Belvidere Cluster Wide
Science Curriculum
1st 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
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.

Integrated Accommodations and Modifications

Special Education

– Printed copy of board work/notes provided
– Additional time for skill mastery
– Assistive technology
– Behavior management plan
– Center-Based Instruction
– Check work frequently for understanding
– Computer or electronic device utilization
– Extended time on tests/ quizzes
– Have student repeat directions to check for understanding
– Highlighted text visual presentation
– Modified assignment format
– Modified test content
– Modified test format
– Modified test length
– Multiple test sessions
– Multi-sensory presentation
– Preferential seating
– Preview of content, concepts, and vocabulary
– Reduced/shortened written assignments
– Secure attention before giving instruction/directions
– Shortened assignments
– Student working with an assigned partner
– Teacher initiated weekly assignment sheet
– Use open book, study guides, test prototypes
– Cubing activities
– Exploration by interest
– Flexible grouping
– Goal setting with students
– Jigsaw
– Mini workshops to re-teach or extend skills Open-ended activities
– Think-Pair-Share
– Varied supplemental materials

ELL

– Allowing students to correct errors (looking for understanding)
– Teaching key aspects of a topic Eliminate nonessential information Using videos, illustrations, pictures, and drawings to explain or clarify
– allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slideshows, videos, etc.) to demonstrate student's learning
– Allowing students to correct errors (looking for understanding)
– Allowing the use of note cards or open-book during testing
– Decreasing the amount of work presented or required
– Having peers take notes or providing a copy of the teacher's notes
– Modifying tests to reflect selected objectives
– Providing study guides
– Reducing the number of answer choices on a multiple choice test
– Tutoring by peers
– Explain/clarify key vocabulary terms

At Risk

– Allowing students to correct errors (looking for understanding)
– Teaching key aspects of a topic Eliminate nonessential information allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slideshows, videos, etc.) to demonstrate student's learning
– Allowing students to select from given choices .
– Allowing the use of note cards or open-book during testing
– Collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test
– decreasing the amount of work presented or required .
– Having peers take notes or providing a copy of the teacher's notes
– Marking students' correct and acceptable work, not the mistakes
– Modifying tests to reflect selected objectives
– Providing study guides
– Reducing the number of answer choices on a multiple choice test
– Tutoring by peers
– Using authentic assessments with real-life problem-solving
– Using true/false, matching, or fill in the blank tests in lieu of essay tests
– using videos, illustrations, pictures, and drawings to explain or clarify
– Flexible grouping
– Goal setting with students
– Jigsaw
– Mini workshops to re-teach or extend skills Open-ended activities
– Think-Pair-Share
– Varied supplemental materials

Gifted and Talented

– Alternative formative and summative assessments
– Choice boards
– Games and tournaments
– Group investigations
– Independent research and projects Interest groups for real world application
– Learning contracts
– Leveled rubrics
– Multiple intelligence options

– Personal agendas
– Project-based learning
– Problem-based learning
– Stations/centers
– Think-Tac-Toes
– Tiered activities/assignments
– Tiered products

504
– Printed copy of board work/notes provided
– Additional time for skill mastery
– Assistive technology
– Behavior management plan
– Center-Based Instruction
– Check work frequently for understanding
– Computer or electronic device utilization
– Extended time on tests/ quizzes
– Have student repeat directions to check for understanding
– Highlighted text visual presentation
– Modified assignment format
– Modified test content
– Modified test format
– Modified test length
– Multiple test sessions
– Multi-sensory presentation
– Preferential seating
– Preview of content, concepts, and vocabulary
– Reduced/shortened written assignments
– Secure attention before giving instruction/directions
– Shortened assignments
– Student working with an assigned partner
– Seacher initiated weekly assignment sheet
– Use open book, study guides, test prototype
– Exploration by interest
– Flexible grouping
– Goal setting with students
– Mini workshops to re-teach or extend skills Open-ended activities
– Think-Pair-Share
– Varied supplemental materials

Grade 1, Science, Unit 1, Characteristics of Living Things

Content Area: **Science**
Course(s): **Science**
Time Period: **September**
Length: **5 weeks**
Status: **Published**

Next Generation Science Standards

SCI.1-LS3-1	**Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.**
SCI.1-LS1-2	**Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.**

Student Learning Objectives

Students will:
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.

Analyze and interpret data to make sense of phenomena using logical reasoning.

Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world.

Discover that any characteristics of organisms are inherited from their parents.

Develop understanding that 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.

Understand that patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

Scientists look for patterns and order when making observations about the world.

Enduring Understanding

Plant and animal offspring inherit traits from their parents making them similar, but not exactly alike. Plants and animals adapt and interact to survive.

Essential Questions

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?

Assessment

Formative assessment

- ***A-B-C Summaries:*** Each student in the class is assigned a different letter of the alphabet and they must select a word starting with that letter that is related to the topic being studied.
- ***Debriefing:*** A form of reflection immediately following an activity.
- ***Idea Spinner:*** The teacher creates a spinner marked into 4 quadrants and labeled "Predict, Explain, Summarize, Evaluate." After new material is presented, the teacher spins the spinner and if the spinner lands in the "Summarize" quadrant, the teacher might say, "List the key concepts just presented."
- ***Inside-Outside Circle:*** Inside and outside circles of students face each other. Within each pair of facing students, students quiz each other with questions they have written. Outside circle moves to create new
  Reader's Theater:
- ***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 t o 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.
- ***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).
- ***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

- Describe responses of the parents, such as feeding, comforting, and protecting the offspring.
- Observe animals and plants in nature and make statements using evidence.
- Observe and construct an evidence-based statements about young plants and animals are alike, but not exactly like, their parents.
- Provide examples of patterns that could include features plants or animals share.
- Compare and contrast plants and animals and their characteristics, behavior, and signals that offspring make, such as crying, cheeping, and other vocalizations.
- Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world.

Benchmark:

ELA Research Based Benchmark
Interim Assessments

Summative:

End-of- Unit Assessment/ Performance Task
Culminating Learning Project
End-of-year Assessment

Alternative:

Self Selected Science Projects
Extension Projects
Concept Map

Instructional Activities

Activites:
Living and Non-Living Cards: Students will examine living and non-living cards and make decisions based on specific checklist. Peers will provide verbal evidence, turn and talk and use academic language to support decisions.

Peer Interaction: Students will provide evidence and logically reasoning for placement of living and non-cards. Students will use a checklist to provide evidence for confirmation.

Animals take care of young Digital Literacy: http://ngexplorer.cengage.com/ngyoungexplorer/ Use online literature to explore the topic of parents and their offsprings as well as food chain, feeding and survival.

Community Outreach: find a local wildlife rescue and collect gently used items for their care or orphaned baby animals. Wild Baby Rescue www.wildbabyrescue.org or Antler Ridge http://www.antler-ridge.com/

Chip Off the Old Block: In this lesson students compare adult plants with young plants and then match pictures of adult animals with their young. They then are asked to identify specific physical traits of plants and animals that can be used to identify them. Note: The Parent/Offspring photo collection on page three incorrectly states the offspringof a horse is a pony.

Eat Like an Animal! Animal Feeding Time: This lesson and activity is one of several lessons about animals. In this lesson, students learn that animal parts come in many different sizes and shapes. Each external animal body part has a specific shape and function to help the animal to get and eat food.

Animal Communication: Animals communicate for survival and to meet needs.

Animal Body Parts for Protection: Plant and animal Protective parts.

Location in the food chain.

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).

Social Studies

Supporting local organizations

Texts and Resources

http://ngexplorer.cengage.com/ngyoungexplorer/ (More issues)
www.readworks.org
http://www.antler-ridge.com/
http://wildbabyrescue.org/
http://www.online-stopwatch.com/
https://csoscience.files.wordpress.com/2011/10/2-g1life1_7711.pdf •Living things and nonliving things •Characteristics of living things •Parts of plant • Needs of plants
http://www.compton.k12.ca.us/pages/departments/Curriculum/PDF/1stGradeUnitBChp3_5.pdf
Chapter 3:Needs of Plants and Animals
Chapter 4: Environments
Chapter 5: Plants & Animals live together, spread seeds, food chain,how do living things get food from their environment? p153 external/body coverings, life cycles
http://www.netl.doe.gov/about/education/k-12-stem-activities

Grade 1, Science, Unit 2, Mimicking Organisms to Solve problems

Content Area: **Science**
Course(s): **Science**
Time Period: **November**
Length: **7 weeks**
Status: **Published**

Next Generation Science Standards

	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.
SCI.K-2-ETS1-2	
SCI.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.**
SCI.1-LS1-2	**Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.**

Student Learning Objectives

The student will:
analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1)
Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1)
Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)
Students will understand:
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)
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)
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)

Enduring Understanding

Students will develop an understanding of how plants and animals use their parts to help them survive, grow, and meet their needs.

Essential Questions

How can humans mimic how plants and animals use their external parts to help them survive and grow?

Assessment

Formative Assessments:

Checklists

A-B-C Summaries: Each student in the class is assigned a different letter of the alphabet and they must select a word starting with that letter that is related to the topic being studied.
Debriefing: A form of reflection immediately following an activity.
Idea Spinner: The teacher creates a spinner marked into 4 quadrants and labeled “Predict, Explain, Summarize, Evaluate.” After new material is presented, the teacher spins the spinner and if the spinner lands in the “Summarize” quadrant, the teacher might say, “List the key concepts just presented.”

Inside-Outside Circle: Inside and outside circles of students face each other. Within each pair of facing students, students quiz each other with questions they have written. Outside circle moves to create new
Reader's Theater:
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 t o 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.
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).
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

Benchmark:

ELA Research Based Benchmark
Interim Assessments

Summative:

End-of- Unit Assessment/ Performance Task
Culminating Learning Project
End-of-year Assessment

Alternative:

Self Selected Science Projects
Extension Projects
Concept Map

Assessment:
Students who understand the concepts are able to:
• Observe and describe how the shape and stability of structures of natural and designed objects are related to their functions.
• Design a device that solves a specific problem or [design] a solution to a specific problem.
• 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.
• 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.

Instructional Activities

In this unit of study, students investigate how plants and animals use their external structures to help them survive, grow, and meet their needs. Then students are challenged to apply their learning 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.
In order to recognize ways in which animals and plants use their external structures, students need opportunities to observe and describe how the shape and stability of organisms' structures are related to their functions. Students can make direct observations and use media resources to find relevant examples for both plants and animals. They should observe that 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. In addition, animals have body parts that capture and convey different kinds of information from the environment, enabling them to respond to these inputs in ways that aid in survival. Plants, like animals, have different parts (roots, stems, leaves, flowers, fruits) that each serve specific functions in survival and growth, and plants also respond to external inputs. For each structure that students observe, they should describe how the shape and stability of that structure is related to its function.
The next step in this unit is to engage in engineering design. Students need opportunities to use materials to design a device that solves a specific human problem. Designs should mimic how plants and/or animals use their external parts to help them survive and grow. The engineering design process students engage in should include the following steps:
• As a class or in small groups, students participate in shared research to find examples of human-made products that have been designed and built by applying knowledge of the natural world. For each example, students identify the human problem(s) that the product solves and how that solution was designed using an understanding of the natural world.
• Students brainstorm possible human problems that can be solved by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. Examples could include:
Designing clothing or equipment to protect bicyclists that mimics turtle shells, acorn shells, and animal scales.
Stabilizing structures that mimic animal tails and plant roots.
Keeping out intruders by mimicking thorns on branches and animal quills.
Detecting intruders by mimicking eyes and ears.

• In small groups, students use sketches, drawings, or physical models to convey a design that solves a problem by mimicking one or more external structures of plants and/or animals.
• Use materials to create the design solution. • Share the design solution with others in the class.
Blubber activity: Discover and simulate function of blubber by placing vasoline on hands and inserting in ice water.
Observe and discover function of plants and its parts: celery experiment, planting seeds.
Parts of a seed: student will examine and dissect lima bean seeds to discover parts and thier function.
Examine plant and observe function of its parts. Create a drawing, label the parts and describe their function.
Plant poetry
Determine different parts of plants that we eat. Use real food or pictures.

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.

Texts and Resources

http://www.state.nj.us/education/modelcurriculum/sci/1u3.pdf
http://ngexplorer.cengage.com/ngyoungexplorer/teachers.html
http://betterlesson.com/lesson/636840/plant-parts-preassessment Unit 5: How plants use external parts to survive
http://betterlesson.com/lesson/627479/growing-knowledge-about-plants Unit 5 :Basic needs of a plant, needs of a plant video
link https://www.youtube.com/watch?v=sRL19kTWEBUhttp://www.netl.doe.gov/about/education/k-12-stem-activities
related books:
Tops & Bottoms by Janet Stevens
Whose Garden Is It? by Mary Ann Hoberman
Tell Me, Tree All About Trees for Kids by Gail Gibbons
We're Going On a Leaf Hunt by Steve Metzger
My Garden by Kevin Henkes
The Tiny Seed by Eric Carle
The Carrot Seed by Ruth Krauss
Growing Apples and Pumpkins by Amy aand Richard Hutchings
Seed, Sprout, Pumpkin Pie by Jill Esbaum
Have You Seen Trees? by Joanne Oppenheim
The Seasons of Arnold's Apple Tree by Gail Gibbons
Seeds! Seeds! Seeds! by Nancy Elizabeth Wallace

Grade 1, Science, Unit 3, Changes in the Night Sky

Content Area: **Science**
Course(s): **Science**
Time Period: **January**
Length: **4 weeks**
Status: **Published**

Next Generation Science Standards

SCI.K-PS2-1	**Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.**
SCI.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.**
SCI.K-2-ETS1-3	**Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.**
SCI.1-ESS1-2	**Make observations at different times of year to relate the amount of daylight to the time of year.**
SCI.K-PS2-2	**Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.**
SCI.1-ESS1-1	**Use observations of the sun, moon, and stars to describe patterns that can be predicted.**

Student Learning Objectives

The students will:
-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
-Plan and conduct investigations collaboratively to produce evidence to answer a question. (1- PS4-1),(1-PS4-3)
-Plan and Carry Out Investigations
-Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)
-Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)
understand Science assumes natural events happen today as they happened in the past. (1-ESS1-1)
-understand many events are repeated. (1-ESS1-1)

Enduring Understanding

Students will observe, describe, and predict some patterns in the movement of objects in the sky. Students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations and analyzing and interpreting data.

Essential Questions

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?

Assessment

Formative Assessments:

A-B-C Summaries: Each student in the class is assigned a different letter of the alphabet and they must select a word starting with that letter that is related to the topic being studied.
Debriefing: A form of reflection immediately following an activity.
Idea Spinner: The teacher creates a spinner marked into 4 quadrants and labeled “Predict, Explain, Summarize, Evaluate.” After new material is presented, the teacher spins the spinner and if the spinner lands in the “Summarize” quadrant, the teacher might say, “List the key concepts just presented.”

Inside-Outside Circle: Inside and outside circles of students face each other. Within each pair of facing students, students quiz each other with questions they have written. Outside circle moves to create new
Reader's Theater:
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 t o 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.
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 ca 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).
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

Benchmark:

ELA Research Based Benchmark
Interim Assessments

Summative:

End-of- Unit Assessment/ Performance Task
Culminating Learning Project
End-of-year Assessment

Alternative:

Self Selected Science Projects
Extension Projects
Concept Map

Students who understand the concepts can:
• Observe and use patterns in the natural world as evidence and to describe phenomena.
• Observe (firsthand or from media) to describe patterns in the sky 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: 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.
• 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.

Instructional Activities

- Observe the Night Sky:http://neave.com/planetarium/ or http://www.kidsastronomy.com/astroskymap/constellations.htm
- Build a paper/carstock personal skyfinder that demonstrates the different views for seasons, months and time of night. Use website to digitally/visually demonstrate.
- Possible Activity: encourage or arrange a visit to Jenny Jump Observatory 333 State Park Rd, Hope, NJ 07844 (908) 459-4909
- The Dynamic Trio: In this lesson, students will learn about the stars, planets, and moons found in our solar system and how they relate to one another. The video segment enhances the learning. After a non-fiction read aloud, students work in groups to create models of the Solar System.
- Our Super Star: This is a three part lesson where students use observations, activities, and videos to learn basic facts about the Sun. Students also model the mechanics of day and night and use solar energy to make a tasty treat. One of the videos is a time-lapse video of a sunrise and a sunset.
- Moon Journal: The National Wildlife Federation's "Keep a Moon Journal" page allows students to get acquainted with the phases of the moon by keeping a moon journal to record their nightly observations for one month. The page has links to diagrams, a student printable, and activities connecting the journal to other content. The page is set up as a "family activity" and could be used as nightly homework for students then discussed weekly in class.
- Who moves, The Sun or Us? Use models and a flashlight to demonstrate the sun remaining stationary and earth rotates/turns around the sun.
- Patterns of Daylight: This is a mini-unit that can be taught directly after Space Part 1or independently. The author chose to teach the Space Part 1 unit (also available on Better Lesson! at http://betterlesson.com/lesson/613469/introduction-and-pre-assessment)

during January, and follows up at the end of the year in a recap in May. This lesson uses prior student knowledge and a video simulation.
- Observing the Sun: This lesson is an activity where students create a sun tracker and monitor the sun's position over the course of a day. Examples of student journals and connections within a larger unit are provided.
- Students create own constellations.

http://www.netl.doe.gov/about/education/k-12-stem-activities

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?

Texts and Resources

http://www.state.nj.us/education/modelcurriculum/sci/1u1.pdf
http://www.kidsastronomy.com/astroskymap/constellations.htm
http://neave.com/planetarium/
http://betterlesson.com/lesson/613469/introduction-and-pre-assessment Unit 3:Space Walk
(The science concepts behind the patterns in the sky are due to the spatial relationships of the sun, earth, and moon.)
Literature connection:
The Moon Book by Gail Gibbons
The Moon/The Sun by Seymour Simon
What Makes The Seasons? Meghan Montague Cash
What Makes Day and Night?
The Night Sky, Day and Night by Robin Nelson
I Wonder Why Stars Twinkle
The Star Gazers Alphabet by John Farrell

Teaching Science Through Trade Books by Christine Anne Royce, Emily Morgan and Karen Ansberry
newsela.org

Grade 1, Science, Unit 4, Light and Sound

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

Next Generation Science Standards

SCI.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.**
SCI.1-PS4-1	**Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.**
SCI.1-PS4-2	**Make observations to construct an evidence-based account that objects can be seen only when illuminated.**

Student Learning Objectives

Students will:
Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.
Begin with a question, 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.
Plan and conduct investigations collaboratively to produce evidence to answer a question.
Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.
Describe how objects can be seen if light is available to illuminate them or if they give off their own light.
Design and perform simple tests to gather evidence to support or refute student ideas about causes.
Understand people depend on various technologies in their lives; human life would be very different without technology.

Enduring Understanding

Students will develop an understanding of the relationship between sound and vibrating materials. Students will also be able to understand the relationship between the availability of light and the ability to see objects.

Essential Questions

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?

Assessment

Formative Assessments:

A-B-C Summaries: Each student in the class is assigned a different letter of the alphabet and they must select a word starting with that letter that is related to the topic being studied.
Debriefing: A form of reflection immediately following an activity.

Idea Spinner: The teacher creates a spinner marked into 4 quadrants and labeled "Predict, Explain, Summarize, Evaluate." After new material is presented, the teacher spins the spinner and if the spinner lands in the "Summarize" quadrant, the teacher might say, "List the key concepts just presented."
Inside-Outside Circle: Inside and outside circles of students face each other. Within each pair of facing students, students quiz each other with questions they have written. Outside circle moves to create new
Reader's Theater:
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 t o 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.
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 ca 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).
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

Benchmark:

ELA Research Based Benchmark
Interim Assessments

Summative:

End-of- Unit Assessment/ Performance Task
Culminating Learning Project
End-of-year Assessment

Alternative:
Self Selected Science Projects
Extension Projects
Concept Map

Students who understand the concepts can:
• Make observations (firsthand or from media) to give explanations about 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.

Instructional Activities

Dark Box: use a shoe box without holes and compare to investigating objects in a box with a hole for light. Observe objects with and without available light. Observe a variety of objects in both illuminated and non illuminated settings. For example, observations could be made in a completely dark room, or students can use a pinhole box to observe objects. Students can also watch videos of cave explorers deep in the earth, using light from a single flashlight. With experiences such as these, they will come to understand that objects can be seen only when illuminated, either from an external light source or by when they give off their own light.

Make and use a kazoo to discover how vibrations create sound waves that travel through the air to your ear. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make material vibrate.

Making a Splash and Musical Rulers
(file:///C:/Users/libuser/Downloads/1st%20Grade%20Teachers%20Guide%20Complete.pdf)

Cup-a-Phone Give each student 1 piece of cotton string and 2 paper cups. The students need to poke a hole in the bottom of their cup with their pencil and put the string through it. Then they need to tie a paper clip to the end of the sting inside the cup. Repeat for the other cup.

Working with a partner, the students will use the pinhole boxes to observe that objects need light to be seen. They will record findings and explanations on student journal page 8. Circulate the room as students explore with the pinhole boxes. Verify that they understand the concept that objects can only be seen when they are illuminated.

What's the Glow: Crack the glow stick in the bag without them seeing and hold the bag closed at the top. Call a couple of kids up to peek in the bag (while you're holding it closed) to see if it's illuminated. Ask students what could be in there that caused it to be illuminated and give examples of cause and effect with darkness and lights. Example: I walked in a dark room and couldn't see so I . . . . (Turned on a lamp or waited for my nightlight to light up). After they come to the conclusion that it's a glow stick, give each of them a glow bracelet and let them try to figure out what makes it illuminate.

Rice Dance: Place rice on speaker. Turn up volume and observe rice.

Camera Lens Magic: Put students into partners and give each pair a flashlight. Turn the lights off and let them explore with their flashlight using prior knowledge of what happens when light hits certain objects. After a couple of minutes pass out the cardboard cameras with different materials. Guide students to collaboratively work to see that some are translucent, transparent, opaque and reflective.

Va-Va-Vibrations: Students will be creating instruments that will allow them to observe, explore and investigate the patterns of sound waves (pitch and volume). They will plan out a design for their instrument and then create it using classroom materials.
Stem & Sound: Can you solve a communication problem using sound?
http://www.netl.doe.gov/about/education/k-12-stem-activities

Interdisciplinary Connections

English Language Arts/Literacy
To integrate the NJSLS 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.

Texts and Resources

http://www.state.nj.us/education/modelcurriculum/sci/1u4.pdf
Related text: On a Beam of Light
Betterlesson.com/lesson/622032/stem-sound-day-1
Teaching Science through Trade Books by Christine Royce, Emily Morgan adn Karen Ansberry
Brain Pop Jr.
http://www.alvordschools.org/cms/lib8/CA01900929/Centricity/Domain/2616/1st%20Grade%20Teachers%20Guide%20Complete.pdf - unit on light and sound
http://www.sedl.org/pubs/mosaic/units/Mosaic_Grade1.pdf : unit on light and sound based on 5E format
http://studyjams.scholastic.com/studyjams/jams/science/energy-light-sound/sound.htm
Book List:
You Can't Taste A Pickle With Your Ear. Harriet Ziefert. Handprint Books (2002). Using a combination of clear information and gentle humor, the book introduces children to their five senses. Written in playful verse, yet scientifically accurate, and illustrated with fresh art and simple diagrams.
https://ed.psu.edu/pds/teacher-inquiry/2005/reynoldsk2005.pdf

Grade 1, Science, Unit 5, Communicating with Light and Sound

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

Next Generation Science Standards

SCI.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.**
SCI.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.**
SCI.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.**

Student Learning Objectives

Students will be able to:
~use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.
~collaborate and communicate in pairs and group setting, communicate findings.
~Plan and conduct investigations collaboratively to produce evidence to answer a question.
~record and make observations both verbally and written about findings with light or sound, including sketches with labels.
~ engage in academic dialogue with peers to make statements on finding and process as well as ask and answer questions.
~understand that people also use a variety of devices to communicate (send and receive information) over long distances.
~describe how people depend on various technologies in their lives; human life would be very different without technology.
~relate light and sound to basis for many inventions and innovations.

Enduring Understanding

Develop and make use of light, sound and vibrating materials to communicate. Students apply their knowledge of light and sound to engage in engineering design to solve a simple problem involving communication with light and sound.

Essential Questions

How can light or sound be used to communicate over a distance?

Assessment

Formative Assessments:

A-B-C Summaries: Each student in the class is assigned a different letter of the alphabet and they must select a word starting with that letter that is related to the topic being studied.
Debriefing: A form of reflection immediately following an activity.

Idea Spinner: The teacher creates a spinner marked into 4 quadrants and labeled "Predict, Explain, Summarize, Evaluate." After new material is presented, the teacher spins the spinner and if the spinner lands in the "Summarize" quadrant, the teacher might say, "List the key concepts just presented."
Inside-Outside Circle: Inside and outside circles of students face each other. Within each pair of facing students, students quiz each other with questions they have written. Outside circle moves to create new
Reader's Theater:
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 t o 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.
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).
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

Benchmark:

ELA Research Based Benchmark
Interim Assessments

Summative:

End-of- Unit Assessment/ Performance Task

Culminating Learning Project
End-of-year Assessment

Alternative:

Self Selected Science Projects
Extension Projects
Concept Map
Assessment: I'm a Scientist:Make a phone using a different string length.

Instructional Activities

-Students brainstorm thee purpose of communication. List ways that people communicate over a distance. Some examples include telephones, cellular phones, email, and video conferencing (by computer).
-Ask students, “How would we communicate over a distance without the use of any of the devices that people currently use?”
-Use that question to guide the class to define the problem: Design and build a device that allows us to communicate over a distance.
-As a class, determine the criteria that will be used to evaluate the design solutions. One criterion MUST be that the device uses either light or sound.
-Also as a class, determine possible constraints, such as available materials and amount of time allotted for designing and building the device. Use chalkboard splash or group quick writes to list pitfalls/what could go wrong?
-Small groups conduct research, looking for examples of devices that use light or sound to communicate over a distance. Rate or rank list of ways to communicate in small groups to justify which they think is most effective to least effective.
-Small groups can then use tools and materials to design and build their devices. Examples could include a light source that sends a signal, paper cup and string telephones, or a pattern of drumbeats.
-Groups should prepare a sketch or drawing of their device. They should label the components and describe, in writing, how each component relates to the function of the device.
-Groups should present their devices to the class, demonstrating how they work.
-Students then determine which devices work as intended based on the criteria, using data as evidence to support their thinking.
Resource Lessons:
Lesson 1: 5 Senses; Lesson 2:The Listening Walk, sound song;Lesson 3: What's the Buzz (make a kazoo); Lesson 4:Making a Splash and Musical Rulers (tuning fork in water);Lesson 5: Cup a Phone; Lesson 6: In the Dark (unable to see w/o light) Lesson 7: What's the Glow? (flashlight & glowstick); Lesson 8:Camera Lens Magic(transparent, translucent, opague, reflective); Lesson 9: Making Shadows; Lesson 10: Relfections; Lesson 11:Go Away. Come Here (communicate using light & sound)

Inventor Options: Telephones through Time - Alexander Graham Bell, Morse Code, PHilo Pharnsworth - The Boy WHo Invented TV
LIterature Connection: What Do You Know About Light? Read aloud first sections of non fiction text. Use various chapters in small groups for students to pair read then teach the class teh main concepts from section read.
Build a model of the ear/eye, explore health related to light and sound. Use kidshealth.org How the Body Works ears and eyes.
SKype communication with another class in the cluster.
http://www.netl.doe.gov/about/education/k-12-stem-activities

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.

Health - hearing, parts of the ear and how the ear works to catch sound. The human Eye and how it works

Texts and Resources

http://www.state.nj.us/education/modelcurriculum/sci/1u5.pdf
http://www.alvordschools.org/cms/lib8/CA01900929/Centricity/Domain/2616/1st%20Grade%20Teachers%20Guide%20Complete.pdf:
http://www.sciencekids.co.nz/ Computer Games: How We See Sunlight and Shadows Video Clip Cool Sound Vibrations
youtube: Video Clip The Magic School Bus: In the Haunted House-Sound is Vibration (3:07)
http://betterlesson.com/lesson/635196/communicating-with-light-people
Sound Video
Literature:
My Five Senses by Aliki
The Listening Walk by Paul Showers
All About Sound by Lisa Trumbauer
All About Light by Lisa Trumbauer
Fireflies by Julie Brinckloe
Nothing Sticks Like a Shadow by Ann Tompert
Shadows by Carolyn B. Otto