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5th Grade Adaptation

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Unit Title	Adaptation	Course(s)	5th Grade Science
Designed by	Michael Carroll	Time Frame	10 Days

Stage 1- Desired Results

Establish Goals

Science TEKS

- *5.10(A) compare the structures and functions of different species that help them live and survive such as hooves on prairie animals or webbed feet in aquatic animals*
- *5.10(B) differentiate between inherited traits of plants and animals such as spines on a cactus or shape of a beak and learned behaviors such as an animal learning tricks or a child riding a bicycle*

Additional Overlap Standards

- 5.9(A) observe the way organisms live and survive in their ecosystem by interacting with the living and non-living elements
- 5.9(C) predict the effects of changes in ecosystems caused by living organisms, including humans, such as the overpopulation of grazers or the building of highways
- 3.9(A) observe and describe the physical characteristics of environments and how they support populations and communities within an ecosystem

Transfer

Students will be able to independently use their learning to....

- Make predictions about how changes to environments will have direct effects on organisms who have specific adaptations for that specific environment.
- Apply the concept of adaptation towards all organisms as a method to show the interdependence of ecosystems and the dangers of direct human involvement (short term and long term); Investigate why certain animals are going extinct or thriving. What direct and indirect factors play into it

- Draw connections on the similarities between humans and other organisms by their shared ability to learn behaviors as well as having inherited traits.

Meaning

UNDERSTANDINGS

- Both human involved and natural changes to an environment affects animals. (Adapt, Migrate, Die)
- All organisms undergo similar life processes.
- All organisms are born with inherited traits but most must also learn behaviors to survive in their environment
- Humans are not exempt from adaptations, and we've used our adaptations to help cultivate the world
- Animals have specific adaptations because they were used to survive in an environment and thus live long enough to reproduce, pass on genetics to the next generation.
- It is not one single adaptation, inherited trait, or learned behavior but a culmination of several that help an animal survive.
- Adaptations are inherited traits but an animal can learn a behavior that will help them adjust/ thrive in their environment

Essential Questions

- Why do some species change specific characteristics and traits over time.
- What does the role of the environment have on how/why different species form adaptations?
- Why do animals develop learned traits in addition to the inherited traits that they are born with?
- How have human interactions on the environment led to adaptations of animals that may share this environment?
- In what ways have humans inherited traits or learned behaviors that set them apart from other species?

Acquisition

Students will know...

What facts and basic concepts should students know and be able to recall? (declarative knowledge)

- Animals have specific adaptations that help them survive in a specific environment

Students will be skilled at...

What discrete skills and processes should students be able to use? (procedural knowledge)

- *Predict which environment an animal belongs to due to the adaptations it has.*

- Changes in an environment affect other aspects of that environment (Interdependency)
- The difference and application of Learned Traits and Inherited Traits
- These Terms and what they mean
 - [Link](#)
- Thumbs (amongst other things) are one of the key adaptations that helped humans thrive so much
- Humans are not the only species that changes their environment
- Human involvement/ human's changing environment is not always bad for all species.
- The removal or introduction of predators can be damaging or beneficial for their entire environment
- Just because the adaptation an animal has can be helpful in more than one environment does not mean that the animal will also survive in either. (A duck couldn't suddenly survive in the arctic even though it has webbed feet)

- *Determine which traits are inherited by the animal and which are learned.*
- Design organisms that would be able to survive in certain environments because of the adaptations they applied to it.
- Apply the Learned traits and inherited traits on humans to learn more about our own species.
 - Compare & contrast our species with other species in the world (similar and non similar)
- Analyze organisms in their environment and make predictions about what would happen to the environment with specific changes
- Interpreting the word adaptation as a present verb describing the process to adjust to a situation and as the forming of traits that help organisms survive in their environment

Stage 2- Evidence

Code	Evaluation Criteria	
		<p>PERFORMANCE TASK(S): <i>Students will show that they understand by evidence of...</i></p> <p>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</p> <p><u>Design of an Organism & Writing Piece</u></p>

- Goal: Students are able to understand how adaptations work properly within a species and what would happen if a specific environmental change would occur.
- Role: Design an organism for a given an environment. Note the organisms' interdependency, adaptations, inherited traits, and learned behaviors. Discuss what would happen to that species you designed if a specific environmental change happened.
- Audience: Teacher/ Student/ Parents. Professional setting.
- Situation: The student will have time to create an organism and once the organism is created the teacher will apply an Environmental change and the student must predict what the response will be.
- Product/ Performance/ Purpose: The student is given a worksheet to help brainstorm an organism, making sure their organism contains all the requirements from a list of traits and features.

Here is link to assignment, rubric, and random information generator

<https://docs.google.com/document/d/1cR4oPyV7pSC57z5kxO-7u96iysDqU81i9zoHCjQ5RtY/edit?usp=sharing>

OTHER EVIDENCE:

Students will show they have achieved Stage 1 goals

What other evidence will you collect to determine whether Stage 1 goals were achieved?

- Exit Tickets
- Article + Question Response
- Journal Entry
- Group Discussion (Anecdotal Notes)
- Class Discussion
 - Class Vocabulary Discussion
- Participation in Games and Class Activities
- Choral Response

Stage 3- Learning Plan

Code	Learning Events	Progress Monitoring
Acquisition Meaning Transfer		
Day 1 M A	<p>Hook:</p> <ul style="list-style-type: none"> ● Youtube video: How Wolves Move Rivers https://www.youtube.com/watch?v=ysa5OBhXz-Q&t=200s ● After the video, have students go into Science Journals and answer the following through Cause and Effect. “What did the introduction of Wolves (predators) in Yellowstone National Park do to the animals, plants, and non-living things” Effect <p>Lesson:</p> <ul style="list-style-type: none"> ● “Today we’re going to be working in biology and expand on our lessons of ecosystem” → Interdependency, break down word and its meaning. How does this connect to the video that we watched? Break off into adjacent partners and discuss how Interdependency and the video we watched about Wolves Changing Rivers are connected. ● Give out Vocabulary Packet and have students create a KWL chart in triads ● Use last bit of class to discuss and answer any confusion on vocabulary. <p>Exit Ticket:</p> <ul style="list-style-type: none"> ● “What does <u>Interdependency</u> Mean in your own words?” 	

Day 2
A

Hook:

- Each Student must read 2 articles, one on Interdependency and the other on Adaptation as they enter the classroom. They must answer the questions about both of those articles. (My school uses STEMscopes, if you don't you may need to find independent articles. [Interdependency](#). [Adaptation](#))

Lesson:

- When students finish the questions of the article they'll turn them in as they form into groups of 2-3 with other students who finish at the same time.
- Students must grab their KWL charts and Make a new Chart:

Animal	Environment(s)	Adaptation(s) [2-3]

- In their small groups they must think of animals, where they live, and the type of adaptations they may have. They may also use this time to adjust their KWL charts with partners so they can add more.
- With 15 minutes left in the lesson have the students gather all back together to:
 - Go over answers from articles with questions, clarify any questions that may not have made sense
 - Review some of the animals from their new charts and the adaptations they have

AM

AM

Day 3

Hook/ Preparation: Lab/ experiment in the room. Requires tools and groups (premade/ random)

- While lab is being set up, have students tape their fingers together on their dominant hand and have them write down (using their dominant hand) a long sentence. The person who has the most accurate version of it and finishes first may win a prize

Lesson:

- Tape is now off fingers.
- Everyone will be split into groups of 4 or 5. Each member per group will be assigned a tool (Chopsticks, Tweezers, Spoon, small shovel, butter knife etc.
- There will be as many stations as there are groups. Each station is a different food source/ type of food (represented by: *Sunflower Seeds, M&Ms, Cream Cheese, Marshmallows etc.*
- Each student must calculate how much of a food source they were able to

AMT

	<p>obtain in specific amount of time only using the tool they had while competing with the students (with different tools).</p> <ul style="list-style-type: none"> • The groups will rotate and repeat until all stations are done. • <u>Goal</u>: The students should soon realize that depending on the tool they had in the beginning they were more successful with certain types of foods than others <p>Exit Ticket:</p> <ul style="list-style-type: none"> • How does this experiment/ activity that we went through reflect on Adaptation. What made you successful in getting food and no successful in getting food? 	
<p>Day 4</p> <p>AM</p> <p>AMT</p>	<p>Hook:</p> <ul style="list-style-type: none"> • In a “game show” style have the students play <u>Match the Environment with the Animal</u> <ul style="list-style-type: none"> ○ Have some obvious ones (ie. a fish lives in either a desert or the ocean) ○ Follow up with some challenging ones or where it seems that the animal could live in either. However, make it so that they visually do have an adaptation that would set them in one environment over the other, even if it's a small one (ie. Beak size/ shape) • Finish game show (can be down with or without points) <p>Lesson:</p> <ul style="list-style-type: none"> • Class Discussion: <ul style="list-style-type: none"> ○ “Who can tell me what some of the obvious animals and their ecosystems. (ie. Fish and water)? ○ How did we know that the fish belonged in the water <ul style="list-style-type: none"> ■ Looking For: It has Fins/ Gills/ Breathes in Water/ Color matches water. ■ Conclude with class: It has certain Traits/ Features that make it more suitable for one environment than the other. Those features are its <u>Adaptations</u> ○ Let’s look at another one: _____ <ul style="list-style-type: none"> ■ Continue with this process but looking at the some of the challenging ones. ■ Two environments that are similar (different types of trees) and a bird with a specific type of beak. Why would this bird be more suitable for one environment than the other. This one is not as obvious. The shape/ size of its beak is specifically designed for a 	

M

specific type of tree, and thus the animal would not survive/ thrive in a different environment.

- Try and do 3- 5 different animals and their environments, discussing why the animal is more suited to one environment than the other because of specific features/ traits that it has.
- Go back to the chart made on Day 2

Animal	Environment(s)	Adaptation(s)

AT

- Have students make changes to their charts now that they have a more strict understanding of Adaptation and how they are related to their environment.
 - Discuss the animals and their environments (adding clarification, when needed)
 - If no student has mentioned Humans (*H. Sapiens*) add it and ask them what our Environment is? What are our adaptations?

Exit Ticket:

- A dog responds to a whistle and sits down. Another whistle has the dog jump on its hindlegs and balance on them. Are these adaptations?

Day 5

AM

Hook

- Show the students pictures/ footage of different animals around the world doing tricks (Learned Behaviors) (ie. Orcas with trainers at seaworld , Dogs at a dog show, Elephants at a circus)
- Central Question: *Are these actions the animals are doing Adaptations?* Write in your journals

Lesson:

AMT

- Today we are going to expand on our idea of animal traits from adaptations (call in response on what adaptation means) to the specific traits an animal is born with and the traits it learns throughout its life.
- Introduce terms: Inherited Traits and Learned Behaviors. Make a T Chart in their journal.
 - Give examples of each
 - Provide a Definition of each
 - Have students construct a personal definition.
- Hand out Venn Diagram
 - Using a random Generator from a list of animals

	<ul style="list-style-type: none"> ○ What did we learn in this video. Goal: The changing of the environment caused the adaptation that species were using to survive. The light colored Peppered moth were dying because their adaptation (camouflage) no longer served the purpose it needed in a changed environment. However, the dark colored Peppered moth were now able to survive and adapt in the new polluted environment. ● Last Video before Exit Ticket https://www.youtube.com/watch?v=sVVldxxbWig <p>Exit Ticket</p> <ul style="list-style-type: none"> ● What do many of the adaptations of birds center around? 	
Day 7 AMT	<p>Introduction of Final Assessment (Evidence) https://docs.google.com/document/d/1cR4oPyV7pSC57z5kxO-7u96iysDqU81i9zoHCjQ5RtY/edit?usp=sharing</p> <ul style="list-style-type: none"> ● Hand out assignment to everyone and make sure everyone puts their name on it <ul style="list-style-type: none"> ○ Make sure all students have a lined piece of paper. ● Review assignment as a whole so that students have options to ask questions about details. Make sure students know it is due at the end of <u>Day 10</u> ● Everyone lines up for their randomly generated “type of animal” and “environment” ● If School allows: Have them go outside and look at nature trying to brainstorm for their organism. They begin the description of their animal rough draft on the lined piece of paper ● Homework: Complete a rough draft of the written portion on the description of your animal. 	
Day 8 AMT	<p>Students use this day as a work day Goal Accomplishment: Final description of animal writing piece is completed</p> <p>From this point on, if students have finished their writing piece and their drawing of the animal they may then choose their Environmental change from a randomizer</p>	
Day 9	<p>Students use this day as a work day Goal Accomplishment: Students have finished their drawing and are starting their</p>	

AMT	response to environmental change.	
Day 10 AMT	Final work day for students to use Goal Accomplishment: Final is finished and turned in.	

Resources / Materials:

- Youtube
 - <https://www.youtube.com/watch?v=ysa5OBhXz-Q&t=200s> (Wolves move Rivers)
 - <https://www.youtube.com/watch?v=sVVldxxbWig> (Peppered Moth)
 - <https://www.youtube.com/watch?v=i1BCehbUsTQ> (Bird Beaks and Adaptations)
- STEMscopes:
 - Article:
 - Reading Science: Interdependency
 - Reading Science: Adaptation
 - Math Connection Activity: Inherited Traits vs Learned Behaviors
- Tools:
 - Day 3/ Lab
 - Chopsticks
 - Plastic Cutlery
 - Tape
 - Seeds/ M&Ms/ Marshmallows
- Venn Diagram
<https://www.eduplace.com/graphicorganizer/pdf/venn.pdf>
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Mission Bay High School UbD Unit Planner is from Wiggins, Grant and McTighe, Jay. *Understanding by Design Guide to Creating High-Quality Units*. Alexandria, VA: Association for Supervision and Curriculum Development. 2011.