# Fair Lawn

# Public Schools

## Fair Lawn, NJ

# Fair Lawn School District

# Science 2

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Second 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.

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# Science Second 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 Lawn 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 Second 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 Second 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 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**
**Matter & Measurement** (16 Essential Sessions)

**Rotation 2**
**Ecosystems: Habitats & Interactions** (16 Essential Sessions)

**Rotation 3**
**Earth's Land & Water** (16 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: Matter and Measurement

**Enduring Understanding:**

1. Solids, liquids, and gases have different properties.
2. The properties of materials should be considered when determining their best uses.
3. Materials can be changed into a new object.
4. Heating or cooling of a substance may cause changes that can be observed. Sometimes these changes are reversible and sometimes they are not.

**Essential Questions:**

1. How are materials classified?
2. How are the properties of materials related to their uses?
3. How can materials be changed into a new object?
4. How can heating, cooling, and mixing a substance change the state of matter?

**Learning Objectives:**

2-PS1-1.
Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]
Learning Target: I can prove that materials can be described and classified according to properties.

2-PS1-2.
Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.* [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]
Learning Target: I can prove that materials properties can make them best suited for a purpose.

2-PS1-3.
Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]
Learning Target: I can prove that heating, cooling or mixing a substance may cause reversible/irreversible changes that can be observed.

2-PS1-4.
Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]
Learning Target: I can determine if changes caused by heating or cooling can be reversed.

**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: Ecosystems: Habitats and Interactions

**Enduring Understanding:**

1. Plants need sunlight and water in order to grow.
2. Animals disperse seeds and pollinate plants.
3. Plants and animals have a specific habitat that is beneficial for survival.

**Essential Questions:**

1. How do plants obtain their needs in order to grow?
2. How do animals disperse seeds and pollinate plants?
3. How do plants and animals adapt to survive in their environment?

**Learning Objectives:**

2-LS2-1.
Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

Learning Target: I can prove that plants require sunlight and/or water to grow.

2-LS2-2.
Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.*

Learning Target: I can prove that animals have the ability to disperse seeds and pollinate plants.

2-LS4-1.
Make observations of plants and animals to compare the diversity of life in different habitats. [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

Learning Target: I can prove that the diversity of plants and animals in habitats is dependent on the resources available.

**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 plants, animals, and their habitats.
**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: Earth's Land and Water**

**Enduring Understanding:**

1. Some changes to earth can occur quickly (ie: flood) or slowly (ie: erosion).
2. Changes to the Earth by water or wind can be prevented.
3. Many types of water and land exist.
4. Different types of water can be found at different locations on Earth.

**Essential Questions:**

1. How do earthquakes occur?
2. How can changes to the earth be prevented?
3. How can bodies of water and land be recognized?
4. How does the location of water on Earth affect its form?

**Learning Objectives:**

2-ESS1-1.
Use information from several sources to provide evidence that Earth events can occur quickly or slowly. [Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.] [Assessment Boundary: Assessment does not include quantitative measurements of timescales.]

Learning Target: I can prove that earthquakes can occur quickly or slowly.

2-ESS2-1
Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

Learning Target: I can prove that changes to the earth by erosion can be prevented.

2-ESS2-2.
Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.]

Learning Target: I can prove that different types of water and land exist.

2-ESS2-3.
Obtain information to identify where water is found on Earth and that it can be solid or liquid.

Learning Target: I can prove that water exists in different states.

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.

**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 Earth's land and water.
**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**