



RAINFOREST  
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## Frogs & The Global Amphibian Crisis

Levels: Ages 11 - 14



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### Standards

- Common Core Standards for English Language Arts/Literacy and Mathematics
- Next Generation Science Standards for MS Interdependent Relationships in Ecosystems: MS Matter and Energy In Ecosystems

### Concepts

- Students will learn about the fascinating world of frogs and the conservation biologists who study these unique creatures and fight to protect them. Additionally, students will learn how amphibians serve as “indicators” of ecosystem health making them unique subjects for studying environmental change.

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## Part I: Making Connections

Idea – Frogs and amphibians are the oldest class of land-living vertebrates (animals with backbones). There are approximately 7,205 species known and three main classifications of amphibians, including:

1. Frogs and toads (Anura), representing around 6,348 species
2. Newts and salamanders (Urodela), representing around 658 species
3. Caecilians (Apoda), representing around 199 species

Collectively, amphibians have been around since the time of the dinosaurs and have remained virtually unchanged. Yet, within our own lifetimes, we have threatened many species of amphibians with extinction. What are the causes of this global amphibian crisis and what are scientists doing to help?

Students will watch the short documentary film, **The Frog Photographer** (2015). In this short film conservation biologist, amphibian specialist and nature photographer Robin Moore documents rare frogs and amphibians on the Osa Peninsula in Costa Rica, home to 2.5 percent of all the world’s unique species.

Materials – Link to The Frog Photographer short to watch online. <https://vimeo.com/124837993>

Procedure –

1. Watch the film together as a class.
2. Develop a series of questions that connects the relationship between the film’s protagonist, Robin Moore, and his quest in search of “lost frogs” in the film.
3. Some questions to think about critically and discuss from the film might include:
  - a. Why are amphibians special?
  - b. What does Robin mean when he says “lost frogs?”
  - c. Why is Costa Rica a good place to search for frogs and focus on conservation?
  - d. How long have frogs been around on the planet?
  - e. What things threaten their current survival?
  - f. At what times and conditions are frogs most active?
  - g. Why was Robin drawn to frogs and amphibians as a child?
  - h. What happens to poison dart frogs when you put them in captivity?
  - i. Describe some ways the study of frogs can help scientists understand resilience and hidden connections in the ecosystem? How is everything connected?
  - j. Explain how Robin’s photography brings the frogs to people and furthers conservation.

- k. Discuss from the example in Costa Rica how conservation and human well-being are connected to happiness.

## **Part II: Reading and Discussion**

Idea – Amphibians worldwide, particularly frogs, are vanishing. A suite of habitat loss, pollution, climate change and emerging pathogens is leading to a global amphibian crisis. Students will read the **National Geographic article: The Vanishing** (2009) to learn more about this crisis through the lens of scientists working to save endangered frog species from extinction and working to understand the spread of the deadly chytridiosis fungus.

Materials – Access to the National Geographic article, The Vanishing by Jennifer Holland and Joel Sartore. <http://ngm.nationalgeographic.com/2009/04/amphibian/holland-text>

Procedure –

1. Read the article.
2. Have students answer the following questions in groups, go over as a class or create your own:
  - a. In a world seemingly at war with wildlife, what makes amphibians particularly hard hit?
  - b. Describe some of these factors in the case study of Ecuador where the researchers are working in the article. What is happening to many amphibians there?
  - c. What does UC Berkeley biologist David Wake refer to when he says, “Today’s amphibians have taken not just a one-two punch, but a one-two-three-four punch. It’s death by a thousand cuts.”
  - d. What is chytridiomycosis?
  - e. Why is “chytrid” so deadly for frogs? How does it affect them and spread?
  - f. What has been the response to chytrid in the scientific community? What are the different ways scientists and conservationists are fighting back and trying to help save species?
  - g. What are two ways biologist Vance Vrendenburg has tried to help save the Mountain Yellow Legged Frog in the Sierra Nevada?
  - h. Could his chytrid treatment methods potentially help save other species?
  - i. Name at least five amazing things you learned about frogs.
  - j. Brainstorm and discuss ways YOU could help save frogs and their habitats.

## **Part III: Math and Geography –**

Idea – In the tropics there are more amphibian species found than anywhere else on our planet. More than 1000 species of frogs are found in the Amazon Basin. Because of the high humidity, frogs in the rainforest can live away from water, thus avoiding predators, and many tropical frogs live in trees. That means there are more physical layers and ecological “niches” that a frog can fill in tropical forests.

In some places such as Ecuador, hundreds of frog species have been documented and more continue to be discovered. Cataloguing and protecting this biodiversity is an exciting but daunting task, especially

today. Even as new species have yet to be discovered, they are going extinct as habitat for wildlife is lost.

Students will learn about the diversity and complexity of the rainforest and that of their own biome through comparison. Learning about tropical frogs and the great biodiversity found in rainforests, students will next study some of the frogs and local biodiversity found in their own neighborhoods by participating in a Bio Blitz in their school yard or park.

A Bio blitz is an event that focuses on finding and identifying as many species as possible in a specific area over a short period of time. They are essentially a biological inventory that brings together citizen scientists in the forms of students, volunteers and community members. Unlike biological inventories to identify rare or little known species in remote areas, Bio blitzes are typically conducted locally in people's backyards, gardens, parks and nature reserves.

#### Materials –

- Paper and pencils
- Basic natural history field guide of your local area
- Magnifying glass, camera, binoculars, sketchbook and/or any materials that would help with your Bio Blitz activity.
- Appropriate clothing
- Access to internet to upload your findings into iNaturalist after the event.  
<http://www.inaturalist.org/>

#### Procedure –

1. For this project, students will do a Bio Blitz in their local area and use iNaturalist to record their observations.
2. Try to focus especially on amphibians and the habitats they prefer like ponds, marshes and streams. The more diverse the area you choose, the more species you are likely to find.
3. The whole group should allot their Bio Blitz time to the same specific period, whether 24 hour to one hour to spaces out over a few visits. The group should also focus their efforts on the same area so that they can combine their findings and determine if the species they documented were rare or common.
4. Have each student record a set number of observations with some being vertebrates, some invertebrate, plants and of course, any frogs they find! Adapt this to your class and area.
5. In addition to recording species, have students record the temperature, wind, sunlight and humidity.
6. Together as a class, transfer the information you collected to a large chart in the classroom.
7. Review iNaturalist and create a class project page on the site before your Bio Blitz event. After your Bio Blitz, log into iNaturalist and walk the students through the program and how it works.
8. As a class or divided into groups, have students record their findings into iNaturalist.

9. Have students research and learn some basic natural history about the creatures and species they found in their local area. Next, have students find a Bio blitz project on iNaturalist to compare to another site, preferably a tropical rainforest ecosystem.
10. Create a Bio Blitz Profile for what they might find in a rainforest to compare to the Bio Blitz Profile for their own school yard area. If you would like to just focus on frogs and amphibians for your Bio Blitz, consider joining the Global Amphibian Bio Blitz on iNaturalist. See how it works here. <http://www.amphibians.org/citizen-science/>
11. Students compare and contrast the two charts, making observations on the differences in species diversity between the two.

#### **Part IV: Create – life cycle of a frog**

**Idea** - Scientists and artists both use their skills of observation, discovery, analysis and realization. Have students imagine they are a herpetologist (a scientist who studies amphibians) in the tropical rainforest searching for new species of amphibians.

Students will learn some essential and interesting facts about amphibians and create a story about their imaginary herpetology expedition. Following their story they will create an original artwork of a “new species” of amphibian they have discovered.

Materials –

- A series of images of different types and varieties of frogs and amphibians.
- Access to internet to demonstrate frog leaping, catching food with their tongues, calling or other sensory experience to give them ideas.
- Appropriate art supplies. Papers, pencils, paint, glue, etc.

Procedure –

1. Introduce some exciting information about frogs and amphibians and explain what herpetology is. For example, you could discuss:
  - a. The first frogs appeared approximately 250 million years ago, before even the dinosaurs!
  - b. Amphibians, like frogs, are able to live both in water and on land.
  - c. Over 2,000 species of amphibians are threatened with extinction.
  - d. Frogs can see almost all the way around (360 degrees) without the ability to turn their heads.
  - e. There are approximately 7,205 recorded frog species.
  - f. Male frogs call to attract female frogs.
  - g. Frogs typically eat insects, small animals like earthworms, minnows and spiders. Most frogs have a sticky tongue. To catch an insect, some frogs flip out their tongue rapidly and get an insect. Some frogs have a tongue that is attached at the front, not at the back like ours. They can roll that tongue out and catch an insect in a fraction of a second.

- h. Frogs can be found on all continents of the world except Antarctica. Their diversity allows them to live in a wide range of environments, from the coldest to the hottest.

#### **Part IV: Service Learning**

**Idea – Put your lessons into action by organizing amphibian awareness and fundraising campaign to protect their habitats.** Use the proceeds of donations raised to help Rainforest Trust directly purchase and protect rainforest around the world.

Materials – as necessary for your event

Procedure –

1. Choose a Rainforest Trust project to support from our website [www.rainforesttrust.org](http://www.rainforesttrust.org).
2. Organize a fundraising event or activity with your class, school or community to raise awareness of the importance of saving tropical forests and the species that call them home.
3. Once you have decided on a fundraiser event plan it and put it into action with the support of your community.
4. Donate the funds you raised to protect critical rainforest acres with the help of Rainforest Trust. All proceeds will be used to protect tropical forests and crucial habitat for wildlife.
5. Tell us about your event and be featured on our Rainforest Ambassadors webpage and receive a certificate to commemorate the acres you saved.
6. Spread the word and help us protect rainforests!

#### Five rainforest fundraiser event ideas:

1. Rainforest Movie Night or Film Fest
  - A movie night themed around rainforest and/or frogs and amphibians.
  - Sell tickets or ask participants to donate for your film festival.
2. Trivia Night
  - Organize a trivia night to put your knowledge of rainforests to the test.
  - Organize prizes for winners and use the ticket money to participate to raise funds.
3. Plant a Tree to save the Earth
  - Organize a tree planting event in your community to raise awareness about the important role of trees for wildlife habitat.
  - Have participants sponsor your tree planting by pledging money to protect rainforests with Rainforest Trust.
4. Create a Rainforest Rain Garden
  - Create a rain garden for your school or community to attract wildlife.
  - Raise awareness of wildlife habitat while raising funds for rainforests.
5. Rainforest Earth Day
  - Help honor mother Earth by raising awareness and funds to protect rainforests.
  - Draw attention to the global threats to our planet posed by climate change and emphasize the protection and regeneration of rainforests as a solution.