



VIRTUAL FIELD TRIP TEACHER'S GUIDE

The Journey of Water: From Colombia's Páramo to the Kitchen Sink

Grades: 3-8

Subjects: Science, Geography, Social Studies

Purpose: This guide contains a variety of student materials, which can be used before, after, or during the virtual field trip. It also contains links to Nature Lab resources and other resources.

Description of Virtual Field Trip: Roughly the size of Texas and Oklahoma combined, Colombia is the second most biologically diverse country on Earth—home to 10% of Earth's plant and animal species! There are over 300 different ecosystems in Colombia and in this Virtual Field Trip, we will explore the magical páramo ecosystem and the stunning mountain landscapes found just beyond the capital city of Bogotá.



Alejandro Calvache
Freshwater Strategy
Coordinator for TNC

Students will see what it's like to walk among towering, furry, sunflower-like plants that capture the mist and rain, ultimately providing water for city residents downstream. And they'll see moss that can hold 40x its weight in water—it's true! They'll also learn about the incredible wildlife in the area including spectacled bears, tapirs, jaguars, and Andean condors. Along the way, students will explore where water comes from, how nature works to store and filter water, and how they can help protect water in their hometown.

By the end of the journey, your students will have a better understanding of how water, nature, and people are connected. It'll be an experience to remember!

Materials: PDF versions of the items listed below are available online to accompany this lesson.

- **Nature Spy Handout** This handout includes images of animals and plants that students will see during the field trip. Print it off and have students check off the images as they see them.
- **Virtual Field Trip Log**
This one-page handout can be printed and used before, during, and after the field trip for students to think about what they hope to see, what they learned, what they want to know more about.
- **Vocabulary Graphic Organizer**
This handout includes vocabulary words used during the virtual field trip and provides a structure for students to define and use them in a sentence.
- **Colombia Virtual Field Trip Discussion Questions**
This handout can be used during and after the virtual field trip. You can modify the questions as needed or use them as discussion prompts after the trip. The answer key is located at the end of this teacher's guide.

Standards:

Next Generation Science Standards Disciplinary Core Ideas

- ESS2.A: Earth Materials and Systems
- ESS3.A: Natural Resources
- ESS3.C: Human Impacts on Earth Systems
- LS4.C: Adaptation
- LS4.D: Biodiversity and Humans
- LS2.C: Ecosystem Dynamics, Functioning, and Resilience

General Resources:

The cheeseburger water footprint reference in the virtual field trip came from the book [Your Water Footprint](#) by Stephen Leahy (2014). You can use this resource to have students explore the other water footprints of items they use or consume.

Related Nature Lab Resources: The following lesson plans and videos can be used to supplement the virtual field trip.



Water: The Source of Life

As water travels across our planet, it shapes our environment, connects all living things, and is critical for survival. This video follows the journey of water to find out how one city, Bogotá, Colombia, gets water from its source in Chingaza National Park and the surrounding páramo ecosystem.

The video is accompanied by two lesson plans: In **Biomimicry: Water Security Inspired by Nature** students use the plants of the páramo as models for an engineering challenge. **Finding Your Flow: A Toolkit for Watershed Engagement** provides online resources for understanding watersheds, connecting to local watershed resources, engaging in watershed activities in the classroom, and identifying opportunities for watershed activism. It also includes a list of suggested projects that can make use of the resources.



How Natural Areas Filter Water

Nature works to filter water and to release water over time, thereby reducing the amount of artificial treatment needed to filter water and helping to prevent flooding. In this lesson, students learn about the importance of water quality for human health and agriculture. They relate their own consumption activities to the water supply and brainstorm various threats to the water supply. By contrasting natural filters with impervious (paved) areas, students compare the impact of development on the ability of nature to provide clean freshwater

Discussion Questions (Answer Key): You can use or adapt these questions for a follow-up discussion with your students after viewing the virtual field trip. Older students may be able to follow along and answer the questions while viewing.

1. What is the páramo and in what country is it located?

Answer: The páramo is a type of ecosystem located in Colombia, South America.

Teachers: Note that the páramo ecosystem is also found in Ecuador, Peru, Venezuela, and Costa Rica. As an extension, students can explore the páramo ecosystem in more depth and discover how it differs in these different regions.

2. Colombia makes up only 0.003% of Earth's land area but has what percent of Earth's plant and animal species?

Answer: 10%.

3. Alejandro talked about how a box of science experiments got him excited about science when he was a child. What kinds of things or activities interest you or get you excited about science?

Answer: Answers will vary.

4. Chingaza is a national park in Colombia. Can you name 2 or 3 national parks in the United States?

Answer: Answers will vary.

Teachers: This is a great extension opportunity to explore current national parks and the history of national parks. See <https://www.nps.gov/learnandexplore/index.htm> for resources.

5. Where does the city of Bogota get most of its drinking water?

Answer: From Chingaza National Park.

6. Alejandro described visiting Chingaza National Park when he was eight years old. Describe a natural place that you have enjoyed visiting (it doesn't have to be a national park). What is it like there? What do you like about it?

Answer: Answers will vary.

7. How do the plants in the páramo help people in Bogotá to have safe drinking water?

Answer: The plants capture and store water and release it year-round, even during the dry season. The plants also help to filter and clean the water.

8. Provide some examples from the virtual field trip that show how "keeping nature healthy helps to keep people healthy."

Answer: People depend on nature for many things, including clean and safe water for drinking and washing. By protecting ecosystems, we make sure they are healthy enough to provide people the resources we need. In the virtual field trip, TNC works with people like farmers so that water quality can be improved and that benefits the upstream and downstream users.

9. What are some of the things that can lower the quality of the water as it travels from Chingaza to Bogotá?

Answer: Loose soil, fertilizers, and manure.

Take it further:

Is the water where you live affected by any of these things? Why or why not?

Answer: Answers will vary. If the water in your region, or the region in which students live, passes through agricultural areas, the answer is likely yes because these issues are the result of agricultural practices.

10. Think about your day. What are some things that you depend on water for and that would be more difficult if you did not have access to enough clean water?

Answer: Answers will vary, but might include eating meals, drinking enough water, washing clothes and dishes, taking showers.

11. Tyler describes the water used to make a simple cheeseburger. Describe one of your favorite meals and how water might be used in each part of it. You do not need to include the number of gallons of water, only how the water might be part of the process, as with the grass the cows need to eat.

Answer: Answers will vary but should include the “hidden” components of the meal.

Take It further:

See if you can do some online research to find out how much water, in gallons, your meal really does use!

Answer: Answers will vary.

12. What kind of plant can absorb 40 times its weight in water?

Answer: Peat moss or moss.

13. Why are the hairy leaves of the frailejones important to people and animals?

Answer: Because the hairs on the leaves capture the mist(water) in the air that the plant then stores in its trunk and releases throughout the year, making it available even during the dry season.

14. Name two of the animals you might see in the páramo.

Answer: Spectacled bear, jaguar, puma/cougar/mountain lion, tapir, golden eagle, Andean condor, hummingbird.

15. What is a camera trap?

Answer: A hidden camera that records when it senses movement. It is a way scientists can learn more about animals that are difficult to see in the wild.

16. What animal does Colombia have the largest number of species in the world?

Answer: Birds.

17. What are some of the threats facing the páramo ecosystem in Colombia?

Answer: Urbanization means a greater need for resources: farming means that land gets cleared—deforestation—and fertilizers and manure are introduced; mining and other development also leads to deforestation and resource use.

Take it further:

Does the ecosystem in which you live or from which you get your water face any of these threats? Explain.

Answer: Answers will vary.

18. What is a water fund?

Answer: When people, companies, and government agencies come together and contribute to protect water at its source. This can help farmers protect the ecosystem and still make a living.

19. What are some ways you can help protect water where you live?

Answer: Learn about where your water comes from; Learn about your watershed and how people are working to protecting it; Join the effort to protect your watershed; conserve/don't waste water.

Take It further:

Why is it important to protect water at its source?

Answer: Because if we protect it at its source, we can be sure it is clean and safe to drink and use, not just for people, but for other animals and for plants for a long time to come.

What does it mean?

Word: **Páramo**

Definition:

Part of speech:

- Noun
- Verb
- Adjective
- Adverb

Sentence:

Word: **Frailejones**

Definition:

Part of speech:

- Noun
- Verb
- Adjective
- Adverb

Sentence:

Word: **Deforestation**

Definition:

Part of speech:

- Noun
- Verb
- Adjective
- Adverb

Sentence:

Word: **Flora**

Definition:

Part of speech:

- Noun
- Verb
- Adjective
- Adverb

Sentence:

Word: **Fauna**

Definition:

Part of speech:

- Noun
- Verb
- Adjective
- Adverb

Sentence:

Word: **Watershed**

Definition:

Part of speech:

- Noun
- Verb
- Adjective
- Adverb

Sentence:



YOU'RE INVITED TO PLAY NATURE SPY!

The goal is simple—spot as many animals and plants from the list below during the virtual field trip and check the boxes as you see them. Be sure to watch closely as some could be hard to spot. Good luck, nature spies!

¡ESTÁS INVITADO A JUGAR ESPÍA DE LA NATURALEZA!

El objetivo de este es simple—encuentra los tantos animales y plantas de la siguiente lista durante el viaje virtual y marca las casillas cuando logres verlos. Las fotos son para inspiración; los objetos pueden verse ligeramente diferentes durante el evento. ¡Buena suerte!



SPECTACLED BEAR
OSO DE ANTEOJOS



TAPIR
TAPIR



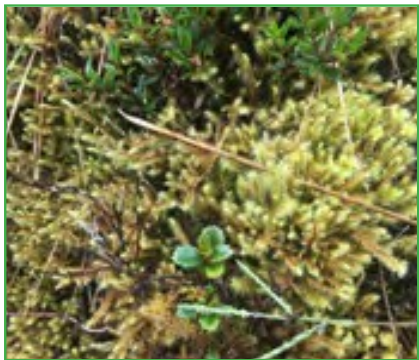
JAGUAR
JAGUAR



ANDEAN CONDOR
CÓNDOR ANDINO



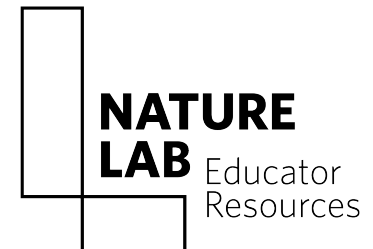
PUMA
PUMA



MOSS
MUSGO



FRAILEJONES
FRAILEJONES



Colombia Virtual Field Trip Log

BEFORE

I know that..._____

I wonder if..._____

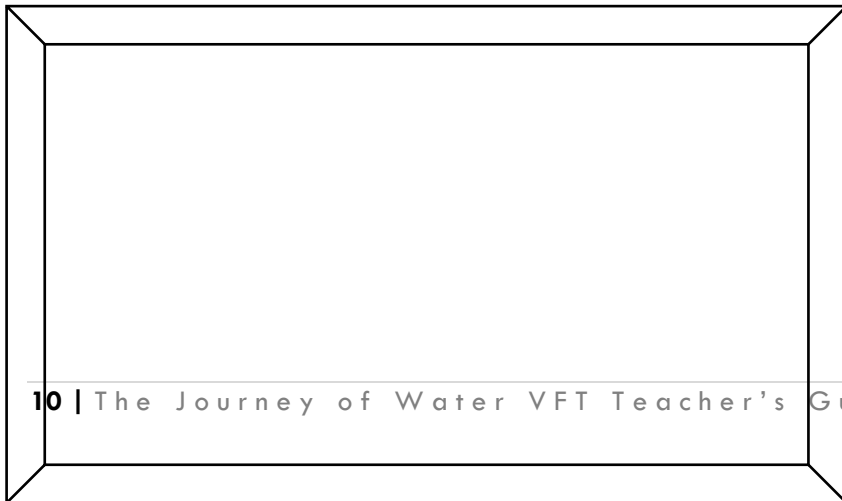
I hope that..._____

AFTER

I want to know more about..._____

My favorite part was ..._____

I learned that..._____



Imagine you are in the Colombian páramo—what would you be doing? On the left, draw a “selfie” of yourself on your trip.

Rate this virtual field trip by coloring in the number of stars you would give it!

The Journey of Water: From Colombia's Páramo to the Kitchen Sink

Virtual Field Trip Discussion Questions

1. What is the páramo and in what country is it located?
2. Colombia makes up only 0.003% of Earth's land area but has what percent of Earth's plant and animal species?
3. Alejandro talked about how a box of science experiments got him excited about science when he was a child. What kinds of things or activities interest you or get you excited about science?
4. Chingaza is a national park in Colombia. Can you name 2 or 3 national parks in the United States?
5. Where does the city of Bogota get most of its drinking water?
6. Alejandro described visiting Chingaza National Park when he was eight years old. Describe a natural place that you have enjoyed visiting (it doesn't have to be a national park). What is it like there? What do you like about it?
7. How do the plants in the páramo help people in Bogotá to have safe drinking water?
8. Provide some examples from the virtual field trip that show how "keeping nature healthy helps to keep people healthy."

9. What are some of the things that can lower the quality of the water as it travels from Chingaza to Bogotá?

Take it further:

Is the water where you live affected by any of these things? Why or why not?

10. Think about your day. What are some things that you depend on water for and that would be more difficult if you did not have access to enough clean water?

11. Tyler describes the water used to make a simple cheeseburger. Describe one of your favorite meals and how water might be used in each part of it. You do not need to include the number of gallons of water, only how the water might be part of the process, as with the grass the cows need to eat.

Take It further:

See if you can do some online research to find out how much water, in gallons, your meal really does use!

12. What kind of plant can absorb 40 times its weight in water?

13. Why are the hairy leaves of the frailejones important to people and animals?

14. Name two of the animals you might see in the páramo.

15. What is a camera trap?

16. What animal does Colombia have the largest number of species in the world?

17. What are some of the threats facing the páramo ecosystem in Colombia?

Take it further:

Does the ecosystem in which you live or from which you get your water face any of these threats? Explain.

18. What is a water fund?

19. What are some ways you can help protect water where you live?

Take It further:

Why is it important to protect water at its source?