
MAINTAINING
You Can be Part of the Solution
BIODIVERSITY
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Maintaining Biodiversity on our planet: I am part of the solution.

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Beacon and Lampstand

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Standards

MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

Introduction

It has been said that diversity is the spice of life. This saying is also true in the animal kingdom. The animal kingdom is one that comes with its array of colors, purposes, and functionalities. For example, bees assist humans in harvesting and producing crops through pollination. If bees were to become extinct, humans would lose their ability to pollinate certain crops. This unit will examine the internal, external, and interconnectedness of humans with animals. We will examine the needs of endangered species for survival. It will also address the concepts of ecosystems, biodiversity, environmental justice, and the causes of animal extinction.

Connections

This unit will confirm and reinforce the idea of the earth as a living body with interconnected patterns of relationships. Humans are part of nature and have the ability to learn from nature. Finally, through this unit, students will become more mindful of how they affect nature, and all of the world around them.

Included in this unit:

Formative Assessments, Summative Assessment, Accommodation suggestions, Games, Videos, Notes and graphic organizers.

Lesson Plan Day One Wants Verses Needs: Maintaining Biodiversity on our planet: I am part of the solution.

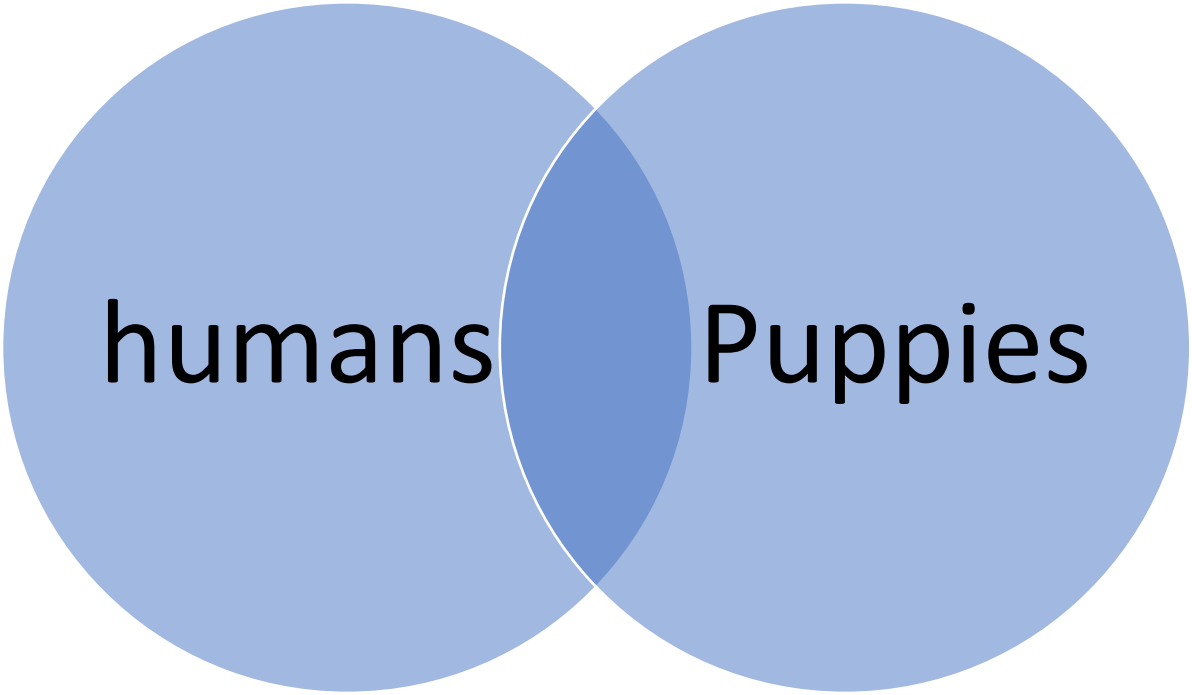
Goals and objectives: Students will create a list of their wants verses their needs. Then they will create a list of the needs of a puppy. Students will use a Venn diagram to compare their needs to the needs of a puppy.	
Multi-disciplinary unit for grades 6-8	
Introduction	Essential Question: What do humans and animals need for survival? How do we distinguish between wants and needs? Key Vocabulary: Survival Video: The difference between needs and wants https://youtu.be/zW7k4Rvo1m8 3:22
Pre-assessment Warm-up (teacher observation)	Teachers will observe whether or not students can distinguish the difference between their wants and their needs. By having each student complete a list of three of their wants and three of their needs, and a brief pre-assessment.
Active Teaching: Modeling (I do) - Demonstration - Think Aloud - Provide model &/or rubric	**Teacher states**: I have up on the board three items: A brush, water, toothpaste. Can you tell me which of these items up here that I absolutely need for survival? There are 4 things that all humans need for survival, they are water, food, shelter, and air. Now display three different items on the board, ask the class which of the items are needed for survival.
Guided Practice (We do) - Small group work - Discussion - Teacher/ student observation & feedback *Assess before*	**Teacher States:** Now, I want you to work together in pairs or groups to read the article about how to take care of a puppy. Take turns reading the text. Then create a list of the needs of a puppy. Finally, you are going to use the Venn diagram to compare your needs to the needs of a puppy. The items that are unique to you as a group, you will categorize under the human side of the diagram. The items that

moving to independent practice	are unique to the puppy, please categorize under puppy. If there are needs that you both have in common, please place those items in the space where the diagram intersects. Give students ample time to read the article, have some discussion, and write their answers. (About 15 min.) Next have some discussion about the things that puppies need to survive, compared to what humans need to survive.
Independent Application (You do) *Multiple practice opportunities to ensure success (90%)*	How can you tell the difference between the things that you need, and the things that you want? How will knowing the difference between the two help you make better decisions in life?
Lesson Closure/exit ticket (formative assessment)	Now, I want you to think about one thing that you really want and explain why you really want that item and list one thing that you need to survive.
Accommodations	If you have students that read far below grade level, pair them with a strong reader, or use a lower-level text.
Strategies	Read-pair-share, paired reading,
Material/Technology	How to take care of a puppy article: https://gohappypuppy.com/how-to-teach-kids-proper-puppy-care/ Venn Diagram with questions Exit Ticket (formative assessment)

Humans and puppies Venn Diagram

Name of Person or Group: _____

Date: _____ Block or Period: _____



Answer the following Questions:
How can you tell the difference between the things that you need, and the things that you want? How will knowing the difference between the two help you make better decisions in life?

Lesson Plan Day Two Animal Extinction: Maintaining Biodiversity on our planet: I am part of the solution.

Goals and objectives: Students will brainstorm a list of causes for animal extinction. Students will offer solutions for the issues involving humans and the disruption of nature.	
Multi-disciplinary unit for grades (6-8)	
Introduction	Essential Questions: What are some of the causes of animal extinction? How can I help to prevent animal extinction? Key Vocabulary: Overharvesting, invasive species, pollution, genetic variation Videos: Endangered Species https://youtu.be/dqEXWXI2XrQ
Pre-assessment Warm-up (teacher observation)	What are the reasons why we need to protect endangered species? (Possible answer: to develop a balanced ecosystem, we need clean air and water, and we need fertile land for agriculture) Write down and discuss other answers.
Active Teaching: Modeling (I do) - Demonstration - Think Aloud - Provide model &/or rubric	**Teacher States:** Today we are going to discuss animal extinction to prepare us for our research project. But first we are going to watch a video on extinction. Show the video, and then say: Let's talk about some reasons why animal extinction occurs. Have the students brainstorm a few reasons first. Then say: Here is a list of a few reasons with examples: hunting, overharvesting, invasive species, pollution, changing wetlands and forests to croplands, habitat loss, population growth, and loss of genetic variation.
Guided Practice (We do) - Small group work - Discussion - Teacher/ student observation & feedback	Strategy: Card game Make copies of a set of cards for each pair. Say: Today we are going to play Environmental "Go Fish." The objective of the game is to match the environmental issue with a possible solution. One person from your group is going to deal the other

Assess before moving to independent practice	person three cards. When it is your turn say what you have for example say, "I have the problem of hunting, and then ask the other person if they have the solution. If they have the solution, then you are to lay down your match. If they don't have it, they say "Go fish." And the opponent pulls a card from the pile. The person with the most matches at the end of the game wins.
Independent Application (You do) *Multiple practice opportunities to ensure success (90%)*	Take a look at your matches and record them in your journal. Talk to your partner about each problem and solution.
Lesson Closure/exit ticket (formative assessment)	Exit Ticket: Name one way that humans can cause animal extinction and list a possible solution to the problem.
Accommodations	If there are students who are having difficulty making matches, give them a list of possible matches.
Strategies	Paired card game
Material/Technology	Environmental "Go Fish" cards
To create	Go Fish cards Journal entry with vocabulary, examples, and exit question.

Problem: **Overharvesting**- Harvesting a renewable resource such as farmland to the point of diminishing returns.	Problem: **Invasive Species**- An introduced organism that negatively alters its new environment. Example: Kudzu	Problem: **Habitat Loss**- When a natural habitat is no longer to support its native species. Example building new homes
Problem: **Loss of genetic variation**- Without it, populations cannot evolve with changing environmental variables.	Problem: **Pollution**- Pollution is a major stressor to natural ecosystems. Example: plastic bags in the ocean	Problem: **Population Growth**- There is concern that human exponential growth if unchecked will strip our natural resources.
Problem: **Changing wetlands and forests to croplands** The conversion has triggered atmospheric change and loss of carbon storage capacity	Problem: **Killing Bees** Bees pollinate 15 billion dollars' worth of U.S. crops.	Problem: **Lack of fresh water:** When waters run dry, people can't get enough to drink, wash, or feed crops.

Government Legislation	**Reducing invasive species**	**Habitat Restoration**
Captive Breeding and seed banks	**Reduction of Pollution**	**Sustainable Living**
Support Local Small Farms	**Plant Nectar producing flowers**	**Take Shorter Showers**

Lesson Plan Day Three Biodiversity and Ecosystems:
Maintaining Biodiversity on our planet: I am part of the solution.

Goals and objectives: Students will learn about ecosystems and the importance of biodiversity. Students will learn about jobs that exist in ecology such as an eco-technologist and an ecological engineer.	
Multi-disciplinary unit for grades (6-8)	
Introduction	Essential Questions: How can we restore and manage natural ecosystems? Why is biodiversity important? What can we learn from these organisms? Key Vocabulary: Biodiversity, ecosystem, scarcity, endangered species, organisms, biomimicry, conservation Videos: Biomimicry https://embed.ted.com/talks/janine_benyus_biomimicry_in_action# How can we restore natural ecosystems? https://youtu.be/IcyM43z0UE8
Pre-assessment Warm-up (teacher observation)	What is an ecosystem? How can we restore and manage natural ecosystems? Video: What is an ecosystem? How can we restore and manage them?
Active Teaching: Modeling (I do) - Demonstration - Think Aloud - Provide model &/or rubric	Introduce the video about ecosystems: Then place the following notes on the board or overhead: Biodiversity- the variety of life in the world or in a particular habitat or ecosystem. Ecosystems- a biological community of interacting organisms and their physical environment Scarcity- a shortage, in short supply

	Conservation- Prevention of wasteful use of a resource Endangered Species- biological species that is seriously at risk of extinction. Organisms- an individual animal, plant, or single celled life form. Take a break to play the video about biomimicry, then display the following definition with example: Biomimicry- the design and production of materials, structures and systems that are modeled on biological entities
Guided Practice (We do) - Small group work - Discussion - Teacher/ student observation & feedback *Assess before moving to independent practice*	Write-Pair-Share: Have students answer the essential questions: How can we restore and manage natural ecosystems? Why is biodiversity important? What can we learn from these organisms? Give students 2 minutes to write the answer to the questions, then give them 4 minutes to discuss the answers with their partner. Walk around the room listening to responses and jotting down any misconceptions to clarify before their independent practice.
Independent Application (You do) *Multiple practice opportunities to ensure success (90%)*	Students will be given a Cornell picture note graphic organizer. Have the students answer the questions using the notes that you have given on the board or the overhead. Play soft music in the background and give students time to respond and write notes.

Lesson Closure/exit ticket (formative assessment)	Exit Ticket: What is Biomimicry? How can biomimicry provide solutions in our attempts to restore and manage natural ecosystems?
Accommodations	If students are unable to keep up with the notes, fill in all or parts of the note sheet.
Strategies	Cornell Picture Notes
Material/Technology	Cornell Picture Note Sheet Videos Whiteboard or overhead

Cornell Picture Notes for Ecosystems and Biodiversity

Name: _____ Date _____Period or Block: _____

Directions: Write the answer or definition, then draw a picture or symbol that will help you remember what the word means.

Question	Answer or Definition	Picture or Symbol
What is biodiversity?		
	a biological community of interacting organisms and their physical environment	
Endangered Species		
	A Shortage of supply	
Conservation		
Organism		
	the design and production of materials, structures and systems that are modeled on biological entities	

Write-Pair-Share: How can we restore and manage natural ecosystems? Why is biodiversity important? What can we learn from these organisms?

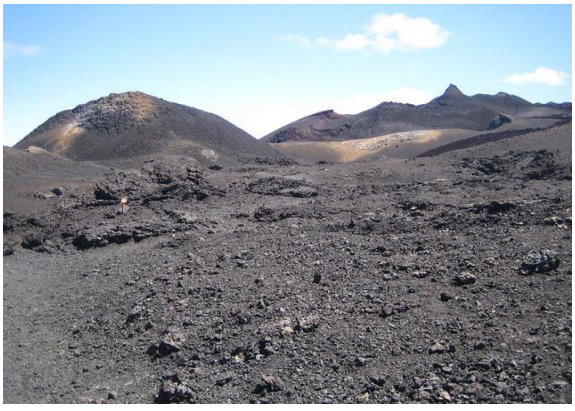
Lesson Plan Day Four What is Environmental Justice?

Maintaining Biodiversity on our planet: I am part of the solution.

Goals and objectives: Students will learn about social justice and environmental justice. Students will investigate ways that all people, no matter race, culture, or socio-economic background can become a conservationist.	
Multi-disciplinary unit for grades (6-8)	
Introduction	Essential Questions: How can I advocate for social and environmental justice? Key Vocabulary: Social Justice, Environmental Justice, Sustainable, Populations, Laws, Policies Videos: What is Environmental Justice? https://youtu.be/5hOJ-VosFI0
Pre-assessment Warm-up (teacher observation)	Give the students the definitions for Environmental and Social Justice. Ask the students to re-write the definitions in their own words, and or draw a picture with examples of the definition in their journals. Then ask the students to watch the video and give two examples of environmental discrepancies from the video.
Active Teaching: Modeling (I do) - Demonstration - Think Aloud - Provide model &/or rubric	**Teacher States:** Today we are going to discuss talk about environmental and social justice. Environmental justice is the fair treatment, and involvement of all people, no matter the background as it involves the development, implementation, and enforcement of environmental laws, regulations, and policies Social Justice is the concept of providing equal opportunities for all people.
Guided Practice (We do) - Small group work - Discussion - Teacher/ student observation & feedback	Strategy- A photo gallery walk. Today, you are going to be paired with a partner to complete a photo gallery walk. As you walk with your partner, you will be given 2 minutes to examine the photo and then give suggestions to make the environment more socially and environmentally fair.

Assess before moving to independent practice	After you have completed all rotations, have the students come back to their seats for a discussion.
Independent Application (You do) *Multiple practice opportunities to ensure success (90%)*	Take a look at your matches and record them in your journal. Talk to your partner about each problem and solution. Say, "What questions came up as you viewed the pictures?" "Was there a takeaway that you and your partner discussed?" "Were you able to propose some viable solutions?"
Lesson Closure/exit ticket (formative assessment)	Exit Ticket: Name one item that is in scarcity. How can we make sure that everyone, no matter our background has equal access to this commodity?
Accommodations	If you have students who have visual impairments, provide descriptions of the photos and pictures.
Strategies	A photo gallery walk
Material/Technology	Photos, Journals

Maintaining Biodiversity on our planet: I am part of the solution grades (6-8)



Lesson Plan Day Five Animal Extinction Mini Research?

Maintaining Biodiversity on our planet: I am part of the solution.

Goals and objectives: Students will choose an endangered species to research by state. Students will research the laws and policies for that state to analyze the possible correlation between resources and prevention.	
Multi-disciplinary unit for grades (6-8)	
Introduction	Essential Questions: How do policies and laws affect animal extinction? Key Vocabulary: Social Justice, Environmental Justice, Sustainable, Populations, Laws, Policies Videos: Million animals, plants at risk of extinction due to human activities, U.N. report says https://www.youtube.com/watch?v=5tgNtIUOL4E How to save our Planet https://youtu.be/0Puv0Pss33M
Pre-assessment Warm-up (teacher observation)	How do we create an existence in which both people and animals can thrive?
Active Teaching: Modeling (I do) - Demonstration - Think Aloud - Provide model &/or rubric	**Teacher States:** Today we are going to conduct research on an endangered species. You will work with a partner to go to the following website: https://ballotpedia.org/Endangered_species_by_state to find a list of endangered species by state. You will use the following site to find the resources by state: https://www.animallaw.info/article/state-endangered-species-chart Then you will choose one endangered species to answer these questions: Which animal did your group choose?

	What are some of the reasons your animal is extinct? What state is your endangered species from? What are the root causes for extinction? What resources are available in the animal's state of origin? Are there examples of policies, resources or laws from other states that could be adopted to protect the animal that you chose?
Guided Practice (We do) - Small group work - Discussion - Teacher/ student observation & feedback *Assess before moving to independent practice*	Before the students begin their research, walk them through each of the websites. Show them how to research reasons why their animal may be extinct. Explain the difference between websites that are credible, and websites that may not be as credible.
Independent Application (You do) *Multiple practice opportunities to ensure success (90%)*	Give students time to complete their research. This lesson may take more than one day.
Lesson Closure/exit ticket (formative assessment)	Video: How to save our Planet https://youtu.be/0Puv0Pss33M Students will answer the following question: How do we create an existence in which both people and animals can thrive?

Accommodations	You may choose to complete this project as a small group, individual or paired project
Strategies	Research
Material/Technology	Computer to be used for research

Biodiversity Unit Assessment

Name_____ Date_____ Block_____

Multiple Choice: Choose the answer that best answers the question.

1. Which reason best describes the reason to protect endangered species?
a. To maintain a well-balanced ecosystem
b. To maintain clean air and water
c. To maintain fertile land for agriculture
d. All of the above.

2. What is the main cause of the extinction of animals?
a. Humans
b. Lack of caring
c. Starvation
d. Animals are killing other animals.

3. When we lose animals through extinction, we lose_____
a. Enjoyment
b. Predators
c. Food
d. Biodiversity

4. Biodiversity is...
a. The way that humans and animals interact.
b. Part of the food chain
c. The variety of live in an ecosystem.
d. Survival of the fittest

5. The best way to describe environmental justice is...
a. Fairly dispersing the resources of the earth
b. Maintaining the earth's balance
c. Maintaining an open mind about the environment
d. Loving nature

Matching: Write the letter of the matching term with the correct definition.

Word bank

a. Ecosystems b. Resources c. Organisms

d. Populations e. Sustainable growth f. Biodiversity

g. Extinct

6. A biological community of interacting organisms and their physical environment_____

7. Animals that have no living members or are no longer in existence. _____

8. The variety of life in the world or in a particular habitat or ecosystem. _____

9. Growth that is sustainable, ethical, and responsible to all communities_____

10. An individual animal, plant, or single celled life form. _____

Fill in the blanks: Fill in the blank with the term that best completes the sentence.

Word bank

b. Ecosystems b. Resources c. Organisms

d. Populations e. Sustainable growth f. Biodiversity

g. Extinct

11. Environmental justice involves maintaining and sharing the earths _____ in a fair and meaningful way.

12. Animal _____decrease as humans destroy their habitats.

Short answer: Completely answer each question with at least one sentence.

13. What can humans do to help assist endangered species?

14. How do policies and laws affect animal extinction?

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