



BOE Approved 8/18

Cliffside Park Public Schools

Science

Unit Name: Materials and Motion (Physical Science)

Resource: FOSS Next Generation, Delta Education

Duration: Ten Weeks

Enduring Understandings

Wood

- Wood can be described in terms of its properties.
- Different kinds of wood come from different kinds of trees. Trees are natural resources. Some kinds of wood are processed and made by people.
- Wood floats in water but can be made to sink.
- Wood can be changed by sanding and mixing with water.
- Sawdust is tiny wood pieces that can be recycled.
- Basic materials can be transformed into new materials (particleboard and plywood).

Paper

- Paper has many observable properties
- People make paper from wood.
- The properties of papers determine their uses.
- Some papers absorb water; others do not.
- Some paper changes when soaked in water. Some paper breaks down into small fibers.
- Paper can be reused, recycled, and fabricated.

Fabric

- Fabric is a flexible material with a wide range of properties.
- The properties of fabrics determine their uses.
- Fabric can be made of woven threads.
- Fabrics can absorb, transmit, or repel water.
- Wet fabric dries when water evaporates, leaving the fabric unchanged.
- Land, air, water, and trees are natural resources.
- People reuse and recycle to conserve natural resources.

Motion

- Engineers design and test solutions to problems.
- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.
- Gravity pulls things down.
- A bigger push or pull makes things go faster.
- When objects touch or collide, they push on one another and can change motion.
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Essential Questions

Wood

- Where does wood come from?
- What is made of wood?
- What happens when wood gets wet?
- How can you sink wood?
- How many passengers can a wood raft hold?
- How can you change the shape of wood?
- How are sawdust and shavings the same?
- How are sawdust and shavings different?
- How is particleboard made?
- How is plywood made?

Paper

- What is made of paper?
- What makes paper good for writing?
- What makes paper easy to fold?
- What happens when water gets on paper?
- How can newspaper be made from old paper?
- How can paper be made strong to form a bowl?

Fabric

- How are fabrics different?
- What is made of fabric?
- How is fabric made?
- What happens when water gets on fabric?
- How are different kinds of fabric used?
- How can we conserve natural resources?
- What happens to water in sunshine and shade?:
- How can we design a structure to keep water cool in sunshine?

Motion

- What causes objects to move?
- What happens when objects collide?
- Where can balls roll on the schoolyard?
- How can we change how far a balloon rocket travels?

Focus of Standards

Student Outcomes	Skills	Assessments
Wood <ul style="list-style-type: none"> • I can work with five different wood samples to observe their properties • I can go on a hunt for matching samples, drop water on the samples, and float them in basins 	<ul style="list-style-type: none"> • Asking Questions and Defining Problems • Developing and Using Models • Classifying Information • Observing Investigations 	Assessments: <ul style="list-style-type: none"> • Formative: Notebook Entries: <ul style="list-style-type: none"> ○ Notebook Entries ○ Teacher Observation ○ Anecdotal Records/Notes ○ Science notebook ○ Embedded Assessment Notes

<ul style="list-style-type: none"> ● I can test the wood to find out how many paper clips it takes to sink it ● I can organize their results by making a concrete graph ● I can use sandpaper to change the shape of wood ● I can compare sawdust and shavings and how they interact with water ● I can simulate the manufacture of two kinds of wood—particleboard and plywood. <p>Paper</p> <ul style="list-style-type: none"> ● I can observe and compare the properties of ten kinds of paper ● I can go on a hunt for matching samples ● I can compare how well the papers fold and which has the best surface for writing ● I can test papers for absorption, then soak the samples overnight ● I can learn how to recycle paper by making new paper from old and crafting papiermâché bowls <p>Fabric</p> <ul style="list-style-type: none"> ● I can observe and compare the properties of ten kinds of fabric and search for different ways fabrics are used. ● I can take apart fabrics to learn how they are woven from threads ● I can investigate how fabrics interact with water ● I can consider the properties of different fabrics and decide which fabric are good choices for clothing ● I can plan how they can conserve, 	<ul style="list-style-type: none"> ● Exploring New Ideas ● Planning and Carrying Out Investigations ● Analyzing and Interpreting Data ● Using Mathematics and Computational Thinking ● Constructing Explanations and Designing Solutions ● Engaging in Argument from Evidence ● Obtaining, Evaluating and Communicating Information 	<ul style="list-style-type: none"> ● Summative Performance <ul style="list-style-type: none"> ○ Foss Post-test on Materials and Motion ○ Vocabulary check ● Benchmark Assessments: <ul style="list-style-type: none"> ○ Investigation Checks ○ Listing- Properties of wood ○ Collecting examples of wood in everyday life ○ Collecting different fabrics ○ Matching direction of movement base on force ● Alternative: <ul style="list-style-type: none"> ○ Conferences ○ Diagrams ○ Word Bank for vocabulary ○ Modeling ○ Illustrations Force ○ Paper sample booklet ○ Fabric sample booklet ○ papiermâché ○ Storybook assembly
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<p>reuse, and recycle</p> <ul style="list-style-type: none"> ● I can observe the warming effect of the Sun and design a structure to reduce the effect of heating. <p>Motion</p> <ul style="list-style-type: none"> ● I can investigate the strength of pushes and pulls needed to move objects. ● I can use gravity to pull balls down slopes to investigate collisions. ● I can find ways to change the strength and direction of the pull on a rolling ball to meet design challenges. ● I can change the strength of the push on a balloon rocket flying on a line to explore cause and effect. 		
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NJ Student Learning Standards: Science
Motion and Stability: Forces and Interactions
 K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
 K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.*
K-PS3 Energy
 K-PS3-1. Make observations to determine the effect of sunlight on Earth’s surface.
 K-PS3-2. Use tools and materials provided to design and build a structure that will reduce the warming effect of sunlight on Earth’s surface.*
 K-LS1 From Molecules to Organisms: Structures and Processes
 K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.
Earth’s Systems
 K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.
 K-ESS3 Earth and Human Activity
 K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.
Engineering Design
 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.

ELA: RI.K.1, RI.K.2, RI.K.3, RI.K.4, RI.K.5,

Math: K.CC.A.1, K.CC.A.2, K.CC.A.3, K.CC.B.4, K.CC.B.5, K.CC.B.6, K.OA.A.1, K.OA.A.2, K.OA.A.3, K.MD.A.1

Career Awareness, Exploration, And Preparation

Strand A: Career Awareness

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.3 Investigate both traditional and nontraditional careers and relate information to personal likes and dislikes.

9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.

8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.

8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).

E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.

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

8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming

All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

A. The Nature of Technology: Creativity and Innovation Technology systems impact every aspect of the world in which we live.

8.2.2.A.1 Define products produced as a result of technology or of nature.

8.2.2.A.2 Describe how designed products and systems are useful at school, home and work.

8.2.2.A.5 Collaborate to design a solution to a problem affecting the community.

B. Technology and Society: Knowledge and understanding of human, cultural and societal values are fundamental when designing technology systems and products in the global society.

8.2.2.B.1 Identify how technology impacts or improves life.

8.2.2.B.3 Identify products or systems that are designed to meet human needs.

8.2.2.B.4 Identify how the ways people live and work has changed because of technology.

C. Design: The design process is a systematic approach to solving problems.

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

8.2.2.C.3 Explain why we need to make new products.

8.2.2.C.6 Investigate a product that has stopped working and brainstorm ideas to correct the problem.

D. Abilities for a Technological World: The designed world is the product of a design process that provides the means to convert resources into products and systems.

8.2.2.D.5 Identify how using a tool (such as a bucket or wagon) aids in reducing work.

Core Instructional Materials:

- FOSS Next Generation: Materials and Motion (2016)

Supplemental Materials: (videos, leveled readers, Readworks, recommended books etc.)

Videos: <https://www.fossweb.com/moduledetail?dDocName=G3842595&classId=>

Recommended books: <https://www.fossweb.com/additional-resources-books-xslt?dDocName=G4292315#non-fiction-books>

NJ Student Learning Standards: Science and Engineering Practices

Practice 1. Asking questions (for science) and defining problems (for engineering) Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.

Ask questions based on observations to find more information about the natural and/or designed world(s).

Ask and/or identify questions that can be answered by an investigation.

Practice 2. Developing and using models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

Distinguish between a model and the actual object, process, and/or events the model represents.

Compare models to identify common features and differences.

Practice 3. Planning and carrying out investigations Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

With guidance, plan and conduct an investigation in collaboration with peers (for K).

Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.

Evaluate different ways of observing and/or measuring a phenomenon to determine which way can answer a question.

Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons.

Make observations (firsthand or from media) and/or measurements of a proposed object or tool or solution to determine if it solves a problem or meets a goal.

Make predictions based on prior experiences.

Practice 4. Analyzing and interpreting data: Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

Record information (observations, thoughts, and ideas).

Use and share pictures, drawings, and/or writings of observations.

Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems.

Compare predictions (based on prior experiences) to what occurred (observable events).

Analyze data from tests of an object or tool to determine if it works as intended.

Practice 6. Constructing explanations (for science) and designing solutions (for engineering) Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts

of natural phenomena and designing solutions.

Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.

Practice 7. Engaging in argument from evidence

Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).

Identify arguments that are supported by evidence.

Distinguish between opinions and evidence in one’s own explanations.

Construct an argument with evidence to support a claim.

21st Century Themes

- **Global Awareness:** students come to understand that humans use natural resources for everything they do and that people affect the world around them.
- **Environmental Literacy:** students will explore the origins of materials and resources that we use everyday (paper, fabric, wood.) Students will learn that these resources are finite and explore strategies for conserving natural resources (recycling.)

21st Century Skills

Creativity and Innovation

- Critical Thinking and Problem Solving
- Communication and Collaboration
- Students engage in science and engineering practices by asking questions, participating in collaborative investigations, observing, recording and interpreting data to build explanations.

Interdisciplinary Connections**Language Arts**

- Ask and answer questions about key details in a text.
- Identify the main topic and retell key details of a text.
- describe the connection between two individuals, events, ideas, or pieces of information in a text.
- Ask and answer questions about unknown words in a text.
- Identify the front cover, back cover, and title page of a book.
- Describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).
- Identify the reasons an author gives to support points in a text.
- Identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures).
- Actively engage in group reading activities with purpose and understanding.

Foundational Skills

- Demonstrate understanding of the organization and basic features of print. a. Follow words from left to right, top to bottom, and page by page. b. Recognize that spoken words are represented in written language by specific sequences of letters. c. Understand that words are separated by spaces in print. d. Recognize and name all upper- and lowercase letters of the alphabet.
- Know and apply grade-level phonics and word analysis skills in decoding words. a. Demonstrate basic knowledge of one-to-one letter/sound correspondences by producing the primary sound or many of the most frequent sounds for each consonant. b. Associate the

long and short sounds with common spellings (graphemes) for the five major vowels. c. Read common high-frequency words by sight (e.g., the, of, to, you, she, my, is, are, do, does). d. Distinguish between similarly spelled words by identifying the sounds of the letters that differ.

- Read emergent-reader texts with purpose and understanding.

Writing Standards

- Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book (e.g., My favorite book is . . .).
- Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.
- Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened.
- With guidance and support from adults, respond to questions and suggestions from peers and add details to strengthen writing as needed
- Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them).
- With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

Speaking and Listening Standards

- Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups. a. Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion). b. Continue a conversation through multiple exchanges.
- Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
- Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
- Describe familiar people, places, things, and events and, with prompting and support, provide additional detail.
- Add drawings or other visual displays to descriptions as desired to provide additional detail.
- Speak audibly and express thoughts, feelings, and ideas clearly.

Mathematical Practices

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Differentiation/Accommodations/Modifications
(Alternate Modes of Instruction and Support)

Modifications to Support Gifted and Talented Students	Modifications to Support English Language Learners	Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)
<p>Recommended non fiction books https://www.fossweb.com/additional-resources-books-xslt?dDocName=G4292315#non-fiction-books</p> <p><u>Invent a Back Scratcher from Everyday Materials</u></p> <p><u>Ramps 2: Ramp Builder</u></p> <p>Investigate gravitational force- why things fall</p> <p>Investigate magnetic force- magnets repel and attract</p> <p>Investigate- recycling paper products</p> <p>Papiermâché</p> <p>Provide appropriate challenge for wide ranging skills and development areas.</p>	<p>Equipment photo cards (spanish and english)</p> <p>Visual cues- image gallery https://www.fossweb.com/additional-resources-image-galleries-xslt?dDocName=G4292315#image-galleries</p> <p>Vocabulary log-</p> <p>Pronunciation/translation assistance https://dictionary.cambridge.org/us/</p> <p>Vocabulary builder Thesaurus- https://www.thesaurus.com/</p> <p>Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary)</p>	<p>Storyboard- process of making paper- tree to pulp</p> <p><u>Push Pull-Changing Direction</u></p> <p><u>Marble Roll</u></p> <p>Match tree to product</p> <p>Equipment photo cards</p> <p>Visual cues- image gallery https://www.fossweb.com/additional-resources-image-galleries-xslt?dDocName=G4292315#image-galleries</p> <p>Word walls</p> <p>Review student individual educational plan and/or 504 plan.</p> <p>Establish procedures for accommodations and modifications for assessments as per IEP/504.</p>

<p>Participate in inquiry and project-based learning units of study</p> <p>Assigning roles within partnerships</p> <p>Differentiated supports: content, process, product, environment</p>	<p>Pair visual prompts with verbal presentations</p> <p>Front Load and immerse students in literacy and language experiences related to content</p> <p>Provide students with visual models, sentence stems, concrete objects, and hands-on materials.</p> <p>Model procedures for life skills.</p> <p>Collaboration between ELL and general education teacher to maximize learning</p>	<p>Establish procedures for modification of classwork and homework as per IEP/504.</p> <p>Modify classroom environment to support academic and physical needs of the students as per IEP/504.</p> <p>Provide appropriate accommodations, instructional adaptations, and/or modifications as determined by the IEP or 504 team.</p> <p>Differentiation through content, process, product, environment</p> <p>Provide Title I services to students not meeting academic standards in ELA and/or Math.</p> <p>Provide instructional adaptations and interventions in the general education classroom.</p> <p>Modify classroom environment to support student needs.</p> <p>Differentiated instruction</p> <p>Basic Skills</p> <p>Intensive individual intervention</p>
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Sources
 NJSLS Science Standards (2017): <http://www.nj.gov/education/cccs/2016/science/>
 NJ: 2014 SLS: Technology: <http://www.state.nj.us/education/cccs/2014/tech/8.pdf>
 NJSLS-S: Science and Engineering Practices: <http://www.nj.gov/education/cccs/2016/science/3-5-ETS1.pdf>
 21st Century Life and Careers: <http://www.state.nj.us/education/cccs/2014/career/9.pdf>
 Career Ready Practices: <http://www.state.nj.us/education/cccs/2014/career/9.pdf>
 2015 FOSS Next Generation: www.FOSSweb.com
 NSTA: <https://ngss.nsta.org/>