



MIDLAND PARK PUBLIC SCHOOLS
Midland Park, New Jersey
CURRICULUM

Science

Grade 1

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Grade 1 Science Curriculum Overview

Grade 1 science is taught in five units throughout the school year. The science curriculum is a hands-on, open-ended and sequential process of investigating the biological and physical world. As part of the spiraling curriculum, aspects of physical science, life science, earth & space science, and engineering; technology & applications of science are taught throughout the year. A guided inquiry program gives students the opportunity to explore topics and concepts through investigations. Participating in this hands-on program helps students:

1. To foster a life-long enjoyment of learning science.
2. To observe science in the world around them.
3. To meet the science standards for New Jersey Public Schools.

Suggested Course Sequence*:

Unit 1: Patterns of Change in the Sky: 15 days

Unit 2: Characteristics of Living Things: 15 days

Unit 3: Mimicking Organisms to Solve Problems: 25 days

Unit 4: Light and Sound: 20 days

Unit 5: Communicating with Light and Sound: 25 days

Pre-Requisite: Kindergarten Science

**The number of instructional days is an estimate based on the information available at this time. 1 day equals approximately 42 minutes of seat time. Teachers are strongly encouraged to review the entire unit of study carefully and collaboratively to determine whether adjustments to this estimate need to be made.*

Content Area: Science**Unit Title: 1 - Patterns of Change in the Sky****Grade Level: 1st****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.

Interdisciplinary Connections:**English Language Arts/Literacy**

In this unit of study, students need opportunities to participate in shared research and writing projects about patterns of change in the sky. For example, students can use online resources or books to research the patterns of change that are visible over time when we observe the objects in the sky. With guidance from adults, students could create books that describe and illustrate the different patterns of change observed in objects in the sky. They could also describe and illustrate the relative amount of daylight in relation to the season using a sequenced set of journal entries or in a sequence-of-events foldable.

Mathematic

Students need opportunities to represent and interpret data and to use addition and subtraction. The following examples from NGSS Appendix L could provide guidance for instruction and should be done with teacher support: Science example 1: There were 16 hours of daylight yesterday. On December 21, there were 8 hours of daylight. How many more hours of daylight were there yesterday than on December 21? Science example 2: Based on the data collected and posted on the bulletin board so far, which day has been the longest of the year so far? Which day has been the shortest?

21st Century**Themes and Skills:**

- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- 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.
- CRP11. Use technology to enhance productivity.

Standards (Content and Technology):

CPI#:	Statement:
NJSLS 1-ESS1-1	Use observations of the sun, moon, and stars to describe patterns that can be predicted.
NJSLS 1-ESS1-2	Make observations at different times of year to relate the amount of daylight to the time of year.
NJSLS 8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.
NJSLS 8.1.2.E.1	Use digital tools and online resources to explore a problem or issue.

<p>Unit Essential Question(s):</p> <ul style="list-style-type: none"> ● What patterns of change can be predicted when observing the sun, moon, and stars? ● What is the relationship between the amount of daylight and the time of year? 	<p>Unit Enduring Understandings:</p> <ul style="list-style-type: none"> ● Science assumes that natural events happen today as they happened in the past. ● Many events are repeated. ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. ● Patterns in the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. ● Seasonal patterns of sunrise and sunset can be observed, described, and predicted.
<p>Unit Learning Targets/Objectives: <i>Students will...</i></p> <ul style="list-style-type: none"> ● Use observations of the sun, moon, and stars to describe patterns that can be predicted. ● Make observations at different times of year to relate the amount of daylight to the time of year. 	
<p>Formative Assessments:</p> <ul style="list-style-type: none"> - Observe and use patterns in the natural world as evidence and to describe phenomena. - Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. - Use observations of the sun, moon, and stars to describe patterns that can be predicted. Examples of patterns could include: <ul style="list-style-type: none"> - The sun and moon appear to rise in one part of the sky, move across the sky, and set. - Stars other than our sun are visible at night but not during the day. (Assessment of star patterns is limited to stars being seen at night and not during the day.) - Observe and use patterns in the natural world as evidence and to describe phenomena. - Make observations (firsthand or from media) to collect data that can be used to make comparisons. - Make observations at different times of the year to relate the amount of daylight to the time of year. (Note: The emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall; assessment is limited to relative amounts of daylight, not to quantifying the hours or time of daylight.) <p>Summative/Benchmark Assessment(s):</p> <ul style="list-style-type: none"> - Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. - Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. <p>Resources/Materials (copy hyperlinks for digital resources): http://ngss.nsta.org/Resource.aspx?ResourceID=205 http://ngss.nsta.org/Resource.aspx?ResourceID=212 http://ngss.nsta.org/Resource.aspx?ResourceID=414 http://ngss.nsta.org/Resource.aspx?ResourceID=418 http://ngss.nsta.org/Resource.aspx?ResourceID=420</p>	

Modifications:

Special Education Students:

- Allow errors
- Rephrase questions, directions, and explanations
- Allow extended time to answer questions, and permit drawing, as an explanation
- Accept participation at any level, even one word
- Consult with Case Managers and follow IEP accommodations/modifications

At-Risk Students:

- Provide extended time to complete tasks
- Consult with Guidance Counselors and follow I&RS procedures/action plans
- Consult with classroom teacher(s) for specific behavior interventions
- Provide rewards as necessary

English Language Learners:

- Assign a buddy, same language or English speaking
- Allow errors in speaking
- Rephrase questions, directions, and explanations
- Allow extended time to answer questions
- Accept participation at any level, even one word

Gifted and Talented Students:

- Provide extension activities
- Build on students' intrinsic motivations
- Consult with parents to accommodate students' interests in completing tasks at their level of engagement

Lesson Name/Topic	Lesson Objective(s)	Time frame (day(s) to complete)	Entire Unit: 15 Days
1	Describe patterns that can be predicted	7	
2	Daylight in certain times of year	8	

Teacher Notes:

Additional Resources

Click links below to access additional resources used to design this unit:

Content Area: Science**Unit Title: 2 - Characteristics of Living Things****Grade Level: 1st****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.

Interdisciplinary**Connections:****English Language Arts**

To integrate English Language Arts into this unit, students need opportunities to read informational texts to gather information about traits and behaviors of organisms. With adult guidance, they identify the main topic, retell key details from texts, and ask and answer questions about key details. Students should also participate in shared research and writing projects. They can gather information from a variety of preselected, grade-level-appropriate texts and resources and use that information to answer questions about traits and behaviors of organisms. In pairs or small groups, students can use pictures and words to create simple books that describe features that parents and offspring share or behaviors that parents and offspring exhibit that help offspring survive.

Mathematics

To integrate mathematics into this unit, students reason abstractly and quantitatively and use appropriate tools strategically as they collect and organize data, and use it to solve problems. For example, when students gather information about the shape, size, color, and number of leaves on plants, they can:

Use grade-level-appropriate tools and strategies to measure, compare, and order leaves by length.

Organize data (e.g., number of leaves) into simple graphs or tables, and then use strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to make comparisons.

Use drawings and equations as they solve problems (e.g., more or less, total amount, how many in each).

21st Century**Themes and Skills:**

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

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.

CRP11. Use technology to enhance productivity.

Standards (Content and Technology):

CPI#:	Statement:
NJSLS 1-LS3-1	Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.
NJSLS 1-LS1-2	Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.
8.1.2.E.1	Use digital tools and online resources to explore a problem or issue.
<p>Unit Essential Question(s):</p> <ul style="list-style-type: none"> ● How are young plants and animals alike and different from their parents? ● What types (patterns) of behavior can be observed among parents that help offspring survive? 	<p>Unit Enduring Understandings:</p> <ul style="list-style-type: none"> ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. ● Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. ● Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents. ● Scientists look for patterns and order when making observations about the world. ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. ● Adult plants and animals can have young. ● In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring survive.
<p>Unit Learning Targets/Objectives: <i>Students will...</i></p> <ul style="list-style-type: none"> ● Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. ● Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. 	
<p>Formative Assessments:</p> <ul style="list-style-type: none"> ● Observe and use patterns in the natural world as evidence and to describe phenomena. ● Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. ● Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. <p>Examples of patterns could include features plants or animals share. Examples of observations could include that leaves from the same kind of plant are the same shape but can differ in size and that a particular breed of puppy looks like its parents but is not exactly the same. [Note: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]</p> <ul style="list-style-type: none"> ● Observe and use patterns in the natural world as evidence and to describe phenomena. ● Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. ● Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. Examples of patterns of behaviors could include: <ul style="list-style-type: none"> - The signals that offspring make, such as crying, cheeping, and other vocalizations. 	

Summative/Benchmark Assessment(s):

- Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.
- Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

Resources/Materials (copy hyperlinks for digital resources):

<http://ngss.nsta.org/Resource.aspx?ResourceID=190>

<http://ngss.nsta.org/Resource.aspx?ResourceID=139>

<http://ngss.nsta.org/Resource.aspx?ResourceID=192>

Modifications:

Special Education Students:

- Allow errors
- Rephrase questions, directions, and explanations
- Allow extended time to answer questions, and permit drawing, as an explanation
- Accept participation at any level, even one word
- Consult with Case Managers and follow IEP accommodations/modifications

At-Risk Students:

- Provide extended time to complete tasks
- Consult with Guidance Counselors and follow I&RS procedures/action plans
- Consult with classroom teacher(s) for specific behavior interventions
- Provide rewards as necessary

English Language Learners:

- Assign a buddy, same language or English speaking
- Allow errors in speaking
- Rephrase questions, directions, and explanations
- Allow extended time to answer questions
- Accept participation at any level, even one word

Gifted and Talented Students:

- Provide extension activities
- Build on students' intrinsic motivations
- Consult with parents to accommodate students' interests in completing tasks at their level of engagement

Lesson Name/Topic	Lesson Objective(s)	Time frame (day(s) to complete)	Entire Unit: 15 Days
1	Provide evidence that traits are inherited	8	
2	Determine patterns in behaviour	7	

Teacher Notes:

Additional Resources

Click links below to access additional resources used to design this unit:

Content Area: Science**Unit Title: 3 - Mimicking Organisms to Solve Problems****Grade Level: 1st****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.

Interdisciplinary Connections:**English Language Arts**

Students participate in shared research and writing projects. Engaging in engineering design provides a perfect opportunity for students to conduct shared research and complete writing projects. Students can use text and media resources to gather information about how the shape and stability of external structures of organisms are related to their functions. In addition, students can conduct simple research to find examples of how humans solve problems using an understanding of the natural world. Examples of writing projects could include creating a book that includes examples of how humans mimic the characteristics of organisms to design solutions to human problems. Students can also use drawings or other visual displays to accompany their design solutions. Students will need support from teachers to conduct shared research and complete writing projects.

Mathematics

N/A

21st Century**Themes and Skills:**

- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- 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.
- CRP11. Use technology to enhance productivity.

Standards (Content and Technology):

CPI#:	Statement:
NJSLS 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.*
NJSLS 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.

8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.
8.1.2.E.1	Use digital tools and online resources to explore a problem or issue.
<p>Unit Essential Question(s):</p> <ul style="list-style-type: none"> ● How can humans mimic how plants and animals use their external parts to help them survive and grow? 	<p>Unit Enduring Understandings:</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. ● The shape and stability of structures of natural and designed objects are related to their function(s). ● 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. ● 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. ● 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.
<p>Unit Learning Targets/Objectives: <i>Students will...</i></p> <ul style="list-style-type: none"> ● 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.* ● 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>Formative Assessments:</p> <ul style="list-style-type: none"> ● Observe and describe how the shape and stability of structures of natural and designed objects are related to their functions. ● Use materials to design a device that solves a specific problem or [design] a solution to a specific problem. ● Use materials to design a solution to a human problem that mimics how plants and/or animals use their external parts to help them survive, grow, and meet their needs: Examples of human problems that can be solved by mimicking plant or animal solutions could include: <ul style="list-style-type: none"> - Designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales. 	

- Stabilizing structures by mimicking animal tails and roots on plants.
- Keeping out intruders by mimicking thorns on branches and animal quills.
- Detecting intruders by mimicking eyes and ears.
- Develop a simple model based on evidence to represent a proposed object or tool.
- 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.

Summative/Benchmark Assessment(s):

- 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.*
- 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.

Resources/Materials (copy hyperlinks for digital resources):

<http://ngss.nsta.org/Resource.aspx?ResourceID=139>

<http://ngss.nsta.org/Resource.aspx?ResourceID=192>

Modifications:

Special Education Students:

- Allow errors
- Rephrase questions, directions, and explanations
- Allow extended time to answer questions, and permit drawing, as an explanation
- Accept participation at any level, even one word
- Consult with Case Managers and follow IEP accommodations/modifications

At-Risk Students:

- Provide extended time to complete tasks
- Consult with Guidance Counselors and follow I&RS procedures/action plans
- Consult with classroom teacher(s) for specific behavior interventions
- Provide rewards as necessary

English Language Learners:

- Assign a buddy, same language or English speaking
- Allow errors in speaking
- Rephrase questions, directions, and explanations
- Allow extended time to answer questions
- Accept participation at any level, even one word

Gifted and Talented Students:

- Provide extension activities
- Build on students' intrinsic motivations
- Consult with parents to accommodate students' interests in completing tasks at their level of engagement

Lesson Name/Topic	Lesson Objective(s)	Time frame (day(s) to complete)	Entire Unit: 25 Days
1	Identify a problem	5	
2	Design solutions	10	
3	Illustrate how shape affects function	10	

Teacher Notes:

Additional Resources

Click links below to access additional resources used to design this unit:

Content Area: Science**Unit Title: 4 - Light and Sound****Grade Level: 1st****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.

Interdisciplinary**Connections:****English Language Arts/Literacy**

To integrate the CCSS for English Language Arts into this unit, students need opportunities to read informational texts in order to gather information about light and sound. With adult guidance, they identify the main topic and retell key details from texts and ask and answer questions about key details. Students should also participate in shared research and writing projects. They can gather information from a variety of preselected, grade-level appropriate texts and resources, and use that information to answer questions about light and sound. In pairs or small groups, students can use pictures and words to create simple books about vibration (sound) and illumination (light). The students' writing should include facts about the topic and have a sense of closure. Throughout the unit of study, students need multiple opportunities to share their experiences with light and sound in collaborative conversations with adults and peers, in small and large group settings.

Mathematic

N/A

21st Century**Themes and Skills:**

- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- 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.
- CRP11. Use technology to enhance productivity.

Standards (Content and Technology):

CPI#:	Statement:
NJSLS 1-PS4-2	Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.
NJSLS 1-PS4-3	Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

<p>NJSLS 1-PS4-1</p>	<p>Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.</p>
<p>8.1.2.B.1</p>	<p>Illustrate and communicate original ideas and stories using multiple digital tools and resources.</p>
<p>8.1.2.E.1</p>	<p>Use digital tools and online resources to explore a problem or issue.</p>
<p>Unit Essential Question(s):</p> <ul style="list-style-type: none"> ● How can you prove that you can only see something when someone shines a light on it or if the object gives off its own light? ● What happens to a beam of light when you put different kinds of things in front of it? How would you design an experiment to prove your thinking? ● How do instruments (band) make sound? 	<p>Unit Enduring Understandings:</p> <ul style="list-style-type: none"> ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. ● Objects can be seen if light is available to illuminate them or if they give off their own light. ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. ● 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. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.) ● Sound can make matter vibrate, and vibrating matter can make sound. ● Simple tests can be designed to gather evidence to support or refute student ideas about causes.
<p>Unit Learning Targets/Objectives: <i>Students will...</i></p> <ul style="list-style-type: none"> ● Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated. ● Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light. ● Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. 	

Formative Assessments:

- Design simple tests to gather evidence to support or refute ideas about cause and effect relationships.
- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.
- Make observations (e.g., in a completely dark room, using a pinhole box, using video of a cave explorer with a flashlight) to construct an evidence based account that objects can be seen only when illuminated (from an external light source or by an object giving off its own light)
- Design simple tests to gather evidence to support or refute ideas about cause and effect relationships.
- Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question.
- Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. Materials can be:
 - Transparent (clear plastic, glass)
 - Translucent (wax paper, thin cloth)
 - Opaque (cardboard, construction paper)
 - Reflective (a mirror, a shiny metal spoon)
- Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
- Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string.
- Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.

Summative/Benchmark Assessment(s):

- Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.
- Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.
- Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

Resources/Materials (copy hyperlinks for digital resources):

<http://moodle.tbaisd.org/course/view.php?id=1021>

Modifications:

Special Education Students:

- Allow errors
- Rephrase questions, directions, and explanations
- Allow extended time to answer questions, and permit drawing, as an explanation
- Accept participation at any level, even one word
- Consult with Case Managers and follow IEP accommodations/modifications

At-Risk Students:

- Provide extended time to complete tasks
- Consult with Guidance Counselors and follow I&RS procedures/action plans
- Consult with classroom teacher(s) for specific behavior interventions
- Provide rewards as necessary

English Language Learners:

- Assign a buddy, same language or English speaking

Gifted and Talented Students:

- Provide extension activities
- Build on students' intrinsic motivations

- Allow errors in speaking
- Rephrase questions, directions, and explanations
- Allow extended time to answer questions
- Accept participation at any level, even one word
- Consult with parents to accommodate students' interests in completing tasks at their level of engagement

Lesson Name/Topic	Lesson Objective(s)	Time frame (day(s) to complete) Entire Unit: 20 Days
1	Objects in darkness can only be seen when illuminated	5
2	How light affects different materials	8
3	Provide evidence that vibrations and sound are related	7

Teacher Notes:

Additional Resources

Click links below to access additional resources used to design this unit:

Content Area: Science**Unit Title: 5 - Communicating With Light and Sound****Grade Level: 1st****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.

Interdisciplinary Connections:**English Language Arts/Literacy**

Students will participate in shared research and writing projects as they engage in engineering design. Students can use text and media resources to first gather information about devices that use light or sound to communicate over a distance. They can demonstrate understanding of key details in a text by asking and answering questions during class and small-group discussions. In addition, students recall information from experiences or gather information from provided sources to support their thinking as they design and build their device. As students complete their devices, they prepare a sketch or drawing of their device, label the components, and describe, in writing, how each component relates to the function of the device and how their communication device works. Students can also write a "how-to" book describing how to use tools and materials to build their design. Students can also use drawings or other visual displays to accompany their writing in order to describe their thought process and clarify their ideas. Adult support should be provided throughout the process.

Mathematic

Students need opportunities to use tools to for a variety of purposes as they design and build devices for communicating with light or sound. They can use objects such as interlocking cubes or paper clips to measure length in nonstandard units, expressing their measurements as whole numbers. Students can also use indirect measurement (i.e., compare the lengths of two objects indirectly by using a third object) to order three objects by length. For example, they might compare the lengths of string used for paper-cup telephones and observe and describe the relative effectiveness of each length of string. Students can also use graphs to organize data, such as the number of drumbeats, and then analyze the data to find a pattern. Students will reason abstractly and quantitatively as they organize data into graphs, analyze the data, and use it to solve simple put-together, take-apart, and compare problems.

21st Century**Themes and Skills:**

- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- 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.
- CRP11. Use technology to enhance productivity.

Standards (Content and Technology):	
CPI#:	Statement:
NJSLS 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.*
NJSLS 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.
NJSLS 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.
8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.
8.1.2.E.1	Use digital tools and online resources to explore a problem or issue.
Unit Essential Question(s): <ul style="list-style-type: none"> How can light or sound be used to communicate over a distance? 	Unit Enduring Understandings: <ul style="list-style-type: none"> The shape and stability of structures of natural and designed objects are related to their function(s). People depend on various technologies in their lives; human life would be very different without technology. People also use a variety of devices to communicate (send and receive information) over long distances. A situation that people want to change or create can be approached as a problem to be solved through engineering. Asking questions, making observations, and gathering information are helpful in thinking about problems. Before beginning to design a solution, it is important to clearly understand the problem. 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.
Unit Learning Targets/Objectives: <i>Students will...</i> <ul style="list-style-type: none"> Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.* 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. 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. 	

Formative Assessments:

- Describe how the shape and stability of structures are related to their function.
- Ask questions based on observations to find more information about the natural and/or designed world.
- Define a simple problem that can be solved through the development of a new or improved object or tool.
- Ask questions, make observations, and gather information about a situation people want to change in order to define a simple problem that can be solved through the development of a new or improved object or tool.
- Develop a simple model based on evidence to represent a proposed object or tool.
- 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.
- Use tools and materials provided to design a device that solves a specific problem.
- Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance. Examples of devices could include:
 - A light source to send signals
 - Paper cup and string telephones
 - A pattern of drum beats

Summative/Benchmark Assessment(s):

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

Resources/Materials (copy hyperlinks for digital resources):

<http://ngss.nsta.org/Resource.aspx?ResourceID=519>

Modifications:

Special Education Students:

- Allow errors
- Rephrase questions, directions, and explanations
- Allow extended time to answer questions, and permit drawing, as an explanation
- Accept participation at any level, even one word
- Consult with Case Managers and follow IEP accommodations/modifications

At-Risk Students:

- Provide extended time to complete tasks
- Consult with Guidance Counselors and follow I&RS procedures/action plans
- Consult with classroom teacher(s) for specific behavior interventions
- Provide rewards as necessary

English Language Learners:

- Assign a buddy, same language or English speaking

Gifted and Talented Students:

- Provide extension activities

- Allow errors in speaking
- Rephrase questions, directions, and explanations
- Allow extended time to answer questions
- Accept participation at any level, even one word
- Build on students' intrinsic motivations
- Consult with parents to accommodate students' interests in completing tasks at their level of engagement

Lesson Name/Topic	Lesson Objective(s)	Time frame (day(s) to complete)	Entire Unit: 25 Days
1	Use light or sound to communicate over a distance	15	
	- Define a simple problem	5	
	- Develop a model	5	

Teacher Notes:

Additional Resources

Click links below to access additional resources used to design this unit: