BOE Approved 8/18

Cliffside Park Public Schools

Science

Unit Name: Solids and Liquids (Physical Science)

Resource: FOSS Next Generation, Delta Education

Duration: Ten Weeks

Enduring Understandings

Solids

- Solid is one state or phase of matter.
- Objects are described and identified by their properties.
- Objects are made of one or more materials.
- Natural and human-made objects occur outdoors.

Liquids

- Liquid is one common state of matter.
- Liquids move freely in containers.
- Liquids have many properties that help identify them.
- Liquids take the shape of their containers.
- The surfaces of liquids are flat and level.
- Liquids pour and flow.

Bits and Pieces

- Solid materials can occur as masses of small particles.

● A mass of particulate matter can form piles and support a more dense object on its surface.
● Particulate solids can be separated by size (with screens).
● Masses of particulate matter can pour.
● The surface of a mass of particles is not flat and level.
● Particulate matter occurs naturally in the outdoors.

Solids, Liquids, and Water

● Some solids change when mixed with water.
● Some solids dissolve in water.
● Water can be separated from a mixture through evaporation; evaporation leaves the solid behind.
● Some liquids mix with water; others form layers.
● Some materials have properties of both solids and liquids.
● Melting is the change from solid to liquid.
● Freezing is the change from liquid to solid.
● Heat causes materials to melt; cold causes them to freeze; changes can be reversible or irreversible.

Essential Questions

Solids

- How can solid objects be described?
- What are solid objects made of?
- Can two or more objects have the same property?
- What are the properties of successful towers?
- Are there solid objects outdoors?

Liquids

- How are liquids different from each other?
- How can liquids be described?
- How do liquids change in containers?
- Where are liquids outdoors?

Bits and Pieces

- Are these materials solid or liquid?

- How can mixtures of particles be separated?
- How do particles of solids move in bottles?
- What is a general rule for using screens to separate a mixture of small objects?
- Are there little pieces of solid material outdoors?

Solids, Liquids, and Water

- What happens when solids are mixed with water?
- What happens when liquids are mixed with water?
- Is toothpaste solid or liquid?
- How do properties of materials change when they are heated or cooled?
- What happens when you mix water with solid plant material collected outdoors?

Focus of Standards

Student Outcomes	**Skills**	**Assessments & Modifications**
Solids ● I can identify solid objects and materials by their properties. ● I can sort objects into collections based on their properties. ● I can use a table to record properties and materials of objects. ● I can use a table to record properties and materials of objects. ● I can discover that some properties of solid objects and materials make them appropriate for tower and bridge construction. ● I can search for solid objects outdoors and sort them into two collections, natural and human-made. **Liquids**	**Solids** ● Developing and using models ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations and designing solutions ● Engaging in argument from evidence ● Obtaining,evaluating, and communicating information **Liquids** ● Asking questions ● Developing and using models ● Planning and carrying out investigations	● **Formative**: Notebook Entries: ○ Notebook Entries ○ Teacher Observation ○ Anecdotal Records/Notes ○ Science notebook ○ Embedded Assessment Notes ● **Summative Performance** ○ Foss Post-test on Solids and Liquids ○ Vocabulary check ● **Benchmark Assessments**: ○ Investigation Checks ○ Constructing models- states of matter of water ○ Properties of each state of matter ○ Comparing/contrasting models- 3 states of matter ○ Characteristics each state of

● I can investigate the properties and behaviors of liquids. ● I can practice vocabulary associated with liquids. ● I can draw the level surface of liquids in containers as the containers change position. ● I can investigate puddles outdoors and create puddles where none previously existed. **Bits and Pieces** ● I can experience solid material as pieces, grains and particles. ● I can observe the behavior of small solids in various settings. ● I can combine and separate solid materials of different particle sizes (with screens). ● I can compare the behavior of solids and liquids in similar settings. **Solids, Liquids, and Water** ● I can observe what happens when solids and water are mixed. ● I can observe what happens when solids and water are mixed. ● I can conduct a systematic investigation of toothpaste. ● I can observe solids and liquids when heated and cooled.	● Analyzing and interpreting data ● Using mathematics and computational thinking ● Constructing explanations ● Engaging in argument from evidence ● Obtaining, evaluating, and communicating information **Bits and Pieces** ● Developing and using models ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Engaging in argument from evidence ● Obtaining, evaluating, and communicating information **Solids, Liquids, and Water** ● Asking questions ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Engaging in argument from evidence ● Obtaining, evaluating, and communicating information	matter ● **Alternative:** ○ Conferences ○ Diagrams ○ Word Bank for vocabulary ○ Modeling ○ Illustrations of changes of matter ○ Storybook assembly
NJ Student Learning Standards: Science 2-PS1 Matter and Its Interactions		

Performance Expectations:
2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.
2-PS1-3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
K-2-ETS1 Engineering Design
Performance Expectations
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

Career Ready Practices
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.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence
how each performs.

ELA: RI.2.1, RI.2.2, RI.2.4, RI.2.5, RI.2.7, RI.2.9
Math: 2.MD.A.1, 2.MD.A.2, 2.MD.D.9, 2.MD.D.10, 2.0A.C.3, 2.0A.C.4

Career Awareness, Exploration, And Preparation
Strand A: Career Awareness
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.
B. Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
8.1.2.B.1 Illustrate and communicate original ideas and stories using multiple digital tools and resources.
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
8.2.2.A.5 Collaborate to design a solution to a problem affecting the community.
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.2 Create a drawing of a product or device that communicates its function to peers and discuss.
E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
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.1 Collaborate and apply a design process to solve a simple problem from everyday experiences.
E. Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.
8.2.2.E.1 List and demonstrate the steps to an everyday task.
8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.

Core Instructional Materials:

- FOSS Next Generation: Solids and Liquids(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
NSTA: https://ngss.nsta.org/Classroom-Resources-Results.aspx?resource=

NJSLS-S: 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.
Define a simple problem that can be solved through the development of a new or improved object or tool.
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.
Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons.
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.
Compare predictions (based on prior experiences) to what occurred (observable events).

Practice 5. Using mathematics and computational thinking

Mathematical and computational thinking in K–2 builds on prior experience and progresses to recognizing that mathematics can be used to describe the natural and designed world(s).

Use counting and numbers to identify and describe patterns in the natural and designed world(s).

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.

Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.
Generate and/or compare multiple solutions to a 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).

Analyze why some evidence is relevant to a scientific question and some is not.
Distinguish between opinions and evidence in one's own explanations.

Practice 8. Obtaining, evaluating, and communicating information

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).
Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question and/or supporting a scientific claim.
Communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about scientific ideas, practices, and/or design ideas.

21st Century Themes

- **Environmental Literacy:** Students will be provided with a foundation for more advanced understanding of core science ideas. Students will be able to become familiar with the natural world, its diversity, and its interdependence. They will be able to understand the

disciplinary core ideas and the cross cutting concepts of science, such as patterns, cause and effect; scale, proportion, and quantity; systems and system models; energy and matter, cycles and conservation; structure and function; and stability and change.

21st Century Skills

- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication and Collaboration

Students experience the natural world in authentic ways and use language to inquire, process information, and communicate their thinking. As students read, write, listen, and speak about the concepts they explore, and engage in argument from evidence, they build 21st Century Skills.

Interdisciplinary Connections

ELA:

NJSLS for ELA are introduced, developed, and practiced in the context of learning science content and engaging in the science and engineering practices.

- Read and comprehend complex science texts related to their prior experience and knowledge.
- Write informational/explanatory texts, arguments to support claims, and narratives about experience in science.
- Engage in collaborative discussions about science
- Learn new vocabulary and language structures in context.

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)
Newsela article: *What makes oceans salty?* Lexile: 420L Recommended non fiction books https://www.fossweb.com/additional-resources-books-xslt?dDocName=G4292315#non-fiction-books Independent research- Other forms of matter- Plasma, Gels, Foam or aerosols Construct a matter song video Debate / Compare and contrast- uniqueness of water and the availability of all three forms on earth. Provide appropriate challenge for wide ranging skills and development areas. Participate in inquiry and project-based learning units of study	Newsela article: *What makes oceans salty?* (Spanish version) Equipment photo cards (spanish and english) Modeling Life cycles Visual cues- image gallery https://www.fossweb.com/additional-resources-image-galleries-xslt?dDocName=G4292315#image-galleries Vocabulary log- Pronunciation/translation assistance https://dictionary.cambridge.org/us/ Vocabulary builder Thesaurus- https://www.thesaurus.com/ Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary) Pair visual prompts with verbal presentations	Newsela article: *What makes oceans salty?* Lexile: 420L Storyboard- cycle of water- from liquid to gas to solid Melting and Freezing: https://ngss.nsta.org/Resource.aspx?ResourceID=134 Equipment photo cards Matter song video- https://ngss.nsta.org/Resource.aspx?ResourceID=303 Visual cues- image gallery https://www.fossweb.com/additional-resources-image-galleries-xslt?dDocName=G4292315#image-galleries Word walls Review student individual educational plan and/or 504 plan. Establish procedures for accommodations and modifications for assessments as per IEP/504. Establish procedures for modification of classwork and homework as per IEP/504. Modify classroom environment to support academic and physical needs of the students as per IEP/504. Provide appropriate accommodations, instructional adaptations, and/or modifications as determined by the IEP or 504 team.

Assigning roles within partnerships Differentiated supports: content, process, product, environment	Front Load and immerse students in literacy and language experiences related to content Provide students with visual models, sentence stems, concrete objects, and hands-on materials. Model procedures for life skills. Collaboration between ELL and general education teacher to maximize learning	Differentiation through content, process, product, environment Provide Title I services to students not meeting academic standards in ELA and/or Math. Provide instructional adaptations and interventions in the general education classroom. Modify classroom environment to support student needs. Differentiated instruction Basic Skills Intensive individual intervention

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/