



Stafford Township School District

STEAM Curriculum Grade K

Adopted: 08/06/2017
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Philosophy

The Stafford Township Public Schools has integrated STEAM (Science, Technology, Engineering, Arts, and Math) into its elementary and intermediate school core curriculum. All Stafford students are exposed to STEAM concepts starting as early as Kindergarten and continuing throughout intermediate.

STEAM refers to the areas of Science, Technology, Engineering, Arts and Mathematics. However, STEAM initiatives are not these disciplines in isolation. Rather, STEAM is the integration of courses, programs or linked learning opportunities using an interdisciplinary approach through exploration, discovery and problem solving.

Learning by doing is inviting and exciting so students learn and remember more. Successful, hands-on experiences exploring engineering can have a major influence on motivation and confidence in learning. Ultimately, we hope to inspire students to challenge themselves and consider careers in STEAM fields. Students need STEAM project-based learning to build 21st century skills. Science and engineering jobs are growing 70 percent faster than other occupations. This means our students will be at an advantage when competing for the high-tech, high-wage jobs of the future.

Unit 1: Motion and Stability: Forces and Interactions		Duration: 15 days (September – December)
Standards		
K-PS2-1	Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.	
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.	
RI.K.1	With prompting and support, ask and answer questions about key details in a text.	
SL.K.3	Ask and answer questions in order to seek help, get information, or clarify something that is not understood.	
K.MD.A.1	Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.	
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.	
RL.K.1	With prompting and support, ask and answer questions about key details in a text (e.g. Who, what, where, when, why, how).	
W.K.8.	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.	
NJSLSA.S L1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others’ ideas and expressing their own clearly and persuasively.	
SL.K.1	Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.	
SL.K.2.	Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarifications if something is not understood.	
SL.K.3.	Ask and answer questions in order to seek help, get information, or clarify something that is not understood.	
8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.	
CRP2.	Apply appropriate academic and technical skills.	
Essential Understandings		Essential Questions
<i>Students will understand that...</i> <ul style="list-style-type: none"> • Pushes and pulls can have different strengths and directions • Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. 		<ul style="list-style-type: none"> • How does friction affect movement? • What kinds of forces act by touching? • What kinds of forces act without touching? • How can a force act upon an object without touching it?

<ul style="list-style-type: none"> • When objects touch or collide, they push on one another and can change motion. • A bigger push or pull makes things speed up or slow down more quickly. • 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 	<ul style="list-style-type: none"> • What happens if you push or pull an object harder?
Evidence of Student Learning	
Formative Assessments	Summative Assessments
<ul style="list-style-type: none"> • Teacher Observations • Anecdotal Notes • Directed Reading • Cooperative Group Learning • Labeling 	<ul style="list-style-type: none"> • Checklist • Rubrics <p>Benchmark Assessment</p> <ul style="list-style-type: none"> • Scientific Notebook Check with Scoring Rubric <p>Alternative Assessments</p> <ul style="list-style-type: none"> • Student Notebook Check with Teacher Scoring Rubric • Stop and Jot Activities with possible Sentence Starters • Teacher Observation Checklist based on Student Performance and Project Creation • Student Participation Rubric • Mystery Science Activities • Student Created Project with Teacher Scoring Rubric
Vocabulary	
gravity, direction, cause, change, above, below, behind, beside, Scientist, Engineer, Architect, wheel, ramp, lever, pulley, screw, wedge	
Knowledge and Skills	
Content	Skills
<p><i>Students will know...</i></p> <ul style="list-style-type: none"> • Pushes and pulls can have different strengths and directions. 	<p><i>Students will be able to ...</i></p> <ul style="list-style-type: none"> • Analyze data and develop an understanding of the effects of different directions of pushes and pulls on the motion of an object to determine if a design solution works as

<ul style="list-style-type: none"> ● Pushing or pulling on an object can change the speed or direction of its motion and can start and stop it. ● When objects touch or collide, they push one another and can change motion. ● A bigger push or pull makes things speed up or slow down more quickly 	<p>intended to change the speed or direction of an object with a push or pull.</p> <ul style="list-style-type: none"> ● 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 from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. ● Analyze data to determine whether a design solution works as intended to change the speed or direction of an object with a push or a pull.
Instructional Plan	
Suggested Activities	Resources
STEAM Lab Safety - Students will discuss how to be safe in the lab and how to use the equipment and stations in the lab.	<ul style="list-style-type: none"> ● Whiteboard Projector ● Lab Overview
Build a Tower - Students will use various items to construct towers and compare heights and shapes of their construction. Students will discuss structure and balance and the effects of gravity on the towers they construct.	<ul style="list-style-type: none"> ● Foam, Wood and Plastic Blocks ● Keva Planks ● Sticks, Toothpicks and Marshmallows ● Plastic Cups and Containers ● Youtube video: <i>The Highest Towers/Buildings in the World Today</i>
Simple Machines - Students will be able to build and explore pulleys, levers, wheels, ramps and screws. Working in small groups students will construct machines using various materials. The students will use the steps of the Engineering Design Process to complete their tasks.	<ul style="list-style-type: none"> ● Blocks, Wooden and Plastic Ramps ● Dowels and Recycled Objects ● Balls, Rope, Cups and Twine ● SciShow Kids videos <i>Ramps, Levers, Pulleys, Simple Machines</i>
Air Racers - Students will be able to build and design a racer from recycled materials. Students will discuss the force of air and what an object looks like when it moves. The students will discuss gravity and how it affects the movement of the racers	<ul style="list-style-type: none"> ● Straws, Dental Floss, Index Cards ● Youtube video <i>String Racers</i>
Cars on Ramps - Students will construct a car and race them on a ramp. Students will discuss gravity and how it affects the car's speed and movement down the ramp.	<ul style="list-style-type: none"> ● Index Cards, Straws, Life Saver Candies, Marshmallows ● Large Ramp made from a table top ● Yardsticks and Tape to mark distances

<p>With guidance, students will collaboratively plan and conduct simple investigations to discover and compare the effects of pushes and pulls on the motion of an object. Students will have opportunities to push and pull a variety of objects. Students should push/pull these objects first with varying strengths, and then in a variety of directions. Students should record their observations using pictures and words, and should participate in class discussions on the effects of varying the strength or direction of a push or pull on an object.</p>	<ul style="list-style-type: none"> ● Data Recording Worksheet ● Balls ● Toy cars ● Pull toys ● Cans ● Tops ● Boxes.
<p>Students will investigate the interactions between colliding objects using pushes and pulls. Students play a game of kickball and observe how the ball is pushed, pulled, started, stopped, or collided with other objects and how it changed position and speed. As a group, students will then brainstorm about other objects being pushed, pulled or colliding and then choose one of those objects to investigate.</p>	<ul style="list-style-type: none"> ● Push Pull-Changing Direction ● Ball
<p>Students will design, build, and test their own ramps. Students are introduced to a variety of materials and explore putting them together. Students create plans for ramps by evaluating a variety of materials provided to them.</p>	<ul style="list-style-type: none"> ● Ramps 2: Ramp Builder
<p>Literature</p>	
<ul style="list-style-type: none"> ● <i>What Do You Do With An Idea?</i> by Kobi Yamada ● <i>Ada Twist, Scientist</i> by Andrea Beaty ● <i>Rosie Revere, Engineer</i> by Andrea Beaty ● <i>Iggly Peck, Architect</i> by Andrea Beaty ● <i>Excavators, Loaders, Dump Trucks, Cranes, Concrete Mixers, Bulldozers</i> by Charles Lennie ● <i>Simple Machines</i> (Big Book) by Melvin Berger ● <i>Push and Pull</i> (Big Book) by Marcia Freeman 	
<p>Websites</p>	
<p>Science A-Z Next Gen Science Connections</p>	<p>https://www.sciencea-z.com/marketing-content/science-a-z-and-ngss-grade-k.pdf</p>
<p>A Push Or A Pull by Peter Weatherall- music video</p>	<p>https://www.youtube.com/watch?v=FOcY37oGhj8</p>

Education.com List of Science Activities	http://www.education.com/activity/kindergarten/science/
Forces Can Push or Pull Educational Songs Jack Hartmann	https://www.youtube.com/watch?v=AKUgWLCNb68
Mystery Science	www.MysteryScience.com
Science Show Kids	www.SciShowKids.com
Accommodations & Modifications	
<p>English Language Learners</p> <ul style="list-style-type: none"> • Shorten or simplify directions • Alternative assessment • Flexible/cooperative grouping • Graphic organizers • Native Language Support and Resources • Modified classwork and homework assignments 	
<p>Special Education/504 Plans</p> <ul style="list-style-type: none"> • Provide differentiated instruction as needed • Follow all IEP modifications/504 plan • Provide manipulatives or the opportunity to draw solution strategies • Modify for varying proficiency levels, multiple intelligences, and grade levels • Use visuals and gestures • Use sentence starters • Build background knowledge • Highlight key words • Graphic organizers • Basic Skills- Pre-teach vocabulary, Preview lesson, Accountable Talk stems, Chunk text, Provide extra time 	
<p>Basic Skills</p> <ul style="list-style-type: none"> • Modified Assignment • Teacher Modeling • Partner Work • Teacher Prompts 	
<p>Economically Disadvantaged</p> <ul style="list-style-type: none"> • Extra set of materials for home • Study guides • Modified Assignment 	

Gifted and Talented

- Higher Level Text
- Provide Multisyllabic Words
- Choice Board to extend learning
- Integrate a variety of activities to meet all types of multiple intelligences

Students at Risk of School Failure

- Alternative assessment
- Flexible/cooperative grouping
- Graphic organizers
- Parent-teacher communication
- Integrate a variety of activities to meet all types of multiple intelligences
- Modified classwork and homework assignments

Unit: 2 Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment		Duration: 15 days (January – April)
Standards		
K-LS1-1	Use observations to describe patterns of what plants and animals (including humans) need to survive.	
K-ESS2-2	Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.	
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.	
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.	
W.K.1	Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book.	
W.K.2	Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.	
W.K.7	Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them).	
SL.K.5	Add drawings or other visual displays to descriptions as desired to provide additional detail.	
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.	
RL.K.1	With prompting and support, ask and answer questions about key details in a text (e.g., who, what, where, when, why, how).	
W.K.8.	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.	
NJSLSA.SL1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others’ ideas and expressing their own clearly and persuasively.	
SL.K.1	Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.	

SL.K.2.	Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarifications if something is not understood.
SL.K.3.	Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.
Evidence of Student Learning	
Essential Understandings	Essential Questions
<p><i>Students will understand...</i></p> <ul style="list-style-type: none"> • All living things need water to survive. • Plants and animals change their environment • Living things need water, air, and resources from the land, and they live in places that have the things they need. • Scientists look for patterns and order when making observations about the world. 	<ul style="list-style-type: none"> • How do plants, animals, and humans impact the environments they live in? • How can people reduce their impacts on land, water, air, and other living things? • How do living things use natural resources to live and grow? • How do parts of the natural world and designed world work together?
Formative Assessments	Summative Assessments
<ul style="list-style-type: none"> • Teacher Observations • Anecdotal Notes • Directed Reading • Cooperative Group Learning • Labeling 	<ul style="list-style-type: none"> • Checklist • Rubrics • Performance Tasks <p>Benchmark Assessment</p> <ul style="list-style-type: none"> • Scientific Notebook Check with Scoring Rubric <p>Alternative Assessments</p> <ul style="list-style-type: none"> • Student Notebook Check with Teacher Scoring Rubric • Stop and Jot Activities with possible Sentence Starters • Teacher Observation Checklist based on Student Performance and Project Creation • Student Participation Rubric • Mystery Science Activities • Student Created Project with Teacher Scoring Rubric

Vocabulary	
patterns, plants, animals, insects, recycle, habitat, resource, want, needs, hypothesis Gardener, Farmer, Forest Ranger	
Knowledge and Skills	
Content	Skills
<p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● Patterns in the natural and human designed world can be observed and used as evidence ● Events have causes that generate observable patterns. ● Systems in the natural and designed world have parts that work together. ● Scientists look for patterns and order when making observations about the world. ● Living things need water, air, and resources from the land, and they live in places that have the things they need. 	<p><i>Students will be able to ...</i></p> <ul style="list-style-type: none"> ● Construct an argument with evidence to support a claim ● Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas ● 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 ● Use a model to represent the relationships between the needs of different animals and the places they live in the natural world
Instructional Plan	
Suggested Activities	Resources
<p>What Plants Need - Students will discuss the life cycle of a plant and its needs to survive. Students will conduct a growing experiment using four different cups. One cup will get sunlight, water, potting soil and grass seeds. One cup will not be given water, another will not be given sunlight and the last cup will be planted in sand not dirt. Student will observe the growth for up to two weeks and report their findings.</p>	<ul style="list-style-type: none"> ● SciShow Kids video <i>How Plants Grow, Part One and Two</i> ● Read Alouds-<i>Seeds</i> by Ken Robbins, <i>Seeds Get Around</i> by Nancy White, <i>From Seed to Plant</i> by Delta Science Readers ● Potting Soil, Grass Seeds, Plastic Cups, Cookie Sheet, Labels
<p>Growing Sunflowers - Students will discuss life cycle, source of food for humans and animals, variations of color and size. Students will plant Mammoth Sunflowers in small cups to be used in the</p>	<ul style="list-style-type: none"> ● Sunflower Seeds, Cups, Potting Soil ● Rulers, Class Sunflower Growth Chart ● <i>Sunflower Life Cycle</i> by Jeff Bauer

<p>Kinder Garden. Once the sunflower sprouts have been replanted in the garden the students will monitor their progress using rulers to measure the inches of growth and then record the data on a class Sunflower Chart.</p>	<ul style="list-style-type: none"> ● Youtube video <i>Sunflowers</i>
<p>Spring Catapults - Students will discuss catapults and how they were used by people throughout history. Students will use four different sized catapults made from various sized popsicle sticks, rubber bands and dowels. The students will determine the best device to launch a marshmallow Peep. Students will compare distances and placement to achieve the best attempt.</p>	<ul style="list-style-type: none"> ● Read Aloud- <i>The Night Before Easter</i> by Natasha Wing ● Various Popsicle Sticks, Rubber Bands, Plastic Spoons, Dowels ● Youtube video- <i>Launch a Pumpkin</i>
<p>Monarch Watch - Students will discuss the life cycle of the Monarch Butterfly. Students will create a Monarch as an art project, grow butterflies in the classroom and maintain the butterfly station in the Kinder Garden.</p>	<ul style="list-style-type: none"> ● <i>Monarch! Come Play With Me</i> by Ba Re ● <i>Monarch and Milkweed</i> by Helen Frost and Leonid Gore ● Various Art Supplies ● Live Caterpillars ● Milkweed Seeds and Plants
<p>Earth Day/Arbor Day- Students will discuss recycling and reusing items so they make less impact on the Earth's pollution. Students will collect various trash items to design and build a robot that will help them complete a task that they would like help with,(ex. A robot to clean up under their beds.)</p>	<ul style="list-style-type: none"> ● Various Recycled Trash (ex. Plastic Milk Jugs, Containers, Tissue Rolls, etc.) ● Read Aloud: <i>This Is Our Earth</i> by Laura Lee Benson
<p>Students will observe and record parts of organisms through drawing and labeling.</p>	<ul style="list-style-type: none"> ● Picture cards ● Books
<p>Literature</p>	
<ul style="list-style-type: none"> ● Are You Living? A Song About Living and Nonliving Things by Laura Purdie Salas ● <i>Living and Nonliving (My World of Science)</i> by Angela Royston ● <i>Butterflies</i> by Tori Kosara ● <i>The Seeds of the Milkweed</i> by The Second Grade Students of East End Elementary in Little Rock, Arkansas ● <i>From Caterpillar to Butterfly</i> by Deborah Heiligman ● <i>Charlie the Caterpillar</i> by Dom DeLuise ● <i>The Very Hungry Caterpillar</i> by Eric Carle ● <i>Waiting for Wings</i> by Lois Ehlert ● <i>Planting a Rainbow</i> by Lois Ehlert 	

<ul style="list-style-type: none"> • <i>Sunflower Life Cycle</i> by Jeff Bauer • <i>Growing Vegetable Soup</i> by Lois Ehlert • <i>This is Our Earth</i> by Laura Lee Benson • <i>Be a Friend to Trees</i> by Patricia Lauber 	
Websites	
Education.com List of Science Activities	http://www.education.com/activity/kindergarten/science/
NEX GEN SCIENCE HOMEPAGE	http://smlevinson.wix.com/ocngss
Environment: Ecosystem Around Us	https://www.youtube.com/watch?v=WDLC9iqcfQw
Science A to Z	https://www.sciencea-z.com/marketing-content/science-a-z-and-ngss-grade-k.pdf
Teachers' domain provides lesson plans and other multimedia resources (video clips and simulations)	http://www.teachersdomain.org/resource/tdc02.sci.life.colt.no%20living/ http://www.teachersdomain.org/resource/tdc02.sci.life.colt.lp%20living/
Harvard-Smithsonian Center for Astrophysics' Digital Video Library provides short video clips of classroom teachers working with students on the specific learning goals.	http://www.hsdvl.org/video.php?record_serial=1113
What plants and animals need to survive and how habitats support those needs.	The Needs of Living Things
This is an excellent resource that provides a Teacher Guide, videos, reading resources, and student activity sheets.	Living Things and Their Needs
This unit plan is about unit plan about living things and environmental interactions.	How do living things Interact
Mystery Science	www.MysteryScience.com
Science Show Kids	www.SciShowKids.com
Accommodations & Modifications	
English Language Learners <ul style="list-style-type: none"> • Shorten or simplify directions • Alternative assessment 	

<ul style="list-style-type: none"> • Flexible/cooperative grouping • Graphic organizers • Native Language Support and Resources • Modified classwork and homework assignments
<p>Special Education/504 Plans</p> <ul style="list-style-type: none"> • Provide differentiated instruction as needed • Follow all IEP modifications/504 plan • Provide manipulatives or the opportunity to draw solution strategies • Modify for varying proficiency levels, multiple intelligences, and grade levels • Use visuals and gestures • Use sentence starters • Build background knowledge • Highlight key words • Graphic organizers
<p>Basic Skills</p> <ul style="list-style-type: none"> • Modified Assignment • Teacher Modeling • Partner Work • Teacher Prompts
<p>Economically Disadvantaged</p> <ul style="list-style-type: none"> • Extra set of materials for home • Study guides • Modified Assignment
<p>Gifted and Talented</p> <ul style="list-style-type: none"> • Higher Level Text • Provide Multisyllabic Words • Choice Board to extend learning • Integrate a variety of activities to meet all types of multiple intelligences
<p>Students at Risk of School Failure</p> <ul style="list-style-type: none"> • Alternative assessment • Flexible/cooperative grouping • Graphic organizers • Parent-teacher communication • Integrate a variety of activities to meet all types of multiple intelligences • Modified classwork and homework assignments

Unit: 3 Weather and Climate		Duration: 15 days (March – June)
Standards		
K-PS3-1	Make observations to determine the effect of sunlight on Earth’s surface.	
K-PS3-2	Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.	
K-ESS2-1	Use and share observations of local weather conditions to describe patterns over time.	
K-ESS3-2	Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.	
RI.K.1	With prompting and support, ask and answer questions about key details in a text.	
SL.K.3	Ask and answer questions in order to seek help, get information, or clarify something that is not understood.	
K.MD.A.1	Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.	
K.MD.B.3	Classify objects into given categories; count the number of objects in each category and sort the categories by count.	
RL.K.1	With prompting and support, ask and answer questions about key details in a text (e.g., who, what, where, when, why, how).	
W.K.8.	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.	
NJLSA.SL1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others’ ideas and expressing their own clearly and persuasively.	
SL.K.1	Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.	
SL.K.2.	Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarifications if something is not understood.	
SL.K.3.	Ask and answer questions in order to seek help, get information, or clarify something that is not understood.	
8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.	
Essential Understandings		Essential Questions
<i>Students will understand...</i> <ul style="list-style-type: none"> ● Sunlight warms Earth’s surface ● Weather is the combination of sunlight, wind, snow or rain and temperature in a particular time. 		<ul style="list-style-type: none"> ● Why do certain regions have more severe weather than others? ● How do people measure and record weather?

<ul style="list-style-type: none"> ● People measure weather conditions to describe and record the weather and to notice patterns over time. ● 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. 	<ul style="list-style-type: none"> ● How does the earth stay warm? ● How does light affect the world we live in? ● How can clouds help predict the weather. ● Why does the weather change at certain times and locations?
Evidence of Student Learning	
Formative Assessments	Summative Assessments
<ul style="list-style-type: none"> ● Teacher Observations ● Anecdotal Notes ● Directed Reading ● Cooperative Group Learning ● Labeling ● Class Discussion/Participation 	<ul style="list-style-type: none"> ● Checklist ● Rubrics ● Performance Tasks <p>Benchmark Assessment</p> <ul style="list-style-type: none"> ● Scientific Notebook Check with Scoring Rubric <p>Alternative Assessments</p> <ul style="list-style-type: none"> ● Student Notebook Check with Teacher Scoring Rubric ● Stop and Jot Activities with possible Sentence Starters ● Teacher Observation Checklist based on Student Performance and Project Creation ● Student Participation Rubric ● Mystery Science Activities ● Student Created Project with Teacher Scoring Rubric
Vocabulary climate, light, rainbows, shadow, thermometer, change, patterns, Meteorologist, Weather Watcher	
Knowledge and Skills	
Content	Skills
<i>Students will know...</i> <ul style="list-style-type: none"> ● Sunlight warms Earth's surface ● Weather is the combination of sunlight, wind, snow or rain and temperature in a particular time. ● People measure weather conditions to describe and record the weather and to notice patterns over time. 	<i>Students will be able to ...</i> <ul style="list-style-type: none"> ● Ask questions based on observations to find more information about the designed world. ● Make observations (firsthand or from media) to collect data that can be used to make comparisons.

<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. • Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. • Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. • Use and share observation of local weather conditions to describe patterns over time. • Look for patterns and order when making observations about the world.
Instructional Plan	
Suggested Activities	Resources
<p>Light - Students will be able to discuss the properties of light and how it affects the world we live in. Students will work together in small groups to sort items into opaque and transparent, use clear plastic sheets and markers to make a suncatcher.</p>	<ul style="list-style-type: none"> • MysteryScience.com <i>What if there were no Windows</i> Whiteboard Activities • Read Aloud - <i>Day Light, Night Light Where Light Comes From</i> by Franklyn M. Branley • Bin of Various Papers, Objects • Clear Plastic Sheets, Permanent Markers, String
<p>Rainbows - Students will use eye droppers and food coloring to explore mixing colors. Introduce the Primary Colors, red, yellow and blue. Students will use markers, string and a cardstock circle to make Newton’s Color Wheels. Students will make a class “Traveling Rainbow” using cups, paper towels and food colors. They will watch and observe the results over a two week period.</p>	<ul style="list-style-type: none"> • SciShow Kids video: <i>Mixing Colors</i> • Read Alouds: <i>A Rainbow of My Own</i> by Freedman • Food Colors, Markers, White Cardstock, String, Clear Plastic Cups, Paper Towels
<p>Shadows - Students will discuss what makes a shadow, the sun in the sky and how the time of day will affect shadows. Working in small groups the students will explore with flashlights. The groups will build a structure out of blocks on a long white piece of paper. Taking turns holding the flashlight at different heights, the students will trace the shadows made by the block structure.</p>	<ul style="list-style-type: none"> • Read Alouds: <i>Sun Up, Sun Down</i> by Gail Gibbons, <i>What Makes a Shadow?</i> By Clyde Robert Bulla • Dr. Binoc’s video “What are Shadows?” • Blocks, 12”by 48” White Paper, Pencils and Flashlights
<p>Shadow Art - Students will use pipe cleaners, white paper, colored markers and a flashlight to create a sculpture. Students</p>	<ul style="list-style-type: none"> • Pipe Cleaners, Tape, Paper, Colored Markers • Youtube video: <i>Shadow Art</i>

will work in pairs to shine the flashlight and use the markers to draw shadow pictures. Students are encouraged to comment and praise other's work.	
Clouds - Students will be able to discuss Cumulus, Cirrus and Stratus clouds. Using pictures they will identify each kind of cloud and tell about the type of weather that each brings. Students will use blue paper and white crayons to make a cloud chart.	<ul style="list-style-type: none"> • Read Alouds: <i>Little Cloud</i> by Eric Carle, <i>Cloulette</i> by Tom Lichtenheld, <i>Weather Words</i> by Gail Gibbons • Blue Paper, White Crayons, Cloud Key Worksheet
Use the local weather to make observations, measure, collect, and record data to describe patterns over time. Students will count types of outdoor clothing worn by classmates and use the data to look for patterns in weather over months and seasons.	<ul style="list-style-type: none"> • About the Weather • Calendar • Pictures of clothing
Students will make their own weather station consisting of actual and simplified versions of real weather equipment. The weather station will consist of a thermometer and a student-made weather vane. They will use that equipment to make observations about the local weather.	<ul style="list-style-type: none"> • Watching Weather • Thermometer
Literature	
<ul style="list-style-type: none"> • <i>What Makes a Shadow</i> by Clyde Robert Bulla • <i>Day Light, Night Light, Where Light Comes From</i> by Franklyn M. Branley • <i>Sun Up Sun Down</i> by Gail Gibbons • <i>Weather Words and What They Mean</i> by Gail Gibbons • <i>What makes Day and Night?</i> by Franklyn Branley and Arthur Dorros • <i>What Will the Weather Be?</i> by Paul Rogers • <i>Sunshine and Shadows</i> by Delta Science Readers • <i>What Makes the Weather</i> by Janet Palazzo • <i>Cloulette</i> by Tom Lichtenheld • <i>Little Cloud</i> by Eric Carle • <i>The Wind Blew</i> by Pat Hutchins 	
Websites	
Weather Wiz Kids	http://www.weatherwizkids.com/
Treehouse Weather Kids Activities and Games	http://extension.illinois.edu/treehouse/index.cfm

Science A to Z	https://www.sciencea-z.com/marketing-content/science-a-z-and-ngss-grade-k.pdf
Education.com List of Science Activities-	http://www.education.com/activity/kindergarten/science/
Crazy Weather:	https://www.youtube.com/watch?v=UbfsQqiqD9M
Weather Videos	http://www.sciencekids.co.nz/videos/weather.html
This is a resource from the National Center for Atmospheric Research and the National Science Foundation that explains the basics of weather and climate. This article is designed as background information for the teacher.	Weather and Climate Basics
Mystery Science	www.MysteryScience.com
Science Show Kids	www.SciShowKids.com
Accommodations & Modifications	
English Language Learners <ul style="list-style-type: none"> • Shorten or simplify directions • Alternative assessment • Flexible/cooperative grouping • Graphic organizers • Native Language Support and Resources • Modified classwork and homework assignments 	
Special Education/504 Plans <ul style="list-style-type: none"> • Provide differentiated instruction as needed • Follow all IEP modifications/504 plan • Provide manipulatives or the opportunity to draw solution strategies • Modify for varying proficiency levels, multiple intelligences, and grade levels • Use visuals and gestures • Use sentence starters • Build background knowledge • Highlight key words • Graphic organizers • Pre-teach vocabulary, Preview lesson, Accountable Talk stems, Chunk text, Provide extra time 	
Basic Skills	

- Modified Assignment
- Teacher Modeling
- Partner Work
- Teacher Prompts

Economically Disadvantaged

- Extra set of materials for home
- Study guides
- Modified Assignment

Gifted and Talented

- Higher Level Text
- Provide Multisyllabic Words
- Choice Board to extend learning
- Integrate a variety of activities to meet all types of multiple intelligences

Students at Risk of School Failure

- Alternative assessment
- Flexible/cooperative grouping
- Graphic organizers
- Parent-teacher communication
- Integrate a variety of activities to meet all types of multiple intelligences
- Modified classwork and homework assignments

Unit 4: Engineering and Design		Duration: 10 days (Ongoing)
Standards		
K-2-ETS-1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	
K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	
K-2-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	
RL.K.1	With prompting and support, ask and answer questions about key details in a text (e.g., who, what, where, when, why, how).	
W.K.8.	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.	
NJSLSA.SL 1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.	
SL.K.1	Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.	
SL.K.2.	Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarifications if something is not understood.	
SL.K.3.	Ask and answer questions in order to seek help, get information, or clarify something that is not understood.	
8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.	
Essential Understandings		Essential Questions
<p><i>Students will understand...</i></p> <ul style="list-style-type: none"> ● How to solve a problem through engineering ● To use questioning, observing, and gathering information to help solve problems ● A clear understanding of the problem is the first step ● Designs can be conveyed through sketches, drawings, or physical models and will aid in communicating with others ● Comparing and testing designs is a useful way to determine the best solution to a problem 		<ul style="list-style-type: none"> ● How can you use questioning and observation to help solve problems? ● How can comparing designs help to find a solution to a problem? ● How do you determine materials and placements to create a strong object or tool? ● Why is it important to tests designs before putting into use?

Evidence of Student Learning	
Formative Assessments	Summative Assessments
<ul style="list-style-type: none"> ● Class Discussion/Participation ● Cooperative Group Learning ● Exit Slips 	<ul style="list-style-type: none"> ● Checklists ● Rubrics ● Performance Tasks <p>Benchmark Assessment</p> <ul style="list-style-type: none"> ● Scientific Notebook Check with Scoring Rubric <p>Alternative Assessments</p> <ul style="list-style-type: none"> ● Student Notebook Check with Teacher Scoring Rubric ● Stop and Jot Activities with possible Sentence Starters ● Teacher Observation Checklist based on Student Performance and Project Creation ● Student Participation Rubric ● Mystery Science Activities ● Student Created Project with Teacher Scoring Rubric
Vocabulary	
The Engineering Design Process, Ask, Imagine, Plan, Create, Improve, design, failure, success, architect, engineer, model, structure, technology, invention	
Knowledge and Skills	
Content	Skills
<p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● How to solve a problem through engineering ● To use questioning, observing, and gathering information to help solve problems ● A clear understanding of the problem is the first step ● Designs can be conveyed through sketches, drawings, or physical models and will aid in communicating with others ● Comparing and testing designs is a useful way to determine the best solution to a problem 	<p>Students will be able to ...</p> <ul style="list-style-type: none"> ● Ask questions based on observations to find more information about the natural and/or designed world(s). ● Define a simple problem that can be solved through the development of a new or improved object or tool. ● Develop a simple model based on evidence to represent a proposed object or tool. ● Analyze data from tests of an object or tool to determine if it works as intended.

Instructional Plan

Suggested Activities	Resources
<p>Craft Stick Catapults: Students will observe how and why a catapult works. Students will create a catapult to observe levers, simple machines, and projectiles. Students will observe the functions of each part to determine how the design works.</p>	<ul style="list-style-type: none"> ● 7 jumbo craft sticks needed for each, pom poms, rubber bands, & rubber rings/half of a plastic egg/ bottle cap. ● Catapult demonstration video
<p>Popsicle Stick Bridge: Students will create a bridge using binder clips, clothespin and popsicle stick to create a strong bridge. Once students complete the bridge, give students materials to place on top to test the strength and stability of their bridges.</p>	<ul style="list-style-type: none"> ● Wooden Clothespins ● Binder Clips – Ours are 3/4 inch wide ● Colored Jumbo Craft Sticks – 6 inches long ● Books or other materials to test out bridge
<p>Strongest Shapes: Students will create towers out of different shapes to determine which shapes are the strongest. Students will use all of the same shapes on each tower. For example: all triangles/ squares/ circles. Once students have finished a design they will test out their designs with a designated book.</p>	<ul style="list-style-type: none"> ● Construction Paper ● Glue Sticks ● Tape ● Strong Shape Demo Video https://youtu.be/_jGPIh7NSSQ
<p>New Bed for Goldilocks: Students will be familiar with the story “Goldilocks” Students will create and design a new bed for goldilocks. Using the listed materials students can work in small groups or pairs to create and design the perfect bed. After designs are completed students will observe other groups designs. Students will then come together to count each beds legs and determine which bed would be the strongest in case a bear ever slept on it.</p>	<ul style="list-style-type: none"> ● “Goldilocks” ● Pipe Cleaners ● Paper Towel Rolls ● Small plastic cups ● Tape & Glue
<p>Parachute Design: Students will observe different types of coffee filters to be used as a parachute. They will predict which one will create the best and safest landing. They will then choose a coffee filter to design a parachute of choice. Students may work in pairs to design a successful parachute. Once completed, have students test their parachutes by holding them up and letting them go to see if they gradually come down or drop extremely fast.</p>	<ul style="list-style-type: none"> ● Coffee Filters (3 difference sizes) ● Markers to decorate the coffee filter parachute ● Pipe cleaners ● Tape ● Popsicle Sticks ● Small paper cups
<p>Simple Machine Winch: Students will create a simple machine winch out of recycled materials. Students will work in group of 2-3 where they will design the machine so that it will be able to</p>	<ul style="list-style-type: none"> ● Cardboard tubes ● Spool ● Straw or pencil

be tested and used properly. This activity gives students a chance to work through problems and find solutions so that the design works.	<ul style="list-style-type: none"> • String • Tape, Scissor • Small basket (object to attach strings)
Literature	
<ul style="list-style-type: none"> • <i>What Do You Do With An Idea?</i> By Kobi Yamada • <i>What is Technology?</i> By Susan Ring • <i>Design It! Build It!</i> By Susan Ring 	
Websites	
Science A to Z	https://www.sciencea-z.com/marketing-content/science-a-z-and-ngss-grade-k.pdf
Education.com List of Science Activities-	http://www.education.com/activity/kindergarten/science/
Science 4 Us Interactive Activities	http://www.science4us.com/k-2-science-lesson-plans/
Science Show Kids	www.SciShowKids.com
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Stafford Township School District
STEAM
Pacing Guide
Grade K

Unit 1 Motion and Stability	September – December 15 days
Unit 2 Interdependent Relationships In Ecosystems	January – April 15 days
Unit 3 Weather and Climate	March – June 15 days
Unit 4 Engineering and Design	10 days/Ongoing