Kindergarten

Science Curriculum

Francis Howell School District

HOME SCHOOL COMMUNITY

LEARNING TOGETHER

Board Approved:

July 19, 2018

Francis Howell School District

Mission Statement

The mission of the Francis Howell School District is to prepare students today for success tomorrow.

Vision Statement

Every student will graduate with college and career readiness skills.

Values

Francis Howell School District is committed to:

- Providing a consistent and comprehensive education that fosters high levels of academic achievement
- Operating safe and well-maintained facilities
- Providing a safe learning environment for all students
- Promoting parent, community, student, and business involvement in support of the school district
- Ensuring fiscal responsibility
- Developing responsible citizens
- Operating as a professional learning community
- Making appropriate use of technology

Francis Howell School District Graduate Goals

Upon completion of their academic study in the Francis Howell School District, students will be able to:

1. Gather, analyze and apply information and ideas.
2. Communicate effectively within and beyond the classroom.
3. Recognize and solve problems.
4. Make decisions and act as responsible members of society.

Science Graduate Goals

Upon completion of their Science study in the Francis Howell School District, students will be able to:

- Use Scientific and Engineering Practices to understand how scientific knowledge develops and the work of engineers, as well as the links between engineering and science. These practices include:
    - Asking questions (for science) and defining problems (for engineering)
    - Developing and using models
    - Planning and carrying out investigations
    - Analyzing and interpreting data
    - Using mathematics and computational thinking
    - Constructing explanations (for science) and designing solutions (for engineering)
    - Engaging in argument from evidence
    - Obtaining, evaluating, and communicating information
- Develop an understanding of, and be able to explain, concepts that bridge disciplinary boundaries, including:
    - Patterns
    - Cause and effect: Mechanism and explanation
    - Scale, proportion, and quantity
    - Systems and system models
    - Energy and matter: Flows, cycles, and conservation
    - Structure and function
    - Stability and change
- Use scientific knowledge to understand the world in four major domains:
    - Physical sciences (Matter and its interactions, Motion and Stability, Energy, Waves and Their Applications)
    - Life sciences (From Molecules to Organisms, Ecosystems, Heredity, Biological Evolution)
    - Earth and space sciences (Earth's Place in the Universe, Earth's Systems, Earth and Human Activity)
    - Engineering, technology, and the applications of science (Engineering Design, Links among Engineering, Technology, Science, and Society)

Rationale for Elementary Science

Science, engineering, and technology permeate nearly every facet of modern life, and they also hold the key to meeting many of humanity's most pressing current and future challenges. The overarching goal of science education is to ensure that all students have some appreciation of the beauty and wonder of science; possess sufficient knowledge of science and engineering to engage in public discussions on related issues; are careful consumers of scientific and technological information related to their everyday lives; are able to continue to learn about science outside of school; and have the skills to enter careers of their choice, including (but not limited to) careers in science, engineering, and technology. Elementary Science in Francis Howell School District will develop student understandings and skills which are necessary for them to function productively as problem-solvers in a scientific and technological world, cultivate students' scientific and engineering habits of mind, develop their capability to engage in scientific and engineering practices, and teach them how to reason in the contexts of science, engineering, and technology.

Kindergarten Science Course Description

Kindergarten Science is designed as an introduction to Life Science, Physical Science, Earth and Space Science, and Engineering. This course serves as the foundation for establishing basic scientific concepts to be built upon in future grades. Students will explore patterns and variations in local weather and the purpose of weather forecasting to prepare for, and respond to, severe weather. They will be able to 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. Students will also develop an understanding of what plants and animals (including humans) need to survive and the relationship between their needs and where they live. The crosscutting concepts of patterns; cause and effect; systems and system models; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In kindergarten, students are expected to demonstrate grade-appropriate proficiency in asking questions, developing and using models, planning and carrying out investigations, analyzing and interpreting data, designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

K-3 Science Curriculum Team

Curriculum Committee

Sara Abney	Central Elementary
Melissa Barth	Harvest Ridge
Becky Bee	Fairmount
Brittany Booth	Fairmount
Samantha Calise-Moody	Daniel Boone
Teresa Gilstrap	Becky-David
Robyn Heimburger	Castlio
Melissa Kirchoff	Fairmount
Christie Kolath	Becky-David
Katie Lenz	Daniel Boone
Rebecca Lewis	Harvest Ridge
Kim Ostertag	Independence
Rainah Pray	Becky-David
Kelly Peterson	Central Elementary
Angela Regan	Harvest Ridge
Karen Ruzicka	Warren
Arica Vester	Warren
Rebecca Weaver	John Weldon
Rachael Wilcox	Independence
Kayla Willbrand	Central Elementary

Academics and Administration

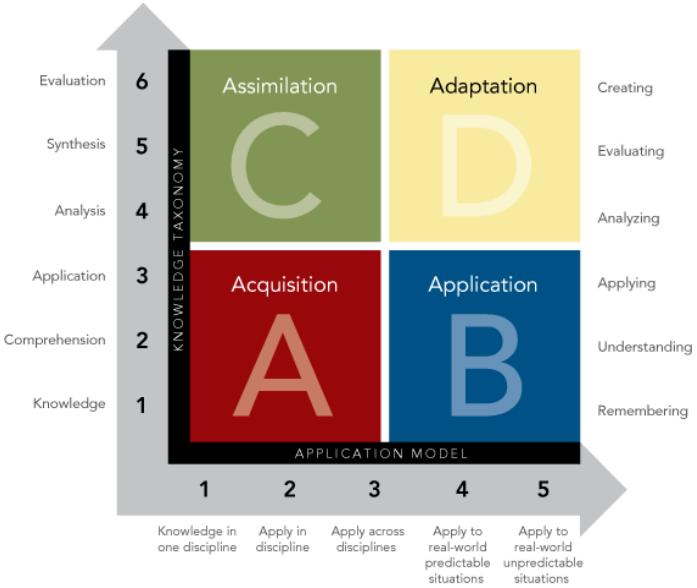
Science & Math Content Leader	Dr. Sherri Lorton
ELA, Social Studies, & Health Content Leader	Carrie Hepburn
Director of Student Learning	Dr. Chris Greiner
Chief Academic Officer	Nicole Whitesell
Superintendent	Dr. Mary Hendricks-Harris

Curriculum Notes

All FHSD performance tasks and sample learning activities are aligned not only to understandings and standards, but also the Rigor and Relevance Framework and 21st Century Skills. Information on these two things is provided below or by clicking on the hyperlinks.

Rigor and Relevance Framework

The Rigor/Relevance Framework is a tool developed by the International Center to examine curriculum, instruction, and assessment along the two dimensions of higher standards and student achievement.



The Rigor/Relevance Framework has four quadrants.
Quadrant A represents simple recall and basic understanding of knowledge for its own sake. Examples of Quadrant A knowledge are knowing that the world is round and that Shakespeare wrote Hamlet.

Quadrant C represents more complex thinking but still knowledge for its own sake. Quadrant C embraces higher levels of knowledge, such as knowing how the U.S. political system works and analyzing the benefits and challenges of the cultural diversity of this nation versus other nations.

Quadrants B and D represent action or high degrees of application. Quadrant B would include knowing how to use math skills to make purchases and count change. The ability to access information in wide-area network systems and the ability to gather knowledge from a variety of sources to solve a complex problem in the workplace are types of Quadrant D knowledge.

A	B	C	D
Students gather and store bits of knowledge and information. Students are primarily expected to remember or understand this knowledge.	Students use acquired knowledge to solve problems, design solutions, and complete work. The highest level of application is to apply knowledge to new and unpredictable situations.	Students extend and refine their acquired knowledge to be able to use that knowledge automatically and routinely to analyze and solve problems and create solutions.	Students have the competence to think in complex ways.

21st Century Skills

These skills have been pared down from 18 skills to what are now called the 4Cs. The components include critical thinking, communication, collaboration, and creativity. Critical thinking is focused, careful analysis of something to better understand and includes skills such as arguing, classifying, comparing, and problem solving. Communication is the process of transferring a thought from one mind to others and receiving thoughts back and includes skills such as choosing a medium (and/or technology tool), speaking, listening, reading, writing, evaluating messages. Collaboration is working together with others to achieve a common goal and includes skills such as delegating, goal setting, resolving conflicts, team building, decision-making, and managing time. Creativity is expansive, open-ended invention and discovery of possibilities and includes skills such as brainstorming, creating, designing, imagining, improvising, and problem-solving.

Standards

Standards aligned to this course can be found:

Science Standards

http://www.nextgenscience.org/overview-topics

https://dese.mo.gov/sites/default/files/curr-mls-standards-sci-k-5-sboe-2016.pdf

Units & Standards Overview

Quarter 1 **Quarter 2** **Quarter 3** **Quarter 4**

Unit 1: Here Comes the Sun	Unit 2: Move It: Pushes and Pulls	Unit 3: We Are All in This Together
NGSS K-PS3-1/MO K.PS3.A.1 NGSS K-PS3-2/MO K.PS3.B.1 NGSS K-ESS2-1/MO K.ESS2.D.1 NGSS K-ESS3-2 CCC1 CCC2 SEP1 SEP2 SEP3 SEP4 SEP6 SEP8	NGSS K-PS2-1/MO K.PS2.A.1 NGSS K-PS2-2 NGSS K-ETS1-A CCC2 SEP1 SEP2 SEP3 SEP4	NGSS K-LS1-1/MO K.LS1.C.1 NGSS K-ESS2-2/MO K.ESS2.E.1 NGSS K-ESS3-1/MO K.ESS3.A.1 NGSS K-ESS3-3/MO K.ESS3.B.1 CCC1 CCC2 CCC4 SEP1 SEP2 SEP4 SEP7 SEP8

Course Map

	Unit Description	PE Standards
Unit 1: Here Comes the Sun 4 Weeks (2nd Q)	Students will develop an understanding of patterns and variations in local weather and the purpose of weather forecasting to prepare for, and respond to, severe weather. Students will formulate answers to questions, such as "What is the weather like today and how is it different from yesterday?"	**K-ESS2-1** **CCC1** (patterns) **SEP2** (develop and use models)
Unit 2: Move It: Pushes and Pulls 3-4 Weeks (3rd Q)	Students will make inquiries about the cause and effect of how objects react when pushed or pulled through the use of a phenomena (observable event), such as: marble runs, foosball, or race car tracks. Students will investigate and answer questions about "What happens when you push or pull an object?"	**K-PS2-1** **CCC2** (cause and effect) **SEP3** (investigations)
Unit 3: We are All in This Together 4 Weeks (4th Q)	Students will develop an understanding of what plants and animals (including humans) need to survive and the relationship between their needs and their environment. Students will formulate answers to questions such as, "Where do animals live and why do they live there?"	**K-LS1-1** **CCC1** (patterns) **SEP4**

		(analyzing & interpreting data)

Unit 1: Here Comes the Sun!

Content Area: Science	Course: Kindergarten	UNIT: Here Comes the Sun!

Unit Description:	Unit Timeline: 4 weeks
This unit begins with students learning about being a scientist and what a scientist does. Students will develop an understanding of patterns and variations in local weather and the purpose of weather forecasting to prepare for, and respond to, severe weather. Students will formulate answers to questions, such as "What is the weather like today and how is it different from yesterday?" **Here Comes the Sun Anchor Chart**	

DESIRED Results

Transfer Goal - ***Students will be able to independently use their learning to……***

1. **Ask questions and define problems:** Ask questions based on observations to find more information about the designed world.
2. **Develop and Use Models:** Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s).
3. **Plan and Carry Out Investigations:** Make observations (firsthand or from media) to collect data that can be used to make comparisons.
4. **Analyze and Interpret Data:** Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.
6. **Construct Explanations and Design Solutions:** Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem.
8. **Obtain, Evaluate, and Communicate Information:** Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world.

Understandings – *Students will understand that… (Big Ideas)*

1. (Patterns) Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.
2. (Cause and Effect) Events have causes that generate observable patterns
8. Scientists study the natural and material world.

<u>Essential Questions</u>: *Students will keep considering…*

Patterns

1. What patterns do I observe?
2. How do these patterns compare to other patterns?
3. What might cause these patterns?
4. What further investigations would help clarify these patterns and their cause?

Cause and effect:

1. What relationships between events or patterns do I observe in this phenomenon or system?
2. What can I explain about these relationships?
3. Are any of these relationships cause and effect? Explain.
4. What further investigations would help determine if these relationships are cause and effect?

STANDARDS ADDRESSED		
Students who demonstrate understanding can: K-PS3-1/MO K.PS3.A.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/MO K.PS3.B.1. 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-ESS2-1/MO K.ESS2.D.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-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather. [Clarification Statement: Emphasis is on local forms of severe weather.]		
Disciplinary Core Ideas **Students will know...**	**Cross Cutting Concepts** **Students will understand…**	**Science and Engineering Practice** **Students will be able to...**
The Nature of Science in the Next Generation Science Standards - NGSS-Appendix H ● Science addresses questions about the natural and material world. (K-2: Scientists study the natural and material world.)		SEP1: Asking Questions and Defining Problems ● Ask questions based on observations to find more information about the natural and/or designed world(s).
PS3.B: Conservation of Energy and	**CCC2: Cause and Effect**	**SEP 2: Developing and Using Models**

Energy Transfer Sunlight warms Earth's surface. (K-PS3-1)	● Events have causes that generate observable patterns. (K-PS3-1)	Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ● Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s). **SEP 3: Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. ● Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1)
PS3.B: Conservation of Energy and Energy Transfer Sunlight warms Earth's surface. (K-PS3-2)	**CCC2: Cause and Effect** ● Events have causes that generate observable patterns. (K-PS3-2)	SEP 6: Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. ● Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2)
ESS2.D: Weather and Climate Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to	**CCC1: Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)	**SEP 2: Developing and Using Models** Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or

describe and record the weather and to notice patterns over time. (K-ESS2-1)		storyboard) that represent concrete events or design solutions. ● Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s). **SEP 4: Analyzing and Interpreting Data** Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1)
ESS3.B: Natural Hazards Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events. (K-ESS3-2) ETS1.A: Defining and Delimiting an Engineering Problem Asking questions, making observations, and gathering information are helpful in thinking about problems. (secondary to K-ESS3-2)	**CCC2: Cause and Effect** ● Events have causes that generate observable patterns. (K-ESS3-2)	**SEP 2: Developing and Using Models** Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ● Develop a simple model based on evidence to represent a proposed object or tool. ● Compare models to identify common features and differences. SEP1: Asking Questions and Defining Problems Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested. ● Ask questions based on observations to find more information about the designed world. (K-ESS3-2) SEP8: Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating

		information in K–2 builds on prior experiences and uses observations and texts to communicate new information. ● Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2)

Unit 1 (Here Comes the Sun): Assessment

EVIDENCE of LEARNING			
Understanding 1	Standards **K-ESS2-1** **CCC1** (patterns) **SEP2** (develop and use models)	**Unit Performance Assessment**: Unit 1 Assessment document **Scoring Guide:** Unit 1 Assessment document	**R/R Quadrant 21 Century** C 4C- critical thinking collaboration communication

Unit 1 (Here Comes the Sun): Sample Activities

SAMPLE LEARNING PLAN
Pre-assessment: (given prior to first lesson) Present this prompt to the whole class: *What are different types of weather?* *Have students independently represent their thoughts with drawings, words, or actions.*
Anchoring Phenomena for this unit: (for kindergarten do this after lesson 1 on being a scientist) Investigate the effects of the sun on the temperature out on the playground. 1. Create wonder with students as to how the sun affects the temperature of the earth 2. Show Snowman Video

3. Have students independently draw about what they think is making the snowman melt
4. Students then discuss with a partner their idea and make changes to their idea based on the discussion.
5. Give students an ice cube and take them outside. Have students find a place to put their ice cube to see how long it takes to melt.
6. Have students develop different scenarios as to why some ice cubes melt faster than others.

This curriculum is based on the Next Generation Science Standards. For clarification on the standards, please visit the wonder of science website. Go to the standards tab to find your grade level and unit. After clicking on the unit, you will see a list of standards students should learn that you can click. After clicking on the standard then the evidence link, you will find a clarification statement as well as the practices you should take the standard through. Also included are observable features of student performance by the end of the grade that will help indicate whether or not the student has met the standard.

This document outlines how to take one of the content objectives from each unit through a specific inquiry process using the 3-dimensional learning outlined in our standards and gives sample activities that would ensure the objective is taught to students. Many of the sample activities in these units have *Asking Questions and Defining Problems* and *Developing a Model* in addition to the other scientific practices found in the evidence section. We added these two practices to use as a pre-assessment and to see what the students already know and understand about the standard to guide our instruction. It will be up to you to look at the objectives that are not addressed in this document and make plans accordingly.

Understanding	**Standards**	**Major Learning Activities:**	**Instructional Strategy:**	**R/R Quad: 21C:**
8	The Nature of Science 8 (NGSS-Appendix H)	**Title**: *What do scientists do?* **Objective:** Students will be able to understand and explain what a scientist is by providing examples of what a scientist does. **Description:** 1. Begin by creating an anchor chart "What Does a Scientist Do?" 2. Have students independently draw/write what they think a scientist does (This could be done in the field journal) 3. Students discuss with a partner and make changes 4. Do a Gallery Walk to share ideas and then allow students time to make changes 5. Share videos on what it means to be a scientist. a. Brainpop Jr. - Be a Scientist b. Be a Field Scientist (SciShow Kids) c. Students could highlight things they hear in their video that they have included d. Give students time to discuss video and make changes 6. Continue to add to anchor chart	Setting Objectives Cooperative Learning	A Collaboration Communication Critical Thinking

		7. Lay groundwork for using tools and field journal **Appendix Documents:** *What do Scientists do?*		
		Before starting this unit ● Determine how you would like for your class to begin recording the weather (i.e. daily class calendar, individual weather journal, smartboard graph) ● Give pre-assessment *What are the different types of weather?*		
	K-PS3-1/MO K.PS3.A.1 **CCC2** (cause and effect) **SEP1** (asking questions and defining problems)	**Sample Activity 1** **Title**: *Asking Questions* **Objective:** Students will ask questions about the cause and effect relationship between sunlight and temperature. **Description:** 1. Tell students that we are going to watch a video and have a chance to ask questions. Ask them to think about the questions they would like to ask as they watch the video, but to keep them to themselves until we come back together as a class. 2. Watch the time-lapse snowman video. 3. Ask students for questions they have about what they observed. (5 minutes), and record on chart paper. Rules for Producing Questions: a. Try to get down as many questions as you can while sticking to 5-7 minutes. b. Do not stop to discuss, judge or answer the questions. c. Write down every question exactly as it is stated. d. Change any statement into a question. 2. Categorize Your Questions (5 minutes) Tell students that on our list, we have two types of questions previously mentioned: questions that can be answered with “yes” or “no” or with one word, and questions that require an explanation and cannot be answered with “yes” or “no” or with one word. Review your list of questions and have students help categorize the questions. Mark the yes, no, or one-word answer questions with a checkmark, and the explanation questions with a star. 3. Have a discussion or use a strategy (such as having students place a dot or their name next to questions) in order to choose the three most important questions from the list. Circle them and discuss your reasons for selecting those three. **Appendix Documents and Resources:** adapted from the Question Formulation Technique from rightquestion.org		

	K-PS3-1/MO K.PS3.A.1 **CCC2** (cause and effect) **SEP1** (asking questions and defining problems)	**Sample Activity 2** **Title**: *Making a Model* **Objective:** Students will develop a model to show the cause and effect relationship between sunlight and temperature. **Description:** 1. Review the list of questions developed in the prior activity. If necessary, also review the video. 2. Have students create a model (drawing) on their own to show and explain what is happening to the snowman in the video 3. Have students share their models with a partner and revise their models to make one model that they agree upon to show what is happening to the snowman in the video. 4. Have the students take a gallery walk to look at the models that other students have created. After the gallery walk, discuss what students noticed and found helpful in the model to explain what is happening to the snowman in the video. Allow students to revise their own models again to best show their understanding. 5. At this time, if you notice that the student's models do not show a clear representation of temperature and the snowman melting, then create a model together as a class in order to clarify understanding before the next lesson.		
2	K-PS3-1/MO K.PS3.A.1 **CCC2** (cause and effect) **SEP3** (planning and carrying out investigations)	**Sample Activity 3** **Title:** What's the temperature? **Objective:** Students will make observations about the effect of sunlight warming the earth's surface. **Description:** 1. Gather students together and pose the question: *How are temperature and weather related?* Ask students to think silently then share with a partner their ideas. Share ideas with class. 2. Ask students how we might test the temperature? Create a list of ideas that the students share. 3. Lead students to: a. a cup of ice water b. a cup of warm water c. a cup of water left outside in the sun d. a cup of water left in outside in the shade 4. Students can work in teams, pairs or individually. Place cups in various places to test the temperature	Setting Objectives Cooperative Learning	B 21C Collaboration, Communication, Critical Thinking,

		5. Share video from Brainpop Jr. - Temperature 6. Students check their temperatures and record them on a record sheet and compare them to the initial recorded temperatures and share their findings. 7. Students use their data to write about their findings. Model and create a sample on chart paper for students to use. 8. Begin building anchor chart **Materials/Resources:** cups, water, ice, thermometers **Appendix Documents:** *Temperature Recording Sheet*	Generate and test hypotheses	
1	**K-ESS2-1/ MO K.ESS2.D.1** K-ESS3-2 **CCC1** (patterns) **SEP4** (analyzing and interpreting data	**Sample Activity 4** **Title:** Tracking Weather* *These activities can be spread over several days as you learn about types of weather, seasons, etc. **Objective**: Students will use observations to describe and record the weather in order to notice patterns over a period of time. **Description:** 1. Gather students together and pose the question; *What is a pattern?* Ask students to think silently then share with a partner their ideas. Share ideas with class. 2. Share samples of different types of patterns (colors, shapes, movement, growing patterns). Have students share how they know when a pattern will repeat. a. Discuss different types of weather, seasons, and when they occur. Read a book about seasons or specific types of weather. See this unit's resource list for books related to this lesson. b. Visit Brainpop Jr. for Science - Weather c. Determine how your students will track the weather (class calendar, individual calendar, graph) d. Record the weather for the day. After several days, revisit and discuss the patterns you are seeing in the weather. **Materials/Resources:** SciShow Kids (tracking weather) **Appendix Documents:** Weather Graph	Setting objectives Identify Similarities and Differences Non-linguistic representation	A Communication and Critical Thinking
2	K-ESS3-2 **CCC2**	**Sample Activity 5** **Title**: Now That's Extreme! *These activities can be spread over several days as you learn about types of		C

	(cause and effect) SEP1 (asking questions to define a problem) SEP8 (obtaining, evaluating, and communicating information)	severe weather (tornadoes, thunderstorms, snow, icy, hail, etc.) **Objective:** Students will identify severe weather specific to our region by asking questions based on observations related to the effects of a tornado. **Description:** 1. Gather students together and pose the question; *Have you ever seen a tornado?* Ask students to think silently then share with a partner their ideas. Share ideas with class. 2. Have students model the rotation of the tornado. 3. Use Sci Show Kids video on tornadoes. 4. Discuss school's safety plan for tornado drill 5. Have students create tornado safety posters. **Materials/Resources**: *Weather Words and What They Mean (Gail Gibbons)* *Feel the Wind (Arthur Dorros)* *Mystery Science - Weather Watching* *Sci Show Kids Link*	Setting objectives Cooperative Learning Nonlinguistic representation	Communication Critical Thinking Creativity
2	K-PS3-2/MO K.PS3B.1 **CCC2** (cause and effect) **SEP2** Developing and Using Models **SEP3** Planning and carrying out investigations SEP6 (Constructing Explanations	**Sample Activity 6** **Title:** *A Place in the Shade* **Objective:** Students will determine the effect of sunlight on the earth's surface by creating a structure that provides shade using the engineering and design process. **Description:** 1. Gather students together and pose the question; *What can we do to stay cool when it is really hot outside?* Ask students to think silently then share with a partner their ideas. Share ideas with class. 2. Create a list of ways you can shade yourself from the sun 3. Students will work with a partner to create a shade structure to keep an ice cube from melting. 4. Partners draw a plan for what they want their shade structures to look like. Students may share plans with groups. 5. Students use supplies to create their structure. 6. Students will test their structures by placing them in various places in the sun. Place one ice cube in each structure and one in a bag uncovered. When this cube melts the test is done. 7. Compare the effectiveness of the structures. 8. Determine what made some structures more/less effective.	Setting objectives Generating and Testing Hypothesis Nonlinguistic representation Similarities	D Collaboration Communication Critical Thinking Creativity

	and Designing Solutions)	a. *Questions to Ask:* ■ *What things helped the structures protect the ice cube?* ■ *What things were possibly missing from the structures that did not protect the ice cube as well?* ■ *Did the color of paper used make a difference? Why do you think that is?* 9. Have students share/draw/or write about the results and/or how they could improve the structures. **Materials/Resources:** *The Sun is My Favorite Star (Frank Asch)* *The Sun (First Facts) (Ralph Winrich)* *Brainpop Jr. - THE SUN* *Better Lesson Link - Shade Engineer Structure* ○ *Paper for sketching plans* ○ *Black construction paper (9x12)* ○ *White construction paper (9x12)* ○ *Popsicle sticks* ○ *Tongue depressors* ○ *Making tape* ○ Ice cubes ○ Ziploc bags	and Differences	

Unit 1 (Here Comes the Sun): Resources

UNIT RESOURCES
Teacher Resources: *Watching the Seasons* (Welcome Books) (Edana Eckart) *The Reasons for the Seasons* (Gail Gibbons) *Weather Words and What They Mean (Gail Gibbons)* *Feel the Wind (Arthur Dorros)* *The Sun is My Favorite Star (Frank Asch)* *The Sun (First Facts) (Ralph Winrich)*
Student Resources: ● Science Journal

Vocabulary:

Fall - the season after summer and before winter
Pattern - a repeated design
Rain-water falling in drops from clouds
Scientist -a person who is studying or has expert knowledge of science
Severe - very great; intense
Sleet - rain containing some ice, as when snow melts as it falls
Snow - precipitation in the form of small white ice crystals
Spring - the season after winter and before summer, in which things begin to grow
Summer - the warmest season of the year
Thermometer - an instrument for measuring and indicating temperature,
Thunderstorm- a storm with thunder and lightning and typically also heavy rain or hail
Tornado – a mobile, destructive vortex of violently rotating winds having the appearance of a funnel-shaped cloud
Weather - the star round which the earth orbits
Wind- the form of a current of air blowing from a particular direction
Winter - the coldest season of the year

Unit 2: Move It: Pushes and Pulls

Content Area: Science	**Course: Kindergarten**	**UNIT: Move It: Pushes and Pulls**

Unit Description: Students will make inquiries about the cause and effect of how objects react when pushed or pulled through the use of a phenomena (observable event), such as: marble runs, foosball, or race car tracks. Students will investigate and answer questions about "What happens when you push or pull an object?" **Link to anchor chart: Move It: Pushes and Pulls**	**Unit Timeline: 3-4 weeks**

DESIRED Results

Transfer Goal - ***Students will be able to independently use their learning to……***

1. **Ask questions and define problems:** Ask questions that can be answered by an investigation.
2. **Develop and use models:** Compare models to find common features and differences.
3. **Plan and Carry Out Investigations:** With guidance, plan and conduct an investigation in collaboration with peers.
4. **Analyze and Interpret Data:** Analyze data from tests of an object or tool to determine if it works as intended.

Understandings – *Students will understand that… (Big Ideas)*

2. (Cause and effect) Events have causes that generate observable patterns.

Essential Questions: *Students will keep considering …*

1. What relationships between events or patterns do I observe in this phenomenon or system?
2. What can I explain about these relationships?
3. Are any of these relationships cause and effect?
4. What evidence supports cause and effect relationships?
5. What further investigations would help determine if these relationships are cause and effect?

STANDARDS ADDRESSED		
Students who demonstrate understanding can: **K-PS2-1/MO K.PS2.A.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 may 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.]		
Disciplinary Core Ideas **Students will know...**	**Cross Cutting Concepts** **Students will understand…**	**Science and Engineering Practice** **Students will be able to...**

PS2.A: Forces and Motion ● Pushes and pulls can have different strengths and directions. (K-PS2-1) ● Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-1)	**CCC2: Cause and Effect** ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1)	SEP1: Asking Questions and Defining Problems Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested. ● Ask and/or identify questions that can be answered by an investigation. **SEP2: Developing and Using Models** Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ● Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s). **SEP 3: Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. ● With guidance, plan and conduct an investigation in collaboration with peers. (K-PS2-1)
PS2.B: Types of Interactions When objects touch or collide, they push on one another and can change motion. (K-PS2-1)	**CCC2: Cause and Effect** ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1)	**SEP 3: Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. ● With guidance, plan and conduct an investigation in collaboration with peers. (K-PS2-1)
PS3.C: Relationship Between Energy and Forces A bigger push or pull makes things speed up or slow down more quickly. (secondary to K-PS2-1)	**CCC2: Cause and Effect** ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1)	**SEP3: Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. ● With guidance, plan and conduct an investigation in collaboration with peers. (K-PS2-1)
PS2.A: Forces and Motion ● Pushes and pulls can	**CCC2: Cause and Effect** ● Simple tests can be	**SEP2: Developing and Using Models** Modeling in K–2 builds on prior experiences and progresses to include using

have different strengths and directions. (K-PS2-2) ● Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-2) <u>ETS1.A: Defining Engineering Problems</u> A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions. (secondary to K-PS2-2)	designed to gather evidence to support or refute student ideas about causes. (K-PS2-2)	and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ● Develop a simple model based on evidence to represent a proposed object or tool. ● Compare models to identify common features and differences. **<u>SEP4: Analyzing and Interpreting Data</u>** Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. ● Analyze data from tests of an object or tool to determine if it works as intended. (K-PS2-2)

Unit 2 (Move It): Assessment

EVIDENCE of LEARNING			
<u>Understanding</u> 2	<u>Standards</u> **K-PS-2-1** **CCC2** (cause and effect) **SEP3** (planning and carrying out investigations)	**<u>Unit Performance Assessment</u>**: Unit 2 Assessment document **Scoring Guide:** Unit 2 Assessment document	**<u>R/R Quadrant 21 Century</u>** B critical thinking communication

Unit 2 (Move It): Sample Activities

SAMPLE LEARNING PLAN
Pre-assessment: Present this prompt to the whole class: *What makes things move?* *Have students independently represent their thoughts with drawings, words, or actions.*
Anchoring Phenomena for this Unit: Marble Mazes: Scott's Marble Maze DIY Marble Maze Hot Wheels: Beach Track The Walking Table (video) Isaac Newton vs. Rube Goldberg (video) OK GO - Rube Goldberg Device (video) Goldiblox - Toys for Future Engineers (video)
This curriculum is based on the Next Generation Science Standards. For clarification on the standards, please visit the wonder of science website. Go to the standards tab to find your grade level and unit. After clicking on the unit, you will see a list of standards students should learn that you can click. After clicking on the standard then the evidence link, you will find a clarification statement as well as the practices you should take the standard through. Also included are observable features of student performance by the end of the grade that will help indicate whether or not the student has met the standard. This document outlines how to take one of the content objectives from each unit through a specific inquiry process using the 3-dimensional learning outlined in our standards and gives sample activities that would ensure the objective is taught to students. Many of the sample activities in these units have *Asking Questions and Defining Problems* and *Developing a Model* in addition to the other scientific practices found in the evidence section. We added these two practices to use as a pre-assessment and to see what the students already know and understand about the standard to guide our instruction. It will be up to you to look at the objectives that are not addressed in this document and make plans accordingly.

Understanding	Standards	Major Learning Activities:	Instructional Strategy:	R/R Quadrant: 21C:
2	**K-PS2-1** **CCC1** (patterns) SEP1 (asking questions and defining problems)	**1. Title:** Baby I'm amazed!! **Objective:** Students will ask questions about patterns when observing the movement of objects **Description:** 1. The teacher will present the phonomena (marble run,dominoes run, or toy cars) 2. The students will observe the phonomena. 3. Ask the kids to write a "I wonder statement" about the phenomena (without talking or sharing) 4. After everyone has generated a question, have students share their "I wonder statements" with the class.. **Materials/Resources:** Domino run	Setting Objectives Cues and Questions	A Communication
2	**K-PS2-1** **CCC1** (patterns) **SEP2** (develop and use models)	**2. Title:** Baby I'm Even More Amazed **Objective:** Students will develop and use a model about patterns when observing the movements of objects. **Description:** 1. The teacher will present the phenomena they shared in lesson one. 2. Have the students (**without** talking or sharing) draw a picture and label what they observed on a whiteboard. 3. Have the students share with a partner their observation of the phonomena 4. Have students do a Gallery walk around the room to view the different models 5. If materials are available have students create marble runs	Setting Objectives Nonlinguistic Representation Cooperative Learning	B Collaboration Critical Thinking
2	**K-PS2-1** **CCC2** (cause and effect) **SEP1** (asking questions	**3. Title:** Hunting for Forces **Objective:** Students will ask questions about what causes motion of objects in the classroom . **Description:** 1. The teacher will introduce and begin to build the Move It! anchor chart by adding the words push and pull. 2. The teacher will ask the question - What objects in our room can we push and/or pull? 3. The student will work with a partner to explore objects in the classroom to	Setting Objectives Cues, Questions, Advance Organizers	B Critical Thinking Communication

	and defining problems)	answer the question. 4. Students will record their findings in the Hunting for Forces Data Collection sheet (appendix document). 5. Students will gather together to share their findings. 6. Students can watch the Jack Hartmann video. **Materials/Resources:** Jack Hartmann Video **Appendix Documents:** Hunting for Forces	Cooperative Learning	
3	**K-PS2-1** **CCC2** (cause and effect) **SEP3** (plan and carry out investigations)	**4. Title:** Bowl the Bottle Down **Objective:** Students will plan and carry out investigations to compare the effect of different strengths of a push on the motion of an object. **Description:** 1. The teacher will show the Pebble Go section on Force. 2. The teacher will add strength to the anchor chart. 3. The teacher will show the students empty plastic bottles and a ball .Ask the question, What game could I play with these objects? What would be the object of the game? 4. The students will explore force by pushing the ball with more and less strength. 5. The students will observe the effects of strength on the ball as it hits the bottles. 6. The students will discuss with their group their observations and record the number of bottles knocked down on 3 trials for a hard push or soft push.(appendix document) **Materials/Resources:** Pebble GO **Appendix Documents:** Bowling for Bottles	Setting Objectives Cues, Questions, Advance Organizers Identify Similarities and Differences Cooperative Learning	B Critical Thinking Communication
4	K-PS2-2 **CCC2** (cause and effect) **SEP4** (analyze and interpret data)	**5. Title:** *Ramp it Up* **Objective:** Students will analyze and interpret data to compare the effect of ramps on the speed of an object. **Description:** 1. The teacher will remind students of the previous lesson and ask them what they noticed about the ball when they added more force to their throw.(speed increased) 2. Discuss another way to increase speed is through ramps. 3. Teacher will add speed to the anchor chart. 4. Have students work in small groups to use classroom materials to design 2 different ramps to increase the speed of an object. Ramps can be created	Setting Objectives Cues, Questions, Advance Organizers Generating and Testing	C Critical Thinking

		from cardboard to keep the length consistent. 5. Students will conduct three trials comparing the speed of cars on two ramps. 6. Students record their findings including *which ramp produced the greatest speed.* **Appendix Documents:** Ramp It Up!	Hypothesis Cooperative Learning	
4	K-PS2-2 **CCC2** (cause and effect) **SEP4** (analyze and interpret data)	**6. Title:** It's time to move it **Objective:** Students will analyze and interpret data from 3 trials to determine the effect on a collision on an object. **Description:** 1. The teacher poses the problem " What will happen to an object when it collides with another object?" Teacher will hold a hockey stick . Have students roll the ball into the hockey stick. 2. Have students draw a picture of what happened to the ball when it collided with the stick. 3. Students will share their observations 4. Teacher will add direction to the anchor chart. 5. Have students return to their ramps. 6. Students will be given a basket of objects (or they can use classroom objects to put at the end of their ramp) Students will pick objects they think will change the direction of the marble.(EX: sponge, cottonball, block, plastic cup, book, dice, lego) 7. Students will record their findings.(appendix document) **Appendix Documents:** It's Time to Move It	Setting Objectives Cues, Questions, Advance Organizers Nonlinguistic Representation	C Critical Thinking

Unit 2 (Move It): Resources

UNIT RESOURCES
Teacher/Student Resources: ● Domino run ● Jack Hartmann Video ● Hunting for Forces ● Pebble GO ● Appendix Documents Move It Anchor Chart, Bowling for Bottles,Ramp It Up!, It's Time to Move It
Vocabulary: Collide- hit with force when moving Direction-the course of which something or someone moves

Distance- amount of space between two things
Force - strength or energy as an attribute of physical action or movement.
Motion - the action or process of moving or being moved
Pull - exert force on (someone or something), typically by taking hold of them, to move or try to move them.
Push - exert force on (someone or something), typically with one's hand, in order to move them away from oneself or the origin of the force.
Ramp - a slope or inclined plane for joining two different levels, as at the entrance or between floors of a building.
Speed - the rate at which someone or something is able to move or operate

Unit 3: We Are All in this Together

Content Area: Science	Course: Kindergarten	UNIT: We Are All in this Together

Unit Description:	Unit Timeline:
Students will develop an understanding of what plants and animals (including humans) need to survive and the relationship between their needs and their environment. Students will formulate answers to questions such as, "Where do animals live and why do they live there?" **Link to anchor chart:** We Are All in this Together	4-6 Weeks

DESIRED Results

Transfer Goal - ***Students will be able to independently use their learning to…***

1. **Ask questions and define problems:**
2. **Develop and Use Models:** Use a model to represent relationships in the natural world.
4. **Analyze and Interpret Data:** Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.
7. **Engage in Argument from Evidence:** Construct an argument with evidence to support a claim.
8. **Obtain, Evaluate, and Communicate Information:** Communicate solutions with others in oral and/or written forms using models an/or drawings that provide detail about scientific ideas.

Understandings – *Students will understand that… (Big Ideas)*

1. (Patterns) Patterns in the natural and human designed world can be observed and used as evidence.
2. (Cause and effect) Events have causes that generate observable patterns.
4. (System and System Models) Systems in the natural and designed world have parts that work together.

Essential Questions: ***Students will keep considering…***

Patterns

1. What patterns do I observe? What questions do I have about these patterns?
2. How do these patterns compare to other patterns?
3. What further investigations would help clarify these patterns and their cause?

Systems and System Models

1. What system or systems do we need to model to explain this phenomenon?
2. What are the relationships between the components in this system?
3. What predictions and limits can be made from our model?

Cause and effect::

1. What relationships between events or patterns do I observe in this phenomenon or system?
2. What can I explain about these relationships?
3. Are any of these relationships cause and effect? Explain.
4. Can my model provide a system for this cause and effect relationship?
5. What further investigations would help determine if these relationships are cause and effect?

STANDARDS ADDRESSED		
Students who demonstrate understanding can: **K-LS1-1/MO K.LS1.C.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.] K-ESS2-2/MO K.ESS2.E.1. 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.] K-ESS3-1/MO K.ESS3.A.1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. [Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas, and grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.] K-ESS3-3/MO K.ESS3.B.1. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment. [Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]		
Disciplinary Core Ideas **Students will know...**	**Cross Cutting Concepts** **Students will understand…**	**Science and Engineering Practice** **Students will be able to...**
LS1.C: Organization for Matter and Energy Flow in Organisms 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.	**CCC1: Patterns** ● Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1)	**SEP4: Analyzing and Interpreting Data** Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-LS1-1)
ESS2.E: Biogeology Plants and animals can change their environment.	**CCC4: Systems and System Models** ● Systems in the natural and designed world have parts that work together. (K-ESS2-2),(K-ESS3-1)	**SEP2: Developing and Using Models** Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ● Use a model to represent relationships in

		the natural world. (K-ESS3-1)
ESS3.A: Natural Resources Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.	**CCC4: Systems and System Models** ● Systems in the natural and designed world have parts that work together. (K-ESS2-2),(K-ESS3-1)	**SEP2: Developing and Using Models** Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ● Use a model to represent relationships in the natural world. (K-ESS3-1)
ESS3.C: Human Impacts on Earth Systems Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.	**CCC2: Cause and Effect** ● Events have causes that generate observable patterns. (K-ESS3-3)	**SEP8: Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information. ● Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. (K-ESS3-3)
ETS1.B: Developing Possible Solutions Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.	**CCC2: Cause and Effect** ● Events have causes that generate observable patterns. (K-ESS3-3)	SEP1: Asking Questions and Defining Problems Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested. SEP7: Engaging in Argument from Evidence Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s). ● Construct an argument with evidence to support a claim. (K-ESS2-2)

Unit 3 (We Are All in This Together): Assessment

EVIDENCE of LEARNING			
Understanding 1	Standards **K-LS1-1** **CCC1** (patterns) **SEP4** (analyzing and interpreting data	**Unit Performance Assessment**: Unit 3 Assessment document **Scoring Guide:** Unit 3 Assessment document	**R/R Quadrant 21 Century** B Critical thinking Communication

Unit 3 (We Are All in this Together): Sample Activities

SAMPLE LEARNING PLAN
Pre-assessment: (To be given prior to the first Major Learning Activity) Present this prompt to the whole class: What do plants, animals and humans need to survive? Have students independently represent their thoughts with drawings, words, or actions.
Anchoring Phenomena for this unit: *Use During Lesson 1*
This curriculum is based on the Next Generation Science Standards. For clarification on the standards, please visit the wonder of science website. Go to the standards tab to find your grade level and unit. After clicking on the unit, you will see a list of standards students should learn that you can click. After clicking on the standard then the evidence link, you will find a clarification statement as well as the practices you should take the standard through. Also included are observable features of student performance by the end of the grade that will help indicate whether or not the student has met the standard. This document outlines how to take one of the content objectives from each unit through a specific inquiry process using the 3-dimensional learning outlined in our standards and gives sample activities that would ensure the objective is taught to students. Many of the sample activities in these units have *Asking Questions and Defining Problems* and *Developing a Model* in addition to the other scientific practices found in the evidence section. We added these two practices to use as a pre-assessment and to see what the students already know and understand about the standard to guide our instruction. It will be up to you to look at the objectives that are not addressed in this document and make plans accordingly.

Understanding	Standards	Major Learning Activities:	Instructional Strategy:	R/R Quadrant: 21C:
3	**K-LS1-1** **CCC1** (patterns) SEP1 (asking questions and defining problems)	**1. Title:** Anchoring Phenomena "I Wonder…" **Objective:** Students will use ask and answer questions to notice patterns in the natural world of what plants, animals, and humans need. **Description:** 1. The teacher will display images of plants that have adapted to their environment (see link below). 2. Pose this question to students: Why do you think the trees did that? 3. Think, Pair, Share: Allow time for students to think about possible reasons, then pair up with a shoulder partner, and share their thoughts. 4. Record student responses on the board as partners share. 5. Save students' responses for the following lesson. **Materials/Resources:**	Setting Objectives Cooperative Learning	B Collaboration Communication, Critical Thinking

		Images from *Tree Roots Winning the Battle Against Concrete*		
2	**K-LS1-1** **CCC1** (patterns) **SEP1** (asking questions and defining problems)	**2. Title:** What are Living Things? **Objective:** Students will use ask and answer questions to notice patterns in the natural world of what plants, animals, and humans need. **Description:** 1. Teacher will pose the question to students, 'What are Living Things?' 2. Teacher will explain that they see living things in their own lives on a daily basis. a. Remind them to pull from their own life observations to give evidence of what living things could be. 3. Allow students time to wonder, then record their thoughts on what living things means to them in their Field Journal. 4. Then ask students to Hand Up, Pair up to share about their drawing and/or writing about living things. 5. Teacher will introduce and start the first section of the anchor chart, titled 'Living Things,' by adding students' responses of Plants, Animals, Humans with picture clues under those words. (See Anchor Chart for example) 6. Inform students that we will use the next few days of learning to talk about what Living Things Need.	Setting Objectives Cooperative Learning Non-Linguistic Representation Cues, Questions, and Advance Organizers	A Collaboration. Communication, Critical Thinking
2	**K-LS1-1** **CCC1** (patterns) SEP1 (ask and answer questions)	**3. Title:** Basic Needs of Living Things (*Prior to teaching this lesson, you will need to determine how you will implement a Plant Needs Investigation. The timeline and materials needed may vary depending on your investigation. The information gathered from observations and field journal entries will be used throughout this unit and for a Plant Needs Investigation conclusion activity.)* **Objective:** Students will ask and answer questions to notice patterns of what plants and animals (including humans) need to survive. **Description:** 1. Today, we are going to talk about the basic needs of plants, animals, and humans. We will learn what plants, animals, and humans need in order to live. 2. Then we will look for patterns to see if they have the same needs or different needs. a. Remind students that people are humans, if necessary. 3. Lead a discussion about basic needs, which are the fundamental requirements that serve as the foundation for survival.	Setting Objectives	A Collaboration. Communication, Critical Thinking

		4. Create a Comparison Matrix with the three headings: “Plants,” “Animals,” and “Humans.” a. Record the student responses onto the matrix. i. If students do not come up with all the answers by themselves, prompt them so that the list is complete. ii. [Student responses may include things that are not thought of as a basic need, such as money, a car, etc. Talk about these responses as they arise.] 5. Ask the following questions: a. What do humans need to stay alive? i. Food, Air, Water, Shelter, Clothing ii. Clothing is important for humans because it helps protect our skin and can keep us warm. iii. Students may want to add sunlight to the list. Add sunlight and say, ‘Yes, humans need some sunlight to stay healthy, but too much sunlight can be harmful to humans. b. What do plants need to stay alive? i. Water, Air, Light 1. Students may mention food as a need. Record this response and say, ‘Yes, sunlight helps plants to make their own food. 2. Students may mention that plants need soil to grow. Say, ‘Yes, some plants need soil to grow, but not all plants do. Some plants can grow in water and some plants can grow in rocks with no soil, but all plants need air,sunlight, and water to live and grow. ii. Plant Needs Investigation 1. Students will participate in planting seeds to observe the needs of plants in order to survive. a. Fast-growing seeds are best to keep their interest and enthusiasm. Commonly used seeds are lima beans and sunflowers for their size and speed in growing. Other fast-growing seeds are marigolds and radishes. 2. Follow the steps below for planting seeds. a. Materials Needed: plastic cups, soil, spoons, markers, object to poke holes in bottom of cup, watering can, tub or saucers to collect draining water.	Cues, Questions, Advance Organizer	

		b. Give each student a cup (pre-poked with holes for drainage), and have them label it with their name. c. Have the children fill the cups to within an inch of the top with the garden soil. They can use a large spoon to take the soil from the bag to the cup so they don't get too dirty. Explain that seeds need soil to grow. d. Push a seed down along the outside of the cup to a depth of about 1 ½ inch. Push another seed in the same way on the other side of the cup. Keeping the seed along the outside of the cup will allow the child to watch what is happening with the seeds. e. Once seeds are planted, you may want to consider planting a few extra seeds in cups to place in different growing conditions, such as: full light/no light, water/no water, dirt/no dirt, etc. f. Record observations through pictures and/or drawings of daily changes in their seed in their Field Journal. ***Keep in Mind for End of Unit*** Plant Needs Investigation Conclusion ● Use information from the students' Field Journals, for students to construct an argument with evidence to support a claim of plant needs based on their findings during the investigation. Review: What do animals need to stay alive? iii. Food, Water, Air, Shelter 1. [Students may want to add sunlight to the list. Say, 'Yes, there are some animals that need sunlight, but not all animals do. Some animals can live and grow in areas with no sunlight. All animals need air, water, food, and shelter. 6. Let's read our chart. What patterns do you see as we read what humans, plants, and animals need in order to live? a. They all need water, air, and food. Animals and humans both need shelter. Plants do not need shelter. Humans need clothing, but plants and animals do not need clothing. 7. Explain the task. a. You will draw pictures in a diorama that shows the basic needs	Generating and Testing Hypothesis Summarizing	

		of humans, animals, and plants. This is what a diorama looks like. b. Show a blank Triangular diorama. c. There are three sections in this diorama—one for humans, one for plants, and one for animals. i. All living things need air, and air is all around us, so you do not have to show air in your drawings. d. On the first large triangle, draw a picture of yourself and your basic needs. You are a human. i. [The picture should show the student in a shelter (e.g., their home) eating and drinking. The student should be clothed in the drawing.] e. On the second large triangle, draw a picture of an animal with its basic needs. i. [The picture should show an animal with shelter, eating and drinking (e.g., a horse in or near a barn with a water trough and a haystack).] f. On the third large triangle, draw a picture of a plant and its basic needs. i. [The picture should show a plant getting sunlight and water (e.g., a sun ower in the ground with the Sun in the sky and raindrops falling down).] g. You can use the lists on our chart paper to help with your drawings. h. After all students have completed the task, have them describe the patterns of animals', plants', and humans' survival needs that they included in their dioramas. They can do this with the class, with partners, or in small groups. i. Plants, animals, and humans all need water, air, and food. Plants need sunlight but do not need shelter. Humans and animals both need shelter. Humans need clothing but plants and animals do not need clothing. ii. Collect the students' dioramas and use the checklist and the rubric to assess the students' understanding of the performance expectation.	Cues, Questions, and Advance Organizers Non-Linguistic Representation	
2, 3	K-ESS3-1 CCC6	**4. Title:** The Relationship of ALL Living Things (Part 1) **Objective:** Students will create and use models to show how different systems allow for the needs of different plants or animals (including	Setting	C

	(systems and systems models) **SEP2** (develop and use models)	humans). **Description:** 1. The first part of this activity could serve as a review, following classroom instruction, of the K-LS1-1 performance expectation. Students will observe patterns of what animals and plants need in order to survive in different environments and then draw a picture of an animal in its environment to show how basic needs are being met by that environment. 2. Teacher will create anchor chart to be completed with the class. For the anchor chart, divide into three sections and label each section with a different environment: Jungle, Forest, Ocean 3. Today, we are going to learn about animals and where they live. Environments are places where plants and animals live and grow. Many different plants and animals can live in one environment. Show the Desert Environment picture to the students. a. Look at this picture of a desert environment. What do you see? i. Possible student responses: Cactus; Rabbit; Snake; Turtle; Mouse; Plants; Prairie dog; Sand; Mountains b. All of these plants and animals live in the desert. Where do the animals in the desert get their food? i. Possible student responses: Animals eat plants or other animals to get their food. c. Where do they get their water? i. Animals can get water from rain and from plants, such as a cactus. d. What would the plants in the desert need to survive? i. Plants need the Sun and some rain in order to grow. They might need animals to help spread their seeds. e. How are all of these plants and animals able to live and grow in this environment? i. They can use each other to get what they need. They all have different needs, and those needs are met by different things in the desert. f. The desert is dry and gets little rain. Yet, there are many plants and animals that can live there. Over time, animals that survive best in this environment have ways to live and grow where there is little rain and a lot of sunshine. They get food, water, and shelter from each other and the place where they	Objectives Cues, Questions, Advance Organizer	Collaboration Communication, Critical Thinking

		live. g. Let's talk about some other environments. h. What plants and animals live in the jungle? Teacher will record student responses on a chart. i. Possible student responses: Gorilla; Tiger; Lion; Cheetah; Toucan; Ferns; Orchids; Moss [Note: Any plant or animal that lives in the jungle is an acceptable answer.] i. Where do these plants and animals get their food, water, and shelter? i. Animals get food from plants and other animals. ii. Plants need the Sun and the rain to grow. iii. Animals can use the plants for shelter. Plants and animals get water from rain, from the ground, or from other living things. j. What plants and animals live in the forest/woods? Record responses on chart. k. Where do these plants and animals get their food, water, and shelter? i. Animals get food from plants and other animals. ii. Plants need the Sun and the rain to grow. iii. Animals can use the plants for shelter. Plants and animals get water from rain, from the ground, or from other living things. l. What plants and animals live in the ocean? Record responses on chart. i. Fish; Sharks; Whales; Dolphins; Kelp; Seaweed; Algae [Note: Any plant or animal that lives in the ocean is an acceptable answer.] m. Where do these plants and animals get their food and shelter? i. The ocean provides different places for animals to hide. ii. Animals feed on each other and on plants in the ocean. iii. Some animals use what other animals leave behind for shelter, such as shells. iv. Some animals use plants to hide from other animals that may eat them. n. Bring the discussion to an end by reviewing the basic needs	Summarizing	

		of plants and animals (food, water, shelter). 4. You will now draw a picture of one of the environments we talked about: Jungle, Forest/Woods, or Ocean. a. As the students draw their pictures, remind them to show where the plants and animals get their food, water, and shelter. b. Help students to read the words on the chart they are using, if asked. c. Allow time for the students to share and explain their drawings. Ask the following questions to help students explain all parts of their drawing. i. What types of plants and animals live in this [point to the student's drawing] environment? ii. Where do the plants or animals get their food, water, or shelter in this environment? iii. Is there anything else you would like to share about this environment?	Non-Linguistic Representation Cooperative Learning	
2	K-ESS3-1 CCC6 (systems and systems models) **SEP2** (develop and use models)	**5. Title:** The Relationship of ALL Living Things (Part 2) **Objective:** Students will create and use models to show how different systems allow for the needs of different plants or animals (including humans). **Description:** *Small groups of two to three students each will create a diagram or drawing of a chosen animal and its natural habitat. They must include: 1. Where the animal lives 2. The animals' three basic needs (food source, water source, and shelter). The project should take several days with a culminating poster presentation.* 1. Assign the students into groups of two or three. 2. Think about your favorite animal. Think about what your animal needs to live and grow. Where does it live? What does it eat? 3. Turn and share your ideas with your partner (group). 4. Have students volunteer to share their responses with the class. 5. All living things must get what they need in order to live and grow. 6. You shared about your favorite animals and what they need to live and grow. Different animals may have different needs. Animals need shelter, but different animals need different types of shelter. All animals need food, but different types of animals need different types of food. 7. Today, you are going to pick an animal and learn more	Setting Objectives Cooperative Learning	B Collaboration. Communication, Critical Thinking

		about where it lives and how it gets what it needs to live and grow. 8. Distribute the animal picture cards (see page K-B29). Allow time for each group to look at the animal picture cards and choose the animal that the group wants to research. 9. Now, you are going to find out more about your animal. Distribute the "My Animal Research" student worksheets. 10. You can use this paper to draw or write down what you find out about your animal. a. Explain each section of the worksheet that the students are expected to complete. b. Direct the students to the available resources based on their choice of animal. Allow time for each group to research their particular animal. This can include looking at picture books, reviewing a preset website, or watching a preset video. [If appropriate materials are provided, students may also cut out pictures for their poster.] 11. Encourage each student to participate in completing the poster. Allow time for the students to complete their drawings (or complete cutting and gluing their pictures). 12. Now choose three different-colored crayons to draw lines from your animal to where it gets its food, water, and shelter. [Allow time for the students to do each of the following three steps.] a. Use one color to draw a line from your animal to its food. b. Use another color to draw a line from the animal to where it gets its water. c. Use your third color to draw a line from the animal to where it gets its shelter. 13. Call on groups of students to present their posters 14. Prompt the students to tell where their animal lives and to explain their connecting lines to where the animal gets its food, water, and shelter. Call on each member of the group to explain a different part of the poster.	Summarizing and Notetaking Nonlinguistic Representation	
3	K-ESS2-2 CCC6 (systems and systems	**6. Title:** Changing the Environment *This activity is intended for use after several lessons studying animals and their environments.* **Objective:** Students will construct an argument supported by evidence for how systems can be changed by plants and animals to meet their needs.	Setting Objectives	B Collaboration. Communicati

	models) SEP7 (engaging in argument from evidence)	**Description:** 1. We have been learning about animals and the environments where they live. a. What things have we learned about animals and their environment? i. Student responses will vary. 2. Can you give me an example of how an animal might change its environment so it can get food, water, or shelter? a. Possible student responses could be: i. Toads make a hole in the ground to hide. ii. Caterpillars eat leaves off plants. iii. Squirrels gather nuts and bury them for food. iv. Rabbits dig holes to make a nest for their babies. v. [Note: Any example of how an animal might change its environment so it can get food, water, or shelter is an acceptable answer.] 3. Constructing An Argument: a. Here are pictures of eight animals. b. Show the picture cards to the students. Keep the picture cards on display for the students to see, but remove the picture cards later as students pick animals. c. I will ask each of you, one at a time, to pick an animal and answer a couple of questions. Then, I will ask for someone else to agree or disagree with your answers by saying one of the following: "I disagree because I see...", or "I agree because I see..." d. Point to the discussion starters on the chart paper. e. Be sure to use things you see in the pictures when you answer the questions or when you agree or disagree with the answer. f. Have the students, one at a time, choose a picture card and identify the animal. g. Does the animal change its environment? i. Students can answer: yes or no ii. If yes: What do you see in the picture [evidence] that shows that the animal is changing its environment? 1. Student answers will vary, but must match the animal in the picture. iii. Why does the animal do this? iv. Ask the class whether they agree or disagree with the answer. Students can give a thumbs-up or a thumbs-down to do this.	Cues, Questions, Advance Organizers Non-Linguistic Representation Generating and Testing Hypothesis	on, Critical Thinking

		v. If a student disagrees, give that student a chance to explain their reasoning with the "I disagree because I see..." discussion starter, using evidence from the picture. 1. If no: Ask the class whether they agree or disagree. Students can give a thumbs-up or a thumbs-down. 2. Go through the same process as for "yes," giving students the chance to explain their reasoning with a discussion starter and evidence from the picture cards. vi. Give each student a chance to participate in the discussion as either a decision-maker or discussion participant. vii. Collect the picture cards to use for the individual verbal assessment. For the assessment, select only the cards that show an animal changing its environment. h. Now that we have talked about all of the animals, pick one to draw in your own Field Journal. Include things in its environment that the animal can use to meet its needs. i. Student drawings will not be assessed. 4. Individual Assessment a. While students are drawing, assess individual students by having them choose two of the animal cards and answer the following questions for each. b. Use the rubric to gauge each student's level of understanding of the performance expectation. i. How is this animal changing its environment? ii. What need is met by this environment? 1. Student answers could include: a. The beaver is changing its environment by cutting down trees. It is building a dam for shelter. b. The bird is changing its environment by breaking off twigs and sticks. It is building a nest for a home. c. The prairie dog is changing its environment. It is digging a hole for shelter. 2. [Teacher may choose to accept other answers based on the student's explanation and the picture cards that the student chose.)		
3	K-ESS3-3 **CCC2**	**7. Title:** Knowing Your Own Environment **Objective:** Students will communicate solutions to show the cause and effect relationship of actions taken to reduce the impact of humans on the	Setting Objective	B Collaboration

	(cause and effect) SEP8 (obtaining, evaluating, and communicating information)	land, water, air, and/or other living things in the local environment. **Description:** 1. Teacher begins discussion: a. An environment is the place where a person, animal, or plant lives and can get what it needs. b. Let's talk about the place where we live. c. Write "Where We Live" on the top of a piece of chart paper and begin to list some of the natural features of the local environment as students answer the following questions. i. Are there trees, lakes, rivers, andor an ocean where we live? ii. Is the land flat or are there hills or mountains where we live? iii. What things do we get from our environment to meet our needs? 1. We get water and air from our environment. 2. We get wood for building houses from our environment. 3. We also get rocks for building roads from our environment. 4. We get food from plants and animals that live here. 5. Today we are going to learn about things that can hurt the environment. We can hurt the environment by changing it in some way, either by adding things that do not belong, such as garbage, or by taking too many things away such as trees. 2. Discuss these questions: a. What does it mean to recycle? (Define the word recycle if students do not know what it means). Student response could be, it means to use something again. b. Do any of you recycle things at home? a. If students participate in any type of recycling program, refer to the program. 4. We are going to read a book about recycling 5. Read aloud a teacher-selected book. Possible selection: *Michael Recycle* 6. After reading the book discuss the following questions: a. What does garbage do to our environment? (It uses up or land. It causes pollution. It harms the plants and animals.)	Cues, Questioning, and Advance Organizers Cues and Questioning	. Communication, Critical Thinking

		b. Why is recycling important? (Recycling helps to protect our planet. It helps us to make less trash.) **Materials/Resources:** *Michael Recycle* by Ellie Bethel		
3	K-LS1-1 **CCC1** (patterns) **SEP4** (analyzing and interpreting data)	**8. Title:** Plant Investigation Conclusion **Objective:** Students use patterns from data to explain what plants need to survive. **Description:** 1. Bring the children back together to share their findings from their field journals. 2. Ask the children to explain the investigation and what the results mean. 3. The children should find that too much water may cause the roots to rot and die and too little will cause the plant to dry out and die. 4. Equally, if they used the other variables they should also find that plants deprived of light will not grow well and plants that get too cold are unlikely to survive. 5. Ask questions to help them. Why did this plant die? Why has this plant grown so well? What happens when a plant is overwatered? What happens if a plant has no light? 6. Were the predictions correct? If not, what was different? What did they find out? 7. Discuss all the results and draw some conclusions about what plants need to grow healthily. **Materials/Resources:** Field Journals	Setting Objectives Identifying Similarities and Differences Generating and Testing Hypothesis	C Collaboration. Communication, Critical Thinking
4	K-ETS1B	**9. Title:** What's Old, Can Be New Again! **Objective:** Students will develop a model(simple sketch, drawing, or physical model) to illustrate how the shape of an object helps it function as needed to solve a given problem. **Description:** 1. Teacher will show pictures of, or actual, objects that are recyclable (box, brown paper bag, glass bottle, newspaper, plastic spray bottle, soda can) 2. Teacher prompt: I have chosen a few things that can be used again, in a new way, instead of throwing them away. You are going to work in small groups to create a poster that shows how one of these	Setting Objectives Cooperative Learning Nonlinguistic	C Collaboration. Communication, Critical Thinking

		objects can be recycled or repurposed several ways. Arrange students in small groups. Groups will select one of the displayed objects. 3. Think of at least two new ways you can use the object and draw pictures to show your ideas. If you can think of more ways to recycle the object, draw those on your poster, too. 4. When you are finished with your poster, you will share it with the class and explain how recycling or repurposing the object can help the environment.	Representation Cooperative Learning	

UNIT RESOURCES

Teacher Resources:

Books

- *Michael Recycle* (Ellie Bethel)
- *The Tiny Seed* (Eric Carle)
- *From Seed to Plant* (Gail Gibbons)
- *The Carrot Seed* (Ruth Krauss)
- *Green and Growing, A Book About Plants* (Susan Blackaby)
- *How a Seed Grows* (Helene J. Jordan)
- *It's Earth Day!* (Mercer Mayer)
- *Commotion in the Ocean* (Giles Andreae)
- *Rumble in the Jungle* (Giles Andreae)

Bookflix

- A Bear Cub Grows Up (Animals & Nature Tab 5-8)
- A Ladybug Larva Grows Up (Animals & Nature Tab 5-8)
- A Tadpole Grows Up (Animals & Nature Tab 5-8)
- Life In a Pond (Animals & Nature Tab 29-32)
- A Home in the Swamp (Animals & Nature Tab 41-44)
- From Seed to Dandelion (People & Places Tab 9-12)
- Inside an Ant Colony (Animals & Nature Tab 1-4)
- Termites (Animals & Nature Tab 37-40)

Mystery Science

- Plant and Animal Secrets
    - How Do Plants and Trees Grow? (Mystery 5)
    - Old Log-Animals Need to Eat (Read-Along Mystery 6)
    - How Do Animals Make Their Homes in Forests? (Read-Along Mystery 4)
    - Animal Homes-Where do Animals Live? (Read-Along Mystery 2)

Other

- Big Changes in the Big Apple
- Big Changes in the Big Forest
- *Tree Roots Winning the Battle Against Concrete*
- STEM-Gauge Primary Life Science Unit

Brain Pop Jr.

- Reduce, Reuse, Recycle
- Natural Resources
- Extinct and Endangered Species

Student Resources:

Books

- *Michael Recycle* (Ellie Bethel)
- *The Tiny Seed* (Eric Carle)
- *From Seed to Plant* (Gail Gibbons)
- *The Carrot Seed* (Ruth Krauss)
- *Green and Growing, A Book About Plants* (Susan Blackaby)
- *How a Seed Grows* (Helene J. Jordan)
- *It's Earth Day!* (Mercer Mayer)
- *Commotion in the Ocean* (Giles Andreae)
- *Rumble in the Jungle* (Giles Andreae)

Bookflix

- A Bear Cub Grows Up (Animals & Nature Tab 5-8)
- A Ladybug Larva Grows Up (Animals & Nature Tab 5-8)
- A Tadpole Grows Up (Animals & Nature Tab 5-8)
- Life In a Pond (Animals & Nature Tab 29-32)
- A Home in the Swamp (Animals & Nature Tab 41-44)
- From Seed to Dandelion (People & Places Tab 9-12)
- Inside an Ant Colony (Animals & Nature Tab 1-4)
- Termites (Animals & Nature Tab37-40)

Mystery Science

- Plant and Animal Secrets
    - How Do Plants and Trees Grow? (Mystery 5)
    - Old Log-Animals Need to Eat (Read-Along Mystery 6)
    - How Do Animals Make their Homes in Forests? (Read-Along Mystery 4)
    - Animal Homes-Where do Animals Live? (Read-Along Mystery 2)

Other

- Big Changes in the Big Apple
- Big Changes in the Big Forest
- *Tree Roots Winning the Battle Against Concrete*

Brain Pop Jr.

- Reduce, Reuse, Recycle
- Natural Resources
- Extinct and Endangered Species

Vocabulary:

Environment: the setting in which plants, animals, or humans live in
living thing: plants, animals, humans
Needs: basic requirements for living things

pollution: waste from humans that harm the environment
Recycle: to use again
reduce: make smaller or less in amount
reuse: to use again especially in a different way