

BOE Approved 8/18

# **Cliffside Park Public Schools**

#### Science

Unit Name: Structures of Life (Life Science)

Resource: FOSS Next Generation, Delta Education

Duration: Ten Weeks

# **Enduring Understandings**

#### **Origins of Seeds**

- Seed develop in the plant part called a fruit.
- Seeds have a variety of properties.
- Seeds change in the presence of water.
- When a seed grows into a new plant it is called reproduction.
- Seeds move away from plants in different ways.

## **Growing Further**

- Germination is the onset of a seed's growth.
- Plants need water, light, space and nutrients to grow.
- The life cycle is the sequence of stages during which a seed grows into an adult plant and produces seeds.
- The fruit of the plant develops from the flower.
- Roots take up water and nutrients that are transported to other parts of the plant.
- The environment plays a role in the characteristics of a plant.

## Meet the Crayfish

- Crayfish have observable structures that serve various functions in growth, survival, and reproduction.
- Crayfish have particular requirements for life, including clean, cool water with oxygen, food and space.
- Adaptations are structures and behaviors of an organism that help it survive and reproduce.

- Difference in characteristics between individuals of the same species may provide an advantage in surviving.
- When the environment changes, some plants and animals survive and reproduce, others decline and move to new locations and some die.
- Organisms are related in feeding relationships called food chains. Animals eat plants, and other animals eat those animals. Some organisms live in social groups.

#### **Human Body**

- A skeleton is a system of interacting bones. Bones have several functions: support, protection and movement
- The skeletons of humans and other mammals have many similarities.
- The number and kinds of bones in an organism are characteristics inherited from the parents of the organism.
- Fossils are important evidence about extinct organisms and past environments.
- The place where two bones meet is called a joint.
- Muscles move across joints to move bones.
- Fingerprints can be sorted into three groups based on basic patterns. No two people have the same fingerprint.

## **Essential Questions**

# **Origins of Seeds**

- How are seeds alike and different?
- What effect does water have on seeds?
- How much water does a seed soak up?
- How do seeds disperse away from the parent plant?

# **Growing Further**

- What structures does a seedling have to help it grow and survive?
- What is the sequence of the bean plant's life cycle?
- How do the roots of schoolyard plants compare to the roots of bean plants?

# Meet the Crayfish

- What are the structures of a crayfish?
- How do crayfish structures and behaviors help crayfish survive? What kind of behavior do crayfish display in their habitat?
- How are the structures of crayfish and other animals alike and different?
- What is needed to sustain a food chain?

# Human Body

- What are the functions of the skeletal system?
- In what ways are the skeletons of a rodent and a human similar? What makes our skeletal system flexible?
- How are fingerprints alike and different?

Focus of Standards				
Student Outcomes	Skills	Assessments		
<ul> <li>Origins of Seeds <ul> <li>I can observe and compare properties of seeds and fruit.</li> <li>I can investigate the effect of water on seeds.</li> <li>I can monitor and record daily changes in seeds.</li> <li>I can compare the mass of dry seeds to those soaked in water.</li> <li>I can design and test models of seed-dispersal mechanisms.</li> </ul> </li> <li>Growing Further <ul> <li>I can plant bean seedlings in nutrient solution and observe them throughout their life cycle.</li> <li>I can observe plant structures as they appear during the plant's life cycle.</li> </ul> </li> <li>Meet the Crayfish <ul> <li>I can observe, analyze, and interpret observations of crayfish structures and behavior as individuals and in groups.</li> </ul> </li> </ul>	<ul> <li>Asking Questions and Defining Problems</li> <li>Developing and Using Models</li> <li>Classifying Information</li> <li>Observing Investigations</li> <li>Exploring New Ideas</li> <li>Planning and Carrying Out Investigations</li> <li>Analyzing and Interpreting Data</li> <li>Using Mathematics and Computational Thinking</li> <li>Constructing Explanations and Designing Solutions</li> <li>Engaging in Argument from Evidence</li> <li>Obtaining, Evaluating and Communicating Information</li> </ul>	<ul> <li>Assessments:         <ul> <li>Formative: Notebook Entries:                 <ul> <li>Notebook Entries</li> <li>Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.</li></ul></li></ul></li></ul>		

<ul> <li>I can use models to understand change over time.</li> </ul>	<ul> <li>Constructing models- life cycle of the crayfish</li> </ul>
Human Body	<ul> <li>Diagramming- the human body</li> </ul>
<ul> <li>I can study skeletal systems using bones, images, and models.</li> </ul>	<ul> <li>Applying- growthing and organism design</li> </ul>
	Alternative:
	<ul> <li>Conferences</li> </ul>
	◦ Diagrams
	<ul> <li>Word Bank for vocabulary</li> </ul>
	◦ Modeling
	<ul> <li>Illustrations of systems</li> </ul>
	<ul> <li>Storybook assembly- Life</li> </ul>
	cycles and traits of crayfish/ or
	seedlings

## NJ Student Learning Standards: Science

## N3-LS1 From Molecules to Organisms: Structures and Processes

3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

## 3-LS2 Ecosystems: Interactions, Energy, and Dynamics

3-LS2-1. Construct an argument that some animals form groups that help members survive.

3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.

3-LS3 Heredity: Inheritance and Variation of Traits

3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

## 3-LS4 Biological Evolution: Unity and Diversity

3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

**ELA:** RI.3.1, RI.3.3, RI.3.4, RI.3.5, RI.3.7, RI.3.9 **Math:** 3.OA.1, 3.OA.2, 3.OA.3

## NJ SLS: 21st Century Life and Careers

#### **Career Ready Practices**

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP5. Consider the environmental, social and economic impacts of decisions.

CRP6. Demonstrate creativity and innovation.

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

CRP9. Model integrity, ethical leadership and effective management.

CRP11. Use technology to enhance productivity.

CRP12. Work productively in teams while using cultural global competence.

#### NJSLS: Technology

NJ: Grades 3-5

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.

8.1.5.A.1 Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

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

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

D. Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.

8.1.5.D.1 Understand the need for and use of copyrights.

8.1.5.D.3 Demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media.

8.1.5.D.4 Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.

E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.

8.1.5.E.1 Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.

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.

8.1.5.F.1 Apply digital tools to collect, organize, and analyze data that support a scientific finding.

8.2 Technology Education, Engineering, Design, and Computational Thinking

Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment. A. The Nature of Technology: Creativity and Innovation

Technology systems impact every aspect of the world in which we live.

8.2.5.A.2 Investigate and present factors that influence the development and function of a product and a system.

8.2.5.A.4 Compare and contrast how technologies have changed over time due to human needs and economic, political and/or cultural influences.

B. Technology and Society: Knowledge and understanding of human, cultural and societal values are fundamental when designing technology systems and products in the global society.

8.2.5.B.1 Examine ethical considerations in the development and production of a product through its life cycle.

C. Design: The design process is a systematic approach to solving problems.

The attributes of design. The application of engineering design. The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.

8.2.5.C.1 Collaborate with peers to illustrate components of a designed system.

8.2.5.C.4 Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models.

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.

8.2.5.D.1 Identify and collect information about a problem that can be solved by technology, generate ideas to solve the problem, and identify constraints and trade-offs to be considered.

8.2.5.D.3 Follow step by step directions to assemble a product or solve a problem.

8.2.5.D.4 Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.

# **NJSLS: Science and Engineering Practices**

## 3-LS1 From Molecules to Organisms: Structures and Processes

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3-LS2-1. Construct an argument that some animals form groups that help members survive.

3-LS3 Heredity: Inheritance and Variation of Traits

# 3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.

# 3-LS4 Biological Evolution: Unity and Diversity

3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. 3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

# **Core Instructional Materials:**

#### • FOSS Next Generation: Structures of Life(2016)

Supplemental Materials: (videos, leveled readers, Readworks, recommended books etc.) Videos: <u>https://www.fossweb.com/moduledetail?dDocName=G3842595&classId=</u>

Recommended books: <u>https://www.fossweb.com/additional-resources-books-xslt?dDocName=G4292315#non-fiction-books</u>

#### **21st Century Themes**

- **Global Awareness:** Students come to understand that humans use natural resources for everything they do and that people affect the world around them.
- Environmental Literacy: Students come to know the climate and seasons around them.

#### 21st Century Skills

#### **Creativity and Innovation**

- Critical Thinking and Problem Solving
- Communication and Collaboration

#### Flexibility and Adaptability

- Initiative and Self-Direction
- Productivity and Accountability
- Leadership and Responsibility

#### **Information Literacy**

- Media Literacy
- ICT (Information, Communications and Technology) Literacy

## **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:?	Newsela article:	Newsela article:		
The structure and	The structure and physiology of the	The structure and physiology of the heart		
physiology of the heart	heart	Lexile: 590L		
Lexile: 800L	Lexile: 590L			
	(Spanish version)	Storyboard- Human and crayfish similarities/differences		
Recommended non fiction				
books	Equipment photo cards (spanish and	Crayfish external anatomy simulation		
https://www.fossweb.com/a	english)	https://www.purposegames.com/game/crayfish-external-anatomy-guiz		
dditional-resources-books-				
xslt?dDocName=G429231	Modeling human structure- in native	Equipment photo cards		
5#non-fiction-books	language (illustrated)			
		Bird Beaks (LSC)		
	From Seed to Flower - Phenomena	Invent an Insect		
	35 Animals of Costa Rica	Adaptations for Survival: Grades 3-5: I Live Where?		

Independent research-		
systems of the human	Visual cues- image gallery	Lab simulation- circulatory system
body- how organs organize	https://www.fossweb.com/additional-res	https://www.explorelearning.com/index.cfm?method=cResource.dspDet
	ources-image-galleries-xslt?dDocName	ail&resourceid=662
VR- Human body	=G4292315#image-galleries	
		Crayfish dissection video
Debate / Compare and	Vocabulary log-	https://www.youtube.com/watch?v=rZ-7LF5AkGs
contrast- inherited and non		
expressed	Pronunciation/translation assistance	Jar specimens- viewing models
	https://dictionary.cambridge.org/us/	
Provide appropriate		Visual cues- image gallery
challenge for wide ranging	Vocabulary builder Thesaurus-	https://www.fossweb.com/additional-resources-image-galleries-xslt?dDo
skills and development	https://www.thesaurus.com/	cName=G4292315#image-galleries
areas.		
		Word walls
Participate in inquiry and	Native Language Translation (peer,	
project-based learning	online assistive technology, translation	Review student individual educational plan and/or 504 plan.
units of study	device, bilingual dictionary)	······································
		Establish procedures for accommodations and modifications for
Assigning roles within	Pair visual prompts with verbal	assessments as per IEP/504.
partnerships	presentations	
	Front Load and immerse students in	Establish procedures for modification of classwork and homework as per
Differentiated supports:	literacy and language experiences	IEP/504.
content, process, product,	related to content	Modify classroom onvironment to support academic and physical peeds
environment		of the students as per IEP/50/
	Provide students with visual models,	
	sentence stems, concrete objects, and	Provide appropriate accommodations, instructional adaptations, and/or
	hands-on materials.	modifications as determined by the IEP or 504 team.
	Madal procedures for life skills	
	Model procedures for the skills.	Differentiation through content, process, product, environment
	Collaboration between ELL and general	
	education teacher to maximize learning	Provide Title I services to students not meeting academic standards in
	g	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 (2017): 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/			
https://www.explorelearning.com/index.cfm?method=cResource.dspDetail&resourceid=662			