

Englewood Public School District

Science

Grade 4

Second Marking Period

Unit 3: Structure and Function

Overview: In this unit of study, students develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. The crosscutting concepts of *systems and system models* are called out as organizing concepts for this disciplinary core idea. Students are expected to demonstrate grade-appropriate proficiency *in engaging in argument from evidence*. Students are also expected to use this practice to demonstrate understanding of the core idea.

This unit is based on 4-LS1-1.

Time Frame: 10 – 15 days

Enduring Understandings:

Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.

Essential Questions:

How do internal and external parts of plants and animals help them to survive, grow, behave, and reproduce?

Standards	Topics and Objectives	Activities	Resources	Assessments
4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.	Topics: Animal Structures Plant Structures Twenty-First Century Themes and Skills include: Environmental Literacy <ul style="list-style-type: none"> • The Four C's • Environmental Literacy • Global Awareness 	<u>Animal Mouth Structures</u> 1. Students will look at different birds eating food and will discuss how their beak shape helps them eat food. 2. In pairs, have students look at pictures of different bird beaks. Students will sketch beaks and make predictions on what food the birds will eat. 3. Students will view a video, Unhinged, on human and snake jaws. They will discuss how jaw structure allows them to eat certain	<u>Animal Mouth Structures:</u> <ul style="list-style-type: none"> • <u>Bird Food</u> • <u>Bird Beak Gallery</u> • <u>Unhinged!</u> • <u>Animal Mouths</u> • <u>Wild Kratts Animal Adaptation</u> <u>Dissecting Daffodils:</u> <ul style="list-style-type: none"> • Daffodil flowers for each group. • Daffodil bulb for each group • Plastic knives <u>Feeding Frenzy</u> For each student:	Formative Assessments: <u>Animal Mouth Structures</u> Student conclusion in science journal <u>Busy Bees</u> Student argument writing <u>Dissecting Daffodils</u> Student diagrams and labels Aha Moment paragraphs Benchmark Assessments: Exact Path
	Objectives <u>Animal Mouth Structures:</u> Students will explore how			

different animal mouth shapes allow it to obtain food and survive.

Busy Bees

Students will be able to understand specialized body parts of bees and their role in agricultural science.

Dissecting Daffodils

Students observe the external and internal parts of a plant and flower to understand how this plant survives and reproduces.

Feeding Frenzy

Students will understand how insect mouthparts are adapted for a particular food source.

Seed Dispersal

Students will explore seed dispersal and classify seeds by the method of dispersal.

4. Students will look at different animal mouth shapes and will make predictions on what the animals will eat. (CRP8)

Busy Bees:

Engage: Ask kids about their experiences with bees. Play Flight of the Bumble Bee Song.

Jigsaw: Each group of four will receive a teacher selected informational book on bees. Students will complete a “KLEWS” chart in their science journal and fill in with their resources. Students will rotate books amongst groups. Then students will create a class list with bee facts. ()

Closing: Students discuss why bees are important to agriculture. For homework students would research how bees are important to New Jersey agriculture. ()

Dissecting Daffodils:

In groups, students will review the parts of the daffodil and prepare for the lab. During the lab, students will dissect, diagram and label the parts of a daffodil following their own procedures. After the flower dissection. Students will then dissect a daffodil bulb and diagram in their science journals. Students will discuss their “Aha” moments with the

- “Feeding Frenzy” activity sheet
- Small cups

For the class:

- Box of breakfast cereal
- Wooden craft stick
- Cookie sheets or cafeteria trays
- Water
- Plastic wrap
- Rubber bands
- Sheets of thin paper
- Paper plate
- Marbles
- Raisins
- Small bits of sponge
- Plain drinking straws
- Drinking straws cut
- Clothespins
- Scissors
- Paper towels

Seed Dispersal

- Collect a variety of seeds; ask students to also bring seeds to class
- Types of seeds for categorizing: Round, burrs, winged, buoyant in water
- For Explore #1 you will need 10 different seeds
- For each pair of students (place these in zip lock baggies for easy distribution).
- For Explore #2 you will need a class set of 4 types of seeds: one that floats, one that is moved by the wind, one that can stick to

Summative Assessments:

Feeding Frenzy
Student Assessment Page

Seed Dispersal

Seed Lab Chart

Alternative Assessments:

Students will describe a system in terms of its components and their interactions.
Writing/ Self Directed Response

Students will construct an argument with evidence, data, and/or a model.
Yes/No Chart

Students will use the evidence from their observations of plants and animals to support the claim that all organisms are systems with structures that function in growth, survival, behavior, and/or reproduction.

Explain What Matters/Paragraph Writing
Rubric for scoring

Students will observe plants and animals closely, taking notes and drawing pictures, so that they can describe various structures

	<p>class and write an open-ended response about their “Aha” moment. (W.4.1, 8.1.5.A.2)</p> <p><u>Feeding Frenzy:</u> Students will act as five different insects at various food centers. Using a specific type of mouth, each student will attempt to eat the food provided. They will record in their data chart, if their insect was successful or not. Students record on a final sheet, a diagram of the mouthpart that was the most successful at each station. (CRP6, CRP4, 9.1.4.B.1)</p> <p><u>Seed Dispersal</u> Students will work in small groups to see how seeds interact with different materials. Based on their findings, they will classify them by type of seed dispersal method. (4.G.A.3, 6.1.4.B.8)</p>	<p>an</p> <ul style="list-style-type: none"> • Animal’s fur, and one that rolls or is in a pod. • Obtain for each pair or group of three: a clean sock or fake fur; • Cardboard to simulate • Wind; and a small plastic bowl of water. • Make a transparency of “Traveling Seeds.” • Make a transparency of the “Seed Lab Chart” or draw the chart on the board • Go to www.mbgnet.net/bioplants/seed.html which shows a video clip of seeds moved by wind and another clip of seeds shooting out of a pod. <p><u>Additional Resources:</u> Animal Senses by Hickman http://www.doe.virginia.gov/testing/sol/standards_docs/science/2010/lesson_plans/grade4/life_processes/ses_s_4.4ab.pdf</p>	<p>and their functions.</p> <p>Draw Pictures</p> <p>Students will describe the symmetry that can be observed in an organism’s structures.</p> <p>Venn Diagram</p> <p>Students will also trace lines of symmetry in their drawings to support their thinking.</p>
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Accommodations and Modifications:

Students with special needs: Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

ELL/ESL students: Students will be supported according to the recommendations for “can do’s” as outlined by WIDA – https://www.wida.us/standards/CAN_DOs/
This particular unit has limited language barriers due to the physical nature of the curriculum.

Students at risk of school failure: Formative and summative data will be used to monitor student success at first signs of failure student work will be reviewed

to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations. More time and will be made available with a certified instructor to aid students in reaching the standards.

Gifted and Talented Students: Students excelling in mastery of standards will be challenged with complex, high level challenges related to the complexity in planning and carrying out investigations and analyzing and interpreting data.

English Language Learners	Special Education	At-Risk	Gifted and Talented
<ul style="list-style-type: none"> ● Use peer readers ● Speak and display terminology ● Teacher modeling ● Peer modeling ● Provide ELL students with multiple literacy strategies. ● Word walls ● Give page numbers to help the students find answers ● Provide a computer for written work ● Provide two sets of textbooks, one for home and one for school ● Provide visual aides ● Provide additional time to complete a task ● Use graphic organizers 	<ul style="list-style-type: none"> ● Connect concepts to prior learning ● Utilize modifications & accommodations delineated in the student's IEP ● Work with paraprofessional ● Use multi-sensory teaching approaches. ● Work with a partner ● Provide concrete examples ● Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA). ● Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling). 	<ul style="list-style-type: none"> ● Connect concepts to prior learning ● Using visual demonstrations, illustrations, and models ● Give directions/instructions verbally and in simple written format. Oral prompts can be given. ● Peer Support ● Increase one on one time ● Teachers may modify instructions by modeling what the student is expected to do ● Instructions may be printed out in large print and hung up for the student to see during the time of the lesson. ● Review behavior expectations and make adjustments for personal space or other behaviors as needed. ● Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. 	<ul style="list-style-type: none"> ● Real world scenarios ● Curriculum compacting ● Inquiry-based instruction ● Independent study ● Higher order thinking skills ● Adjusting the pace of lessons ● Interest based content ● Student Driven Instruction ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Use project-based science learning to connect science with observable phenomena. ● Structure the learning around explaining or solving a social or community-based issue. ● Collaborate with after-school programs or clubs to extend learning opportunities.

- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).

Interdisciplinary Connections:

ELA-NJSLS/ELA:

W.4.1: Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4-LS1-1)

Mathematics:

4.G.A.3: Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (4-LS1-1)

Career Ready Practices:

CRP6: Demonstrate creativity and innovation.

CRP4: Communicate clearly and effectively and with reason.

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

Integration of Technology Standards NJSLS 8:

8.1.5.A.2: Format a document using a word processing application to enhance text and include graphics, symbols and/or pictures.

Integration of 21st Century Skills:

9.1.4.B.1: Participate in brainstorming sessions to seek information, ideas, and strategies that foster creative thinking.

Social Studies:

6.1.4.B.8: Compare ways people choose to use and distribute natural resources.

Key Vocabulary:

Plant: one of a large group of living things that use sunlight to make their own food.

Animal: one of a large group of living things that can move around by themselves to find food.

Carnivore: an animal that eats other animals.

Herbivore: an animal that eats only plants.

Omnivore: an organism that eats both plants and animals.

Stems: the main part of a plant that grows up from the ground and supports the branches, leaves, flowers, or fruits that may grow from it.

Leaf: one of the usually green, flat parts of a plant or tree that grows from the stem or branch.

Petals: one of the separate leaves that form the outer part of a flower head.

Adaptation: the ability to make changes to survive in an environment.

Habitat: the natural environment of an animal or plant.

Dispersal: the act of moving from one place to another.

Science and Engineering Practices**Engaging in Argument from Evidence**

- Construct an argument with evidence, data, and/or a model. (4-LS1-1)

Disciplinary Core Ideas**LS1.A: Structure and Function**

- Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)

Crosscutting Concepts**Systems and System Models**

- A system can be described in terms of its components and their interactions. (4-LS1-1)

Englewood Public School District

Science

Grade 4

Second Marking Period

Unit 4: How Organisms Process Information

Overview: In this unit of study, students are expected to develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. By developing a model, they describe that an object can be seen when light reflected from its surface enters the eye. The crosscutting concepts of *cause and effect*, *systems and system models*, and *structure and function* are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *developing and using models*. Students are expected to use these practices to demonstrate understanding of the core ideas. This unit is based on 4-LS1-2 and 4-PS4-2.

Time Frame: 10 – 15 days

Enduring Understandings:

Animals are able to use their perceptions and memories to guide their actions.

An object can be seen when light reflected from its surface enters the eyes.

Essential Questions:

How do animals receive and process different types of information from their environment in order to respond appropriately?

What happens when light from an object enters the eye?

Standards	Topics and Objectives	Activities	Resources	Assessments
(4-LS1-2) Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.	Topics Creativity Communication	<u>Pinhole Cameras</u> Students will construct a pinhole camera following step-by-step directions. Students will use their pinpoint cameras to experiment with image and image size based on the size of hole of the pinpoint camera. (4.G.A.1,4-LS4-2)	<u>Pinhole Cameras</u> <ul style="list-style-type: none"> Copies of the student instructions to make a pinhole camera. 2 x hollow cylinders of slightly different diameters so that one fits snugly inside the other (tubes from plastic wrap and paper towels can fit together well) OR 2 x sheets of A3 size black cartridge paper 	Formative Assessments: Do Now/Ticket to Leave Journal Entries
	Objectives <u>Pinhole Cameras:</u> Students will describe how a pinhole camera produces small upside-down images. Students will explain why a larger hole produces brighter but less focused images. In a	<u>Does Ear Shape Matter?</u> Students will work in pairs and bend different shapes to see which ear allows them to	<ul style="list-style-type: none"> <u>Pinhole Cameras and Eyes</u> 	<u>Animal Senses</u> Student Participation Benchmark Assessment: Exact Path Summative Assessments: <u>Pinhole Cameras</u> Student pinhole cameras

<p>allows objects to be seen.</p>	<p>lab, observe how a lens placed in front of the pinhole camera produces a bright and sharply focused image. After students will, compare a pinhole camera with a human eye, describing similarities and differences</p> <p><u>Does Ear Shape Matter?</u> Students will model different shaped ears and how it impacts the ability to hear.</p> <p><u>Animal Senses</u> To learn how animals use their senses in special ways. To use our own senses to better understand how animals use theirs.</p> <p><u>Eye Lab</u> Students will explain how the eye uses light energy to see objects by creating a model.</p>	<p>hear the soft music playing. Students will discuss results and complete a lab worksheet. (SL.4.5)</p> <p><u>Animal Senses</u> Students will work through five activities – each one based on a sense. Students will discuss how an animal would respond after each activity. (W.4.2, 6.1.4.B.9,4-LS1-2)</p> <p><u>Eye Lab</u> Students will review eye model rubric and materials acceptable to create a small model. Students are given a week or more to gather materials and construct model. Students will then present their models and findings to their class. (MP.2, CRP4, CRP6, 9.1.4.A.5, 8.1.5.A.3)</p>	<ul style="list-style-type: none"> • 1 x translucent plastic bag – plastic bags from the supermarket vegetable aisle work well • Aluminum foil • Rubber band • Cellotape • Magnifying lens • <u>Time to Think?</u> • <u>Catch It!</u> <p><u>Does Ear Shape Matter?</u></p> <ul style="list-style-type: none"> • Does Ear Shape Matter? PDF Document • Tape player and any tape of sounds or music • Construction paper (8" x 11" and 8" x 14") • Scissors • Tape <p><u>Animal Senses</u></p> <ul style="list-style-type: none"> • Binoculars • Colanders • 2 Blindfolds/Bandanas • Assorted crushed-up forest items (for smell) • Several opaque containers with small holes or slits in the lids • Water in a large bowl • Water in a small bowl • 2 T. sugar • Small disposable cups or spoons • Assorted forest items (for touch identification) i.e. pinecones, rocks, bark, moss, etc. • Paper bags • <u>The Life of Environments</u> 	<p><u>Does Ear Shape Matter?</u> Student lab report</p> <p><u>Eye Lab</u> Student models and presentations</p> <p><u>Additional Assessments:</u> Students should model with mathematics as they draw points, lines, line segments, and angles to describe how light behaves when coming into contact with lenses, mirrors, and other objects.</p> <p>Practice Presentations</p> <p>Students will use points, lines, and angles when drawing pictures and diagrams that show how light reflects off objects and into the pinhole viewer or into the human eye.</p> <p>Observations, Drawings</p> <p>Students should use text and online media resources when appropriate to help them understand how animals receive and process information they receive from the environment.</p> <p>Performances, Teacher-created tests</p> <p>Students should use visual displays to enhance their</p>
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	Book: Animal Senses by Pamela Hickman	observations and explanations of the concepts in this unit of study.
	<u>Eye Lab:</u> <u>Eye Model Rubric</u>	Graphic organizers, Rubrics

Accommodations and Modifications:

Students with special needs: Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

ELL/ESL students: Students will be supported according to the recommendations for “can do’s” as outlined by WIDA – https://www.wida.us/standards/CAN_DOs/
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English Language Learners	Special Education	At-Risk	Gifted and Talented
<ul style="list-style-type: none"> Students can track their learning via graphs and data walls Speak and display terminology Teacher modeling Peer modeling Provide ELL students with multiple literacy strategies. Word walls 	<ul style="list-style-type: none"> Students can track their learning via graphs and data walls Utilize modifications & accommodations delineated in the student’s IEP Work with paraprofessional Use multi-sensory teaching approaches. 	<ul style="list-style-type: none"> Students can track their learning via graphs and data walls Using visual demonstrations, illustrations, and models Give directions/instructions verbally and in simple written format. Oral prompts can be given. Peer Support Increase one on one time 	<ul style="list-style-type: none"> Provide opportunities for student-created presentations to other classes Curriculum compacting Inquiry-based instruction Independent study Higher order thinking skills Adjusting the pace of lessons Interest based content Real world scenarios Student Driven Instruction Engage students with a

- Use peer readers
- Give page numbers to help the students find answers
- Provide a computer for written work
- Provide two sets of textbooks, one for home and one for school
- Provide visual aides
- Provide additional time to complete a task
- Use graphic organizers

- Work with a partner
- Provide concrete examples
- Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA).
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).

- Teachers may modify instructions by modeling what the student is expected to do
- Instructions may be printed out in large print and hung up for the student to see during the time of the lesson.
- Review behavior expectations and make adjustments for personal space or other behaviors as needed.
- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).

- variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
 - Structure the learning around explaining or solving a social or community-based issue.
 - Collaborate with after-school programs or clubs to extend learning opportunities.

Interdisciplinary Connections:

ELA-NJSLS/ELA:

W.4.2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (4-LS4-3)

SL.4.5: Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-LS1-2), (4-LS4-2)

Integrations of 21st Century Skills:

9.1.4.A.5 : Apply critical thinking and problem-solving skills in classroom and family settings.

Social Studies:

6.1.4.B.9: Relate advances in science and technology to environmental concerns, and to actions taken to address them.

Mathematics:

MP.2: Model with mathematics. (1-ESS1-2)

4.G.A.1: Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4-PS4-2)

Career Ready Practices:

CRP6: Demonstrate creativity and innovation.

CRP4: Communicate clearly and effectively and with reason.

Integration of Technology Standards NJSL 8:

8.1.5.A.3: Use a graphic organizer to organize information about a problem or issue.

Key Vocabulary:

Sense: any of five ways to understand or experience one's surroundings. The senses are touch, smell, taste, sight, and hearing.

Organ: a part of plants or animals that performs a particular task

Stimulus: something that causes a physical response in a body part.

Response: a reaction

Reflect: to throw back from a surface

Iris: the colored circle around the pupil of the eye.

Lens: a clear part of the eye that brings together the rays of light needed for sight. The lens focuses rays of light so that they form an image inside the eye on the retina.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<u>Developing and Using Models</u> <ul style="list-style-type: none">Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2)Develop a model to describe phenomena. (4-PS4-2)	<u>LS1.D: Information Processing</u> <ul style="list-style-type: none">Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)	<u>Systems and System Models</u> <ul style="list-style-type: none">A system can be described in terms of its components and their interactions. (4-LS1-1),(4-LS1-2) <u>Cause and Effect</u> <ul style="list-style-type: none">Cause and effect relationships are

		<p><u>PS4.B: Electromagnetic Radiation</u></p> <ul style="list-style-type: none">• An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2)	routinely identified. (4-PS4-2)	
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