

Fair Lawn Public Schools

Fair Lawn, NJ

**Grade 5
Science**

August

2015

**Revised August 2015
Updated June 2009**

The elementary school science program focuses on inquiry-based, hands-on science instruction. The current program is aligned to the 2009 NJCCCS and a transition plan is in place to move toward the NGSS which includes pilot programs and teacher training.

**Science
Department**

Fair Lawn School District

Committee Credits

Written By

Rachael Carletto, Christine Hildebrandt, Ann Lustgarten,
Pamela Shawulsky, Jennifer Squillaci, Richard Vecciarello,

With Input from

Ronald M. Durso, District Science Supervisor

Grade 5 Science

I. Course Synopsis

Science should be taught with a focus on hands-on student-inquires as well as content driven instruction for three units of study. Students are expected to take part in at least two investigations for each chapter in the textbook with an optional unit summary investigation. Teachers are encouraged to include additional investigations, research, and cross curricular opportunities, especially including literacy and mathematics.

II. Philosophy & Rationale

Through the study of science, students will learn to apply scientific knowledge and problem solving skills to “real-word” situations. Utilizing the scientific method, students will recognize the importance of variables and constants to answer questions and test hypothesis. They will learn to predict the results of investigations, record and construct methods to display data (including bar and line graphs), interpret and then draw conclusions from that data. Through the study of science, students will also learn strategies to determine the meaning of key vocabulary words. The study of science provides an excellent opportunity for students to enhance reading and mathematical skills as they complete student-centered investigations.

Our elementary school science program is undergoing a transition toward the NGSS.

All NGSS aligned courses in the Fair Lawn Schools demonstrate a commitment preparing students to become [college and career ready](#) as well as the other guiding assumptions of the [Frameworks for Science Education](#) (NRC, 2011) and the [NGSS](#) including

- Students are born investigators;
- Science instruction should focus on core ideas and practices;
- An understanding of science develops over time;
- Science and engineering require both knowledge and practice;
- Science education must connect to students’ interests and experiences; and
- Promoting equity for all students must be a focus of science education.

Additionally, all NGSS aligned courses in the Fair Law Schools integrate the three dimensions discussed in the [Frameworks for Science Education](#) and the NGSS, including

- [Science & Engineering Practices](#) which describe behaviors that scientists engage in as they investigate and build models and theories about the natural world and the key set of engineering practices that engineers use as they design and build models and systems; ([NGSS PDF](#))
- [Cross Cutting Concepts](#) which link all domains of science and provide an organizational schema for interrelating knowledge from various science fields into a coherent and scientifically-based view of the world; ([NGSS PDF](#)) and
- [Disciplinary Core Ideas](#) which focus and unite K-12 science, have a broad importance across multiple sciences or engineering disciplines or are a key organizing concept within a single discipline; provide a key tool for understanding or investigating more complex ideas and solving problems; relate to the interests and life experiences of students; are connected to societal or personal concerns that require scientific or technological knowledge; and are teachable and learnable over multiple grades at increasing depth and sophistication. ([NGSS PDF](#))

Once the elementary school program is fully aligned to the NGSS, the above noted concepts will be further and more fully defined within the curriculum.

Since coherence is a main dimension of the NGSS, consider reviewing the “story line” for the middle school [physical science](#), [life science](#), [earth and space science](#), and [engineering, technology and applications of science](#), as well as the high school [physical science](#), [life science](#), [earth and space science](#), and [engineering, technology and application of science](#) for a full picture of the NGSS philosophy. For a full picture of how these programs are implemented in the Fair Lawn Schools, visit the [district curriculum website](#).

Differentiated instruction for students at different levels of achievement and specific learning needs (e.g. special education, English Language Learners (ELL), at-risk, and Gifted & Talented) is embedded in targeted scaffolding based on knowledge of each student’s interests, needs, and assessment data, including, but not limited to, in class formative and summative assessments.

When deemed appropriate, department teachers will engage students in purposeful paired discussions to share information more effectively, such as the “turn and talk” (Harvey & Daniels, 2009). “Text annotation” could be used, for example to optimize reading comprehension (Daniels & Steineke, 2010).

III. Scope & Sequence

During the 2013-2014 school year, the district implemented a three-four week cycle of science and social studies.

Rather than being asked to teach, and students to learn, science and social studies every week for a short period of time (1-2) periods, the 2013-2014 will provide teachers and students will a more concentrated amount of time to focus on social studies or science for about 4 weeks. Teachers will be able to connect literacy, technology, and other content areas with this thematic focus on our current social studies and science units.

Unit 1: How and Why Things Work

Topic 1: Forces and Motion (From Single to Complex Machines)

Unit C; Chapter 13

Topic 2: Technology in Our Lives

Unit D; Chapter 18 (Not Lesson 4)

Includes student research and presentation project.

Unit 2: Our Solar System and Beyond

Topic 1: Stars and Galaxies

Unit D; Chapter 16

Topic 2: Earth in Space

Unit D; Chapter 17

Topic 3: Technology in Our Lives (Lesson 4 Only)

Unit D; Chapter 18

*Includes student trip to the Buehler Challenger Center.
Includes student trip to Fair Lawn High School Planetarium.*

Unit 3: Weather and Our Environment

Topic 1: Water on Earth

Unit B; Chapter 7

Topic 2: Weather Patterns

Unit B; Chapter 8

Topic 3: Protecting Earth's Resources

Unit B; Chapter 10

Elementary School Marking Period Schedule

	MP 1	MP 2	MP 3
K	Matter: Liquids Solids Plants & Animals	Five Senses How & Why Things Move	Caring for Earth Weather
1	Earth & Space*	Weather	Living Things
2	Matter, Weather, Water Cycle	Life Long Ago	Solar System Light & Shadows*
3	Composition & Changing Earth	Living World	Plant & Animal Habitat
4	Electricity, Magnetism, Light, Color Sound	Simple Machines	Human Body
5	Weather & Our Environment	Our Solar System & Beyond*	How & Why Things Work

IV. Unit Descriptions**IV. Unit Descriptions****Unit 1: How and Why Things Work**Enduring Understanding

1. Forces and simple machines enable work to be accomplished.
2. Recombining simple machines and integrating technology creates complex machines which can be used to complete tasks that affect society.

Essential Question(s)

1. How are forces and motion part of our every day life? (Chapter 13)
2. How do simple machines make work easier? (Chapter 13)
3. How does technology affect our lives? (Chapter 18)

Learning Objectives

1. Describe and measure the motion of an object.
2. Explain that objects do not change their motion unless acted upon by an outside force.
3. Describe the relationship between the strength of a force and its effect on an object.
4. Explain how forces such as gravity, electricity, friction and magnetism affect motion.
5. Compare and contrast how motion in space is different from motion on Earth due to changes

in gravitational force and friction.

6. Understand the relationship between force and distance as it relates to simple machines (ie. levels and fulcrums working to lift objects) ** Review the 7 simple machines and their functions.
7. Describe the difference between simple and complex machines.
8. Utilize scientific tools to measure speed, distance, and direction of an object.
9. Describe areas in which technology has improved human lives.
10. Extend and refines knowledge of ways that, through use of scientific processes and knowledge, people can solve problems, make decisions, and form new ideas.
11. Describe how new inventions can lead to other new inventions and ways of doing things.
12. Understand how a solution to one scientific problem can create another problem.
13. Analyze a modern piece of technology; identify the simple and complex machines associated with that piece of technology, and present the information.

Suggested Activities & References (Beyond the Book)

1. National Geographic Kids www.Kids.NationalGeographic.com
2. United Streaming
3. Brain Pop
4. Siemen's Science
5. Persuasive Writing
6. Power Point Presentation
7. Literature Circles- biographies
8. Leveled Readers
9. Experiments:
 - Clay Trial & Error Experiment
 - Aluminum Boat Bouncy Experiment
 - Egg drop Invention Design

New Jersey Core Curriculum Content Standards

5.1.8 A,B,C; 5.2.8 A,B; 5.3.8 A,B,C,D; 5.4.8 A,B; 5.4.8 C1; 5.4.8 C2; 5.7.8 A-B; 5.8.8 D
9.1.8.A 4; 9.2.8.A 1-5; 9.2.8.B 2-3; 9.2.8.C 1-6; 9.2.8.F 1-3.

Unit 2: Our Solar System and Beyond

Enduring Understanding

1. Many relationships exist between the Sun and the objects that orbit it.
2. These relationships create unique cycles like seasons, weather, and day/night.

Essential Question(s)

1. How has the study of the solar system expanded our knowledge of the universe? (Chapter 16)
2. How does the motion of objects in space create cycles? (Chapter 17)

Learning Objectives

1. Identify equipment and instruments that are used to explore the universe.
2. Describe the characteristics of stars, including the Sun.
3. Conclude that in addition to our Sun, there are many other stars that are grouped together in galaxies.
4. Describe different ways in which stars are grouped together.
5. Describe the characteristics of Earth that make it suitable for life.
6. Describe Earth's movements including rotation, revolution, and orbit.
7. Analyze effects of Earth's movements on seasons, length of day, and energy available.
8. Compare and contrast characteristics of the objects in our solar system.
9. Describe the parts of a comet.
10. Identify characteristics of Halley's Comet.
11. Describe the features of the moon.
12. Identify the phases of the Moon.

Buehler Challenger Space Center (BCSC) Field Trip

Teachers will be contacted by their building principal and the district science supervisor at the end of the school year to arrange a trip to the Buehler Challenger Center in Paramus, NJ for the following school year. Prior to the field trip, teachers are expected to lead their classes in preparation for the trip. Binders including lesson plans are available to all teachers.

Depending on which "mission" the class attends, the objectives for that "mission" will differ. All missions, however, contain these similar objectives:

1. Develop team work and character education skills.
2. Experience a simulation of various careers in space science.
3. Develop content knowledge regarding space science.

Teachers will be trained by BCSC for their specific mission. Refresher training is encouraged as needed. Contact the district science supervisor in the spring to arrange for training the following year.

For more information, visit the website at <http://www.bcsc.org/>.

Suggested Activities & References (Beyond the Book)

1. Buehler Reference Binder/ Experiments
2. National Geographic Kids Kids.NationalGeographic.com
3. The NASA Kids' Club Kids.Msfc.NASA.gov
4. United Streaming
5. Brain POP
6. Visit to the FLHS Planetarium
7. Astronomy Picture of the Day Website www.antwrp.gsfc.nasa.gov
8. "Apollo 13" – Video (with principal and parent permission)
9. Constellation Project
10. Space Station Build Website http://i.usatoday.net/tech/graphics/iss_timeline/flash.htm

New Jersey Core Curriculum Content Standards

5.1.8 A,B,C; 5.2.8 A,B; 5.3.8 A,B,C,D; 5.4.8 A,B; 5.9.8 A
9.1.8.A 4; 9.2.8.A 1-5; 9.2.8.B 2-3; 9.2.8.C 1-6; 9.2.8.F 1-3.

Unit 3: Weather and Our Environment

Enduring Understanding

1. Weather affects people and their life styles.
2. Weather affects our environment.
3. Weather and climate affect the quality of life for people and the planet.
4. Human actions affect the natural processes of our planet.

Essential Question(s)

1. How does water move through the environment? (Chapter 7)
2. Why does weather change? (Chapter 8)
3. Why is it important to conserve Earth's resources? (Chapter 10)

Learning Objective(s)

1. Determine that the properties of materials can be compared and measured.
2. Know that 75 percent of the surface of the Earth is covered by water.
3. Describe the properties and features of water in the oceans.
4. Describe the various forms of fresh water.
5. Explain the process of getting fresh water to where it is used.
6. Compare and contrast ocean water and fresh water.
7. Describe the influence of temperature, pressure, air pressure and topography on the water cycle.
8. Describe the formation of clouds and their role in the water cycle.
9. Describe the water cycle and its influence.
10. Classify, compare & contrast, cloud formations.
11. Conclude that common materials can be changed from one state to another by heating and cooling.
12. Describe how air pressure relates to altitude, convection currents, and the water cycle.
13. Explain what happens when air masses meet.
14. Compare and contrast causes and structure of types of severe weather.
15. Explain how weather data is collected and analyzed.
16. Understand that natural events are often predictable and logical.
17. Compare and contrast weather and climate.
18. Demonstrate how climates have changed over time.
19. Identify resources as being renewable or nonrenewable.
20. Recognize the cost and risk to society and the environment posed by the use of

non-renewable energy.

21. Know that a limited supply of usable energy sources places great significance on the development of renewable energy sources.
22. Understand that wind and water are examples of a renewable energy resource.
23. Investigate ways Earth's renewable resources can be maintained.
24. Extend and refine knowledge of ways people can reuse, recycle and reduce the use of resources to improve and protect the quality of life.

Suggested Activities & References (Beyond the Book)

1. Weather Bug Achieve: www.achieve.weatherbug.com
2. National Geographic Kids Kids.NationalGeographic.com
3. Brain Pop
4. United Streaming
5. Books: Cloudy with a Chance of Meatballs, Magic School Bus Inside a Hurricane etc.
6. Weather related videos; Bill Nye the Science Guy; Weather Channel Videos
7. Various forms of writing; narrative, descriptive, expository, persuasive
8. Presentation of reports
9. Power Points
10. Weather Forecasting
11. Astronomy Picture of the Day (www.nasa.gov)
12. Space Station Build (usatoday.net)
13. "Green" Project

New Jersey Core Curriculum Content Standards

5.1.8 A,B,C; 5.2.8 A,B; 5.3.8 A,B,C,D; 5.4.8. A,B; 5.4.8 C1; 5.7.8 A,B; 5.8.8 A-D; 5.9.8 B-D; 5.10.8 A2; 5.10.8 B; 9.1.8.A 4; 9.2.8.A 1-5; 9.2.8.B 2-3; 9.2.8.C 1-6; 9.2.8.F 1-3.

Suggested Activities & Suggested Modifications for Special Education Students, ELL Students, Students at Risk, and Gifted Students:

1. Students with special needs and ELL learners may be provided with key vocabulary terms prior to the unit beginning. In particular, the amount of key vocabulary terms should be reduced for ELL students.
2. Opportunities should be given to students to form connections between math and literacy skills and concepts.
3. ELL students may be provided with additional visual aids. For additional modifications, refer to Classroom Instruction that Works for ELL Learners or the SIOP protocol.

4. Gifted students may be challenged by asking them to form additional connections between life, earth and physical science concepts and to engage in additional critical thinking or research studies.

V. Course Materials

Scott Foresman Science, The Diamond Edition, Grade 5 (2010)

Unit B: Earth Science (SE)

Unit C: Physical Science (SE)

Unit D: Space & Technology (SE)

Leveled Readers

On-Line Access (Contact Science Supervisor for Registration Information) -

www.pearsonsuccessnet.com

VI. Assessment

Student content knowledge and understanding will be assessed through tests, quizzes, lab reports, performance assessments, and classroom activities. (Rubrics are available in the activity book and on-line.) Students will participate in an analysis of a piece of modern technology during the “How & Why Things Work” unit which will involve an oral and written presentation.

VII. Cross Curricular Aspects

The study of science provides an excellent opportunity for students to enhance reading and mathematical skills as they complete student-centered investigations. Teachers are urged to integrate literacy through the use of the leveled readers and through instruction of how to read non-fiction text, note taking, etc. The analysis of data through the construction and interpretation of graphs leads to mathematical literacy.

Cross Curricular Aspects

CCCS Literacy: Students will be expected to apply [anchor standards for reading and writing](#) in non-fiction situations.

CCCS Math: Students will be expected to [perform number operations, measurement, analyze data, and apply geometry](#). They may be asked to apply the concepts of fractions to scientific principles.

Interdisciplinary Connections and Alignment to Technology standards

Science classes in the Fair Lawn Public schools promote career-readiness skills related to Personal Financial Literacy (9.1) and Career Awareness, Exploration, and Presentation (9.2). Some course concepts from the Career and Technical Education Standards (9.3), but these are not directly correlated since our district is not a CTE program.

The Fair Lawn Public Schools District fosters an environment that promotes career-readiness skills in all content areas. Whereas [Career Ready Practices](#) are explored consistently, specific alignment to [Personal Finance Literacy \(9.1\)](#) and [Career Awareness, Exploration, and Presentation Standards \(9.2\)](#) are included in the district level document (below). When appropriate, the [Career and Technical Education Standards \(9.3\)](#) have been reviewed and aligned as well.

- Examples:
- 9.2A: Career awareness as it relates to the study of each unit.
 - 9.2B: Career exploration in each unit of study.

In addition, every effort is made to integrate technology and engineering into our science classes. [Educational Technology \(8.1\)](#) and [Technology Education, Engineering, Design, and Computational Thinking – Programming \(8.2\)](#) standards are cross connected throughout our science programs.

- Examples:
- 8.1A: Use spreadsheets to analyze & interpret data from laboratories, 6-12.
Use the internet to increase productivity and efficiency, 9-12.
 - 8.1B,C: Use data to solve real-world problems, 6-12.
Use online platforms to collaborate & address global issues, 9-12.
 - 8.1F: Collect and analyze data using internet and data simulations, 6-12.
 - 8.2A: Become aware of the invention process, 3-5.
 - 8.2B: Become aware of the global impacts on technology, 6-12.
 - 8.2C: Apply the design process to pushes & pulls, K-2.
 - 8.2D: Use tools to reduce work, K-2.

For additional detail on how these standards are integrated throughout the Fair Lawn Schools curriculum, review the Fair Lawn Public Schools District Alignment to Technology & Career Readiness & 21st Century Skills Standards Curriculum Appendix.

Name _____ Date _____

**Science Inquiry Guide**

What is the question you are answering? Page # _____

How do you think the materials can be used to answer this question?

What is your prediction/hypotheses as to what will happen?

What are some of the possible variables?

In what way was your prediction proven or disproven?

Summer Science Committee 2009

Oral Presentation Rubric

Title: _____

Score: _____

Name: _____

Date: _____

CATEGORY	4 Advanced	3 Proficient	2 Developing	1 Needs Improvement
Content	Shows a full understanding of the topic.	Shows a good understanding of the topic.	Shows a good understanding of parts of the topic.	Does not seem to understand the topic very well.
Focus	Stays on topic all of the time.	Stays on topic most of the time.	Stays on topic some of the time.	It was hard to tell what the topic was.
Fluency	Always speaks in complete sentences. Transitions between ideas.	Usually speaks in complete sentences. Some transitions between ideas.	Sometimes speaks in complete sentences. Few transitions between ideas.	Rarely speaks in complete sentences. No transitions between ideas.
Word Choice	Uses vocabulary appropriate for the audience. Extends audience vocabulary by defining words that might be new to most of the audience.	Uses vocabulary appropriate for the audience. Includes 1-2 words that might be new to most of the audience, but does not define them.	Uses vocabulary appropriate for the audience. Does not include any vocabulary that might be new to the audience.	Uses several (5 or more) words or phrases that are not understood by the audience.
Vocalization	Speaks clearly and distinctly all the time, and mispronounces no words. Uses vocal variety. Well paced.	Speaks clearly and distinctly all the time. Mispronounces few words. Uses some vocal variety. Appropriate pace.	Speaks clearly and distinctly most of the time. Mispronounces some words. Little vocal variety. Inconsistent pace.	Often mumbles or cannot be understood OR mispronounces many words. Monotone. Too fast/ too slow.
Body Language and Eye Contact	Stands up straight, looks relaxed and confident. Gestures enhance performance. Establishes eye contact with everyone in the room.	Stands up straight and uses some gestures. Establishes eye contact with everyone in the room most of the time.	Sometimes stands up straight. Uses few gestures. Little eye contact evidenced.	Slouches and/or does not look at audience during the presentation. No gestures.