

Fair Lawn Public Schools

Fair Lawn, NJ

**Science
5**

August

2017

NGSS Version Developed August 2017

Third Grade Science is an integrated science program developed by a committee of Fair Lawn Elementary School general education and special education teachers. It is aligned to the NJSLS-S which are correlated to the NJSLS-ELA and NJSLS-M. There is a focus on learning science through investigation and through reading non-fiction texts and inquiry-based science exploration.

**Science
Department**

Fair Lawn School District

Committee Credits

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Science Fifth Grade

I. Course Synopsis

Our elementary science program reflects an integrated, thematic approach to the study of the field of science which supports the philosophy of the NJSL-S. Students will develop an understanding of the core principles of physical, earth, space, and life science while engaging in engineering and technology through exposure to rich, non-fiction text.

II. Philosophy & Rationale

This course has been aligned to and developed with the NJSL-S as its focus.

All NJSL-S 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 [NJSL-S](#) 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 NJSL-S aligned courses in the Fair Law Schools integrate the three dimensions discussed in the [Frameworks for Science Education](#) and the NJSL-S, 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](#))

Since coherence is a main dimension of the NJSLS-S, 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 NJSLS-S philosophy. For a full picture of how these programs are implemented in the Fair Lawn Schools, visit the [district curriculum website](#).

As described in the NJSLS-S, technical writing and reading non-fiction is also a focus of our elementary science curricula as required by the NJSLS-ELA and Math. Students are expected to think critically about data they collect or read about and then express their thoughts through text-based narratives, journal entries, short-constructed response, argument-based writing, and/or in-class discussion.

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

The third Grade Science program consists of three thematic units reflective of the NJSL-S. Each unit develops new content with consistent emphasis on the science and engineering processes, disciplinary core ideas, and cross cutting concepts reflective of the Next Generation Science Standards and the Frameworks for Science Education.

*Each third Grade rotation is approximately 5 weeks long. The following scope and sequence aligns with the **Knowing Science** program. Each row listed below should last approximately one 30-45 minute lesson/session. Each rotation is comprised of 13-15 lessons/sessions which are considered essential to students' development as learners. Following these 13-15 lessons/sessions, optional "enrichment" lessons are listed which may be used at the teacher's discretion. Buffer weeks may be used for enrichment or to catch up on essential sessions.*

See the district Social Studies/Science calendar for the rotation schedule.

Rotation 1	Structure, Properties & Interactions of Matter Unit 1	9 Essential Sessions (At least 15 Days)
Rotation 2	Earth Surface Processes & Space Systems: Stars & The Solar System Unit 3 and 4	19 Essential Sessions
Rotation 3	Matter & Energy in Organisms & Ecosystems	15 Essential Sessions

*Teachers should refer to the Science Pacing Chart on K5 Google Teacher Share for specific lessons/sessions which correlate with this curriculum. The spiral-bound teacher's guide includes detailed instructions for each inquiry-based lesson.

Rotation 1: Structure, Properties & Interactions of Matter**Enduring Understanding:**

1. Everything is made up of stuff too small to see.
2. The amount of stuff something is made of does not change when heat is added or taken away.
3. Materials can be identified based on their properties.

Essential Questions:

1. How can you prove that everything is made up of stuff which is too small to see?
2. How can you prove that the amount of stuff something is made of doesn't change when heat is added or taken away?
3. How can materials be identified based on their properties?

Learning Objectives:

5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. [Clarification Statement: Examples of evidence could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.] [Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.]

5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. [Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances.] [Assessment Boundary: Assessment does not include distinguishing mass and weight.]

5-PS1-3. Make observations and measurements to identify materials based on their properties. [Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.] [Assessment Boundary: Assessment does not include density or distinguishing mass and weight.]

5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

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

1. Use the pictorial glossary as a tool for your word wall, and pre-teach vocabulary to ELL or special education students.
2. Enrichment activities are described in the pacing guide which may be assigned to gifted students as homework assignments or during pull-out sessions.

Cross-Content Connections:

NJSLS- Math: Students will measure and make measurements comparing feet and standard units of measure.

NJSLS-Literacy: Students will engage in collaborative conversations with diverse partners.

The pacing chart lists NJSLS-M and NJSLS-ELA standards which are addressed in this unit.

8.1: Use technology to collect and analyze data and to communicate findings with local peers and peers from other classes.

9.2: Explore careers directly related to this unit.

Rotation 2: Earth Surface Processes & Space Systems: Stars & The Solar System**Enduring Understanding:**

1. Each of Earth's spheres interacts.
2. Water is distributed unequally around the Earth.
3. Earth can be protected by individual people and communities.
4. The relative brightness of a star is relative to its distance from the Earth.
5. Patterns can be observed related to connections between the Earth, Sun and Moon.
6. Gravity is a non-contact force which is exerted downward.

Essential Questions:

1. How do Earth's spheres interact?
2. How can the distribution of Earth's water be measured?
3. How can people and communities protect Earth's resources?
4. How can data be used to show that the relative brightness of a star is relative to its distance from Earth?
5. How are patterns observed related to Earth, Sun and Moon?
6. How can gravity be observed?

Learning Objectives:

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]

5-ESS2-2. Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. [Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.]

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

5-ESS1-1. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. [Assessment Boundary: Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, stage).]

5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. [Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.] [Assessment Boundary: Assessment does not include causes of seasons.]

5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down. [Clarification Statement: “Down” is a local description of the direction that points toward the center of the spherical Earth.] [Assessment Boundary: Assessment does not include mathematical representation of gravitational force.]

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

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

1. Use the pictorial glossary as a tool for your word wall, and pre-teach vocabulary to ELL or special education students.
2. Enrichment activities are described in the pacing guide which may be assigned to gifted students as homework assignments or during pull-out sessions.

Cross-Content Connections:

NJSLS- Math: Students will make observations, measure, collect data, and interpret data related to the Seasons, sun, moon, and stars.

NJSLS-Literacy: Students will ask and answer questions about key details from texts.

The pacing chart lists NJSLS-M and NJSLS-ELA standards which are addressed in this unit.

8.1: Use technology to collect and analyze data and to communicate findings with local peers and peers from other classes.

9.2: Explore careers directly related to this unit.

Rotation 3: Matter & Energy in Organisms & Ecosystems

Enduring Understanding:

1. Animals use energy for life which was once provided by the Sun.
2. Plants obtain materials for life from the air and water.
3. Matter cycles between plants, animals, decomposers and the environment.

Essential Questions:

1. How do animals obtain energy to live?
2. How do plants obtain energy to live?
3. How does matter cycle between living things?

Learning Objectives:

organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]

5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. [Clarification Statement: Examples of models could include diagrams, and flow charts.]

5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water. [Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.]

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. [Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.] [Assessment Boundary: Assessment does not include molecular explanations.]

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

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

1. Use the pictorial glossary as a tool for your word wall, and pre-teach vocabulary to ELL or special education students.

2. Enrichment activities are described in the pacing guide which may be assigned to gifted students as homework assignments or during pull-out sessions.

Cross-Content Connections:

NJSLS- Math: Students will make observations, measure, collect data, and interpret data related to the animals, their offspring, and their adaptations.

NJSLS-Literacy: Students will interpret non-fiction anchor books related to the science content.

The pacing chart lists NJSLS-M and NJSLS-ELA standards which are addressed in this unit.

8.1: Use technology to collect and analyze data and to communicate findings with local peers and peers from other classes.

9.2: Explore careers directly related to this unit.

V. Course Materials

Knowing Science is a curriculum resource which provides each classroom with a variety of mentor books, a teacher's guide, and inquiry supplies, which should be used along with this curriculum. A pacing guide is provided to teachers on the Google Share Drive.

Each classroom has been provided sets of non-fiction leveled readers and shared reading books to provide students and teachers with content knowledge. For list of leveled readers and shared reading books, contact the Science Supervisor.

VI. Assessments

Assessment of student learning in science at the elementary level should be formative in nature. Rubrics are provided in the Knowing Science program. The focus of assessment should be of students mastery of the [Science and Engineering Processes](#) of the NJSLS-S. The teacher should keep in mind the [expected progression](#) of their understandings.

See the pages titled, "Assessing Student Learning" within each unit of the Knowing Science spiral-bound teacher guide.

VII. Interdisciplinary Connections and Alignment to Technology standards

(<http://www.state.nj.us/education/cccs/standards/8/>); Workplace readiness standards (<http://www.state.nj.us/education/archive/frameworks/ccwr/appendixb.pdf>); and 21st Century Content Standards (<http://www.state.nj.us/education/cccs/standards/9/#91>):

English/Social Studies

Based on English and Social Studies Department collaboration, the following topics have been identified across the American Literature and US History II curricula:

- Civil Rights
- Class Separation/Division
- Education System
- Poor/Wealthy
- Gates/Koch Brothers
- Ferguson

In turn, integrated curriculum has been created based on the essential question:

- How is our American culture shaped by socioeconomic class distinction?

English/Media Arts

Students choose books for independent reading projects in collaboration with the high school media specialist.

Technology-based process supports the construction of the MLA-research paper. This includes a media-driven lesson on acceptable academic sources and computer-based production of a formal research paper.

For alignment to Technology standards

(<http://www.state.nj.us/education/cccs/standards/8/>); Workplace readiness standards (<http://www.state.nj.us/education/archive/frameworks/ccwr/appendixb.pdf>); and 21st Century Content Standards (<http://www.state.nj.us/education/cccs/standards/9/#91>),

Copy and paste standards below