

**Englewood Public School District**  
**Science**  
**Kindergarten**  
**First Marking Period**

**Unit 1: Engineering & Technology and Forces & Motion**

**Overview:** In this unit of study, students will learn all about engineers and what they do. Students will learn how to solve a problem in the same manner that an engineer does. They will learn about designs and use technology to enhance their problem-solving skills. Students will also apply an understanding of the effects of different strengths or different directions of pushes and pulls on the motion of an object to analyze a design solution.

The crosscutting concept of cause and effect is called out as the organizing concept for this disciplinary core idea. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations* and *analyzing and interpreting data*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

**Time Frame:** 15 – 20 days

**Enduring Understandings:**

A situation that people want to change or create can be approached as a problem to be solved through engineering.

There are many ways to solve a problem, it is useful to compare and test designs.

Technology is constantly changing to meet our needs.

Simple tests can be designed to gather evidence to support or refute student ideas about causes.

Pushes and pulls can have different strengths and directions.

Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.

**Essential Questions:**

What is an engineer and why are they important?

How do engineers solve problems?

How do objects move?

How can you design a simple way to change the speed or direction of an object using a push or pull from another object?

Why is technology important?

How do scientists and engineers use technology?

Standards	Topics and Objectives	Activities	Resources	Assessments
<p><b>K-2-ETS1-1.</b> 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.</p> <p><b>K-2-ETS1-2.</b> 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.</p> <p><b>K-2-ETS1-3.</b> Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p> <p><b>K-PS2-1.</b> Plan and conduct an investigation to compare the effects of different strengths or different</p>	<p><b>Topics</b></p> <p>Engineering and technology forces and motion</p> <p>Twenty-First Century Themes and Skills include:</p> <ul style="list-style-type: none"> <li>Information Literacy &amp; Media Literacy</li> <li>The Four C's</li> <li>Career and life skills</li> </ul> <p><b>Objectives</b></p> <p>Students will:</p> <ul style="list-style-type: none"> <li>Define what an engineer is and what they do.</li> <li>Use technology to research and problem solve.</li> <li>Apply problem solving skills by defining simple problems and developing new or improved objects or tools.</li> <li>Design and build a coin sorter</li> <li>Analyze data from a test of an object or</li> </ul>	<p><b>Topic 1: Engineering &amp; Technology</b></p> <p>As an introduction to the unit, students will watch a short video clip to determine what makes an object move. Students will work with partners to discuss 'What makes the object move?'</p> <p><b>Unit 1 Project:</b></p> <p>Design a Coin Sorter: Students will work in small groups to design a coin sorter. Students will complete a planning sheet and determine the problem, the solution, and what type of materials they need. (9.2.4.A.1, 9.2.4.A.2) (CRP2, CRP4, CRP6, CRP7, CRP8) (8.2.2.C.1)</p> <p>Following a teacher directed lesson on Unit 1</p>	<p><b>*You must be logged into the "Ed: Your Friend in Learning" platform to access the HMH links. *</b></p> <p><b>Text:</b> <i>HMH Science Dimensions: Grade K</i></p> <p><b>Unit 1 Engineering &amp; Technology</b> <a href="https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE_9780544709157/book_pages/unit1/#cards--kx2_0101_ese_op_engineeringtechnology/">https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE_9780544709157/book_pages/unit1/#cards--kx2_0101_ese_op_engineeringtechnology/</a></p> <p><b>Design a Coin Sorter Worksheet</b> <a href="https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE_9780544709157/student_resources/unitprojectworksheet/K_UPWKST_U1.pdf">https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE_9780544709157/student_resources/unitprojectworksheet/K_UPWKST_U1.pdf</a></p> <p><b>Materials:</b></p> <ul style="list-style-type: none"> <li>construction paper</li> <li>Masking tape</li> <li>Black markers</li> <li>Full sticky notes</li> <li>Three long sheets of Bulletin</li> </ul>	<p><b>Formative Assessments:</b> Students will maintain a science journal that includes vocabulary words, brainstorming ideas, and problems and solutions.</p> <p><b>Benchmark Assessments:</b> Exact Path</p> <p><b>Summative Assessments:</b></p> <p>Unit 1 project: Design a Coin Sorter</p> <p>Unit 2 project: Build a Game</p> <p>Engineering Project- Build a Ramp</p> <p><b>Alternative Assessment:</b> Students will respond to oral questioning and retell the events that took place in the videos.</p>

**directions of pushes and pulls on the motion of an object**

**K-PS2-2**

**Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or pull.**

- tool to determine if it works as intended
- Develop and evaluate the strength of a push or a pull.
  - Gather information to determine if a design works as intended to change the direction or speed of an object.

vocabulary, students will review digital vocabulary cards and create a science journal containing unit vocabulary words. (8.1.2.B.1)

Following a teacher guided lesson on how engineers solve problems, students will work in pairs to answer the following: How do engineers solve problems? (CRP8) (9.2.4.A.3, 9.2.4.A.1)

Students will watch short videos of many kinds of problems and learn ways to solve the problem like an engineer. (9.2.4.A.1) (8.1.2.B.1)

Students will watch a short video of engineers at work. Class will generate a list of things engineers design and build. (8.1.2.E.1)

Students will explore different kinds of technology and the problems that technology

Board Paper

- Boxes of varying sizes
- Cardboard of varying sizes
- Jars or plastic containers of varying sizes
- Ziploc baggies
- Envelopes
- Clear tape
- Elastic bands
- Science journal

***HMH Science Dimensions:***  
***Grade K- Student Digital text***

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***Grade K- Student Digital text***  
[https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE\\_9780544709157/\\_book\\_pages\\_unit1/#cards--k2x1\\_0100\\_ese\\_ee1\\_whatengineerdo/](https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE_9780544709157/_book_pages_unit1/#cards--k2x1_0100_ese_ee1_whatengineerdo/)

Chart Paper  
You Tube: *Technology for Kids: Communication, Contact*  
<https://youtu.be/kZ5K2Lu5MgI>

***HMH Science Dimensions:***  
***Grade K- Student Digital text***

Science Journal

Students will tell how they created the Coin Sorter and then justify the approach they chose to use.

Students will verbally compare each group's project design and draw pictures while labeling the phases.

Students will present their designs to the class.

Students will make observations (firsthand or from media) to collect data that can be used to make comparisons. Rubric will be used to access journal.

can solve. Class will generate a list of different types of technology and place it on chart paper (e.g. digital books, calculators, smartboards) (8.1.2.E.1, 8.1.2.B.1, 6.1.4.B.9)

Students will draw a picture in their science journals showing how technology has helped them solve problems. Students will share their drawings with a partner. (8.2.2.C.1, 8.1.2.E) (CRP4, CRP2)

**Topic 2: Forces & Motion**

As an introduction to the topic of Forces and Motion students will watch a short video about a marble maze and how force and motion work together.

**Unit 2 Project:**

With prompting and support students will design and build a game that scores point with a push. (6.1.4.B.9)

***HMH Science Dimensions:  
Grade K- Student Digital text***

[https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE\\_9780544709157/\\_book\\_pages\\_unit2/#cards--kpk2\\_0102\\_eSE\\_op\\_forcesmotion/](https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE_9780544709157/_book_pages_unit2/#cards--kpk2_0102_eSE_op_forcesmotion/)

**Unit Project: A Game in Motion**

Project Worksheet

[https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE\\_9780544709157/\\_student\\_resources/unitprojectworksheets/K\\_UPWKST\\_U2.pdf](https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE_9780544709157/_student_resources/unitprojectworksheets/K_UPWKST_U2.pdf)

**Materials:**

Shoe boxes  
Copy box lids  
Construction paper  
Masking tape  
Markers  
Scissors  
Glue  
Marbles or small balls

Students will work in small groups and think of two games they could design and build and select one of them. They will draw the materials needed to build the game and orally describe the steps of designing and building the game. Students will build the game and then test if their game works. Students will play the game and answer the following question in their journal and on the data collection worksheet. *How can you score points with a push?* (9.2.4.A.1, 9.2.4.A.2) (CRP2, CRP4, CRP6, CRP7, CRP8) (8.2.2.C.1, 8.1.2.E.1)

Following a teacher directed lesson on Unit 2 vocabulary, students will review digital vocabulary cards and write new vocabulary in their science journal (8.1.2.B.1) (RI.K.1) (W.K.7)

Elastic bands  
Pencils or popsicle sticks  
Project Worksheet  
Science Journal

***HMH Science Dimensions:***  
***Grade K- Student Digital text***  
[https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE\\_9780544709157/BOOK\\_pages\\_unit2/#cards--kpk2\\_0102\\_eSE\\_uv\\_forcesmotion/](https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE_9780544709157/BOOK_pages_unit2/#cards--kpk2_0102_eSE_uv_forcesmotion/)

***HMH Science Dimensions:***  
***Grade K- Student Digital text***  
Motion Video  
[https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE\\_9780544709157/BOOK\\_pages\\_unit2/#cards--k2p1\\_0102\\_eSE\\_ee1\\_motion/](https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE_9780544709157/BOOK_pages_unit2/#cards--k2p1_0102_eSE_ee1_motion/)

Science Journal

Post-it Notes

T-Chart

Speed

Following a teacher led lesson, students will learn about what makes things move by learning about pushes and pulls. Class will generate a class list of things they pull and things they push.

Students will watch a video about motion then work in pairs to answer the following question: How do pushes and pulls make things move? (8.1.2.B.1)

Working in small groups, students will look for things that are moving around the school and classroom or outside the school windows. Students will determine if they are pushes or pulls. Students should provide evidence to explain their answers.

\* Teacher may modify by creating a picture checklist of objects and have students find objects and mark if they are a push or a pull. (CRP4, CRP8) (W.K.7) (SL.K.3)

[https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE\\_9780544709157/book\\_pages\\_unit2/#cards--k2p1\\_0102\\_eSE\\_ee2\\_motion/](https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE_9780544709157/book_pages_unit2/#cards--k2p1_0102_eSE_ee2_motion/)

Engineer It. Make a Ramp Worksheet

[https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE\\_9780544709157/student\\_resources/handsonactivity/K\\_HOA\\_U2\\_L1.pdf](https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE_9780544709157/student_resources/handsonactivity/K_HOA_U2_L1.pdf)

**Materials:**

- Toy car-1 per small group
- 8x11 piece of cardboard or small slate/whiteboard- 1 per small group
- 4 books per group
- Masking tape

**Direction-Objects move in different directions**

[https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE\\_9780544709157/book\\_pages\\_unit2/#cards--k2p1\\_0102\\_eSE\\_ee3\\_motion/](https://www.hmhco.com/content/science/sciencedimensions/na/grk/eSE_9780544709157/book_pages_unit2/#cards--k2p1_0102_eSE_ee3_motion/)

Teacher will create a T-chart listing pushes or pulls and students will draw pictures on post-it notes and place their picture under the appropriate category.

Students will watch a video about speed. (8.1.2.B.1)

**Hands on Engineering project:**  
***Make a Ramp!***

Students will work in small groups to build a ramp using given materials and the Engineering worksheet with directions. Students will then conduct research to determine if adding books or taking books away will increase the speed of the vehicle. Students will use & complete worksheet explaining the their results. (CRP2, CRP4, CRP6, CRP8) (8.2.2.C.1) (9.2.4.A.1) (RI.K.1)

**Additional Texts:**

Readworks.org: Science and Technology & Engineering Texts:

*Blue Jeans*

*Ben Franklin's Idea*

*Ticktock, Meet This Clock*

*How is a Soccer Ball Made?*

*Getting Water from a Well*

[https://www.readworks.org/technology-engineering-passages#!s0:373,358/q:/g:16/t:0/s:358/k:/cid:/f:0/pt:A/features:/staff\\_picks:/sel/](https://www.readworks.org/technology-engineering-passages#!s0:373,358/q:/g:16/t:0/s:358/k:/cid:/f:0/pt:A/features:/staff_picks:/sel/)

Students will watch a short video about the direction marbles can move.  
(8.1.2.B.1)

As a way of checking for understanding, students will play “Follow the Leader”-different students will take turns to play follow the leader using a Conga style line. (SL.K.3)

Teacher will read-aloud various non-fiction texts related to the unit.



## **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/](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.

<b>English Language Learners</b>	<b>Special Education</b>	<b>At-Risk</b>	<b>Gifted and Talented</b>
<ul style="list-style-type: none"><li>● Speak and display terminology</li><li>● Teacher modeling</li><li>● Peer modeling</li><li>● Provide ELL students with multiple literacy strategies.</li></ul>	<ul style="list-style-type: none"><li>● Utilize modifications &amp; accommodations delineated in the student’s IEP</li><li>● Work with paraprofessional</li><li>● Use multi-sensory teaching approaches.</li></ul>	<ul style="list-style-type: none"><li>● Using visual demonstrations, illustrations, and models</li><li>● Give directions/instructions verbally and in simple</li></ul>	<ul style="list-style-type: none"><li>● Curriculum compacting</li><li>● Inquiry-based instruction</li><li>● Independent study</li><li>● Higher order thinking skills</li><li>● Adjusting the pace of lessons</li><li>● Interest based content</li></ul>

<ul style="list-style-type: none"> <li>● Word walls</li> <li>● Use peer readers</li> <li>● Give page numbers to help the students find answers</li> <li>● Provide a computer for written work</li> <li>● Provide two sets of textbooks, one for home and one for school</li> <li>● Provide visual aides</li> <li>● Provide additional time to complete a task</li> <li>● Use graphic organizers</li> </ul>	<ul style="list-style-type: none"> <li>● Work with a partner</li> <li>● Provide concrete examples</li> <li>● Restructure lesson using UDL principals (<a href="http://www.cast.org/our-work/about-udl.html#.VXmoXcfD-UA">http://www.cast.org/our-work/about-udl.html#.VXmoXcfD-UA</a>).</li> <li>● 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).</li> </ul>	<p>written format. Oral prompts can be given.</p> <ul style="list-style-type: none"> <li>● Peer Support</li> <li>● Increase one on one time</li> <li>● Teachers may modify instructions by modeling what the student is expected to do</li> <li>● Instructions may be printed out in large print and hung up for the student to see during the time of the lesson.</li> <li>● Review behavior expectations and make adjustments for personal space or other behaviors as needed.</li> <li>● Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>● 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).</li> </ul>	<ul style="list-style-type: none"> <li>● Real world scenarios</li> <li>● Student Driven Instruction</li> <li>● Engage students with a variety of Science and Engineering practices provide students with multiple entry points and multiple ways to demonstrate their understanding</li> <li>● Use project-based science learning connect science with observable phenomena.</li> <li>● Structure the learning around explaining or solving a social or community-based issue.</li> <li>● Collaborate with after-school programs or clubs to extend learning opportunities.</li> </ul>
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<b>Interdisciplinary Connections:</b>				
<b>ELA - NJSLS/ELA:</b> <b>NJSLSA.R1.</b> Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific text evidence when writing or speaking to support conclusions drawn from the text. <b>RI.K.1</b> With prompting and support, ask and answer questions about key details in a text. (K- PS2-2) <b>RI.K.4.</b> With prompting and support, ask and answer questions about unknown words in a text. <b>W.K.7</b> Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS2-2) <b>SL.K.3</b> Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-PS2-2)				
<b>Mathematics:</b> <b>MP.2</b> Reason abstractly and quantitatively. (K- PS2-1) <b>MP.4</b> Model with mathematics. (K-2-ESS2-1) <b>MP.5</b> Use appropriate tools strategically. (K-2-ETS1-2) <b>K.MD.A.1</b> Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K- PS2-1) <b>K.MD.A.2</b> Directly compare two objects with a measurable attribute in common, to see which object has “more of”/”less of” the attribute, and describe the difference. (K-PS2- 1)				
<b>Social Studies:</b> <b>6.1.4.B.9</b> Relate advances in science and technology to environmental concerns, and to actions taken to address them.				
<b>Career Ready Practices:</b> <b>CRP2.</b> Apply appropriate academic and technical skills. <b>CRP7.</b> Employ valid and reliable research strategies. <b>CRP6:</b> Demonstrate creativity and innovation. <b>CRP4:</b> Communicate clearly and effectively and with reason. <b>CRP8:</b> Utilize critical thinking to make sense of problems and persevere in solving them.				

**Integration of Technology Standards NJSLS 8:**

**8.1.2.E.1:** Use digital tools and online resources to explore a problem or issue.

**8.1.2.B.1:** Illustrate and communicate original ideas and stories using multiple digital tools and resources.

**8.2.2.C.1** Brainstorm ideas on how to solve a problem or build a product.

**Integration of 21st Century Standards NJSLS 9:**

**9.2.4.A.1:** Identify reasons why people work, different types of work, and how work can help a person achieve personal and professional goals.

**9.2.4.A.2:** Identify various life roles and civic and work-related activities in the school, home, and community.

**9.2.4.A.3:** Investigate both traditional and nontraditional careers and related information to personal likes and dislikes.

**Key Vocabulary:**

Problem, solution, engineer, technology, design process, model, force, motion, speed, force