Shelby County Schools Science Vision

Shelby County Schools' vision of science education is to ensure that from early childhood to the end of the 12th grade, all students have heightened curiosity and an increased wonder of science; possess sufficient knowledge of science and engineering to engage in discussions; are able to learn and apply scientific and technological information in their everyday lives; and have the skills such as critical thinking, problem solving, and communication to enter careers of their choice, while having access to connections to science, engineering, and technology.

To achieve this, Shelby County Schools has employed The Tennessee Academic Standards for Science to craft meaningful curricula that is innovative and provide a myriad of learning opportunities that extend beyond mastery of basic scientific principles.

Introduction

In 2014, the Shelby County Schools Board of Education adopted a set of ambitious, yet attainable goals for school and student performance. The District is committed to these goals, as further described in our strategic plan, Destination 2025. In order to achieve these ambitious goals, we must collectively work to provide our students with high quality standards aligned instruction. The Tennessee Academic Standards for Science provide a common set of expectations for what students will know and be able to do at the end of each grade, can be located in the Tennessee Science Standards Reference. Tennessee Academic Standards for Science are rooted in the knowledge and skills that students need to succeed in post-secondary study or careers. While the academic standards establish desired learning outcomes, the curricula provide instructional planning designed to help students reach these outcomes. The curriculum maps contain components to ensure that instruction focuses students toward college and career readiness. Educators will use this guide and the standards as a roadmap for curriculum and instruction. The sequence of learning is strategically positioned so that necessary foundational skills are spiraled in order to facilitate student mastery of the standards.

Our collective goal is to ensure our students graduate ready for college and career. Being College and Career Ready entails, many aspects of teaching and learning. We want our students to apply their scientific learning in the classroom and beyond. These valuable experiences include students being facilitators of their own learning through problem solving and thinking critically. The Science and Engineering Practices are valuable tools used by students to engage in understanding how scientific knowledge develops. These practices rest on important "processes and proficiencies" with longstanding importance in science education. The science maps contain components to ensure that instruction focuses students toward understanding how science and engineering can contribute to meeting many of the major challenges that confront society today. The maps are centered around five basic components: the Tennessee Academic Standards for Science, Science and Engineering Practices, Disciplinary Core Ideas, Crosscutting Concepts, and Phenomena.

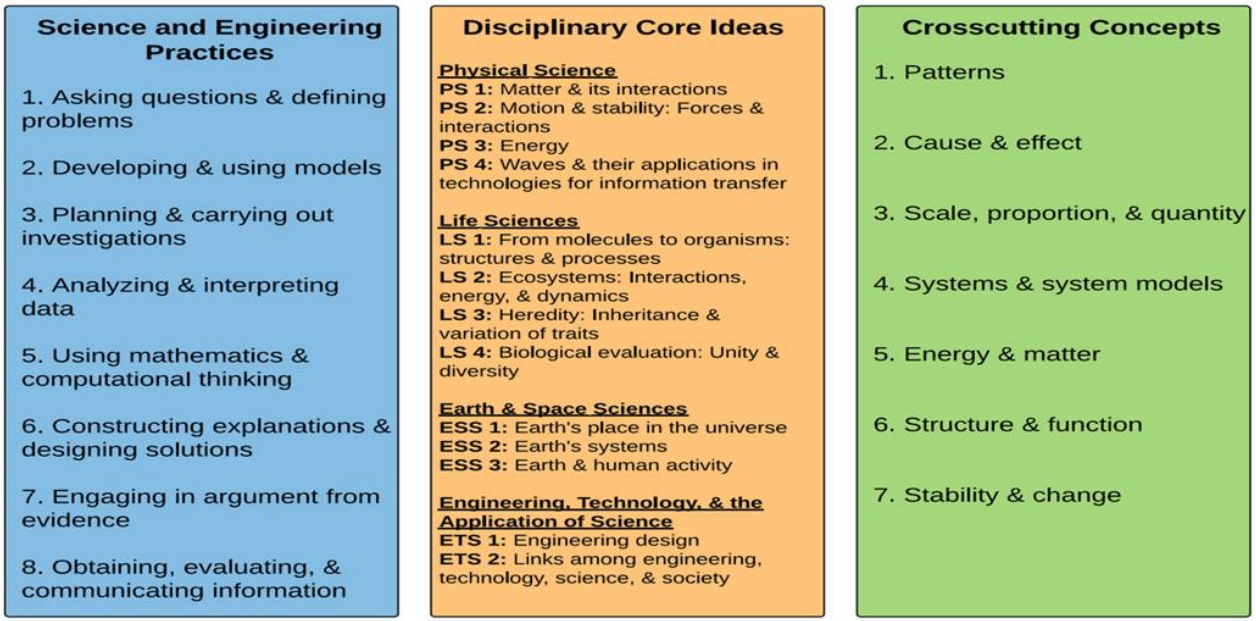
The Tennessee Academic Standards for Science were developed using the National Research Council's 2012 publication, A Framework for K-12 Science Education as their foundation. The framework presents a new model for science instruction that is a stark contrast to what has come to be the norm in science classrooms. Thinking about science had become memorizing concepts and solving mathematical formulae. Practicing science had become prescribed lab situations with predetermined outcomes. The framework proposes a three-dimensional approach to science education that capitalizes on a child's natural curiosity. The Science Framework for K-12 Science Education provides the blueprint for developing the effective science practices. The *Framework* expresses a vision in science education that requires students to operate at the nexus of three dimensions of learning: Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas. The *Framework* identified a small number of disciplinary core ideas that all students should learn with increasing depth and sophistication, from Kindergarten through grade twelve. Key to the vision expressed in the *Framework* is for students to learn these disciplinary core ideas in the context of science and engineering practices. The importance of combining Science and Engineering Practices, Crosscutting Concepts and Disciplinary Core Ideas is stated in the *Framework* as follows:

Standards and performance expectations that are aligned to the framework must take into account that students cannot fully understand scientific and engineering ideas without engaging in the practices of inquiry and the discourses by which such ideas are developed and refined. At the same time, they cannot learn or show competence in practices except in the context of specific content. (NRC Framework, 2012, p. 218)

To develop the skills and dispositions to use scientific and engineering practices needed to further their learning and to solve problems, students need to experience instruction in which they use multiple practices in developing a particular core idea and apply each practice in the context of multiple core ideas. We use the term "practices" instead of a term such as "skills" to emphasize that engaging in scientific investigation requires not only skill but also knowledge that is specific to each practice. Students in grades K-12 should engage in all eight practices over each grade band**.** Crosscutting concepts have application across all domains of science. As such, they are a way of linking the different domains of science. Crosscutting concepts have value because they provide students with connections and intellectual tools that are related across the differing areas of disciplinary content and can enrich their application of practices and their understanding of core ideas. There are seven crosscutting concepts that bridge disciplinary boundaries, uniting core ideas throughout the fields of science and engineering. Their purpose is to help students deepen their understanding of the disciplinary core ideas and develop a coherent and scientifically based view of the world.

The map is meant to support effective planning and instruction to rigorous standards. It is *not* meant to replace teacher planning, prescribe pacing or instructional practice. In fact, our goal is not to merely "cover the curriculum," but rather to "uncover" it by developing students' deep understanding of the content and mastery of the standards. Teachers who are knowledgeable about and intentionally align the learning target (standards and objectives), topic, text(s), task, and needs (and assessment) of the learners are best-positioned to make decisions about how to support student learning toward such mastery. Teachers are therefore expected--with the support of their colleagues, coaches, leaders, and other

support providers--to exercise their professional judgment aligned to our shared vision of effective instruction, the Teacher Effectiveness Measure (TEM) and related best practices. However, while the framework allows for flexibility and encourages each teacher/teacher team to make it their own, our expectations for student learning are non-negotiable. We must ensure all of our children have access to rigor—high-quality teaching and learning to grade level specific standards, including purposeful support of literacy and language learning across the content areas.



Learning Progression

At the end of the elementary science experience, students can observe and measure phenomena using appropriate tools. They are able to organize objects and ideas into broad concepts first by single properties and later by multiple properties. They can create and interpret graphs and models that explain phenomena. Students can keep notebooks to

record sequential observations and identify simple patterns. They are able to design and conduct investigations, analyze results, and communicate the results to others. Students will carry their curiosity, interest and enjoyment of the scientific world view, scientific inquiry, and the scientific enterprise into middle school.

At the end of the middle school science experience, students can discover relationships by making observations and by the systematic gathering of data. They can identify relevant evidence and valid arguments. Their focus has shifted from the general to the specific and from the simple to the complex. They use scientific information to make wise decision related to conservation of the natural world. They recognize that there are both negative and positive implications to new technologies.

As an SCS graduate, former students should be literate in science, understand key science ideas, aware that science and technology are interdependent human enterprises with strengths and limitations, familiar with the natural world and recognizes both its diversity and unity, and able to apply scientific knowledge and ways of thinking for individual and social purposes.

Structure of the Standards

- Grade Level/Course Overview: An overview that describes that specific content and themes for each grade level or high school course.
- Disciplinary Core Idea: Scientific and foundational ideas that permeate all grades and connect common themes that bridge scientific disciplines.
- Standard: Statements of what students can do to demonstrate knowledge of the conceptual understanding. Each performance indicator includes a specific science and engineering practice paired with the content knowledge and skills that students should demonstrate to meet the grade level or high school course standards.

Purpose of Science Curriculum Maps

This map is a guide to help teachers and their support providers (e.g., coaches, leaders) on their path to effective, college and career ready (CCR) aligned instruction and our pursuit of Destination 2025. It is a resource for organizing instruction around the Tennessee Academic Standards for Science, which define what to teach and what students need to learn at each grade level. The map is designed to reinforce the grade/course-specific standards and content (scope) and provides *suggested* sequencing, pacing, time frames, and aligned resources. Our hope is that by curating and organizing a variety of standards-aligned resources, teachers will be able to spend less time wondering what to teach and searching for quality materials (though they may both select from and/or supplement those included here) and have more time to plan, teach, assess, and reflect with colleagues to continuously improve practice and best meet the needs of their students.

The map is meant to support effective planning and instruction to rigorous standards. It is *not* meant to replace teacher planning, prescribe pacing or instructional practice. In fact, our goal is not to merely "cover the curriculum," but rather to "uncover" it by developing students' deep understanding of the content and mastery of the standards. Teachers who are knowledgeable about and intentionally align the learning target (standards and objectives), topic, text(s), task, and needs (and assessment) of the learners are best-positioned to make decisions about how to support student learning toward such mastery. Teachers are therefore expected--with the support of their colleagues, coaches, leaders, and other support providers--to exercise their professional judgment aligned to our shared vision of effective instruction, the Teacher Effectiveness Measure (TEM) and related best practices. However, while the framework allows for flexibility and encourages each teacher/teacher team to make it their own, our expectations for student learning are non-negotiable. We must ensure all of our children have access to rigor—high-quality teaching and learning to grade level specific standards, including purposeful support of literacy and language learning across the content areas.

3rd Grade Quarter 4 Curriculum Map Quarter 4 Curriculum Map Feedback							
Quarter 1			Quarter 2	Quarter 3		**Quarter 4**	
Structure and Routine	Unit 1 Matter	Unit 2 Magnetic Forces	Unit 3 Energy	Unit 4 Solar System	Unit 5 Weather and Climate	**Unit 6 Types of Living Things**	Unit 7 Survival of Animals and Plants
1 week	5 weeks	3 weeks	9 weeks	3 weeks	6 weeks	**3 weeks**	6 weeks

UNIT 6: Types of Living Things (3 weeks)

Overarching Question(s)

How do organisms live, grow, respond to their environment, and reproduce?

Unit 6: Lesson 1	Lesson Length	Essential Question	Vocabulary
Structures and Functions of Plants	1.5 weeks	How do plant structures help them survive and reproduce?	adaptation, photosynthesis, stomata, transpiration, respiration, cone, stimulus, response

Standards and Related Background Information	Instructional Focus	Instructional Resources
DCI(s) 3.LS1 From Molecules to Organisms: Structures and Processes **Standard(s)** 3.LS1.1 Analyze the internal and external structures that aquatic and land animals and plants have to support survival, growth, behavior, and reproduction. **Explanation and Support of Standard** 3.LS1.1 The goal of this standard is not to have students memorize all, or even a specific set of	**Learning Outcomes** Students will be able to construct an argument that plants have internal and external structures that help the plant survive, grow, react to stimuli, and reproduce. **Suggested Phenomena** *Click on the phenomenon picture to view the video.* 	**Curricular Resources** Engage Inspire Science TE, pp. 5-6 TE p. 5, Phenomenon TE p. 6, Essential Question TE p. 6, Science and Engineering Practices Explore TE, pp. 7-8 *(LAB)* Be a Scientist Notebook, p. 7, Inquiry Activity: Movement of Water in Plants Explain

structures/systems found in living organisms. Instead, students should make the connection that the functions that organisms carry out in order to survive are performed by a group of structures working together. This is the first time that students are expected to consider that things have internal structures that are not externally visible. In life science, the study of these internal structures is known as anatomy. Internal structures work as a system of organs to accomplish the life processes listed in the standard. *A focus should be placed on the big-picture functions of the systems, not the microscopic processes taking place. For example, it would not be appropriate to describe that structures called villi in the small intestine absorb nutrients from digested food. It would be appropriate to say that the small intestine helps us digest, which means to break down food so that our bodies get the materials needed to grow.* **Suggested Science and Engineering Practice(s)** Analyzing and Interpreting Data **Suggested Crosscutting Concept(s)** Systems and System Models **Teacher Overview** Roots, stems, leaves, and flowers are plant structures with specific functions that allow the plant to survive and reproduce. Roots anchor plants and take in water	Phenomenon Explanation: Students begin to recognize that objects have smaller substructures which determine the property of a material or system.	TE, pp. 9-13 Be A Scientist Notebook, p. 9: Vocabulary Digital Interactive: Roots, Stems, and Leaves Science Handbook/eBook: Plant Reproduction <u>Elaborate</u> TE, pp. 14-15 *(LAB)* Be a Scientist Notebook, p. 12, Inquiry Activity: Design an Experiment <u>Evaluate</u> TE, pp. 16-17 *(LAB)* Be A Scientist Notebook, p. 14, Performance Task: How Do Plants Respond to Changes in Their Environments? eAssessment **Additional Resources** Video: Plant Structure and Adaptations Lesson: Plant Life Cycles: Flowering Plants Lesson: Planting for a Purpose **ESL Supports and Scaffolds** WIDA Standard 4 To support students in speaking refer to this resource: WIDA Doing and Talking Science

and minerals from the soil. Stems support the leaves and flowers and contain vascular tissue through which water and nutrients move. Leaves are usually the main site of photosynthesis in a plant. Plants exchange gases through their leaves. During daylight, the stomata on the leaves take in carbon dioxide for photosynthesis and release oxygen from respiration. During darkness, leaves take in oxygen for respiration and release carbon dioxide. In many plants, flowers play a role in reproduction. Differences among plants' structures are adaptations related to the environment in which each plant is found. Some examples of adaptations include thick skin on leaves and stems, spines on a cactus, and flowers that open only at night because they are pollinated by bats. **Misconceptions** Students may have the misconception that plants do not respond to their environment as animals do. As you teach the lesson, look for opportunities to address this misconception by pointing out examples such as the opening and closing of stomata in response to changing water levels in a plant, and plants growing toward sources of light.		When applicable- use Home Language do build vocabulary in concepts. Spanish Cognates Interactive Science Dictionary with visuals Resources Sort Images Sequencing Flow Chart Sentence stems: First, there are _____. Next come _____. Next come _____. Next come _____). Plant parts diagrams Youtubevideo: songplantparts Turtle Diary Science Video

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UNIT 6: Types of Living Things (3 weeks)

Overarching Question(s)

How do organisms live, grow, respond to their environment, and reproduce?

Unit 6: Lesson 2	Lesson Length	Essential Question	Vocabulary
Structures and Functions of Animals	1.5 weeks	How do animal structures help them survive?	structural adaptation, internal structure, respiratory system, external structure

Standards and Related Background Information	Instructional Focus	Instructional Resources
DCI(s) 3.LS1 From Molecules to Organisms: Structures and Processes **Standard(s)** 3.LS1.1 Analyze the internal and external structures that aquatic and land animals and plants have to support survival, growth, behavior, and reproduction. **Explanation and Support of Standard** 3.LS1.1 The goal of this standard is not to have students memorize all, or even a specific set of	**Learning Outcomes** Students will be able to construct an argument that animals have internal and external structures that function to support survival, and growth. **Suggested Phenomena** *Click on the phenomenon picture to view the video.* 	**Curricular Resources** Engage Inspire Science TE, pp. 19-20 TE p. 19, Phenomenon TE p. 20, Essential Question TE p. 20, Science and Engineering Practices Explore TE, pp. 20-21 *(LAB)* Be a Scientist Notebook, p. 20, Inquiry Activity: Put Your Best Foot Forward Explain TE, pp. 22-27

structures/systems found in living organisms. Instead, students should make the connection that the functions that organisms carry out in order to survive are performed by a group of structures working together. This is the first time that students are expected to consider that things have internal structures that are not externally visible. In life science, the study of these internal structures is known as anatomy. Internal structures work as a system of organs to accomplish the life processes listed in the standard. *A focus should be placed on the big-picture functions of the systems, not the microscopic processes taking place. For example, it would not be appropriate to describe that structures called villi in the small intestine absorb nutrients from digested food. It would be appropriate to say that the small intestine helps us digest, which means to break down food so that our bodies get the materials needed to grow.* **Suggested Science and Engineering Practice(s)** Analyzing and Interpreting Data **Suggested Crosscutting Concept(s)** Systems and System Models **Teacher Overview** Scientists classify all organisms on the planet using a taxonomic scheme consisting of seven levels: 1. kingdom 2. phylum or division 3. class 4. order 5.	Phenomenon Explanation: Certain internal and external features of animals are necessary for their survival in their environment.	Be A Scientist Notebook, p.23: Vocabulary Science Handbook/eBook: Animal Needs Science Handbook/eBook: Getting Resources Video: Animal Structures Science Handbook/eBook Structural Adaptations Digital Interactive: How Animals Survive <u>Elaborate</u> TE, pp. 28-29 *(LAB)* Be a Scientist Notebook, p. 29, Inquiry Activity: Structures of a Snail <u>Evaluate</u> TE, pp. 29-31 *(LAB)* Be A Scientist Notebook, p. 31, Performance Task: The Model Is Afoot! eAssessment **Additional Resources** Lesson: Macro-Structures of Animals - Bi-Peds Lesson: https://www.memphismuseums.org/lichterman-nature-center/programs/exhibits-252571/animals-alive/ Video: Amazing Adaptations Video: Strategies for Animal Survival **ESL Supports and Scaffolds** WIDA Standard 4

family 6. genus 7. species Kingdom is the broadest division. The lowest division is species, which consists of organisms that are capable of interbreeding to produce fertile offspring. Species are identified by two names (binomial nomenclature). The two parts of the name indicate the genus and species to which the organism belongs. All animals belong to the animal kingdom. Chordata is a phylum beneath the animal kingdom. Subphyla below chordates include invertebrates (without a backbone) and vertebrates (with a backbone). **Misconceptions** Students may believe that small animals are defenseless against predators, but this is not true. Many insects have hard outer skeletons to protect them. They may also be toxic to other animals or be able to blend into the background of a forest or desert floor. Larger prey, such as zebras or antelopes, have the protection of a herd and the ability to run quickly		To support students in speaking refer to this resource: WIDA Doing and Talking Science When applicable- use Home Language do build vocabulary in concepts. Spanish Cognates Pre-teach: **(consider teaching additional vocabulary to support Entering Level ELs)** Structures; survive Animal Adaptions Classifying animals activities

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1 week	5 weeks	3 weeks	9 weeks	3 weeks	6 weeks	3 weeks	**6 weeks**

UNIT 7: Survival of Animals and Plants (6 weeks)

Overarching Question(s)

How and why do organisms interact with their environment and what are the effects of these interactions?

Unit 7: Lesson 1	Lesson Length	Essential Question	Vocabulary
Animal Group Survival	1.5 weeks	How does being part of a group help animals survive?	survive, population

Standards and Related Background Information	Instructional Focus	Instructional Resources
DCI(s) 3.LS2 Ecosystems: Interactions, Energy, and Dynamics **Standard(s)** 3.LS2.1 Construct an argument to explain why some animals benefit from forming groups. **Explanation and Support of Standard** 3.LS2.1 Group behavior increases the chances of survival for individual members of the group. Formation of a group helps individual animals obtain food, defend themselves, and cope with changes (e.g., changes to the environment). Depending on species, the features of a group may vary with respect to: function,	**Learning Outcomes** Students will be able to explain the advantages to living in a group. **Suggested Phenomena** *Click on the phenomenon picture to view the video.* 	**Curricular Resources** Engage Inspire Science TE, pp. 37-38 TE p. 37, Phenomenon TE p. 38, Essential Question TE p. 38, Science and Engineering Practices Explore TE, pp. 39-40 *(LAB)* Be a Scientist Notebook, p. 41, Inquiry Activity: Ant Workers Explain TE, pp. 40-47 Be A Scientist Notebook, p. 43: Vocabulary

structure, and size. Structurally, groups may assign specialized tasks to different members (e.g. honeybees) or all members may have similar roles. (e.g., schooling/shoaling fishes). The purpose or function of groups may be to increase efficiency at tasks such as hunting (e.g. dolphins taking turns darting through a school of fish). Finally, size of groups can fluctuate both within a single group where membership may fluctuate over time or in terms of absolute size of groups ranging from a few individuals to thousands of members. **Suggested Science and Engineering Practice(s)** Analyzing and Interpreting Data **Suggested Crosscutting Concept(s)** Systems and Models **Teacher Overview** Group behavior in animals evolved to increase their chances of survival in finding food, staying warm, defending themselves from predators, and other social functions. Most animals of the same or similar species interact in groups, but some animals from different species also interact. These interactions can be beneficial, such as a form of interaction called mutualism between a clown fish and a sea anemone. These interactions can also be negative, such as a form of interaction called predation where one animal hunts and kills another animal for food. A group can	Phenomenon Explanation: Group behavior in animals evolved to increase their chances of survival in finding food, staying warm, defending themselves from predators, and other social functions. Most animals of the same or similar species interact in groups, but some animals from different species also interact. These interactions can be beneficial, such as a form of interaction called mutualism where two different species help each other survive. Mutualism occurs when clown fish live on sea anemones, for example. These interactions can also be negative, such as a form of interaction called predation where one animal hunts and kills another animal for food. A group can be as small as a mating pair, like bald eagles that mate for life, or as large as a colony of ants. Groups also can be made up of animals of different ages and relatedness.	Video: Animal Groups Digital Interactive: An Elephant Herd Science Handbook/eBook: Animal Group Survival Science File: All Different Sizes <u>Elaborate</u> TE, pp. 48-49 *(LAB)* Be a Scientist Notebook, p. 48, Inquiry Activity: Minnow Observations <u>Evaluate</u> TE, pp. 50-51 *(LAB)* Be A Scientist Notebook, p. 50, Performance Task: Animal Group Exploration Digital Interactive: How does being part of a group help animals survive? eAssessment **Additional Resources** Video: Animal Groups Video: Living in Groups Lesson: Animal Groups: Benefits and Disadvantages Lesson: Pink Palace Resource Lesson: Memphis Zoo Resource **ESL Supports and Scaffolds** WIDA Standard 4

be as small as a mating pair, such as bald eagles that mate for life, or as large as a colony of ants. Groups also can be made up of animals of different ages and relatedness. **Misconceptions** Students might think that all animals survive better in groups, but some animals, such as tigers and giant pandas, survive better on their own. During the lesson, students will learn that some animals, such as bonobos, benefit from searching for food in a group, and that sharing food comes at a cost for other animals, such as pandas. Students can be introduced to both scenarios if they hold this misconception.		To support students in speaking refer to this resource: WIDA Doing and Talking Science When applicable- use Home Language do build vocabulary in concepts. Spanish Cognates Pre-teach: Benefit, protection; Animal groups with photos

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1 week	5 weeks	3 weeks	9 weeks	3 weeks	6 weeks	3 weeks	**6 weeks**

UNIT 7: Survival of Animals and Plants (6 weeks)

Overarching Question(s)

How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?
How does biodiversity affect humans?

Unit 7: Lesson 2	Lesson Length	Essential Question	Vocabulary
Adaptations	1.5 weeks	How can adaptations help plants and animals survive?	adaptation, camouflage, mimicry, hibernation, migration

Standards and Related Background Information	Instructional Focus	Instructional Resources
DCI(s) 3.LS4 Biological Change: Unity and Diversity **Standard(s)** 3.LS4.2: Infer that plant and animal adaptations help them survive in land and aquatic biomes. **Explanation and Support of Standard** 3.LS4.2 Organisms possess internal and external structures which are well-suited to their environments. Some adaptations could include; blubber, dense feathers, and thick fur for warmth; ability to burrow	**Learning Outcomes** Students will demonstrate an understanding of how some animals survive better in certain environments than others. **Suggested Phenomena** *Click on the phenomenon picture to view the video.*  Martin Ruegner/Getty Images	**Curricular Resources** Engage Inspire Science TE, pp. 53-54 TE p. 53, Phenomenon TE p. 54, Essential Question TE p. 54, Science and Engineering Practices Explore TE, pp. 55-56 *(LAB)* Be a Scientist Notebook, p. 55, Inquiry Activity: Bird Beak Adaptations Explain

underground, nocturnal, and drought tolerant to escape heat, spines or thorns to avoid being eaten, large beaks or appendages that can grab fruit from tree tops, shallow roots to absorb water quickly, waxy leaves to protect water, and gills for taking in oxygen. Standard 3.LS1.1 examines the connectedness of sets of structures to performing general life processes. By contrast, 3.LS4.2 is an opportunity to examine structures that may be unique to certain kinds of organisms and allow them to survive in environments that may be unsuitable for many other types of organisms. **Suggested Science and Engineering Practice(s)** Constructing Explanations and Designing Solutions **Suggested Crosscutting Concept(s)** Cause and Effect **Teacher Overview** Group behavior in animals evolved to increase their chances of survival in finding food, staying warm, defending themselves from predators, and other social functions. Most animals of the same or similar species interact in groups, but some animals from different species also interact. These interactions can be beneficial, such as a form of interaction called mutualism between a clown fish and a sea anemone. These interactions can also be negative, such as a form of interaction called predation where one animal	Phenomenon Explanation: Adaptation is not something an organism willingly does. Biological adaptation involves genetic variation that allows some individuals to adjust to or survive a particular change in their environment. These individuals can reproduce, passing on their genes to successive generations of offspring that will be better adapted to the changed environment.	TE, pp. 56-65 Be A Scientist Notebook, p. 57: Vocabulary Video: Animals in Their Own Environment Science Handbook/eBook: Animal Group Behavior *(LAB)* Be a Scientist Notebook, p. 58, Inquiry Activity: Color and Heat Science Handbook/eBook: Adaptations Science Handbook/eBook: Forest Adaptations Simulation: Rabbit Population Science Handbook/eBook: Ocean and Wetland Adaptations *(LAB)* Be a Scientist Notebook, p. 58, Inquiry Activity: Animal Fat <u>Elaborate</u> TE, p. 66 *(LAB)* Be a Scientist Notebook, p. 65, Inquiry Activity: Minnow Adaptations <u>Evaluate</u> TE, pp. 67-69 *(LAB)* Be A Scientist Notebook, p. 66, Performance Task: Design a Bird eAssessment **Additional Resources** Lesson: <u>If frogs need water, why do they live in the desert?</u>

hunts and kills another animal for food. A group can be as small as a mating pair, such as bald eagles that mate for life, or as large as a colony of ants. Groups also can be made up of animals of different ages and relatedness. **Misconceptions** Students might think that all animals survive better in groups, but some animals, such as tigers and giant pandas, survive better on their own. During the lesson, students will learn that some animals, such as bonobos, benefit from searching for food in a group, and that sharing food comes at a cost for other animals, such as pandas. Students can be introduced to both scenarios if they hold this misconception.		Lesson: Pink Palace Resource Lesson: Memphis Zoo Resource Video: Animal Atlas, The Life Aquatic **ESL Supports and Scaffolds** WIDA Standard 4 To support students in speaking refer to this resource: WIDA Doing and Talking Science When applicable- use Home Language do build vocabulary in concepts. Spanish Cognates Animal Adaptions Sentence Stems: The adaption-----helps the -----survive by____.

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UNIT 7: Survival of Animals and Plants (6 weeks)

Overarching Question(s)

How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?
How does biodiversity affect humans?

Unit 7: Lesson 3	Lesson Length	Essential Question	Vocabulary
Natural Selection	1.5 weeks	How do variations in traits provide advantages for survival?	natural selection, competition

Standards and Related Background Information	Instructional Focus	Instructional Resources
DCI(s) 3.LS4 Biological Change: Unity and Diversity **Standard(s)** 3.LS4.1: Explain the cause and effect relationship between a naturally changing environment and an organism's ability to survive. **Explanation and Support of Standard** 3.LS4.1 Organisms have specific needs and will only survive in places where those needs are met. The environment where an organism lives will have certain characteristics (e.g., hot/cold or plentiful/scarce	**Learning Outcomes** Students will be able to explain how variations in traits provide advantages for survival. **Suggested Phenomena** *Click on the phenomenon picture to view the video.*  Martin Ruegner/Getty Images	**Curricular Resources** Engage Inspire Science TE, pp. 71-72 TE p. 71, Phenomenon TE p. 72, Essential Question TE p. 72, Science and Engineering Practices Explore TE, pp. 72-73 *(LAB)* Be a Scientist Notebook, p. 71, Inquiry Activity: Giraffe Feeding Explain TE, pp. 74-81

water). Some types of organisms may be able to survive under a particular set of conditions, but the species is not likely to survive. Changes to an environment can happen suddenly or occur gradually. At times these changes can be harmful to living organism. Detrimental changes can cause organisms to struggle to find food, water, or clean air and may cause some to die. Examples should include needs of a specific organism, characteristics of a particular environment, and how the two support each other. Examples may include alligators now thriving after all these years in their habitat; polar bears losing their sea ice habitat, causing their population to be threatened; and the dodo bird which is now extinct partly due to predators introduced by humans. **Suggested Science and Engineering Practice(s)** Construct Explanations and Design Solutions **Suggested Crosscutting Concept(s)** Cause and Effect **Teacher Overview** When there is a drastic change to an environment, some individuals of a species might survive better than others. This depends on whether each of the individuals were born with a variation that helped it adapt to the changed environment. Except for humans, animals generally do not intentionally change	Phenomenon Explanation: Organisms can survive if they were born with a characteristic that would help them survive and reproduce in a changed environment.	Be A Scientist Notebook, p. 73: Vocabulary Science Handbook/eBook: Natural Selection and Trait Variations *(LAB)* Be a Scientist Notebook, p. 74, Inquiry Activity: Camouflage and Survival Science Handbook/eBook: Variations and Natural Selection Science Handbook/eBook: Competition Among Plants and Animals Simulation: Rabbit Population <u>Elaborate</u> TE, pp. 81-82 *(LAB)* Be a Scientist Notebook, p. 79, Inquiry Activity: Natural Selection in Minnows <u>Evaluate</u> TE, pp. 83-85 *(LAB)* Be A Scientist Notebook, p. 81, Performance Task: Galápagos Finches eAssessment **Additional Resources** Lesson: **Pink Palace Resource** Lesson: **Memphis Zoo Resource** **ESL Supports and Scaffolds** WIDA Standard 4

their behavioral and structural characteristics in response to an environmental change. However, variations will allow the animal to survive, reproduce, and pass on the variation to its offspring. Many of the animals will die because they cannot intentionally adapt to the changed environment; that is, they cannot willingly change their physical characteristics or behaviors to allow them to survive. **Misconceptions** Students might think that animals can choose their traits or that they can grow into them. They also might think that natural selection occurs at an individual level rather than a population level. Natural selection describes the process by which variations in traits allow some organisms to survive better to reproduce in an environment. Thus, the population will begin reflecting that specific trait in subsequent generations.		To support students in speaking refer to this resource: WIDA Doing and Talking Science When applicable- use Home Language do build vocabulary in concepts. Spanish Cognates Animal traits with visuals National Geographic

3rd Grade Quarter 4 Curriculum Map Quarter 4 Curriculum Map Feedback							
Quarter 1			Quarter 2	Quarter 3		**Quarter 4**	
Structure and Routine	Unit 1 Matter	Unit 2 Magnetic Forces	Unit 3 Energy	Unit 4 Solar System	Unit 5 Weather and Climate	Unit 6 Types of Living Things	**Unit 7 Survival of Animals and Plants**
1 week	5 weeks	3 weeks	9 weeks	3 weeks	6 weeks	3 weeks	**6 weeks**

UNIT 7: Survival of Animals and Plants (6 weeks)

Overarching Question(s)

How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?
How does biodiversity affect humans?

Unit 7: Lesson 4	Lesson Length	Essential Question	Vocabulary
Resources and Biodiversity	1.5 weeks	How do changes in the ecosystem affect the things that live there?	biodiversity, ecosystem, trait

Standards and Related Background Information	Instructional Focus	Instructional Resources
DCI(s) 3.LS4 Biological Change: Unity and Diversity **Standard(s)** 3.LS4.3: Explain how changes to an environment's biodiversity influence human resources. **Explanation and Support of Standard** 3.LS4.3 Even a very small space around the school yard or in a neighborhood will have many different types of organisms living there, and these organisms can usually be found on other places on Earth. Changes to	**Learning Outcomes** Students will describe how an environment change affects organisms that live there. **Suggested Phenomena** *Click on the phenomenon picture to view the video.* 	**Curricular Resources** Engage Inspire Science TE, pp. 87-88 TE p. 87, Phenomenon TE p. 88, Essential Question TE p. 88, Science and Engineering Practices Explore TE, pp. 88-89 *(LAB)* Be a Scientist Notebook, p. 87, Inquiry Activity: Acid Rain Explain

this biodiversity can be brought on by habitat destruction, pollution, introduction to invasive species, or overuse of shared resources. Healthy ecosystems provide humans with natural resources and perform various ecosystem services. Examples of how an environment's biodiversity can influence human resources may include food, medicines, and functions (such as scrubbing carbon dioxide from the atmosphere). When a species is threatened due to overexploitation is can lead to a decrease in a human resource. An example of this is the overexploitation of fish leaving a shrinking population of food. **Suggested Science and Engineering Practice(s)** Constructing Explanations and Designing Solutions **Suggested Crosscutting Concept(s)** Cause and Effect **Teacher Overview** Living things in an ecosystem are interdependent. Animals feed on plants, predators feed on prey, and when animals die, their bodies decay and enrich the soil so more plants can grow. In an ecosystem's life cycle, organisms depend on each other for food and survival. Food chains show how energy flows from one living thing to another in an ecosystem and between two or more interconnected food chains. Food webs show how many different plants and animals impact one another. Ecosystems are dynamic. They are	Phenomenon Explanation: Some organisms will survive and reproduce in a changed environment; some of the organisms will move to new locations, some of the organisms will move into the changed environment and some of the organisms will die.	TE, pp. 90-96 Be A Scientist Notebook, p. 89: Vocabulary Video: Patterns for Survival Science Handbook/eBook: Ecosystems Simulation: Changing Ecosystems Science Handbook/eBook: Changes in Ecosystems Digital Interactive: Environments Change Science Handbook/eBook: Humans and the Environment Science Handbook/eBook: Environmental Changes Digital Interactive: How Humans Change Environments <u>Elaborate</u> TE, p. 96 Be a Scientist Notebook, p. 95, Research, Investigate and Communicate: Invasive Species <u>Evaluate</u> TE, pp. 97-99 *(LAB)* Be A Scientist Notebook, p. 96, Performance Task: Beaver Dam Pros and Cons eAssessment **Additional Resources** Lesson: Utah Education Network Resource

always changing. Some changes are gradual, but other changes are sudden. One change can impact many organisms. When an environment changes in ways that affect the availability of resources, some organisms in a population might have variations in their traits that help them to survive and reproduce. Other organisms might migrate to find new food sources or a more hospitable environment. Some organisms might not have traits that would help them to survive and reproduce. Those organisms might also face physical barriers that prevent migration, such as highways or buildings that isolate organisms in a limited location. These limitations could hurt the organisms' chance for survival. **Misconceptions** Students might give human characteristics or feelings to organisms leading to the misconception that all organisms get along. Students might not realize that organisms are part of the food chain and have predator/prey relationships. Students might also confuse acclimation and adaptation, using these terms interchangeably. Students might have difficulty with concepts related to food chains and food webs. They might believe that animals on the top of the food web eat everything below them. The food web represents the potential flow of energy in an ecosystem. Arrows in a food web diagram go from the energy source to the organism into which the energy flows.		Water Pollution Graphing **ESL Supports and Scaffolds** WIDA Standard 4 To support students in speaking refer to this resource: WIDA Doing and Talking Science When applicable- use Home Language do build vocabulary in concepts. Spanish Cognates National Geographic Ecosystems Sentence stems: The ____ecosystem supports animals by_____ The qualities of the _____ecosystem that help animals____are_____.