (smooth) and digital (0s and 1s) signals and choose simple evidence cards showing why digital signals have less	I can gather text evidence to write a simple claim explaining why digitized signals are more reliable than analog signals using a graphic organizer and	I can integrate qualitative evidence from scientific sources to construct a written argument supporting the claim that digitized signals transmit

	noise.	sentence starters.	information more reliably with less noise degradation than analog signals.

Lesson Sequence	Learning Target	Success Criteria	Resources/Assessments/ Assured Learning Experiences See: Grade 6 - MS Science Instructional Guide
Learning Sequence 1: 2 Days			
1-2	**Learning Target 1** I can create an initial model to explain how whales communicate.	**Phenomena Launch** • I can brainstorm possible reasons why animals communicate. • I can analyze whale sounds to determine possible communications.	
Learning Sequence 2: 18 Days			
3-20	**Learning Target 2** I can use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave	• I can break down the diverse ways whales use sound for different functions. • I can revise my initial model of whale sounds using my new knowledge of frequency • I can explain how energy transfers to create waves and analyze the factors that change wave frequency • I can identify the properties of a wave and explain how changing amplitude, frequency, and speed alters its behavior • I can describe how changes to the frequency affect the shape (wavelengths) of a wave • I can construct accurate, scale models of waves based on specific mathematical properties and constraints.	
21	**Flex Day**		
22	**Energy and Amplitude Quiz (MS-PS4-1)**		
Learning Sequence 3: 10 Days			
23-31	**Learning Target 3** I can develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. *(MS-PS4-2 Part 1: sound waves)*	• I can differentiate between the various states of matter • I can explain/describe how a medium affects the movement of sound waves • I can explain how a moving source affects the apparent frequency and wavelength of sound waves • I can mathematically model the Doppler Effect by calculating and comparing the changes in frequency and wavelength from a moving sound source • I can explain how an object exceeding the speed of sound generates a shock wave and results in a sonic boom.	
32	**Flex Day**		
33	**Common Formative Assessment or IAB Practice**		
Learning Sequence 4: 6 Days			
34-38	**Learning Target 3** I can develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. *(MS-PS4-2 Part 2: light waves)*	• I can use evidence from a hands-on investigation to construct an argument for how light wave behavior changes when it interacts with different materials. • I can gather evidence by observing how a light beam's path changes when it travels through different media (such as air, water, and glass).	
39	**Flex Day**		
40	**Wave Properties Quiz (MS-PS4-2)**		
Learning Sequence 5: 7 Days			
41-47	**Learning Target 4** I can integrate qualitative scientific and technical information to support	• I can distinguish between analog and digital technologies by comparing how they display, record, and transmit information	

	the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.	• I can simulate and compare how analog and digital signals encode and transmit information. • I can write a well-structured argument that compares analog and digital signals and explains why digital technology is more reliable for transmitting information.
48	**Flex Day**	
49	**Technology Waves Quiz (MS-PS4-3)**	
50	**Flex Day**	
51	**EOU Assessment**	

NOTE: *All flex days can be used strategically throughout the unit if needed.*