# EGG HARBOR TOWNSHIP PUBLIC SCHOOLS CURRICULUM

## Elementary School Science
## Grades K-3

| | |
|---|---|
| Length of Course: | Full Year |
| Elective / Required: | N/A |
| Schools: | Davenport, Slaybaugh and Swift |
| Student Eligibility: | Grades K, 1, 2 and 3 |
| Credit Value: | N/A |
| Date Submitted: | March 2017 |
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## DISTRICT MISSION STATEMENT

Our mission in the Egg Harbor Township School District is to partner with the student, family, school and community to provide a safe and rigorous learning environment which will result in a mastery of the NJ Common Core Standards at all grade levels. Students will demonstrate academic scholarship, integrity, leadership, citizenship, while developing a strong work ethic so that they will act responsibly in their school community and every day society.

## SCIENCE – PHILOSOPHY

We believe that ALL students regardless of race, ethnicity, socio-economic status, religious background, and/or any other classification are deserving of a holistic science education. This holistic approach would include an education that will allow them to fully discover themselves, their strengths and weaknesses, and benefit from science instruction.

> Scientific literacy assumes an increasingly important role in the context of globalization. The rapid pace of technological advances, access to an unprecedented wealth of information, and the pervasive impact of science and technology on day-to-day living require a depth of understanding that can be enhanced through quality science education. In the 21st century, science education focuses on the practices of science that lead to a greater understanding of the growing body of scientific knowledge that is required of citizens in an ever-changing world (NJCCCS-Science).

Science curricula are designed to reinforce 21st Century Learning, to maximize rigor, relevance, and relationships, and to engage students individually through differentiated instruction.

## SCIENCE - STATEMENT OF PURPOSE

Education exists for the purpose of enabling each individual to realize and maintain her/his full potential. Scientifically literate students possess the knowledge and understanding of scientific concepts and processes required for personal decision-making, participation in civic and cultural affairs, and economic productivity.

> Science, engineering, and technology influence and permeate every aspect of modern life. Some knowledge of science and engineering is required to engage with the major public policy issues of today as well as to make informed everyday decisions, such as selecting among alternative medical treatments or determining how to invest public funds for water supply options. In addition, understanding science and the extraordinary insights it has produced can be meaningful and relevant on a personal level, opening new worlds to explore and offering lifelong opportunities for enriching people's lives. In these contexts, learning science is

> important for everyone, even those who eventually choose careers in fields other than science or engineering (NJSLS-Science)
>
> All students engage in science experiences that promote the ability to ask, find, or determine answers to questions derived from natural curiosity about everyday things and occurrences. The underpinning of the revised standards lies in the premise that science is experienced as an active process in which inquiry is central to learning and in which students engage in observation, inference, and experimentation on an ongoing basis, rather than as an isolated a process. When engaging in inquiry, students describe objects and events, ask questions, construct explanations, test those explanations against current scientific knowledge, and communicate their ideas to others in their community and around the world. They actively develop their understanding of science by identifying their assumptions, using critical and logical thinking, and considering alternative explanations (NJCCCS-Science).

Our school district provides an extensive science program, which will enable students to succeed and compete in the global marketplace using the New Jersey Student Learning Standards as well as the Next Generation Science Standards.

## INTRODUCTION

The most precious resource teachers have is time. Regardless of how much time a course is scheduled for, it is never enough to accomplish all that one would like. Therefore, it is imperative that teachers utilize the time they have wisely in order to maximize the potential for all students to achieve the desired learning.

High quality educational programs are characterized by clearly stated goals for student learning, teachers who are well-informed and skilled in enabling students to reach those goals, program designs that allow for continuous growth over the span of years of instruction, and ways of measuring whether students are achieving program goals.

## THE EGG HARBOR TOWNSHIP SCHOOL DISTRICT CURRICULUM TEMPLATE

The Egg Harbor Township School District has embraced the backward-design model as the foundation for all curriculum development for the educational program. When reviewing curriculum documents and the Egg Harbor Township curriculum template, aspects of the backward-design model will be found in the stated enduring *understandings/essential questions, unit assessments,* and *instructional activities*. Familiarization with backward-design is critical to working effectively with Egg Harbor Township's curriculum guides.

## GUIDING PRINCIPLES: WHAT IS BACKWARD DESIGN? WHAT IS UNDERSTANDING BY DESIGN?

"Backward design" is an increasingly common approach to planning curriculum and instruction. As its name implies, "backward design" is based on defining clear goals, providing acceptable evidence of having achieved those goals, and then working 'backward' to identify what actions need to be taken that will ensure that the gap between the current status and the desired status is closed.

Building on the concept of backward design, Grant Wiggins and Jay McTighe (2005) have developed a structured approach to planning programs, curriculum, and instructional units. Their model asks educators to state goals; identify deep understandings, pose essential questions, and specify clear evidence that goals, understandings, and core learning have been achieved.

Programs based on backward design use desired results to drive decisions. With this design, there are questions to consider, such as: What should students understand, know, and be able to do? What does it look like to meet those goals? What kind of program will result in the outcomes stated? How will we know students have achieved that result? What other kinds of evidence will tell us that we have a quality program? These questions apply regardless of whether they are goals in program planning or classroom instruction.

The backward design process involves three interrelated stages for developing an entire curriculum or a single unit of instruction. The relationship from planning to curriculum design, development, and implementation hinges upon the integration of the following three stages.

*Stage I: Identifying Desired Results:* Enduring understandings, essential questions, knowledge and skills need to be woven into curriculum publications, documents, standards, and scope and sequence materials. Enduring understandings identify the "big ideas" that students will grapple with during the course of the unit. Essential questions provide a unifying focus for the unit and students should be able to answer more deeply and fully these questions as they proceed through the unit. Knowledge and skills are the *"stuff"* upon which the understandings are built.

*Stage II: Determining Acceptable Evidence:* Varied types of evidence are specified to ensure that students demonstrate attainment of desired results. While discrete knowledge assessments (e.g.: multiple choice, fill-in-the-blank, short answer, etc…) will be utilized during an instructional unit, the overall unit assessment is performance-based and asks students to demonstrate that they have mastered the desired understandings. These culminating (summative) assessments are authentic tasks that students would likely encounter in the real-world after they leave school. They allow students to demonstrate all that they have learned and can do. To demonstrate their understandings students can explain, interpret, apply, provide critical and insightful points of view, show empathy and/or evidence self-knowledge. Models of student performance and clearly

defined criteria (i.e.: rubrics) are provided to all students in advance of starting work on the unit task.

*Stage III: Designing Learning Activities:* Instructional tasks, activities, and experiences are aligned with stages one and two so that the desired results are obtained based on the identified evidence or assessment tasks. Instructional activities and strategies are considered only once stages one and two have been clearly explicated. Therefore, congruence among all three stages can be ensured and teachers can make wise instructional choices.

At the curricular level, these three stages are best realized as a fusion of research, best practices, shared and sustained inquiry, consensus building, and initiative that involves all stakeholders. In this design, administrators are instructional leaders who enable the alignment between the curriculum and other key initiatives in their district or schools. These leaders demonstrate a clear purpose and direction for the curriculum within their school or district by providing support for implementation, opportunities for revision through sustained and consistent professional development, initiating action research activities, and collecting and evaluating materials to ensure alignment with the desired results. Intrinsic to the success of curriculum is to show how it aligns with the overarching goals of the district, how the document relates to district, state, or national standards, what a high quality educational program looks like, and what excellent teaching and learning looks like. Within education, success of the educational program is realized through this blend of commitment and organizational direction.

## INTENT OF THE GUIDE

This guide is intended to provide teachers with course objectives and possible activities, as well as assist the teacher in planning and delivering instruction in accordance with the New Jersey Core Curriculum Content Standards. The guide is not intended to restrict or limit the teacher's resources or individual instruction techniques. It is expected that the teacher will reflectively adjust and modify instruction and units during the course of normal lessons depending on the varying needs of the class, provided such modified instruction attends to the objectives and essential questions outlined below.

## N.J.A.C. 6A:8-3.1 Required Curriculum Components

| **Code Language** | **Evident in Curriculum YES/NO** | **Comments** |
|---|---|---|
| Interdisciplinary Connections | **Yes** | **STEM units 1 per trimester** |
| A pacing guide | **Yes** | **By Trimester** |
| A list of core instructional materials, including various levels of text at each grade level | **Yes** | **Leveled Readers on Science Topics** |
| Benchmark assessments | **Yes** | **Teacher-developed** |
| Modifications for special education students, for ELLs in accordance with N.J.A.C. 6A:15, and for gifted students. (As appropriate) | **Yes** | **As directed by student's Individual Education Plan** |

**Unit Name: Earth Science (Weather and Sun)** **Time Frame: 8 weeks**
**Author: Egg Harbor Township Public Schools - Science Department**

**UNIT**

Subject: **Science** Country: **USA**

Course/Grade: **Kindergarten** State/Group: **NJ**

School: **Egg Harbor Township Elementary Schools (Miller, Davenport, Slaybaugh and Swift)**

## UNIT SUMMARY

Part A:

In this unit of study, students develop an understanding of patterns and variations in local weather and the use of weather forecasting to prepare for and respond to severe weather. The crosscutting concepts of patterns; cause and effect; interdependence of science, engineering, and technology; and the 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 asking questions, analyzing and interpreting data, and obtaining, evaluating, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Part B:

In this unit of study, students apply an understanding of the effects of the sun on the Earth's surface. The crosscutting concepts of cause and effect and structure and function are called out as organizing concepts for this disciplinary core idea. Students are expected to demonstrate grade-appropriate proficiency in developing and using models; planning and carrying out investigations, analyzing and interpreting data, and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ides.

## UNIT RESOURCES

Books: (any book on weather, not limited to the following)

- The Wind Blew
- Come on Rain
- The Cloud
- The Story of Snow
- Tap Tap Boom Boom
- Hide & Seek Fog
- The Gift of the Sun
- Sun Bread
- A Big Star
- Dr. Seuss (What's the Weather Today?)
- Who Will See Their Shadows This Year?

**Internet Resource Links:**

**www.Youtube.com**
**www.scholastic.com/kids/weather**
**www.theweatherchannelkids.com**
**www.weatherwizkids.com**
**www.climatekids.com**
**www.sciencekids.com**
**www.kidsastronomy.com**

## STAGE ONE

### GOALS AND STANDARDS

### Part A

**K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.**
[Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.]
[Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.]

**K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.**
[Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]

### Part B

**K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface.**
[Clarification Statement: Examples of Earth's surface could include sand, soil, rocks, and water]
[Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.]

**K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.***
[Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.]

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

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

**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.**

## ENDURING UNDERSTANDINGS

- Weather changes throughout the season.
- Weather changes from day to day over time
- Dangerous weather conditions
- How weather effects everyday life
- The effects of sunlight on the Earth's surface
- Understand the meaning of cause and effect relationships

## ESSENTIAL QUESTIONS

How does weather forecasting help to keep people safe? (Part A)

How can we use science to keep cool from sunlight? (Part B)

## KNOWLEDGE AND SKILLS

**Students will demonstrate a knowledge of physical science vocabulary.**

**Rain**- moisture condensed from the atmosphere that falls visibly in separate drops.
**Snow**- atmospheric water vapor frozen into ice crystals and falling in light white flakes or lying on the ground as a white layer.
**Sunny**- bright with sunlight.
**Cloudy**- having little or no sunshine
**Wind**- movement of air
**Fog**- Condensed water vapor in cloudlike masses lying close to the ground and limiting visibility.
**Temperature**- the measurement of how hot or cold something is
**Meteorologists**- a weather forecaster.

**Students will:**

- Ask questions to obtain information about weather conditions.
- Ask question to obtain information about weather temperature.
- Share ideas about different types of weather.
- Make observations to determine the effect of sunlight on the Earth's surface.
- Create a shadow of different sizes by changing the location of a light source.

## STAGE TWO

### PERFORMANCE TASKS

**Part A:**
**Suggestive Experiment:**
Use materials to complete a rain/cloud experiment. Discuss the effects of rain/clouds. This can be completed as a whole or small group, or as an individual task.

**Materials:**
- Clear plastic cups, shaving cream, food dye, paper towels

**Directions:**
- Teacher will fill plastic cups with water half way.
- Teacher will spray shaving cream into plastic cup.
- Teacher/Student will add 2-3 drops of food dye.
- Students will observe how the food dye represents rain and falls from the clouds.

**Part B:**
**Suggestive Experiment:**
Use materials to create a shadow on the earth's surface. Discuss the how shadows are obtained and where they come from. This is a whole group lesson.

**Materials:**
- Groundhog cut out/stuffed animal/student
- Sidewalk chalk
- Space on black-top outside

**Directions:**
- Teacher will place a tall cutout of a ground hog on a spot located outside on the blacktop.
- Teacher will explain to the students about shadows and how the groundhog will see his shadow to determine spring weather.
- Teacher will use chalk to mark the location of the shadow at different times of the day.
- Students will observe shadows at different locations and times of the day.

### OTHER EVIDENCE
**Formative Assessments:**
- teacher questions
- teacher observations of students
- class discussions
- weather / sun worksheets
- home connection projects
- journal writing
- groundhog's day video
- groundhog's day puppet project
- exit ticket out

## STAGE THREE

**LEARNING PLAN**
**Additional Activities:**

- weather chart
- weather emergent reader
- Venn-diagram, cut/paste, rainy/sunny
- weather sensory bottles
- 5 day weather chart (home connection activity)
- graph your favorite weather
- weather activity centers
- classroom rotations of weather activities
- sunlight activities
- shadow activities

**September/October/November (Prior Knowledge):**

- begin to discuss different types of weather
- begin to discuss/continue different types of weather patterns each day
- begin to discuss what is a meteorologist
- complete a 5-day weather chart

**December:**

- discuss winter weather
- discuss severe weather conditions
- discuss types of clothing to wear for winter
- complete journal sentence based on weather

**January/February:**

- discuss weather patterns
- discuss winter inside/outside activities
- complete rain/cloud experiment
- discuss shadows
- discuss how we get sunlight from the sun
- introduce groundhog's day for February

**March:**

- discuss weather seasons
- discuss the effects of weather for spring
- STEM Day (trimester 2)

**Connecting with LAL and Mathematics**

**Part A:**

**LAL**
With adult support, students use trade books (read-aloud, big books) to learn about and discuss severe weather. Strategies, such as Think-Pair-Share, can be used to encourage students to think about information from books and to use that information to ask and answer questions about key details. With guidance, students use online media resources to view examples of severe weather. They can ask questions in order to understand how severe weather affects people and communities and to determine how communities prepare for and respond to severe weather.

**Mathematics**

With adult support, students measure and record various types of weather (e.g., rainfall or snow amounts, relative temperature at different times of the day and over a period of time). They mathematically represent real-world information by organizing their data into simple weather charts and graphs. Kindergarteners attend to the meaning of various quantities using a variety of units of measure and use counting to analyze data and determine patterns in charts and graphs. By using media resources, students explore how weather scientists represent real-world weather data with picture representations, charts, and graphs. They can use this information to think about how weather scientists use tools to collect and record weather data in order to determine patterns of change. Students will attend to the meaning of various quantities used in simple weather charts and graphs, both from classroom observations and from media sources, by counting and comparing severe weather data with daily weather data (e.g., relative amounts of rainfall, snowfall). By analyzing data from weather graphs and charts, young students begin to understand how severe weather affects people and communities and that weather scientists play an important role in predicting severe weather conditions.

**Part B:**

**LAL**

With guidance and support from adults, students recall information from experiences and gather information from books (read-aloud, big books) and other resources about the warming effects of the sun. Strategies such as Think-Pair-Share can be used to encourage students to think about and use information from books to answer questions and share their thinking. Kindergartners can add drawings or other visual displays to descriptions to provide additional detail about the structures they built to reduce the warming effects of the sun. With guidance and support from adults, students produce and publish their descriptions and observations of the structures they designed and built.

**Mathematics**

Students make comparisons of objects using relative temperature [hotter, colder, warmer, and cooler] and describe the objects as warmer or cooler. Students can classify the objects into categories (warmer/cooler), then count and compare the number of objects in each category. Data should be organized and compared so that students understand that placing objects in the sun generates an observable pattern of change (i.e., the objects get warmer). Kindergarteners attend to the meaning of various quantities using a variety of measurement tools, such as thermometers without scale markings, to determine if an object has gotten warmer when placed in the sun. They mathematically represent real-world information by organizing their data into simple graphs or charts or by diagramming the situation mathematically.

**Unit Name: Physical Science** **Time Frame: 8 weeks**
**Author: Egg Harbor Township Public Schools - Science Department**

**UNIT**

Subject: **Science** Country: **USA**

Course/Grade: **Kindergarten** State/Group: **NJ**

School: **Egg Harbor Township Elementary Schools (Miller, Davenport, Slaybaugh and Swift)**

## UNIT SUMMARY

During this unit of study, students apply an understanding of the effects of different strengths or different directions of pushes and pulls on the motion of an object to analyze a design solution. The crosscutting concept of cause and effect is called out as the organizing concept for this disciplinary core idea. 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.

## UNIT RESOURCES

Books:

- And Everyone Shouted, "Pull!" A First Look at Forces and Motion, by Claire Llewelyn
- Motion: Push, Pull, Fast and Slow by Darlene R. Stile
- Forces Make Things Move, by Kimberly Bradley
- Roller Coaster, by Marla Frazee
- I Fall Down, by Vicki Cobb
- Gravity is a Mystery, by Franklin M. Branley
- Meet Einstein, by Mariels Kleiner
- Simple Machines, by D.J. Ward
- Roll, Slope and Slide: A Book About Ramps, by Michael Dahl

**Internet Resource Links:**

**http://www.state.nj.us/education/cccs/2016/science/K-PS2.pdf**
**http://www.sciencekids.co.nz/physics.html**
**http://www.pbskids.org/sidthesciencekid**
**http://ngss.nsta.org/Resource.aspx?ResourceID=129**
**http://ngss.nsta.org/Resource.aspx?ResourceID=211**
**http://ngss.nsta.org/Resource.aspx?ResourceID=227**
**http://ngss.nsta.org/Resource.aspx?ResourceID=457**
**http://ngss.nsta.org/Classroom-Resources.aspx**

**More Resources and Suggested Experiments:**
**(See http://ngss.nsta.org/classroom-resources.aspx)**
Ramps 2: Ramp Builder: This is a multi-day lesson plan that has students design, build, and test their own ramps. Students are introduced to a variety of materials and explore putting them together. Students engage in an inquiry-based learning experience to reinforce math, science, and technology. They create plans for ramps by evaluating a variety of materials provided to them

Push Pull-Changing Direction: Students investigate the interactions between colliding objects using pushes and pulls. Students play a game of kickball and observe how the ball is pushed, pulled, started, stopped, or collided with other objects and how it changed position and speed. As a group, students will then brainstorm about other objects being pushed, pulled or colliding and then choose one of those objects to investigate.

Marble Roll: This is an assessment probe from the book Uncovering Student Ideas in Primary Science Vol. 1 that is used to elicit children's descriptions of motion. The probe is designed to reveal how students describe the path of a moving object as it leaves a winding track.

Roller Coaster: There are two parts to this lesson from the book More Picture Perfect Science Lessons. In the first part learners explore ways to change the speed and direction of a rolling object by building roller coasters out of pipe insulation after reading the book, Roller Coaster by Marla Frazee. In the second part students read I Fall Down by Vicki Cobb and then investigate the idea that gravity affects all objects equally by conducting dropping races with everyday items.

## STAGE ONE

### GOALS AND STANDARDS

**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.**
[Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.] [Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]

**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.***
[Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.] [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]

### ENDURING UNDERSTANDINGS

- Pushes and pulls can have different strengths and directions.
- Pushing or pulling on an object can change the speed or direction of its motion.
- When objects touch or collide, they push on one another and can change motion.
- A bigger push or pull makes things speed up or slow down more quickly.

### ESSENTIAL QUESTIONS

***What does science have to do with playing sports?***
***How can you design a simple way to change the speed or direction of an object using a push or pull from another object?***

## KNOWLEDGE AND SKILLS

**Students will demonstrate a knowledge of physical science vocabulary.**

**Push-** to press against something
**Pull-** to draw or haul towards oneself
**Force**- strength or power applied upon an object
**Motion-** the action of moving or of changing place or position
**Incline-** to lean, bend or slant like a ramp
**Speed-** how fast something moves
**Direction-** the path along which anything moves
**Object-**a thing, person or matter to which you apply force
**Gravity-**the force of attraction that pulls objects to the Earth
**Friction-** resistance that affects motion

## STAGE TWO

## PERFORMANCE TASKS

Part A(K-PS2-1)-With guidance, students will work collaboratively to plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of the object. (*Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include noncontact pushes or pulls such as those produced by magnets.)* Some examples of pushes and pulls on the motion of an object could include:

- A string attached to an object being pulled.
- A person pushing an object.
- A person stopping a rolling ball.
- Two objects colliding and pushing on each other.

Part B (K-PS2-2)-With guidance, students will work collaboratively to analyze data to determine whether a design solution works as intended to change the speed or direction of an object with a push or a pull. Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn. *(Assessment does not include friction as a mechanism for change in speed.)*

### Materials

- Teachers will use materials gathered from the classroom.

## OTHER EVIDENCE

- teacher questions
- class discussions
- related math/STEM activities
- related English Language Arts activities
- Formative Assessment-A push/pull worksheet will be provided to teacher.

## STAGE THREE

### LEARNING PLAN

**September/October –**Students will be introduced to and discuss forces of push and pull upon an object.
**November/December-**Students will work together to conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object and to determine if a design solution works as intended.
**STEM DAY-Trimester 1(Date to be determined.)**

**Connecting with LAL and Mathematics**

**English Language Arts**

In order to integrate English Language Arts into this unit, students need the opportunity to participate in shared research that will enhance their understanding of the effect of forces (pushes and pulls) on objects. This could include exploring simple books and other media or digital resources. With prompting and support, students should ask and answer questions about key details in texts in order to seek help, get information, or clarify something that they do not understand. With support from adults, students will also recall information from experiences to answer questions and clarify their thinking. With support and/or collaboration, they can use digital tools to produce and publish simple informative writing or to document their observations of the simple force and motion systems they design and build.

**Mathematics**
During this unit of study, students will make connections to Mathematics in a number of ways. Kindergartners can use simple nonstandard units to measure the distances that two different objects travel when pushed or pulled or the distances that an object travels when varying the strength of a push or a pull. If using two objects, students can compare them using a measurable attribute, such as weight, to see which object has “more of” or “less of” the attribute, and describe the effect that increased weight has on the distance that an object travels. As students conduct multiple trials with the two objects (or with a single object, varying the strength of the push or pull), they can document the distance traveled in a simple graph. Then they can analyze the data in order to describe the cause-and-effect relationship between forces and motion of objects. As students collect and analyze data, they are learning to reason abstractly and quantitatively and use appropriate tools strategically.

**Unit Name: Life Science** **Time Frame: 8 weeks**
**Author: Egg Harbor Township Public Schools - Science Department**

**UNIT**

Subject: **Science** Country: **USA**

Course/Grade: **Kindergarten** State/Group: **NJ**

School: **Egg Harbor Township Elementary Schools (Miller, Davenport, Slaybaugh and Swift)**

## UNIT SUMMARY

The students will be able to demonstrate an understanding that all plants and animals need certain things to survive. Students will identify that basic resources needed for survival. Assessment will be observation and discussion of the design challenge.

Part A:

In this unit of study, students develop an understanding of what plants and animals need to survive and the relationship between their needs and where they live. Students compare and contrast what plants and animals need to survive and the relationship between the needs of living things and where they live. The crosscutting concepts of patterns and systems and system models are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in developing and using models, analyzing and interpreting data, and engaging in argument from evidence. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on K-LS1-1, K-ESS3-1, and K-ESS2-2.

Part B:

In this unit of study, students develop an understanding of what humans need to survive and the relationship between their needs and where they live. The crosscutting concept of cause and effect is called out as the organizing concept for the disciplinary core ideas. Students demonstrate grade-appropriate proficiency in asking questions and defining problems, and in obtaining, evaluating, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on K-ESS3-3 and K-2 ETS1-1.

## UNIT RESOURCES

***Books (any book on Life Science)***

- The Tiny Seed by Eric Carle
- Living and Nonliving by Rebecca Rissman
- What's Alive by Kathleen Weirder Zoefeld
- Why Living Thing s Need Light by Daniel Nunn
- Why Living Things need Food by Daniel Nunn
- Why Living Things need Water by Daniel Nunn
- Garden of Happiness by Erika Tamar
- The Ugly Vegetables by Grace Lin
- Carlos and the Squash Plant by Jan Romero and Jeanne Stevens
- From Seed to Plant by Gail Gibbons

***B. Books***

- Earth Day Every Day by Lisa Bullard
- I can save the Earth By Alison Inches
- It's Earth Day by Mercer Mayer
- Recycling Day By Edward Miller
- Earth Day- Horray By Stuart Murphy
- The Lorax By Dr. Suess

**Internet Resource Links:**

**http://www.state.nj.us/education/aps/cccs/science/resources.htm**

**https://www.education.com/activity/life-science/**

**https://nj.pbslearningmedia.org/collection/sid-the-science-kid/**

**http://games.noaa.gov/**

**http://interactivesites.weebly.com/earth-day.html**

**http://www.acua.com/**

**http://www.earthday.org/earth-day-2011**

**http://holidays.kaboose.com/earth-day/**

**http://sciencespot.net/Pages/classearthday.html**

**http://www.earthdaybags.org**

## STAGE ONE

### GOALS AND STANDARDS

**Part A**

**K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.** [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]

**Part B**

**K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.** [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]

### ENDURING UNDERSTANDINGS

- All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1)

- Scientist look for patterns and order when making observations about the world.(K-LS1-1)
- Plants and animals are dependent on the natural resources of where they live. .(K-LS1-1)

**ESSENTIAL QUESTIONS**
Part A. How do plants and get the things that they need to live and grow?

Part B. How can humans reduce their impact on the land, water, air, and other living things in the local environment?

**KNOWLEDGE AND SKILLS**
**(Vocabulary is not assessed and is to be used by teacher as needed).**
**Plants-**A living thing that grows in the ground, usually has leaves or flowers, and needs sun and water to survive.
**Animals-**Any living thing that is not a plant.
**Recycle-**To use something again; to make something new from something that has been used before.
**Habitat-**The place or type of place where a plant or animal naturally or normally lives or grows.
**Resource-** A place or thing that provides something useful.
**Wants-**To desire or wish for something.
**Needs-**Something that a plant or animal must have in order to live and/or survive.
**Patterns-** The regular or repeated way in which something happens or is done.
**Hypothesis**- A guess or theory.
**Recycle-**convert (waste) into reusable material
**Environment-**the surroundings or conditions in which a person, animal, or plant lives or operates

## STAGE TWO

**PERFORMANCE TASKS**
**(Below are ideas for teachers please feel free to share or create your own projects for performance task)**
**Choice A: Use recycled materials to house your plant or flower seed. Provide each group of students a seed and a choice of housing for their seed.**
**Materials:**
- **Recycled containers to house seeds**
- **Seeds**
- **Soil**

**Directions:**
- **Students will work in small groups to plant and care for their seed.**
- **Students will record data about the care and growth to their plant.**

**Part B. Students can participate in an Earth Day events. (Make recycled art)(Teacher choice of activities)**

**OTHER EVIDENCE**
**Formative Assessments:**
A. Label plant diagram

B. Who remembers to recycle their milk carton after snack?

## STAGE THREE

**LEARNING PLAN**
***Part A.* "Kid Questions"**
**How can you tell if something is alive?**
**What do living things need to survive?**
**Where do organisms live and why do they live there?**
The unit should begin with observable phenomena. The purpose of presenting phenomena to students is to start them thinking and wondering about what they observe. After students have observed the event, they can work individually, with partners, or in a small group to develop questions about what they saw.
The questions will lead them into investigational opportunities throughout the unit that will help them answer their questions.
The questions students share about this unit will be used to guide them in identifying patterns of what plants and animals need to survive. For example, a pattern may include the types of food that specific organisms eat or that animals consume food but plants do not. Furthermore, students' questions and investigations will also guide them in developing models that reflect their understanding of the inter-relationship between an organism and its environment.
Prior to starting the unit, display pictures of living and non-living things. Direct students to sort the pictures into two groups: living and non-living. Ask students to explain how they decided which pictures represented living things and which represented non-living things.
Watch the PBS video "Is It Alive?" Stop after each picture and ask students if it's alive or not. Ask them to explain how they can tell. (This activity will also provide an opportunity to pre-assess students' understandings and/or misconceptions. It will also provide an opportunity for students to think about what having life means.)
Watch the Teacher Tube video "Living or Non-Living?" (This activity provides similar experiences for students as the PBS video. The difference is that after each picture and question, the narrator provides the answer with reasoning.)
In this unit's progression of learning, students first learn that scientists look for patterns and order when making observations about the world and those patterns in the natural world can be observed and used as evidence. Students conduct firsthand and media-based observations of a variety living things and use their observations as evidence to support the concepts
Plants do not need to take in food, but do need water and light to live and grow.
All animals need food in order to live and grow, that they obtain their food from plants or from other animals, that different kinds of food are needed by different kinds of animals, and that all animals need water.
After determining what plants need to survive, kindergarteners learn that plants are systems, with parts, or structures, that work together, enabling plants to meet their needs in a variety of environments. The vast majority of plants have similar structures, such as roots, stems, and leaves, but the structures may look different depending on the type or variety of plant. Although there are many varieties of plants, their structures function in similar ways, allowing the plants to obtain the water and light they need to survive. In other words, each variety of plant has structures that are well-suited to the environment in which it lives. As students learn about different types of plants and the environments in which they live, they use models, such as diagrams, drawings, physical replicas, or dioramas, to represent the relationships between the needs of plants and the places they live in the natural world. For example, grasses need sunlight, so they often grow in meadows. Cacti,

which live in places subject to drought, have thick, wide stems and modified leaves (spines) that keep water within the plant during long periods without rain.
After determining what animals need to survive, kindergarteners learn that animals are systems that have parts, or structures, that work together, enabling animals to meet their needs in a variety of environments. Many animals have similar structures, such as mouths or mouthparts, eyes, legs, wings, or fins, but the structures may look different, depending on the type or species of animal. Although there are many types of animals, their structures function in similar ways, allowing them to obtain the water and food they need to survive. In other words, each type of animal has structures that are well-suited to the environment in which they live. As students learn about different types of animals and the environments in which they live, they use models, such as diagrams, drawings, physical replicas, or dioramas, to represent the relationships between the needs of animals and the places they live in the natural world. For example, deer eat buds and leaves; therefore, they usually live in forested areas; pelicans eat fish, therefore they live near the shorelines of oceans or seas.
The final portion of the learning progression focuses on the understanding that plants and animals are system with parts, or structures, that work together. Students use what they have learned about plants and animals to make further observations to determine ways in which plants and animals change their environment to meet their needs. For example:
Tree roots can break rocks and concrete in order to continue to grow, plants will expand their root systems in search of water that might be found deeper in the earth, and plants can be found growing around and through man-made structures in search of light.
A squirrel digs in the ground to hide food, and birds collect small twigs to build nests in trees. Students need opportunities to make observations, and then, with adult guidance, to use their observations as evidence to support a claim for how an animal can change its environment to meet its needs.
Students need opportunities make observations; then, with adult guidance, they can use their observations as evidence to support a claim about how living things can change its environment to meet its needs.

**B. In this unit of study, students will develop an understanding of the impact that humans have on the land, water, air, and other living things in the local environment and engage in a portion of the engineering design process in order to communicate solutions that can reduce these impacts.**

To help students recognize the impact that humans have on the living and nonliving components of the local environment, they need opportunities to observe and think about the things that people do to live comfortably. Over a period of a few days, students can observe their families in their day-to-day lives, paying attention to what they eat, what they throw away, when and how they use water, how they warm or cool their home, what types of appliances and gadgets they use, how they maintain their home and yard, what resources are used to make the clothes they wear, how they travel from place to place, and how they communicate withothers. During whole-group discussions, students can share their observations and then discuss the concept of comfortable lifestyle. This list could include:

- Plants and animals for food
- Trees, rocks, sand, and other materials for building homes and schools
- Local reserves of water for drinking, washing clothes, showering, washing dishes, watering lawns, and cooking
- Gas and oil for cars and buses
- Electricity to power the appliances in their homes
- Land for homes, schools, parks, parking lots, and landfills

Then the class can discuss how obtaining and using these types of resources affects the local environment. To help with these discussions, teachers can use books, multimedia resources, field trips, or even invite guest speakers to the classroom. As students

participate in discussions, they should be encouraged to ask questions, share observations, and describe cause-and-effect relationships between human use of resources and human impact on the environment.

As students come to understand that things people do to live comfortably can affect the world around them, they are ready to engage in the engineering design process. The process should include the following steps:

- As a class or in groups, students participate in shared research to find examples of ways that people solve some of the problems created by humans' use of resources from the environment. For example, people in the community might choose to: Recycle plastic, glass, paper, and other materials in order to reduce the amount of trash in landfills;

- Plant trees in areas where trees have been cut down for lumber to renew regional habitats for local wildlife; or Set up rainwater collection systems so that rainwater can be used to maintain landscaping instead of using water from local reserves.

- Groups of students then develop a simple sketch, drawing, diagram, or physical model to illustrate how the solution reduces the impact of humans on land, water, air and/or other living things in the local environment.

- Groups need the opportunity to communicate their solutions with the class in oral and/or written form, using their sketches, drawings, diagrams, or models to help explain how the solution reduces the human impact on the environment.

While engaging in this process, students should learn that even though humans affect the environment in many ways, people can make choices that reduces the human impact on the environment.

**Connecting with English LAL and Mathematics**

***A) English Language Arts***

With adult support, kindergarteners use trade books (read-aloud and big books) to learn about plants and animals. With prompting and support strategies, such as Think-Pair-Share, students can discuss what they have learned and read and answer questions using key details from text.

As students learn about different types of plants, animals and the environments in which they live, they will use models, such as diagrams, drawings, physical replicas, or dioramas, to represent the relationships between the needs of living things and the places they live in the natural world. Using models in this way gives students an opportunity to use simple informative writing to provide additional detail that will enhance their visual displays.

**Mathematics**

With adult support, kindergarteners use simple measurements to describe various attributes of plants and animals. Kindergarteners can use simple, nonstandard units to measure the height of plants or the amount of water given to plants. For example, they might use Unifix cubes to measure height or count the number of scoops of water given to a plant on a daily or weekly basis. Students should work in groups to measure and record their data. They also measurements to describe various attributes of animals. Kindergarteners can use simple, nonstandard units to measure such attributes as height, length, or weight. They can also count numbers of appendages or other body parts. They might use Unifix cubes to measure height or length and wooden blocks to measure weight. Students should work in groups to measure and record their data.

With adult guidance and questioning, students can then learn to analyze their data. As students use data to compare the amount of growth that occurs in plants that get varying amounts of water or sunlight, they are given the opportunity to reason abstractly and quantitatively. For example, students can measure and compare the height of a sunflower grown in the shade compared to the height of a sunflower grown in the sun, or they can

count and compare the number of leaves on bean plants that receive different amounts of water daily. These investigations will give students evidence to support claims about the needs of plants. Students should also have opportunities to solve one-step addition/subtraction word problems based on their collected data.

**Connecting with English LAL and Mathematics**

**B) English Language Arts**

With adult support, students participate in shared research in order to find examples of ways that humans reduce their impact on the land, water, air, and other living things in the local environment. With prompting and support, students will ask and answer questions about key details in a text. Students, with adult support and/or peer collaboration, can also use simple books and media resources to gather information and then use drawings, simple informative writing (or dictation), and visual displays to represent some of the ways that people lessen their impact on the environment. With support from adults, students will recall information from experiences or gather information provided from sources to answer a question. Students can clarify their ideas, thoughts, and feelings using simple informative writing.

**Mathematics**

With adult support, students will classify data by one attribute, sort data into categories, and graph the data. For example, students can keep track of the amount of materials recycled over a period of time. They can classify recycled trash as paper, plastic, or glass, then count and graph these data, using bar graphs or picture graphs. Student should have opportunities to analyze and compare the data and then use the data to solve word problems. As students work with their data, they are learning to reason abstractly and quantitatively, model by diagramming the situation mathematically, and use appropriate tools strategically.

**Unit Name: Space Systems: Patterns and Cycles** **Time Frame: 8 weeks**
**Author: Egg Harbor Township Public Schools-Science Department**

## UNIT

Subject: **Science** Country: **USA**
Course/Grade: **1st Grade** State/Group: **NJ**
School: **Egg Harbor Township Elementary Schools** (Davenport, Slaybaugh and Swift)

## 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. Throughout the unit students are expected to demonstrate grade-appropriate proficiency look for patterns as they *plan and carry out investigations and analyze and interpret data*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

In this unit's progression of learning, students develop the understanding that natural events happen today as they happened in the past, and that many events are repeated. In addition, they observe and use patterns in the natural world as evidence and to describe phenomena. First graders ask questions and use observations of the sun, moon, and stars to describe apparent patterns of change in each. These patterns are then used to answer questions and make predictions. Some examples of patterns include:

- ✓ The sun and moon appear to rise in one part of the sky, move across the sky, and set.
- ✓ The shape of the moon appears to change over a period of time in a predictable pattern.
- ✓ Stars, other than our sun, are visible at night but not during the day.

After students observe and document these types of patterns over a period of time, they need opportunities to describe the patterns and to make predictions about the changes that occur in the objects in the sky. It is important that they use observed patterns as evidence to support predictions they might make about the sun, moon, and stars.

In this unit, students also learn that seasonal patterns of sunrise and sunset can be observed, described, and predicted. They relate the amount of daylight to the time of year by making observations at different times of the year. Over time, they collect and use data in order to identify the relationship between the amount of sunlight and the season. Grade 1 students are expected to make relative comparisons of the amount of daylight from one season to the next, and assessment should be limited to relative amounts of daylight, not quantifying the hours or time of daylight.
This unit is based on 1-ESS1-1 and 1-ESS1-2.

## UNIT RESOURCES

Science Journals
Observation/Data Recording Sheets
**Books:**

- *Good Night Moon*
- *Out in Space*
- *What Makes Day and Night*
- *American Lives: Astronauts*
- *The Sun: Our Nearest Star*
- *Neighbors in Space Series*
- *Exploring the Galaxy Set*
- *I See the Moon*
- *Faces of the Moon*

- *The Moon Book*
- *The Lollipop Fairies*
- *My Light by Molly Bang*
- *Kittens First Full moon by Kevin Henkes*
- *If you Decide to go to the Moon by Faith McNulty*
- *The Moon Book by Gail Gibbons*
- *And if the Moon Could Talk by Kate Banks*
- *Sun, Moon and Stars by Stephanie Turnbill*
- *Papa, Please get the Moon for me by Eric Carle*
- *So That's How the Moon Changes Shape by Alan Fowler*
- *Shadows and Reflections by Tina Hoban*
- *Chicken Little by Rebecca Emberley*
- *The Man in the Moon by William Joyce*
- *Stars by Mary Lyn Ray*
- *Why the sun and moon live in the sky: An African Folktale by Elphinstone Dayrell*
- *Moonshot: The Flight of Apollo 11 by Brian Floca*
- *Reaching for the Moon by Buzz Aldrin*
- *It's sunny today by Kristin Sterling*
- *On Earth by G. Brian Karas*
- *Sun by Melanie Mitchell*
- *Moon by Melanie Mitchell*
- *Stars by Melanie Mitchell*
- *Energy from the Sun by Alan Fowler*
- *The Sun Our Nearest Star by Franklyn Mansfield Branley*

**Internet Resource Links:**

**https://sites.google.com/a/solteacher.com/olteacher-com/home/first-grade-virginia-sol-resources/1st-grade-science/science-sol-2-8-sun-earth**
**http://www.childrensunivehttp://www.beaconlearningcenter.com/WebLessons/AsTheEarthTurns/default.htmrsity.manchester.ac.uk/interactives/science/earthandbeyond/soonmoonearth/**
**http://www.eyeonthesky.org/ourstarsun.html**
**http://library.thinkquest.org/29033/begin/earthsunmoon.htm**
**http://www.nextgenscience.org/**
**http://www.calendar-updates.com/sun.asp?PostalCode=08234&Submit=Get+Sunrise+%2F+Sunset+Times**
**www.brainpopjr.com**
**www.pebblego.com**
**http://www.beaconlearningcenter.com/WebLessons/AsTheEarthTurns/default.htm**
**www. Readworks.org**
**http://earthsunmoon.pingmooreandbloom.com/**
**http://www.edu.pe.ca/southernkings/moon.htm**
**http://www.scootle.edu.au/ec/viewing/L1128/index.html**
**http://splash.abc.net.au/res/i/L5774/index.html**
**https://stardate.org/nightsky/moon**
**www.discoveryeducation.com**

## STAGE ONE

### GOALS AND STANDARDS

**New Jersey Student Learning Standards - Science:**

**1-ESS1-1**. **Use observations of the sun, moon, and stars to describe patterns that can be predicted.** [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [*Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.*]

**1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year.** [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [*Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.*]

**1-PS4-2**. **Make observations to construct an evidence-based account that objects can be seen only when illuminated.** [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]

**Interdisciplinary Standards (Cross-Curricular Standards):**

**ELA/Literacy –**
**RI.1.1** Ask and answer questions about key details in a text. (1-LS1-2)
**RI.1.2** Identify the main topic and retell key details of a text. (1-LS1-2)
**RI.1.10** With prompting and support, read informational texts appropriately complex for grade. (1-LS1-2)
**W.1.7** Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS1-1)

**Mathematics –**
**1.NBT.B.3** Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols >, =, and <. (1-LS1-2)
**1.NBT.C.4** Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning uses. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2)
**1.NBT.C.5** Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2)
**1.NBT.C.6** Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2)

### ENDURING UNDERSTANDINGS

- **The amount of daylight changes throughout the year.**
- **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**
- **Illumination could be from an external light source or by an object giving off its own light.**

- **Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted.**
- **Seasonal patterns of sunrise and sunset can be observed, described, and predicted.**
- **Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.**

**ESSENTIAL QUESTIONS**

**Can we predict how the sky will change over time?**
**What objects are in the sky and how do they seem to move?**

**KNOWLEDGE AND SKILLS**
**Vocabulary:**

- **Seasons (fall, winter, spring, summer)**
- **Sun – closest star to Earth**
- **Earth – the planet in which we live**
- **Moon – the natural satellite of Earth**
- **Stars – a fixed ball of gas giving off light, far away from Earth**
- **Rotation – the act spinning**
- **Sunrise – the time in the morning when the sun appears**
- **Sunset – the time in the evening when the sun disappears**
- **Model – an example**
- **Effect – something that is caused by an action**
- **Compare – to examine or look at two or more things**
- **Observation – the act of watching**
- **Noon – when the sun is at the highest point in the sky**
- **Day – between sunrise and sunset; when it is light out**
- **Night – between sunset and sunrise; when it is dark out**

**Students will know:**

Night and day are caused by the rotation of the Earth.
The amount of daylight changes throughout the year with the seasons.
The Moon rotates around the Earth.
The stars are in the sky both day and night. During the day our star, the sun, makes our sky so bright that we cannot see the much dimmer stars.

**Students will be able to:**

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.

## STAGE TWO

**PERFORMANCE TASKS**
**<u>Task A – Shadow Clock</u>:**
Students will design a "shadow clock" to record the apparent movement of the sun and shadows during different times of the day. Students will go outside and use a paper plate

with a pencil in the center to color the shadow and the time for three different times of the day. Students will observe and discuss how the sunlight and shadows change depending on the time of day and position of the sun in the sky.

**Task B Sunrise/Sunset:**

Students collect data to track the time of sunrise and sunset for one week and make predictions based on the data collected. Students use patterns in nature of sunrise and sunset to predict what will happen during the second week.

**Task C Model:**

Create a model of the Earth, sun and moon system to illustrate the moon's orbit of Earth simultaneously with Earth's orbit of the sun. This is also an effective way to model eclipses and the position of Earth, the moon and the sun during the moon's phases.

**OTHER EVIDENCE**

**Formative assessments**

- Teacher Questions
- Class Discussions
- Completed Student Products

**Relating concepts of science standards to reading and math activities**

## STAGE THREE

**LEARNING PLAN**

**Activities, experiences, and lessons:**

**Task A – Day and Night/Shadow Clock:**


Students will design a "shadow clock" to record the apparent movement of the sun and shadows during different times of the day. Students will go outside and use a paper plate with a pencil in the center to color the shadow and the time for three different times of the day. Students will observe and discuss how the sunlight and shadows change depending on the time of day and position of the sun in the sky.

**Suggested Materials:** informational books about sunlight, shadows, day, and night paper plates, pencils, crayons, rocks, science journals or recording sheets

**Lesson Plan:**

1. Read aloud informational text about sunlight and shadows to activate any student prior knowledge.

2. Hold a class discussion, allowing students to share what they already know about sunlight and shadows and what questions they still have. It is typical for first graders to think that the sun is moving/rotating as opposed to the Earth, and this is

to be expected and discussed after the challenge. Record their ideas on a K, W, C, L chart. (what we KNOW, What we WANT to know, what we CREATED, and what we LEARNED.) Have students record their ideas on their own chart or in a science journal.

3. Watch "The Sun at Different Times of Day" on www.discoveryeducation.com. After watching the video create your own sundial/Shadow Clock as a class.

4. Introduce permitted materials and share the challenge instructions. Model the use of the shadow clock and take students outside for three tests every 2 hours or so during the school day.

5. Allow students time to trace their shadows with different crayon colors, write the times to match and record in their science journals or on a recording sheet. Have them mark their starting point with a rock at the top so that they place their plate in the same spot each time.

6. Hold a whole class closing discussion and reflection, allowing students to share what they discovered through their shadow clock tests. Ask students why they think that shadows move and grow longer/shorter throughout the day. At this point, you can discuss the rotation and orbit of the earth around the sun and how it seems like the sun is always moving, when in fact it is the earth. Record their ideas on the K, W, C, L chart and have them finish their recording sheets or science journals.

7. Teacher projects the interactive story from the website below to culminate the activity. www.beaconlearningcenter.com/WebLessons/AsTheEarthTurns/default.htm

**Task B Sunrise/Sunset Data Tracking & Prediction:**

1. Hold a class discussion, allowing students to share what they already know about sunrise and sunset and what questions they still have. Record their ideas on a K, W, C, L chart. (what we KNOW, What we WANT to know, what we CREATED, and what we LEARNED.) Have students record their ideas on their own chart or in a science journal.

2. Read aloud informational text about sunrise and sunset to activate any student prior knowledge.

3. Use a globe and a flashlight to model the sun and the role in plays in day and night. Turn the classroom lights off and rotate the globe while shining the flashlight on one spot. Make observations about what parts of the earth are experiencing daytime vs. nighttime.

4. Students collect data to track the time of sunrise and sunset for one week and record the data in their science journals or on a recording sheet. Teacher can find this information each day on www.weather.com.

5. Students use patterns in nature of sunrise and sunset to predict what will happen during the second week. Class discussion to share predictions.

6. Students check their predictions by checking www.weather.com during the following week. Class discussion based on patterns seen in nature and how we can use them to make predictions for many things (weather, seasons, amount of daylight, etc.)

**Task C Sun, Earth, Moon Model:**
Students will design a working model of the Earth and the sun using colored playdough, penicls. They will then act out a rotation of the Earth and the Earth's revolution around the sun with partner. Students may also choose to make a small model of the moon. After this, students will create a paper model of the sun, earth and moon.
**Suggested Materials:** informational books about the Earth, moon and sun, unsharpened pencils or popsicle sticks, Play-doh (blue, green, white and yellow), science journals or recording sheets
**Lesson Plan:**

1. Read aloud informational text about the Sun, moon and earth to activate any student prior knowledge.

2. Hold a class discussion, allowing students to share what they already know about the sun, moon and earth and what questions they still have. It is typical for first graders to think that the sun is moving/rotating as opposed to the Earth, and this is to be expected and discussed after the challenge. Record their ideas on a K, W, C, L chart. (what we KNOW, What we WANT to know, what we CREATED, and what we LEARNED.) Have students record their ideas on their own chart or in a science journal.

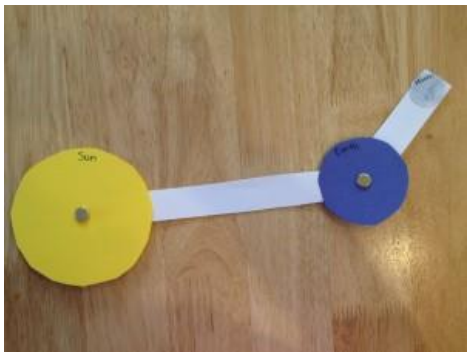
3. Introduce permitted materials and share the challenge instructions. Model the use of the sun and Earth models and how to "act them out" with a partner, with one student rotating the Earth and revolving around the Sun and their partner holding the Sun in the center stationary. You may choose to have a third students act out the Moon.

4. Allow students time to act out their models and record in their science journals.

5. Hold a whole class closing discussion and reflection, allowing students to share what they discovered through acting out the sun and the Earth. You can also discuss that rotation and revolution of the earth around the sun and how it seems like the sun is always moving, when in fact it is the Earth.

6. Have students complete the paper model after modeling how to create it. Students can use this model to demonstrate how the Earth orbits around the Sun, and how the Moon orbits around the Earth as well as demonstrate night, day, and when stars are visible.

**Model of the Sun, the Earth, and the Moon**



**You will need:**

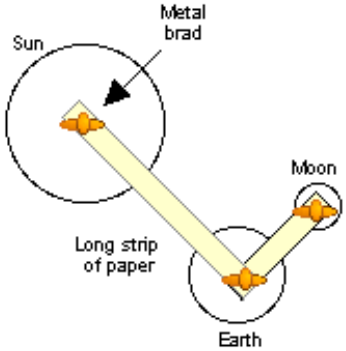
- Yellow construction paper (for the sun)
- Blue construction paper (for the Earth)
- Gray paper (for the moon)

- White paper (for the connectors)
- 3 small brads
- Scissors
- Ruler

*Alternatively, if you don't have colored construction paper, you could use white paper or even paper plates, and use crayons to color it in. If you have a color printer, you can also use the colored template.* **Directions:**

- Cut out the templates and trace them onto the colored paper
- The large circle represents the sun
- The middle sized circle represents the Earth
- The smallest circle represents the moon
- Then cut out two strips of paper; these will be the connectors (BOTH 1 inch thick)
- One should be about 5 inches
- The other about 8.5 inches long
- Place the brads in through the center of each circle and the end of the connectors.

See Diagram Below for Placement of BRADS; your model should look something like this:




Model of the Sun, the Earth, and the Moon

- Students may also demonstrate moon phases
  - Note that although the relative sizes of the Earth and the Moon are roughly accurate (about 3:1), the Sun should be much, much larger (the Sun is over 100 times bigger than the Earth).
  - The Earth is over 370 times farther from the Sun than it is from the Moon. If this model were accurate, the Earth and the Sun should be over 90 feet apart (given that the Earth-Moon distance in the model is about 3 inches).

7. Record their ideas on the K, W, C, L chart and have them finish their recording sheets or science journals.

Teacher projects the interactive story from the website below to culminate the activity.
www.beaconlearningcenter.com/WebLessons/AsTheEarthTurns/default.htm

**Unit Name: Physical Science** **Time Frame:** 8 Weeks
**Author: Egg Harbor Township Public Schools - Science Department**

**UNIT**

Subject: **Science** Country: **USA**

Course/Grade: **1st Grade** State/Group: **NJ**

School: **Egg Harbor Township Elementary Schools (Miller, Davenport, Slaybaugh and Swift)**

## UNIT SUMMARY

1. 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.
2. 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.
3. **UNIT RESOURCES: See resources for informational assessments attached in the Common Drive**

**Book Resources:**

| Light | Sound | General Energy |
|---|---|---|
| What Living Things Need: Light | All About Sound by Lisa Trumbauer | "All About Waves" video from the school library |
| Bright Lights and Shadowy Shapes | Sounds All Around by Wendy Pfeffer | "Energy is Everywhere (low)" from Sciencea-z.com |
| My Light by Molly Bang | The Listening Walk by Paul Showers | "Where we Get Energy" from Sciencea-z.com |
| All about light by Monica Hal | Sound and Light<br>By Karen Bryant-Mole | |
| Moonbear's Shadow by Frank Asch | How to See Sound<br>Readworks.org | |
| "Light" from readworks.org | "A Loud Concert"<br>Readworks.org | |

**Internet Resource Links:**

**Great resource for both light & sound:**
**http://www.alvordschools.org/cms/lib8/CA01900929/Centricity/Domain/2616/1st%20Grade%20Teachers%20Guide%20Complete.pdf**

## Light:

**http://www.brainpopjr.com/science/energy/light/grownups.weml**

## Sound:

**http://www.sciencekids.co.nz/projects/stringphone.html**

**http://www.discoveryeducation.com/teachers/free-lesson-plans/the-phenomenon-of-sound-waves.cfm**

**http://pbskids.org/zoom/activities/sci/#sound&txtSearchFor=SOUND%7CSOUNDING%7CSOUNDS%7CSOUNDNESS%7CULTRASOUND%7CSOUNDED%7CULTRASOUNDS**

**Then scroll down to Sound: Listen Up

## STAGE ONE

### GOALS AND STANDARDS

**1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.** [Clarification Statement: 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.]

**1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated.** [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]

**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**. [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).] [Assessment Boundary: Assessment does not include the speed of light.]

**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.*** [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.] [Assessment Boundary: Assessment does not include technological details for how communication devices work.]

### ENDURING UNDERSTANDINGS

- **To develop understanding of the relationship between sound and vibrating materials.**
- **To develop an understanding of the relationship of the availability of light and the ability to see objects.**

- **To understand that light travels from place to place in a straight beam.**
- **A beam of light is affected by placing objects made of different materials in the path of the beam.**

## 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?
- How do instruments (band) make sound?
- How can light or sound be used to communicate over a distance?

## KNOWLEDGE AND SKILLS

**Vocabulary:**

- **Sound – something that you hear**
- **Vibrate – to move back and forth**
- **Illuminate – to light something up**
- **Transparent – clear like glass and lets light through**
- **Translucent – not completely clear but lets some light through**
- **Opaque - not letting light through, or not transparent**

**Students will be able to:**

- Identify man-made versus natural light using picture cards
- Use a flashlight and different materials to see what light can pass through
- 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.
- Students will apply their knowledge of light and sound to solve a simple problem involving communication with light and sound.

## STAGE TWO

## PERFORMANCE TASKS

**Light**

- Task A
  - Identify man-made versus natural light using picture cards
- Task B
  - Complete investigations to see what light can shine through using different materials (materials: flashlights, different materials that are transparent, translucent and opaque)

**Sound**

- Task A
  - Identify that vibrating materials make sound
  - Create an instrument to make sound
- Task B
  - Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance (i.e. cans with a string attached)

**OTHER EVIDENCE**

- Teacher Questions
- Class discussions
- Complete student products

## STAGE THREE

**LEARNING PLAN**

# Light

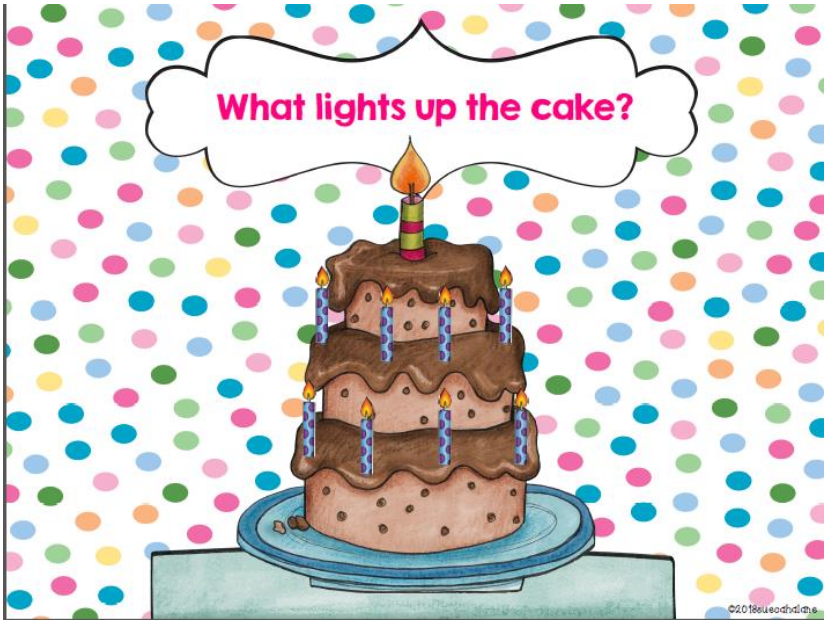
**Part A: How can you prove that you can only see something when someone shines a light on it or if the object gives off its own light? (2 weeks)**

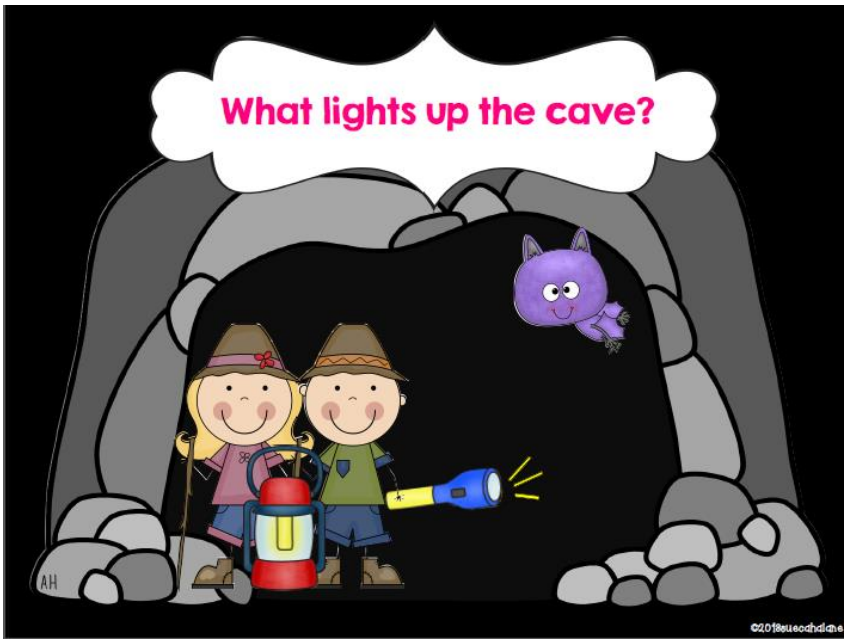
- Concepts:
  - Objects can be seen if light is available to illuminate them or if they give off their own light.
- Lesson Plan:
  - Man-made versus natural light: Show picture cards of man-made and natural light (photo cards attached in Common Drive from "Waves: Light and Sound"). Have the students identify what is causing light in the picture
  - Demonstrate that man-made objects need light to be seen

*Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]* **(1-PS4-2)**


What lights up the day?


What lights up the campsite?


What lights up the cake?


What lights up the cave?



**<u>Part B: 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?</u> (2 weeks)**

- Concepts:
    - 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.

- Lesson Plan:
    - Gather different materials that are transparent, translucent and opaque
        - i.e.: folder, solid colored cup, clear cup, aluminum foil, plastic wrap, water bottle, colored construction paper, white paper, etc.
        - Have students work collaboratively in groups to shine a flashlight through each object to see if light shines though "Yes, No, Some." Have a black piece of paper up to shine against.

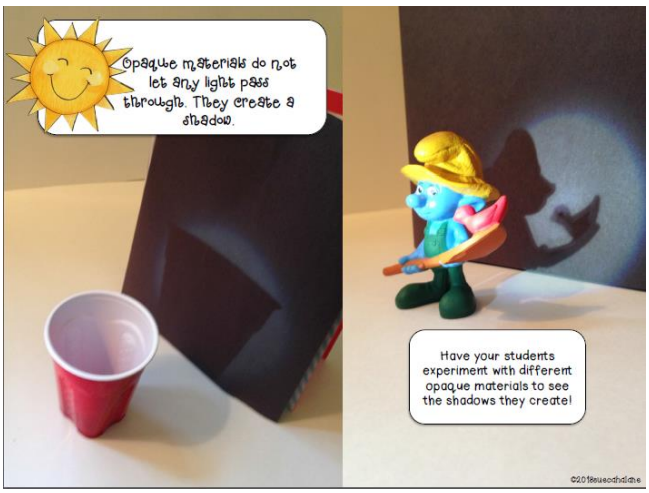
As students observe the interaction between light and various materials, they should notice that when some or all of the light is blocked, a shadow is created beyond the object. If only a portion of light is blocked (translucent materials), a dim shadow will form, and some light will pass through the object. If all the light is blocked (opaque materials), students will see only see a dark shadow beyond the object. They will also observe that shiny materials reflect light, redirecting the beam of light in a different direction. Students should use their observations as evidence to support their explanations of how light interacts with various objects.

Name _____

Experimenting with Light

| | Can light pass through? | | |
|---|---|---|---|
| | yes | some | no |
| plastic wrap | | | |
| foil | | | |
| solid colored cup | | | |
| clear colored cup | | | |
| wax paper | | | |
| white paper | | | |
| acetate | | | |
| clear cup | | | |
| tracing paper | | | |


Transparent materials let nearly all light pass through them.
Tape a piece of black paper onto a school folder, have your students shine the flashlight onto this.


Opaque materials do not let any light pass through. They create a shadow.
Have your students experiment with different opaque materials to see the shadows they create!

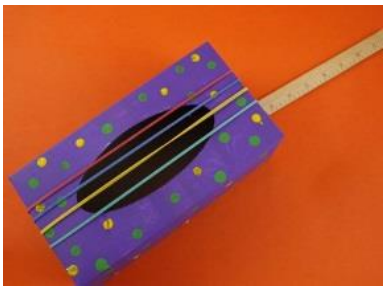

Translucent materials let some light pass through them, but not all.

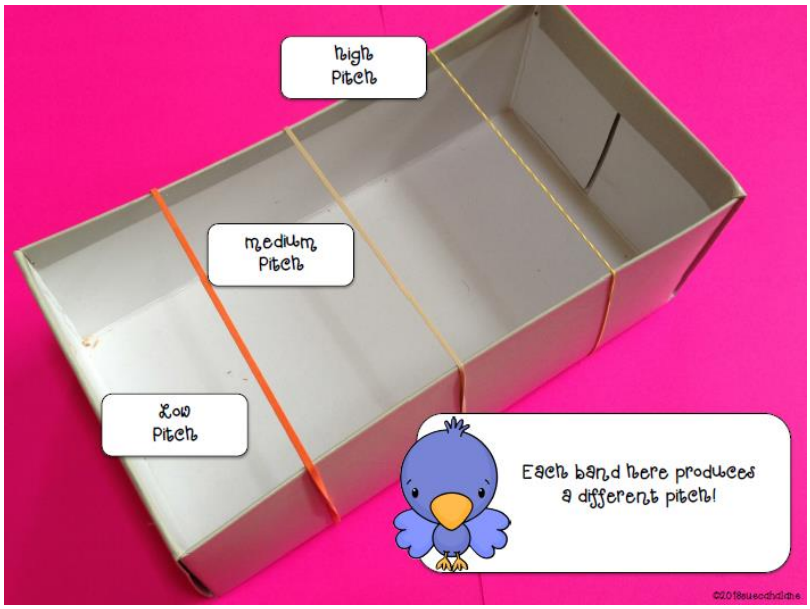
# Sound

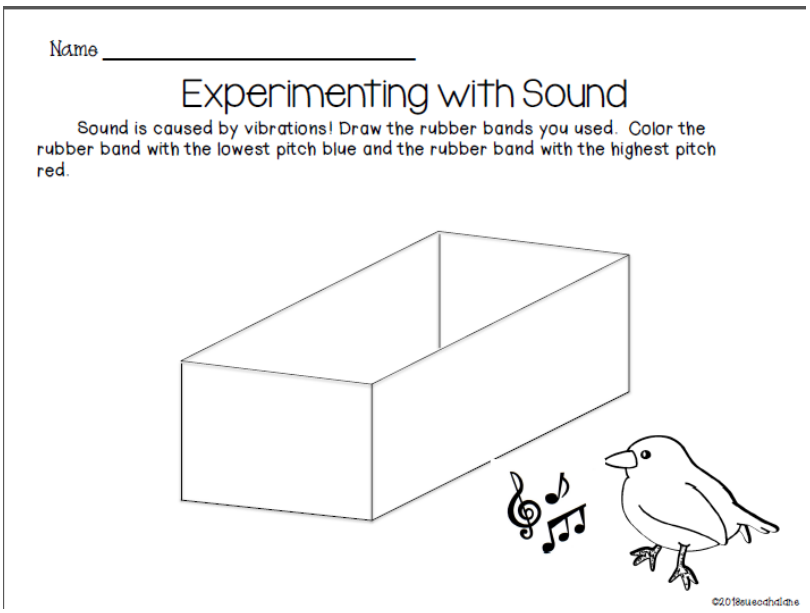
**Part A: How do instruments (band) make sound? (2 weeks)**

- **Concepts:**
  - 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.

- **Lesson Plan**
  - Students can use a variety of objects and materials to observe that vibrating materials can make sound and that sound can make materials vibrate.
  - Gently tapping various sizes of tuning forks on a hard surface.
  - Plucking string or rubber bands stretched across an open box.
  - Cutting and stretching a balloon over an open can to make a drum that can be tapped.
  - Holding the end of a ruler on the edge of a table, leaving the opposite end of the ruler hanging over the edge, and then plucking the hanging end of the ruler.
  - Touching a vibrating tuning fork (Consult with music teacher for a tuning fork) to the surface of water in a bowl.
- Students will create an instrument to show that vibrating materials make sound
  - i.e students can make a drum out of a tissue/shoe box







Name _____

Experimenting with Sound

Sound is caused by vibrations! Draw the rubber bands you used. Color the rubber band with the lowest pitch blue and the rubber band with the highest pitch red.



**<u>Part B: How can light or sound be used to communicate over a distance?</u> (2 weeks)**

- **Concepts:**
  - 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," and a pattern of drum beats.]

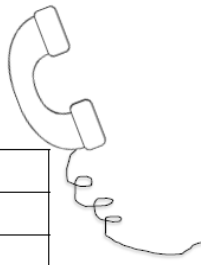
**- Lesson Plan:**

- Students brainstorm a list of 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 whether the device uses light or sound.
- As a class look for examples of devices that use light or sound to communicate over a distance.
- 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.

Example:

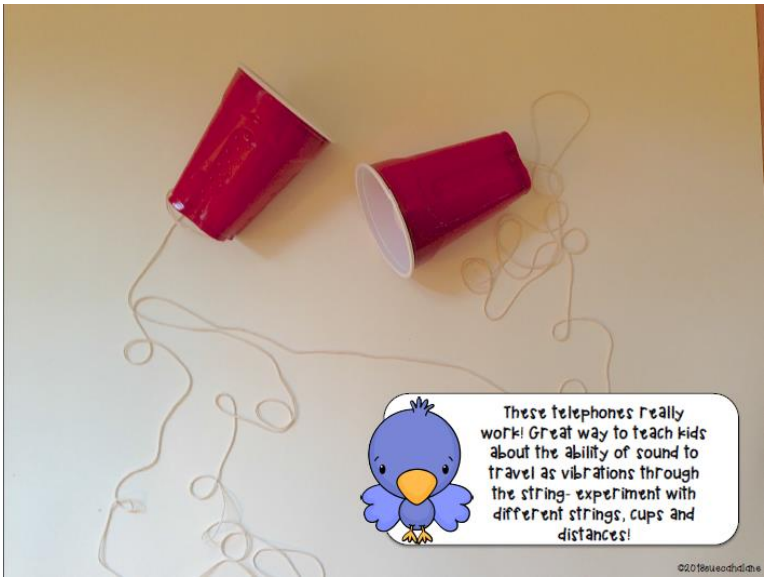
Name _____

Experimenting with Sound



| | Does it work? | |
|---|---|---|
| | yes | no |
| paper cup | | |
| plastic cup | | |
| can | | |
| loose string | | |
| tight string | | |
| short distance | | |
| long distance | | |





**Unit Name: Life Science** **Time Frame: 8 weeks**
**Author: Egg Harbor Township Public Schools - Science Department**

**UNIT**

Subject: **Science** Country: **USA**

Course/Grade: **1st Grade** State/Group: **NJ**

School: **Egg Harbor Township Elementary Schools (Miller, Davenport, Slaybaugh and Swift)**

**UNIT SUMMARY –**

**A. Characteristics of Living Things**

**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.**
**This unit is based on 1-LS3-1 and 1-LS1-2.**

**B. Mimicking Organisms to Solve Problems**

**In this unit of study, students will 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.**

**This unit is based on 1-LS1-1 and K-2-ETS1-2.**

**UNIT RESOURCES**

- **The Happy Dromedary**
- **The Checkerboard Library (series)**
- **Chameleon, Chameleon**
- **The Nature Treasury: A First Look at the Natural Worlds**
- **Plants Grow From Seeds**

- **How Do Seeds Sprout?**
- **See Me Grow**
- **How to Clean a Hippopotamus : a look at unusual animal partnerships by Steve Jenkins**
- **Do Animals Work Together? by Brynie, Faith Hickman**
- **And Tango makes three by Richardson, Justin,**
- **Animal families, animal friends by Woelfle, Gretchen**
- **Animals and their families by Nascimbeni, Barbara**
- **Animal Dads by Sneed Collard**
- **Babies on the Go by Linda Ashman**
- **Bears and their cubs by Tagliaferro, Linda**
- **Dogs and their puppies by Linda Taglieaferro**

**Internet Resource Links:**
**www.brainpopjr.com**
**www.readinga-z.com**
**www.a-zscience.com**
**www.nextgenscience.org**
**www.istem.com**
**www.tc.pbs.org**
**www.moore-stem.wikispaces.com/1st+grade+stem**
**www.scholastic.com/sn1**
**www.sciencenetlinks.com/lessons/animal-adaptations**
**http://www.harmonydc.org/Curriculum/pdf/1sample.pdf**

## STAGE ONE

### GOALS AND STANDARDS

**Students who demonstrate understanding can:**
**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**.* [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include 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; and, detecting intruders by mimicking eyes and ears.]

**1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.** [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]

**1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.** [Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the

same.] [Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]

## ENDURING UNDERSTANDINGS

LS1.A: Structure and Function

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)

LS1.B: Growth and Development of Organisms

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)

LS1.D: Information Processing

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.

LS3.A: Inheritance of Traits

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

LS3.B: Variation of Traits

Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.

## ESSENTIAL QUESTIONS

A. 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?

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

## KNOWLEDGE AND SKILLS

Students will be able to:

A. Observe and compare external features of an organism.

   Identify patterns in what they observe.
   Observe a variety of plants and animals to look for similarities and differences in external features of organisms.
   Recognize that young plants and animals look very much, but not exactly like their parents.

B. Determine patterns in the behaviors of parents and offspring that help offspring survive.

   Observe that different animals and plants use their body parts in different ways.
   Describe how the shape and stability of animal and plant body structures are related to its function.
   Design a device that mimics how external plant or animal parts are used for survival.

Vocabulary:

Offspring – a child, plant or animal in relation to its parent(s)
Parent – a person, plant or animal that produces an offspring
Survive – continue to live
Pattern – a behavior that is repeated
Behavior – an observable activity in a human, plant or animal

Trait – a distinguishing characteristic or quality
Adaptation – special features that allow a plant or animal to live in a particular place or habitat
Habitat – an natural environment of an organism

## STAGE TWO

**PERFORMANCE TASKS**
**Identify and compare young/parent plant and animal features necessary for survival and growth using pictures, diagrams, posters, and Venn diagrams.**
**Create a life cycle product showing plant/animal changes.**
**Create a plant journal to observe and record plant growth and change.**
**Complete diagram comparing young/parent showing features for survival.**
**Use tools and materials to design a solution to a life problem by mimicking how plants/animals use external parts for survival.**
**OTHER EVIDENCE**

- **Teacher questions**
- **Class discussions**
- **Completed student products**

## STAGE THREE

**LEARNING PLAN**

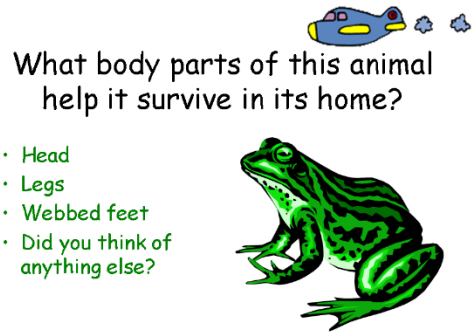
# Characteristics of Living Things

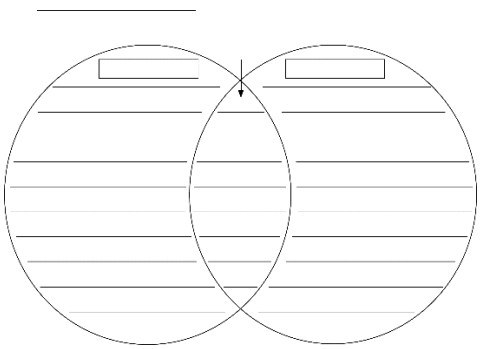
**Part A: How are young plants and animals alike and different from their parents? (2 weeks)**

- **Concept: Young plants and animals have features that change during their life cycle to better support growth and survival.**

- **Lesson Plan:**

  - **Use posters, books, pictures or power points (see attached) to help students identify, discuss and compare plant/animal features used for survival.**
  - **Create Venn diagram (attached) to compare and contrast young and parent features.**
  - **Read and discuss baby animal pdf document (attached) to compare and contrast young/parent features. Emphasis differences and discuss how those changes better support survival of both baby and adult animals.**





Assess: Multiple Choice

Animal Trait Inheritance and Variation
Heredity: Inheritance and Variation of Traits

Name: _____ Date: _____ Group: _____

**1** The cat is the mother of the kitten.

| Adult cat | Kitten |
|---|---|
| No stripes | Stripes |
| Long tail | Short tail |
| Pointy ears | Pointy ears |
| Large body | Small body |

What trait is the same for the cat and the kitten?

**A** The stripes

**B** Long tail

**C** Pointy ears

**D** Small body

Accelerate Learning™  1

Life Science Museum

## Animal Scramble

**Baby to Adult**

**Kindergarten Core: Standard 3 Objective 2**
**Describe how young animals are different from adult animals; observe and imitate the sounds and movements of animals with songs, dances, and storytelling.**

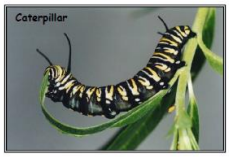
**Objectives:** See differences in ways adult and baby animals move.
**Materials:** Index cards for whole class with pictures of either an animal baby or an animal adult.
**Procedure:**

1. Divide class into half
2. One half of the class gets index cards with an animal baby picture on it; the other half has the matching adult animal on their card.
3. Then, the "animals" all act out their part (caterpillars crawl slowly, and butterflies fly) and try to find their baby or parent.

**Animal Matches to Use:**

- Caterpillar—Butterfly
- Chick—Chicken
- Tadpole—Frog
- Joey—Kangaroo
- Foal—horse
- Maggot—Fly
- Grasshopper nymph—Grasshopper
- Penguin chick—Penguin
- Rhinoceros calf—Rhinoceros
- Chimpanzee baby—Chimpanzee
- Panda Baby—Panda

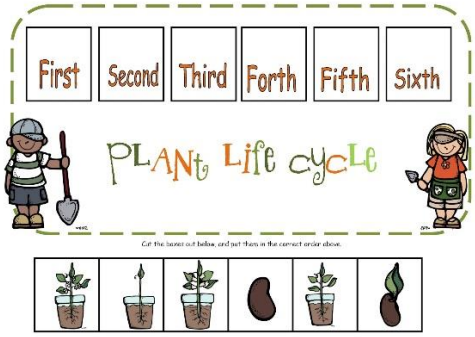
**Pictures to Use:**

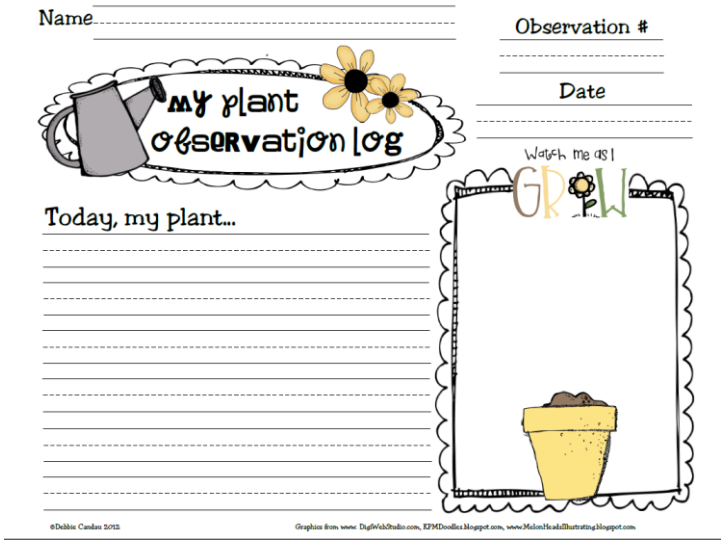



**<u>Part B: What types (patterns) of behavior can be observed among parents that Help offspring survive? (4 weeks)</u>**

- **Concepts: Parent plants and animals (organisms) have features and behaviors that ensure the survival of offspring.**

- **Lesson:**
  - **Display life cycle pictures/posters of an animal such as a butterfly (attached).**
  - **Discuss important features shown that help with survival such as protective coverings, eggs/seeds, body features, etc.**
  - **Create a model of animal life cycle to show features and sequence for its survival.**
  - **Plant seeds in classroom to observe daily/weekly plant changes. Record observations into journal (attached).**

# Mimicking Organisms to Solve Problems

**Part C. How can humans mimic how plants and animals use their external parts to help them survive and grow? ( 2 weeks)**

**Concept:**

- 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).
- 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.

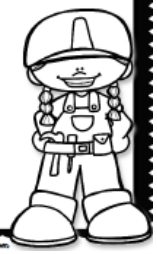
**Lesson Plan:**

**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.*** *[Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include 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; and, detecting intruders by mimicking eyes and ears.]*

1. Read aloud an informational book of your choice to review students' background knowledge about animal survival.
2. Hold a classroom discussion, allowing students to share what they already know about animal survival and what questions they have about how animals use their body coverings to survive and protect themselves.
    a. You may record their ideas on a teacher chart
3. Introduce materials to the class and share the challenge
    a. Challenge: Students will design a body covering for an animal that will protect it as much as possible and allow for optimal potential for survival. Students will use a paper plate to create a "shield" for a stuffed animal that turns into a "super animal," offering protection from enemies and weather. Students can use harder objects to mimic protective shells, toothpicks for "spikes," waterproof materials to keep their animal dry, or insulating materials to keep it warm. They may also color camouflaged patterns on their plates.

# SUPER ANIMAL

| What we KNOW | QUESTIONS we Have |
|---|---|
| | |
| **What we CREATED** | **What we LEARNED** |
| | |





## My super Animal

| Material | How it Protects my Animal |
|---|---|
| | |
| | |
| | |

One thing that was EASY:

_____

_____

One thing that was HARD:

_____

_____

One new thing I LEARNED:

_____

_____





# SUPER ANIMAL

Name:_____

## THE CHALLENGE

Can you create a shield for an animal that protects it and helps it to survive?

## What I Know About ANIMAL SURVIVAL

1 _____

_____

2 _____

_____

**Unit Name: Earth Science** **Time Frame: Trimester 1 (60 days)**
**Author: Egg Harbor Township Public Schools - Science Department**

## UNIT

Subject: **Science** Country: **USA**

Course/Grade: **2nd Grade** State/Group: **NJ**

School: **Egg Harbor Township Elementary Schools (Miller, Davenport, Slaybaugh and Swift)**

### UNIT SUMMARY

The student will investigate and understand the physical changes of the Earth. The student will realize how wind and water changes the shape of the land. While considering factors and forces of weathering and erosion, the student will provide a solution to slow or prevent wind and water from changing the shape of the land.

### UNIT RESOURCES

- See learning plan for resources

**Internet Resource Links:**

- Pebblego.com
(username: egg)
(password: harbor)
- Brainpopjr.com
(username: slaybaugh)
(password: eht)
- Reading A-Z
- Science A-Z
- Science-class.net
- Readworks

## STAGE ONE

### GOALS AND STANDARDS

**2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.*** [Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.]

**2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area.** [Assessment Boundary: Assessment does not include quantitative scaling in models.]

**2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.**

**ENDURING UNDERSTANDINGS**
Students will understand that:
- Wind and water can change the shape of the land quickly or over a slow period of time.
- There are different solutions for preventing wind and water from changing the shape of the land.
- Students can identify and represent the shapes and kinds of land and bodies of water in an area and where water is found on Earth.

**ESSENTIAL QUESTIONS**

- How does wind and water change the shape of the land?
- In what ways, do humans slow or prevent wind or water from changing the shape of the land?
- Where do we find specific kinds of land and bodies of water?

**KNOWLEDGE AND SKILLS**
**Students will know:**
- Water and wind are powerful forces that causes mountains and land forms to shrink away from weathering and erosion

**Students will be able to:**
- Students will be able to demonstrate the prevention of wind and water erosion.

## STAGE TWO

**PERFORMANCE TASKS (End of Unit)**
*** Teacher may assign different project(s) to meet the standards.**
- Create a sand dune or type of landform.
- Build a design to prevent the wind and water from changing the shape of the land.

Link to lesson plan:
http://ehtschoolsstem.weebly.com/uploads/5/4/6/9/54693447/gr._2_erosion_vignette_t1.pdf

**OTHER EVIDENCE**
- Teacher Observations
- Class Discussions

## STAGE THREE

**LEARNING PLAN**
*** The following activities are to be completed over a 6 week period of time.**
**Introduction Ideas:**
1.) Introduce erosion and weathering topic by utilizing a KWL chart or class brainstorm to access student's prior knowledge.
2.) Show a correlating video on Brainpopjr.com.
Options: slow land changes, fast land changes, landforms

3.) Teacher may also read a non-fiction text or watch a video about erosion and weathering to introduce the topic. (All of these resources can be found in your school media center)
Options below:
- Erosion: Changing Earth's Surface by Robin Michal Koontz
- All About Weathering & Erosion DVD
- Earth Science DVD by Rock 'N Learn
- Cracking Up: A Story About Erosion by Jacqui Bailey

4.) Teachers may also utilize Reading A-Z, Science A-Z, or ReadWorks in order to build student's knowledge on weathering and erosion.

**Student Application Ideas:**
*** Teacher may assign different project(s) to meet the standards.**

- Teachers have the option to choose one project for the whole class or do different projects within a station format.
- Teachers do not have to choose these ideas if they have another project that will meet the standards.
- Ideas below:
  **1.) http://science-class.net/archive/science-class/Lessons/Geology/Weathering_Erosion/WandE_1.pdf**
  **2.) http://science-class.net/archive/science-class/Lessons/Geology/Weathering_Erosion/WandE_2.pdf**
  **3.) http://science-class.net/archive/science-class/Lessons/Geology/Weathering_Erosion/WandE_3.pdf**

**Culminating Performance Task (End of Unit):**
*** Teacher may assign different project(s) to meet the standards.**

- Create a sand dune or type of landform.
- Demonstrate weathering and erosion to landform.
- Build a design to prevent the wind and water from changing the shape of the land.
- Students may write an expository writing piece in order to explain the results of their project and the reasons behind it. (Optional)
- Link to lesson plan: http://ehtschoolsstem.weebly.com/uploads/5/4/6/9/54693447/gr._2_erosion_vignette_t1.pdf

**Unit Name: Physical Science** **Time Frame: Trimester 2 (60 days)**
**Author: Egg Harbor Township Public Schools - Science Department**

## UNIT

Subject: **Science** Country: **USA**

Course/Grade: **2nd Grade** State/Group: **NJ**

School: **Egg Harbor Township Elementary Schools (Miller, Davenport, Slaybaugh and Swift)**

### UNIT SUMMARY

In this unit of study, students demonstrate an understanding of observable properties of materials through analysis and classification of different materials.

### UNIT RESOURCES

- See learning plan for resources

### Internet Resource Links:

- Pebblego.com
(username: egg)
(password: harbor)
- Brainpopjr.com
(username: slaybaugh)
(password: eht)
- Reading A-Z
- Science A-Z
- Science-class.net
- Readworks

## STAGE ONE

### GOALS AND STANDARDS

2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]

2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.* [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]

2-PS1-3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]

2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]

## ENDURING UNDERSTANDINGS

Students will understand:

- All materials have different properties such as; strength, flexibility, hardness, texture, and absorbency.
- Materials can be reused and recycled for different purposes.
- Materials can be changed through heating and cooling.

## ESSENTIAL QUESTIONS

– Which materials' properties are the best fit for the design?

- Why do you think these properties worked best?

## KNOWLEDGE AND SKILLS

**Students will know:**

- Students will know which materials have the properties that are best suited for an intended purpose.

**Students will be able to:**

- Students will be able to describe and classify different kinds of materials by their observable properties.
- Students will be able to create a structure that will withstand outside forces using their knowledge of properties of matter.

## STAGE TWO

## PERFORMANCE TASKS (End of Unit)

*** Teacher may assign different project(s) to meet the standards.**

- Teacher will read different versions of "The 3 Little Pigs" to the students with correlating comparing and contrasting activities.
- Students will use the allotted amount of money given to buy supplies for the construction of the 4th Little Pig's house. (optional)
- Work in small groups to create the 4th Little Pig's House that would withstand the wind from the Big Bad Wolf.

Link to lesson plan:
http://ehtschoolsstem.weebly.com/uploads/5/4/6/9/54693447/gr._2_-_pigs_-_t2_vignette.pdf

## OTHER EVIDENCE

- Teacher Observations
- Class Discussions

## STAGE THREE

## LEARNING PLAN

*** The following activities are to be completed over a 6 week period of time.**

**Introduction Ideas:**

1.) In order to prompt student discussion, teacher may build a small house out of playing cards. Teacher will purposely put force on it to make it collapse. Students will then offer ideas as to why it was not able to stand on its own.
2.) Teachers may also use resources such as BrainpopJr. and pebble go to introduce matter.
3.) Teacher may also use Reading A-Z, Science A-Z, and Readworks in order to build student's knowledge of the properties of matter.

4.) Your school's media center also has a wide variety of non-fiction text and videos that can explain the properties of matter.

**Student Application Ideas:**

*** Teacher may assign different project(s) to meet the standards.**

1.) In order to have students practice creating structures out of different materials, teachers may choose any of the following projects:

- Towers (marshmallows, cups, popsicle sticks, straws, etc.)
- Marble Maze (paper, marbles, etc.)
- Bridges (paper, index cards, cardboard, etc.)

2.) Students will search through magazines and newspapers in order to find different solids, liquids, and gases. They will cut out their findings and sort them into the proper category.

3.) Heating and Cooling Project:

- Students will fill glass bottles with water. Make sure the lids are secure once bottle is filled.
- Students will then wrap bottles with several layers of newspaper and place in freezer overnight.
- The next day, the teacher will unwrap each glass bottle in order for the students to observe the changes that occurred with the bottle, which is similar as to what would happen to a rock that is broken apart with water over a long period of time.

**Culminating Performance Task (End of Unit):**

*** Teacher may assign different project(s) to meet the standards.**

- Teacher will read different versions of "The 3 Little Pigs" to the students with correlating comparing and contrasting activities.
- Students will use the allotted amount of money given to buy supplies for the construction of the 4th Little Pig's house. (Optional)
- Work in small groups to create the 4th Little Pig's House that would withstand the wind from the Big Bad Wolf.

Link to lesson plan:
http://ehtschoolsstem.weebly.com/uploads/5/4/6/9/54693447/gr._2_-_pigs_-_t2_vignette.pdf

**Unit Name: Life Science** **Time Frame: Trimester 3 (60 days)**
**Author: Egg Harbor Township Public Schools - Science Department**

## UNIT

Subject: **Science** Country: **USA**

Course/Grade: **2nd grade** State/Group: **NJ**

School: **Egg Harbor Township Elementary Schools (Miller, Davenport, Slaybaugh and Swift)**

### UNIT SUMMARY

In this unit of study, students develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination. Students also compare the diversity of life in different habitats.

### UNIT RESOURCES

- See learning plan for resources

### Internet Resource Links:

- Pebblego.com
(username: egg)
(password: harbor)
- Brainpopjr.com
(username: slaybaugh)
(password: eht)
- Reading A-Z
- Science A-Z
- Science-class.net
- Readworks

## STAGE ONE

### GOALS AND STANDARDS

**2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.** [Assessment Boundary: Assessment is limited to testing one variable at a time.]

**2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.***

**2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats.** [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

### ENDURING UNDERSTANDINGS

- Plants need water and sunlight to grow.
- Animals disperse seeds and/or pollinate plants.
- Plants and animals live in different habitats.

**ESSENTIAL QUESTIONS**

- How do animals and plants depend on each other?
- How do the different habitats affect the life cycles and adaptations of plants and animals?

**KNOWLEDGE AND SKILLS**

Students will know: Plants and animals depend on one another within different habitats.
Students will know: There is diversity of life in different habitats.
Students will be able to: Plan and develop a plant and animal habitat using models.
Students will be able to: Plan and carry out investigations involving plants.
Students will be able to: Describe the roles of people and animals in the pollination process.

## STAGE TWO

**PERFORMANCE TASKS**

*** Teacher may assign different project(s) to meet the standards**

Option #1: Create a plant and animal habitat diorama.
Option #2: Design a 3D poster of a habitat.
Option #3: Oral presentation or PowerPoint to demonstrate plants and animals in a habitat.

**OTHER EVIDENCE**

-Teacher observations
-Class discussions

## STAGE THREE

**LEARNING PLAN**

*** The following activities are to be completed over a 6 week period of time.**

**Introduction Ideas:**

5.) In order to prompt student discussion, the teacher and students will create a web on what plants need and what animals need for survival.
6.) Teachers may also use resources such as BrainpopJr. and Pebble Go to introduce habitats.
7.) Teacher may also use Reading A-Z, Science A-Z, and Readworks in order to build student's knowledge of habitats.
8.) Your school's media center also has a wide variety of non-fiction text and videos that can explain habitats.

**Student Application Ideas:**

*** Teacher may assign different project(s) to meet the standards.**

- Carousel activity: Students will create a web for each different habitat. They will rotate around the room in groups using various books to research each habitat and will add facts to the web. (Another option is to have each group collaborate on one habitat and then present their findings to the class).
- Draw a diagram, with labels, displaying life cycles of different animals (butterflies, frogs, etc.) and their habitats.
-Compare and contrast different habitats using a Venn diagram.
- Hand Pollinator Project:
  - Place students into small groups.
  - The group will build a model pollinator with materials given. (Possible materials could be: toilet paper rolls, pipe cleaners, felt, cotton, etc.)
  - Students will then test their pollinator to see if it was able to transfer "pollen" to the flower.
- Plant Observation Activity:

- Place a seed wrapped with wet paper towels into a plastic bag and then place a plain seed into a plastic bag into the closet.
- Students will make predictions as to what they think will happen to the seed and why.
- Students will observe the changes to the seed in both settings and draw the observations into a class science log as often as you see fit.

**Culminating Performance Task (End of Unit):**
*** Teacher may create different project(s) to meet the standards.**
- Teacher will divide the students into groups and assign each group a habitat.
- Students will then create a habitat diorama using various materials using the research and details learned from the prior activities. (ask parents for classroom donations)
- Students will then present dioramas to the class in order to explain the details of their habitat.
- If possible, display dioramas within the school. Some examples may be the library or the main office area.

*** Instead of a diorama, students may also create a 3D poster, Powerpoint, or any other teacher endorsed project in order to showcase their knowledge of habitats and the plants and animals within them.**

**Unit Name: Earth Science** **Time Frame: 6 weeks**
**Author: Egg Harbor Township Public Schools - Science Department**

## UNIT

Subject: **Science** Country: **USA**

Course/Grade: **3rd Grade** State/Group: **NJ**

School: **Egg Harbor Township Elementary Schools (Davenport, Slaybaugh and Swift)**
**UNIT SUMMARY:** The students will be able to understand the typical weather conditions expected in a particular season and in various regions of the world. These conditions can be recorded and predicted and may help prevent the impact of hazardous weather. Humans can engineer ways to minimize the impact of hazardous weather

**UNIT RESOURCES:**

- Tornadoes! /by Gail Gibbons
- Flash, Changing seasons / Bobbie Kalman & Kelley MacAulay
- Crash, Rumble, and Roll /by Franklyn Mansfield Branley
- What is climate? / by Ellen Lawrence
- Monsoon afternoon / written by Kashmira Sheth ; illustrated by Yoshiko Jaeggi
- Weather / Seymour Simon
- On the same day in March : a tour of the world's weather / Marilyn Singer ; illustrated by Frane Lessacoffrey
- Fearsome forces of nature / Anita Ganeri.
- Wild weather / Anita Ganeri
- Climates of the world : identifying and comparing mean, median, and mode / Barbara Linde

**Internet Resource Links:**
**www.pbskids.org/designsquad**
**http://education.nationalgeographic.com/education/activity/extreme-weather-on-earth/?ar_a=1**
**www.weather.com**
**http:www.nssl.noaa.gov/edu/bm/bm_main.html**
**http://www.sercc.com/education**

## STAGE ONE

### GOALS AND STANDARDS

**3-ESS2-1: Represents data and tables in graphical displays to describe typical weather conditions during a particular season.** [Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth's materials.] [Assessment Boundary: Assessment does not include the identification and naming of minerals.]

**3-ESS2-2: Obtain and combine information to describe climate in different regions of the world.** [Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.]

**3-ESS3-1: Make a claim about the merit of a design solution that reduces the impact of a weather-related hazard.** [Clarification Statement: Examples of data include similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches).] [Assessment Boundary: Paleomagnetic anomalies in oceanic and continental crust are not assessed.]

**3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.**

**3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.**

**3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.**

## ENDURING UNDERSTANDINGS

- **Weather changes depending on the season.**
- **Weather is different in different regions of the world.**
- **Scientists can record weather across different times and areas so that they can make prediction about what kind of weather might happen next.**
- **Earth's processes combine to make weather.**
- **Weather can be hazardous.**
- **Humans cannot eliminate natural hazards, but can take steps to reduce their impacts.**

## ESSENTIAL QUESTIONS

"How does weather impact your everyday life?"

## KNOWLEDGE AND SKILLS

**The Students will know:**

- **Typical weather patterns during each season**
- **The process of observing weather and collecting data**
- **Climates are different depending on the region of the world.**
- **A variety of hazards result from weather processes**
- **Humans can reduce the impact of hazardous weather in a variety of ways**

- **Vocabulary:**
- **Climate-**The general weather conditions of a location.
- **Region-** A large part of the Earth's surface.
- **Season**- A period of the year that is distinguished by special climate conditions and the hours of daylight.
- **Temperature-** The measurement of how hot or cold something is.

- **Precipitation-** Water that falls from clouds in the form of rain, snow, sleet, or hail.
- **Lightning**- A flash of light formed when electricity passes from one cloud to another or between a cloud and the ground.
- **Wind-** Moving air
- **Front-** The line where two air masses meet.
- **Atmosphere-** The mass of air around the earth.
- **Hurricane-** A strong, spinning rainstorm with high winds that starts over the Atlantic or Eastern Pacific ocean.
- **Typhoon-** A strong, spinning rainstorm with high winds that starts in the Western Pacific Ocean.
- **Blizzard-** A severe snowstorm with cold temperatures, high winds, and heavy snow.
- **Thunderstorm-** A storm with thunder, lightning, heavy precipitation, and sometimes hail.
- **Tornado**- A fast-spinning, funnel-shaped column of air that touches the earth's surface.
- **Derecho-**A widespread, long-lived, straight-line windstorm.
- **Flood-** An overflow of water that covers land.
- **Barrier-** A physical structure which blocks something.

## STAGE TWO

**PERFORMANCE TASKS* Record, compare, and present data on weather conditions**

- **Materials: To be selected by teacher**
- **Directions:**

  **Each student will use weather.com (or comparable resource) to examine and compare forecasts for one selected city in the northern hemisphere, and one in the southern hemisphere. Students will create a graph to represent collected data on a weather conditions. For example, temperature, precipitation, or wind direction.**

***Create a structure/barrier as a solution to the hazard of high winds.**

- **Materials:**
  - **Cardboard base (11" x 14" ) one per group**
  - **Straws (for creating wind)**
  - **Assorted construction materials (paper, toothpicks, clay, toilet paper rolls, popsicle sticks, etc.)**
- **Directions:**
  - **Students will work in small groups and design a barrier/structure that will withstand high winds as demonstrated by blowing on the barrier/structure with a wind source (hairdryer, fan). The barrier/structure should not collapse or blow away.**

## STAGE THREE

**LEARNING PLAN**

- **KWL Chart**
- **SPARK ACTIVITY 1: Read <u>Cloudy With a Chance of Meatballs</u>**
- **SPARK ACTIVITY 2: Demonstrate thunder and lightning**
  - **Materials:**
    - **Comb**
    - **Wool cloth**

- **Metal object**
- **Paper lunch bags**
- **Questions:**
    - *What is lightning?*
    - *What is thunder?*
    - *Is there a certain time of year when you see lightning and hear thunder more than other times of the year? When? Why do you think this is?*

**Demonstrate lighting on a small scale by rubbing the comb several times over the wool. Immediately hold the comb up to a metal object and let the students observe the electric discharge. Explain that this spark is similar to the flash seen when electricity passes between the ground and a cloud or from one cloud to another. Let volunteers try reproducing the effect.**

**Now demonstrate thunder by inflating a paper lunch bag, twisting it shut, and then popping it between your hands. Like thunder, this sudden movement of air creates strong vibrations and thus makes a loud sound. Provide volunteers with more bags to make their own thunder.**

**Ask students to discuss in small groups how each demonstration is similar to and different from real lightning and thunder. Challenge students to research more about the science behind these and other weather-related phenomenon. Use this activity to begin a study of weather hazards.**

- **Show video clips demonstrating various types of hazardous weather**

- **Assign small groups of students a hazardous weather condition to research. Conference with students on their progress. They will become the "experts' on this topic and present what they learned with to class. They will create a visual aid to accompany their presentations**

- **Invite a meteorologist to come speak to the students about his/her career and to explain how understanding weather helps students in their daily life.**

- **Concluding activity : Students complete barrier design challenge performance task**

**Unit Name: Forces and Interactions** **Time Frame: 6 weeks**
**Author: Egg Harbor Township Public Schools - Science Department**

**UNIT**

Subject: **Science** Country: **USA**

Course/Grade: **3rd Grade** State/Group: **NJ**

School: **Egg Harbor Township Elementary Schools (Davenport, Slaybaugh and Swift)**

**UNIT SUMMARY:** The students will be able to understand how forces affect our everyday lives. These forces can be observed to predict the pattern of motion and the interaction between two objects.

**UNIT RESOURCES:**

- Forces and motion/Lewis Parker
- Physical Science-Forces of motion and magnets
- Forces and motion/Katie Dicker
- Forces and motion/Lesley Evans Ogden
- Forces and motion: a question and answer book/Catherine A. Welch
- How amusement parks work/Lisa Greathouse
- Motion/Darlene Lauw, Lim Cheng Puay
- Pull it, push it/Buffy Silverman
- Magnet Power/Buffy Silverman
- Stop and go, fast and slow: moving objects in different ways/Buffy Silverman
- The iciest, diciest, scariest sled ride ever!/Rebecca Rule
- Walking is wild, weird, and wacky/Karen Kerber
- Amazing forces and movement/Sally Hewitt
- Electricity and magnetism /Dana Meachen Rau
- Investing magnetism/Sally Walker
- What makes a magnet?/Franklyn M. Branley
- Magnet power! Science adventures with MAG-300 the origami robot/Thomas Kingsley Troup
- Looking at forces and motion: how do things move?/Angela Royston

**Internet Resource Links:**

**http://betterlesson.com/next_gen_science/browse/2109/ngss-3-ps-physical-sciences?from=megamenu_domain**

**http://neok12.com**

**http://www.bbc.co.uk/schools/scienceclips/ages/5_6/pushes_pulls.shtml**

http://www.first4magnets.com/fun-magnet-facts-for-kids-i77

http://teachingchannel.orgtp://

http://www.sciencekids.co.nz/gamesactivities/forcesinaction.html

http://www.physics4kids.com/files/motion_intro.html

http://science.k12flash.com/forceandmotion/

http://pbs.org/teachers/sid/activities/forceandmotion/

http://scienceforkids.kidipede.com/physics/electricity/magnet.htm

http://brainpopjr.com

## STAGE ONE

### GOALS AND STANDARDS

**3-PS2-1: Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.** [Clarification Statement: Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all.] [*Assessment Boundary: Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.*]

**3-PS2-2: Make observations and /or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.** Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.] [*Assessment Boundary: Assessment does not include technical terms such as period and frequency.*]

**3-PS2-3: Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.** [Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.] [*Assessment Boundary: Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.*]

**3-PS2-4: Define a simple design problem that can be solved by applying scientific ideas about magnets.** [Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.]

**ENDURING UNDERSTANDINGS**

*Students will understand…*

- **Unbalanced and balanced forces impact the motion of an object.**
- **A pattern of a motion can be observed and used to predict future motion.**
- **The cause and effect relationships of electric or magnetic interaction between two objects that not in contact with each other.**

**ESSENTIAL QUESTIONS**

"How do forces affect our everyday lives?"

**KNOWLEDGE AND SKILLS**

**The Students will know:**

- **A force can change the motion of an object.**
- **Forces work in pairs.**
- **There are different kinds of forces.**
- **Magnetism is a force that may attract or repel certain materials.**

**SUGGESTED VOCABULARY:**

**Attract-to pull something closer**
**Force- a push or a pull**
**Magnet- a piece of metal that attracts other pieces of metal**
**Magnetism-a force that pushes or pulls certain metals**
**Metal-a material, usually hard and shiny, that lets electricity and heat move through it**
**Poles-two opposite parts of something, such as the two ends of a magnet**
**Repel-to push something away**
**Pull-to use force to move something closer**
**Push-to use force to move something away**
**Barrier- a fence or other obstacle that prevents movement or access.**

## STAGE TWO

**PERFORMANCE TASKS***

**Task 1: "Paper Cup Challenge"**

**Provide students with a paper cup and markers/pencils. Students must devise a way to get the paper cup to hold the pencils without tipping over. The cup may not be taped to the desk.**

**Materials**

**Flimsy paper cup**
**Pencils/markers**
**Cardboard or Cardstock**
**String**
**Popsicle Sticks**
**Tape**
**Straws**

**Students will follow the engineering design process to solve the problem.**

**Task 2**: **"The Marble Challenge"**
**Students will determine what effect force has on an object's motion.**

**Materials**:
**6 Marbles**
**Pencil**
**12x18" sheet of construction paper**
**Measuring tape**

**Task Challenge Supporting Documents:**
**http://www.cape.k12.mo.us/blanchard/hicks/news%20pages/scienceforce.htm**

## STAGE THREE

**LEARNING PLAN**

- **KWL Chart**
- **Spark Activity**
  **The spark is designed to get students thinking about the unit's topics and to generate curiosity and discussion.**
  - **Materials:**
    - **Small magnet**
    - **File folder (to work as thin cardboard)**
    - **An assortment of magnetic and nonmagnetic items**
  - **Activity:**
  - **Begin with a magic demonstration. Hold a magnet behind a piece of thin cardboard so students can't see that a magnet is there. Make a paper clip cling to the side of the cardboard opposite the magnet and in view of the students. Show everyone the paperclip doesn't fall off, even if you shake the cardboard.**
  - **Ask students what is holding the paperclip in place**
  - **Explain that the magnet is holding the paperclip in place. Explain that magnets can hold onto certain things, even through a sheet of cardboard.**
  - **Allow pairs/groups of students to try the magic themselves.**
    - **Questions:**
    - *What makes the paper clip stick to the magnet, even through the cardboard?*
    - *What happened when you tried moving one magnet with another magnet?*
    - *How was it different from trying to move the paperclip?*
    - *Which other object was most attracted to the magnet?*
    - *Why didn't some of the objects stick to the magnet?*
- **Suggested Videos**

  *Bill Nye - Motion*
  https://www.schooltube.com/video/

  *PBS Learning – Force and Motion*
  http://www.pbslearningmedia.org

  *PBS Learning – The Magic of Magnets*
  http://www.pbslearningmedia.org

*BrainPop (forces and motion/magnets)*
https://jr.brainpop.com/science

- **Complete Performance Task "The Cup Challenge"**
- **Complete Performance Task "The Marble Challenge"**

**Unit Name: Life Science** **Time Frame: 6 weeks**
**Author: Egg Harbor Township Public Schools - Science Department**

**UNIT**

Subject: **Science** Country: **USA**

Course/Grade: **3rd Grade** State/Group: **NJ**

School: **Egg Harbor Township Elementary Schools (Davenport, Slaybaugh and Swift)**

## UNIT SUMMARY:

The students will be able to understand how organisms have unique and diverse life cycles. Characteristics of organisms are either inherited from parents or a result of the environment. Sometimes differences in characteristics provide advantages in which some survive and some cannot.
The students will be able to understand how organisms adapt to changes in the environment and interact within a group.
The students will be able to understand how populations live in a variety of habitats and how changes in those habitats affect all organisms living there.
The students will be able to learn how the study of fossils provides understanding and insight into environmental changes that have occurred.

## UNIT RESOURCES:

- Are you living? By Laura Salas
- What's Alive by Kathleen Weirder Zoefeld
- Is it Living or Nonliving by Rebecca Rissman
- When Rain Falls by Melissa Stewart
- The Tree in the Ancient Forest by Carol Reed-Jones
- When We go Camping by Margriet Ruurs
- Good Night Owl by Pat Hutchins
- Living and Nonliving by Carol Lindeen
- The Tiny Seed by Eric Carle
- What do you do with a Tail Like This? By Steven Jenkins and Robyn Page
- Animals Grow New Parts by Elaine Pascoe and Dwight Kuhn
- Living and Nonliving by Angela Rotation
- Why Living things need Light by Daniel Nunn
- Why Living Things Need Food by Daniel Nunn
- Why Living Things Need Water by Daniel Nunn

## Internet Resource Links:

- http://www.mbgnet.com overview of habitats
- http://www.dnr.state.wi.us/org/caer/ce/eek/nature/wetland1.htm, wetland animals and plants.
- http://wwwrus.lkwash.wednet.edu/users/Wetlands/inhab.html, wetland plants
- http://desertusa.com/animal.html description of desert animals
- http://www.amnh.org/ology/features/layersoftime/ layers of time game- fossils

- https://www.ixl.com/science/grade-3/compare-fossils-to-modern-organisms- comparing fossils to modern organisms

## STAGE ONE

### GOALS AND STANDARDS

**3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.** [Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.]

**3-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**. [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.]

**3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment**. [Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight.]

**3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.** [Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]

**3-LS2-1. Construct an argument that some animals form groups that help members survive.**

**3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.** [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]

**3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.** [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]

**3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago**. [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms.

Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages

**ENDURING UNDERSTANDINGS**

*Students will understand that…*

- *Organisms go through changes during their life.*
- *Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings.*
- *Traits can be influenced by the environment.*
- *Differences in characteristics provide advantages in surviving among individuals of the same species.*
- *Changes in the environment will determine how organisms adapt.*
- *Social interactions and group behavior can help animals survive.*
- *When the environment changes, organisms may survive, adapt, migrate, or die.*

**ESSENTIAL QUESTIONS**

*How do changes in the environment affect living things?*

**KNOWLEDGE AND SKILLS**

**The Students will know:**

- *When the environment changes organisms may survive, adapt, migrate or die.*
- *How animals adapt to different environments*
- *How traits can reflect environments in which living things live*
- *All life cycles contain four stages: birth, growth, reproduction, and death*
- *How to predict where unfamiliar animals live based on observations*
- *Differences in characteristics provide advantages in surviving among individuals of the same species*
- *How to design a habitat suitable for a specified environment or animal characteristics*

**SUGGESTED VOCABULARY:**

**Birth- the start of life**
**Growth-the process of developing**
**Reproduction- the production of offspring or physically maturity**
**Adapt- adapt or conform oneself to new or different conditions**
**Death-The end of a life cycle.**
**Inherited Trait – any characteristic that is passed from one generation to the next.**
**Learned Trait – behaviors that result from the influence of one's environment.**
**Solitude-The act of living or being alone.**

**Herd- The act of living with others. Depending on the animal, it can be called families, colonies, troops, swarms, and many other names.**

**Fossils- Preserved traces of animals, plants, and other organisms from the past.**

**Pollinate-To deposit pollen on a plant to allow the plant to spread its seeds.**

**Climate-The typical weather conditions of a given region.**

**Habitat- the natural home or environment of an animal, plant, or other organism.**

**Predator-An animal that preys on other animals for food.**
**Prey-An animal that is hunted or killed for food.**

**Global warming-The gradual increase in the temperature of the Earth's atmosphere.**

**Deforestation-The act of clearing an area from trees.**

**Desert- A very dry habitat defined as having less than 10 inches of rainfall each year.**

**Tundra- Usually found in the extreme north and experiences harsh winters and cool summers.**

**Deciduous forest- An area with dense growth of trees that lose their leaves each year.**

**Grassland-A habitat where the land is dominated by grass.**

**Tropical rain forest- A habitat usually located near the equator that experiences high temperatures and high rainfall.**

**Land cave- A habitat characterized by dark, often cooler temperatures.**

**Freshwater marsh- A habitat that is located near freshwater lakes or rivers.**

**Coral reef- Warm, clear, shallow ocean habitats that are usually rich with wildlife.**

**Temperate ponds- A habitat offering both land and water with mild temperatures that is usually teeming with wildlife.**

## STAGE TWO

**PERFORMANCE TASKS***
Design an enclosure to support the life of an animal from an alien planet.
Directions: Using a cardboard box, design an enclosure to keep the animal alive and to allow them to thrive.
**See supporting document- STEM, Trimester 3, Vignette- Constraints may be adapted as needed*
Materials:

- Cardboard box
- Toilet paper/paper towel rolls
- Bowls
- Soil
- Tape
- Glue
- Construction Paper
- Pipe cleaners
- Clothespins
- Popsicle sticks

- Leaves
- Water

## STAGE THREE

**LEARNING PLAN**

- **KWL Chart**
- **Animal observation- Introduction to physical traits. Provide students with stuffed animals or pictures of animals. Students will then act as scientists and record their observations of the observable traits. For example, fur, wings, claws etc. Students will then make inferences about the habitats in which the animals live based on the traits.**
- **Animal Webquest: The resource below poses questions about animal adaptations with links for student to follow to find the answer through images or short reading passages**

  **http://wsfcs.k12.nc.us/cms/lib/NC01001395/Centricity/Domain/7897/ADAPTATIONS%20NATURAL%20SELECTION%20WEBQUEST%20v3.pdf**

  **http://questgarden.com/84/51/4/090705185956/SPARK**

- **Show video clips of animals to inspire/assist students in the selection of an animal for a research activity. Animal adaptation clips can be found via edpuzzle.com**
- **Conduct research on traits and habitat of a selected animal. Teacher determines final product to be presented to class**
- **Teacher selects animal to examine the lifecycle of- Monarchs, painted ladies, frogs, ladybugs etc. This can be done via literature, video footage and/or live animal habitat within the classroom.**
- **Performance Task**

# Curriculum Resources - Differentiated Instruction

## Special Education Interventions in General Education

Visual Supports
Extended time to complete tests and assignments
Graphic Organizers
Mnemonic tricks to improve memory
Study guides
Use agenda book for assignments
Provide a posted daily schedule
Use of classroom behavior management system
Use prompts and model directions
Use task analysis to break down activities and lessons into each individual step needed to complete the task
Use concrete examples to teach concepts
Have student repeat/rephrase written directions
Heterogeneous grouping

*Resources:*

Do to Learn:
http://www.do2learn.com/

Sen Teacher:
http://www.senteacher.org/

Intervention Central:
http://www.interventioncentral.org/

Learning Ally:
https://www.learningally.org/

**English Language Learners Interventions in Regular Education**
*Resources:*

FABRIC - Learning Paradigm for ELLs (NJDOE)
www.nj.gov/education/bilingual/pd/**fabric/fabric**.pdf

Guide to Teaching ELL Students
http://www.colorincolorado.org/new-teaching-ells

Edutopia - Supporting English Language Learners
https://www.edutopia.org/blog/strategies-and-resources-supporting-ell-todd-finley

Reading Rockets
http://www.readingrockets.org/reading-topics/english-language-learners

**Gifted and Talented Interventions in Regular Education**
*Resources:*

Who are Gifted and Talented Students

http://www.npr.org/sections/ed/2015/09/28/443193523/who-are-the-gifted-and-talented-and-what-do-they-need

Hoagies Gifted Education Page
http://www.hoagiesgifted.org/programs.htm

**21st Century Learning**
*Resources:*

Partnership for 21st Century Learning
http://www.p21.org/

Career Ready Practices (NJDOE)
http://www.nj.gov/education/cte/hl/CRP.pdf