Grade 3

Life Science Module

Structures of Life

In a code such as 5.2.4.D.1, the “5” indicates the science standards, the “2” indicates the physical science standard within the set of science standards, the “4” indicates a third grade cumulative progress indicator, the “D” indicates a “strand” or theme within the science standards, and the “1” indicates the first of the third grade cumulative progress indicators within the “D” strand.
III. Scope and Sequence: Grade 3 – Structures of Life

In completing the work in Investigation 1 of *Structures of Life*, students are expected to develop understandings and skills including:

**Seeds are found in the plant part called a fruit.**

**Different kinds of fruits have different kinds and numbers of seeds.**

**Seeds have a variety of properties.**

**Seeds undergo changes in the presence of water.**

**A seed is an organism, a living thing.**

**A seed contains the embryo plant and stores food and water.**

In doing so they begin to acquire knowledge and abilities such as:

**Develop and use evidence-based criteria to determine if an unfamiliar object is living or nonliving.** (5.3.4.A.1)

**Organisms can only survive in environments in which their needs are met. Within ecosystems, organisms interact with and are dependent on their physical and living environment.** (5.3.4.C.1)

**Sort and describe objects based on the materials of which they are made and their physical properties.** (5.3.4.A.1)

**Identify and categorize the basic needs of living organisms as they relate to the environment.** (5.4.2.G.3)

**Describe and sort seeds in terms of properties.**

**Estimate numbers of seeds.**

**Compare and record the number and properties of seeds from a variety of fruits.**
Sort and compare seeds.

Observe changes over time.

In doing so they begin to acquire knowledge and abilities such as:

Use outcomes of investigations to build and refine questions, models, and explanations. (5.1.4.A.2)

Use scientific facts, measurements, observations, and patterns in nature to build and critique scientific arguments. (5.1.4.A.3)

Design and follow simple plans using systematic observations to explore questions and predictions. (5.1.4.B.1)

Measure, gather, evaluate, and share evidence using tools and technologies. (5.1.4.B.2)

Formulate explanations from evidence. (5.1.4.B.3)

Communicate and justify explanations with reasonable and logical arguments. (5.1.4.B.4)

Monitor and reflect on one’s own knowledge regarding how ideas change over time. (5.1.4.B.4)

Revise predictions or explanations on the basis of learning new information. (5.1.4.C.2)

Present evidence to interpret and/or predict cause-and-effect outcomes of investigations. (5.1.4.C.3)

Actively participate in discussions about student data, questions, and understandings. (5.1.4.D.1)

Work collaboratively to pose, refine, and evaluate questions, investigations, models, and theories. (5.1.4.D.2)

Demonstrate how to safely use tools, instruments, and supplies. (5.1.4.D.3)
In completing the work in Investigation 2 of *Structures of Life*, students are expected to develop understandings and skills including:

**Germination is the onset of a seed’s growth.**

**Plants need water, light, and nutrients to grow.**

**The life cycle is the process of a seed growing into a mature plant, which in turn produces seeds.**

**The fruit of the plant develops from the flower.**

In doing so they begin to acquire knowledge and abilities such as:

Living organisms:
- Interact with and cause changes in their environment.
- Exchange materials (such as gases, nutrients, water, and waste) with the environment.
- Reproduce.
- Grow and develop in a predictable manner. (5.3.4.A.1)

Essential functions required for the wellbeing of an organism are carried out by specialized structures in plants and animals. (5.3.4.A.2)

Explain that most plants get water from soil through their roots and gather light through their leaves. (5.3.2.B.3)

Identify sources of energy (food) in a variety of settings (farm, zoo, ocean, forest). (5.3.4.B.1)

Organisms can only survive in environments in which their needs are met. Within ecosystems, organisms interact with and are dependent on their physical and living environment. (5.3.4.C.1)

Plants and animals have life cycles (they begin life, develop into adults, reproduce, and eventually die). The characteristics of each stage of life vary by species. (5.3.4.D.1)
III. Scope and Sequence: Grade 3 – Structures of Life

Evaluate similar populations in an ecosystem with regard to their ability to thrive and grow. (5.3.4.E.2)

Identify and categorize the basic needs of living organisms as they relate to the environment. (5.4.2.G.3)

Observe changes over time.

Record information systematically for later analysis.

Observe and sort seedlings by properties of germination.

Compare germination in different types of seeds.

In doing so they begin to acquire knowledge and abilities such as:

Use outcomes of investigations to build and refine questions, models, and explanations. (5.1.4.A.2)

Use scientific facts, measurements, observations, and patterns in nature to build and critique scientific arguments. (5.1.4.A.3)

Design and follow simple plans using systematic observations to explore questions and predictions. (5.1.4.B.1)

Measure, gather, evaluate, and share evidence using tools and technologies. (5.1.4.B.2)

Formulate explanations from evidence. (5.1.4.B.3)

Communicate and justify explanations with reasonable and logical arguments. (5.1.4.B.4)

Monitor and reflect on one’s own knowledge regarding how ideas change over time. (5.1.4.C.1)

Revise predictions or explanations on the basis of learning new information. (5.1.4.C.2)
III. Scope and Sequence: Grade 3 – Structures of Life

Present evidence to interpret and/or predict cause-and-effect outcomes of investigations. (5.1.4.C.3)

Actively participate in discussions about student data, questions, and understandings. (5.1.4.D.1)

Work collaboratively to pose, refine, and evaluate questions, investigations, models, and theories. (5.1.4.D.2)

Demonstrate how to safely use tools, instruments, and supplies. (5.1.4.D.3)

In completing the work in Investigation 3 of *Structures of Life*, students are expected to develop understandings and skills including:

Crayfish have observable structures such as legs, pincers, antennae, eyes, swimmerets, tail, and mouth parts.

Crayfish have certain requirements for life, including clean, cool water; food; and shelter.

Habitat is where an animal lives.

Behavior is what an animal does.

Some animals claim a territory that they protect from other animals.

In doing so they begin to acquire knowledge and abilities such as:

Living organisms:
- Interact with and cause changes in their environment.
- Exchange materials (such as gases, nutrients, water, and waste) with the environment.
- Reproduce.
- Grow and develop in a predictable. (5.3.4.A.1)

Compare and contrast structures that have similar functions in various organisms, and explain how those functions may be carried out by structures that have different physical appearances. (5.3.4.A.2)
III. Scope and Sequence: Grade 3 – Structures of Life

Describe the interactions of systems involved in carrying out everyday life activities. (5.3.4.A.3)

All animals, including humans, are consumers that meet their energy needs by eating other organisms or their products. (5.3.6.B.2)

Organisms can only survive in environments in which their needs are met. Within ecosystems, organisms interact with and are dependent on their physical and living environment. (5.3.4.C.1)

Compare the physical characteristics of the different stages of the life cycle of an individual organism, and compare the characteristics of life stages among species. (5.3.4.D.1)

Evaluate similar populations in an ecosystem with regard to their ability to thrive and grow. (5.3.4.E.2)

**Compare and record observations about structures of an organism.**

**Observe and compare behaviors of an organism.**

**Record systematically over time.**

In doing so they begin to acquire knowledge and abilities such as:

Use outcomes of investigations to build and refine questions, models, and explanations. (5.1.4.A.2)

Use scientific facts, measurements, observations, and patterns in nature to build and critique scientific arguments. (5.1.4.A.3)

Design and follow simple plans using systematic observations to explore questions and predictions. (5.1.4.B.1)

Measure, gather, evaluate, and share evidence using tools and technologies. (5.1.4.B.2)
III. Scope and Sequence: Grade 3 – Structures of Life

Formulate explanations from evidence. (5.1.4.B.3)

Communicate and justify explanations with reasonable and logical arguments. (5.1.4.B.4)

Monitor and reflect on one’s own knowledge regarding how ideas change over time. (5.1.4.C.1)

Revise predictions or explanations on the basis of learning new information. (5.1.4.C.2)

Present evidence to interpret and/or predict cause-and-effect outcomes of investigations. (5.1.4.C.3)

Actively participate in discussions about student data, questions, and understandings. (5.1.4.D.1)

Work collaboratively to pose, refine, and evaluate questions, investigations, models, and theories. (5.1.4.D.2)

Demonstrate how to safely use tools, instruments, and supplies. (5.1.4.D.3)
Hawk Rise, in the City of Linden, New Jersey, represents a unique 37-acre natural preserve that offers nearly limitless opportunity for Linden public school students to learn about natural systems and their relationships to those systems. The site—which includes terrestrial, wetland, and aquatic habitats—is within a 15-minute bus ride from most of the schools in the district, and will ultimately be accessible by means of parking facilities and a pedestrian trail system that winds its way through notable features of the site.

The site’s natural features and phenomena are also very well-suited to inquiry-based lessons that can be correlated to the K-12 Science Curriculum of the Linden Public Schools. A Science curriculum consultant has drafted a curriculum framework designed to engage students from Grades 2 through Grade 8 in science lessons that pertain to the Hawk Rise ecosystem. The lessons will support the District’s existing grade-level science modules and units, but also add an outdoor, discovery/investigation dimension to the modules and units that will enrich them and engage the students, at times, in field-based, experiential learning. Most of the lessons will also be very well-adapted to interdisciplinary connections to the learning domains of Mathematics, Social Studies, and Language Arts Literacy.

Field trips to Hawk Rise are planned for Grades 2,4,6 and 7 with perhaps select opportunities for Grade 8 students to visit the Hawk Rise site as part of their Environmental Issues Unit. Grades 3,5, and 8 students will be engaged in classroom, school-site, or local park habitat sites that will either prepare them for or follow-up learning experiences at the Hawk Rise site. All lessons will be correlated to the recently revised New Jersey Department of Education Core Curriculum Content Science Standards, as well as the “Four Strands of Science Learning” championed by the text that serves as a guideline reference for the Linden District’s Science Curriculum: Ready, Set, Science.

As with all innovations in science education in the Linden Public School District, a rigorous program of professional development training is recommended that will seek to familiarize teachers from each of the participating grade levels—Grades 2 through 8—in classroom and field-based strategies for enhancing student awareness and understanding of the Hawk Rise ecosystem. Experts in ecology-based instruction—some from the New Jersey Audubon Society—will be recruited to facilitate the professional development training of classroom teachers, as well as initial field trips that will include their students. It is hoped that, ultimately, Linden’s classroom teachers will not only develop a command of classroom, school-yard, or park-based lessons relating to Hawk Rise, but also be capable of facilitating lessons at the Hawk Rise preserve on their own.
The following outline highlights key ecosystem concepts pertinent to Hawk Rise that can be focused on through adherence to key New Jersey Core Curriculum Content Science Standards and the Grade 3 Science curriculum module, “STRUCTURES OF LIFE.”

“STRUCTURES OF LIFE” Grade 3 Science Module:

- **NJCCC SCIENCE STANDARD**
  CPI# 5.3.4.A.2 Background Content:
  *(Life Science Strand A—Organization and Development):*
  Essential functions required for the well-being of an organism are carried out by specialized structures in plants and animals.

- **FOSS GRADE 3 “STRUCTURES OF LIFE” MODULE—KEY CONCEPTS**
  - An organism’s structures have functions that help it survive in its habitat.
  - The structures found on different kinds of organisms show some similarities and some differences.
  - The fruit of a plant develops from the flower.
  - Different kinds of fruits have different kinds and numbers of seeds.
  - A seed contains the embryo plant and stores food and water.
  - Seeds have a variety of properties.
  - Crayfish *[as with all animals]* have certain requirements for life, including clean water, food, and shelter.

- **HAWK RISE ECOSYSTEM CURRICULUM CORRELATION FEATURES**
  - Hawk Rise supports a rich and varied population of plants and animals—many of which are structurally and anatomically adapted to survive in wetland habitats.
  - The New Jersey Audubon Society has conducted a preliminary inventory of many of the plants and animals that exist in several of Hawk Rise’s varied habitats. Perhaps photos of some of the Hawk Rise plants and/or animals with unique structural adaptations could be made available to Grade 3 teachers to use as a classroom enhancement of the ‘Structures of Life’ science module.
INQUIRY-BASED CURRICULUM
focusing on the
HAWK RISE ECOSYSTEM

KEY CURRICULUM SUPPORT REFERENCE

Essential guidelines from a reference that has been strongly endorsed and institutionalized in the Linden School District will be seamlessly woven into the Hawk Rise Curriculum: *Ready, Set, SCIENCE!—Putting Research to Work in K-8 Classrooms* (National Research Council of the National Academies, 2008).

A credible and well-respected ‘blueprint’ for quality Science Education, this reference reviews principles from the latest educational research and applies them to effective teaching practice. Four interrelated and learner-focused science education strands are highlighted: 1) marshalling scientific explanations  2) using their own data as evidence  3) reflecting on their current understanding, and  4) participating in authentic scientific practices as presenters and audience members.

Each of these Strands will be purposefully infused into the Hawk Rise curriculum, since it will focus on student-based observations, investigations, data-based documentation, and inquiry skills. The Strands also correlate very closely with the New Jersey Core Curriculum Content Standards in Science, and the associated Cumulative Progress Indicators (CPI’s).