

Fair Lawn Public Schools

Fair Lawn, NJ

Science
K

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Kindergarten Science is a integrated science program developed by a committee of Fair Lawn Elementary Schools general education and special education. 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 Grade K

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 Kindergarten Science program consists of four 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 Kindergarten 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 15 lessons/sessions which are considered essential to students' development as learners. Following these 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	Weather Unit 5	9 Essential Sessions	Sunlight & Energy Unit 6*	4 Essential Sessions
Rotation 2	Measurement Unit 1	8 Essential Sessions	Motional & Forces Unit 2	5 Essential Sessions
Rotation 3	Living Things Unit 4	9 Essential Sessions	Sensational Senses Unit 3*	6 Essential Sessions

Optional

Taking Care of the Earth (Earth Day) (2 Enrichment 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: Weather, Sunlight & Energy

Enduring Understanding:

1. Weather patterns can be observed over time.
2. Local weather forecasting can be used to help us prepare for severe weather.
3. Plants and animals may change the environment to meet their needs.
4. Sometimes, humans change our environment too much to meet our needs.
5. Heat from the sun can have different effects on the Earth's surface.

Essential Questions:

1. How are patterns of weather observed?
2. How can Weather forecasts help us to be prepared for severe weather?
3. How do plants and animals change the environment to meet their needs?
4. How can we reduce the impact of human changes on the earth?

Learning Objectives:

K-ESS2-1

Use and share observations of local weather conditions to describe patterns over time. [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in

Learning Target: Observe and describe weather, temperature, wind speed, precipitations, clouds, and analyze weather data.

K-ESS3-2

Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.* [Clarification Statement: Emphasis is on local forms of severe weather.]

Learning Target: Use data to predict severe weather.

K-PS3-1

Make observations to determine the effect of sunlight on Earth's surface. [Clarification Statement: Examples of Earth's surface could include sand, soil, rocks, and water] [Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.]

Learning Target: Explain that the sun is a source of energy which warms material.

K-PS3-2

Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.* [Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.]

Learning Target: Engineer a product to reduce warming effects of the sun.

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 weather.

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.

Rotation 2: Measurement / Motion & Forces

Enduring Understanding:

1. A push or pull will change the motion of an object.
2. People can work together to design a solution to a problem.

Essential Questions:

1. How will a push or a pull affect an object?
2. How can a push or pull be applied to an object to change its direction?

Learning Objectives:

Make observations which are quantitative in nature, by measuring height and length, using standard units and then a measuring tape, to prepare to measure the effects of various forces.

Learning Target: Measure accurately using standard units. Compare the concepts of motion and speed.

K-PS-2-1

Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. [Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.] [Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]

Learning Target: Differentiate between pushes and pulls and explain the concept of a force.

K-PS-2-2

Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.* [Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.] [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]

Learning Target: Relate force with motion.

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 force.

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.

Unit 3: Living Things / Sensational Senses

Enduring Understanding:

1. Plants and animals are alive. They need certain things to grow.
2. The places where a plant or animal lives is directly related to what it needs to survive.
3. We use our senses to explore and understand.

Essential Questions:

1. How similar are the needs of plants and animals?
2. How are the places where animals and plants live related to their needs?
3. How do we use our senses?

Learning Objectives:

K-LS1-1

Use observations to describe patterns of what plants and animals (including humans) need to survive. [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]

Learning Targets: Define living and non-living things. Define the needs of living things.

K-ESS3-1

Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. [Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.]

Define and apply knowledge of sight, touch, hearing, smell, and taste.

Learning Target: Use senses to collect data.

K-ESS2-2

Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]

Learning Target: Explain how living things change the environment to survive. Our focus will be on plants.

K-ESS3-3

Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.* [Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]

Learning Target: Explain how we depend on Earth and how we can take care of it.

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 energy and living things.

NJSLS-Literacy: Students will make observations using their five senses to add details in their drawing and writing for the “Looking Closely” unit of Readers/Writers Workshop.

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