

UPDATED 4/4/2020

# HABITAT & BIODIVERSITY CONSERVATION

RECOMMENDED FOR GRADES 2 - 4

A Unit on Biodiversity, Ecosystems,  
Climate Change, and Environmental Solutions

WRITTEN AND DEVELOPED BY EMILY VOREAS

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Our Habitat & Biodiversity Conservation unit combines environmental education with tangible conservation solutions. With eco-anxiety on the rise, we believe that teaching solutions alongside challenges will benefit the mental health of students and help the planet at the same time. If you have questions, comments, or requests for our next unit, please email [info@reservaylt.org](mailto:info@reservaylt.org).

### HABITAT & BIODIVERSITY CONSERVATION

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**The lessons in this unit address the following Next Generation Science Standards:**

<b>2</b>	<p>2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats.</p> <p>2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.</p> <p>2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.</p>
<b>3</b>	<p>3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.</p> <p>3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.</p> <p>3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.</p> <p>3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.</p>
<b>4</b>	<p>4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.</p> <p>4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p>4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.</p>



**biodiversity (biological diversity):** The combination of all living things in a place. It can include animals, plants, and even single-celled algae.

**ecosystem:** Homes with biodiversity. Similar terms: habitat, biome, environment

**carbon dioxide (CO<sub>2</sub>):** A gas in the air. Plants “breathe it in” and humans breathe it out.

**greenhouse gases:** Different gases in the air (including water, carbon dioxide, methane, etc.). These gases act like a blanket around the earth and absorb the sun’s heat (known as The Greenhouse Effect).

**oxygen:** A gas in the air. Plants “breathe it out” and humans breathe it in.

**fossil fuel:** A natural fuel (source of energy) such as gas, oil or coal. Fossil fuels were formed hundreds of millions of years ago from the remains of living organisms.

*\*Extra information: The organisms were made of carbon, and were then squashed under layers of earth. The pressure transformed the remains into gas, oil, or coal. When burned, fossil fuels release CO<sub>2</sub> into the atmosphere.*

**climate change:** A change in Earth’s climate patterns. Over time, Earth has experienced much colder climates and much hotter climates.

*\*Extra information: Climate is the long term average of the weather over decades. Weather is the short changes of energy around the globe.*

**global warming:** Scientists are noticing an increase in the earth’s temperature. This is because greenhouse gases (such as Carbon Dioxide) are building up in our atmosphere and acting like a blanket around the earth. The Greenhouse gases are trapping the sun’s heat and warming the earth faster than normal.

**lawsuit:** A process by which disputes between people are decided in court.

*\*Extra information: In the lawsuit Juliana vs. United States, 21 kids are suing the US government for failing to protect the earth against climate change.*

## WHAT IS BIODIVERSITY?

*Essential Question:* Why is biodiversity important?

### Summary

This lesson will teach students about biodiversity. Biodiversity (short for biological diversity) is the combination of all living things in a place. It can include animals, plants, and even single-celled algae that are too small to see with a microscope. The more diverse or different an area is, the stronger it will be, because every species is linked and relies on one another to survive and thrive.

### Hook

VIDEO: [Bill Nye Biodiversity](#) (22 min.) + [Question Sheet](#)

OR BOOK: *I See a Kookaburra!* by Steve Jenkins and Robin Page + Discussion:

*Turn and Talk:* Tell your partner all about an animal you learned about in this book.

*Whole Class:* We learned about several habitats including deserts, tide pools, jungles, savannas, forests, and ponds. How do some animals or plants adapt or change to live in their special habitats? *Example:* I know the desert has very little water, so a cactus survives by storing water in its stem.

FOLLOWED BY: KWL Chart

### RESOURCES

#### Video:

TED Ed, Why is biodiversity so important? - Kim Preshoff:  
[thekidshouldseethis.com/post/why-is-biodiversity-so-important-ted-ed](http://thekidshouldseethis.com/post/why-is-biodiversity-so-important-ted-ed)

#### Website:

Bio-benefits: [amnh.org/explore/ology/biodiversity/bio-benefits2](http://amnh.org/explore/ology/biodiversity/bio-benefits2)  
Learn about specific species: [iucnredlist.org](http://iucnredlist.org)

ACTIVITY 1

## Web of Life

### Directions:

Sit in a circle and give each student a card. Explain how the ball of string represents connections between plants and animals. Teacher holds the sun card, and starts the web by passing the ball of string to the student holding the tree card. Explain that trees need the sun's energy to grow. Tree student passes the string to an animal or plant student, and explains why they are connected. Continue until everyone is connected within the web at least once.

### Supplies:

Ball of String  
[Ecosystem Cards](#)

### >> EXIT TICKET

KWL CHART STICKY NOTES:  
 WHAT DO YOU STILL WONDER ABOUT BIODIVERSITY?

### String Tug:

| DISCUSS: What would happen (hypothetically) if the sun didn't shine?  
*Plants would die, and other animals would starve.*

Class sits very still and teacher (sun) tugs on string. When students feel the tug, they should tug gently. Watch as tugs move the web. The entire web should be shaking.

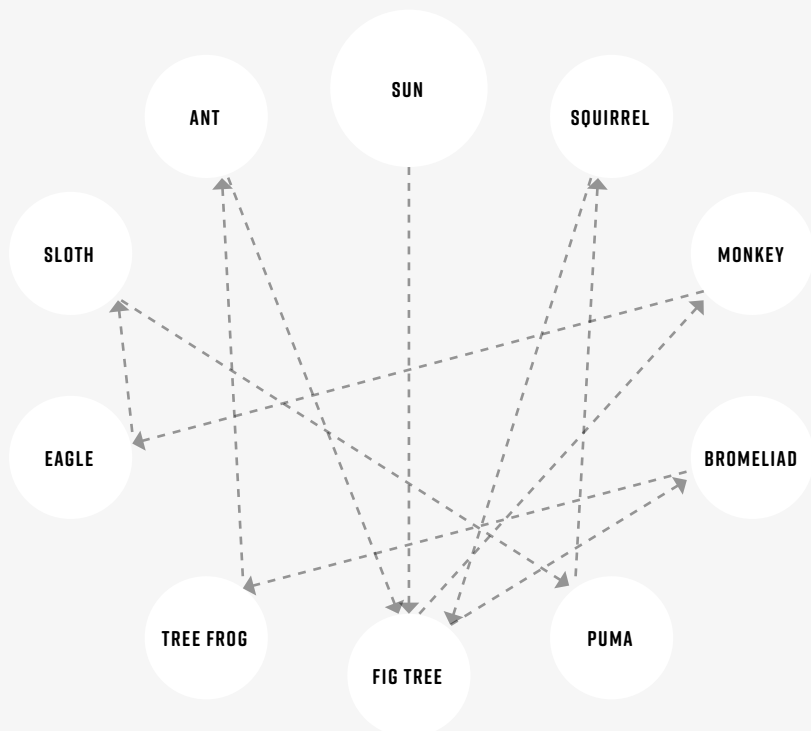
| DISCUSS: What do you notice about the web? *The entire web is connected. If one species is removed, it will affect all connected species, causing a chain reaction.*

Now, ask the students to consider what would happen if one of the animals or plants were removed from the ecosystem. Choose various students to tug (one at a time) and discuss the chain reaction.

### Example:

Sun (teacher) gives energy to the tree, which feeds the monkey, which feeds the eagle, which eats the sloth, which feeds the puma, which eats the squirrel, which lives in the tree, which hosts the bromeliad, which is home to the frog, which eats the ant, who lives in the tree.

*Note: It's OK if students aren't sure about each connection; encourage students to consider how their card \*might\* connect if they aren't sure.*



## ACTIVITY 2

**Species Discovery****Directions:**

Go outside to a nearby green space. Give each student Species Discovery Worksheets, magnifying glass, and hula hoop or length of string. Split class into pairs or small groups, and spread out until each group has their own “discovery zone” to explore. Students place hoop (or loop of string) on the ground, and make note of every plant and animal they find within the enclosed space.

***Optional Supplies:***

Magnifying Glasses

Hula Hoops

*or*

String (6' Lengths)

**Worksheet:**

Travel around to each group as they work, and encourage students to look closely for smaller forms of life they might be overlooking. Continue until each group has several species documented, then gather to present findings.

DISCUSS: Did you find more species than you expected in your discovery zone? *Some species are very small, and you will only find them by looking closely.*

DISCUSS: What can we do to protect these species in our ecosystem? *Don't kill bugs, do pick up litter (safely!), and volunteer with local environmental groups to help plant trees and monitor wildlife.*

**ECOSYSTEM CARDS**

**ENERGY SOURCE**

**SUN**

**PLANTS**

**FIG TREE**

**ANIMALS**

**EAGLE**

**FUNGI**

**MUSHROOM**

**ANIMALS**

**TREE FROG**

**ANIMALS**

**ANT**



**ECOSYSTEM CARDS**

**ANIMALS**

**SNAKE**

**ANIMALS**

**OWL**

**PLANTS**

**ORCHID**  
(FLOWER)

**ANIMALS**

**MONKEY**

**ANIMALS**

**TARANTULA**  
(SPIDER)

**ANIMALS**

**BUTTERFLY**

**ECOSYSTEM CARDS**

**ANIMALS**

**PUMA**

**ANIMALS**

**TOUCAN**

**ANIMALS**

**SQUIRREL**

**ANIMALS**

**ANOLE**  
**(LIZARD)**

**ANIMALS**

**SLOTH**

**ANIMALS**

**HUMMINGBIRD**

**ECOSYSTEM CARDS**

**PLANTS**

**BROMELIAD**  
(FLOWERING PLANT)

**ANIMALS**

**DEER**

**ANIMALS**

**SPECTACLED  
BEAR**

**ANIMALS**

**BEE**

**ANIMALS**

**MOUSE**

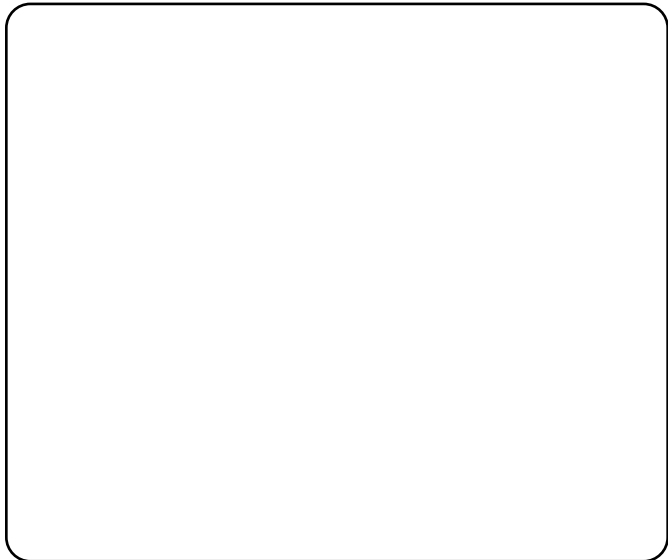
**ANIMALS**

**JAGUAR**

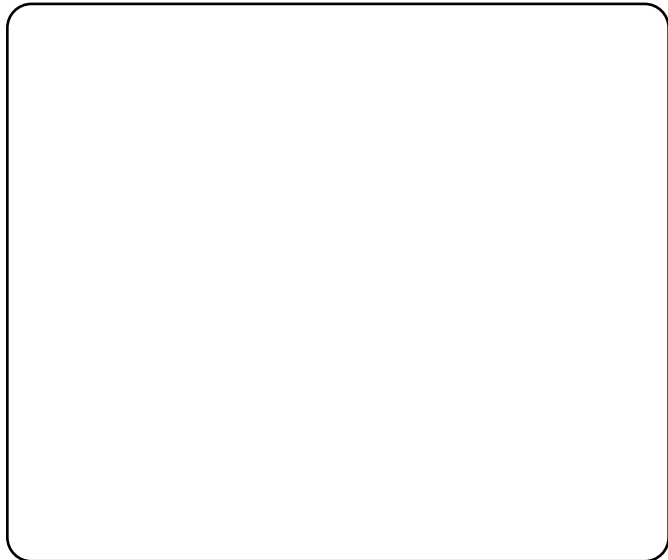
**SPECIES DISCOVERY WORKSHEET**

**Name:** \_\_\_\_\_

**SPECIES #** \_\_\_\_\_



**SPECIES #** \_\_\_\_\_



**Type (circle one):**

Animal | Plant | Insect | Other

**Type (circle one):**

Animal | Plant | Insect | Other

**Description:**

**Description:**

**How is it connected to other species?**

**How is it connected to other species?**

## WHERE DO YOU FIND BIODIVERSITY?

**Essential Question:** Which biomes contain the most biodiversity?

“Ecosystems can be as small as a drop of water,  
or as huge as a whole ocean.”

-Bill Nye

### Summary

Ecosystem, habitat, biome, environment... these are all names for homes with biodiversity. You can find biodiversity in deserts, oceans, arctic areas, grasslands, and many types of forests. In particular, tropical rainforests cover approximately 6% of the earth's surface and house around one half to three quarters of the earth's species of animals and plants

### Hook

VIDEO: [Biome Introduction Video](#)

[TWITTER GRAPH](#) - Uses emojis to represent biodiversity by latitude

BOOK: *The Rainforest Grew All Around* by Susan Mitchell -Free book through Epic! (must log in)

### ACTIVITY

## Sound Map

### Directions:

Students have 5-10 minutes to create a Sound Map of noises in the rainforest. (*Suggested soundtrack:* [youtube.com/watch?v=8myYyMqjFE](https://www.youtube.com/watch?v=8myYyMqjFE))

Students create an abstract map on a blank sheet of paper to track the sounds they hear in an environment. They may use pictures, shapes, or words to track each individual sound.

### **Supplies:**

Paper  
Pens / Pencils

### >> EXIT TICKET

STUDENTS DO A GALLERY WALK OF THEIR PEERS' SOUND MAPS AND WRITE NOTES ON INDIVIDUALS' GALLERY WALK NOTES SHEET, PLACED NEXT TO EACH SOUND MAP. STUDENTS CAN WRITE ABOUT WHAT THEY LIKE AND WHAT THEY WONDER FOR EACH SOUND MAP.

## RESOURCES

**Websites:**

More information: [wwf.panda.org/our\\_work/forests/importance\\_forests/tropical\\_rainforest/](http://wwf.panda.org/our_work/forests/importance_forests/tropical_rainforest/)

Rainforest coloring sheet: [rainforest-alliance.org/coloring-pages/rainforest](http://rainforest-alliance.org/coloring-pages/rainforest)

What is Biodiversity?: [amnh.org/explore/ology/biodiversity/what-is-biodiversity](http://amnh.org/explore/ology/biodiversity/what-is-biodiversity)

Sound Maps: [sensorytrust.org.uk/information/creative-activities/sound-maps.htm](http://sensorytrust.org.uk/information/creative-activities/sound-maps.htm)

**Video:**

Suggested soundtrack (many music streaming websites and apps also have free rainforest sounds, and may work better, depending on your internet strength): [youtube.com/watch?v=8myYyMgifFE](https://youtube.com/watch?v=8myYyMgifFE)



## THREATS TO BIODIVERSITY

*Essential question:* Why should we worry about biodiversity?

### Summary

The earth's temperature has always fluctuated over millions of years. It has been much hotter and much colder. Unfortunately, over the past 100 years, the earth has been heating up at an alarming rate. The climate is changing faster than the biodiversity can evolve, and it is having an impact on many species' survival. Also, humans are cutting down trees and taking away many species' homes. Many species are losing their homes and having trouble acclimating to the new conditions on Earth.

### *So what's the deal with global warming?*

Plants “breathe in” Carbon Dioxide (CO<sub>2</sub>) and release Oxygen. Most animals breathe in Oxygen and release CO<sub>2</sub>. This keeps the levels of CO<sub>2</sub> and Oxygen in the atmosphere relatively equal. However, over the past several hundred years, humans have started to burn great amounts of fossil fuels to power their lives. When fossil fuels (oil, coal, wood) are burned, they release CO<sub>2</sub> into the air. Unfortunately, there is more CO<sub>2</sub> than the plants can handle, which has led to a large surplus of CO<sub>2</sub> and other greenhouse gases floating in our atmosphere. The problem is, the CO<sub>2</sub> acts like a blanket and traps the sun's heat close to the earth.

### Hook

BOOK: *Buried Sunlight* by Sallie Chisolm

Optional discussion questions on pages 7-8

\*Note: This book has amazing information, but the last 1/3 can be a bit scary.

Consider skipping pages 25-28 (“Your Earth has begun to feel these changes...”)

## ACTIVITY

**Web of Life****Directions:**

In container 1, pour water over multiple sponges so sponges absorb most of the water.

DISCUSS: What do you notice? *The plants are “breathing in” the CO<sub>2</sub> from the air.*

In container 2, pour water over 0-1 of the sponges so there is a lot of excess water.

DISCUSS: What do you notice? *The CO<sub>2</sub> builds up in the air when we do not have enough plants.*

Squeeze water out of the sponges.

DISCUSS: What do you notice? *The CO<sub>2</sub> is released when we burn trees and other fossil fuels.*

**Video Conclusion:**

Watch this [timelapse video](#) of a glacier melting over 10 years.

DISCUSS: What did you see, and why is it happening? Why might the seas be rising? Where is the extra water coming from? Did you know that wetter air can cause storms, floods or even droughts?

**Supplies:**

Water  
(to Represent CO<sub>2</sub>)  
Sponges  
(to Represent Trees)  
2 Containers

**>> EXIT TICKET**

**HANDOUT:** PRINT EXIT TICKET  
WORKSHEET ON NEXT PAGE

## RESOURCES

**Websites:**

Weather vs. Climate: [pmm.nasa.gov/education/weather-climate](http://pmm.nasa.gov/education/weather-climate)

Causes of Climate Change: [climate.nasa.gov/causes/](http://climate.nasa.gov/causes/)

Threats to Biodiversity: [amnh.org/explore/ology/biodiversity/going-going-gone](http://amnh.org/explore/ology/biodiversity/going-going-gone)

# EXIT TICKET WORKSHEET

Name: \_\_\_\_\_

GLACIER ON APRIL 1, 2007



GLACIER ON JUNE 28, 2017



How could these changes affect our lives?:

Name: \_\_\_\_\_

GLACIER ON APRIL 1, 2007



GLACIER ON JUNE 28, 2017



How could these changes affect our lives?:

## SOLUTIONS

**Essential question:** What can we do to conserve the earth's biodiversity?

### Summary

In 2018, 15 year old Greta Thunberg stood outside her government in Sweden holding a sign for “stronger climate action”. Other students joined the movement, and now hundreds of school strikes for climate have been held all over the world. Greta wasn't the first youth environmental advocate, but her actions have provoked the strongest response yet. Students worldwide are demanding that their communities take action to slow down global warming and climate change.

Kids are becoming the leaders in the fight to protect our planet. And people can start by changing habits at home and in their communities. Reduce, Reuse and Recycle are the most well-known solutions. People can also educate themselves and speak out to spread the word.

### Hook

[Picture](#) of Great Thunberg and the climate strikes and/or Greta Thunberg [Video](#).

DISCUSS: What are your thoughts about this photo/video? Why is climate change a problem for kids? Do you think the government should help with climate change? How can it help?

### ACTIVITY

## Gallery Walk

### Directions:

Print out these solutions to help save the environment: [Solutions for Kids](#). Students work in groups to do a gallery walk (or jigsaw if time is limited) spending several minutes at each solution. They may take notes using the template provided on page 13.

### >> EXIT TICKET

**HANDOUT:** STUDENTS WILL EACH CHOOSE A SOLUTION TO COMMIT TO IN ORDER TO HELP BIODIVERSITY. STUDENTS WILL WRITE A PROMISE ABOUT THEIR CHOICE OF SOLUTION. PROMISE SHEETS CAN BE FOUND ON PAGE 15.

### RESOURCES

### Websites:

Drawdown Solutions: [drawdown.org/solutions-summary-by-rank](https://drawdown.org/solutions-summary-by-rank)

NASA Climate Kids: [climatekids.nasa.gov/how-to-help/](https://climatekids.nasa.gov/how-to-help/)

# SOLUTIONS WORKSHEET

**Name:** \_\_\_\_\_

**Directions:**

Consider each solution. What problem does it solve, and how? Take notes on this sheet with your team.

**STOP WASTING FOOD**

**Problem:**

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**Notes on the solution:**

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**EAT MORE PLANTS**

**Problem:**

---

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**Notes on the solution:**

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---

**USE LESS PLASTIC**

**Problem:**

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**Notes on the solution:**

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**SAVE WATER**

**Problem:**

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**Notes on the solution:**

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# SOLUTIONS WORKSHEET

## RECYCLE

**Problem:**

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**Notes on the solution:**

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---

## RIDE BIKES

**Problem:**

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**Notes on the solution:**

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## COMPOST

**Problem:**

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**Notes on the solution:**

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## PLANT MORE PLANTS

**Problem:**

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**Notes on the solution:**

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**PROMISE SHEET**

**'s Promise to Help Save Our Earth**

***Key solutions:***

Stop wasting food

Save water

Recycle

Compost

Eat more plants

Use less plastic

Ride bikes

Plant more plants

**I promise to ...**

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**This will help the earth because ...**

---

---

---

**I will do this by ...**

---

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---

## MY FIRST ACTION

**Essential Question:** How can we help save biodiversity in the rainforests?

### Summary

As we learned in Lessons 2–3, the rainforests are full of biodiversity, but are often threatened by human activity. The solutions we discussed in Lesson 4 will help you reduce your carbon footprint and be a better steward of the planet. But many of those actions prove their impact over time, and we want to end this lesson with an action that will help save the rainforest *right now!*

**Reserva:** The Youth Land Trust is an organization that works to empower children to save the planet directly. In fact, they need your help right now as they work to create the world's first *entirely youth-funded* nature reserve—a highly threatened piece of cloud forest in Ecuador.

Reserva's Million Letters campaign is an effort to bring your opinion to world leaders and save important habitats at the same time. They need kids everywhere to write a letter explaining why you love nature, and why it is important to protect wild places like the rainforest. In return, Reserva will match your letter with \$3 toward their youth-funded reserve project. That's enough money to buy a classroom-sized piece of land!

Want to save even more rainforest? You can help by donating your own money or creating a fundraiser at home or school—maybe it's a bake sale, a lemonade stand, or even a walk for wildlife. Every donation will be matched dollar for dollar by Reserva's partner, Rainforest Trust! (*Learn more at [reservaylt.org/donate](https://reservaylt.org/donate).*)

### Hook

[Video Introducing Reserva](#) - Winner of the UN Global Youth Video Competition

### ACTIVITY

## The Million Letters Campaign

### Directions:

Write a letter about why you love nature, and why we should protect it. Draw a picture to illustrate why nature is important! Include your first name, age, and state or country, but do not include sensitive information such as your address, last name, or phone number.

Teachers can send youth letters by mail to P.O. Box 57277, Washington, D.C. 20037 or email a photo of each letter to [info@reservaylt.org](mailto:info@reservaylt.org).

**>> EXIT TICKET**  
HANDOUT: LETTER TEMPLATE

Large empty rounded rectangular box for drawing or writing.

Seven horizontal lines for writing.

**First Name, Age**  
**State/Country**

Empty rounded rectangular box with a dotted border for writing.



**Acknowledgments:**

*Unit created by: Emily Voreas, Reserva Advisory Council Member and Educational Consultant*

*Design by: Callie Broaddus, Reserva Founder & Executive Director*

*Additional Educational Consultants: Carolyn Weddell, Emily Dale*

**About Reserva**

Reserva: the Youth Land Trust is an organization dedicated to empowering youth through conservation, education, and storytelling. Based in Washington, D.C., Reserva is supported by an international Youth Council, a group of (currently) 50 youth from around the world who formally advise on our actions and help design, share, and implement Reserva's initiatives.

**Our Vision:**

One day, every young person will feel empowered to make a measurable difference in the future of their planet.

**Our Mission:**

We create youth-funded nature reserves to protect biodiversity, fight climate change, and to elevate the status of young people as environmental change-makers. We educate youth around the world on the importance of habitat and biodiversity and empower them with this platform for action. And we design creative projects that amplify our impact on a global scale through engaging storytelling.

*Contact us:*

[reservaylt.org](http://reservaylt.org)

[info@reservaylt.org](mailto:info@reservaylt.org)

*or*

**P.O. Box 57277**

**Washington, D.C. 20037**

*Social Media:*

**@ReservaYLT**

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