



Stafford Township School District

STEAM Curriculum Grade 2

Adopted: 08/06/2017
Updated: 10/17/2018

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: Introduction to the STEAM lab		Duration: 4 days/September
Standards		
K-2-ETS1-1.	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	
K-2-ETS1-2.	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	
K-2-ETS1-3.	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	
RI.2.10	Read and comprehend informational texts, including history/social studies, science, and technical texts, at grade level text complexity proficiently with scaffolding as needed.	
W.2.8	Recall information from experiences or gather information from provided sources to answer a question.	
SL.2.1.A	Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).	
SL.2.1.B	Build on others' talk in conversations by linking their explicit comments to the remarks of others.	
SL.2.1.C	Ask for clarification and further explanation as needed about the topics and texts under discussion.	
8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.	
CRP4.	Communicate clearly and effectively with reason.	
Essential Understandings		Essential Questions
<i>Students will understand...</i> <ul style="list-style-type: none"> ● How to safely use all equipment, materials, and furniture in the STEAM Lab. ● The various cooperative learning jobs they may use in their groups. ● The steps of the engineering process. 		<ul style="list-style-type: none"> ● What is a STEAM lab? ● How can we stay safe while playing, creating and working in the lab? ● What would you like to learn about in the STEAM lab this year? ● How do we work together as a group? ● What are the steps of the engineering process?
Evidence of Student Learning		
Formative Assessments		Summative Assessments

<ul style="list-style-type: none"> • Cooperative Group Learning • Journal Entries • Teacher Observations • Anecdotal Notes • Turn and Talk 	<ul style="list-style-type: none"> • Lab / Recording sheet • Unit Assessment <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	
Science, Technology, Engineering, Art, Mathematics, Flexible Seating	
Knowledge and Skills	
Content	Skills
<p><i>Students will know...</i></p> <ul style="list-style-type: none"> • A situation that people want to change or create can be approached as a problem to be solved through engineering. • Asking questions, making observations, and gathering information are helpful in thinking about problems. • Before beginning to design a solution, it is important to clearly understand the problem. 	<p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Plan and conduct investigations collaboratively to produce evidence to answer a question. • Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. • Use tools and materials provided to design a device that solves a specific problem. • Begin an investigation with a question. • Study the world using different ways.
Instructional Plan	
Suggested Activities	Resources

<p>STEAM Lab Safety Students will try flexible seating furniture. Students will play Name Game. Students will share what they hope to learn and do this year in the lab. Students will discuss Lab Rules.</p>	<p>www.proteacher.net/discussions/showthread.php?t=108948</p>
<p>Lab Procedures, Routines & Expectations Students will review lab rules and safety procedures. Students will make STEAM lab journal cover. Students will draw 1 picture of “safe lab behavior” and 1 picture of “unsafe lab behavior”.</p>	<p>YouTube: What's an Engineer? Crash Course Kids #12.1 (video)</p>
<p>Working as a Team/Cooperative Learning Students will work together to create various cup challenges</p>	<p>Solo Cup Stacking https://www.youtube.com/watch?v=teJbh-dxHTQ</p>
<p>Plan & build with Imagination Playground blocks (Group) Groups will design and build a structure of their choice using the large blue blocks</p>	<p>Imagination Playground App on iPad</p>
<p>Literature</p>	
<ul style="list-style-type: none"> ● <u>Year Round Project Based Activities Grade 2</u> by Steve Butz ● <u>The Big Book of MakerSpace Projects</u> by Aaron Graves 	
<p>Websites</p>	
<p>Ideas for STEAM-related team building activities</p>	<p>https://usergeneratededucation.wordpress.com/2015/08/14/team-building-activities-that-support-maker-education-stem-and-steam/</p>
<p>Ideas for STEAM-related team building activities</p>	<p>http://stemactivitiesforkids.com/2015/12/10/team-building-for-stem-challenges/</p>
<p>Ideas for STEAM-related team building activities</p>	<p>http://www.playdoughtoplato.com/stem-activities-for-kids/</p>
<p>Accommodations & Modifications</p>	
<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 	

<ul style="list-style-type: none"> • 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
<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 2: Structure and Properties of Matter		Duration: 10 days (October – December)
Standards		
2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.	
2-PS1-2	Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.	
2-PS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.	
2-PS1-4	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.	
W.2.7	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).	
RI.2.1	Ask and answer such questions as <i>who</i> , <i>what</i> , <i>where</i> , <i>when</i> , <i>why</i> , and <i>how</i> to demonstrate understanding of key details in a text.	
RI.2.10	Read and comprehend informational texts, including history/social studies, science, and technical texts, at grade level text complexity proficiently with scaffolding as needed.	
W.2.8	Recall information from experiences or gather information from provided sources to answer a question.	
SL.2.1.A	Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).	
SL.2.1.B	Build on others' talk in conversations by linking their explicit comments to the remarks of others.	
SL.2.1.C	Ask for clarification and further explanation as needed about the topics and texts under discussion.	
8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.	
MP.4	Model with mathematics.	
Essential Understandings		Essential Questions

<p><i>Students will understand that...</i></p> <ul style="list-style-type: none"> ● Matter exists as different substances that have various observable properties. ● Properties such as strength, flexibility, hardness, texture, and absorbency determine the purpose of matter. ● Objects may break into smaller pieces and be put together into larger pieces, or change shapes. ● Some materials experience permanent changes when heated or cooled, while others have changes that are reversible. 	<ul style="list-style-type: none"> ● How can you describe and classify different kinds of materials? ● Which properties of different materials make them suitable for select functions? ● How can an object made of a small set of pieces be disassembled and made into a new object? ● How does heating and cooling change matter?
Evidence of Student Learning	
Formative Assessments	Summative Assessments
<ul style="list-style-type: none"> ● Graphic Organizers & Guided Note Taking ● Directed Reading ● Cooperative Group Learning ● Homework ● Journal Entries ● Teacher Observation 	<ul style="list-style-type: none"> ● RST- Research Simulation Task ● Associated Unit tests, quizzes ● Labs and engineering based projects <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	
<p>Solid, Matter, States of Matter, Plasma, Gas, Liquid, Temperature, Heat, Energy, Condensation, Melting, Freezing, Chemical Symbol, Kinetic Energy, Vaporization, Physical Change, Chemical Change, Sublimation, Melting Point, Chemical Property, Element, Boiling Point, Physical Properties, Atom, Mass, Mixture, Nucleus, Property, Molecule, Solution, Volume, Freezing Point and Vapor</p>	

Knowledge and Skills	
Content	Skills
<p><i>Students will know...</i></p> <ul style="list-style-type: none"> • different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. • matter can be described and classified by its observable properties • different properties are suited to different purposes • a great variety of objects can be built up from a small set of 	<p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Analyze data from tests of an object or tool to determine if it works as intended. • Make observations (firsthand or from media) to construct an evidence-based account of how an object made of a small set of pieces can be assembled. • Construct an argument with evidence that some change caused by heating or cooling can be reversed and some cannot. • Search for cause and effect relationships to explain natural events.
Instructional Plan	
Suggested Activities	Resources
<p>Why do we wear clothes? Students will explore the different properties of materials used for clothing. In the activity, students will select materials they need to construct a hat that protects them from the sun.</p>	<p>https://mysteryscience.com/materials/mystery-1/material-properties-engineering/64?r=6365131</p>
<p>Can you really fry an egg on a hot sidewalk? Students will consider the insulating and conducting properties of different materials. In the activity, students will test different materials to determine which material is best for making oven mitts.</p>	<p>https://mysteryscience.com/materials/mystery-2/material-properties-classifying-materials/65?r=6365131</p>
<p>Why are so many toys made out of plastic? Students will learn about melting and the solid and liquid states of matter, then discover why plastic was invented. In the activity, students test the “meltable” property of candy.</p>	<p>https://mysteryscience.com/materials/mystery-3/material-changes-phases-of-matter/66?r=6365131</p>
<p>What materials might be invented in the future? Students will learn how new materials are invented. In the activity, they create a design for an invention that uses a futuristic material.</p>	<p>https://mysteryscience.com/materials/mystery-4/material-inventions-engineering/67?r=6365131</p>
<p>Building Blocks of Matter Students will explore how smaller pieces can be assembled in more than one way to create a large object.</p>	<p>STEMscopes</p>

Building Blocks of Matter Students will create four different structures using the blocks. Students will draw what each structure looks like, and record what it could represent in real life.	STEMscopes
Building Blocks of Matter Students will construct a tower using mini marshmallows and toothpicks.	STEMscopes
Building Blocks of Matter Students will use marshmallows and toothpicks to construct a model tower that meets the criteria. Students will present your design to the review board at Marshmallows Inc.	STEMscopes
Literature	
<ul style="list-style-type: none"> • Amazing Materials by Sally Hewitt • Changing Materials by Chris Oxlade • Does It Sink or Float? by Susan Hughes • Melting and Freezing by Lisa Greathouse • Oscar and the Snail by Geoff Waring 	
Websites	
Activities related to every unit of science for grade 2	https://betterlesson.com/next_gen_science/browse/2085/ngss-2-ps1-1-plan-and-conduct-an-investigation-to-describe-and-classify-different-kinds-of-materials-by-their-observable-property?from=domain_core_lesson_count
How It's Made - Car Doors - YouTube Greatest Inventions with Bill Nye: The Science of Materials	https://www.opened.com/search?standard=2.PS1.2
Experiments about matter	http://www.hookedonscience.org/nextgenerationsciencestandards.html
NGSS aligned hands on lessons and activities	http://www.earthsciweek.org/classroom-activities/ngss
Building a tower	http://betterlesson.com/common_core/browse/2087/ngss-2-ps1-3-make-observations-to-construct-an-evidence-based-account-of-how-an-object-made-of-a-small-set-of-pieces-can-be-disa
Brainpop video on matter	https://jr.brainpop.com/science/matter/solidsliquidsandgases/
The Matter song by Untamed Science	https://www.youtube.com/watch?v=jQ5VbjWetUE

Accommodations & Modifications

English Language Learners

- 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

- 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

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 3: Interdependent Relationships in Ecosystems		Duration: 10 days (January – March)
Standards		
2-LS2-1	Plan and conduct an investigation to determine if plants need sunlight and water to grow.	
2-LS2-2	Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.	
2-LS4-1	Make observations of plants and animals to compare the diversity of life in different habitats.	
MP.5	Use appropriate tools strategically.	
W.2.8	Recall information from experiences or gather information from provided sources to answer a question.	
RI.2.10	Read and comprehend informational texts, including history/social studies, science, and technical texts, at grade level text complexity proficiently with scaffolding as needed.	
W.2.8	Recall information from experiences or gather information from provided sources to answer a question.	
SL.2.1.A	Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).	
SL.2.1.B	Build on others' talk in conversations by linking their explicit comments to the remarks of others.	
SL.2.1.C	Ask for clarification and further explanation as needed about the topics and texts under discussion.	
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 that...</i> <ul style="list-style-type: none"> Plants need water and light. Seed dispersal and pollination of plants occur when animals eat and travel to various areas. Diversity is dependent on availability of life sustaining resources. 		<ul style="list-style-type: none"> Do plants and animals need sunlight and water to grow? What are the steps that occur when animals help disperse seeds or aid in pollinating plants? What are observations that can be made about the diversity of living things in different habitats?
Evidence of Student Learning		
Other Assessments		
Formative Assessments		Summative Assessments
<ul style="list-style-type: none"> Graphic Organizers & Guided Note Taking Directed Reading Cooperative Group Learning Homework Journal Entries Teacher observation 		<ul style="list-style-type: none"> RST- Research Simulation Task Associated Unit tests, quizzes Labs and engineering based projects Benchmark Assessment <ul style="list-style-type: none"> Scientific Notebook Check with Scoring Rubric Alternative Assessments

	<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	
Ecosystems, Habitat, Producer, Consumer, Climate, Food Chain, Environment, Organism, Prey, Predator, Scavenger, Pollutant, Seed Dispersal, Pollination, Primary Consumer, Secondary Consumer	
Knowledge and Skills	
Content	Skills
<p><i>Students will know...</i></p> <ul style="list-style-type: none"> • Plants depend on water and light to grow. • Plants depend on animals for pollination or to move their seeds around here are many different kinds of living things in any area, and they exist in different places on land and in water • Students develop a simple model that mimics the function of an animal, example, the seed dispersal or pollination of plants. Students identify the relevant components of their model, including those components that mimic the natural structure of an animal that helps it disperse seeds (e.g., hair that snares seeds, squirrel cheek pouches that transport seeds) or that mimic the natural structure of an animal that helps it pollinate plants (e.g., bees have fuzzy bodies to which pollen sticks, hummingbirds have bills that transport pollen). The relevant components of the model include: relevant structures of the animal, relevant structures of the plant, pollen or seeds from plants. 	<p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Make observations to compare the diversity of plants and animals in different habitats. • Develop a simple model that mimics the function of an animal dispersing seeds or pollinating plants. • Plan and conduct an investigation to determine if plants need sunlight and water to grow. • Students identify and describe the phenomenon and purpose of the investigation, which include answering a question about whether plants need sunlight and water to grow. • Students describe collected evidence for plant growth with light and water, plant growth with light but without water, plant growth without light but with water, plant growth without light and water. • Students collaboratively develop an investigative plan in which students describe the plants used, the light

<ul style="list-style-type: none"> In the model, students describe relationships between components, including evidence that the developed model mimics how plant and animal structures interact to move pollen or disperse seeds. Students describe the relationships between components that allow for movement of pollen or seeds. Students describe the relationships between the parts of the model they are developing and the parts of the animal they are mimicking. <p>Students use the model to describe how the structure of the model gives rise to the function, and how the structure-function relationships in the natural world that allow some animals to disperse seeds or pollinate plants. Students will observe and describe (firsthand or from media) including land habitats (playground, parking lot, garden, forest, and water habitats such as a pond, lake or river.</p> <p>Students will describe living things in a habitat based on observation such as trees, grasses, bushes, flowering plants, lizards, squirrels, ants, fish, clams.</p> <ul style="list-style-type: none"> Students collect, record, and organize data on different types of plants and animals in the habitats. 	<p>source, how plants will be kept with and without light in both the light/dark test and the water/no water test.</p> <ul style="list-style-type: none"> Students identify and describe the phenomenon and purpose of an investigation, which includes comparisons of plant and animal diversity of life in different habitats. Based on a given plan for the investigation, students describe the following evidence to be collected: <ul style="list-style-type: none"> Descriptions based on observations (firsthand or from media) of habitats, including land habitats (e.g., playground, garden, forest, parking lot) and water habitats (e.g., pond, stream, lake). Descriptions based on observations (firsthand or from media) of different types of living things in each habitat (e.g., trees, grasses, flowering plants, lizards, squirrels, ants, fish, clams). Comparisons of the different types of living things that can be found in different habitats. Students collect, record and organize data on different types of plant and animals in the habitats.
Instructional Plan	
Suggested Activities	Resources
<p>How did a tree travel halfway around the world? Students will learn how seeds must get away from their parent plant in order to survive.</p>	<p>https://mysteryscience.com/plants/mystery-1/seed-dispersal/84?r=6365131</p>
<p>Do planets eat dirt? Students will learn the importance of water (which is taken in by the roots) for plants, and what it is about dirt that plants really need. They'll build a Root Viewer to see up close how roots behave.</p>	<p>https://mysteryscience.com/plants/mystery-2/roots-water-minerals/85?r=6365131</p>

<p>Should you water a cactus? Students will learn that plants have different needs in terms of sunlight and water. In the activity, we will revisit our Grass Heads.</p>	<p>https://mysteryscience.com/plants/mystery-4/adaptations-habitat/87?r=6365131</p>
<p>Where do plants grow best? Students will practice thinking like gardeners. We will play “Plant Survivor!”</p>	<p>https://mysteryscience.com/plants/mystery-5/adaptations-habitat/88?r=6365131</p>
<p>Animal and Plant Dependence Students will test models of animal parts to see if they can help spread pollen or seeds.</p>	<p>STEMscopes</p>
<p>Animal and Plant Dependence Students will observe animal pictures and determine what features help cause seed dispersal.</p>	<p>STEMscopes</p>
<p>Animal and Plant Dependence Students will use their knowledge of animal structures that disperse pollen and seeds to build a super insect that will quickly pollinate plants and spread out their seeds.</p>	<p>STEMscopes</p>
<p>Literature</p>	
<p><u>Acorn to Tree</u> by Lisa Herrington <u>New Plants: Seeds in the Soil Patch</u> by Emily and Erin Ash Sullivan <u>Seed, Soil, Sun: Earth’s Recipe for Food</u> by Cris Peterson <u>Seeds Sprout!</u> by Mary Dodson Wade <u>A Tree Is a Plant</u> by Clyde Robert Bulla <u>Weeds Find a Way</u> by Cindy Jenson-Elliott <u>A Day and Night in The Forest</u> by Caroline Arnold <u>Do You Really Want to Visit a Rainforest?</u> By Bridget Heos <u>Interdependence of Living Things</u> by Dona Rice <u>A Place for Butterflies</u> by Melissa Stewart <u>The Secret Pool</u> by Kimberly Ridley</p>	
<p>Websites</p>	
<p>Links to activities and resources for second grade science standards</p>	<p>http://thehappyscientist.com/next-generation-science-standards-second-grade</p>
<p>NGSS aligned experiments</p>	<p>http://www.hookedonscience.org/nextgenerationsciencestandards.html</p>

NGSS aligned videos	https://www.teachingchannel.org/videos/next-generation-science-standards-achieve
NGSS aligned activities	http://www.earthsciweek.org/classroom-activities/ngss
Lesson Plans for 2-LS2-1	https://betterlesson.com/next_gen_science/browse/2091/ngss-2-ls2-1-plan-and-conduct-an-investigation-to-determine-if-plants-need-sunlight-and-water-to-grow/browse/2091/ngss-2-ls2-1-plan-and-conduct-an-investigation-to-determine-if-plants-need-sunlight-and-water-to-grow?from=domain_core
Exploring nature science education resource	https://www.exploringnature.org/db/view/1936
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 	

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: Earth's Systems: Processes that Shape the Earth		Duration: 8 days (April – June)
Standards		
2-ESS1-1	Use information from several sources to provide evidence that Earth events can occur quickly or slowly.	
2-ESS2-1	Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land	
2-ESS2-2	Develop a model to represent the shapes and kinds of land and bodies of water in an area.	
2-ESS2-3	Obtain information to identify where water is found on Earth and that it can be solid or liquid.	
W.2.8	Recall information from experiences or gather information from provided sources to answer a question.	
RI.2.3	Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.	
RI.2.10	Read and comprehend informational texts, including history/social studies, science, and technical texts, at grade level text complexity proficiently with scaffolding as needed.	
W.2.8	Recall information from experiences or gather information from provided sources to answer a question.	
SL.2.1.A	Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).	
SL.2.1.B	Build on others' talk in conversations by linking their explicit comments to the remarks of others.	
SL.2.1.C	Ask for clarification and further explanation as needed about the topics and texts under discussion.	
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 that...</i></p> <ul style="list-style-type: none"> ● Patterns in the natural world can be observed. ● Things may change slowly or rapidly such as erosion of rocks, glaciers melting, volcanic explosions, and earthquakes. ● Developing and using technology has impacts on the natural world. ● Humans have designed multiple solutions to slow or prevent wind or water from changing the shape of the land, such as windbreaks, shrubs, grass and trees. 		<ul style="list-style-type: none"> ● Why do some Earth events happen very slowly or quickly? ● What are different solutions designed to prevent wind or water changing the shape of land? ● How can a map represent the shape and kind of water in a specified area? ● Where and why is water on Earth found in both solid and liquid form?
Evidence of Student Learning		
Other Assessments		
Formative Assessments		Summative Assessments

<ul style="list-style-type: none"> ● Graphic Organizers & Guided Note Taking ● Directed Reading ● Cooperative Group Learning ● Homework ● Journal Entries 	<ul style="list-style-type: none"> ● RST- Research Simulation Task ● Associated Unit tests, quizzes ● Labs and engineering based projects <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
<p>Vocabulary</p>	
<p>Geology, Water erosion, Weathering, Rock erosion, Weathering, Wind vane, Barometer, Thermometer, Rain gauge, Rock, Minerals, Volcano, Topographic maps, Plate tectonics, Rock cycle, Earth's layers</p>	
<p>Knowledge and Skills</p>	
<p>Content</p>	<p>Skills</p>
<p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe ● Wind and water can change the shape of the land ● Maps show where things are located ● One can map the shapes and kinds of land and water in any area ● Water is found in the ocean, rivers, lakes, and ponds ● Water exists as solid ice and in liquid form ● It is useful to compare and test designs when there is more than one solution to a problem 	<p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> ● Investigate the properties of water. ● Develop a model to represent patterns in the natural world. ● Make observations from several sources to construct an evidence-based account for natural phenomena. ● Compare multiple solutions to a problem. ● Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic

	<p>menus, icons), and other media that will be useful in answering a scientific question.</p> <ul style="list-style-type: none"> ● Observe patterns in the natural world. ● Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) and other media that will be useful in answering a scientific question. ● Obtain information to identify where water is found on Earth and to communicate that it can be a solid or liquid. ● Use information from several sources to provide evidence that Earth events can occur quickly or slowly. ● Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. ● Develop a model to represent the shapes and kinds of land and bodies of water in an area.
Instructional Plan	
Suggested Activities	Resources
<p>If you floated down a river, where would you end up? Students will develop a model of the earth’s surface and use it to discover an important principle about how rivers work.</p>	<p>https://mysteryscience.com/water/mystery-1/mapping-earth-s-surface-landforms/112?r=6365131</p>
<p>Why is there sand at the beach? Students will investigate the effects of rocks tumbling in a river. From the results of their investigation, they will construct an explanation for why there is sand at a beach.</p>	<p>https://mysteryscience.com/water/mystery-2/erosion-earth-s-surface-landforms/113?r=6365131</p>
<p>What’s strong enough to make a canyon? Students will use a model of rain and land to explain what causes a canyon to form.</p>	<p>https://mysteryscience.com/water/mystery-3/erosion-earth-s-surface-landforms/114?r=6365131</p>
<p>Effects of Wind and Water Students will conduct an investigation comparing different ways to prevent wind and water erosion.</p>	<p>STEMscopes</p>
<p>Effects of Wind and Water</p>	<p>STEMscopes</p>

Water Erosion PBL- Students will compete in a sand castle competition that focuses on students' abilities to design and build a barrier system to protect their castle from wind and water erosion.	
Preventing Wind Erosion Students will create a structure of blocks to prevent the wind from hitting a house.	https://betterlesson.com/lesson/637474/preventing-wind-erosion
Literature	
<u>Cracking Up: A Story About Erosion</u> by Jacqui Bailey	
<u>Earthquakes!</u> by Cy Armour	
<u>Earthquakes, Eruptions, And Other Events That Change Earth</u> by Paula Smith	
<u>Volcanoes</u> by Thea and Claire Llewellyn	
<u>Weathering and Erosion</u> by Torrey Maloof	
<u>Awful Avalanches</u> by Jane Katirgis	
<u>Earth's Landforms and Bodies of Water</u> by Paula Smith	
<u>How Do Wind and Water Change Earth?</u> By Paula Smith	
<u>Water</u> by Melissa Stewart	
<u>Water Can Be . . .</u> by Laura Purdie Salas	
Websites	
NGSS aligned activities	http://www.earthsciweek.org/classroom-activities/ngss
Lesson Plans for 2-ESS2-1	https://betterlesson.com/common_core/browse/2099/ngss-2-ess2-1-compare-multiple-solutions-designed-to-slow-or-prevent-wind-or-water-from-changing-the-shape-of-the-land
Lesson Plans for 2-ESS2-2	https://betterlesson.com/next_gen_science/browse/2100/ngss-2-ess2-2-develop-a-model-to-represent-the-shapes-and-kinds-of-land-and-bodies-of-water-in-an-area
Lesson Plans for 2-ESS2-3	https://betterlesson.com/next_gen_science/browse/2101/ngss-2-ess2-3-obtain-information-to-identify-where-water-is-found-on-earth-and-that-it-can-be-solid-or-liquid/browse/2101/ngss-2-ess2-3-obtain-information-to-identify-where-water-is-found-on-earth-and-that-it-can-be-solid-or-liquid?from=domain_core
Educational videos about water, the Earth and glaciers	https://www.opened.com/search?standard=2.ESS2.3
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
<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

<ul style="list-style-type: none"> • Graphic organizers • Parent-teacher communication • Integrate a variety of activities to meet all types of multiple intelligences • Modified classwork and homework assignments 	
Unit 5: Engineering and Design	Duration: 8 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.
RI.2.1	Ask and answer such questions as <i>who</i> , <i>what</i> , <i>where</i> , <i>when</i> , <i>why</i> , and <i>how</i> to demonstrate understanding of key details in a text.
MP.4	Model with mathematics
MP.5	Use appropriate tools strategically
RI.2.10	Read and comprehend informational texts, including history/social studies, science, and technical texts, at grade level text complexity proficiently with scaffolding as needed.
W.2.8	Recall information from experiences or gather information from provided sources to answer a question.
SL.2.1.A	Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).
SL.2.1.B	Build on others' talk in conversations by linking their explicit comments to the remarks of others.
SL.2.1.C	Ask for clarification and further explanation as needed about the topics and texts under discussion.
8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.
Essential Understanding	Essential Questions
<i>Students will understand that...</i> <ul style="list-style-type: none"> • The shape and stability of structures of natural and designed objects are related to their function(s). 	<ul style="list-style-type: none"> • How does sketching or creating a model to illustrate its shape help solve a given problem? • How does testing a model determine its strengths and weaknesses in solving a given problem? • How are asking questions, gathering information, and making observation helpful when thinking about problems?
Evidence of Student Learning	

Formative Assessments	Summative Assessments
<ul style="list-style-type: none"> ● Graphic Organizers & Guided Note Taking ● Directed Reading ● Cooperative Group Learning ● Journal Entries ● Teacher Observations ● Anecdotal Notes 	<ul style="list-style-type: none"> ● RST- Research Simulation Task ● Associated Unit tests, quizzes ● Labs and engineering based projects <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	
Argument, Brainstorming, Challenge, Classification, Collaboration, Communication, Constraint, Critical Thinking, Data, Evidence, Hypothesis, Model, Observation, Prior Knowledge, Questioning, Recording	
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><i>Students will be able to ...</i></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
Students will plan and design a new tool or machine that can accomplish a job or make a work easier using only the supplies provided to them.	https://betterlesson.com/lesson/637784/simple-machines-inventions
Students will demonstrate knowledge of the engineering and design process by creating a structure that provides shade.	https://betterlesson.com/lesson/645370/still-looking-for-shade-a-design-and-engineering-challenge-continues
Students will explain that engineers help solve problems. (Part 1)	https://betterlesson.com/lesson/620234/what-do-engineers-do-part-1
Students will explain that engineers help solve problems. (Part 2)	https://betterlesson.com/lesson/628204/what-do-engineers-do-part-2
Literature	
<ul style="list-style-type: none"> ● <u>Animal Robots</u> by Erika L. Shores ● <u>Building Roads</u> by Pam Holden ● <u>Engineers Build Bridges</u> by Katie Smythe ● <u>Felix and His Flying Machine</u> by Sally Odgers ● <u>How Engineers Find Solutions</u> by Reagan Miller ● <u>Who Invented the Ferris Wheel?</u> George Ferris by Sara L. Latta 	
Websites	
50+ STEM Activities for Kids	http://thestemlaboratory.com/stem-activities-for-kids/
NGSS aligned lessons	https://www.sciencea-z.com/main/NextGenerationScienceStandards
Science Scope and Sequence	http://www.science4us.com/k-2-science-lesson-plans/
American Society for Engineering Education	http://teachers.egfi-k12.org/
Engineering is Elementary Curriculum	http://www.eie.org/
K-3 STEM Lessons	https://www.maryville-schools.org/site/Default.aspx?PageID=4713
Curriculum for K-12 Educators	https://www.teachengineering.org/
Curriculum for Pre-k-12 Education	https://www.acceleratelearning.com/
Accommodations & Modifications	

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<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

Stafford Township School District
STEAM
Pacing Guide
Grade 2

Unit 1 Introduction to the STEAM Lab	4 Days September
Unit 2 Structure and Properties Of Matter	10 Days October - December
Unit 3 Interdependent relationships in Ecosystems	10 Days January - March
Unit 4 Earth's Systems	8 Days April - June
Unit 5 Engineering and Design	8 Days Ongoing