SURVIVAL OF THE FITTEST

A Unit Plan for Upper Elementary Students

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STEPS Summer Learning Institute 2015

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UNIT OVERVIEW

Do you have what it takes to survive in the wild? You'll explore different animal adaptations to learn how animals fend for themselves, and you will create the ultimate animal to survive in different ecosystems. It's "Survival of the Fittest." Who will be at the top of this food chain?

Survival of the Fittest is designed to allow students to deepen their knowledge of animal adaptations. Students will also spend time exploring biomes to help them understand the necessity of specific adaptations based on environment, and they will learn about food webs as they make considerations about the requirements for survival.

Through a variety of activities students will be engaged in learning how adaptations impact survival. They will watch videos, complete research, explore concepts, play games, and work collaboratively to build an understanding of the necessity of animal adaptations.

Rationale

The content, skills, and concepts in this unit are important for all students to learn.

Many children are naturally curious about animals from an early age and the state curriculum capitalizes on this interest by including learning about animals from an early level. The content of these lessons builds upon the North Carolina Essential Standards in fourth and fifth grades. This unit can be used to accelerate learning for gifted students in a third or fourth grade class, or used for review and further instruction in a regular education fifth grade class. Learning about animal adaptations furthers student understanding about how animals survive in their environments.

The skills that students learn through the engaging activities in this unit are 21st century skills that students are expected to learn in the classroom. Students will learn how to think critically, communicate effectively, collaborate, and create. Additionally students will learn research skills through activities in this unit. By practicing and fine-tuning these skills in a safe environment students are learning skills that will help them excel in the classroom and to eventually enter life outside of the classroom as responsible and well-prepared citizens.

The concept of adaptations and survival in this unit are essential for students to understand and transcend the science curriculum in which they are currently embedded. By thinking of characters in novels or important persons throughout history, students can consider how these people adapted to their own environments in order to ensure survival. Students can also consider the consequences of choosing not to adapt to a situation and the effect on survival.

Differentiation for Gifted Learners

As mentioned above, the lessons in this unit can be used for students at a variety of grade levels. However, the activities and instructional methods used are especially beneficial and appropriate for gifted learners. Furthermore, the lessons of this unit engage students in real-world learning that appeals to the interests of at least some students. By using scientific vocabulary, like practitioners in the field would, students are gaining authentic experience through their learning.

Activities in this unit have been differentiated to appeal to the learning styles and levels of gifted learners. By differentiating content, process, product, and/or learning environment, the needs of gifted learners are met in these lessons.

The content is accelerated and challenges students to think deeply about the interconnectedness of adaptations and survival within the realm of animals and their environments. Many sources that students access for research are above grade level and require students to think critically as they search the text for the information they need and synthesize information from a variety of sources. Students get to also dig deeper into this content area because most will already have a base understanding of animal adaptations.

The process that students learn by is also differentiated in a variety of ways due to the instructional methods used. Lesson 1 uses questioning which helps students develop critical and creative thinking skills. Students are actively engaged in the learning and, as they hear and respond to questions, they learn how to also develop questions that probe them into deeper thinking. This development helps turn students into lifelong learners with a thirst for the continual attainment of knowledge. Visual Thinking Strategy is used during Lesson 2 and helps students to examine artwork in a way in which they may not have before. Students learn how to observe and they develop confidence in their ability to make meaning from art as they use communication skills to support their assertions with evidence (which carries over into other subject areas, such as reading). The instructional method of Taba's Concept Development, used in Lesson 3, is especially effective for gifted students as it enhances their critical thinking skills. Students are expected to categorize, develop, extend, and refine concepts with little input from the teacher. They continue to think more in-depth about one topic and use communication skills in small groups to verbalize their thought processes.

Students are given some choice in the product they produce each day during the Evaluate portion of the lesson. They are able to use creativity in answering the questions that relate to the concept, and creativity is highly engaged during the performance task. The work that students complete is not "busy work" but authentically engages them and requires critical reflection and application of knowledge attained throughout the unit.

Most activities in this unit are student-centered which engages students and also gives them choice in their learning environment. They are able to work independently or with a partner, depending on learning preferences. Additionally, although not reflected in the lessons, students are transitioning from activities which keeps them from sitting for long periods, and students can receive instruction and participate while sitting at a desk or on the floor, or while standing.

GOALS AND OUTCOMES

Content Goals

North Carolina Essential Understanding 4.L.1: Understand the effects of environmental changes, adaptations and behaviors that enable animals (including humans) to survive in changing habitats.

Students will know…

- ✓ Environment is the air, water, minerals, organisms, and all other external factors surrounding and affecting a given organism at any time.
- ✓ A biome is a complex biotic community characterized by distinctive plant and animal species and maintained under the climatic conditions of the region. This word will be used along with ecosystem to describe the environment in which animals and plants live. An ecosystem is a group of interconnected elements formed by the interaction of a community of organisms with their environment (it will be considered as a small part of a biome).
- ✓ Various types of biomes (deciduous forest, desert, fresh water, grasslands, salt water, taiga, tropical rainforest, tundra), their locations in the world, and their characteristics
- ✓ The interdependence of animals and plants in an ecosystem
- ✓ Similarities in animals that live in each biome
- ✓ Adaptations help an animal survive in particular environments/biomes
- ✓ All plants and animals within an ecosystem must depend on one another for survival.
- ✓ Producer - an organism, as a plant, that is able to produce its own food from inorganic substances
- ✓ Consumer - an organism, usually an animal, that feeds on plants and other animals
- ✓ Decomposers - an organism, usually a bacterium or fungus, that breaks down the cells of dead plants and animals into simpler substances
- ✓ Food chain - a series of organisms interrelated in their feeding habits, the smallest being fed upon by a larger one, which in turn feeds a still larger one, etc.
- ✓ Food web - a series of organisms related by predator-prey and consumer-resource interactions (the entirety of interrelated food chains in an ecological community)
- ✓ There are different adaptations that animals use to survive. These include structural (physical) and behavioral adaptations.
- ✓ Students will define adaptations as: any alteration in the structure or function of an organism or any of its parts that results from natural selection and by which the organism becomes better fitted to survive and multiply in its environment. Or, an adaptation is a mutation, or genetic change, that helps an organism, such as a plant or animal, survive in its environment.
- ✓ Animal adaptations have developed over time (are passed down to offspring) and often are in response to a change in the habitat.
- ✓ An instinct is a behavioral adaptation that animals are born with. A learned behavior is one that animal exhibit after observation.
- ✓ Animals in different environments/ecosystems can have the same adaptations.

Process Goals

Goal: Synthesize and apply knowledge of biomes, food webs, and animal adaptations

Students will be able to…

- ✓ Use research skills to acquire knowledge about biomes and the animals that reside in them
- ✓ Compare and contrast ecosystems and animal adaptations based on ecosystems
- ✓ Synthesize learning to determine characteristics (adaptations) that animals in biomes share
- ✓ Work cooperatively and collaboratively in groups
- ✓ Analyze artwork
- ✓ Communicate ideas effectively
- ✓ Synthesize thinking about parts of an ecosystem while being able to label and create their own food webs
- ✓ Categorize animal adaptations according to similarities
- ✓ Make generalizations about the concept of adapting for survival
- ✓ Evaluate the effectiveness of animal adaptations
- ✓ Create the ultimate animal for a biome using their knowledge of adaptations

Concept Goals

Goal: Understand how adaptations impact survival

Students will be able to…

- ✓ Give examples of animal adaptations and their impact on animal survival
- ✓ Analyze the interdependence of biotic and abiotic factors in a biome and the impact on animals as the biome undergoes change
- ✓ Transfer their knowledge of animal adaptations to a performance task in which they must create an animal with adaptations of their choosing

ASSESSMENT PLAN

Formative Assessments

To ensure that students are gaining understanding of the topics and concept of this unit, formative assessments must be completed daily, in addition to the performance task. The teacher should observe student work throughout the day and also use participation in class discussions to formatively assess student. This unit also has built-in formative assessments featured in the Evaluate part of each lesson. These serve as exit tickets for each day.

Lesson 1: How do adaptations impact survival?

Lesson 2: Students will now choose one biome from the biomes we studied in Lesson 1. They will have to make a food web with at least 2 consumers, 2 producers, and 2 decomposers that could be found in that biome (students may write about or draw their food web). They will also write a paragraph explaining how the adaptations of these organisms impact their survival in their environment.

Lesson 3: Students will write one paragraph to explain the necessity of animal adaptations. Then each student will choose one animal we've studied and decide on another adaptation (one the animal doesn't already have) that would also benefit the animal in its environment. They will write a paragraph or draw a picture with a diagram to explain their reasoning.

Lesson 4: Students must name an animal and four of its adaptations (two behavioral, two structural) that help it survive in its environment. They should specifically explain how those adaptations help the animal survive (does it protect the animal from prey, is it necessary for survival in the environment, etc.).

By evaluating student responses on these "exit tickets" the teacher is able to determine if students are gaining a deeper understanding of the concept that adaptations impact survival. Students should move beyond saying that adaptations help the animal survive and should be able to cite specific examples of how these adaptations affect the survival of the animal species while thinking about the aspects of survival for animals (food, water, climate, oxygen, and offspring). (For examples of student work from STEPS 2015 that demonstrate student understanding of content knowledge, our concept, and skill development, visit the "Examples of student work" folder on the Google Drive, found here.)

Performance Task

The Board of Directors for the North Carolina Zoo wants to open a new exhibit to attract more visitors and make our state's zoo the most profitable nationwide. They need you to create an animal that will bring people from all over the country to North Carolina to boost our economy.

Using your knowledge as a zoologist and geneticist, your task is to work with a partner to create an animal that has adaptations that will enable it to outlive all others in its environment. This animal will sit at the top of the food chain in its biome. The zoo currently has exhibits that feature animals from North America and Africa. However, the animal you create does not have to reside in a biome found in either of these countries.

With your partner, you will present your animal to the zoo's Board of Directors. You may create a PowerPoint presentation or typed handouts for the presentation. Be sure that your animal has a name and you highlight its adaptations. You should explain how the animal's adaptations make it best suited for its environment, and you must also include a picture of your animal. The Board of Directors will choose one animal to fund the creation of with hopes of unveiling the new exhibit during the summer of 2016.

A successful presentation to the Board of Directors will show that you have used your knowledge of biomes, food webs, and animal adaptations to create an animal that is able to out survive all others. You must be able to describe how the adaptations of the animal will help it live in its environment and successfully feed from available food sources. Additionally you must consider how the animal will protect itself from other predators. With these considerations you will create a new "king of the jungle."

This performance task requires students to draw on the content, skill, and concept goals that are established in the unit. They must synthesize their knowledge of biomes and animal adaptations to complete this task, as well as use creativity in creating their animal. Students will apply skills of collaboration, research, evaluation of adaptations, and effective communication as they create a presentation and present it to the Board of Directors. This culminating activity requires students to think about how adaptations impact survival as they select the most effective adaptations for the animal they are creating. (To see an example of the presentation created by my students during STEPS 2015, click here.)

LESSON PLANS

TEACHER NAME			Lesson #
Kayla Vaden			1
MODEL	**CONTENT AREA**	**GRADE LEVEL**	
Questioning	**Science**	**STEPS Summer Camp**	

CONCEPTUAL LENS	LESSON TOPIC
Adaptations	**Biomes/Ecosystems**

LEARNING OBJECTIVES *(from State/Local Curriculum)*

Science: 4.L.1 - Understand the effects of environmental changes, adaptations and behaviors that enable animals (including humans) to survive in changing habitats.

Science: 5.L.2 – Understand the interdependence of plants and animals with their ecosystem.

Reading: RI.4.3 - Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

Reading: RI.5.9 - Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

THE ESSENTIAL UNDERSTANDING *(What is the overarching idea students will understand as a result of this lesson?*	THE ESSENTIAL QUESTION *(What question will be asked to lead students to "uncover" the Essential Understanding)*
Adaptations impact survival	**How do adaptations impact survival?**
CONTENT KNOWLEDGE **(What factual information will students learn in this lesson?)**	**PROCESS SKILLS** **(What will students be able to do as a result of this lesson?)**
• **Students will define environment as: the air, water, minerals, organisms, and all other external factors surrounding and affecting a given organism at any time.** • **Students will define adaptations as: any alteration in the structure or function of an organism or any of its parts that results from natural selection and by which the organism becomes better fitted to survive and multiply in its environment.** • **A biome is a complex biotic community characterized by distinctive plant and animal species and maintained under the climatic conditions of the region. This word will be used along with ecosystem to describe the environment in which animals and plants live. An ecosystem is a group of interconnected elements formed by the interaction of a community of organisms with their environment (it will be considered as a small part of a biome).** • **Various types of biomes (deciduous forest, desert, fresh water, grasslands, salt water, taiga, tropical rainforest, tundra), their locations in the world, and their characteristics** • **The interdependence of animals and plants in an ecosystem** • **Similarities in animals that live in each biome** • **Adaptations help an animal survive in particular environments/biomes**	**Students will be able to:** • **Use research skills to acquire knowledge about biomes and the animals that reside in them** • **Compare and contrast ecosystems and animal adaptations based on ecosystems** • **Synthesize learning to determine characteristics (adaptations) that animals in biomes share** • **Work cooperatively and collaboratively in groups**

GUIDING QUESTIONS *What questions will be asked to support instruction?* *Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding*		
Pre-Lesson Questions:	**During Lesson Questions:**	**Post Lesson Questions:**
• What are various environments that animals live in? • What are the characteristics of those environments? • What is a biome? • Where in the world are biomes located? • What animals and plants reside in different biomes? How do they survive in their environment? • How are the terms biome, ecosystem, and environment related?	• How can you classify the parts of an ecosystem? • How are biomes and ecosystems related? • What are the parts of a successful ecosystem? • What plants and animals live in different ecosystems? • How are these ecosystems alike and different? • How do the locations of ecosystems affect their climate and the organisms that live there? • Why must plants and animals depend on each other? • Name specific animals that live in this environment. How are these animals similar? • What are some animal adaptations? • What adaptations are most beneficial to animals living in each biome? Why? • Why do animals need to adapt to their environment?	• What animal adaptations would help an animal survive in this ecosystem? Why? • Which biome would your animal be worst-suited for? Why? • How do environments drive adaptations? • How do adaptations impact survival?

DIFFERENTIATION *(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.*			
Content	**Process**	**Product**	**Learning Environment**
-Students will be given various websites to use for research. These are written at various levels and students can choose the website that works best for their personal reading level. -Information will be presented via text online in print, video, and an interactive SmartBoard lesson	-Students will engage in critical thinking		

PLANNED LEARNING EXPERIENCES

(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)

Engage and Connect - *This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.*

As students enter they will be given a handout which explains that they will need to pay close attention to the video playing and take notes about the environments they see. *Introduction to Biomes* will be playing via YouTube (https://www.youtube.com/watch?v=hIy0ZlyPPDg). Students should pay attention to the different environments they see in the video and the characteristics of the environments.

The teacher will lead a discussion of the environments that students noticed. Create a master list of the types of environments and their characteristics based on what students share.

Ask students to define what a biome is (word is introduced in video) by writing their own definition and then sharing that to create a class definition. Ask students to describe where biomes exist in the world. Show students a world map of the major biomes and explain that biomes are broken into two categories - terrestrial and aquatic. Use the SmartBoard lesson Intro to Habitats (http://exchange.smarttech.com/details.html?id=dc77d72a-50a9-4a7f-9963-798d5be4cbfd) to help students think more about the characteristics of biomes and animals that inhabit them. This will include a discussion of how the animals survive in their environment through their adaptations (the word is introduced in the SmartBoard lesson).

Explore - *In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.*

Show students a picture of a forest and give them one minute to write down all the parts they see. Have students (in groups of 3) classify the parts of the forest according to their commonalities. Discuss the groupings and make a class list broken into two parts - living and nonliving.

Ask which biome the forest could be part of then have students think about how this is just a small part of a biome (see if any know that it is called an ecosystem). Watch Ecosystems and Biomes on YouTube (https://www.youtube.com/watch?v=dTaWsFct32g) (stop at 1:54). Ask students what the relationship between a biome and an ecosystem is, and then ask students what ecosystems need to be successful based on the picture and the video (lead to understand that all parts of the ecosystem, living/biotic and nonliving/abiotic, must work together - quick review of food chains may be necessary here before the full lesson later in the unit). Explain to students that we will focus on discussing biomes which are made up of many ecosystems (puddles or ponds, rotting logs or the whole forest).

Students will work with partners to explore one biome more closely (each partnership will have a different biome). They will use resources listed on these websites (http://zunal.com/teacherspage.php?w=167223, http://buncombe.k12.nc.us/Page/30255, https://sites.google.com/site/5thgradeecosystemswebquest/resources, http://www.blueplanetbiomes.org/world_biomes.htm, http://www.ucmp.berkeley.edu/glossary/gloss5/biome/) to fill in a graphic organizer. Students will be expected to describe the climate and name 5 characteristics of the biome, at least 7 animals, and 5 plants that live in the ecosystem. They will write this information on a poster board (with the informational table template already printed on the poster board).

Explain - *Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.*

Students will present the information they found about biomes to the others in the class. They will name similarities and differences they see in the different biomes in regards to climate. We will relate the

information back to the world map of the biomes to discuss why the climate is how it is. Then we will focus on the animals and plants within each biome. We will talk about the interdependence of those biotic factors (relating back to food webs).

Now the teacher will ask the students to think about the animals they named in each biome. They will write one adaptation each animal has that enables it to be successful within that environment and then share within their groups of 3 (from earlier) which adaptations they identified.

Elaborate —*Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways*

The question will be posed to students - what adaptations are most beneficial to animals living in each biome and why? Discuss the reason for adaptations - survival.

Each student will be assigned one animal to research online. They will color a map to show where the animal lives and write a narrative to describe the location of the biome in which the animal lives. Further, students will create a diagram of the animal, labeling at least three adaptations that enable it to survive in that biome. Students will then be asked to write a short response as to which biome their animal would be worst-suited for and why.

Evaluate: *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

We will make a class list of the adaptations that students found were most beneficial within each biome. We will talk about how environments drive adaptations. Then students will do their exit ticket for the day - How do adaptations impact survival?

Video Notes

(Pay close attention to the types of environments you see and their characteristics.)

My Biome: _____

Climate
Characteristics
1. 2. 3. 4. 5.
Animals (minimum of 7)
Plants (minimum of 5)

Animal: _____

Describe where your animal lives: _____

_____

_____

_____

Diagram of animal with *at least* 3 adaptations labeled:

Which biome would your animal be worst-suited for? Why?

_____

_____

_____

_____

TEACHER NAME		Lesson #
Kayla Vaden		2

MODEL	CONTENT AREA	GRADE LEVEL
Visual Thinking Strategy	Science	STEPS Summer Camp

CONCEPTUAL LENS	LESSON TOPIC
Adaptations	Food Chains

LEARNING OBJECTIVES *(from State/Local Curriculum)*

4.L.1.2 - Explain how animals meet their needs by using behaviors in response to information received from the environment.

5.L.2.2 - Infer the effects that may result from the interconnected relationship of plants and animals to their ecosystem.

6.L.2.1 - Summarize how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within food chains and webs (terrestrial and aquatic) from producers to consumers to decomposers.

5.V.2 – Apply creative and critical thinking skills to artistic expression

4.W.2 - Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

THE ESSENTIAL UNDERSTANDING *(What is the overarching idea students will understand as a result of this lesson?*	THE ESSENTIAL QUESTION *(What question will be asked to lead students to "uncover" the Essential Understanding)*
Adaptations impact survival	**How do adaptations impact survival?**

CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)	PROCESS SKILLS (What will students be able to do as a result of this lesson?)
• All plants and animals within an ecosystem must depend on one another for survival. • Producer - an organism, as a plant, that is able to produce its own food from inorganic substances • Consumer - an organism, usually an animal, that feeds on plants and other animals • Decomposers - an organism, usually a bacterium or fungus, that breaks down the cells of dead plants and animals into simpler substances • Food chain - a series of organisms interrelated in their feeding habits, the smallest being fed upon by a larger one, which in turn feeds a still larger one, etc. • Food web - a series of organisms related by predator-prey and consumer-resource interactions (the entirety of interrelated food chains in an ecological community)	Students will be able to... • Analyze artwork • Communicate ideas effectively • Synthesize thinking about parts of an ecosystem while being able to label and create their own food webs • Work cooperatively in small groups

GUIDING QUESTIONS

What questions will be asked to support instruction?

Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding

Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:

• **What do you think is going on in this picture?** • **What do you see that makes you say that?** • **What else can you find in this picture?** • **What examples can you find of predators, prey, carnivores, herbivores, and omnivores in the picture?**	• **How are the living and non-living organisms in this picture related?** • **How do organisms in an ecosystem support one another?** • **Which pictures represent consumers? producers? decomposers?** • **In which order would these organisms belong in a food chain?** • **Which environments would these organisms live in?** • **How do these particular organisms help one another survive?**	• **How does a food chain/web enable an organism to survive in its environment?** • **What qualities do the strongest organisms have?** • **How do these qualities help the organism to be at the "top of the food chain"?** • **How do adaptations impact survival?**

DIFFERENTIATION

(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.

Content	Process	Product	Learning Environment
	Students use observation and analysis to create individual and personal meaning of artwork by using the Visual Thinking Strategy model.		

PLANNED LEARNING EXPERIENCES

(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)

Engage and Connect - *This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students*

As students enter the classroom there will be a piece of artwork displayed on the projector (http://www.sayostudio.com/33720/2265930/complete-gallery/animal-art-interactions-and-ecology). The piece shows an aquatic ecosystem. Students will be given an index card as they enter that encourages them to silently examine the artwork and jot down any observations they make. After a brief period of observation (approximately 5 minutes) the teacher will ask students what they think is going on in the picture. As students begin to discuss the picture the teacher will affirm each student's ideas by paraphrasing and clarifying what the student has said. If needed the teacher will prompt the students by asking what they see that makes them say something, and asking what else they can find in the picture. While students share the teacher will make notes of any key vocabulary that might be mentioned in student responses (producers, consumers, decomposers, predator, prey, carnivores, herbivores, omnivores, food chain, food web, etc.).

Explore - *In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.*

Students will now work with partners to make lists of predators, prey, carnivores, herbivores, and omnivores they notice in the picture (without providing definitions of the terms, only giving an example of each in a terrestrial ecosystem, if needed). We will share our lists and students will be asked to think about how these organisms help one another to survive.

The teacher will now ask students to think about how the living and non-living things in the picture are related. Students will take 5 more minutes to study the picture and write individual responses. Then we will discuss how the plants play a part in the ecosystem.

Explain - *Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.*

The teacher will lead the students through two SmartBoard lessons that will help to reinforce the ideas of carnivores, herbivores, and omnivores (http://exchange.smarttech.com/details.html?id=566a93a3-14b3-4e9a-baff-2334562a8d05, *only slides 5-11*) and introduce producers, consumers, and decomposers (http://exchange.smarttech.com/details.html?id=fcf02721-0272-4ce8-ac46-8fe4c0ecd360, *only slides 2-19*). These lessons will also introduce food chains and webs.

We will revisit our artwork and determine which parts of the ecosystem are producers, consumers, and decomposers. We will then make a food web together using the organisms present in the ecosystem.

Elaborate —*Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways*

Students will be placed in groups of 4 and given a set of pictures. These pictures represent consumers, producers, and decomposers. They will be responsible for deciding which category each picture represents and creating a food chain with those pictures. Then, each group will be given more cards and will make a food web. Students will present their food webs and be required to tell which biome their organisms would belong in. (The cards are Food Web Building Kit from Nyla's Crafty Teaching.)

The class will discuss how food webs help organisms to survive in their environments. We will also discuss the qualities we notice certain animals have in each biome and how these qualities (adaptations) help the animals to be at the top of their respective food chains.

Evaluate: *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

Students will now choose one biome from the biomes we studied on the previous day. They will have to make a food web with at least 2 consumers, 2 producers, and 2 decomposers that could be found in that biome (students may write about or draw their food web). They will also write a paragraph explaining how the adaptations of these organisms impact their survival in their environment.

Biome: _____

Make a food web with at least 2 consumers, 2 producers, and 2 decomposers. You may write about or draw your food web.

Explain how the adaptations of the organisms in your food web impact their survival in their environment.

_____

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TEACHER NAME			Lesson #
Kayla Vaden			3
MODEL	**CONTENT AREA**	**GRADE LEVEL**	
Taba Concept Development	**Science**	**STEPS Summer Camp**	
CONCEPTUAL LENS		**LESSON TOPIC**	
Adaptations		**Animal Adaptations**	

LEARNING OBJECTIVES *(from State/Local Curriculum)*

Science: 4.L.1 - Understand the effects of environmental changes, adaptations and behaviors that enable animals (including humans) to survive in changing habitats.

Reading: RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

THE ESSENTIAL UNDERSTANDING ***(What is the overarching idea students will understand as a result of this lesson?***	**THE ESSENTIAL QUESTION** ***(What question will be asked to lead students to "uncover" the Essential Understanding)***
Adaptations impact survival	**How do adaptations impact survival?**
CONTENT KNOWLEDGE **(What factual information will students learn in this lesson?)**	**PROCESS SKILLS** **(What will students be able to do as a result of this lesson?)**
• **There are different adaptations that animals use to survive. These include structural (physical) and behavioral adaptations.** • **Students will define adaptations as: any alteration in the structure or function of an organism or any of its parts that results from natural selection and by which the organism becomes better fitted to survive and multiply in its environment. Or, an adaptation is a mutation, or genetic change, that helps an organism, such as a plant or animal, survive in its environment.** • **Animal adaptations have developed over time (passed down to offspring) and often are in response to a change in the habitat.** • **Animals in different environments/ ecosystems can have the same adaptations.**	**Students will be able to...** • **work collaboratively and think critically to categorize adaptations according to similarities.** • **refer to a non-fiction text to categorize animal adaptations.** • **make generalizations about the concept of adapting for survival.**

GUIDING QUESTIONS

What questions will be asked to support instruction?

Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding

Pre-Lesson Questions:	**During Lesson Questions:**	**Post Lesson Questions:**

• **How do animals survive in their environments?** • **How do these animals' noses help them in their environment?** • **What other body parts do animals use for survival? How do these body parts aid the animal?** • **What is an adaptation?** • **How do adaptations impact survival?**	• **What are some examples of animal adaptations that affect survival?** • **What similarities do you see between the adaptations listed?** • **How could you classify these adaptations?** • **Why did you group the adaptations that way?** • **Could one category you've created go into another category (be subsumed)?** • **What is another way you could group these adaptations? How would you classify them now?** • **How do these adaptations help animals to survive?** • **What is an adaptation?** • **Which adaptations are structural and which are behavioral?**	• **Name specific animals that use the same adaptation to survive.** • **Why do animals adapt to their environment?** • **What happens if animals do not adapt to their environment?** • **How do adaptation impact survival?** • **While thinking of one specific animal, what is another adaptation that could enable the animal to survive in its habitat?**

DIFFERENTIATION

(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.

Content	Process	Product	Learning Environment
The reading selection (encyclopedia definition) uses advanced vocabulary and extends learning.		**Student choice**	**Student-focused**

PLANNED LEARNING EXPERIENCES

(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)

Engage and Connect - *This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.*

1. Read the book *What Do You Do With a Tail Like This?* to students. The students will be instructed to think about how the animal's body parts help the animal to survive (The first page of the text states: "Animals use their noses, ears, tails, eyes, mouths, and feet in very different ways. See if you can guess which animal each part belongs to and how it is used.")
2. After the first section of the book engage students in a discussion about the various types of animals mentioned and how their noses help them in their environments. We will discuss how other animal body parts can help them to survive, then we will read the rest of the book and discuss how the adaptations mentioned help each animal to survive in its environment.

Explore - *In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.*

Listing:

1. Students will play "I have...Who has...?" with animal adaptation cards. The cards will show a picture of an animal and then students will ask who has the next animal based on the adaptation written. (For example, "I have an elephant. Who has a thick layer of fat, called blubber, under its skin?")

Students will be required to think about animal adaptations they discovered earlier in the week (with our discussions of environments and food webs) and animals they know of that have the adaptations mentioned.

As students match the animals and adaptations on the cards I will write a master list on the board for students to access. Once all cards have been played we will talk about how the adaptations impact survival.

Explain - *Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.*

Grouping and Naming:

1. Students will work in groups of 3 to classify the adaptations from our list according to similarities. They will write these in a graphic organizer. The list will be on the board and also printed (on individual cards cut apart and given to groups) for students to access and manipulate. They will be instructed to create three to four categories, in which they cannot put the same adaptation into more than one category. Students should also decide a name/label for each of their categories based on the similarities. The teacher will go from group to group and prompt students to explain their thinking and assist in categorizing while leading students to their own conclusions.

2. Groups will share their category labels and listings with the class while explaining the thinking behind their categorizations.

Elaborate —*Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways*

Subsuming, Regrouping and Naming:

1. Students will be instructed to consider if some of the adaptations could be moved from one category to another, could fit within more than one category, or decide if an entire category could fit within another category. The teacher will circulate the groups while listening to thought processes.
2. Student groups will now create three to four new categories using the same set of adaptations. However, they again must only place the adaptation within one category and name/label each category. This time students will be encouraged to think more specifically about adaptations and their role in helping animals to survive.
3. Students will share their new categories and elaborate on the adaptations they put in each. We will discuss different factors key to survival (food, water, shelter, protection, climate, and offspring) and how the adaptations we've talked about contribute to these various aspects of survival.
4. In their groups, students will read the encyclopedia entry for adaptation and discuss the categories of adaptations (specifically structural and behavioral) and which categories our examples fit in. (http://education.nationalgeographic.com/education/encyclopedia/adaptation/?ar_a=4)

Evaluate: *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

Generalizing:

Students will engage in a class discussion why adaptations are important for animals. We will relate this back to our discussion of the specific animals we've already discussed and other animals we know of that have the same adaptations. The teacher will ask students to think about what happens when students do not adapt to their environment (dinosaurs, prehistoric animals, and other extinct and endangered animals). This discussion should ultimately lead to student realizing that adaptations impact survival.

After the discussion students will write one paragraph to explain the necessity of animal adaptations. Then each student will choose one animal we've studied and decide on another adaptation (one the animal doesn't already have) that would also benefit the animal in its environment. They will write a paragraph or draw a picture with a diagram to explain their reasoning.

I have…Who has…? Answer Key

I have an elephant. Who has a thick layer of fat under its skin called blubber?

I have a walrus. Who has a long neck to reach leaves high up in trees?

I have a giraffe. Who can change colors to blend into its surroundings?

I have a chameleon. Who has sharp fangs that release venom?

I have a snake. Who uses whistles, sounds, and echolocation underwater to communicate?

I have a dolphin. Who shoots out black ink to escape predators?

I have an octopus. Who has a strong, curved beak to crack open large seeds/nuts?

I have a parrot. Who has webbed feet for swimming?

I have a duck. Who has a shell for protection against predators?

I have a turtle. Who has a mane to look fierce?

I have a lion. Who has 3,000 sharp teeth to grasp onto its prey?

I have a shark. Who has a strong tail that helps navigate it through the swamp?

I have a crocodile. Who emits light to communicate?

I have a lightning bug. Who has long legs to run super-fast?

I have an ostrich. Who has eyes on the side of its head to see predators?

I have a rabbit. Who has fancy feathers to attract a mate?

I have a peacock. Who secretes mucus to prevent it from drying out?

I have a slug. Who has a pouch to carry its young?

I have a kangaroo. Who has sharp quills that it releases for protection?

I have a porcupine. Who wears armor and rolls up into a ball for protection?

I have an armadillo. Who has strong, long teeth used to gnaw trees?

I have a beaver. Who has a long bill to drink nectar from flowers?

I have a hummingbird. Who has a hard shell and pincers for protection?

I have a crab. Who has a hump that stores fat and long eyelashes to protect its eyes from sand?

I have a camel. Who has long arms to swing from tree to tree?

I have a monkey. Who has a bald head to stay clean and healthy when eating?

I have a vulture. Who has cheek pouches to carry nuts?

I have a squirrel. Who has special toe pads that help it climb up smooth and vertical surfaces.

I have a gecko. Who has hooves with special traction for climbing steep mountains?

I have a goat. Who has large ears that flap to swat flies and help it stay cool?

Adaptations cards for grouping – cut apart and give to each group

blubber	**long neck**	**camouflage**	**sharp fangs that release venom**
echolocation	**shoots out black ink**	**strong, curved beak**	**webbed feet**
shell	**mane**	**3,000 sharp teeth**	**strong tail**
emits light	**long legs**	**eyes on the side of its head**	**fancy feathers**
secretes mucus	**pouch to carry young**	**sharp quills**	**rolls up into a ball**
strong, long teeth	**long bill**	**hard shell and pincers**	**hump**
long eyelashes	**long arms**	**bald head**	**cheek pouches**
special toe pads	**hooves**	**large ears**	

Grouping of Adaptations

Label:	**Label:**

Label:	**Label:**

Grouping of Adaptations

Label:	**Label:**
Label:	**Label:**

Why are animal adaptations necessary?

_____

_____

_____

_____

_____

Choose one animal we've studied: _____

Beyond the adaptations the animal already has, what is another adaptation that would benefit this animal in its environment? Write a paragraph and/or create a descriptive diagram to explain why you chose this adaptation and how it will affect the animal.

TEACHER NAME		Lesson #
Kayla Vaden		4

MODEL	CONTENT AREA	GRADE LEVEL
	Science	STEPS Summer Camp

CONCEPTUAL LENS	LESSON TOPIC
Adaptations	Animal Adaptations

LEARNING OBJECTIVES *(from State/Local Curriculum)*

Science: 4.L.1 - Understand the effects of environmental changes, adaptations and behaviors that enable animals (including humans) to survive in changing habitats.

Reading: RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

THE ESSENTIAL UNDERSTANDING *(What is the overarching idea students will understand as a result of this lesson?*	THE ESSENTIAL QUESTION *(What question will be asked to lead students to "uncover" the Essential Understanding)*
Adaptations impact survival	**How do adaptations impact survival?**

CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)	PROCESS SKILLS (What will students be able to do as a result of this lesson?)
• There are different adaptations that animals use to survive. These include structural (physical) and behavioral adaptations. • Students will define adaptations as: any alteration in the structure or function of an organism or any of its parts that results from natural selection and by which the organism becomes better fitted to survive and multiply in its environment. Or, an adaptation is a mutation, or genetic change, that helps an organism, such as a plant or animal, survive in its environment. • Animal adaptations have developed over time (passed down to offspring) and often are in response to a change in the habitat. • An instinct is a behavioral adaptation that animals are born with. A learned behavior is one that animal exhibit after observation. • Animals in different environments/ ecosystems can have the same adaptations.	Students will be able to... • work collaboratively to explain why animals must adapt to their environment. • make generalizations about the concept of adapting for survival. • evaluate the effectiveness of animal adaptations

GUIDING QUESTIONS

What questions will be asked to support instruction?

Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding

Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:

• How can you survive in this environment? • What is an adaptation? • What adaptations would humans develop over time to survive in this environment? • How have humans already adapted to their environments? • What are behavioral versus structural adaptations?	• What animals have these adaptations? • How could you classify these adaptations? • Which adaptations are structural and which are behavioral? • What environment does this specific animal live in? • How do these specific adaptations enable this animal to survive in its environment? • What is the relationship between muskoxen and wolves? • How do muskoxen work to protect one another? Is this an instinct or learned behavior? • What would happen if the wolves never got to the herd? What would happen if the wolves always got to the herd? • How do prey protect themselves from predators? Give specific examples. • Why must prey protect itself? What would be the long-term consequences? • What are specific animals that use the same adaptation to survive? • If certain adaptations are suitable to particular environments, what might happen if an animal's habitat is changed or destroyed? • In what ways do humans change or destroy habitats? • What can we can do to help the Earth be a healthier place for all living things?	• How do adaptations enable survival? • How do environments drive adaptations? • While thinking of one specific animal, what are four adaptations that help this animal to survive? How do they help the animal? • How do adaptations impact survival?

DIFFERENTIATION

(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.

Content	Process	Product	Learning Environment
	Appeals to different learning styles – information is presented to students in a variety of manners (text, video, independent research)		Student-focused

PLANNED LEARNING EXPERIENCES

(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)

Engage and Connect - *This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.*

As students enter the classroom they will be assigned to a different environment (set up in different parts of the classroom). As they reach their environment (i.e. desert, rainforest, or marsh) they must work with others in their group to decide what they must do to survive, as humans, in the biome. Students will spend 5 minutes creating a plan for their survival (which should include adaptations), then we will come together and share our plans. We will discuss how adaptations are evident in people who live in certain parts of the world. We will watch a video about the Moken children in Thailand (https://www.youtube.com/watch?v=YIKm3Pq9U8M) as an example. Students will have to think about whether the adaptations in the video and those that they suggested earlier are behavioral or structural.

Explore - *In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.*

In two groups, students will play Brainium with animal adaptations. They will take turns giving clues about their animal (mostly clues that are adaptations) while others try to guess the animal. After each animal has been identified students will group the adaptations based on the categories we developed yesterday (behavioral, structural). Then each group will pick 5 animals to present to the class. They will need to tell the adaptations of the animal (broken into the categories of behavioral and structural), its natural environment (biome), and how the adaptations help that animal to survive in its environment.

Explain - *Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.*

We will watch a video (25 Coolest Ways That Animals Adapt to Their Environments - https://www.youtube.com/watch?v=U_YD0XU0TNU). The teacher will pause the video after every 5 adaptations to have students mention which they think is most unique or beneficial and how those adaptations enable the animal to survive.

Next we will play Muskox Maneuvers (http://web.antigo.k12.wi.us/District/Programs/SchoolForest/Unit4_MuskoxManeuvers.pdf). First the teacher will show the students a picture of a muskox and explain their habitat. Then students will be assigned to be either a calf, cow, bull, or wolf. Students will be instructed how to act depending on their role (each group will be given an index card with the information). They will need to also identify the relationship between muskoxen and wolves and how that determines their actions.

As students play the game they will be encouraged to think about their behaviors and how these will enable their survival. Once we have played the game two or three times then we will discuss why we had various outcomes each time we played the game and potential outcomes (What would happen if the wolves never got to the herd? What would happen if the wolves always got to the herd?) We will also discuss if these actions by muskoxen and wolves are instincts or learned behaviors. Students will watch a video of musk oxen protecting a calf from a wolf (http://www.discovery.com/tv-shows/frozen-planet/videos/musk-ox-save-calf-from-wolves/).

Then students will think of other predator/prey relationships they know of and name adaptations or behaviors that help the prey to protect itself. Finally we will discuss why prey must protect itself through adaptations and behaviors.

Elaborate —*Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways*

Students will be given an Analyzing Animals sheet that lists different adaptations and prompts students to find animals with those adaptations, and think about how those adaptations help with survival. Students will work with a partner to research animals to include on the list and then will individually complete the column about how the adaptations enable survival. Students will be expected to find two animals for at least 10 of the adaptations. Students will use these websites to aid in their research:

- http://www.nczoo.org/ (click on Exhibits and Attractions)
- http://kids.nationalgeographic.com/animals/

The teacher will circulate as the students work on this to make sure they have an understanding of the adaptations and to answer any questions that arise.

Students will also need to answer the three questions that are on the bottom of the Analyzing Animals sheets. (If certain adaptations are suitable to particular environments, what might happen if an animal's habitat is changed or destroyed? In what ways do humans change or destroy habitats? What can we can do to help the Earth be a healthier place for all living things?) These will be discussed after all students have had time to complete them.

Evaluate: *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

Students must name an animal and four of its adaptations (two behavioral, two structural) that help it survive in its environment. They should specifically explain how those adaptations help the animal survive (does it protect the animal from prey, is it necessary for survival in the environment, etc.).

Animal _____

Name four adaptations your animal has (two behavioral, two structural). Tell how each adaptation helps the animal survive in its environment. Be specific!

Behavioral Adaptations	Structural Adaptations

UNIT RESOURCES

Instructional Materials

Kids Discover Spotlight: Biomes (http://www.kidsdiscover.com/infographics/infopacket-biomes/): This infopacket can be used by students to gain more knowledge about the world's biomes.

Biomes map - http://worksheetplace.com/mf/Biomes-Map-Outline.pdf: This is used by students in Lesson 1 as they complete an activity highlighting the location of an animal and its adaptations.

Biomes of the World Posters – Carrie Whitlock (https://www.teacherspayteachers.com/Product/Biomes-of-the-World-Posters-Complete-Set-1555570): This poster pack is an additional resource that teachers may want to print and post for students.

Steps for Making a Food Web – Nyla's Crafty Teaching (https://www.teacherspayteachers.com/Product/Free-Posters-6-Steps-for-Making-a-Food-Web-1493262): These steps are outlined with visuals and text instructions so students are able to transition from creating food chains to food webs.

Food Web Building Kit – Nyla's Crafty Teaching (https://www.teacherspayteachers.com/Product/Food-Web-Building-Kit-1493171): Grouped by biomes, this kit can be divided among students to create their own food webs. Students can be provided with information about the biome or will have to infer which biome their web is part of.

Food Web Creation Worksheet – Rusty (https://www.teacherspayteachers.com/Product/Food-Web-Creation-Worksheet-203685): A simpler version of creating a food web for students who need extra support.

Jenkins, Steven and Page, Robin. (2003). *What Do You Do With a Tail Like This?* Boston: Houghton Mifflin Company.

"I have…Who has…?" Animal Adaptation Cards – Erin Bittman (https://www.teacherspayteachers.com/Product/Animal-Adaptation-Cards-1222430): These cards are easily cut apart and given out to students who have to then think about the various adaptations the animals on their cards have. Students are engaged in learning and listening as the game plays out.

Animal Adaptations Brainium Game – Marianne Dobrovolny (https://www.teacherspayteachers.com/Product/Animal-Adaptations-Brainium-Game-407880): This game, played like Cranium, has students act out or draw, as well as identify and explain, various animal adaptations. It allows students to think about how these adaptations are necessary for animal survival.

Muskox Maneuvers (http://web.antigo.k12.wi.us/District/Programs/SchoolForest/Unit4_MuskoxManeuvers.pdf): This activity places students in the role of musk oxen and wolves as they simulate the

roles of predator and prey in the wild. Math extensions can be made from this activity as well.

Analyzing Animals (http://www.nczoo.org/Documents/AnalyzingAnimals.pdf): This activity requires students to think about animals that have different adaptations and how the adaptations are needed for survival.

Animal Adaptations and Behaviors Information Packet – Riaan Diedericks (https://www.teacherspayteachers.com/Product/Animal-Adaptations-907182): A resource to provide students with additional information about animal adaptations.

Animal Adaptations Poster Design for Upper Elementary – Angela Kanerva (https://www.teacherspayteachers.com/Product/Animal-Adaptations-Poster-Design-for-Upper-Elementary-420662): Useful for students in planning their performance task, this poster requires students to think about various aspects of their animal's design and it's location in the world.

Websites

https://www.youtube.com/watch?v=hIy0ZlyPPDg: The *Introduction to Biomes* video shows pictures of different biomes in the world with text that gives a basic definition of what a biome is.

http://exchange.smarttech.com/details.html?id=dc77d72a-50a9-4a7f-9963-798d5be4cbfd: This SmartBoard activity, *Intro to Habitats*, is a primer on the variety of habitats in the world. It will help students think about climates and plant and animal life present.

www.blueplanetbiomes.org/world_biomes.htm: This website shows a map of biomes in the world, provides a definition of biomes, and has information about each specific biome including plant and animal life.

http://tisscience-lessons-life.wikispaces.com/Biomes+of+the+World: This website provides an alternative world map of the different biomes and two videos about biomes.

https://www.youtube.com/watch?v=dTaWsFct32g: *Ecosystems and Biomes* defines ecosystems and biomes and provides an explanation of their interconnectedness.

http://zunal.com/teacherspage.php?w=167223: This website provides additional information about terrestrial and aquatic biomes. It is one of the sites provided for students for independent research.

http://buncombe.k12.nc.us/Page/30255: This website from a fifth grade teacher in North Carolina provides links to information about biomes, ecosystems, and food webs.

https://sites.google.com/site/5thgradeecosystemswebquest/resources: Another research website for students that provides information about estuaries, lakes, grasslands, and forests.

http://www.ucmp.berkeley.edu/glossary/gloss5/biome/: Used for student research, this website provides additional information about aquatic, desert, forest, grassland, and tundra biomes.

https://youtu.be/DNMiZiK-0Dg: This commercial for Jurassic World is useful in introducing the performance task and increasing student enthusiasm. (Play from 1:17 to 1:34.)

http://www.sayostudio.com/33720/2265930/complete-gallery/animal-art-interactions-and-ecology: A piece of artwork by Nicolle R. Fuller that shows a marsh – used for the Visual Thinking Strategy in lesson 2.

http://exchange.smarttech.com/details.html?id=566a93a3-14b3-4e9a-baff-2334562a8d05: This *Food Chains* SmartBoard lesson helps students review animal categorizations of herbivores, carnivores, and omnivores, and reviews basic animal food chains.

http://exchange.smarttech.com/details.html?id=fcf02721-0272-4ce8-ac46-8fe4c0ecd360: *Food Chains and Webs* uses the SmartBoard to help students further their understanding of food chains and webs. The activity also introduces decomposers, producers, and consumers.

http://www.education.com/worksheet/article/food-chain-pyramid/: This graphic is useful if you have students who need a visual of a food pyramid, and it also reviews the terms decomposers, producers, primary consumers, secondary consumers, and top level consumers.

http://education.nationalgeographic.com/education/encyclopedia/adaptation/?ar_a=4: This is the encyclopedia entry about adaptations. It is useful in allowing students to think more about adaptations and how they are behavioral or structural.

https://youtu.be/7o8GHd17aiE: Used to add excitement to the performance task, this video – *Creating Jurassic World's New Genetically Modified Dinosaur* – is an interview with Jack Horner, a paleontologist, who helped in creating the dinosaurs for the movie series. He also discusses the ability of scientists to actually create genetically modified animals.

https://www.youtube.com/watch?v=YIKm3Pq9U8M: Used to demonstrate how humans can adapt to their environments, this video from the *Inside the Human Body* series highlights how children in Thailand can see underwater.

https://www.youtube.com/watch?v=U_YD0XU0TNU: *25 Coolest Ways That Animals Adapt to Their Environments* highlights animal adaptations that are not as well-known by students.

http://www.discovery.com/tv-shows/frozen-planet/videos/musk-ox-save-calf-from-wolves/: This is a video of wolves attacking a calf from a herd of musk oxen. It is used during Lesson 4 to help students visualize the musk oxen activity they complete.

http://animals.nationalgeographic.com/animals/mammals/musk-ox/: A visual of a musk ox for students who are not familiar with the animal.

http://www.nczoo.org/: The North Carolina Zoo's website is useful as students complete their research task of identifying animals with various adaptations.

http://kids.nationalgeographic.com/animals/: National Geographic's website is also a useful research tool for students looking to find animals with specific adaptations.

http://dictionary.reference.com/: This website provided definitions of words in the Content Knowledge section of the lesson plans.