

Mullica Township School District



Science Curriculum Grade 1

Board approval: 11/28/2018

MULLICA TOWNSHIP SCHOOL DISTRICT
Science Curriculum
GRADE 1

Content Area: SCIENCE

Course Title: ELEMENTARY

Grade Level: 1

UNIT 1

Patterns of Change In The Sky

20 days

UNIT 2

Characteristics of Living Things

20 days

UNIT 3

Mimicking Organisms to Solve Problems

20 days

UNIT 4

Light and Sound

20 days

UNIT 5

Communicating With Light and Sound

10 days

Date Created: 10/18/2018

Board Approved:

Created By: Barbara Rheault

MULLICA TOWNSHIP SCHOOL DISTRICT

Grade 1 - Unit 1

Content Area: Science

Unit Title: Patterns of Change In The Sky

Target Course/Grade Level: First

Unit Summary

In this unit of study, students observe, describe, and predict some patterns in the movement of objects in the sky. The crosscutting concept of *patterns* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations* and *analyzing and interpreting data*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Primary Interdisciplinary Connections

ELA/Literacy

W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions).

(1-ESS1-1),(1-ESS1-2)

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-1),(1-ESS1-2)

Mathematics

MP.2 Reason abstractly and quantitatively. (1-ESS1-2)

MP.4 Model with mathematics. (1-ESS1-2)

MP.5 Use appropriate tools strategically. (1-ESS1-2)

1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)

1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)

21st Century Themes:

Career Ready Practices and Financial Literacy

CRP1. Act as a responsible and contributing citizen and employee.

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP6. Demonstrate creativity and innovation.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation or future academic and career success.

Technology Integration

8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.

LEARNING TARGETS

Performance Expectations

1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted.

1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year.

<p style="text-align: center;">Essential Questions</p> <ul style="list-style-type: none"> • How do you know if the sun will rise and set tomorrow? • Why does it get darker earlier in the winter? 	<p style="text-align: center;">Disciplinary Core Ideas</p> <p>ESS1.A: The Universe and its Stars</p> <ul style="list-style-type: none"> • Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) <p>ESS1.B: Earth and the Solar System</p> <ul style="list-style-type: none"> • Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1- ESS1-2)
<p style="text-align: center;">Science and Engineering Practices</p> <p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> • Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1- 2) <p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> • Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1) 	<p style="text-align: center;">Crosscutting Concepts</p> <p>Patterns</p> <ul style="list-style-type: none"> • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1),(1-ESS1-2)

Evidence of Learning

Formative Assessments

- Activity: Hook - Day and Night; Day or Night?
- Activity: Investigate - Moon Phases; Seasons Day or Night Dioramas
- Activity w/report: Engineering Design
- Activity w/report: Science/Literacy - Observing Objects In The Sky; Length of Day Or Night
- Quiz/STEMScopedia Activity - Vocabulary Quiz
- Quiz/Activity: Concept Review Game
- STEM Talk: View and discuss Content Connections Interactive Video(s):.
- Communicate/Drama Activity: Students use Science Rock “Movement” musical/video software platform where students sing standards-based science songs and dance to the tune.

- Quiz/Activity: Math Connections interactive practice/quiz that uses grade-level appropriate math activities to address the concept.
- STEM Talk: View and discuss Teacher-Guided Read Aloud
- Assessment Review: View and interact with “Science Today - Watch It!” by Associated Press

Summative Assessments

Argue: Claim-Evidence-Reasoning: student writes a scientific explanation to show their understanding of a science in a way that uses evidence.

Open-Ended Response: a short-answer and essay assessment to evaluate student mastery of the concept.

Multiple-Choice Assessment: a standards-based assessment designed to gauge students’ understanding of the science concept using their selections of the best possible answers from a list of choices

Modifications (ELLs, Special Education, Gifted and Talented)

ELL

- Learn the backgrounds of LEP students
- Plan lessons that are both culturally and linguistically appropriate.
- Group students flexibly, in small groups based on individual or group interests as well as instructional need or ability.
- Give clear, simple directions
- Ask them to retell or restate, in their own words, the task.
- Reiterate, in the student’s native language or in simplified English, the key concepts learned in content areas.
- Paraphrase information and main ideas.
- Reorganize and reinforce information.
- Provide bilingual classroom resources, such as bilingual dictionaries, picture books and dictionaries, and English language encyclopedias for LEP students.

Special Education

- Provide Instructional Strategies and Techniques that Address Learning Style
- Utilize Techniques and Activities to Support Personal-Social Development
- Modify the Presentation of Materials
- Modify the Learning Environment
- Modify Assessments
- Modify Grading
- Facilitate Appropriate Behavior
- Limit/Reduce/Modify/Permit Alternate Class Work Curricular Procedures
- Provide Alternative Homework
- Provide Access to Special Equipment and Instructional Materials

Gifted and Talented

- Accelerate or enrich content.
- Reduce regular classroom work
- Providing alternate assignments
- Schedule opportunities to work individually through independent study
- Schedule opportunities to work in homogeneous groupings with peers of similar ability and interests
- Schedule opportunities to participate heterogeneous groupings of mixed-ability students.
- Stimulate higher order thinking skills and give students opportunities to consider and express personal opinions by asking open-ended questions.

- Scaffold investigations and reports to require thinking skills such as comparison, synthesis, insight, judgment, hypothesis, conjecture, and assimilation.
- Curriculum compact to allow student to skip standard assignments in order to acquire time to pursue alternate assignments or independent projects.
- Compact curriculum in areas that represent student strengths
- Create a plan outline and time frame for completion of assignments & alternate activities.
- Incorporate written independent study contracts to research topics of interest to become “resident experts.”
- Develop descriptions and the criteria for evaluating each project.
- Determine (jointly) deadline dates and work schedule.
- Provide complex, critical thinking tasks.

Curriculum Development Resources/Instructional Materials/Equipment Resources:

STEMScopes -

- Patterns In Space
- Seasonal Patterns

Materials

- Student Journal
- Toolkit
- Globe
- Flashlight
- Printables
- Moon Phase cards
- Zippered plastic bags
- sunrise/sunset charts
- Various library books about the seasons

Equipment

- Smartboard and Projector
- Computer access

MULLICA TOWNSHIP SCHOOL DISTRICT

Grade 1 - Unit 2

Content Area: Science

Unit Title: Characteristics of Living Things

Target Course/Grade Level: First

Unit Summary

In this unit of study, students develop an understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs, as well as how the behaviors of parents and offspring help offspring survive. The understanding that young plants and animals are like, but not exactly the same as, their parents is developed. The crosscutting concept of *patterns* is called out as an organizing concept for the disciplinary core ideas. Students are

expected to demonstrate grade-appropriate proficiency in *obtaining, evaluating, and communicating information* and *constructing explanations*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Primary Interdisciplinary Connections:

ELA/Literacy

RI.1.1 Ask and answer questions about key details in a text. (1-LS3-1)

W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-LS3- 1)

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-LS3-1)

Mathematics

MP.2 Reason abstractly and quantitatively. (1-LS3-1)

MP.5 Use appropriate tools strategically. (1-LS3-1)

1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-LS3-1)

21st Century Themes:

Career Ready Practices and Financial Literacy

CRP1. Act as a responsible and contributing citizen and employee.

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP6. Demonstrate creativity and innovation.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

Technology Integration

8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.

Learning Targets

Performance Expectations

1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

Essential Questions

- Why do some animals not look like their parents?
- Why do plants look so much like their parent plants?
- How do babies communicate with their parents if they can't talk?

Disciplinary Core Ideas

LS3.A: Inheritance of Traits

- Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents. (1- LS3-1)

LS3.B: Variation of Traits

- Individuals of the same kind of plant or

	<p>animal are recognizable as similar but can also vary in many ways. (1-LS3-1)</p> <p>LS1.B: Growth and Development of Organisms</p> <ul style="list-style-type: none"> • Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)
<p>Science and Engineering Practices</p> <p>Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.</p> <ul style="list-style-type: none"> • Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1) <p>Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in K– 2 builds on prior experiences and uses observations and texts to communicate new information.</p> <ul style="list-style-type: none"> • Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2) <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> • Scientists look for patterns and order when making observations about the world. (1-LS1-2) 	<p>Crosscutting Concepts</p> <p>Patterns Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-LS3-1) and (1-LS1-2)</p>

Evidence of Learning
<p>Formative Assessments</p> <ul style="list-style-type: none"> • Activity: Hook - To Whom Do I Belong?; Nature Walk; Meet My Needs • Activity: Investigate - Bugs!; Plant Sort; Who Are My Parents?; My Needs Charades • Activity w/report: Engineering Design - Helping My Herd • Activity w/report: Science/Literacy -Are You My Parents?; Plant Babies

- Quiz/STEMScopedia Activity - Vocabulary Quiz
- Quiz/Activity: Concept Review Game
- STEM Talk: View and discuss Content Connections Interactive Video(s):.
- Communicate/Drama Activity: Students use Science Rock “Movement” musical/video software platform where students sing standards-based science songs and dance to the tune.
- Quiz/Activity: Math Connections interactive practice/quiz that uses grade-level appropriate math activities to address the concept.
- STEM Talk: View and discuss Teacher-Guided Read Aloud
- Assessment Review: View and interact with “Science Today - Watch It!” by Associated Press

Summative Assessments

Argue: Claim-Evidence-Reasoning: student writes a scientific explanation to show their understanding of a science in a way that uses evidence.

Open-Ended Response: a short-answer and essay assessment to evaluate student mastery of the concept.

Multiple-Choice Assessment: a standards-based assessment designed to gauge students’ understanding of the science concept using their selections of the best possible answers from a list of choices

Modifications (ELLs, Special Education, Gifted and Talented)

ELL

- Learn the backgrounds of LEP students
- Plan lessons that are both culturally and linguistically appropriate.
- Group students flexibly, in small groups based on individual or group interests as well as instructional need or ability.
- Give clear, simple directions
- Ask them to retell or restate, in their own words, the task.
- Reiterate, in the student’s native language or in simplified English, the key concepts learned in content areas.
- Paraphrase information and main ideas.
- Reorganize and reinforce information.
- Provide bilingual classroom resources, such as bilingual dictionaries, picture books and dictionaries, and English language encyclopedias for LEP students.

Special Education

- Provide Instructional Strategies and Techniques that Address Learning Style
- Utilize Techniques and Activities to Support Personal-Social Development
- Modify the Presentation of Materials
- Modify the Learning Environment
- Modify Assessments
- Modify Grading
- Facilitate Appropriate Behavior
- Limit/Reduce/Modify/Permit Alternate Class Work Curricular Procedures
- Provide Alternative Homework
- Provide Access to Special Equipment and Instructional Materials

Gifted and Talented

- Accelerate or enrich content.
- Reduce regular classroom work
- Providing alternate assignments
- Schedule opportunities to work individually through independent study
- Schedule opportunities to work in homogeneous groupings with peers of similar ability and interests

- Schedule opportunities to participate heterogeneous groupings of mixed-ability students.
- Stimulate higher order thinking skills and give students opportunities to consider and express personal opinions by asking open-ended questions.
- Scaffold investigations and reports to require thinking skills such as comparison, synthesis, insight, judgment, hypothesis, conjecture, and assimilation.
- Curriculum compact to allow student to skip standard assignments in order to acquire time to pursue alternate assignments or independent projects.
- Compact curriculum in areas that represent student strengths
- Create a plan outline and time frame for completion of assignments & alternate activities.
- Incorporate written independent study contracts to research topics of interest to become “resident experts.”
- Develop descriptions and the criteria for evaluating each project.
- Determine (jointly) deadline dates and work schedule.
- Provide complex, critical thinking tasks.

Curriculum Development Resources/Instructional Materials/Equipment Resources:

STEMScopes

- Animal Trait Inheritance and Variation
- Plant Trait Inheritance and Variation
- Protecting The Young

Materials

- Student journal
- Printables
- Plastic ziploc bags
- Pipe cleaners
- Baby/Parent Cards
- Plant printables
- Various small plants and flowers, various colors (see list)
- Medium brown paper bags
- Audio clips of animals communicating with their young
- Linking cubes
- Printables
- Parent/offspring picture cards
- Butcher paper
- Metal and non-metal objects
- Sand
- Magnetic wands

Equipment

- Smartboard and Projector

MULLICA TOWNSHIP SCHOOL DISTRICT

Grade 1 - Unit 3

Content Area: Science

Unit Title: Mimicking Organisms to Solve Problems

Target Course/Grade Level: First**Unit Summary**

In this unit of study, students develop an understanding of how plants and animals use their parts to help them survive, grow, and meet their needs. Students also need opportunities to *develop possible solutions*. As students develop possible solutions, one challenge will be to keep them from immediately implementing the first solution they think of and to instead think through the problem carefully before acting. Having students sketch their ideas or make a physical model is a good way to engage them in shaping their ideas to meet the requirements of the problem. The crosscutting concept of *structure and function* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *constructing explanations*, *designing solutions*, and in *developing and using models*. Students are expected to use these practices to demonstrate understanding of the core ideas.

Primary Interdisciplinary Connections:**ELA/Literacy**

RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)

W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1),(K-2-ETS1-3)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1),(K-2-ETS1-3)

SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)

Mathematics

MP.2 Reason abstractly and quantitatively. (K-2-ETS1-1),(K-2-ETS1-3) **MP.4** Model with mathematics. (K-2-ETS1-1),(K-2-ETS1-3)

MP.5 Use appropriate tools strategically. (K-2-ETS1-1),(K-2-ETS1-3)

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1),(K-2-ETS1-3)

21st Century Themes:**Career Ready Practices and Financial Literacy**

CRP1. Act as a responsible and contributing citizen and employee.

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP6. Demonstrate creativity and innovation.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

Technology Integration

8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.

Learning Targets

Performance Expectations

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

<p style="text-align: center;">Essential Questions</p> <ul style="list-style-type: none"> ● Why do some animals have tails, but others don't? ● What would happen if a plant had no roots? ● How can owls catch their prey (food) in the dark? ● Why do plants turn towards light? 	<p style="text-align: center;">Disciplinary Core Ideas</p> <p>LS1.A: Structure and Function</p> <ul style="list-style-type: none"> ● All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1) <p>LS1.D: Information Processing</p> <ul style="list-style-type: none"> ● Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1) <p>ETS1.B: Developing Possible Solutions</p> <ul style="list-style-type: none"> ● Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2)
<p style="text-align: center;">Science and Engineering Practices</p> <p>Constructing Explanations and Designing Solutions</p> <p>Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.</p> <ul style="list-style-type: none"> ● Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1) <p>Developing and Using Models</p> <p>Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or</p>	<p style="text-align: center;">Crosscutting Concepts</p> <p>Structure and Function</p> <ul style="list-style-type: none"> ● The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1) <p>Connections to Engineering, Technology, and Applications of Science; Influence of Engineering, Technology, and Science on Society and the Natural World</p> <ul style="list-style-type: none"> ● Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. (1-LS1-1) <p>Structure and Function</p> <ul style="list-style-type: none"> ● The shape and stability of structures of natural and designed objects are related to their function(s). (K-2- ETS1-2)

storyboard) that represent concrete events or design solutions.

- Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)

Evidence of Learning

Formative Assessments

- Activity: Hook - Little Red Riding Hood; “Flowers, Stems, Leaves, and Roots”; Plant Characteristics
- Activity: Investigate - We’re Going On a Zoo Hunt!; Dinner Time; HmMMMM, I’m Hungry
- Activity w/report: Engineering Design - Animal Inventions; Helpful Parts; Build A Bed; Solar Energy
- Activity w/report: Science/Literacy -Super Animal!; Human Mimicking Plants; Growing Sideways
- Quiz/STEMScopedia Activity - Vocabulary Quiz
- Quiz/Activity: Concept Review Game
- STEM Talk: View and discuss Content Connections Interactive Video(s):.
- Communicate/Drama Activity: Students use Science Rock “Movement” musical/video software platform where students sing standards-based science songs and dance to the tune.
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Summative Assessments

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Modifications (ELLs, Special Education, Gifted and Talented)

ELL

- Learn the backgrounds of LEP students
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- Give clear, simple directions
- Ask them to retell or restate, in their own words, the task.
- Reiterate, in the student’s native language or in simplified English, the key concepts learned in content areas.
- Paraphrase information and main ideas.
- Reorganize and reinforce information.
- Provide bilingual classroom resources, such as bilingual dictionaries, picture books and dictionaries, and English language encyclopedias for LEP students.

Special Education

- Provide Instructional Strategies and Techniques that Address Learning Style
- Utilize Techniques and Activities to Support Personal-Social Development
- Modify the Presentation of Materials
- Modify the Learning Environment
- Modify Assessments
- Modify Grading
- Facilitate Appropriate Behavior
- Limit/Reduce/Modify/Permit Alternate Class Work Curricular Procedures

- Provide Alternative Homework
- Provide Access to Special Equipment and Instructional Materials

Gifted and Talented

- Accelerate or enrich content.
- Reduce regular classroom work
- Providing alternate assignments
- Schedule opportunities to work individually through independent study
- Schedule opportunities to work in homogeneous groupings with peers of similar ability and interests
- Schedule opportunities to participate heterogeneous groupings of mixed-ability students.
- Stimulate higher order thinking skills and give students opportunities to consider and express personal opinions by asking open-ended questions.
- Scaffold investigations and reports to require thinking skills such as comparison, synthesis, insight, judgment, hypothesis, conjecture, and assimilation.
- Curriculum compact to allow student to skip standard assignments in order to acquire time to pursue alternate assignments or independent projects.
- Compact curriculum in areas that represent student strengths
- Create a plan outline and time frame for completion of assignments & alternate activities.
- Incorporate written independent study contracts to research topics of interest to become “resident experts.”
- Develop descriptions and the criteria for evaluating each project.
- Determine (jointly) deadline dates and work schedule.
- Provide complex, critical thinking tasks.

Curriculum Development Resources/Instructional Materials/Equipment Resources:

STEMScopes -

- Parts of Animals
- Parts of Plants
- Animal Survival
- Plant Survival

Materials

- Student journal
- Animal printables
- Carrot
- Broccoli
- Spinach
- Artichoke
- Radish
- Lettuce
- Celery w/leaves
- Pumpkin seeds
- Sunflower seeds
- Fruits with seeds (apple, orange, lemon, grapes)
- Printables/Pictures (Build a Bed)
- Empty shoebox
- Essential oils, cooking extracts (food smells)
- Cotton balls
- Rocks
- Fabric
- Feathers

- Leaves
- Tree bark
- Empty shoebox
- Small plant
- Plant pictures

Equipment

- Smartboard and Projector
- Computer access

MULLICA TOWNSHIP SCHOOL DISTRICT

Grade 1 - Unit 4

Content Area: Science

Unit Title: Light and Sound

Target Course/Grade Level: First

Unit Summary

In this unit of study, students develop an understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. The idea that light travels from place to place can be understood by students at this level by placing objects made with different materials in the path of a beam of light and determining the effect of the different materials. The crosscutting concept of *cause and effect* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations*, *constructing explanations*, and *designing solutions*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 1-PS4-2, 1-PS4-3, and 1-PS4-1.

Primary Interdisciplinary Connections:

ELA/Literacy

W.1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. (1-PS4-2)

W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-PS4-1),(1-PS4-2),(1-PS4-3)

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1),(1-PS4-2),(1-PS4-3)

SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-1),(1-PS4-2),(1-PS4-3)

21st Century Themes:

Career Ready Practices and Financial Literacy

CRP1. Act as a responsible and contributing citizen and employee.

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP6. Demonstrate creativity and innovation.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

Technology Integration

8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.

Learning Targets

Performance Expectations

1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated.

1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.

Essential Questions

- Why can't we see in the dark?
- How do drums and guitars make sound?

Disciplinary Core Ideas

PS4.A: Wave Properties

- Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)

PS4.B: Electromagnetic Radiation

- Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2)
- Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (1-PS4-3)

Science and Engineering Practices

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. (1-PS4-1),(1-PS4-3)

Crosscutting Concepts

Cause and Effect

- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1),(1-PS4-2),(1-PS4-3)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-PS4-2)

Connections to Nature of Science: Scientific Investigations Use a Variety of Methods

- Science investigations begin with a question. (1-PS4-1)
- Scientists use different ways to study the world. (1-PS4-1)

Evidence of Learning

Formative Assessments

- Activity: Hook - I See The Light; Laser Show
- Activity: Investigate - What Do I See?; Star Quality; Sound Stations
- Activity w/report: Engineering Design - Rock Out
- Activity w/report: Science/Literacy - What Do You See?
- Quiz/STEMScopedia Activity - Vocabulary Quiz
- Quiz/Activity: Concept Review Game
- STEM Talk: View and discuss Content Connections Interactive Video(s):.
- Communicate/Drama Activity: Students use Science Rock "Movement" musical/video software platform where students sing standards-based science songs and dance to the tune.
- Quiz/Activity: Math Connections interactive practice/quiz that uses grade-level appropriate math activities to address the concept.
- STEM Talk: View and discuss Teacher-Guided Read Aloud
- Assessment Review: View and interact with "Science Today - Watch It!" by Associated Press

Summative Assessments

Argue: Claim-Evidence-Reasoning: student writes a scientific explanation to show their understanding of a science in a way that uses evidence.

Open-Ended Response: a short-answer and essay assessment to evaluate student mastery of the concept.

Multiple-Choice Assessment: a standards-based assessment designed to gauge students' understanding of the science concept using their selections of the best possible answers from a list of choices

Modifications (ELLs, Special Education, Gifted and Talented)

ELL

- Learn the backgrounds of LEP students
- Plan lessons that are both culturally and linguistically appropriate.
- Group students flexibly, in small groups based on individual or group interests as well as instructional need or ability.
- Give clear, simple directions
- Ask them to retell or restate, in their own words, the task.
- Reiterate, in the student's native language or in simplified English, the key concepts learned in content areas.
- Paraphrase information and main ideas.
- Reorganize and reinforce information.
- Provide bilingual classroom resources, such as bilingual dictionaries, picture books and dictionaries, and English language encyclopedias for LEP students.

Special Education

- Provide Instructional Strategies and Techniques that Address Learning Style
- Utilize Techniques and Activities to Support Personal-Social Development
- Modify the Presentation of Materials
- Modify the Learning Environment
- Modify Assessments
- Modify Grading
- Facilitate Appropriate Behavior
- Limit/Reduce/Modify/Permit Alternate Class Work Curricular Procedures
- Provide Alternative Homework
- Provide Access to Special Equipment and Instructional Materials

Gifted and Talented

- Accelerate or enrich content.
- Reduce regular classroom work
- Providing alternate assignments
- Schedule opportunities to work individually through independent study
- Schedule opportunities to work in homogeneous groupings with peers of similar ability and interests
- Schedule opportunities to participate heterogeneous groupings of mixed-ability students.
- Stimulate higher order thinking skills and give students opportunities to consider and express personal opinions by asking open-ended questions.
- Scaffold investigations and reports to require thinking skills such as comparison, synthesis, insight, judgment, hypothesis, conjecture, and assimilation.
- Curriculum compact to allow student to skip standard assignments in order to acquire time to pursue alternate assignments or independent projects.
- Compact curriculum in areas that represent student strengths
- Create a plan outline and time frame for completion of assignments & alternate activities.
- Incorporate written independent study contracts to research topics of interest to become “resident experts.”
- Develop descriptions and the criteria for evaluating each project.
- Determine (jointly) deadline dates and work schedule.
- Provide complex, critical thinking tasks.

Curriculum Development Resources/Instructional Materials/Equipment Resources:

STEMScopes -

- Behavior of Light
- Sound

Materials

- Student journal
- Toolkit
- Flashlight
- Mirrors
- Copy of The Dog and His Bone
- Wax paper
- Black construction paper
- Plastic wrap
- Cardstock frames
- Metal spoon
- Wooden block
- Pink eraser
- Index card
- Aluminum foil
- Styrofoam plate
- Stop watch
- Aluminum cans
- Tuning fork
- Laser light
- Safety goggles
- Musical greeting card
- Rubber band
- Bowl
- Balloon

- Rice
- Sand
- Salt
- Aquarium rocks

Equipment

- Smartboard and Projector

MULLICA TOWNSHIP SCHOOL DISTRICT

Grade 1 - Unit 5

Content Area: Science

Unit Title: Communicating With Light and Sound

Target Course/Grade Level: First

Unit Summary

In this unit of study, students continue to develop their understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. Students apply their knowledge of light and sound to engage in engineering design to solve a simple problem involving communication with light and sound. The crosscutting concepts of *structure and function and influence of engineering, technology, and science on society and the natural world* are called out as organizing concepts for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *constructing explanations and designing solutions, asking questions and defining problems, and developing and using models*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 1-PS4-4, K-2-ETS1-1, and K-2-ETS1-2.

Primary Interdisciplinary Connections:

ELA/Literacy

W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). ((1-PS4-4)

RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)

W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1),

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1),

SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)

Mathematics

MP.5 Use appropriate tools strategically. (1-PS4-4)

1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-PS4-4)

1.MD.A.2 Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. (1-PS4-4)

MP.2 Reason abstractly and quantitatively. (K-2-ETS1-1)

MP.4 Model with mathematics. (K-2-ETS1-1)

MP.5 Use appropriate tools strategically. (K-2-ETS1-1)

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1)

21st Century Themes:

Career Ready Practices and Financial Literacy

CRP1. Act as a responsible and contributing citizen and employee.

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP6. Demonstrate creativity and innovation.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

Technology Integration

8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.

Learning Targets

Performance Expectations

1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.

K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Essential Questions

- How do lighthouses communicate to ships and boats?

Disciplinary Core Ideas

PS4.C: Information Technologies and Instrumentation

- People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)

ETS1.A: Defining and Delimiting Engineering Problems

- A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1)

	<ul style="list-style-type: none"> • Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) • Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1) <p>ETS1.B: Developing Possible Solutions</p> <ul style="list-style-type: none"> • Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people. (K-2-ETS1-2)
<p style="text-align: center;">Science and Engineering Practices</p> <p>Constructing Explanations and Designing Solutions</p> <p>Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.</p> <ul style="list-style-type: none"> • Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4) <p>Asking Questions and Defining Problems</p> <p>Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions.</p> <ul style="list-style-type: none"> • Ask questions based on observations to find more information about the natural and/or designed world(s). (K2-ETS1-1) • Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1) <p>Developing and Using Models</p> <p>Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.</p> <ul style="list-style-type: none"> • Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2) 	<p style="text-align: center;">Crosscutting Concepts</p> <p>Structure and Function</p> <ul style="list-style-type: none"> • The shape and stability of structures of natural and designed objects are related to their function(s). (K-2- ETS1-2) <p style="text-align: center;">Connections to Engineering, Technology, and Applications of Science</p> <p>Influence of Engineering, Technology, and Science, on Society and the Natural World</p> <ul style="list-style-type: none"> • People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4)

Evidence of Learning

Formative Assessments

- Activity: Hook - How Do We Communicate?
- Activity: Investigate - Talking With Lights
- Activity w/report: Engineering Design - Do You Hear What I Said?
- Quiz/STEMScopedia Activity - Vocabulary Quiz
- Quiz/Activity: Concept Review Game
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- Develop descriptions and the criteria for evaluating each project.
- Determine (jointly) deadline dates and work schedule.
- Provide complex, critical thinking tasks.

Curriculum Development Resources/Instructional Materials/Equipment Resources:

STEMScopes

- Communication

Materials

- Student journal
- Toolkits
- Printables
- Communication devices (actual and/or pictures)
- Flashlights
- Twine
- Wire
- Yarn
- Plastic cups

Equipment

- Smartboard and Projector
- Computer access