Kindergarten Science
Year-at-a-Glance

Pushes and Pulls	Interdependent Relationships in Ecosystems: Humans, Animals, Plants and their Environment	Weather and Climate
September-November	December-February	March-June
K-PS2-1 (PS2.A, PS2.B, PS2.C) K-PS2-2 (PS2.A) K-ETS1-1 (ETS1.A, ETS1.B), ETS1.C) K-ETS1-2 (ETS1.A, ETS1.B, ETS1.C) K-ETS1-3 (ETS1.A, ETS1.B, ETS1.C)	K-LS1-1 (LS1.C) K-ESS2-2 (ESS3.C, ESS2.E) K-ESS3-1 (ESS3.A) K-ESS3-3 (ESS3.C) K-ETS1-1 (ETS1.A, ETS1.B, ETS1.C) K-ETS1-2 (ETS1.A, ETS1.B, ETS1.C) K-ETS1-3 (ETS1.A, ETS1.B, ETS1.C)	K-ESS2-1 (ESS2.D) K-ESS3-2 (ESS3.B) K-PS3-1 (PS3.B) K-PS3-2 (PS3.B) K-ETS1-1 (ETS1.A, ETS1.B, ETS1.C) K-ETS1-2 (ETS1.A, ETS1.B, ETS1.C) K-ETS1-3 (ETS1.A, ETS1.B, ETS1.C)

Standards are listed in a numerical order only and may be taught in any order within the unit.

*The standards listed in red are the Disciplinary Core ideas as they relate to the Performance Expectations within the units.

NOTE: The Science and Engineering Practices are interwoven and should be addressed throughout the year in as many different units and tasks as possible in order to stress the natural connections that exist among mathematical concepts.

Science Curriculum - Kindergarten

Unit 1 Pushes and Pulls

Performance Expectations

K.PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. [Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.] [*Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.*]

K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.* [Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.] [*Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.*]

Science and Engineering Practices:

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)

Disciplinary Core Ideas:

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

Crosscutting Concept:

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)

Connections to the Nature of Science Scientific Investigations Use a Variety of Methods Scientists use different ways to study the world. (K-PS2-1)	• 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)*	

Essential Questions

- What happens if you push or pull an object harder?
- How does push or pull effect the motion of an object?
- What happens when objects touch or collide?
- How does an object change direction?

Vocabulary

analyze, measurable, collide, motion, conduct, plan, data, pulls, decrease, pushes, describe, speed, difference, investigate, direction, increase, distance, engineering

Resources and Links

Videos

PS2.A Forces and Motion- Bozeman Science Video

PS2. B Types of Interactions- Bozeman Science Video

PS3.C Relationship between Energy and Forces- Bozeman Science Video

ETS1.A Defining Engineering Problems-Bozeman Science Video

BrainPop Jr.: Pushes and Pulls

Push and Pull Song

Other Resources

Mystery Science-

Mystery 1: What is the biggest excavator?

Mystery 2: How can you knock down a wall made of concrete?

Mystery 3: Coming September 2017

Activities

-Teachers Pay Teachers (free downloads)

https://www.teacherspayteachers.com/Product/Science-Push-Pull-Sort-2253794

https://www.teacherspayteachers.com/FreeDownload/Push-Or-Pull-2133593

Force and Motion Pushes and Pulls (Books, Experiments, Activities & Printables- TPT ($3.50)

Force and Motion Activity Set (playdoughplato.com)

Tower Of Coins

Force and Motion Hands on Science Unit- TPT ($8)

Push and Pull Research Project (https://thekindergartensmorgasboard.com)

Forces and Motion Kindergarten Bundle- TPT ($6.50)

Transfer of Energy Marble Roll

19 Fun Ideas and Resources for Force and Motion

4 Simple Experiments to Introduce Push and Pull (weareteachers.com)

Books

My Big Book of Trucks and Diggers (Chronicle Books)

Dazzling Diggers (Tony Mitton)

Barney Backhoe and the Big City Dig (Susan Knopf)

Forces Make Things Move (Kimberly Brubaker Bradley)

Push And Pull (Patricia Murphy)

Move it! Forces, Motion, and You! (Adrienne Mason)

Motion: Push and Pull, Fast and Slow (Darlene Stille)

Roll, Slope, and Slide: A Book About Ramps (Michael Dahl)

And Everyone Shouted,“Pull: A First Look at Forces and Motion (Claire Llewellyn)

Forces and Motion (Tom DeRosa)

Summative/Formative Assessment

Formative

Classroom observations
Science Journal
K-W-L (What you Know, What you Want to know)

Summative
K-W-L (What you Learned)

Literacy Standards

NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. (K-PS2-2)

NJSLSA.W7. Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation. (K-PS2-1)

NJSLSA.SL3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric. (K-PS2-2)

Math Standards

MP.2 Reason abstractly and quantitatively. (K-PS2-1)
K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-PS2-1)
K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-PS2-1)

1.OA.A.1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)

1.MD.C.4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)

Additional Information

-NGSS Interactive site: http://www.nextgenscience.org/search-standards

Science Curriculum - Kindergarten

Unit 2 Interdependent Relationships in Ecosystems: Humans, Animals, and Plants in their Environment

Performance Expectations	
K-LS1-1.	Use observations to describe patterns of what plants and animals (including humans) need to survive. [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]
K-ESS2-2.	Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]
K-ESS3-1.	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-ESS3-3.	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.]

Science and Engineering Practices:	**Disciplinary Core Ideas:**	**Crosscutting Concept:**
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.	**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) **ESS2.E: Biogeology** ● Plants and animals can change their environment. (K-ESS2-2) **ESS3.A: Natural Resources**	**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

● 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) - ***Connections to Nature of Science*** Scientific Knowledge is Based on Empirical Evidence Scientists look for patterns and order when making observations about the world. (K-LS1-1)	● 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) **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. (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. *(secondary to K-ESS3-3)*	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)

Essential Questions

- How and why do organisms interact with their environment and what are the effects of these interactions?
- How can an organism in a particular habitat survive well, less well or not at all?

- What do all plants and animals (including humans) need in order to live and grow?
- Where do plants and animals obtain their food?
- How do plants and animals (including humans) change their environment?
- •How are an animal's needs (including humans) met within its habitat?
- What choices can people make to reduce their impact on the land, water, air, and other living things?

Vocabulary

analyze, habitat, evidence, animals, humans, reuse, basic needs, impact, resources, change, natural resources, environment, compare, plants, construct, recycle, describe, reduce

Resources and Links

Videos

LS1.C. Matter and Energy Flow in Organisms – Bozeman Science Video

ESS2.E. Biogeology- Bozeman Science Video
ESS3.A. Natural Resources- Bozeman Science Video
ESS3.C. Human Impacts on Earth's Systems- Bozeman Science Video

BrainPopJr: Plant Adaptations

Harry Kindergarten - "The Needs of an Animal" (youtube)

Harry Kindergarten - "The Needs of a Plant" (youtube)

Other Resources

Mystery Science-

Mystery 1: Why do woodpeckers peck wood?

Mystery 2: How can you find animals in the woods?

Mystery 3: How do plants and trees grow?

Activities

Animals: Needs, Patterns, Habitats & Impacts on Earth- TPT ($8)

Plants, Animals, and Environmental Changes-TPT ($2)
Science Investigations Needs of Plants and Animals-TPT (8.50)
Animal Homes
Feed Me: Living Things need food
What do plants need - Part 1
What do plants need - Part 2
Why are trees different?
Awesome Animals Assessment

Tree Activities for Kids: Animal Habitats, Tree Facts, and Nature Facts

What's A Habitat? TPT (Free)

Animal Reports

Landfill Model

Recycle-TPT ($4.80)

Books

Woodpecker Wham! (April Pulley Sayre)

Woodpeckers (Backyard Wildlife)

Let's Learn About Woodpeckers (Breanne Sartori)

All Ears, All Eyes (Richard Jackson)

Little Fox in the Forest (Stephanie Graegin)

The Busy Tree (Jennifer Ward)

The Lorax (Dr. Seuss)

Plant a Tree For Me (Naomi Klienberg)

Charlie and Lola: We Are Extremely Very Good Recyclers (Lauren Child)

The Earth Book (Todd Parr)
The Earth and I (Frank Asch)
I can save the Earth (Allison Inches)

Perfect Pairs (Melissa Stewart and Nancy Chesley)

The Three R's: Reuse, Reduce, Recycle (Nuria Roca)

Summative/Formative Assessment

Formative

Classroom observations
Science Journal
K-W-L (What you Know, What you Want to know)

Summative
K-W-L (What you Learned)

Literacy Standards

NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. (K-ESS3-2)

NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. (K-ESS2-2)

NJSLSA.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content. (K-ESS2-2, K-ESS3-3)

NJSLSA.W7. Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation. (K-PS3-1, K-PS3-2, K-ESS2-1)

NJSLSA.SL5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations. (K-ESS3-1)

Math Standards

MP.2. Reason abstractly and quantitatively. (K-ESS3-1)
M.P.4. Model with mathematics. (K-ESS3-1)
K.CC. Counting and Cardinality (K-ESS3-1)
K.MD.A.2. Describe the difference when comparing two objects (side-by-side) with a measurable attribute in common, to see which object has more of or less of the common attribute. (K-LS1-1)

Additional Information

-NGSS Interactive site: http://www.nextgenscience.org/search-standards

Science Curriculum - Kindergarten

Unit 3 Weather and Climate

Performance Expectations

K-PS3-1.	Make observations to determine the effect of sunlight on Earth's surface. [Clarification Statement: Examples of Earth's surface could include sand, soil, rocks, and water.] [*Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.*]
K-PS3-2.	Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.* [Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.]
K-ESS2-1.	Use and share observations of local weather conditions to describe patterns over time. [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.] [*Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.*]
K-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.]

Science and Engineering Practices:	Disciplinary Core Ideas:	Crosscutting Concept:
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) **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) **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	**Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1) **Cause and Effect** ● Events have causes that generate observable patterns.

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)

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)

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)

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)

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describe and record the weather and to notice patterns over time. (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)*

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.

ETS1.C: Optimizing the Design Solution

· Because there is always more than one possible solution to a problem, it is

(K-PS3-1),(K-PS 3-2),(K-ESS3-2)

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Connections to Engineering,Technology and Applications of Science

Interdependence of Science, Engineering, and Technology

- People encounter questions about the natural world every day. (K-ESS3-2)

Influence of Engineering, Technology, and Science on Society and the Natural World

People depend on various technologies in their lives; human life would be very different without technology. (K-ESS3-2)

Connections to Nature of Science Scientific Investigations Use a Variety of Methods ● Scientists use different ways to study the world. (K-PS3-1) Science Knowledge is Based on Empirical Evidence Scientists look for patterns and order when making observations about the world. (K-ESS2-1)	useful to compare and test designs.	

Essential Questions

- What is weather?
- What contributes to climate change?
- How does climate influence the activities of people?

- How can we measure and record weather conditions?
- How does the weather forecast help us?
- What local severe weather do we have to prepare for and how do we prepare?
- What effect does the sun have on different surfaces of the Earth?
- How can the warming effects of the sun be reduced?

Vocabulary

compare, sand , rocks, Earth's Surface, shade, water, effect , soil, observe, sunlight, reduce, warming cloudy, stormy, cold , sunny, cool, foggy, temperature, thunder , forecast, tornado, hail, water, hot, weather, icy, windy, lightning, patterns, rainy, snowy, sleet

Resources and Links

Videos

ESS2.D. Weather and Climate -Bozeman Science Video
ESS3.B. Natural Hazards -Bozeman Science Video

PS3.B. Conservation of Energy and Energy Transfer- Bozeman Science Video

BrainPop Jr.: the Sun

BrainPop Jr.: Temperature

Other Resources

Mystery Science-

Mystery 1: Have you ever watched a storm?

Mystery 2: What will the weather be like on your birthday?

Mystery 3: Coming September 2017

Activities

Kindergarten Weather Activities

Tornado in a Bottle Experiment

Weather Science Experiments for Kids

Have you Ever Watched A Storm? TPT (Free)

Weather and Temperature TPT ($7.60)

Weather Calendar Cards TPT (Free)

Weather Graph TPT (Free)

Weather and Seasons Unit TPT ($6)

Books

Teaching Science Through Trade Books (Karen Ansberry and Emily Morgan)

More Picture Perfect Science Lessons (Karen Ansberry and Emily Morgan)-

(Bubbles chapter 6 and Sunshine on My Shoulders chapter 17)

Why Does it Thunder and Lightning? (Darice Bailer)

Lightning (Stephen P. Kramer)

Flash, Crash, Rumble, Roll (Franklyn Mansfield Branley)

When the Wind Stops (Charlotte Zolotow)

Green Eyes (Abe Birnbaum)

Sunshine Makes the Seasons (Lets Read and Find Out Science Series)

Can You See The Wind? (Allen Fowler)
Four Seasons Make A Year (Anne Rockwell)

Weather Words And What They Mean (Gail Gibbons)

What Will The Weather Be? (Lynda Dewitt)

Our Nearest Star (Franklyn Branley)

Energy from the Sun (Allan Fowler)

Earth and the Sun (Bobbie Kalman)

What is the Sun (Reeve Linbergh)

Summative/Formative Assessment

Formative

Classroom Observations
Science Journal
K-W-L (What you Know, What you Want to know)

Summative
K-W-L (What you Learned)

Literacy Standards

NJSLSA.W7. Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation. (K-PS3-1, K-PS3-2, K-ESS2-1)

NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. (K-ESS3-2)

NJSLSA.L3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening. (K-ESS3-2)

Math Standards

MP.2. Reason abstractly and quantitatively. (K-ESS2-1)
MP.4. Model with mathematics. (K-ESS2-1) (K-ESS3-2)
K.CC. Counting and Cardinality (K-ESS3-2)
K.CC.A. Know number names and the count sequence. (K-ESS2-1)
K.MD.A.1. Describe several attributes of a single object, including but not limited to length, weight, height, and temperature. (K-ESS2-1) K.MD.B.3. Classify, sort, and count objects using both measurable and non-measurable attributes such as size, number, color, or shape. (K-ESS2-1)

K.MD.A.2. Describe the difference when comparing two objects (side-by-side) with a measurable attribute in common, to see which object has more or less of the common attribute. (K-PS3-1, K-PS3-2)

K.MD.B.3. Classify, sort, and count objects using both measurable and non-measurable attributes such as size, number, color, or shape. (K-ESS2-1)

Additional Information

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