

# THIS IS MY EARTH: BIODIVERSITY CONSERVATION IN ACTION

## TABLE OF CONTENTS

<b>INTRODUCTION: HOW TO USE THIS TEACHER GUIDE</b>	<b>2</b>
ACKNOWLEDGEMENTS	2
<b>LESSON OVERVIEW</b>	<b>3</b>
Standards	4
A Note on Lesson Delivery	5
<b>ACTIVITY PROCEDURE</b>	<b>6</b>
<b>1. PREPARE THE LESSON</b>	<b>6</b>
<b>2. PRESENTATION AND HANDOUT</b>	<b>6</b>
Slide 2: Learning Objectives	6
Slide 3: Biodiversity Video - 3 minutes 4 seconds	6
Slide 4: Define biodiversity	6
Slide 5: Discussion question	7
Slides 6-10: Human activities that lead to biodiversity loss	7
Slides 11 & 12: Expand - what is the link between climate change and biodiversity loss?	8
Slide 13: Define endemic species	9
Slides 14 & 15: What is a biodiversity “hotspot”?	9
Slide 16: Define biodiversity hotspot and its criteria	9
<b>3. INTRODUCE THE ACTIVITY</b>	<b>10</b>
Slide 17: Problem & Solution	10
Slides 18 & 19: What can you do about it? ; TIME’s website screenshots	10
Slide 20: Let’s get started! - Activity Instructions Video	10
<b>4. RESEARCH &amp; DEVELOP PRESENTATIONS</b>	<b>10</b>
<b>5. STUDENT PRESENTATIONS</b>	<b>11</b>
<b>6. RAISE FUNDS FOR THE CONSERVATION PROJECT</b>	<b>11</b>
<b>7. CAST VOTES USING EMAIL ADDRESSES</b>	<b>11</b>
<b>8. EXIT POLL - HOW DID THE CLASS VOTE?</b>	<b>12</b>
<b>9. SHARE THE PROJECT WITH OTHERS</b>	<b>12</b>

## **INTRODUCTION: HOW TO USE THIS TEACHER GUIDE**

The Climate Action Education Program includes the foundational lesson, *Climate Science and Action*, as well as several extension lessons: *Renewable Energy*, *This is My Earth: Biodiversity Conservation in Action*, *Climate Justice*, and *Consumption and Waste*. The goal of this program is for students to gain a better understanding of climate science and the socioeconomic systems that increase the impacts of climate change. In addition, these lessons aim to inspire action on an individual and community level. Each lesson includes a teacher guide, Google Slides presentation, and all materials needed to complete the activity both in a classroom and through distance learning.

In this lesson, *This is My Earth: Biodiversity Conservation in Action*, students will gain an understanding of biodiversity conservation in action by participating in a real, global conservation project through the nonprofit organization, This is My Earth (TiME). TiME uses advocacy, education, and a democratic voting process to crowdsource funds and purchase highly threatened biodiversity hotspots across the globe, allowing them to be managed into the future protected from development. Through a guided activity, groups of students will research, present, and vote on which biodiversity hotspots TiME should purchase for conservation through their membership funds. Additionally, students will have the opportunity to develop a fundraising plan and raise money to participate in the voting process, empowering them to take action to protect endangered habitats.

This teacher guide is a companion to the Google Slides presentation *TiME + ECO Lesson* and contains all of the necessary background information needed to teach each idea. This lesson is not an exhaustive unit on biodiversity and it is recommended that extension lessons on topics such as mass extinctions, climate change, introduced/invasive species, and other topics are covered in the same timeframe. Teachers in social studies and/or ELA can use this lesson in conjunction with units on democracy, engagement and activism, social and environmental justice, or other related subjects.

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## LESSON OVERVIEW

Title: This is My Earth: Biodiversity Conservation in Action

### Summary

In this lesson, students will gain an understanding of biodiversity conservation in action by participating in a real, global conservation project through the nonprofit organization, This is My Earth (TiME). TiME uses advocacy, education, and a democratic voting process to crowdsource funds to purchase highly threatened biodiversity hotspots across the globe, allowing them to be managed into the future by local communities and protected from development. Through a guided activity, groups of students will research, present, and vote on which biodiversity hotspots TiME should purchase that year for conservation through their membership funds. Additionally, students will have the opportunity to develop a fundraising plan and raise money to participate in the voting process, empowering them to take action to protect threatened habitats. TiME's fundraising efforts are unique in that 100% of the funds raised go to land purchasing and there is no overhead for the organization.

### Lesson At A Glance

Grade Level: 6-8

Integrated Learning Focus: Science, ELA, and Social Science

Duration: 60-90 minutes, plus additional sessions if needed

Class Size: Any

Activity Teams: 2-4

Materials:

- [Instructor presentation](#)
  - Introduction to the activity video (last slide)
- Student handouts:
  - [introduction handout](#)
  - [activity worksheet](#)
- [Student presentation template](#)
- Paper, pencil
- Computer, tablet, or phone with internet

### Objectives

By the end of this lesson, students will be able to:

1. Define biodiversity and describe what makes a particular area a biodiversity hotspot
2. Discuss the challenges and threats to biodiversity conservation
3. Develop and present an argument in favor of preserving a particular biodiversity hotspot through the TiME organization
4. Understand the importance of biodiversity conservation

### Guiding Questions

1. What is biodiversity?

2. Why is it important to conserve biodiversity?
3. What actions can I personally take to help solve global biodiversity loss?
4. What is the connection between biodiversity conservation and climate change?
5. How does the loss of biodiversity impact our future?

Standards

<b>Next Generation Science Standards</b>	
MS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
MS-ESS3-4 Earth and Human Activity	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
<b>ELA Standards</b>	
CCSS.ELA-LITERACY.RI.6.1	Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
CCSS.ELA-LITERACY.SL.6.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.
CCSS.ELA-LITERACY.SL.6.2	Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.
CCSS.ELA-LITERACY.SL.6.4	Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.
CCSS.ELA-LITERACY.RH.6-8.1	Cite specific textual evidence to support analysis of primary and secondary sources.
<b>Social Science Standards</b>	

Geography 6.16, 7.18	Explain how technological developments, societal decisions, and personal practices influence sustainability. (Western/Eastern Hemispheres)
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### Vocabulary and Key Terms

biodiversity, habitat loss, habitat fragmentation, exploitation of natural resources, global climate change, resiliency, ecosystem services, sequestration, monoculture, biodiversity hotspot, endemic species, vascular plants, conservation advocacy, endangered, threatened

### A Note on Lesson Delivery

- The presentation may be delivered synchronously as a class, or asynchronously, assigned to be completed on one's own.
- Pre-teaching of key vocabulary and terminology is recommended, so students are re-visiting terms during the presentation
- Lesson may be broken into multiple sessions, for example:
  - Introduction presentation and worksheet, slides 1-10 - introducing key concepts
  - Introduction presentation and worksheet, slides 11-20 - deeper dive into biodiversity and climate change
  - Activity video, biodiversity hotspot research with worksheet and student presentation activity
  - Fundraise/collect donations
  - Vote on TiME's platform

## ACTIVITY PROCEDURE

### 1. PREPARE THE LESSON

Set up the activity by opening the presentation titled TiME: Biodiversity Conservation in Action.

Print or distribute digital copies of the TiME Introduction handout, one for each student. Later, students will also need access (printed or digital copies) to the TiME Activity handout.

Determine student groups beforehand. Each group will be assigned one biodiversity hotspot for their research project before beginning the activity.

### 2. PRESENTATION AND HANDOUT

#### Slide 2: Learning Objectives

Have students begin by filling out the blanks in their TiME Introduction handout. If students are filling out their worksheet digitally, create a new copy for each student on Google Docs by selecting **File → Make A Copy**, then **rename** their document with their name.

The learning objectives are as follows:

1. Define biodiversity, its importance, and describe what makes a particular area a biodiversity hotspot
2. Discuss the challenges and threats to biodiversity conservation
3. Discuss the need and opportunities for biodiversity conservation
4. Develop and present an argument in favor of preserving a particular biodiversity hotspot identified through the TiME organization

Stop and ask students what they already know about biodiversity. Have they heard the term before? If they have, what do they know about it? Spend a few seconds hearing students' responses.

#### Slide 3: Biodiversity Video - 3 minutes 4 seconds

Watch the video clip from the Our Planet series, narrated by David Attenborough (hosted on YouTube by the World Wildlife Fund). Note that students should fill in three interesting facts they learned while watching the video.

#### Slide 4: Define **biodiversity**

Biodiversity is the variety of life at all its levels, from genetics to ecosystems. This diversity of life may be viewed and quantified from three different levels: the genetic diversity between and within individuals in a population, the variety of species in a particular ecosystem, and the variety of ecosystems in a particular region and the world

If time allows, invite students to share what they learned or found interesting while watching the video and what it meant to them.

### Slide 5: Discussion question

Have students take a moment to think about the discussion question on their own, then pair students (in person or breakout rooms) to share their answers for 1-2 minutes. Finally, return as a group and have a few students share with the group for a short discussion.

Students may have noticed footage during the video that suggests ways we are losing species across the globe, especially in biodiversity hotspots. Keep in mind that there are natural and human-caused factors that students may point out. Natural phenomena include things such as meteor strikes, volcanic eruptions, and other large-scale disaster events. Human caused factors, discussed in the following slides, include habitat loss and habitat fragmentation (e.g. deforestation, development), over-exploitation of resources (e.g. over-fishing, poaching/trophy hunting), and global climate change.

### Slides 6-10: Human activities that lead to biodiversity loss

While going through each slide, students will fill out the definitions of each term on their worksheet.

- **Habitat loss**
  - **The process by which a natural habitat becomes incapable of supporting its native species.**
  - Examples include: deforestation, pollution (plastic pollution, oil spills, air pollution), development, resource extraction, fire
- **Habitat fragmentation**
  - **Continuous habitat broken up into many smaller pieces, so areas are separated from one another by a human-made matrix of different land use types.**
  - Can be large-scale or small-scale, such as the breaking up of soils
  - Invite students to imagine they are an animal such as a deer or a coyote, suddenly having to interact with humans in cities or suburbs
  - Or exposed to threats from human recreation and industry in their fragmented habitat
- **Exploitation of natural resources**
  - **The unsustainable harvest of natural resources and overuse of wild animal and plant species by people.**
  - Examples: poaching (large cats for fur, rhinoceros and elephants for ivory, pangolins for scales and meat) , overfishing, exotic pet trade
  - Displacement by resource extraction
  - This is often a sad or traumatic event for students to think about, particularly with animals they find interesting or exciting such as the rhinoceros, tiger, caribou
- **Global climate change**
  - **Significant changes in global temperature, precipitation, wind patterns, and other measures of climate that occur over several decades or longer.**
  - Keep in mind that changes in climate have occurred historically and contributed to the extinction of animal species in the past, but on a geologic time scale of hundreds of millions of years ago. This also allowed for animals and plants to evolve and adapt.
  - Presently, the accelerated rate of climate change is due to massive changes in land

use (habitat loss, exploitation of natural resources, large-scale agriculture that transform wild lands to grazing) and emissions of greenhouse gases (burning fossil fuels for energy and transportation), meaning the climate changes of today are largely human-caused.

Slides 11 & 12: Expand - what is the link between climate change and biodiversity loss?

Using the feedback loop diagrams, show how climate change and biodiversity loss are connected in the big picture. The first loop shows the current situation the planet faces. The second shows an intervention point, and how the system improves as a whole after actions such as conservation, less consumptive lifestyles and renewable energy are used.

A diverse ecosystem is a **resilient** one, meaning it is better equipped to withstand changes and recover back to its previous state after disruption, and thus better able to survive climate change. This is because there is more opportunity to adapt as well as more species to play crucial roles (**ecosystem services**) such as:

- maintain soil integrity, fertility and friability
- hold soils together and retain water
- **sequester** (trap and hold) carbon in the soil and plants
- deliver clean water to streams and rivers
- cycle nutrients
- filter toxins from the air
- pollinate plants (including crops)
- buffer against pests and diseases
- provide natural remedies
- maintain a balanced food chain from large predators to microorganisms

When climate change-related events, such as extreme wildfire, disrupts an area, a biodiverse ecosystem is more likely to have enough surviving species that can begin the regrowth process, restore soil health, and store water. In contrast, a single-species forest (also known as a **monoculture**) would be completely destroyed and the land would eventually become an entirely new type of ecosystem.

- For example, species-rich forests store twice as much carbon as single-species forests<sup>1</sup>. We know that the world's forests absorb as much as 30% of the world's human-caused CO<sub>2</sub> emissions, making them an extremely valuable ally in the fight against climate change.<sup>2</sup>

Unfortunately, climate change is a significant driver of species loss. In general, species with restricted temperature tolerances and dietary preferences, small populations, and limited ability to migrate are most likely to suffer from rapid climate change.

- An example of this is the American Pika, which lives in cool, high alpine environments in the

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<sup>1</sup> <https://www.sciencedaily.com/releases/2018/10/181004143905.htm>

<sup>2</sup> <https://www.nature.com/news/carbon-sequestration-managing-forests-in-uncertain-times-1.14687#:~:text=In%20the%20past%20few%20decades,thirds%20of%20forests%20are%20managed>



western US. An increase in temperature is proving deadly to this species, because they live so high up in the mountains that there is nowhere left for them to go to find their food source, and their populations become disconnected.

- Locations with high biodiversity often are home to animals or plants that are likely to suffer from rapid climate change- this will be explained in the next slide, when you define endemic species, and look at the example of caribou and reindeer.

### Slide 13: Define **endemic species**

Endemic species are species that are native to a defined geographic location (such as an island) or habitat type found nowhere else in the world. A few familiar examples of endemic species: lemurs of Madagascar, Galapagos tortoise, kangaroos in Australia.

Caribou and reindeer, endemic to northern Boreal forests in North America and Europe, are another example of species in decline due to compounded effects of deforestation and climate change. The loss of these forests, which absorb more carbon than Amazonia, is also damaging to efforts to meet climate and biodiversity commitments and protect indigenous rights. Instead of conserving habitat, the key to self-sustaining populations, governments continue discredited programs such as killing wolves. These types of short-term “solutions” neither address climate change or the need to conserve large areas of habitat for the endemic caribou and reindeer, the other species that rely on Boreal forests for food and shelter, or indigenous peoples who rely on the land for their livelihoods and lifeways.

### Slides 14 & 15: What is a biodiversity “hotspot”?

Ask students what they notice on the map, and invite students to guess what they think a biodiversity hotspot may be.

Explain: “around the world, 36 areas qualify as hotspots. They represent just 2.4% of Earth’s land surface, but they support more than half of the world’s plant species as endemics — i.e., species found no place else — and nearly 43% of bird, mammal, reptile and amphibian species as <sup>3</sup> endemics.”

### Slide 16: Define **biodiversity hotspot** and its criteria

To qualify as a biodiversity hotspot, a region must meet two strict criteria:

1. It must have at least 1,500 vascular plants as endemics — which is to say, it must have a high percentage of plant life found nowhere else on the planet. A hotspot, in other words, is irreplaceable.
2. It must have 30% or less of its original natural vegetation. In other words, it must be threatened. <sup>4</sup>

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<sup>3</sup> <https://www.conservation.org/priorities/biodiversity-hotspots>

<sup>4</sup> <https://www.conservation.org/priorities/biodiversity-hotspots>

### 3. INTRODUCE THE ACTIVITY

#### Slide 17: Problem & Solution

Problem: over 50% of biodiversity hotspots are on privately owned land. Solution: buy them as public trust.

For biodiversity conservation strategies, this is one solution that the organization This is My Earth (TiME) has adopted. TiME's strategy is to raise funds through education and outreach - informing the public about the importance of these locations - then have funders vote on which hotspot the organization purchases and transfers to local guardians.

The way this project works is outlined on TiME's website:

- Crowdfunded - The money to buy land and preserve biodiversity is 100% crowdfunded
- Transparent - 100% of the crowdfunding contributes directly towards our conservation projects
- Inclusive - Everyone can vote for which conservation project they want to prioritize saving first
- Globally Local - We always partner with local organizations to ensure land stays in the hands of Indigenous people

#### Slides 18 & 19: What can you do about it? ; TiME's website screenshots

Explain to students they will be participating in this global project through a research activity and presentation. Then, students will have the opportunity to take part in the project and cast their vote on where TiME spends their funds at the end of the year.

TiME's model is egalitarian; whether donating \$1 or \$100,000 each donor gets one single vote. Anyone with one dollar and computer access can participate in the project. The goal is to get people across the globe to take action to protect biodiversity by permanently keeping habitat intact and away from development, also known as **conservation**. Through the fundraising and voting process, students will be participating in **advocacy**!

#### Slide 20: Let's get started! - Activity Instructions Video

Show students the video explaining how to do the activity. Uri Shanas, the founder of TiME, and ECO educators will lead students through their next steps.

### 4. RESEARCH & DEVELOP PRESENTATIONS

Divide the class into two or more groups depending on the number of projects presented on the website, and assign each group one of the biodiversity hotspots on TiME's website ([www.this-is-my-earth.org](http://www.this-is-my-earth.org)).

Give each student a copy of the activity worksheet, This is My Earth Activity, and instruct teams to begin research on their hotspot. If students are filling out their worksheet digitally, create a new

copy for each student on Google Docs by selecting **File → Make A Copy**, then **rename** their document with their name.

Give groups a blank copy of the Google Slides presentation, Student Presentation Template, which they will use as a team to present their hotspot. Again, have students select **File → Make A Copy → Entire Presentation**, then **Rename** their presentation with their names. They may input new photos, facts, and information, but should stick to the assigned number of slides to keep their presentation around 5-6 minutes long (1-2 minutes per slide).

Encourage students to appeal to their classmates passionately and intellectually. For example, a cute picture of an animal might make others want to vote, but they also need to know why that animal is important to the ecosystem.

## **5. STUDENT PRESENTATIONS**

Come together as a class and have students share what they have learned. Remind students that making an argument for their hotspot ought to include compelling reasons for voters to pick their project.

## **6. RAISE FUNDS FOR THE CONSERVATION PROJECT**

As a class, brainstorm ways to fundraise so they may participate in the voting process. This can be done in many different ways, depending on your school culture. Here are some ideas to get you started:

- Collect and return refundable bottles and cans
- Host a bake sale or craft sale
- Put together a raffle with prizes
- Ask local businesses to contribute
- Do a social media campaign
- Put a container at the front office of the school asking for donations
- Send out flyers or emails to families to ask for donations

The important piece to remember is that you must raise at least enough money to donate \$1 per voter. This will allow each student to vote once. However, students may feel strongly that it is important to raise a higher goal amount, to donate more money to the projects.

Contact [time.myearth@gmail.com](mailto:time.myearth@gmail.com) before donating the funds to begin the process to ensure students can vote via their email addresses.

## **7. CAST VOTES USING EMAIL ADDRESSES**

Once the donation has been received by TiME, collect students' school email addresses and send them to TiME at [time.myearth@gmail.com](mailto:time.myearth@gmail.com).

TiME will send students a link to be able to access a way to cast their vote for the conservation project they would like to see funded this year. Students may do this on a school computer or using a personal computer, depending on accessibility.

Give students a timeframe within which they should cast their vote, in order to do an exit poll at the end.

## **8. EXIT POLL - HOW DID THE CLASS VOTE?**

An exit poll is useful if the class wants to know which project “won” within the class. If skipping this step, simply refresh the TiME website after votes have been submitted to see the real-time update of votes.

Options for a classroom exit poll include:

- Create a SurveyMonkey, Google Form, Doodle Poll, or other online tool and send the link to students
- Have students send an email to the instructor with the name of the hotspot they voted for
- Put heads down on desks with eyes closed and raise hands; count the votes this way
- Have students write their vote on a slip of paper and put it in a container

## **9. SHARE THE PROJECT WITH OTHERS**

Encourage students to share what they learned with their families and community outside of school. What projects do their friends and families want to learn more about? Can they convince others to cast a vote as well? This may be assigned as homework or an extension of the activity.

The more people that participate, the greater chance TiME has to preserve these critical habitats for generations to come!