BOE Approved 8/18

Cliffside Park Public Schools

Science

Unit Name: Plants and Animals (Life Science)

Resource: FOSS Next Generation, Delta Education

Duration: Ten Weeks

Enduring Understandings

Grass and Grain Seeds

- Seeds are alive and grow into new plants. Seeds need water to begin growth.
- Plants need water, air, nutrients, and space to grow.
- Plants have different structures that function in growth and survival. Plant roots take in water and nutrients, and leaves make food from sunlight.
- Wheat and other cereals that we eat come from seeds called grains.
- Not all plants grow alike. There are variations in structures that serve the same function. Individuals of the same kind of plant or animal are similar but also vary.

Stems

- Plants are living organisms that need water, air, nutrients, light, and space to grow.
- New plants can grown from the stems of mature plants.
- Roots and leaves develop on stems at nodes.
- Potatoes are underground stems; potato eyes are nodes where buds grow.

Terrarium

- Plants and animals live in many different environments and have structures and behaviors that help them survive. These include sensory structures that provide animals with information about their surroundings.
- Plants and animals need food, water, air, and space, and plants need sunlight to make food.
- A habitat is a place where plants and animals live. It provides what a plant or animal needs to live. There are many different habitats around the world.
- Individuals of the same kind are similar but also vary.
- Engineers learn from nature to solve human problems.

Growth and Change

- Plant bulbs are alive and grow new structures when provided with water.
- Some parts of plant roots will grow will grow into new plants if they are provided with water. Other parts will not,
- Plants grow and change. Plants can produce new plants in many ways.
- Adult animals can have young (offspring), and the young resemble their parents.
- In many kinds of animals, parents and the offspring engage in behaviors that help the offspring survive.

Essential Questions

Grass and Grain Seeds

- What happens to ryegrass and alfalfa seeds in moist soil?
- What happens to the grass and alfalfa plants after we mow them?
- How does a wheat seed grow?
- How many different kinds of plants live in an area of the schoolyard?

Stems

- How can we make a new plant from an old one?
- What grows from the nodes of a potato?
- How do we keep our cuttings alive?

Terrarium

- What do plants need to live and grow in a terrarium?
- What do animals need to live in a terrarium?
- What structures or behaviors do plants or animals have that help them live in their habitat?

- How do the behaviors of squirrels help them survive the winter?

Growth and Change

- How does a bulb grow?
- What parts of the plant can grow new plants?
- How do the plants in the schoolyard compare to the plants studied in class?
- What do animal parents do to help their young survive?

Focus of Standards

Student Outcomes	**Skills**	**Assessments**
Grass and Grain Seeds ● I can plant miniature lawns with ryegrass and alfalfa. ● I can mow the lawn and observe the response of grass and alfalfa to cutting. ● I can plant individual wheat seeds in clear straws and observe how seeds germinate and grow, observing variation in the growth of the same kind of seed. ● I can conduct a plant hunt in the schoolyard and continue to look for variation. ● I can use media to look at variation in animals and how animals use their senses to gather information about their surroundings to help them survive. **Stems** ● I can make new plants from stems of houseplants. ● I can put sections of stems into water and look for evidence that a new plant is forming. ● I can plant pieces of potatoes (modified stems) and observe them grow.	● Asking Questions and Defining Problems ● Developing and Using Models ● Classifying Information ● Observing Investigations ● Exploring New Ideas ● Planning and Carrying Out Investigations ● Analyzing and Interpreting Data ● Using Mathematics and Computational Thinking ● Constructing Explanations and Designing Solutions ● Engaging in Argument from Evidence ● Obtaining, Evaluating and Communicating Information	***Assessments:*** ● **Formative**: Notebook Entries: ○ Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. ○ Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. Examples of patterns of behaviors could include: ○ Notebook Entries ○ Teacher Observation ○ Anecdotal Records/Notes ○ Science notebook ○ Embedded Assessment Notes ● **Summative Performance** ○ Foss Post-test on Plants and Animals ○ Vocabulary check ● **Benchmark Assessments**: ○ Investigation Checks ○ Constructing models- terrariums ○ Constructing models- growth of organisms- needs and changes

Terrarium ● I can set up terrariums using seeds and plants from Investigations 1 and 2. ● I can add local animals such as snails and isopods and provide for the needs of the plants and animals. ● I can learn about other animals and plants through readings and multimedia and compare and sort structures and functions. ● Through an outdoor simulation, I can learn about variations in how squirrels store food for winter survival. ● I can read about how engineers learn from nature to solve human problems. ● I can plant onion or garlic bulbs in moist cotton and observe as they develop into new plants. ● I can plant parts of roots—carrots and radishes—to discover which parts will develop into new plants. ● I can adopt a schoolyard plant and compare it to other plants. **Growth and Change** ● I can use media to learn about the behavior of animals and their young and how these behaviors help the young to survive. ● I can observe how young plants and animals resemble their parents.		○ Observations and Descriptions- parts of as plant ● **Alternative:** ○ Conferences ○ Diagrams ○ Word Bank for vocabulary ○ Modeling ○ Illustrations of plant and animal growth ○ Storybook assembly ○ Digital labs- simulations ○ Science Articles
NJ Student Learning Standards: Science **From Molecules to Organisms: Structures and Processes** 1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. 1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. **Heredity: Inheritance and Variation of Traits** 1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.		

K-2-ETS1 Engineering Design
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.

ELA: RI.1.1, RI.1.3, RI.1.4, RI.1.5, RI.1.7, RI.1.9
Math: 1.OA.A.1, 1.OA.A.2, 1.OA.A.3, 1.OA.B.4, 1.OA.B.5,1.MD.A.1, 1.MD.A.2, 1.MD.B.3, 1.MD.B.4

8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
- 8.1.2.A.6 Identify the structure and components of a database.
- 8.1.2.A.7 Enter information into a database or spreadsheet and filter the information.

E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
- 8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.

F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
- 8.1.2.F.1 Use geographic mapping tools to plan and solve problems.

8.2 Technology Education, Engineering, Design, and Computational Thinking
B. Technology and Society: Knowledge and understanding of human, cultural and society values are fundamental when designing technology systems and products in the global society.
- 8.2.2.B.4 Identify how the ways people live and work has changed because of technology.

C. Design: The design process is a systematic approach to solving problems.
- 8.2.2.C.3 Explain why we need to make new products.
- 8.2.2.C.4 Identify designed products and brainstorm how to improve one used in the classroom.

D. Abilities for a Technological World: The designed world is the product of a design process that provides the means to convert resources into products and systems.
- 8.2.2.D.1 Collaborate and apply a design process to solve a simple problem from everyday experiences.
- 8.2.2.D.3 Identify the strengths and weaknesses in a product or system.

E. Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.
- 8.2.2.E.1 List and demonstrate the steps to an everyday task.

Practice 1. Asking questions (for science) and defining problems (for engineering)
Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.
Ask questions based on observations to find more information about the natural and/or designed world(s).
Ask and/or identify questions that can be answered by an investigation.

Define a simple problem that can be solved through the development of a new or improved object or tool.

Practice 3. Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.
With guidance, plan and conduct an investigation in collaboration with peers (for K).
Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.
Evaluate different ways of observing and/or measuring a phenomenon to determine which way can answer a question.
Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons.
Make observations (firsthand or from media) and/or measurements of a proposed object or tool or solution to determine if it solves a problem or meets a goal.
Make predictions based on prior experiences.

Practice 4. Analyzing and interpreting data
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
Record information (observations, thoughts, and ideas).
Use and share pictures, drawings, and/or writings of observations.
Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems.
Compare predictions (based on prior experiences) to what occurred (observable events).
Analyze data from tests of an object or tool to determine if it works as intended.

Practice 6. Constructing explanations (for science) and designing solutions (for engineering)
Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.
Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.
Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.
Generate and/or compare multiple solutions to a problem.

Practice 8. Obtaining, evaluating, and communicating information
Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.
Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).
Describe how specific images (e.g., a diagram showing how a machine works) support a scientific or engineering idea.
Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question and/or supporting a scientific claim.
Communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about scientific ideas, practices, and/or design ideas.

Core Instructional Materials:

- FOSS Next Generation: Plants and Animals(2016)

Supplemental Materials: (videos, leveled readers, Readworks, recommended books etc.)

Videos: https://www.fossweb.com/moduledetail?dDocName=G3842595&classId=
Recommended books: https://www.fossweb.com/additional-resources-books-xslt?dDocName=G4292315#non-fiction-books

21st Century Themes

- **Global Awareness/Environmental Literacy:** Students will understand how and why living things grow

21st Century Skills

- **Flexibility and Adaptability/Productivity and Accountability:** Students must work together to create sustainable living habits for plants and animals and must be flexible with making changes to the environments as necessary.

Interdisciplinary Connections
NJSLS for ELA are introduced, developed, and practiced in the context of learning science content and engaging in the science and engineering practices.
ELA:

- Read and comprehend science texts related to their prior experience and knowledge.
- Write informational/explanatory texts, arguments to support claims, and narratives about experience in science.
- Engage in collaborative discussions about science.
- Learn new vocabulary and language structures in context.

Math:

- Participate in active investigations and apply mathematics during data gathering and analysis
- Interdisciplinary Extensions at the end of each investigation usually include a math problem of the week
- Analyze hypothetical data related to the context of the investigation

Mathematical Practices
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.

- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Differentiation/Accommodations/Modifications ***(Alternate Modes of Instruction and Support)***		
Modifications to Support Gifted and Talented Students	**Modifications to Support English Language Learners**	**Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)**
Newsela article: Zoos:breeding programs to counter extinction Lexile: 480 Recommended non fiction books https://www.fossweb.com/additional-resources-books-xslt?dDocName=G4292315#non-fiction-books Independent research-setting up an aquarium Debate / Compare and contrast-aquariums vs terrariums Participate in inquiry and project-based learning units of study	Newsela article: Zoos:breeding programs to counter extinction (Spanish version) Equipment photo cards (spanish and english) ·Provide ELL students with multiple literacy strategies. Collaborate with after-school programs or clubs to extend learning opportunities Investigating plant responses Visual cues- image gallery https://www.fossweb.com/additional-resources-image-galleries-xslt?dDocName=G4292315#image-galleries Researching Plants and animals per native country Vocabulary log-	Newsela article: Zoos:breeding programs to counter extinction Lexile: 320 Lab simulations- flower in water- https://selfservice.inqits.com/teacher/ Equipment photo cards ·Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. ·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). Visual cues- image gallery https://www.fossweb.com/additional-resources-image-galleries-xslt?dDocName=G4292315#image-galleries Word walls Review student individual educational plan and/or 504 plan. Establish procedures for accommodations and modifications for assessments as per IEP/504.

Assigning roles within partnerships Differentiated supports: content, process, product, environment	Pronunciation/translation assistance https://dictionary.cambridge.org/us/ Vocabulary builder Thesaurus- https://www.thesaurus.com/ Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary) Pair visual prompts with verbal presentations Front Load and immerse students in literacy and language experiences related to content Provide students with visual models, sentence stems, concrete objects, and hands-on materials. Model procedures for life skills. Collaboration between ELL and general education teacher to maximize learning	Establish procedures for modification of classwork and homework as per IEP/504. Modify classroom environment to support academic and physical needs of the students as per IEP/504. Provide appropriate accommodations, instructional adaptations, and/or modifications as determined by the IEP or 504 team. Differentiation through content, process, product, environment Provide Title I services to students not meeting academic standards in ELA and/or Math. Provide instructional adaptations and interventions in the general education classroom. Modify classroom environment to support student needs. Differentiated instruction Basic Skills Intensive individual intervention

Sources:

NJSLS Science Standards (2016): http://www.nj.gov/education/cccs/2016/science/
NJ: 2014 SLS: Technology: http://www.state.nj.us/education/cccs/2014/tech/8.pdf
NJSLS-S: Science and Engineering Practices: http://www.nj.gov/education/cccs/2016/science/3-5-ETS1.pdf
21st Century Life and Careers: http://www.state.nj.us/education/cccs/2014/career/9.pdf
Career Ready Practices: http://www.state.nj.us/education/cccs/2014/career/9.pdf
2015 FOSS Next Generation: www.FOSSweb.com
NSTA: https://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=6
https://www.nj.gov/education/modelcurriculum/sci/1u4.shtml
https://www.explorelearning.com/index.cfm?method=cResource.dspStandardCorrelation&id=1888
https://selfservice.inqits.com/teacher/