Englewood Public School District
Science
Grade 4
Fourth Marking Period

Unit 7: Using Engineering Design with Force and Motion Systems

Overview: In this unit of study, students use evidence to construct an explanation of the relationship between the speed of an object and the energy of that object. Students develop an understanding that energy can be transferred from place to place by sound, light, heat, and electrical currents or from objects through collisions. They apply their understanding of energy to design, test, and refine a device that converts energy from one form to another. The crosscutting concepts of *energy and matter* and the *influence of engineering, technology, and science on society and the natural world* are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *asking questions and defining problems, planning and carrying out investigations*, *constructing explanations*, and *designing solutions*. Students are also expected to use these practices to demonstrate their understanding of the core ideas.
This unit is based on 4-PS3-4, 3-5-ETS1-1, 3-5-ETS1-2, and 3-5-ETS1-3.

Time Frame: 15 days

Enduring Understandings:
Energy can be transferred in various ways and between objects.
The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use.

Essential Questions:
How can scientific ideas be applied to design, test, and refine a device that converts energy from one form to another?

Standards	Topics and Objectives	Activities	Resources	Assessments
(4-PS3-4): **Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*** **(3-5-ETS1-1):** **Define a simple design problem reflecting a need or a want that includes specified criteria for success**	**Topics** Force and Motion Engineering Design Twenty-First Century Themes and Skills include: Environmental Literacy • The Four C's • Global Awareness **Objectives**	**Light Your Way:** Students will design and build a lantern that they can wear on their expedition to light their way without using your hands to hold it. Their lantern should be designed to point ahead of them when they walk, to have an on/off switch to conserve energy, and to be comfortable to	**Light Your Way:** **Materials:** • C battery • AA battery • Film canister • Bell wire • Electrical tape • Masking tape • Bulb • Bulb holder	**Formative Assessments:** Do Now/Ticket to Leave Journal Entries **Benchmark Assessment:** Exact Path **Summative Assessments:** **Light Your Way:** Lantern Diagram

and constraints on materials, time, or cost. **(3-5-ETS1-2):** **Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.** **(3-5-ETS1-3):** **Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.**	**Light Your Way:** The student will investigate and understand the characteristics of electricity and engineering design. **Testable Questions:** Students will be able to create a testable question using poppers. **Build a Toy:** Students will apply the engineering design process to a design challenge by creating a plan for project material expenses based on a budget and setting up an electric circuit using batteries, wire, and a motor. **Solar Oven:** Students will observe how light transports energy into heat energy through the construction of solar ovens.	wear. Remember to prepare a final labeled sketch to show the scientists, and be prepared to explain how your lantern works. (4-PS3-4, MP.2, CRP4) **Testable Questions:** Students explore different sizes of poppers and their potential popping height. They experiment in different ways and begin to formulate questions. Students then experiment to answer their questions. (3-5-ETS1-2, W.4.8, CRP8) **Build a Toy:** Working as if they are engineers who work for (the hypothetical) Build-a-Toy Workshop company, students apply their imaginations and the engineering design process to design and build prototype toys with moving parts. They set up electric circuits using batteries, wire and motors. They create plans for project material expenses to meet a budget. (3-5-ETS1-3, 3-5-ETS1-1,W.4.8, 8.1.5.A.3) **Solar Oven:** The students will build solar ovens to demonstrate how light energy is transferred into heat energy. (MP.4, 4.OA.A.3, (CRP6)	• Brass fasteners • Paper clips • Christmas tree lights • Wire cutter • Card stock • Wire stripper • Cardboard • String • General art supplies **Testable Questions:** Investigation Sheet **Build a Toy:** Each group needs: • 10 Popsicle or wooden craft sticks • 10 plastic drinking straws • 1 pair of scissors • 5 notecards • 1 small electric motor (available online, such as the 1.5 to 3VDC hobby motor at Radio Shack at https://www.radioshack.com/products/radioshack-1-5-to-3vdc-hobby-motor) • 2 wheel and axle sets (available online, such as at Kidder, https://kidder.ca/kidder-front-wheels-each-cat-19-1015.html and http://kidder.ca/axles-100-pcs-bulk.html) • 2 sets of gears (available online, such as at Kidder or Science Kit, https://kidder.ca/gears-7-pc-set.html or	Explanation **Testable Questions:** Student Investigation sheet **Build a Toy:** Completed Toy Project Plans and Budget **Solar Oven:** Student Demonstration **Alternative Assessments:** Students will conduct research that builds their understanding of energy transfers. Computers, Checklists Students will gather relevant information from their investigations and from multiple print or digital sources, take notes, and categorize their findings. Presentations, Graphic organizers Students will analyze constraints on materials, time, or cost to determine what implications the constraints have for design solutions. Rubrics, Polling, Socratic discussions

http://sciencekit.com/plastic-gears/p/IG0030524/)
- 1 rubber band
- 3 paperclips
- 2 feet (.6 m) thin insulated wire
- 2 AA batteries
- 1 ruler
- 3 sheets of paper
- 1 set of markers
- 4 magnets
- Masking tape
- Toy money (such as Monopoly money)

Build a Toy Web-based Resources:

- Toy Engineering Presentation PPT
- Toy Engineering Presentation PDF
- Build-a-Toy Workshop Design Worksheet Word Doc
- Build-a-Toy Workshop Design Worksheet (PDF)

Solar Oven:

- Aluminum Foil
- Pizza Boxes
- Clear Plastic Wrap
- Scissors
- Glue
- Thermometer

Additional Resources:

https://www.teachjunkie.com/sciences/force-and-motion-experiments/

Accommodations and Modifications:

Students with special needs: Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

ELL/ESL students: Students will be supported according to the recommendations for "can do's" as outlined by WIDA – https://www.wida.us/standards/CAN_DOs/
This particular unit has limited language barriers due to the physical nature of the curriculum.

Students at risk of school failure: Formative and summative data will be used to monitor student success at first signs of failure student work will be reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations. More time and will be made available with a certified instructor to aid students in reaching the standards.

Gifted and Talented Students: Students excelling in mastery of standards will be challenged with complex, high level challenges related to the complexity in planning and carrying out investigations and analyzing and interpreting data.

English Language Learners	**Special Education**	**At-Risk**	**Gifted and Talented**
● Provide graphic organizers to take notes during lectures ● Speak and display terminology ● Teacher modeling ● Peer modeling ● Provide ELL students with multiple literacy strategies. ● Word walls ● Use peer readers ● Give page numbers to help the students find answers ● Provide a computer for	● Provide graphic organizers to take notes during lectures ● Utilize modifications & accommodations delineated in the student's IEP ● Work with paraprofessional ● Use multi-sensory teaching approaches. ● Work with a partner ● Provide concrete examples ● Restructure lesson using UDL principals (http://www.cast.org/our	● Provide graphic organizers to take notes during lectures ● Using visual demonstrations, illustrations, and models ● Give directions/instructions verbally and in simple written format. Oral prompts can be given. ● Peer Support ● Increase one on one time ● Teachers may modify instructions by modeling what the student is expected to do ● Instructions may be printed out in large print and hung up for the student to see	● Provide students opportunities to create a bulletin board displaying the concepts learned ● Curriculum compacting ● Inquiry-based instruction ● Independent study ● Higher order thinking skills ● Adjusting the pace of lessons ● Interest based content ● Real world scenarios ● Student Driven Instruction ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understand

written work ● Provide two sets of textbooks, one for home and one for school ● Provide visual aides ● Provide additional time to complete a task ● Use graphic organizers	-work/about-udl.html#.VXmoXcfD_UA). ● Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).	during the time of the lesson. ● Review behavior expectations and make adjustments for personal space or other behaviors as needed. ● Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. ● Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).	-ings. ● Use project-based science learning to connect science with observable phenomena. ● Structure the learning around explaining or solving a social or community-based issue. ● Collaborate with after-school programs or clubs to extend learning opportunities.

Interdisciplinary Connections:

ELA-NJSLS/ELA:

W.4.8: Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-PS3-4)

W.4.7: Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-PS3-4)

Mathematics:

4.OA.A.3: Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (4-PS3-4)

MP.2: Reason abstractly and quantitatively. (3-5-ETS1-1), (3-5-ETS1-2), (3-5-ETS1-3)
MP.4: Model with mathematics. (3-5-ETS1-1), (3-5-ETS1-2), (3-5-ETS1-3)

Career Ready Practices:
CRP6: Demonstrate creativity and innovation**.**
CRP4: Communicate clearly and effectively and with reason.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

Integration of Technology Standards NJSLS 8:
8.1.5.A.3: Use a graphic organizer to organize information about a problem or issue.

Integration of 21st Century Skills:
9.1.4.C.1: Practice collaborative skills in groups, and explain how these skills assist in completing tasks in different settings (at home, in school, and during play).

Social Studies:
6.1.4.B.9: Relate advances in science and technology to environmental concerns, and to actions taken to address them.

Key Vocabulary:
Solar Energy: energy present in sunlight
Circuit: the complete path that an electric current travels along
Transfer: move from one place to another
Engineering: the work of designing and creating new products or systems by using scientific methods

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions • Apply scientific ideas to solve design problems. (4-PS3-4) • Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2) Asking Questions and Defining Problems • Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several	PS3.B: Conservation of Energy and Energy Transfer • Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-4) PS3.C: Relationship Between Energy and Forces • When objects collide, the contact forces transfer energy so as to change the objects'	Energy and Matter • Energy can be transferred in various ways and between objects. (4-PS3-4) - *Connections to Engineering, Technology, and Applications of Science* Influence of Engineering, Technology, and Science on Society and the Natural World • Engineers improve existing technologies or develop new ones. (4-PS3-4)

	criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1) Planning and Carrying Out Investigations • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-5-ETS1-3)	motions. (4-PS3-3) PS3.D: Energy in Chemical Processes and Everyday Life • The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4) ETS1.A: Defining and Delimiting Engineering Problems • Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1) ETS1.B: Developing Possible Solutions • Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2) • At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2) • Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3) ETS1.C: Optimizing the Design Solution • Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the	- *-Connections to Nature of Science* Science is a Human Endeavor • Most scientists and engineers work in teams. (4-PS3-4) • Science affects everyday life. (4-PS3-4) Influence of Science, Engineering, and Technology on Society and the Natural World • People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1) • Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)

		constraints. (3-5-ETS1-3)		

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Unit 8: Waves and Information

Overview: In this unit of study, students use a model of waves to describe patterns of waves in terms of amplitude and wavelength and to show that waves can cause objects to move. The crosscutting concepts of *patterns; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world* are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in developing and *using models*, *planning and carrying out investigations*, and *constructing explanations, and designing solutions*. Students are also expected to use these practices to demonstrate their understanding of the core ideas.

Time Frame: 20 days

Enduring Understandings:
Waves, which are regular patterns of motion, can be made in water by disturbing the surface.
When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach. Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks.

Essential Questions:
If a beach ball lands in the surf, beyond the breakers, what will happen to it?
Which team can design a way to use patterns to communicate with someone across the room?

Standards	Topics and Objectives	Activities	Resources	Assessments
(4-PS4-1): Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.	**Topics** Waves and Information Creativity Communication Twenty-First Century Themes and Skills	**<u>Pop Bottle Waves:</u>** Students explore what waves are all about as we observe, draw, and think about how waves are shaped and how they move and what creates them. (4-PS4-1)	**<u>Pop Bottle Waves:</u>** • Enough 2 Liter bottles with tightly fitting caps, per groups of 3 (to 4) • Corks cut into ½ " pieces. • 1 1000 ML graduated cylinder, • Funnels • A Metronome (either a real one or go to 8notes.com and use that one. Put it through the sound system on the SB if using iPad.)	**Formative Assessments:** Do Now/Ticket to Leave Journal Entries **<u>How Do Waves Move Objects?</u>** Student Notes **Benchmark Assessment:** Exact Path

(4-PS4-3): Generate and compare multiple solutions that use patterns to transfer information.

(3-5-EST-1-2): Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

(3-5-ETS-1-3): Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

include:
Environmental Literacy

- The Four C's
- Environmental Literacy
- Global Awareness

Objectives

Pop Bottle Waves:
Students investigate how motion and wind create waves on water.

How Do Waves Move Objects?
Students use what they have learned to develop questions about waves and begin to understand how waves transfer energy.

Amplitude of a Wave (Page 94):
Students will work with a jump rope to develop questions and predict how to change the amplitude of a wave.

Morse Code: (Page 97)
Students will learn that data can be sent across distances in a variety of different ways.

How Do Waves Move Objects?
Using what they have observed about water waves and questioning, students continue to develop the vocabulary and begin to understand how waves transfer energy. (MP.2, CRP8, CRP6, 4-PS4-3, 8.1.5.A.3)

Amplitude of a Wave:
Students will use a rope to model and change the amplitude of wave.
(CRP4, 3-5-ETS-1-3)

Morse Code:
Students will study Morse code and practice using patterns to send messages. (4.G.A.1, RI.4.9, 3-5-EST-1-2, 9.1.4.C.1)

- Blue or green food dye.
- Paper towels for spills.
- Blow dryer & small tub of water.
- Students need their iPad timer app & Camera/Video app
- Data Chart/ Notebooks/ pencils

How Do Waves Move Objects?

- Ponder This, Video
- Using What We Learned

Amplitude of a Wave:

- Jump Rope
- Tuning fork
- Amplitude Video

Morse Code:

- Data Transfer Video
- Morse Code Game
- Wires
- Buzzers
- Batteries

Additional Resources:

https://study.com/academy/exam/topic/4th-grade-science-waves-sound.html
Waves and Wavelike Motion by The Physics Classroom
https://missbupp2016-2017.weebly.com/waves-unit.html

"What it Looks Like in the Classroom"
Utah Education Network
Michigan NGSS Moodle:

Summative Assessments:

Pop Bottle Waves:
Collaboration Board

Amplitude of a Wave:
Presentation
Summary

Morse Code:
Presentation
Summary

Alternative Assessments:

Sort and classify designed products using similarities and differences in patterns.

Venn Diagram, Peer Reviews

Develop a model using an analogy, example, or abstract representation to describe a scientific principle.

Informal Presentations, Capstone Projects, Rubrics

Accommodations and Modifications:

Students with special needs: Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

ELL/ESL students: Students will be supported according to the recommendations for "can do's" as outlined by WIDA – https://www.wida.us/standards/CAN_DOs/
This particular unit has limited language barriers due to the physical nature of the curriculum.

Students at risk of school failure: Formative and summative data will be used to monitor student success at first signs of failure student work will be reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations. More time and will be made available with a certified instructor to aid students in reaching the standards.

Gifted and Talented Students: Students excelling in mastery of standards will be challenged with complex, high level challenges related to the complexity in planning and carrying out investigations and analyzing and interpreting data.

English Language Learners	**Special Education**	**At-Risk**	**Gifted and Talented**
● Connect to prior learning to build prior knowledge ● Speak and display terminology ● Teacher modeling ● Peer modeling ● Provide ELL students with multiple literacy strategies. ● Word walls ● Use peer readers ● Give page numbers to help the students find answers ● Provide a computer for	● Utilize modifications & accommodations delineated in the student's IEP ● Work with paraprofessional ● Use multi-sensory teaching approaches. ● Work with a partner ● Provide concrete examples ● Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_	● Provide analogies to connect concepts to new learning ● Using visual demonstrations, illustrations, and models ● Give directions/instructions verbally and in simple written format. Oral prompts can be given. ● Peer Support ● Increase one on one time ● Teachers may modify instructions by modeling what the student is expected to do ● Instructions may be printed	● Increase the pace of lessons ● Curriculum compacting ● Inquiry-based instruction ● Independent study ● Higher order thinking skills ● Interest based content ● Real world scenarios ● Student Driven Instruction ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Use project-based science learning to connect science with observable phenomena.

written work ● Provide two sets of textbooks, one for home and one for school ● Provide visual aides ● Provide additional time to complete a task ● Use graphic organizers	UA). ● Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).	out in large print and hung up for the student to see during the time of the lesson. ● Review behavior expectations and make adjustments for personal space or other behaviors as needed. ● Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).	● Structure the learning around explaining or solving a social or community-based issue. ● Collaborate with after-school programs or clubs to extend learning opportunities.

Interdisciplinary Connections:

ELA-NJSLS/ELA:
RI.4.9: Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS4-3)
SL.4.5: Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-PS4-1)

Mathematics:
MP.2: Reason abstractly and quantitatively. (3-5-ETS1-2),(3-5-ETS1-3)
4.G.A.1: Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4-PS4-2)

Integration of 21st Century Skills:
9.1.4.C.1: Practice collaborative skills in groups, and explain how these skills assist in completing tasks in different settings (at home, in school, and during play).

Career Ready Practices:
CRP6: Demonstrate creativity and innovation**.**
CRP4: Communicate clearly and effectively and with reason.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

Social Studies:
6.1.4.B.8: Compare ways people choose to use and distribute natural resources.

Integration of Technology Standards NJSLS 8:
8.1.5.A.3: Use a graphic organizer to organize information about a problem or issue.

Key Vocabulary:
Energy: the ability to do work. Energy can take a number of forms and can be converted from one form to another.
Energy transfer: The movement of energy from one thing to another or the change of energy from one form to another.
Light: A form of energy.
Sound Wave: A wave produced by the energy of a vibrating object.
Wave: a regular, repeating pattern, such as an ocean wave or a sound wave.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models • Develop a model using an analogy, example, or abstract representation to describe a scientific principle. (4-PS4-1) **Constructing Explanations and Designing Solutions** • Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-PS4-3) • Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2) - ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** • Science findings are based on recognizing patterns. (4-PS4-1) **Planning and Carrying Out Investigations** • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-5-ETS1-3)	**PS4.A: Wave Properties** • Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach. *(Note: This grade band endpoint was moved from K–2.)* (4-PS4-1) • Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1) **PS4.C: Information Technologies and Instrumentation** • Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3) **ETS1.C: Optimizing The Design Solution** • Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. *(secondary to 4-PS4-3)* **ETS1.B: Developing Possible Solutions** • Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2) • At whatever stage, communicating with peers about proposed solutions is an	**Patterns** • Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena. (4-PS4-1) • Similarities and differences in patterns can be used to sort and classify designed products. (4-PS4-3) - ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** • Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4-3) **<u>Influence of Science, Engineering, and Technology on Society and the Natural World</u>** • <u>Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)</u>

		important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2) • Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3) **ETS1.C: Optimizing the Design Solution** • Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)		