4th Grade Science Plans

Sequence and Pacing

Quarter and Units	<u>Standards</u>	Time Frame	Target End Date
Quarter 1			
Unit 1: Force and Motion	4.2 (Links to an external site.)Links to an external site., 4.1 (Links to an external site.)Links to an external site.	4 weeks	09/28/18 Tucker: 08/31/18
Unit 2: Electricity	4.3 (Links to an external site.)Links to an external site., 4.1 (Links to an external site.)Links to an external site.	5 weeks	11/02/18 Tucker: 10/04/18
Quarter 2			
Unit 3: The Planets	4.7 (Links to an external site.)Links to an external site., 4.1 (Links to an external site.)Links to an external site.	3 weeks	12/07/18 Tucker: 11/16/18
Unit 4: Earth, Moon and Sun	4.8 (Links to an external site.)Links to an external site., 4.1 (Links to an external site.)Links to an external site.	<u>5 weeks</u>	01/31/19 Tucker: 01/10/19
Quarter 3			

Unit 5: Weather	4.6 (Links to an external site.)Links to an external site., 4.1 (Links to an external site.)Links to an external site.	4 weeks	03/01/19 Tucker: 02/08/19
Unit 6: Virginia's Natural Resources	4.9 (Links to an external site.)Links to an external site., 4.1 (Links to an external site.)Links to an external site.	3 weeks	03/22/19 Tucker: 03/01/19
Unit 7: Ecosystems	4.5 (Links to an external site.)Links to an external site., 4.1 (Links to an external site.)Links to an external site.	5 weeks (2 Weeks Q4)	05/03/19 Tucker: 05/03/19
Quarter 4			
Unit 8: Plants	4.4 (Links to an external site.)Links to an external site., 4.1 (Links to an external site.)Links to an external site.	5 weeks	06/07/19

	Virginia Ecosystems (4.5)					
	Objectives (Do)	Big Ideas (Know)				
Week 1 - (4.1a, 4.5b)	□ Differentiate among simple observations, conclusions, inferences and predictions (4.1a) □ Describe why certain communities exist in given habitats. (4.5b) □ Identify the influences of human activity on ecosystems. (4.5b) Mastery Objectives Day 1 I can describe why certain communities exist in a given habitat by looking at pictures and making written and oral observations in a GLAD observation chart. Day 2 I can differentiate between living and non-living things by making observations and classifying 20/24 objects correctly. Day 3 I can Day 4 Day 5	 An observation is a written or verbal statement using only your senses. A qualitative observation communicates an observation you've made using adjectives. A quantitative observation communicates an observation you've made using numbers. An inference is a conclusion based on evidence and prior knowledge after making an observation. All the living and nonliving components in an environment that interact with each other form an ecosystem. An ecosystem can be any size, including a log, field or forest. An organism is any living thing. Dead organisms are categorized as living because they were once alive. Living things need water, shelter, food and air to survive. Virginia has a great variety of plant and animal resources. 				
	Essential Questions					

	☐ How can people in	ivities in a forest have a positive Virginia restore a natural ecosys	stem?		
	☐ What animals are for ☐ What are some non	a forest and take a picture, whic ound in a Virginia forest? living things in a bluebird's eco mples of nonliving partifs of a fo	system?	xample of human impac	ct on the ecosystem?
Detailed Lesson Plan	Activator (5-7 mins)	Direct Instruction (10 mins)	Guided Instruction (10 mins)	Independent Instruction (10 -15 mins)	Closure Formative Assessment (5 mins)
Day 1	GLAD Inqu iry Chart Instructions	Discovery Education: An Ecosystem (Living Things Teacher Guide pages 6-8)	Video Review & Video Quiz (<u>Living Things Teacher's</u> <u>Guide</u> page 12)	GLAD Observation Charts	Exit Ticket What is Living? (Living Things Teacher's Guide page 13)
Day 2	Ecosystems: Describe what you see (<u>Coral Reef</u> , <u>a pond</u>)	Observation vs Inference	Discovery Education: <u>Nonliving</u> <u>Living</u>	Living and Nonliving Sort	Exit Ticket What are some examples of nonliving parts of a forest?
Day 3	Ecosystems Around our State: Describe what you see	Discovery Education: Living and Nonliving Compare and Contrast	Schoolyard Plot Directions	Outdoor Activity: Observations of Schoolyard Plots and	Exit Ticket:

	(Coastal Plain PPT)	(<u>Teacher Guide: Living Things</u> <u>Interacting</u> pg.15)		collect soil samples	What are some nonliving things in a bluebird's ecosystem?
Day 4	Ecosystems Around our State: Describe what you see (<u>Piedm ont</u>)	Discovery Education: Interactions in Ecosystems	Active Learning: Ecosystem Interconnection Activity (Yarn connecting animals to other living and nonliving organisms.)	Discovery Education: Interactive: Exploring Ecosystems Discovery Education Check-In: What is an Ecosystem?	Provide feedback on Ecosystem Check-In
Day 5	Ecosystems Around our State: Describe what you see (Blue Ridge Mountains)	Tour Guide! Provide example of activity sheet and model how to fill it out.	Outdoor Activity: Ecosystem Walk and Scavenger Hunt Ecosystem Observation Sheet: https://docs.google.com/ document/d/1ESjcPAZ 98t8-L8vvwldP7o9bVY0 wy1NwdO3cQOkrAw/ed it?usp=sharing	Outdoor Activity: Students work in pairs or groups to discuss and fill out activity sheet	Exit Ticket If you are hiking in a forest and take a picture, which photo would show an example of human impact on the ecosystem?

^{**}STEAM Project: Design and Build a mini-ecosystem **

	Virginia's Mineral Resources - 4.9						
	Objectives (Do)	Big Ideas (Know)					
Week 2 (4.1a, 4.1b, 4.9c, 4.9d)	 Differentiate between observations, conclusions, inferences and predictions Classify objects or events according to characteristics or properties Recognize the importance of Virginia's mineral resources, including coal, limestone, granite, sand and gravel Describe a variety of soil and land uses important in Virginia 	 Virginia is rich in a wide variety of natural resources, including forests, arable (farmable) land, coal, sand and aggregates (rocks), wildlife and aquatic organisms, clean water and air, and beautiful scenery Virginia's soil and land support a great variety of life, provide space for many economic activities, and offer a variety of recreational opportunities. A mineral is a natural solid material that has its own characteristics, such as, color, texture and shape. Mineral resources are substances that come from the ground and are useful to people. Rocks are made of minerals Virginia's mineral resources include: coal, limestone, sand, granite and gravel and are used as building materials, such as roads, 					

	concrete and countertops; or to create electricity in power plants. What the mineral is used for and what it looks like. A natural resource is a material collected from the natural environment and used by people to get jobs completed or to help them survive. Coal is an important natural resource used for energy. Coal is formed from organisms that have died and have been buried under layers of sediment over millions of years. Limestone is caused by water evaporating on earth Soil is made from particles of rocks broken down by weathering
Master Objectives	
Day 1 I can describe why soil is important by looking at pictures and making written and oral observations in a GLAD observation chart. Day 2 I can differentiate between soil samples by making observations and writing the observations on a data chart. Day 3 I can differentiate between living and nonliving organisms in soil by making observations and writing the observations on a data chart. Day 4 I can identify and observe different minerals by making observations and writing the observations on a data chart. Day 5 I can identify the main minerals of Virginia by making observations and writing the observations on a data chart.	

SOL Released Test Questions (Understand) ☐ Which human activities rely on high quality soil? ☐ What are some examples of natural resources? ☐ What is an important natural resource of the Chesapeake Bay? ☐ Why are the top layers of soil important? ☐ How can people protect natural resources? ☐ Which mineral resource can be mined from the earth and used for energy? **Guided Instruction** Day Activator **Direct Instruction** Independent Closure Instruction **Discovery Education** Observation vs Inference **GLAD Pictorial Input** Active Learning: Soil Exit Ticket: What are **Engage:Sampling Soil** (Appalachian Plateau: Coal) Sample Observations (Coal) some examples of (Observation Chart) natural resources Observation vs Inference **GLAD Pictorial Input** Classify: Create Active Learning: Sort 2 (Valley and Ridge: Limestone) (Limestone) Categories to Classify your Soil Sample Exit Ticket Why are your Soil Sample the top layers of soil (Data Table) important? Observation vs Inference Reflection: Living and Discovery Education: 3 **GLAD Pictorial Input** (Blue Ridge: Granite) **Nonliving Components** Uses of Soil Exit Ticket: Which (Granite) in your Soil? human activities rely on high quality soul? Observation vs Inference **GLAD Pictorial Input** Discovery Education: Active Learning: 4 Exit Ticket: WHich (Gravel) (Piedmont: Gravel) What are Minerals? Observe Mineral Resources mineral resources can (Data Table using cart be mined from the earth and used for resources) energy? **GLAD Pictorial Input** Observation vs Inference **Discovery Education** Student Worksheet: 5 (Coastal Plain: Sand) Exit Ticket: What is an (Sand) Exploration: They're They're your Main your Main Minerals Minerals important natural resource of the

Chesapeake Bay?

STEAM Project: create a compost pile

Investigating Watersheds - 4.9 Objectives (Do) Big Ideas (Know) ☐ A scientific prediction is a forecast about what may happen in a □ **Differentiate** between observations, conclusions. future event. It is based on evidence. inferences and predictions A Watershed is a area over which surface water and the materials ☐ Construct a physical model to clarify an explanation, demonstrate a relationship or solve a problem in it (runoff) to a single collection place. Week 3 ☐ **Distinguish** among rivers, lakes, and bays; describe All of Virginia's watersheds lead to the Chesapeake Bay, the Gulf of (4.1a, 4.1I, characteristics of each and name an example of each in Mexico or the North Carolina Sounds; these flow to the Atlantic 4.9a) Virginia Ocean. ☐ A watershed address is a description of the specific rivers, streams. ☐ Create and interpret a model of a watershed **Evaluate** the statement: "We all live downstream" and other paths water travels to get to the Atlantic Ocean, Gulf of ■ Identify watershed addresses Mexico or the Pacific Ocean. ☐ A bay is a body of water that is partially surrounded by land with a wide mouth that feeds into a larger body of water. ☐ A river is a wide, natural flowing body of water. □ "We all live downstream." Runoff water from the Virginia Mountains flows into our local bodies of water and continues to flow downhill through the Chesapeake Bay and into the Atlantic Ocean. William Ramsay is located within the Potomac River Watershed that drains into the Chesapeake Bay Watershed. **SOL Released Test Questions (Understand)** What is a watershed? "We all live downstream." What does this phrase mean? Which geographic region of Virginia has the least impact on the water quality of the Chesapeake Bay?

- What are the important natural resources of the Chesapeake Bay?
- What organisms are found in the Chesapeake Bay?
- How do humans impact the Chesapeake Bay and rivers in Virginia?
- What are some ways you can protect Virginia's water resources?

Day	Activator	Direct Instruction	Guided Instruction	Independent Instruction	Closure
1	Quizlet: 4.9 Virginia Resources	Discovery Education Engage: Why is Water so Important?	Discovery Education Exploration: Waters of the Earth Student Worksheet: Waters of the Earth	If time, have students copy (on blank sheet of paper) Pictorial Input of Virginia's Mineral Resources	Exit Ticket What are some ways you can protect Virginia's water resources?
2	Quizlet: 4.9 Virginia Resources	GLAD Pictorial Input: (add Appalachian Mountains,Potomac River, Alexandria City, Chesapeake Bay and Atlantic Ocean)	What is a Watershed?	Find Your Watershed Address: USGS National Map Viewer	Exit Ticket What is a watershed?
3	Quizlet: 4.9 Virginia Resources	GLAD Pictorial Input: (add Fredericksburg, Rappahannock River, Yorktown and York River)	Active Learning: Make a Model of a Watershed Directions	Active Learning: Make a model of a watershed	Exit Ticket "We all live downstream." What does this phrase mean?
4	Virginia Watershed QR Task Cards	GLAD Pictorial Input: (add Jamestown, James River, Richmond and Smith Mountain Lake)	Discuss: Human Impact (pg.7)	Project Based Learning: Writing/Comic Strip Activity about what happens to litter as it travels through the watershed.	Exit Ticket How do humans impact their watershed?

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^{**}STEAM Project: Solve the Global Water Crisis**

	In	vestigating Ha	abitats - 4.5	5/4.9		
	Object	ives (Do)	1	Big Ideas (Know)		
Week 4 (4.1b, 4.5b, 4.5d,4.9b)	 □ Analyze a set of twenty or fewer objects or pictures. Sort them into categories to organize the data □ Recognize the organization of a population as all organisms of the same species that live in the same place at the same time □ Recognize the organization of a community as all the populations of species that live in the same place at the same time. □ Describe why certain communities exist in given habitats □ Identify a habitat as a place in which an animal or plant naturally lives □ Recognize that Virginia has a great variety of animals and plants 		 A population is a group of organisms, all one species, that live in the same area. The white-tailed deer in Alexandria is an example of a population. A community is all of the different populations of organisms that live together in the same place. An example of a community is the population of pine trees, squirrels, and slugs in a forest. A habitat is the place or kind of place in which an animal or plant naturally lives. An organism's habitat provides food, water, shelter and space. The size of the organism's habitat depends on its needs. A forest habitat is defined by the trees and other plants found in the area. Virginia's forests support a great variety of life and provide abundant natural resources. 			
	SOL Released Test Questions (Understand)					
	☐ The osprey is a bird☐ If a population of koa☐ Owls nest in the holl☐ A Salamander needs	ows of trees. They eat mice and	prey MOST likely to live? eucalyptus leaves to meet their needs, which will MOST likely happen? nd crickets. Where is an owl MORE likely to live? would be the best place for him to live?			
Detailed Lesson Plan	Activator	Direct Instruction	Guided Instruction	Independent Instruction	Closure	

Day 1	What is a Habitat?	GLAD Pictorial Input: <u>World Habitat Map</u> (Desert, Populations and Communities)	Active Learning: What's Your Habitat?	Nature Center: Observe organisms in their habitats (draw the habitats of 4 organisms in science notebook)	Exit Ticket What is an example of a shelter in a forest ecosystem?
Day 2	Discovery Education Explore: Organism Needs	GLAD Pictorial Input: World Habitat Map (Grassland, Populations and communities)	Lakeshore Animals Kit: Organism Cards "Where in the World"	Smithsonian Science Education: Habitat Game	Exit Ticket If a population of giraffes is unable to find enough acacia to meet their needs, what will MOST likely happen?
Day 3	DK Land Habitats Interactive	GLAD Pictorial Input: World Habitat Map (Forest, Populations and Communities)	VDOE Lesson: Hello from my Habitat!	VDOE Lesson: Hello from my Habitat!	Exit Ticket Owls nest in the hollows of trees. They eat mice and crickets. Where is an owl MORE likely to live?
Day 4	DK Animal Adaptations	GLAD Pictorial Input: <u>World Habitat Map</u> (Aquatic, Populations and Communities)	Science Lab: Oysters in the Chesapeake Bay	Science Lab: Oysters in the Chesapeake Bay	Exit Ticket The osprey is a bird that eats fish. Where is an osprey MOST likely to live?
Day 5	Active Learning: Ecosystem Causation Cards	GLAD Pictorial Input: World Habitat Map (Tundra, Populations and Communities)	Mystery Science: Why do you have to clean a	Mystery Science: Why do you have to clean	Exit Ticket A Salamander needs to live in a humid

			fish tank but not a pond?	a fish tank but not a pond?	area. What would be the best place for him to live?
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**STEAM Project: Design a Backyard Habitat for bird

Plant Adaptations - 4.4						
	Objectives (Do)	Big Ideas (Know)				
Week 5 (4.1b,4.1h, 4.1L,4.4b 4.4d,4.5a, 4.9b)	 Analyze a set of twenty or fewer objects or pictures. Sort them into categories to organize the data Create a plausible hypothesis, stated in terms of cause and effect, from a set of observations that can be tested. Construct a physical model to clarify an explanation, demonstrate a relationship or solve a need. Explain the role of adaptations of common plants to include dormancy, response to light and response to moisture. Investigate and Infer the function of basic adaptations. Understand that adaptations allow an organism to succeed in a given environment. Explain how different organisms use their unique 	 An adaptation is a characteristic in an organism's body or behavior that helps it to survive in its environment. Adaptations is carried on through several generations and helps the population to survive. Structural adaptations of plants and animals are physical characteristics such as: sharp claws, large pupils, thick bark or sharp needles. Plants have structural adaptations which help them meet their life needs. Dormancy is a period of suspended life processes brought on by changes in the environment. A hypothesis is a prediction stated in terms of cause and effect, from a set of basic observations that can be tested. A hypothesis is stated as an, "If, then" statement. 				

	adaptations to meet the Recognize that Virginia and plants. Compare and contrast pollinated.	has a great variety of animals t different ways plants are	est Questions (Understand	1)	
	Plants are on a shelf growing towards a window. What environmental factor is the plants responding to? □ Some kinds of plants, like redwood trees, may live for thousands of years. Other kinds, like wind poppy wildflowers, may only live for a few months. What do these plants have in common? □ What is made by plants to attract pollinators to flowers? □ A seed of a plant sticks to the fur of an animal as it walks by. How has the animal MOST likely helped the plant? □ Some plants, like a cactus and a rosebush, have sharp thorns on their stems. How do thorns help a plant to survive? □ What would help pollinators find flowers that are pollinated at night? □ Describe a feature of the root system that helps the cactus survive in the desert. □ Where are fern plants most likely to grow? □ Describe four ways that plants protect themselves. □ The shape of the leaves of the plants that survive well in a rainy climate are: □ Which characteristic of a plant is the one that BEST would help it to survive in a very dry climate?				
Day	Identify Prior knowledge	Activator	Frame the Learning	Investigation	Closure
Day 1	Why do some plants lose their leaves? How is this adaptation useful to the survival of that plant?	Discovery Ed: What are adaptations?	Objectives: Understand that adaptations allow an organism to succeed in a given environment. Essential Question: Why does a plant need each of its parts?	I Do: GLAD Plant Adaptations (Virginia Ecosystem) We Do: Plant Adaptations Field Investigation You Do: Being created	What is made by plants to attract pollinators to flowers?

			Agenda		
Day 2	What is an adaptation?	Four (or more) Corners: Students take a position in one corner of the classroom to respond to a prompt. Prompt: What do you think would happen to a leaf with a drop of water on a waxy leaf? Corners (responses): I think the water will evaporate completely. I think the water will stay on the leaf. I think only some of the water will evaporate. I think it will collect more water.	Objectives: Investigate and Infer the function of basic adaptations. Essential Question: Why does a plant need each of its parts? Agenda	I Do: GLAD Plant Adaptations (Amazon Water Lily, Water Ecosystem) We Do:Introduce how to make observations of leaves (holly leaf and oak leaf) You Do:Students complete the leaf observation chart	Which characteristic of a plant is the one that BEST would help it to survive in an aquatic ecosystem?
Day 3	How do adaptations help an organism to survive?	Video: Deciduous Forest Over One Year (Time Lapse)	Objectives: Explain the role of adaptations of common plants to include dormancy, response to light and response to moisture. Essential Question:Why does a plant need each of its parts? Agenda	I Do: GLAD Plant Adaptations (Cacti, Desert Ecosystem) We Do:Create a hypothesis You Do: Leaf Adaptation Investigation	Describe a feature of the root system that helps the cactus survive in the desert.

Day 4	What is dormancy? How does dormancy help plants to survive?	Discovery Ed: Response to Environment	Objectives: Explain how different organisms use their unique adaptations to meet their needs Essential Question:Why does a plant need each of its parts? Agenda	I Do: GLAD Plant Adaptations (Arctic Poppy, Tundra Ecosystem) We Do: Plant Dormancy: discuss that the seed you are about to plant is in a dormant state (slide 16) You Do: Garden Phototropism	A seed of a plant sticks to the fur of an animal as it walks by. How has the animal MOST likely helped the plant?
Day 5	How do different plants in a Virginia forest use their adaptations to survive?	Mix and Mingle: Students share GLAD Plant Adaptation Picture File Cards with a series of partners as they move around the room.	Objectives Essential Question Agenda	I Do: GLAD Plant Adaptations (Rattan, Tropical rainforest Ecosystem) We Do: Explain procedures for designing a butterfly garden. You Do: Design a butterfly garden	Plants are on a shelf growing towards a window. What environmental factor is the plants responding to?

^{**}STEAM Project: Design a butterfly Garden**

Animal Adaptations - 4.5

	Objectives (Do)	Big Ideas (Know)
Week 6	 (4.1b) Analyze a set of twenty or fewer objects or pictures and sort them into categories to organize them into quantitative and qualitative data. (4.1e) Make predictions, inferences and draw conclusions using a variety of sources such as picture graphs, bar graphs and basic line graphs. (4.1l) Construct a physical model to clarify an explanation, demonstrate a relationship or solve a need. (4.5a) Distinguish between structural and behavioral adaptations. (4.5a) Investigate and infer the function of basic adaptations. (4.5a) Understand that adaptations allow an organism to succeed in a given environment. (4.5a) Explain how different organisms use their unique adaptations to meet their needs. (4.5d) Compare and contrast the niches of several different organisms within the community. (4.5e) Compare and contrast the differing ways an organism interacts with its surroundings at various stages of its life cycle. (4.5e) Compare and contrast the ways frogs and butterflies interact with their surroundings at various stages of their life cycles. (4.9b) Recognize that Virginia has a great variety of animals and plants. 	 Animals have structural adaptations or physical characteristics the help them survive in their environment. Animals have behavioral adaptations or certain types of activities they perform that help them survive in their environment. A niche is a function or role an organism has in its environment. It includes everything an organism needs and does, and what it eats and what eats it. Life cycles are predictable stages of growth that all organisms go through. Each life cycle change also changes the organism's niche within the ecosystem.

Day	Activator	Direct Instruction	Guided Instruction	Independent Instruction	Closure
Day 1 and Day 2	Essential Question: What roles do organisms have in their ecosystem?	Mystery Science - Where do Insects Go During the Winter?	Mystery Science Activity: Why do Birds Have Beaks?	Mystery Science Explanation: Why do Birds have Beaks?	Answer questions on Mystery Science worksheet
Day 3	What types of physical and behavioral adaptations do birds have?	CNN Student News: Recycling and Sloths Conservation (play video starting at 5:18 to end)	Chicken Life Cycle Sort	GLAD Pictorial Input: Chicken Life Cycle	VDOE Lesson: What's my niche? (student worksheet page 4)
Day 4	What is a niche?	Butterfly life cycle sort	Research Project: Red and Grey Foxes Niches (Day 1 only)	Discovery Education: What is a Niche?	
Day 5	How does a niche change during the frog's life cycle?	Frog life cycle sort			

	Objectives (Do)		Big Ideas (Know)		
Neek 7					
		SOL Released	Test Questions (Understand)	
Day	Activator	Direct Instruction	Guided Instruction	Independent Instruction	Closure

Week 8	Objectives (Do)		Big Ideas (Know)		
	SOL Released Test Questions (Understand)				
Day	Activator	Direct Instruction	Guided Instruction	Independent Instruction	Closure