Fair Lawn

Public Schools

Fair Lawn, NJ

Science 3

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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

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Science Third Grade

I. Course Synopsis

Our elementary science program reflects and integrated, thematic approach to the study of the field of science which supports the philosophy of the NJSLS-S. Students will develop an understanding of the core principals 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 NJSLS-S as its focus.

All NJSLS-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 NJSLS-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 NJSLS-S aligned courses in the Fair Law Schools integrate the three dimensions discussed in the Frameworks for Science Education and the NJSLS-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 NJSLS-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	**Forces & Interactions** **Unit 1**	**12 Essential Sessions** (At least 15 Days)
Rotation 2	**Weather & Climate** **Unit 3**	**12 Essential Sessions** (At least 15 Days)
Rotation 3	**Life Cycles & Traits** **Unit 2**	**12 Essential Sessions** (At least 15 Days)

*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: Forces & Interactions

Enduring Understanding:

1. An object's future motion can be predicted based on the observation and measurement of patterns.
2. Balanced and unbalanced forces can affect the motion or lack of motion of an object.
3. Electric and magnetic forces can affect an objects motion without contacting it.

Essential Questions:

1. How can the future motion of an object be predicted based on observation and measurements of a pattern?
2. How do unbalanced or balanced forces affect the motion of an object?
3. How do electric or magnetic interactions affect objects which are not in contact?

Learning Objectives:

3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. [Clarification Statement: Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all.] [Assessment Boundary: Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.]

3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. [Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.] [Assessment Boundary: Assessment does not include technical terms such as period and frequency.]

3-PS2-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. [Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.] [Assessment Boundary: Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.]

3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets.* [Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.]

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: Weather & Climate

Enduring Understanding:

1. Weather data can be used to describe weather conditions expected during a particular season.
2. Climates around the world are dependent on weather in a given area.
3. Solutions may be designed and engineered to reduce the impacts of weather related hazards.

Essential Questions:

1. How can data be used to describe weather conditions expected during a particular season?
2. How can weather be used to describe climates around the world?
3. How can a solution be designed to reduce the impacts of a weather-related hazard?

Learning Objectives:

3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]

3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.

3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.* [Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.]

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: Life Cycles & Traits

Enduring Understanding:

1. All living things have similar and different aspects to their life cycles.
2. Some animals form groups to improve their chances for survival.
3. Living things inherit traits from their parents. Traits vary within groups of similar organisms to enhance their opportunities for survival, related to environmental changes.
4. Fossils can serve as evidence that environments change over time.

Essential Questions:

1. How can models be used to show the uniqueness and common aspects of living things?
2. How do animals form groups to survive?
3. How can data be analyzed as evidence of the inheritance of traits from parents and the variation of traits within groups of similar organisms?
4. How can evidence support the explanation that the environment influences traits?
5. How can fossils be used as evidence of the environments in which organisms lived long ago?
6. How can evidence be used to explain how variation within a species provides advantages in surviving, reproducing and finding mates?
7. How can evidence be used to show that some organisms survive better in a given habitat but others can not survive at all?

Learning Objectives:

3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. [Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.]

3-LS2-1. Construct an argument that some animals form groups that help members survive.

3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.]

3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment. [Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight.]

3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.]

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. [Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]

3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]

3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.* [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]

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