



BOE Approved 8/18

Cliffside Park Public Schools

Science

Unit Name: Air and Weather (Earth Science)

Resource: FOSS Next Generation, Delta Education

Duration: Ten Weeks

Enduring Understandings

Exploring Air

- Air is a gas and is all around us.
- Air is matter and takes up space.
- Air makes objects move.
- Air moves from place to place. Moving air is wind.
- Air resistance affects how things move.
- Air can be compressed.
- The pressure from compressed air can move things, including water.

Observing the Sky

- Weather describes conditions in the air outside.
- Temperature describes how hot or cold the air is. Temperature is measured with a thermometer.
- The Sun rises in the east, moves across the sky, and sets each day at predictable times. The Sun warms the Earth.
- Wind moves clouds in the sky.
- Clouds are made of liquid water droplets that fall to the Earth as rain; water is also in the air as a gas that we can't see.
- The Moon can be observed moving across the sky; we see it at different locations in the sky; depending on the time of day or night.

Wind Exploration

- Wind is moving air.
- Meteorologists use wind scales (models) to describe the strength of the wind.
- Meteorologists use anemometers to measure the speed of the wind.
- A wind vane points in the direction the wind is coming from.
- Wind lifts kites up into the sky.

Looking for Change

- Daily changes in temperature and weather type can be observed, compared, and predicted over a month.
- The Sun and Moon can be observed moving across the sky; we see them at different locations in the sky, depending on the time of day or night.
- Each season has a typical weather pattern that can be observed, compared, and predicted. The number of hours of daylight changes predictably through the seasons.

Essential Questions

Exploring Air

- What can air do?
- How does a parachute interact with air?
- What happens when air is pushed into a smaller space?
- How can water be used to show that air takes up space?
- How can compressed air be used to make a balloon rocket?

Observing the Sky

- What is the weather today?
- What time of day is the air the warmest?
- What types of clouds are in the sky today?
- What time of day can we observe the Moon?

Wind Explorations

- How can bubbles be used to observe the wind?
- How strong is the wind today?
- How can pinwheels be used to observe the wind?

- What does a wind vane tell us about the wind?
- What weather conditions are good for kite flying?

Looking for Change

- How can we describe the weather over a month?
- What does the Moon look like at different times during a month?
- How does the amount of daylight change over the year?
- How does the temperature and weather change over the seasons?

Focus of Standards

Student Outcomes	Skills	Assessments
<p>Exploring Air</p> <ul style="list-style-type: none"> • I can explore properties of a common gas mixture—air. • I can experience air as matter, discovering that it takes up space and can be compressed, and that compressed air builds up pressure that can push objects around. • I can construct and compare parachutes and balloon rockets that use air. <p>Observing the Sky</p> <ul style="list-style-type: none"> • I can use instruments for 4–8 weeks to observe and record weather on a class calendar and in science notebooks. • I can monitor temperature with a thermometer and (optionally) rainfall with a rain gauge. • I can learn to identify three basic cloud types by matching their observations with a cloud chart. • I can also monitor times of sunrise and sunset and record the number of daylight 	<ul style="list-style-type: none"> • Asking Questions and Defining Problems • Developing and Using Models • Classifying Information • Observing Investigations • Exploring New Ideas • Planning and Carrying Out Investigations • Analyzing and Interpreting Data • Using Mathematics and Computational Thinking • Constructing Explanations and Designing 	<p>Assessments:</p> <ul style="list-style-type: none"> • Formative: Notebook Entries: <ul style="list-style-type: none"> ○ Make observations to construct an evidence-based account that weather changes over time but is consistent based on a season ○ Read texts and use media to determine patterns in weather ○ Notebook Entries ○ Teacher Observation ○ Anecdotal Records/Notes ○ Science notebook ○ Embedded Assessment Notes • Summative Performance <ul style="list-style-type: none"> ○ Foss Post-test on Air and Weather ○ Vocabulary check • Benchmark Assessments: <ul style="list-style-type: none"> ○ Investigation Checks ○ Constructing models- parachutes and air pressure ○ Constructing models- temperature and local weather over 4-8 week period ○ Observations and Descriptions- clouds and wind- factors of weather

<p>hours each day.</p> <p>Wind Explorations</p> <ul style="list-style-type: none"> • I can look for evidence of moving air. • I can observe and describe wind speed using pinwheels, an anemometer, and a wind scale. • I can observe bubbles and construct wind vanes to find the wind's direction. • I can fly kites to feel the strength of the wind and the direction it is moving. • I can organize monthly weather data, using graphs to describe weather trends. <p>Looking for Change</p> <ul style="list-style-type: none"> • I can continue to monitor weather throughout the year, comparing the seasons and looking for weather patterns. • I can use the observations I have recorded on the calendar to look for monthly patterns of the Moon and annual patterns of daylight hours. 	<p>Solutions</p> <ul style="list-style-type: none"> • Engaging in Argument from Evidence • Obtaining, Evaluating and Communicating Information 	<ul style="list-style-type: none"> • Alternative: <ul style="list-style-type: none"> ○ Conferences ○ Diagrams ○ Word Bank for vocabulary ○ Modeling ○ Illustrations of plant and animal growth ○ Storybook assembly ○ Digital labs- simulations ○ Science Articles
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NJ Student Learning Standards: Science

Earth's Place in the Universe

1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted.

1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year.

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.1.1, RI.1.3, RI.1.4, RI.1.5, RI.1.7, RI.1.9

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

8.1 Educational Technology

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

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

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

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.

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.

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.

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.

Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.
Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.
Generate and/or compare multiple solutions to a problem.

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).

Describe how specific images (e.g., a diagram showing how a machine works) support a scientific or engineering idea.

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.

Core Instructional Materials:

- FOSS Next Generation: Air and Weather(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>

21st Century Themes and Skills

- **Global Awareness/Environmental Literacy:** Students will know the weather around them to help be a safe/productive citizen
- **Creativity and Innovation/Critical Thinking and Problem Solving:** Students use these skills to hypothesize and prove or disprove thoughts through investigation.

Interdisciplinary Connections

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

ELA

- Read and comprehend 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.

Math

- Participate in active investigations and apply mathematics during data gathering and analysis

- Interdisciplinary Extensions at the end of each investigation usually include a math problem of the week
- Analyze hypothetical data related to the context of the investigation

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>Newsela article: Extreme weather Lexile: 480</p> <p>Recommended non fiction books https://www.fossweb.com/additional-resources-books-xslt?dDocName=G4292315#non-fiction-books</p> <p>Independent research- On this day</p>	<p>Newsela article: Extreme weather (Spanish version)</p> <p>Equipment photo cards (spanish and english)</p> <p>·Provide ELL students with multiple literacy strategies.</p> <p>Collaborate with after-school programs or clubs to extend learning opportunities</p> <p>Investigating weather forecasts</p>	<p>Newsela article: Extreme weather Lexile: 320</p> <p>Lab simulations- Micro environments- https://selfservice.inqits.com/teacher/ Equipment photo cards</p> <p>·Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</p> <p>·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).</p>

<p>Weather of Cliffsides park - 1910</p> <p>Debate / Compare and contrast-weather and climate</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>Visual cues- image gallery https://www.fossweb.com/additional-resources-image-galleries-xslt?dDocName=G4292315#image-galleries</p> <p>Researching weather and climate per native country</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) 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>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>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 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 Basic Skills</p> <p>Intensive individual intervention</p>
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Sources:
NJSL Science Standards (2016): <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/classroom-resources-results.aspx?CoreIdea=6>
<https://www.nj.gov/education/modelcurriculum/sci/1u4.shtml>
<https://www.explorelearning.com/index.cfm?method=cResource.dspStandardCorrelation&id=1888>
<https://selfservice.inqits.com/teacher/>