



Stafford Township School District

STEAM Curriculum Grade 1

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.	
Interdisciplinary Connections		
ELA Standards		
W.1.8	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.	
SL.1.1.A	Follow agreed-upon norms for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).	
SL.1.1.B	Build on others' talk in conversations by responding to the comments of others through multiple exchanges.	
SL.1.1.C	Ask questions to clear up any confusion about the topics and texts under discussion.	
SL.1.5	Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.	
Math Standards		
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.	
Technology Standards		
8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.	
21st Century Life and Careers		
<p>Century Life and Career Skills: 21st century life and career skills enable students to make informed decisions that prepare them to engage as active citizens in a dynamic global society and to successfully meet the challenges and opportunities of the 21st century global workplace. http://www.state.nj.us/education/aps/cccs/career/</p> <p>9.1 Personal Financial Literacy This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.</p>		

<p>9.2 Career Awareness, Exploration, and Preparation This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.</p> <p>9.3 Career and Technical Education This standard outlines what students should know and be able to do upon completion of a CTE Program of Study.</p> <p style="text-align: center;">Career Ready Practices</p> <p>CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP5. Consider the environmental, social and economic impacts of decisions. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP9. Model integrity, ethical leadership and effective management. CRP10. Plan education and career paths aligned to personal goals. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence.</p>	
Essential Understandings	Essential Questions
<p><i>Students will understand...</i> How to safely use all equipment, materials, and furniture in the STEAM Lab.</p> <ul style="list-style-type: none"> ● 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=10894 <u>8</u></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"> ● <i>Ada Lace Sees Red</i> by Emily Calandrelli ● <i>Cao Chong Weighs an Elephant</i> by Songju Ma Daemicke ● <i>Find the Dots</i> by Andy Mansfield ● <i>Year Round Project Based Activities Grade 1</i> by Stephanie Lester ● <i>The Big Book of MakerSpace Projects</i> 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 ● Modified classwork and homework assignments 	
<p>Special Education/504 Plans</p>	

- 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 2: Waves: Light and Sound		Duration: 10 days (October- December)
Standards		
1-PS4-1	Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.	
1-PS4-2	Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.	
1-PS4-3	Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.	
1-PS4-4	Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.	
Interdisciplinary Connections		
ELA Standards		
RI.K.1	With prompting and support, ask and answer questions about key details in a text.	
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.3	Ask and answer questions in order to seek help, get information, or clarify something that is not understood.	
SL.1.1.A	Follow agreed-upon norms for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).	
SL.1.1.B	Build on others' talk in conversations by responding to the comments of others through multiple exchanges.	
SL.1.1.C	Ask questions to clear up any confusion about the topics and texts under discussion.	
SL.1.5	Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.	
Technology Standards		
8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.	
Math Standards		
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.	
21st Century Life and Careers		
<p>Century Life and Career Skills: 21st century life and career skills enable students to make informed decisions that prepare them to engage as active citizens in a dynamic global society and to successfully meet the challenges and opportunities of the 21st century global workplace.</p> <p>http://www.state.nj.us/education/aps/cccs/career/</p>		

9.1 Personal Financial Literacy

This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

9.2 Career Awareness, Exploration, and Preparation

This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

9.3 Career and Technical Education

This standard outlines what students should know and be able to do upon completion of a CTE Program of Study.

Career Ready Practices

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- CRP5. Consider the environmental, social and economic impacts of decisions.
- CRP6. Demonstrate creativity and innovation.
- CRP7. Employ valid and reliable research strategies.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9. Model integrity, ethical leadership and effective management.
- CRP10. Plan education and career paths aligned to personal goals.
- CRP11. Use technology to enhance productivity.
- CRP12. Work productively in teams while using cultural global competence.

Essential Understandings	Essential Questions
<p><i>Students will understand that...</i></p> <ul style="list-style-type: none"> ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. ● People depend on various technologies in their lives; human life would be very different without technology. 	<ul style="list-style-type: none"> ● How and why do materials create sound through vibration? ● How and why does sound cause materials to vibrate? ● How does light and where it is located affect our ability to see objects? ● What are different ways you can communicate over a distance using light and/or sound?
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 	<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	
Sound Waves, Vibration, Illumination, Communication, Light Waves, Translucent, Transparent, Opaque, Reflective, Light Source, Light Energy, Sound, Sound Receiver, Sound Carrier, Sound Producer, Pitch, Volume, Properties	
Knowledge and Skills	
Content	Skills
<i>Students will know...</i> <ul style="list-style-type: none"> ● Sound can make matter vibrate ● Vibrating matter can make sound ● Objects can be seen if light is available to illuminate them or if they give off their own light ● Some materials allow light to pass through them, others allow only some light through and other block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. 	<i>Students will be able to...</i> <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.

<ul style="list-style-type: none"> • Mirrors can be used to redirect a light beam 	<ul style="list-style-type: none"> • Study the world using different ways.
Instructional Plan	
Suggested Activities	Resources
STEM & Sound Students will design a device that will allow you to communicate with other classrooms without leaving your room and without using power.	https://betterlesson.com/next_gen_science/browse/2068/ngss-1-ps4-1-plan-and-conduct-investigations-to-provide-evidence-that-vibrating-materials-can-make-sound-and-that-sound-can-make?from=domain_core_lesson_count
Sounds/Vibrations: How do they make silly sounds in cartoons? Students will investigate vibrations as a source of sound effects for movies.	Mystery Science
Light, Materials, Transparent & Opaque: What if there were no windows? Students will consider materials from the perspective of how much light they let through, then use these materials to create a work of art.	Mystery Science
Communication Students will experiment with communication through the use of Morse code.	STEMscopes
Communication This Project Based Learning Challenge is to design and construct a string phone. Students will test different types of string to determine the best one for the string phone.	STEMscopes
Literature	
<ul style="list-style-type: none"> • <i>All About Light</i> by Lisa Trumbauer • <i>All About Sound</i> by Lisa Trumbauer • <i>Oscar and The Moth</i> by Geoff Waring • <i>Sending Messages with Light and Sound</i> by Jennifer Boothroyd • <i>Vibrations Make Sound</i> by Jennifer Boothroyd • <i>What are Shadows and Reflections?</i> by Paula Smith • <i>Who Was Alexander Graham Bell?</i> by Natalie Brown 	
Websites	
NGSS Resource Center	http://smlevinson.wix.com/ocngss
NGSS aligned activities	http://www.hookedonscience.org/nextgenerationsciencestandards.html

STEM activities	http://www.watchknowlearn.org/Category.aspx?CategoryID=2548
Properties of Matter lessons	http://www.propertiesofmatter.si.edu
Light and Sound lessons	https://sites.google.com/a/msad60.org/k-5_science/first-grade/waves-light-sound
Elementary NGSS lesson plans	http://www.resa.net/curriculum/curriculum/science/professionaldevelopment/ngss-pd/lesson-plans-exploring-ngss/
1-PS4-2 Lessons	https://betterlesson.com/next_gen_science/browse/2069/ngss-1-ps4-2-make-observations-to-construct-an-evidence-based-account-that-objects-can-be-seen-only-when-illuminated
1-PS4-3 Lessons	https://betterlesson.com/next_gen_science/browse/2070/ngss-1-ps4-3-plan-and-conduct-an-investigation-to-determine-the-effect-of-placing-objects-made-with-different-materials-in-the-p
Materials correlated by standard	https://www.sciencea-z.com/main/NextGenerationScienceStandards
1-PS4-1 Lessons	https://betterlesson.com/next_gen_science/browse/2068/ngss-1-ps4-1-plan-and-conduct-investigations-to-provide-evidence-that-vibrating-materials-can-make-sound-and-that-sound-can-make
NGSS aligned lesson ideas	https://climatekids.nasa.gov/science-standards/
NGSS videos	https://www.teachingchannel.org/videos/next-generation-science-standards-achieve
NGSS Scope and Sequence, demos & modules	http://www.science4us.com/k-2-science-lesson-plans/
Observations of Sound	MSAD60.org
Observations of Light	MSAD60.org
Shadow Theater	MSAD60.org
Meet Alexander Graham Bell	MSAD60.org
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

- 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
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- Parent-teacher communication
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Unit 3: Space Systems: Patterns and Cycles		Duration: 10 days (January – March)
Standards		
1-ESS1-1	Use observations of the sun, moon, and stars to describe patterns that can be predicted.	
1-ESS1-2	Make observations at different times of year to relate the amount of daylight to the time of year.	
Interdisciplinary Connections		
ELA Standards		
W.1.7.	Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions).	
SL.1.1.A	Follow agreed-upon norms for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).	
SL.1.1.B	Build on others’ talk in conversations by responding to the comments of others through multiple exchanges.	
SL.1.1.C	Ask questions to clear up any confusion about the topics and texts under discussion.	
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Math Standards		
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.	
Technology Standards		
8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.	
21st Century Life and Careers		
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<p>9.3 Career and Technical Education This standard outlines what students should know and be able to do upon completion of a CTE Program of Study.</p> <p style="text-align: center;">Career Ready Practices</p> <p>CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP5. Consider the environmental, social and economic impacts of decisions. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP9. Model integrity, ethical leadership and effective management. CRP10. Plan education and career paths aligned to personal goals. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence.</p>	
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, used to describe phenomena, and used as evidence. ● Science assumes natural events happen today as they happened in the past. ● Many events are repeated. 	<ul style="list-style-type: none"> ● What predictable, observable patterns occur due to the motion of the sun, moon, and stars? ● How is the amount of daylight related to the time of year?
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 Entry ● Teacher Observations ● Anecdotal Notes 	<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

	<ul style="list-style-type: none"> • Teacher Observation Checklist based on Student Performance and Project Creation • Student Participation Rubric • Mystery Science Activities • Student Created Project with Teacher Scoring Rubric
Vocabulary Stars, Sunrise, Sunset, Shadow, Phases, Rotate, Spin, Patterns	
Knowledge and Skills	
Content	Skills
<i>Students will know...</i> <ul style="list-style-type: none"> • patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted • seasonal patterns of sunrise and sunset can be observed, described, and predicted 	<i>Students will be able to...</i> <ul style="list-style-type: none"> • Make observations (firsthand or from media) to collect data that can be used to make comparisons. • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.
Instructional Plan	
Suggested Activities	Resources
Patterns in Space Students will observe what they see in the sky at different times.	STEMscopes
Patterns in Space Students will place pictures of the moon phases in order to show that they follow a predictable pattern.	STEMscopes
Could a statue's shadow move? Students will investigate what it takes to make a stationary object's shadow move, and reflect on what this means about the sun's place in the sky.	Mystery Science
How can the sun help you if you're lost? Students will develop a model of the sun's daily path across the sky, then use this model to help someone who's lost.	Mystery Science
Exploring the Sun's energy	https://betterlesson.com/lesson/635063/exploring-the-sun-s-energy

Students will investigate how the Sun affects the temperature of soil, air and water in a predictable pattern.	
Literature	
<ul style="list-style-type: none"> ● <i>Planets</i> by Elizabeth Carney ● <i>Stars</i> by William B. Rice ● <i>Sun</i> by William B. Rice ● <i>Sun, Moon, and Stars</i> by Thea Feldman ● <i>Why Do Seasons Change?</i> by Ryan Stark ● <i>Why Does the Sun Set?</i> by Violet Miller ● <i>Why Is It Winter?</i> by Sara L. Latta 	
Websites	
Sun article	http://kids.nationalgeographic.com/explore/space/sun/#sun.jpg
Lunar Samples Activity	https://betterlesson.com/next_gen_science/browse/2080/ngss-1-ess1-1-use-observations-of-the-sun-moon-and-stars-to-describe-patterns-that-can-be-predicted
Solar Eclipse Box Experiment	http://www.hookedonscience.org/files/Experiment_Archive_SOLAR_ECLIPSE_BOX.pdf
Recreate a geode using an egg	https://www.stevespanglerscience.com/lab/experiments/incredible-egg-geode/
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 4: Structure, Functions, and Information Processing	Duration: 8 days (April – June)
Standards	
1-LS1-1	Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
1-LS1-2	Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.
1-LS3-1	Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
Interdisciplinary Connections	
ELA Standards	
RI.1.1	Ask and answer questions about key details in a text.
RI.1.2	Identify the main topic and retell key details of a text.
RI.1.10	With prompting and support, read informational texts appropriately complex for grade 1.
SL.1.1.A	Follow agreed-upon norms for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
SL.1.1.B	Build on others' talk in conversations by responding to the comments of others through multiple exchanges.
SL.1.1.C	Ask questions to clear up any confusion about the topics and texts under discussion.
SL.1.5	Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.
Math Standards	
1.NBT. B.3	Compare two two-digit numbers based on meanings of the tens and one's digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.
1.NBT. B.4	Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.
1.NBT. B.5	Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.
Technology Standards	
8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.

21st Century Life and Careers	
<p>Century Life and Career Skills: 21st century life and career skills enable students to make informed decisions that prepare them to engage as active citizens in a dynamic global society and to successfully meet the challenges and opportunities of the 21st century global workplace. http://www.state.nj.us/education/aps/cccs/career/</p>	
9.1 Personal Financial Literacy	
<p>This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.</p>	
9.2 Career Awareness, Exploration, and Preparation	
<p>This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.</p>	
9.3 Career and Technical Education	
<p>This standard outlines what students should know and be able to do upon completion of a CTE Program of Study.</p>	
Career Ready Practices	
<p>CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP5. Consider the environmental, social and economic impacts of decisions. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP9. Model integrity, ethical leadership and effective management. CRP10. Plan education and career paths aligned to personal goals. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence.</p>	
Essential Understandings	Essential Questions
<p><i>Students will understand that...</i></p> <ul style="list-style-type: none"> ● Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. ● The shape and stability of structures of natural and designed objects are related to their function(s). 	<ul style="list-style-type: none"> ● How do plants and animals use their external parts to help them survive, grow, and meet their needs? ● What patterns of behavior of parent and offspring help offspring survive? ● How are offspring in both plants and animals alike but not exactly alike their parents?

<ul style="list-style-type: none"> • Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world 	<ul style="list-style-type: none"> • What are some ways plants and animals meet their needs so that they can survive and grow? • How are parents and their children similar and different?
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 • Brainstorming 	<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	
Prowl, Soar, Offspring, Adaptation, Habitat, Embryo, Seed Coat	
Knowledge and Skills	
Content	Skills
<p><i>Students will know...</i></p> <ul style="list-style-type: none"> • all organisms have external parts • different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air 	<p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. • Use materials to design a device that solves a specific problem or a solution to a specific problem.

<ul style="list-style-type: none"> • plants have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow • adult plants and animals can have young • parents and the offspring themselves engage in behaviors that help the offspring to survive • animals have body parts that capture and convey different kinds of information needed for growth and survival • animals respond to these inputs with behaviors that help them survive • plants respond to some external inputs • individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways 	<ul style="list-style-type: none"> • Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. • Scientists look for patterns and order when making observations about the world.
Instructional Plan	
Suggested Activities	Resources
Why Do Birds Have Beaks? Students will carry out an investigation to determine the relationship between the shape of different bird beaks and the food each bird eats.	Mystery Science https://mysteryscience.com/powers/mystery-1/structure-survival/117?r=6365131
Why Are Polar Bears White? Students will make observations to construct an explanation of why camouflage is helpful to animals.	Mystery Science https://mysteryscience.com/powers/mystery-2/structure-survival/118?r=6365131
Animal Survival Students will use their sense of smell to identify substances that remind them of food versus smells that are unpleasant or dangerous.	STEMscopes
Animal Survival This Project Based Learning Challenge is to design a bed for an animal that provides comfort and safety. The students will create a model of the bed using materials that can be found in the animal's habitat.	STEMscopes
Literature	
<ul style="list-style-type: none"> • <i>How and Why Do Animals Adapt?</i> By Bobbie Kalman • <i>A Book About Seeds</i> by Susan Blackaby • <i>Rainforest Animal Adaptations</i> by Lisa J. Amstutz 	

<ul style="list-style-type: none"> • <i>The Secret Pool</i> by Kimberly Ridley • <i>Weird Sea Creatures</i> by Laura Marsh • <i>Animal Dads</i> by Sneed B. Collard • <i>Animal Mothers and Babies</i> by Dona Rice • <i>Dolphin Baby!</i> by Nicola Davies • <i>Termites on a Stick</i> by Michele Coxon • <i>What Are Natural Structures?</i> by Bobbie Kalman 	
Websites	
1-LS1-1 Lessons	https://betterlesson.com/next_gen_science/browse/2074/ngss-1-ls1-1-use-materials-to-design-a-solution-to-a-human-problem-by-mimicking-how-plants-and-or-animals-use-their-external-par
1-LS1-2 Lessons	https://betterlesson.com/common_core/browse/2075/ngss-1-ls1-2-read-texts-and-use-media-to-determine-patterns-in-behavior-of-parents-and-offspring-that-help-offspring-survive
Heredity Lesson	http://wyobio.org/index.php/education/lesson-plan-heredity/
1-LS1-3 Lessons	https://betterlesson.com/common_core/browse/2077/ngss-1-ls3-1-make-observations-to-construct-an-evidence-based-account-that-young-plants-and-animals-are-like-but-not-exactly-lik
NGSS aligned classroom activities	http://www.earthsciweek.org/classroom-activities/ngss
Printable resources by topic	https://www.teachervision.com/plants
NGSS aligned activities	http://www.hookedonscience.org/nextgenerationsciencestandards.html
Materials correlated by standard	https://www.sciencea-z.com/main/NextGenerationScienceStandards
NGSS Scope and Sequence, demos & modules	http://www.science4us.com/k-2-science-lesson-plans/
Accommodations & Modifications	
English Language Learners <ul style="list-style-type: none"> • Shorten or simplify directions • Alternative assessment • Flexible/cooperative grouping • Graphic organizers 	

<ul style="list-style-type: none"> • 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 • 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-ETS-1-2	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-ETS-1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	
Interdisciplinary Connections		
ELA Standards		
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.	
SL.1.1.A	Follow agreed-upon norms for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).	
SL.1.1.B	Build on others' talk in conversations by responding to the comments of others through multiple exchanges.	
SL.1.1.C	Ask questions to clear up any confusion about the topics and texts under discussion.	
SL.1.5	Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.	
Math Standards		
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.	
Technology Standards		
8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.	
	21st Century Life and Careers	
	Century Life and Career Skills: 21st century life and career skills enable students to make informed decisions that prepare them to engage as active citizens in a dynamic global society and to successfully meet the challenges and opportunities of the 21st century global workplace. http://www.state.nj.us/education/aps/cccs/career/	
	9.1 Personal Financial Literacy	
	This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.	

<p>9.2 Career Awareness, Exploration, and Preparation This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.</p> <p>9.3 Career and Technical Education This standard outlines what students should know and be able to do upon completion of a CTE Program of Study.</p> <p style="text-align: center;">Career Ready Practices</p> <p>CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP5. Consider the environmental, social and economic impacts of decisions. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP9. Model integrity, ethical leadership and effective management. CRP10. Plan education and career paths aligned to personal goals. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence.</p>	
Essential Understanding	Essential Questions
<p><i>Students will understand that...</i></p> <ul style="list-style-type: none"> The shape and stability of structures of natural and designed objects are related to their function(s). <p>http://www.nap.edu/openbook.php?record_id=13165&page=204 http://www.nap.edu/openbook.php?record_id=13165&page=204</p>	<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

	<p>Rubric</p> <ul style="list-style-type: none"> • 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
SWBAT will explain that engineers help solve problems. (Part 1)	https://betterlesson.com/lesson/620234/what-do-engineers-do-part-1
SWBAT 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"> ● <i>Animal Robots</i> by Erika L. Shores ● <i>Building Roads</i> by Pam Holden ● <i>Engineers Build Bridges</i> by Katie Smythe ● <i>Felix and His Flying Machine</i> by Sally Odgers ● <i>How Engineers Find Solutions</i> by Reagan Miller ● <i>Who Invented the Ferris Wheel? George Ferris</i> 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	
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 	

<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
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Stafford Township School District
STEAM
Pacing Guide
Grade 1

Unit 1 Motion and Stability	September 4 Days
Unit 2 Waves: Light and Sound	October-November 10 Days
Unit 3 Space Patterns	January-March 10 Days
Unit 4 Structure, Functions, And Information Processing	April-June 8 Days
Unit 5 Engineering and Design	Ongoing 8 Days