Belvidere Cluster Wide
Science Curriculum
6th Grade
Updated Fall 2018

All Belvidere Cluster curriculum and instruction areas are aligned to the New Jersey Student Learning Standards (NJSLS) in accordance with the NJ Department of Education's curriculum implementation requirements.

Interdisciplinary Connections

– English Language Arts
– Mathematics
– Social Studies
– Technology
– Visual and Performing Arts

Technology Standards and Integration
iPads/Chromebooks
TCI Science
iXL
Scholastic Online
Interactive SmartBoard activities

NJSLA Technology
8.1.2.A.2
Create a document using a word processing application.
8.1.2.A.4
Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
8.1.P.B.1
Create a story about a picture taken by the student on a digital camera or mobile device.
8.1.P.C.1
Collaborate with peers by participating in interactive digital games or activities.
8.1.2.E.1
Use digital tools and online resources to explore a problem or issue.

CAREER EDUCATION (NJDOE CTE Clusters)

– Education & Training
– Finance
– Information Technology
– Science, Technology, Engineering & Mathematics (STEM)

21st Century Skills/ Themes

– Global Awareness
– Financial, Economic, Business and Entrepreneurial Literacy
– Civic Literacy
– Health Literacy
– Environmental Literacy
– Creativity and Innovation
– Critical Thinking
– Problem Solving
– Communication
– Collaboration
– Information Literacy
– Media Literacy
– ICT (Information, Communication and Technology) Literacy

CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.

RST.6-8.1

Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS1-4),(MS-ESS2-2),*(MS-ESS2-3)*

RST.6-8.7

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-ESS2-3)

RST.6-8.9

Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (MS-ESS2-3)

WHST.6-8.2

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-ESS1-4),(MS-ESS2-2)

WHST.6-8.8

Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. *(MS-ESS2-5)*

WHST.6-8.9

Draw evidence from informational texts to support analysis, reflection, and research. (MS-ESS3-1)

Grade 6, Science, Unit 1, History of Earth

Content Area: **Science**
Course(s): **Science**
Time Period: **September**
Length: **8 weeks**
Status: **Published**

Enduring Understanding

Geologic processes operate differently over the long expanse of geologic time.

Essential Questions

How do people figure out that the Earth and life on Earth have changed over time?
How does the movement of tectonic plates impact the surface of Earth?

Next Generation Science Standards

History of Earth

SCI.MS-ESS1-4	**Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.**
SCI.MS-ESS2-3	**Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.**
SCI.MS-ESS2-2	**Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.**

Student Learning Objectives

1	Use relative dates provided by the fossil record to make claims regarding the appearance or disappearance of organisms.
2	Correlate the evolution of organisms and the environmental conditions on Earth as they changed throughout geologic time.
3	Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
4	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
5	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

Instructional Activities

Create a Geologic Time Scale
Make a Flip Book of Pangea
Pangea Puzzle

Connecting With Nature	3-8	activity, climate, nature, soil, dynamic planet
Core Sampling	5-12	activity, natural resources, energy, dynamic planet

Dating Popcorn	5-12	activity, dynamic planet, rocks
Exploring for Petroleum - Modeling an Oil Reserve	6-12	activity, energy, natural resources, dynamic planet
Geologic Age	5-12	activity, climate, dynamic planet, fossils, rocks, soil, landforms
Geologic Time Scale Analogy	5-12	activity, climate, dynamic planet, fossils, rocks, soil, landforms
Global Change: Where Land, Air and Water Meet	5-8	activity, water, dynamic planet
Gold Panning	K-9	activity, rocks, dynamic planet, materials, minerals, natural resources
It's About Time	5-8	activity, climate, dynamic planet, fossils, rocks, soil, landforms, natural resources
Land and People: Finding a Balance	6-12	activity, energy, landforms, dynamic planet
Logs of Straw - Dendrocronology	5-9	activity, dynamic planet
Looking for Wild Elements	5-8	activity, climate, landforms, dynamic planet
Making Your Own National Park Geologic Tour	6-8	activity, landforms, rocks, dynamic planet
Map-Making Basics	6-8	activity, climate, weather, dynamic planet, energy, fossils, materials, minerals, oceans, rocks, landforms, soil, water, space, natural resources
Mapping a Refuge	6-12	activity, climate, landforms, soil, water, weather, dynamic planet, oceans, natural resources
Model of a Normal Fault	4-12	activity, dynamic planet
Modeling Earthquake Waves	6-10	activity, dynamic planet
Places on the Planet: Latitude and Longitude	6-8	activity, climate, weather, dynamic planet, energy, fossils, materials, minerals, oceans, rocks, landforms, soil, water, space
Ring of Fire	6-9	activity, dynamic planet
Seismic Mapping	5-9	activity, dynamic planet
Take the Pulse of Your Classroom	6-9	activity, dynamic planet
The Mountain Blows its Top	5-8	activity, dynamic planet, volcano
Third From the Sun	4-9	activity, space, dynamic planet
Traveling Nitrogen	5-9	activity, climate, weather, dynamic planet, energy, fossils, materials, oceans, rocks, landforms, soil, water, space, natural resources
What Lies Beneath the Upper Crust?	6-9	activity, dynamic planet

Interdisciplinary Connections

ELA/Literacy -

RST.6-8.1

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RST.6-8.7

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-ESS2-3)

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Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (MS-ESS2-3)

WHST.6-8.2

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-ESS1-4),(MS-ESS2-2)

WHST.6-8.8

Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. *(MS-ESS2-5)*

SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. *(MS-ESS2-1),(MS-ESS2-2),(MS-ESS2-6)*

Mathematics -

MP.2 Reason abstractly and quantitatively. (MS-ESS2-2),(MS-ESS2-3),(MS-ESS2-5)

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. *(MS-ESS1-4),(MS-ESS2-2),(MS-ESS2-3)*

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *(MS-ESS1-4),(MS-ESS2-2),(MS-ESS2-3)*

Assessment

Formative Assessments:

Exit tickets; teacher produced rubrics; student self checkoff rubric; three fact fold chart; conversations with students about their thinking

Index Card/Summaries/Questions: Periodically, distribute index cards and ask students to write on both sides, with these instructions: (Side 1) Based on our study of (unit topic), list a big idea that you understand and word it as a summary statement. (Side 2) Identify something about (unit topic) that you do not yet fully understand and word it as a statement or question.

Hand Signals: Ask students to display a designated hand signal to indicate their understanding of a specific concept, principal, or process: - I understand_____ and can explain it (e.g., thumbs up). - I do not yet understand _____ (e.g., thumbs down). - I'm not completely sure about _____ (e.g., wave hand).

One Minute Essay: A one-minute essay question (or one-minute question) is a focused question with a specific goal that can, in fact, be answered within a minute or two.

Analogy Prompt: Present students with an analogy prompt: (A designated concept, principle, or process) is like _____ because _____.

Web or Concept Map: Any of several forms of graphical organizers which allow learners to perceive relationships between concepts through diagramming key words representing those concepts.
http://www.graphic.org/concept.html

Additional Formative Assessments:

Checklists
Observation
Round Robin Charts
Strategic Questioning
Misconception Check
Laboratory Activity
Pair share activity
Exit ticket/cards
List 10 Things
Reflection Journals

Summative Assessments:

Selected response items: Multiple choice, True/false, Matching, Short answer, Fill in the blank, One or two sentence response, Extended written response
Performance assessment: Laboratory activities, models, various projects
End-of-unit or -chapter tests
End-of-term or -semester exams

Benchmark:

ELA Research Based Benchmark
Interim Assessments

Alternative:

Self Selected Science Projects
Group Collaboration Projects
Concept Map
Demonstration Stations
Powerpoint

Texts and Resources

Beaker, string, dowel, water, salt, sugar, food coloring, basic mineral kit, mineral ID Book, hand lens, stereomicroscope, streak plate, glass plate, copper penny, steel nail, ultra-violet light, balance, displacement beaker, graduated cylinder, basic rock kit, rock ID book, basic fossil Book, sedimentary rock samples, meter-stick, string, paper slips, colored pencils, scissors, seismograph, shake table device, pangaea map, paper plate, topographic map, quake-shake table, various building materials, graph paper, pencil, stream table, sand, gravel, bucket water tubing, beads, marbles, golf balls, beaker, dry soil sample, soil sieve, calculator, chalk, Erlenmeyer Flask, tubing, liquid soap, fractional distillation setup, rubbing alcohol, ethylene glycol, trashed paper, large basin, warm water, electric blender, strainer, paper press, clamps, water quality test kit, petri dishes, petroleum jelly, graph paper, air compressor, air tubing, ring stand, clamp, house plans, cardstock paper

Grade 6, Science, Unit 2, Earth's Systems

Content Area: **Science**
Course(s): **Science**
Time Period: **November**
Length: **8 weeks**
Status: **Published**

Enduring Understanding

Earth’s geosystems operate through a flow of energy and cycling of matter within and among different systems.

Essential Questions

How do the materials in and on Earth’s crust change over time?
How does water influence weather, circulate in the oceans, and shape Earth’s surface?

Next Generation Science Standards

Earth's Systems

SCI.MS-ESS1	**Earth’s Place in the Universe**
SCI.MS-ESS2-1	**Develop a model to describe the cycling of Earth’s materials and the flow of energy that drives this process.**
SCI.MS-ESS3-1	**Construct a scientific explanation based on evidence for how the uneven distributions of Earth’s mineral, energy, and groundwater resources are the result of past and current geoscience processes.**
SCI.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.**
SCI.MS	**Earth’s Systems**

Student Learning Objectives

1	Analyze the characteristics of Earth materials before and after chemical and physical changes that occur during Earth’s processes, including the direction of any matter flow.
2	Using a systems model, explain how energy from the Sun is transformed or transferred in biological, hydrological, and meteorological systems.
3	Develop a model to describe the cycling of Earth’s materials and the flow of energy that drives this process.
4	Develop a conceptual model to describe the multiple pathways that water cycles through Earth’s systems driven by energy from the sun and the force of gravity.
5	Analyze and interpret data to deduce the mechanisms that resulted in a variety of rock formations.
6	Construct a scientific explanation based on evidence for how the uneven distributions of Earth’s mineral, energy, and groundwater resources are the result of past and current geoscience processes.

Instructional Activities

Infiltration Lab
Can we feed the growing population? Soil Erosion. Preserving soil (effects of plant life)
http://authoring.concord.org/sequences/50/activities/294
Weather and Climate Lab

Use topographic maps to calculate watershed drain		
Earthsciweek.org		
A Bit of Engineering	5-8	activity, oceans
Deep-Sea Drilling	5-8	activity, oceans, natural resources
Earth's Hydrologic Cycle	1-12	activity, water, natural resources, oceans, weather
Freddy the Fish	3-8	activity, oceans
Map-Making Basics	6-8	activity, climate, weather, dynamic planet, energy, fossils, materials, minerals, oceans, rocks, landforms, soil, water, space, natural resources
Mapping a Refuge	6-12	activity, climate, landforms, soil, water, weather, dynamic planet, oceans, natural resources
Measure for Measure	6-12	activity, oceans
Ocean Currents	K-12	activity, oceans, water
Ocean Currents Change Our Earth	6-8	activity, oceans, water
Places on the Planet: Latitude and Longitude	6-8	activity, climate, weather, dynamic planet, energy, fossils, materials, minerals, oceans, rocks, landforms, soil, water, space
Properties of Fresh Water and Sea Water	6-12	activity, water, oceans
Sea and Ice Salinity	6-10	activity, oceans, water, minerals
Sea Level and the Terrapin	6-10	activity, oceans
The Great Ocean Conveyor	6-10	activity, oceans
Traveling Nitrogen	5-9	activity, climate, weather, dynamic planet, energy, fossils, materials, oceans, rocks, landforms, soil, water, space, natural resources

Interdisciplinary Connections

NJSLS Connections:

ELA/Literacy -

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS3-1)

WHST.6-8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-ESS3-1)

WHST.6-8.9

Draw evidence from informational texts to support analysis, reflection, and research. (MS-ESS3-1)

SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. *(MS-ESS2-1)*

Mathematics -

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. *(MS-ESS3-1)*

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *(MS-ESS3-1)*

Assessment

Formative Assessments:

Misconception Check: Present students with common or predictable misconceptions about a designated concept, principle, or process. Ask them whether they agree or disagree and explain why. The misconception check can also be presented in the form of a multiple-choice or true-false quiz.

Student Conference: One on one conversation with students to check their level of understanding.

3-Minute Pause: The Three-Minute Pause provides a chance for students to stop, reflect on the concepts and ideas that have just been introduced, make connections to prior knowledge or experience, and seek clarification.

Observation: Walk around the classroom and observe students as they work to check for learning.

Self-Assessment: A process in which students collect information about their own learning, analyze what it reveals about their progress toward the intended learning goals and plan the next steps in their learning.

Index Card/Summaries/Questions: Periodically, distribute index cards and ask students to write on both sides, with these instructions: (Side 1) Based on our study of (unit topic), list a big idea that you understand and word it as a summary statement. (Side 2) Identify something about (unit topic) that you do not yet fully understand and word it as a statement or question.

Hand Signals: Ask students to display a designated hand signal to indicate their understanding of a specific concept, principal, or process: - I understand_____ and can explain it (e.g., thumbs up). - I do not yet understand _____ (e.g., thumbs down). - I'm not completely sure about _____ (e.g., wave hand).

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Analogy Prompt: Present students with an analogy prompt: (A designated concept, principle, or process) is like _____ because _____.

Web or Concept Map: Any of several forms of graphical organizers which allow learners to perceive relationships between concepts through diagramming key words representing those concepts.
http://www.graphic.org/concept.html

Summative Assessments:

Selected response items: Multiple choice, True/false, Matching, Short answer, Fill in the blank, One or two sentence response, Extended written response

Performance assessment: Laboratory activities, models, various projects

End-of-unit or -chapter tests

End-of-term or -semester exams

Benchmark:

ELA Research Based Benchmark

Interim Assessments

Alternative

Self Selected Science Projects

Group Collaboration Projects

Concept Map

Demonstration Stations

Powerpoints

Texts and Resources

Earth-Moon model, lamp, ball-on-stick, tide chart, test tube, candle, match, small pan (tuna fish), clay, water, ruler, beaker, funnel, filter paper, gravel, sand, clay, thermometers, string, cotton balls, tin can, small dowel (dry spaghetti), balloon, scissors, pan, 100 watt bulb with lamp, plastic wrap, world map, biome map, climate data, colored pencils, 2-liter bottle, various plants, various soils,

Grade 6, Science, Unit 3, Weather and Climate

Content Area: **Science**
Course(s): **Science**
Time Period: **January**
Length: **8 weeks**
Status: **Published**

Enduring Understanding

Many factors control weather and climate.

Essential Questions

What factors interact and influence weather and climate?
How have these factors led to climate change?

Next Generation Science Standards

Weather and Climate

SCI.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.**
SCI.MS	**Weather and Climate**
SCI.MS-ESS2-5	**Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.**
SCI.MS-ESS3-5	**Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.**

Student Learning Objectives

1	Develop a conceptual model to explain the mechanisms for the Sun's energy to drive wind and the hydrologic cycle.
2	Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.
3	Explain how variations in density result from variations in temperature and salinity drive a global pattern of interconnected ocean currents.
4	Use a model to explain the mechanisms that cause varying daily temperature ranges in a coastal community and in a community located in the interior of the country.
5	Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
6	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Instructional Activities

Earthsciweek.org		
Build a Rain Gauge	5-9	activity, water, weather, climate
Climate and Temperature	5-8	activity, soil, climate, weather
Connecting With Nature	3-8	activity, climate, nature, soil, dynamic planet
Dangerous Atmosphere	5-8	activity, atmosphere, climate, weather
Engineer a Satellite	6-12	activity, engineering, space, weather, climate
Exploring Change with GIS	6-12	activity, gis, climate
Exploring Climate Change with GIS	6-12	activity, climate
Exploring Color Maps	5-12	activity, climate
Geologic Age	5-12	activity, climate, dynamic planet, fossils, rocks, soil, landforms
Geologic Time Scale Analogy	5-12	activity, climate, dynamic planet, fossils, rocks, soil, landforms
Glacier Slide	5-12	activity, weather, climate, water
It's About Time	5-8	activity, climate, dynamic planet, fossils, rocks, soil, landforms, natural resources
Looking for Wild Elements	5-8	activity, climate, landforms, dynamic planet
Map-Making Basics	6-8	activity, climate, weather, dynamic planet, energy, fossils, materials, minerals, oceans, rocks, landforms, soil, water, space, natural resources
Mapping a Refuge	6-12	activity, climate, landforms, soil, water, weather, dynamic planet, oceans, natural resources
Places on the Planet: Latitude and Longitude	6-8	activity, climate, weather, dynamic planet, energy, fossils, materials, minerals, oceans, rocks, landforms, soil, water, space
Plant an Ozone Monitoring Garden	6-9	activity, space, weather, climate
Traveling Nitrogen	5-9	activity, climate, weather, dynamic planet, energy, fossils, materials, oceans, rocks, landforms, soil, water, space, natural resources

Interdisciplinary Connections

ELA/Literacy -

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS2-5),(MS-ESS3-5)

RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (MS-ESS2-5)
WHST.6-8.8	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. *(MS-ESS2-5)*
SL.8.5	Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. *(MS-ESS2-6)*

Mathematics -

MP.2	Reason abstractly and quantitatively. (MS-ESS2-5),*(MS-ESS3-5)*
6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (MS-ESS2-5)
6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. *(MS-ESS3-5)*
7.EE.B.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *(MS-ESS3-5*

Assessment

Formative Assessments:

Exit Card: Exit cards are written student responses to questions posed at the end of a class or learning activity or at the end of a day.

Portfolio Check: Check the progress of a student's portfolio. A portfolio is a purposeful collection of significant work, carefully selected, dated and presented to tell the story of a student's achievement or growth in well-defined areas of performance, such as reading, writing, math, etc. A portfolio usually includes personal reflections where the student explains why each piece was chosen and what it shows about his/her growing skills and abilities.

Quiz: Quizzes assess students for factual information, concepts and discrete skill. There is usually a single best answer.

Journal Entry: Students record in a journal their understanding of the topic, concept or lesson taught. The teacher reviews the entry to see if the student has gained an understanding of the topic, lesson or concept that was taught.

Choral Response: In response to a cue, all students respond verbally at the same time. The response can be either to answer a question or to repeat something the teacher has said.

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Student Conference: One on one conversation with students to check their level of understanding.

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Observation: Walk around the classroom and observe students as they work to check for learning.

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http://www.graphic.org/concept.html

Summative Assessments:
Selected response items: Multiple choice, True/false, Matching, Short answer, Fill in the blank, Short constructed response, Extended written response
Performance assessment: Laboratory activities, models, various projects
End-of-unit or -chapter tests
End-of-term or -semester exams

Benchmark:

ELA Research Based Benchmark
Interim Assessments

Alternative

Self Selected Science Projects
Group Collaboration Projects
Concept Map
Demonstration Stations
Powerpoints

Texts and Resources

thermometers, string, cotton balls, tin can, small dowel (dry spaghetti), balloon, scissors, pan, 100 watt bulb with lamp, plastic wrap, world map, biome map, climate data, colored pencils, 2-liter bottle, various plants, various soils,

Grade 6, Science, Unit 4, Waves and Electromagnetic Radiation

Content Area: **Science**
Course(s): **Science**
Time Period: **March**
Length: **8 weeks**
Status: **Published**

Enduring Understanding

When waves interact with matter, characteristic properties and behaviors can be predicted.

Essential Questions

How can the characteristic properties of waves be utilized?

Waves and Electromagnetic Radiation

SCI.MS-PS4-2	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
SCI.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.
SCI.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.

Student Learning Objectives

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.
2	Explain why we can see the color of an object in space but cannot hear sound.
3	Use ray diagrams to explain how refracted light and reflected light bring images of distant objects closer and enlarge things that are too small to be observed with an unaided eye.
4	Create a simple model that explains the mechanism for how wave pulses are used to save, transmit, and receive information.
5	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
6	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.

Instructional Activities

Make a telescope
Shine a flashlight through a container of water to see the light bend
Spectral analysis
http://web.csulb.edu/~lhenriqu/ReflectionsOnLight.pdf

Interdisciplinary Connections

ELA/Literacy -

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. (MS-PS4-3)

RST.6-8.2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. *(MS-PS4-3)*

RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (MS-PS4-3)

WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research. (MS-PS4-3)

SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. *(MS-PS4-1),(MS-PS4-2)*

Mathematics -

MP.2 Reason abstractly and quantitatively. (MS-PS4-1)

MP.4 Model with mathematics. (MS-PS4-1)

6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (MS-PS4-1)

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems. (MS-PS4-1)

7.RP.A.2 Recognize and represent proportional relationships between quantities. (MS-PS4-1)

8.F.A.3 Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *(MS-PS4-1)*

Assessment

Formative Assessments:

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Debriefing: A form of reflection immediately following an activity.

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http://www.graphic.org/concept.html
Summative Assessments:
Selected response items: Multiple choice, True/false, Matching, Short answer, Fill in the blank, One or two sentence response, Extended written response
Performance assessment: Laboratory activities, models, various projects
End-of-unit or -chapter tests
End-of-term or -semester exams
Benchmark:
ELA Research Based Benchmark
Interim Assessments
Alternative
Self Selected Science Projects
Group Collaboration Projects
Concept Map
Demonstration Stations
Powerpoints

Texts and Resources

spectroscope, spectrum tube power supply, spectrum tubes, colored pencils, lamp with low wattage light, lenses (small focal length), lenses (long focal length), calculators, meter-stick

Grade 6, Science, Unit 5, Space Systems

Content Area: **Science**
Course(s): **Science**
Time Period: **May**
Length: **8 weeks**
Status: **Published**

Enduring Understanding

The Earth has a place in the solar system, Milky Way galaxy, and universe and the placement of the Earth affects patterns and motion.

Essential Questions

What is Earth's place in the Universe?
What makes up our solar system and how can the motion of Earth explain seasons and eclipses?

Next Generation Science Standards

Space systems

SCI.MS-ESS1-2	**Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.**
SCI.MS-ESS1-3	**Analyze and interpret data to determine scale properties of objects in the solar system.**
SCI.MS-ESS1-1	**Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.**

Student Learning Objectives

1	Generate and analyze evidence (through simulations or long term investigations) to explain why th motion across the sky changes over the course of a year.
3	Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar ph and moon, and seasons.
4	Develop and use a model that shows how gravity causes smaller objects to orbit around larger obj including the gravitational force of the sun causes the planets and other bodies to orbit around it h solar system.
5	Analyze and interpret data to determine scale properties of objects in the solar system.
6	Develop and use a model to describe the role of gravity in the motions within galaxies and the sola

Instructional Activities

Make a model of solar and lunar eclipses with ball and lamp

Make a model of the seasons
Scale model of the solar system
Calculate Earth's gravity using a pendulum
Blanket or Bedsheet space demo with different size and mass balls
Lab on paralax method for determining distances to stars and to calculate the diameter of the sun using a pinhole camera

Interdisciplinary Connections

NJSLS *Connections:*
ELA/Literacy -
RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS1-3)
RST.6-8.7
Integrate quantitative or technical information expressed in words in a text with a version of that information expressed flowchart, diagram, model, graph, or table). (MS-ESS1-3)
SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evide *(MS-ESS1-1),(MS-ESS1-2)*
Mathematics -
MP.2 Reason abstractly and quantitatively. (MS-ESS1-3)
MP.4 Model with mathematics. *(MS-ESS1-1),(MS-ESS1-2)*
6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quanti *(MS-ESS1-1),(MS-ESS1-2)*,(MS-ESS1-3)
7.RP.A.2 Recognize and represent proportional relationships between quantities. *(MS-ESS1-1),(MS-ESS1-2)*,(MS-ESS1-3
6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problen variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified *(MS-ESS1-2),(MS-ESS1-4)*
7.EE.B.6 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equation problems by reasoning about the quantities. *(MS-ESS1-2)*

Assessment

Formative Assessments:
One Sentence Summary: Students are asked to write a summary sentence that answers the "who, what where, when, why, how" questions about the topic.
Summary Frames: Description: A _____ is a kind of_____ that
... Compare/Contrast: Problem/Solution/Cause/Effect
One Word Summary: Select (or invent) one word which best summarizes a topic.
Think-Pair- Share/Turn to Your Partner: Teacher gives direction to students. Students formulate individual response, and then turn to a partner to share their answers. Teacher calls on several random pairs to share their answers with the class.
Think-Write-Pair-Share: Students think individually, write their thinking, pair and discuss with partner, then share with the class.

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stop watch, calculator, string, metal washer, ruler, star (picture), measuring tape (large print), meter stick, aluminum foil (with pinhole), telescope, cardboard screen, cardstock paper, colored pencils, scissors, large area to work, 2 liter bottle, air pump (with a gauge), rocket launcher, materials for rockets