South Harrison Township Elementary School District

Committed to Excellence

Course Name: Science	**Grade Level(s): K**
BOE Adoption Date: October 2017	**Revision Date(s):**

ABSTRACT

Science in Kindergarten begins with observing and recording weather daily. The weather unit is scheduled for the second trimester, but should be incorporated throughout the school year. This unit will include investigating severe weather in our area, such as thunderstorms and blizzards, and looking for patterns in seasonal weather. Later students will explore what plants and animal need from the environment, and how the plants and animals can in turn impact their habitats. In the physical science unit students will test the interactions of forces in different directions. Students will use the engineering process to test ways of decreasing the warming impact of the sun on the Earth. Lastly students will return to investigating what living things need by gathering information on not only what people need to live comfortably, but how that impacts the land, air, water, and other living things. They will identify these problems, then develop possible solutions to some of these problems and present these toothers.

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Mission Statement

The primary goal of the South Harrison Township Elementary School District is to prepare each student with the real life skills needed to compete in a highly competitive global economy. This will be achieved by providing a comprehensive curriculum, the integration of technology, and the professional services of a competent and dedicated faculty, administration, and support staff.

Guiding this mission will be Federal mandates, including the Every Student Succeeds Act (ESSA), the New Jersey Student Learning Standards, and local initiatives addressing the individual needs of our students as determined by the Board of Education. The diverse resources of the school district, which includes a caring Home and School Association (HSA) and active adult community, contribute to a quality school system. They serve an integral role in supporting positive learning experiences that motivate, challenge and inspire children to learn.

Curriculum and Instruction Goals

Goal(s):

1. To ensure students are college and career ready upon graduation
2. To vertically and horizontally align curriculum K-12 to ensure successful transition of students at each grade level
3. To identify individual student strengths and weaknesses utilizing various assessment measures (formative, summative, alternative, etc.) so as to differentiate instruction while meeting the rigor of the applicable content standards
4. To improve student achievement as assessed through multiple measures including, but not limited to, state testing, local assessments, and intermediate benchmarking

Philosophy of the Shared Curriculum Service with Kingsway Regional School District

Together in its partnership with the South Harrison Township Elementary School District, the Kingsway Curriculum & Instruction Department is committed to providing all students grades K-12 with an engaging and quality curricular experience that aligns with the New Jersey Student Learning Standards (NJ SLS) for mathematics and English-Language Arts as well as the New Jersey Student Learning Standards (NJ SLS) for all other core disciplines. It is the goal of this shared service to provide students with curricular and educational experiences that allows them to succeed as they move on to the middle and high school level. Through this shared service, both horizontal and vertical alignment is stressed at and within each grade level with the aim of developing life-long learners who are college and career ready upon graduation from high school. Additionally, classroom instruction will be designed to meet the unique learning desires of all children and will be differentiated according to the needs of each learner. Whether through added support or enrichment activities, it is the role of the educator in the classroom to ensure students are reaching their highest level of social, emotional, and academic growth each school year. A combination of summative, formative, and performance-based

assessments will be used to assess students' understanding and acquisition of necessary concepts and skills. Group work, projects, and a variety of co-curricular activities will make mathematics more meaningful and aid in the understanding of its application across all disciplines as well as in life.

How to Read this Document

This document contains a pacing guide and curriculum units. The pacing guides serve to deliver an estimated timeframe as to when noted skills and topics will be taught. The pacing of each course, however, will differ slightly depending upon the unique needs of each class. The curriculum units contain more detailed information as to the specific skills and concepts that are introduced as well as how students will be assessed. The terms and definitions below will assist the reader in better understanding the sections and components of this curriculum document.

Terms to Know

1. **Accommodation(s):** The term "accommodation" may be used to describe an *alteration* of environment, curriculum format, or equipment that allows an individual with a disability to gain access to content and/or complete assigned tasks. They allow students with disabilities to pursue a regular course of study. The term accommodation is often used interchangeable with the term modification. However, it is important to remember that modifications change or modify the intended learning goal while accommodations result in the same learning goal being expected but with added assistance in that achievement. Since accommodations do not alter what is being taught, instructors should be able to implement the same grading scale for students with disabilities as they do for students without disabilities.

2. **Differentiated Instruction:** Differentiation of instruction relies on the idea that instructional approaches should be tailored to each individual student's learning needs. It provides students an array of options during the learning process that allows them make sense of ideas as it relates to them. The integration of differentiated instructional techniques is a curriculum design approach to increase flexibility in teaching and decrease the barriers that frequently limit student access to materials and learning in classrooms. http://www.udlcenter.org/aboutudl

3. **Enduring Understanding:** Enduring understandings (aka big ideas) are statements of understanding that articulate deep conceptual understandings at the heart of each content area. Enduring understandings are noted in the alongside essential questions within each unit in this document. http://www.ascd.org

4. **Essential Question:** These are questions whose purpose is to stimulate thought, to provoke inquiry, and to spark more questions. They extend beyond a single lesson or unit. Essential questions are noted in the beginning of each unit in this document. http://www.ascd.org

5. **Formative Assessment(s):** Formative assessments monitor student learning to provide ongoing feedback that can be used by (1) instructors to improve teaching and (2) by students to improve their learning. Formative assessments help identify students' strengths and weaknesses and address problems immediately.

6. **Learning Activity(s):** Learning activities are those activities that take place in the classroom for which the teacher facilitates and the students participate in to ensure active engagement in the learning process. (Robert J. Marzano, *The Art and Science of Teaching*)

7. **Learning Assignment(s):** Learning assignments are those activities that take place independently by the student inside the classroom or outside the classroom (i.e. homework) to extend concepts and skills within a lesson. http://www.marzanocenter.com

8. **Learning Goal(s):** Learning goals are broad statements that note what students "should know" and/or "be able to do" as they progress through a unit. Learning goals correlate specifically to the NJSLS (New Jersey Student Learning Standards) are noted within each unit.

9. **Learning Objective(s):** Learning objectives are more specific skills and concepts that students must achieve as they progress towards the broader learning goal. These are included within each unit and are assessed frequently by the teacher to ensure students are progressing appropriately. http://www.marzanoresearch.com

10. **Model Assessment:** Within the model curriculum, model assessments are provided that included assessments that allow for measuring student proficiency of those target skills as the year of instruction progresses. http://www.state.nj.us/education/modelcurriculum/

11. **Model Curriculum:** The model curriculum has been provided by the state of New Jersey to provide a "model" for which districts can properly implement the NJSLS (New Jersey Student Learning Standards) by providing an example from which to work and/or a product for implementation.

12. **Modification(s):** The term "modification" may be used to describe a *change* in the curriculum. Modifications are typically made for students with disabilities who are unable to comprehend all of the content an instructor is teaching. The term modification is often used interchangeable with the term accommodations. However, it is important to remember that modifications change or modify the intended learning goal while accommodations result in the same learning goal being expected but with assistance in that achievement.

13. **Performance Assessment(s):** (aka alternative or authentic assessments) Performance assessments are a form of assessment that requires students to perform tasks that generate a more authentic evaluation of a student's knowledge, skills, and abilities. Performance assessments stress the application of knowledge and extend beyond traditional assessments (i.e. multiple-choice question, matching, true & false, etc.).

14. **Standard(s):** Academic standards, from which the curriculum is built, are statements that of what students "should know" or "be able to do" upon completion of a grade-level or course of study. Educational standards help teachers ensure their students have the skills and knowledge they need to be successful by providing clear goals for student learning. http://www.state.nj.us/njded/cccs/

    - **State:** The New Jersey Student Learning Standards (NJSLS) include Preschool Teaching and Learning Standards as well as K-12 standards for: *Visual and Performing Arts; Comprehensive Health and Physical Education; Science; Social Studies; World Languages; Technology; and 21st-Century Life and Careers.*

15. **Summative Assessment(s):** Summative assessments evaluate student learning at the end of an instructional time period by comparing it against some standard or benchmark. Information from summative assessments can be used formatively when students or faculty use it to guide their efforts and activities in subsequent courses.

16. **21st Century Skill(s):** These skills emphasis the growing need to focus on those skills that prepare students successfully by focusing on core subjects and 21st century themes; learning and innovation skills; information, media and technology skills; and life and career skills. These concepts are embedded in each unit of the curriculum. http://www.p21.org/our-work/p21-framework

Proficiencies and Pacing Guide:

Unit Title	Duration/Month(s)	Related Standards	Learning Goals	Crosscutting Concepts
Unit 1 Animal Needs and the Environment	5 Weeks	**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.(K-LS1-1) **ESS3.A: Natural Resources** Living things need water, air, and resources from the land, and they live in places that havethe things they need. Humans use natural resources for everything they do.(K-ESS3-1) **ESS2.E: Biology** Plants and animals can change their environment.(K-ESS2-2)	***Students will…*** • Use observations to describe patterns of what plants and animals (including humans) need to survive. • Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live. • Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.	**Patterns** • Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1) **Cause and Effect** • Events have causes that generate observable patterns. (K-ESS3-3) **Systems** • Systems in the natural and designed world have parts that work together. (K- ESS2-2),(K-ESS3-1)
Unit 2 Pushes and Pulls	5 Weeks	**PS2.A: Forces and Motion** Pushes and pulls can have different strengths and directions. (K-PS2-1),(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-PS2-1),(K-PS2-2) **PS2.B: Types of Interactions** When objects touch or collide,	***Students will…*** • 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. • 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.	**Cause and Effect** • Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1),(K-PS2- 2) **Structure and Function** • The shape and stability of structures of natural and designed objects are related to their function(s). (K-2- ETS1-1)

		they push on one another and canchange motion. (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 toK-PS2-1)* **ETS1.A: Defining Engineering Problems** A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems mayhave many acceptable solutions. *(secondary to K-PS2- 2)*	• Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	
Unit 3 Weather & Climate	7 Weeks *Weather data collection and seasonal observations should be completed throughout the year*	**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 describe and record the weather and to notice patterns over time. **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.	***Students will…*** • Use and share observations of local weather conditions to describe patterns over time. • Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather. • Ask questions, make observations, and gather information about a situation people want to change to define a simple	**Patterns** • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. **Cause and Effect** • Events have causes that generate observable patterns.

		ETS1.A: Defining and Delimiting an Engineering Problem Asking questions, making observations, and gathering information are helpful in thinking about problems. *(secondary)*	problem that can be solved through the development of a new or improved object or tool.	
Unit 4 The Sun	7 Weeks	**PS3.B: Conservation of Energy and Energy Transfer** Sunlight warms Earth's surface. (K-PS3-1),(K-PS3-2)	***Students will…*** • Make observations to determine the effect of sunlight on Earth's surface. • Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area. • Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. • Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	**Cause and Effect** • Events have causes that generate observable patterns. (K-PS3-1),(K- PS3-2) **Structure and Function** • The shape and stability of structures of natural and designed objects are related to their function(s). (K-2- ETS1-2)
Unit 5	7 Weeks	**LS1.C: Organization for Matter**	***Students will…***	**Patterns**

Basic Needs of Plants		**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. (K-LS1-1) **ESS2.E: Biology** Plants and animals can change their environment. (K-ESS2-2) **ESS3.A: Natural Resources** Living things need water, air, and resources from the land, and they live in places that havethe things they need. Humans use natural resources for everything they do. (K-ESS3-1)	• Use observations to describe patterns of what plants and animals need to survive. • Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. • Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.	• Patterns in the natural and human designed world can be observed and used as evidence. **Systems and System Models** • Systems in the natural and designed world have parts that work together. (K- ESS2-2)(K-ESS3-1)

South Harrison School District

Kindergarten – Science

Unit 1: Animal Needs and the Environment	Recommended Duration: 5 Weeks

Unit Description:

In this unit of study, students will characterize the properties of living and non-living things. They will discover the basic needs of plants and animals.

Essential Questions	Enduring Understandings
• *What common things do animals need to survive?* • *How do plants and animals affect their surroundings?*	• All living things have basic needs that are necessary for them to survive, grow and reproduce.

New Jersey Student Learning Standards

By the end of the unit, the Student will be able to:

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-LS1-1)

Use a model to represent the relationship between the needs of different plants and 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-ESS3-1)

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-ESS2-2)

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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, storyboard) that represent concrete events or design solutions. • Use a model to represent relationships in the natural world. (K-ESS3-1) **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) **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) **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)	**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. (K-LS1-1) **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. (K-ESS3-1) **ESS2.E: Biology** • Plants and animals can change their environment. (K-ESS2-2)	**Patterns** • Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1) **Cause and Effect** • Events have causes that generate observable patterns. (K-ESS3-3) **Systems and System Models** • Systems in the natural and designed world have parts that work together. (K- ESS2-2),(K-ESS3-1)

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
• Rubrics • Learning Questions to guide unit progression • Observe and use patterns in the natural world as evidence. • Use observations *(firsthand or from media)* to describe patterns in the natural world in order to answer scientific questions. • Use observations to describe patterns in what plants need to survive. Examples of patterns could include:	• Rubrics • Oral and Slate Assessments • Science Assessment Tasks	• Science Assessment Tasks • Science Investigations • Student Science notebooks • Student-designed models	**Possible NGSS Phenomena:** ● Question: How does this whale "Bubble Feeding" dance help whales survive? ○ (video) https://youtu.be/z00G0RxeSP0 Whales Team Up in Amazing Bubble-Net Hunt | National Geographic ○ (also, https://www.ngssphenomena.com/ -Humpbacks Bubble Feeding) ● Question: Where do animals live - why do they live there? https://www.ngssphenomena.com/ - Snakes Climbing (snake finding shelter)

Possible Assessment Adjustments (Modifications /Accommodations/ Differentiation): *How will the teacher provide multiple means for the following student groups to **EXPRESS** their understanding and comprehension of the content/skills taught?*			
Special Education Students	**English Language Learners (ELLs)**	**At-Risk Learners**	**Advanced Learners**
• Modify assignments as needed (e.g., vary length, limit items) • Shorten assignments • Increase the amount of item allowed to complete assignments and tests	• Word/Picture Wall • L1 support • Word/Picture Wall • Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart • Native language support • Choice questions	• Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) • Teacher Modeling • Small group instruction • Extended time • Illustrations/diagrams/drawings	• Provide independent learning opportunities through learning contracts • Offer accelerated instruction • Computer-Assisted Instruction • Pairing direct instruction w/coaching to promote self-

• Limit amount of work required or length of tests • Hands-on-projects • Give in small groups ***Individualized per each student per IEP***	• Teacher Modeling • Illustrations/diagrams/drawings • Small group		directed learning

Instructional Strategies
• Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia,modeling). • Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, andbiographies). • Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable (NGSS)phenomena. • Structure the learning around explaining or solving a social or community-based issue.

Possible Instructional Adjustments (Modifications /Accommodations/ Differentiation): *How will the teacher provide multiple means for the following student groups to **ACCESS** the content/skills being taught?*			
Special Education Students	**English Language Learners (ELLs)**	**At-Risk Learners**	**Advanced Learners**
• Read class materials orally • Provide small group instruction • Provide study outlines/guides	• Word/Picture Wall • Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) • Native language support • Fact Family Triangles • Choice questions	• Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart, clock,) • Teacher Modeling • Small group instruction • Extended time • Illustrations/diagrams/drawings	• Provide independent learning opportunities through learning contracts • Offer accelerated instruction

Possible Instructional Adjustments (Modifications /Accommodations/ Differentiation): *How will the teacher provide multiple means for the following student groups to **ACCESS** the content/skills being taught?*			
Special Education Students	**English Language Learners (ELLs)**	**At-Risk Learners**	**Advanced Learners**
• Prior notice of tests • Test study guide • Give tests in small groups **Individualized per each student per IEP**	• Teacher Modeling • Illustrations/diagrams/drawings • Small group		• Computer-Assisted Instruction • Pairing direct instruction w/coaching to promote self-directed learning

Interdisciplinary Connections (Applicable Standards)	**Integration of Technology**	**21st Century Themes**	**21st Century Skills**
NJSLS Literacy: RI.K.1 RI.K.5 RI.K.10 W.K.2 W.K.5 L.K.1 SL.K.1 SL.K.2 ***NJSLS Mathematics:*** K.CC.B.4 K.CC.B.5 K.MD.B.3 ***Mathematical Practices:*** MP.1 MP.2 MP.3 MP.4 MP.6	**8.1 Educational Technology:** All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge • Students may use computers for reinforcement of skills during centers • Interactive whiteboards may be used to display problems and/or interactive manipulatives • Student use of iPads **8.2** All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the	**Leadership and Responsibility**- Acting responsibly with the interests of the larger community in mind. • Students will participate in class activities and discussions appropriately **Collaboration**- Demonstrating the ability to or kith diverse teams • Students will learn to work with a partner on various math activities **Critical Thinking and Problem Solving**- Exercising sound reasoning in understanding • Students will develop problem solving skills and practice verbalizing their reasoning behind it	**Leadership and Responsibility**- Acting responsibly with the interests of the larger community in mind. • Students will participate in class activities and discussions appropriately **Collaboration**- Demonstrating the ability to or kith diverse teams • Students will learn to work with a partner on various math activities **Critical Thinking and Problem Solving**- Exercising sound reasoning in understanding • Students will develop problem solving skills and practice verbalizing their reasoning behind it

Interdisciplinary Connections (Applicable Standards)	Integration of Technology	21st Century Themes	21st Century Skills
	designed world as they relate to the individual, global society, and the environment.		

Resources

Resources & Materials:

Suggested Literature:

- RAZ Kids (Leveled Texts)

Baby Animals (A)	*Hello, Butterfly (A)*	*Rabbits (A)*	*Snake Colors (A)*
This Insect (A)	*The Chicken (aa)*	*Farm Animals (aa)*	*Pets (aa)*
These birds (aa)	*Animal Ears (B)*	*Firefly (B)*	*This Turtle (B)*
All About Earthworms (C)	*All About Penguins (C)*	*All About Spiders (C)*	*The Animals of Canada (C)*
Ladybugs (C)	*Moms Do So Much (C)*	*More Baby Animals (C)*	

Website/Media Links:

- Science Evidence Statements:
  - K-LS1-1
  - K-ESS3-1
  - K-ESS2-2

- Videos:
  - The Problem With Pandas (SciShow Kids)
  - Ingenious Bubble Net Fishing - Nature's Great Events - BBC
  - PBS video - Is It Alive?
  - Youtube - Animals And Their Habitats
  - "Living or Non-living" (Teacher Tube)
  - 4 Facts to Know About Reindeer (SciShow Kids)

Unit 2: Pushes and Pulls	Recommended Duration: 5 Weeks
Unit Description: In this unit of study, students plan and carry out investigations in order to understand the effects of different strengths and different directions of pushes and pulls on the motion of an object. Students will also engage in a portion of the ***engineering design process*** to determine whether a design solution works as intended to change the speed or direction of an object.	

Essential Questions	Enduring Understandings
• *What happens if you push or pull an object harder?*	• Objects share a relationship between force and motion. • Motion is everywhere as everything is constantly moving. • Force and motion are closely related as a force can change the motion of an object

New Jersey Student Learning Standards

By the end of the unit, the Student will be able to:

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-PS2-1)

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.*] (K-PS2-2)

Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. (K- 2-ETS1-3)

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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) **Analyzing and Interpreting Data** 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) **Asking Questions and Defining Problems** • Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1) • Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2- ETS1-1) **Developing and Using Models** Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)	**PS2.A: Forces and Motion** • Pushes and pulls can have different strengths and directions. (K-PS2-1),(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-PS2-1),(K-PS2-2) **PS2.B: Types of Interactions** • When objects touch or collide, they push on one another and can change motion. (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)* **ETS1.A: Defining Engineering Problems** • 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)* **ETS1.A: Defining and Delimiting Engineering Problems** • A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2- ETS1-1) • Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)	**Cause and Effect** • Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1),(K-PS2-2) **Structure and Function** • The shape and stability of structures of natural and designed objects are related to their function(s). (K-2- ETS1-1)

	• Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)	

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
• Rubrics • Learning Questions to guide unit progression • Observe and use patterns in the natural world as evidence. • Use observations *(firsthand or from media)* to describe patterns in the natural world in order to answer scientific questions. • Use observations to describe patterns in what plants need to survive. Examplesof patterns could include:	• Rubrics • Oral and Slate Assessments • Science Assessment Tasks	• Science Assessment Tasks • Science Investigations • Student Science notebooks • Student-designed models	**Possible NGSS Phenomena:** Vintage Pinball Machine How is this ball bouncing around? Ultimate Penalty Shootout w/ Weidenfeller How do these soccer players know how hard to kick or where to kick the ball? Is there a science to soccer?

Possible Assessment Adjustments (Modifications /Accommodations/ Differentiation): *How will the teacher provide multiple means for the following student groups to **EXPRESS** their understanding and comprehension of the content/skills taught?*			
Special Education Students	**English Language Learners (ELLs)**	**At-Risk Learners**	**Advanced Learners**
• Modify assignments as needed (e.g., vary length, limit items) • Shorten assignments • Increase the amount of item allowed to complete assignments and tests • Limit amount of work required or length of tests • Hands-on-projects • Give in small groups ***Individualized per each student per IEP***	• Word/Picture Wall • L1 support • Word/Picture Wall • Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart • Native language support • Choice questions • Teacher Modeling • Illustrations/diagrams/drawings • Small group	• Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) • Teacher Modeling • Small group instruction • Extended time • Illustrations/diagrams/drawings	• Provide independent learning opportunities through learning contracts • Offer accelerated instruction • Computer-Assisted Instruction • Pairing direct instruction w/coaching to promote self-directed learning

Instructional Strategies
• Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia,modeling). • Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, andbiographies). • Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable (NGSS)phenomena. • Structure the learning around explaining or solving a social or community-based issue.

Possible Instructional Adjustments (Modifications /Accommodations/ Differentiation): *How will the teacher provide multiple means for the following student groups to **ACCESS** the content/skills being taught?*			
Special Education Students	**English Language Learners (ELLs)**	**At-Risk Learners**	**Advanced Learners**
• Read class materials orally • Provide small group instruction • Provide study outlines/guides • Prior notice of tests • Test study guide • Give tests in small groups **Individualized per each student per IEP**	• Word/Picture Wall • Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) • Native language support • Fact Family Triangles • Choice questions • Teacher Modeling • Illustrations/diagrams/drawings • Small group	• Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart, clock,) • Teacher Modeling • Small group instruction • Extended time • Illustrations/diagrams/drawings	• Provide independent learning opportunities through learning contracts • Offer accelerated instruction • Computer-Assisted Instruction • Pairing direct instruction w/coaching to promote self-directed learning

Interdisciplinary Connections (Applicable Standards)	**Integration of Technology**	**21st Century Themes**	**21st Century Skills**
NJSLS Literacy: RI.K.1 RI.K.5 RI.K.10 W.K.2 W.K.5 L.K.1 SL.K.1 SL.K.2	**8.1 Educational Technology:** All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge • Students may use computers for reinforcement of skills during centers	**Leadership and Responsibility**- Acting responsibly with the interests of the larger community in mind. • Students will participate in class activities and discussions appropriately **Collaboration**- Demonstrating the ability to or kith diverse teams • Students will learn to work	**Leadership and Responsibility**- Acting responsibly with the interests of the larger community in mind. • Students will participate in class activities and discussions appropriately **Collaboration**- Demonstrating the ability to or kith diverse teams • Students will learn to work with a partner on various math activities

Interdisciplinary Connections (Applicable Standards)	Integration of Technology	21st Century Themes	21st Century Skills
NJSLS Mathematics: K.CC.B.4 K.CC.B.5 K.MD.B.3 ***Mathematical Practices:*** MP.1 MP.2 MP.3 MP.4 MP.6	• Interactive whiteboards may be used to display problems and/or interactive manipulatives • Student use of iPads **8.2** All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.	with a partner on various math activities **Critical Thinking and Problem Solving**- Exercising sound reasoning in understanding • Students will develop problem solving skills and practice verbalizing their reasoning behind it	**Critical Thinking and Problem Solving**- Exercising sound reasoning in understanding • Students will develop problem solving skills and practice verbalizing their reasoning behind it

Resources

Resources & Materials:

Suggested Literature:

- Trade books:
  - *Silly Sally* (A. Wood)
  - *Roller Coaster* (M. Frazee)
- RAZ Kids (level)

Machines (C) *Tools (C)*

Website/Media Links:

- Science Evidence Statements:
  - K-PS2-1
  - K-PS2-2
  - K-2-ETS1-3

Videos:

- SciShow Kids (YouTube Channel)
  - Slipping, Sliding Science
  - Ramps: A super Simple Machine
  - Solve Problems: Be an Engineer!
- BrainPop Jr
  - Pushes and Pulls

✓ 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.

Unit 3: Weather and Climate	Recommended Duration: 6 Weeks
Unit Description: Unlike other science units, the Weather unit is intended to become a part of the classroom routine throughout the year. Some weather patterns are not obvious unless the students collect data over long periods of time. For example, in some locations it is sunnier during some parts of a year than others. The temperature outside will change from fall, winter, spring, to summer. Also, during some periods, the weather data should be recorded in the morning and then again in the afternoon. Students will be able to observe patterns in temperature through the course of the day.	

Essential Questions	Enduring Understandings
• *What is the weather like today, and how is it different from yesterday?*	• The weather all around us is constantly changing.

New Jersey Student Learning Standards

By the end of the unit, the Student will be able to:

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-ESS2-1)

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.] (K-ESS3-2)

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-ETS1-1)

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.	**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.	**Patterns** • Patterns in the natural world can be observed, used to describe phenomena, and used as

• Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. **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. **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.	People measure these conditions to describe and record the weather and to notice patterns over time. **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. **ETS1.A: Defining and Delimiting an Engineering Problem** Asking questions, making observations, and gathering information are helpful in thinking about problems. *(secondary)*	evidence. **Cause and Effect** • Events have causes that generate observable patterns.

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
• Rubrics • Learning Questions to guide unit progression • Observe and use patterns in the natural world as evidence. • Use observations *(firsthand or from media)* to describe patterns in the natural world in order to answer scientific	• Rubrics • Oral and Slate Assessments • Science Assessment Tasks	• Science Assessment Tasks • Science Investigations • Student Science notebooks • Student-designed models	**Possible NGSS Phenomena:** Read the local weather forecast from an online or print resource. Make a list of the words that they use to describe weather (cloudy, sunny, partly cloudy, temperature, and wind). As a class, create symbols that the students can use to record the weather each day.

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
questions. • Use observations to describe patterns in what plants need to survive. Examples of patterns could include:			

Possible Assessment Adjustments (Modifications /Accommodations/ Differentiation): *How will the teacher provide multiple means for the following student groups to **EXPRESS** their understanding and comprehension of the content/skills taught?*			
Special Education Students	**English Language Learners (ELLs)**	**At-Risk Learners**	**Advanced Learners**
• Modify assignments as needed (e.g., vary length, limit items) • Shorten assignments • Increase the amount of item allowed to complete assignments and tests • Limit amount of work required or length of tests • Hands-on-projects • Give in small groups ***Individualized per each student per IEP***	• Word/Picture Wall • L1 support • Word/Picture Wall • Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart • Native language support • Choice questions • Teacher Modeling • Illustrations/diagrams/drawings • Small group	• Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) • Teacher Modeling • Small group instruction • Extended time • Illustrations/diagrams/drawings	• Provide independent learning opportunities through learning contracts • Offer accelerated instruction • Computer-Assisted Instruction • Pairing direct instruction w/coaching to promote self-directed learning

Instructional Strategies
• Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling). • Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).

Instructional Strategies
• Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable (NGSS) phenomena. • Structure the learning around explaining or solving a social or community-based issue.

Possible Instructional Adjustments (Modifications /Accommodations/ Differentiation): *How will the teacher provide multiple means for the following student groups to **ACCESS** the content/skills being taught?*			
Special Education Students	**English Language Learners (ELLs)**	**At-Risk Learners**	**Advanced Learners**
• Read class materials orally • Provide small group instruction • Provide study outlines/guides • Prior notice of tests • Test study guide • Give tests in small groups **Individualized per each student per IEP**	• Word/Picture Wall • Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) • Native language support • Fact Family Triangles • Choice questions • Teacher Modeling • Illustrations/diagrams/drawings • Small group	• Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart, clock,) • Teacher Modeling • Small group instruction • Extended time • Illustrations/diagrams/drawings	• Provide independent learning opportunities through learning contracts • Offer accelerated instruction • Computer-Assisted Instruction • Pairing direct instruction w/coaching to promote self-directed learning

Interdisciplinary Connections (Applicable Standards)	**Integration of Technology**	**21st Century Themes**	**21st Century Skills**
NJSLS Literacy: RI.K.1 RI.K.5 RI.K.10	**8.1 Educational Technology:** All students will use digital tools to access, manage, evaluate, and synthesize information in order to	**Leadership and Responsibility**- Acting responsibly with the interests of the larger community in mind.	**Leadership and Responsibility**- Acting responsibly with the interests of the larger community in mind. • Students will participate in class

Interdisciplinary Connections (Applicable Standards)	Integration of Technology	21st Century Themes	21st Century Skills
W.K.2 W.K.5 L.K.1 SL.K.1 SL.K.2 ***NJSLS Mathematics:*** K.CC.B.4 K.CC.B.5 K.MD.B.3 ***Mathematical Practices:*** MP.1 MP.2 MP.3 MP.4 MP.6	solve problems individually and collaborate and to create and communicate knowledge • Students may use computers for reinforcement of skills during centers • Interactive whiteboards may be used to display problems and/or interactive manipulatives • Student use of iPads **8.2** All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.	• Students will participate in class activities and discussions appropriately **Collaboration**- Demonstrating the ability to or kith diverse teams • Students will learn to work with a partner on various math activities **Critical Thinking and Problem Solving**- Exercising sound reasoning in understanding • Students will develop problem solving skills and practice verbalizing their reasoning behind it	activities and discussions appropriately **Collaboration**- Demonstrating the ability to or kith diverse teams • Students will learn to work with a partner on various math activities **Critical Thinking and Problem Solving**- Exercising sound reasoning in understanding • Students will develop problem solving skills and practice verbalizing their reasoning behind it

Resources

Resources & Materials:

Suggested Literature:

- RAZ Kids (level)

The Rainstorm (A) *Rain in the City (B)* *Rain in the Country (B)* *Snow Falls (C)*

Fog (D)

Website/Media Links:

- Science Evidence Statements:
  - K-ESS2-1

Resources

- K-ESS3-2

Weather Study:

In this ongoing study, students are expected to develop an understanding of patterns and variations in local weather and how they respond to the weather.

- They look for cause and effect relationships between the day's weather and the clothing that they wear.
- They look for patterns between hazardous weather (very hot/very cold, rain, snow, and thunderstorm) and relate that to how their choices help to keep them comfortable and safe.

With adult support, students use trade books (read-alouds, big books) to learn about and discuss 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.

Students learn that we can help people to be safe from hazardous weather (thunderstorms, hurricanes, and nor'easters,) through engineering. Students begin by comparing and contrasting hazardous weather events. With the support of the teacher, they ask scientific questions about how each type of weather is hazardous, gather information that will help them understand the types of problems they might face when severe weather conditions exist, and in and around their homes, schools, and communities, and work together to design ways to keep people safe during hazardous weather events.

In this unit's progression of learning, students first develop an understanding that patterns in the natural world can be observed and documented, and that, like scientists, they can use these patterns as evidence to describe phenomena (weather conditions) and make predictions (what will the weather be like tomorrow?). In order to observe patterns in weather, kindergartners will learn that weather is the combination of sunlight, wind, precipitation, and temperature in a particular region at a particular time (See Appendix B, Weather Chart). By observing and recording daily weather events—such as sunny, cloudy, rainy, and windy— students can analyze both qualitative and quantitative data. Recording and analyzing data over time will reveal recognizable weather patterns that can be used to make predictions.

Examples of weather patterns may include:

- Snow and colder temperatures generally occur in the winter.
- Clouds may bring rain or snow.
- Rain occurs more often in the spring.
- Warmer/hotter temperatures occur in the summer.
- It is generally cooler in the morning and warmer in the afternoon.

At this grade level, it is developmentally appropriate to describe temperature in relative terms; therefore, vocabulary words such as hot, warm, cool, cold, and warmer/cooler can be used to describe temperature. Students may also record temperature in degrees Fahrenheit and relate the number of degrees with descriptors such as hot, warm, cold, cool, and warmer/colder.

Weather Activities:

- About the Weather: This lesson is about using local weather to make observations, measure, collect, and record data to describe patterns over time. Students will

Resources
count types of outdoor clothing worn by classmates and use the data to look for patterns in weather over months and seasons. ● Science- Weather: This is a free interactive learning activity designed for individual students and can easily be used as a whole class interactive whiteboard activity. This particular title explores weather in relationship to season and temperature. Students learn to use a thermometer as a tool for recording temperature and identify the four seasons through measurable changes in the thermometer readings. ● Weather Patterns: This lesson is the first in a two-part series on the weather. The study of the weather in these early years is important because it can help students understand that some events in nature have a repeating pattern. It also is important for students to study the earth repeatedly because they take years to acquire the knowledge that they need to complete the picture.

Unit 4: The Sun	Recommended Duration: 7 Weeks
Unit Description: In this unit of study, students investigate the effects of the sun on the surface of the Earth. Throughout the unit, students make observations in order to describe patterns of change. With adult support, they design and build a structure that will reduce the warming effect of sunlight, and then conduct tests to determine if the structure works as intended.	

Essential Questions	Enduring Understandings
• *How can we use science to keep a playground cool in the summertime?*	• The sun provides heat.

New Jersey Student Learning Standards

By the end of the unit, the Student will be able to:

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-PS3-1)

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-PS3-2)

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-ETS1-1)

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-ETS1-2)

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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	**PS3.B: Conservation of Energy and Energy Transfer** • Sunlight warms Earth's surface. (K-PS3-1),(K-PS3-2) **ETS1.A: Defining and Delimiting Engineering**	**Cause and Effect** • Events have causes that generate observable patterns. (K-PS3-1),(K- PS3-2) **Structure and Function** • The shape and stability of structures of

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) **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) **Asking Questions and Defining Problems** • Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1) • Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2- ETS1-1) **Developing and Using Models** • Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2) **Analyzing and Interpreting Data** • Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)	**Problems** • A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) • Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) • Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1) **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. (K-2-ETS1-2) **ETS1.C: Optimizing the Design Solution** Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)	natural and designed objects are related to their function(s). (K-2- ETS1-2)

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
• Rubrics • Learning Questions to guide unit progression • Observe and use patterns in the natural world as evidence. • Use observations *(firsthand or from media)* to describe patterns in the natural world in order to answer scientific questions. • Use observations to describe patterns in what plants need to survive. Examples of patterns could include:	• Rubrics • Oral and Slate Assessments • Science Assessment Tasks	• Science Assessment Tasks • Science Investigations • Student Science notebooks • Student-designed models	**Possible NGSS Phenomena:** Playground Lab: • *How does sunlight affect the playground?* • *Imagine that we have been asked to design a new playground. How would we keep the sand, soil, rocks, and water found on the playground cool during the summer?*

Possible Assessment Adjustments (Modifications /Accommodations/ Differentiation): *How will the teacher provide multiple means for the following student groups to **EXPRESS** their understanding and comprehension of the content/skills taught?*			
Special Education Students	**English Language Learners (ELLs)**	**At-Risk Learners**	**Advanced Learners**
• Modify assignments as needed (e.g., vary length, limit items) • Shorten assignments • Increase the amount of item allowed to complete assignments and tests • Limit amount of work required or length of tests	• Word/Picture Wall • L1 support • Word/Picture Wall • Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart • Native language support • Choice questions • Teacher Modeling	• Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) • Teacher Modeling • Small group instruction • Extended time • Illustrations/diagrams/drawings	• Provide independent learning opportunities through learning contracts • Offer accelerated instruction • Computer-Assisted Instruction • Pairing direct instruction w/coaching to promote self-directed learning

Possible Assessment Adjustments (Modifications /Accommodations/ Differentiation): *How will the teacher provide multiple means for the following student groups to **EXPRESS** their understanding and comprehension of the content/skills taught?*			
Special Education Students	**English Language Learners (ELLs)**	**At-Risk Learners**	**Advanced Learners**
• Hands-on-projects • Give in small groups ***Individualized per each student per IEP***	• Illustrations/diagrams/drawings • Small group		

Instructional Strategies
• Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling). • Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies). • Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable (NGSS) phenomena. • Structure the learning around explaining or solving a social or community-based issue.

Possible Instructional Adjustments (Modifications /Accommodations/ Differentiation): *How will the teacher provide multiple means for the following student groups to **ACCESS** the content/skills being taught?*			
Special Education Students	**English Language Learners (ELLs)**	**At-Risk Learners**	**Advanced Learners**
• Read class materials orally • Provide small group instruction • Provide study outlines/guides	• Word/Picture Wall • Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) • Native language support • Fact Family Triangles	• Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart, clock,) • Teacher Modeling • Small group instruction • Extended time	• Provide independent learning opportunities through learning contracts • Offer accelerated instruction

Possible Instructional Adjustments (Modifications /Accommodations/ Differentiation): *How will the teacher provide multiple means for the following student groups to **ACCESS** the content/skills being taught?*			
Special Education Students	**English Language Learners (ELLs)**	**At-Risk Learners**	**Advanced Learners**
• Prior notice of tests • Test study guide • Give tests in small groups **Individualized per each student per IEP**	• Choice questions • Teacher Modeling • Illustrations/diagrams/drawings • Small group	• Illustrations/diagrams/drawings	• Computer-Assisted Instruction • Pairing direct instruction w/coaching to promote self-directed learning

Interdisciplinary Connections (Applicable Standards)	**Integration of Technology**	**21st Century Themes**	**21st Century Skills**
NJSLS Literacy: RI.K.1 RI.K.5 RI.K.10 W.K.2 W.K.5 L.K.1 SL.K.1 SL.K.2 ***NJSLS Mathematics:*** K.CC.B.4 K.CC.B.5 K.MD.B.3 ***Mathematical Practices:*** MP.1 MP.2 MP.3 MP.4 MP.6	**8.1 Educational Technology:** All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge • Students may use computers for reinforcement of skills during centers • Interactive whiteboards may be used to display problems and/or interactive manipulatives • Student use of iPads **8.2** All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the	**Leadership and Responsibility**- Acting responsibly with the interests of the larger community in mind. • Students will participate in class activities and discussions appropriately **Collaboration**- Demonstrating the ability to or kith diverse teams • Students will learn to work with a partner on various math activities **Critical Thinking and Problem Solving**- Exercising sound reasoning in understanding • Students will develop problem solving skills and practice verbalizing their reasoning behind it	**Leadership and Responsibility**- Acting responsibly with the interests of the larger community in mind. • Students will participate in class activities and discussions appropriately **Collaboration**- Demonstrating the ability to or kith diverse teams • Students will learn to work with a partner on various math activities **Critical Thinking and Problem Solving**- Exercising sound reasoning in understanding • Students will develop problem solving skills and practice verbalizing their reasoning behind it

Interdisciplinary Connections (Applicable Standards)	Integration of Technology	21st Century Themes	21st Century Skills
	designed world as they relate to the individual, global society, and the environment.		

Resources

Resources & Materials:

Suggested Literature:

- RAZ Kids (level)

Spring and Fall (A)	*It is Fall (aa)*	*Spring Weather (A)*	*Summer (aa)*
Winter (aa)	*It is a Spring Day (B)*	*Fall (C)*	*What Season Is It? (C)*

Website/Media Links:

- Science Evidence Statements:
  - K-PS3-1

Weather Study:

Scientists use different ways to study the world. In this unit's progression of learning, students work like scientists to investigate the warming effect of sunlight on the surface of the Earth. They will conduct simple investigations in order to make observations and collect data that can be used to make comparisons. Students should test a variety of materials that are found naturally on the surface of the Earth, including sand, soil, rocks, and water. Samples of each of these materials can be placed on two separate paper plates or shallow plastic containers; one container can be placed in direct sunlight, and the other can be placed out of direct sunlight. After a period of time, students should compare the relative temperature of each. Students should record their observations, then analyze and compare the data to determine if there is a pattern. They should draw the conclusion that the sun has the same warming effect on all the materials found on the surface of the Earth.

As students come to understand that the sun warms the surface of the Earth, they should engage in the engineering design process as follows:

- Students are challenged to design and build a structure that will reduce the warming effects of thesun.
- Students brainstorm a list of objects that reduce the warming effects of the sun (e.g., shade trees, umbrellas, large hats, canopies).
- As a class, students determine what the design should be able to do (criteria). Forexample:
  - The structure must reduce the warming effects of the sun.
  - The structure should be built using materials provided by theteacher.
  - The structure should be easy to carry and fit through the doorway of theclassroom.
- Groups of students then use simple drawings or diagrams to design a structure, and use given tools and materials to build their design. Groups should be given a

Resources
predetermined amount of time to draw and build their designs. ● Groups share their designs with the class, using their drawings or diagrams, and then test their designs outside. (Groups can place their structures in a sunny area, then compare the relative temperature of the ground under the structure and the ground in direct sunlight.). ● Students make and use observations to determine if the designs worked as intended, then compare the strengths and weaknesses of how each design performed. **Weather Activities:** Casting Shadows Across Literacy and Science: This lesson introduces shadows by taking students on a shadow walk. Ideally this should be done on a sunny day in the schoolyard or neighborhood, but it can be a simple walk around the classroom. A Big Star: This reading passage that explains what the sun is and that it provides heat to the Earth. This activity comes with comprehension and critical thinking questions. The Warmth of the Sun: This lesson helps students broaden their understanding of the sun, particularly its critical role in warming the land, air, and water around us. The Sun: An Introduction : This lesson plan from NASA is adaptable to several grade band levels and introduces the topic of the Sun. Cooler in the Shadows: This lesson includes several activities where students observe, explore, and analyze shadows. Students will make inferences about the cause of shadows, The lesson is linked to NASA's MESSENGER spacecraft in its voyage to and around Mercury. This lesson is designed to last 4 or more days. There are four different activities within the lesson. The teacher will need to gather some materials prior to beginning the lesson. Shadow Smile! - Part 6 | Sid the Science Kid: In this song, Miss Susie teaches the class about shadows and the necessary shade they provide for people and animals in the heat! Learn how shadows are a result of an object getting in the way of the path of the sun and that the shadow it casts over the ground provides shade.

Unit 5: Basic Needs of Plants	Recommended Duration: 7 Weeks
Unit Description: 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.	

Essential Questions	Enduring Understandings
• *Do plants and animals all need the same things to survive?*	• Plants and animals need things to survive and thrive.

New Jersey Student Learning Standards

By the end of the unit, the Student will be able to:

Use observations to describe patterns of what plants and animals 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-LS1-1)

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-ESS2-2)

Use a model to represent the relationship between the needs of different plants and 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-ESS3-1)

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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	**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.	**Patterns** • Patterns in the natural and human designed world can be observed and used as evidence. **Systems and System Models** • Systems in the natural and designed world have parts that work together. (K- ESS2-

in the natural world in order to answer scientific questions. (K-LS1-1) **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) **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, storyboard) that represent concrete events or design solutions. • Use a model to represent relationships in the natural world. (K-ESS3-1)	(K-LS1-1) **ESS2.E: Biology** • Plants and animals can change their environment. (K-ESS2-2) **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. *(secondary)* (K-ESS2-2) **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. (K-ESS3-1)	2)(K-ESS3-1)

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
• Rubrics • Learning Questions to guide unit progression • Observe and use patterns in the natural world as evidence. • Use observations *(firsthand or from media)* to describe patterns in the natural world in order to answer scientific	• Rubrics • Oral and Slate Assessments • Science Assessment Tasks	• Science Assessment Tasks • Science Investigations • Student Science notebooks • Student-designed models	**Possible NGSS Phenomena:** *My cat eats cat food and my dog eats dog food; I eat people food.* **Focus Questions:** • *Are plants alive?* • *Do plants eat?* • *What do plants need to survive and grow?*

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
questions. • Use observations to describe patterns in what plants need to survive. Examples of patterns could include:			

Possible Assessment Adjustments (Modifications /Accommodations/ Differentiation): *How will the teacher provide multiple means for the following student groups to **EXPRESS** their understanding and comprehension of the content/skills taught?*			
Special Education Students	**English Language Learners (ELLs)**	**At-Risk Learners**	**Advanced Learners**
• Modify assignments as needed (e.g., vary length, limit items) • Shorten assignments • Increase the amount of item allowed to complete assignments and tests • Limit amount of work required or length of tests • Hands-on-projects • Give in small groups ***Individualized per each student per IEP***	• Word/Picture Wall • L1 support • Word/Picture Wall • Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart • Native language support • Choice questions • Teacher Modeling • Illustrations/diagrams/drawings • Small group	• Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) • Teacher Modeling • Small group instruction • Extended time • Illustrations/diagrams/drawings	• Provide independent learning opportunities through learning contracts • Offer accelerated instruction • Computer-Assisted Instruction • Pairing direct instruction w/coaching to promote self-directed learning

Instructional Strategies
• Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling). • Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).

Instructional Strategies
• Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable (NGSS) phenomena. • Structure the learning around explaining or solving a social or community-based issue.

Possible Instructional Adjustments (Modifications /Accommodations/ Differentiation): *How will the teacher provide multiple means for the following student groups to **ACCESS** the content/skills being taught?*			
Special Education Students	**English Language Learners (ELLs)**	**At-Risk Learners**	**Advanced Learners**
• Read class materials orally • Provide small group instruction • Provide study outlines/guides • Prior notice of tests • Test study guide • Give tests in small groups **Individualized per each student per IEP**	• Word/Picture Wall • Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) • Native language support • Fact Family Triangles • Choice questions • Teacher Modeling • Illustrations/diagrams/drawings • Small group	• Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart, clock,) • Teacher Modeling • Small group instruction • Extended time • Illustrations/diagrams/drawings	• Provide independent learning opportunities through learning contracts • Offer accelerated instruction • Computer-Assisted Instruction • Pairing direct instruction w/coaching to promote self-directed learning

Interdisciplinary Connections (Applicable Standards)	**Integration of Technology**	**21st Century Themes**	**21st Century Skills**
NJSLS Literacy: RI.K.1 RI.K.5 RI.K.10	**8.1 Educational Technology:** All students will use digital tools to access, manage, evaluate, and synthesize information in order to	**Leadership and Responsibility**- Acting responsibly with the interests of the larger community in mind.	**Leadership and Responsibility**- Acting responsibly with the interests of the larger community in mind. • Students will participate in class

Interdisciplinary Connections (Applicable Standards)	Integration of Technology	21st Century Themes	21st Century Skills
W.K.2 W.K.5 L.K.1 SL.K.1 SL.K.2 ***NJSLS Mathematics:*** K.CC.B.4 K.CC.B.5 K.MD.B.3 ***Mathematical Practices:*** MP.1 MP.2 MP.3 MP.4 MP.6	solve problems individually and collaborate and to create and communicate knowledge • Students may use computers for reinforcement of skills during centers • Interactive whiteboards may be used to display problems and/or interactive manipulatives • Student use of iPads **8.2** All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.	• Students will participate in class activities and discussions appropriately **Collaboration**- Demonstrating the ability to or kith diverse teams • Students will learn to work with a partner on various math activities **Critical Thinking and Problem Solving**- Exercising sound reasoning in understanding • Students will develop problem solving skills and practice verbalizing their reasoning behind it	activities and discussions appropriately **Collaboration**- Demonstrating the ability to or kith diverse teams • Students will learn to work with a partner on various math activities **Critical Thinking and Problem Solving**- Exercising sound reasoning in understanding • Students will develop problem solving skills and practice verbalizing their reasoning behind it

Resources
Resources & Materials: ***Suggested Literature:*** ● RAZ Kids (level) *Vegetables A; Apple Tree C; Cranberries D Future Flowers D; Grow, Vegetables, Grow! D* ***Website/Media Links:*** ● Science Evidence Statements: ○ K-LS1-1 ○ K-ESS2-2

Resources

- K-ESS3-1

Weather Activities:

- The Needs of Living Things This lesson plan has one level for Grades K-2 and another level for Grades 3-5. Students will learn about what plants and animals need to survive and how habitats support those needs. They will also learn about how organisms can change their environment.
- Living Things and Their Needs: This is an excellent resource that provides a Teacher Guide, videos, reading resources, and student activity sheets. The objective of the lessons is for students to learn about living organisms and what they need to survive. These lessons can easily be taught as an interdisciplinary set of learningexperiences.
- How do living things Interact: This unit plan is about unit plan about living things and environmental interactions
- 5E Science Lesson Plan: This Prezi presentation describes lesson ideas that support students' understanding of living organisms. Lessons also provide an opportunity for students to identify patterns that help them determine similarities and differences between plants and animals.
- Curious George: Paper Towel Plans: This video from Curious George shows students helping bean seeds sprout outside of soil by meeting their essential needs for moisture, temperature, air, and light. The children place the beans and a wet paper towel inside a zippered plastic bag and leave them undisturbed in a warm, well-lighted place. After two weeks, the students return and observe that the beans have sprouted and, like apple seeds, will one day grow to be fully developed plants.
- From Seed to Fruit | Everyday Learning: Seed to Fruit takes children through the different stages of growth in the life of a cherry tomato plant. Planting a seed in a cup and watching it grow over time is a wonderful way to introduce the life cycle to young children. This resource is part of the KET Everyday Science for Preschoolers collection. This video is available in both English and Spanish audio, along with corresponding closed captions.
- Think Garden: The Importance of Water: This video from KET's Think Garden collection explores why plants need water to survive, and how they tell us they're thirsty. Learn about the signs plants give when they've had too much or too little water and the part water plays in the process of photosynthesis. See a quick, easy-to-understand animation explaining the water cycle and transpiration process. Also find out how to improve water quality with rain gardens and how to conserve water with rain barrels. This video is available in both English and Spanish audio, along with corresponding closedcaptions.
- Think Garden: Plant Structure: This video from KET's Think Garden collection examines plant structure by taking a closer look at the root and shoots systems. Learn about roots, stems, leaves, flowers, seeds, and fruit through engaging illustrations and animations.