



— *virtual field trip* —

BIOSPHERE 2 RAINFOREST

the student guide



Digital Learning

ARIZONA
PUBLIC MEDIA



THE UNIVERSITY OF ARIZONA
Biosphere 2

Introduction: Welcome to Biosphere 2

This Virtual Field Trip is designed to help you explore the Rainforest biome, one of 5 different biomes in the Biosphere 2 facility. After construction was completed in 1991, the original Mission in the Biosphere 2 featured 8 researchers living in a completely enclosed system (closed to the outside world for two years), to demonstrate the interconnectedness of humans and the environment. Today, Bio 2 hosts impactful research projects focused on climate change.

In the Virtual Field Trip you will find:

- » An overview of the facility and information about the original Missions
- » Current and previous research in the Bio 2 Rainforest
- » Scientific concepts related to systems such as photosynthesis and the carbon cycle
- » Challenges and possible solutions around global warming and climate change
- » Ways that you can take action to minimize human impact on the environment



Navigation: Explore - Click - Read - Watch - Listen

You will find 8-15 resources that you can explore in each location. These include: videos, graphics, images, Fun Facts, and Threats and Actions. You can randomly click on any resources, but can also go in numerical order.

This link provides an [accessible version](#) of the Biosphere 2 Virtual Field Trip that works with screen readers. There are a variety of controls shown below and they include dyslexia-friendly viewing, adjustable contrast, adjustable cursor size, reading mask, screen reader, and more.

*****Move between locations using the green arrows. You can also move between locations with the icons shown above in the Icon Guide***

Locations within the Virtual Field Trip:

- » Welcome to Biosphere 2
- » Biosphere 2: The Past and the Present
- » Photosynthesis
- » The Carbon Cycle
- » Drought
- » Temperature
- » Biodiversity

Welcome to Biosphere 2

You'll learn about the different biomes in Biosphere 2 through photos and videos that take you inside the facility.

Biosphere 2: The Past and the Present

Learn about the history of the facility and the land, and you'll want to check out the section on the original Missions from 1991 and 1994. Click on the resources in any order.

Photosynthesis (average time: 12-15 minutes)

Explore concepts related to photosynthesis, the role that plants play in keeping our atmosphere oxygenated, and some of the factors that can affect the photosynthetic process.

In Threats and Actions, learn about invasive species in the Sonoran Desert and in other parts of the United States.



Vocabulary:

- » **Chlorophyll**- A compound that gives plants their green color
- » **Stomates** - Stomates (also known as stoma, stomata) are tiny openings, or pores, in plant tissue that allow for gas exchange
- » **Transpiration** - The loss of water vapor through the stomata
- » **Invasive species** - Any living organism (plant, animal, bacteria, etc.) that is not native to an ecosystem and causes harm

Carbon Cycle (Average time- 17-20 min)

Explore concepts related to the basic processes of the carbon cycle and the connections to photosynthesis. You will be able to identify different sources of CO₂ and carbon and the impact of human activity on carbon dioxide production.

In Threats and Actions you will consider different perspectives about causes and solutions for rainforest deforestation, weighing information from at least 2 different sources.



Vocabulary:

- » **Carbon sequestration**- the process of capturing and storing atmospheric carbon
- » **Terrestrial sequestration** - CO₂ is captured and stored by plants and within the top 2 feet of the Earth's surface
- » **Sustainably grown** - growing food by caring for and regenerating the soil, air, and water. People and animals are also treated humanely.

Temperature (Average time 20-35 min)

Explore information about global rainforests as well as the Bio 2 Rainforest, research being conducted, and learn about the life of a researcher.

In Threats and Actions, you will analyze temperature data and will learn about data models and how they can be interpreted and analyzed.



Vocabulary:

- » **Climatologist** - a scientist who studies weather patterns over a period of time
- » **Transpiration** - The loss of water vapor through the stomata

Drought (Average time 35-55 min depending on time on extra readings)

Explore different causes for drought, including human influence and the global impacts. You will also learn about the environmental system used to control the Bio 2 climate and the WALD experiment that studied the impact of drought on the Bio 2 Rainforest as a model for the future of global rainforests.

In Threats and Actions, you will learn how wildfires are a direct effect of drought in the West and Southwest. You'll explore small scale environmental solutions such as rainwater harvesting and agrivoltaics and other ways to conserve water.



Vocabulary:

- » **Aridity** - Permanent lack of moisture in a region due to low precipitation.
- » **Mitigation** - The action of reducing the severity or seriousness of something.
- » **Agrivoltaics** - Using areas of land for both solar power generation and growing crops beneath the panels.

Biodiversity (20-35 minutes)

Explore many examples of biodiversity in global rainforests, primarily animals but plants as well, and you will also analyze a chart to determine biodiverse locations globally.

In Threats and Actions, you will explore two different perspectives on palm oil production and whether these plantations are responsible for the destruction of rainforests globally.

**Vocabulary:**

- » **Biodiversity** - The variety of life in the world or a particular habitat or ecosystem.
- » **Pollinators** - Anything that helps carry pollen from the male part of the flower (stamen) to the female part (stigma) of the same or another flower.
- » **Species** - A class of plants or animals whose members have the same characteristics and are able to breed with one another.

- » **Vertebrates** - Animals having vertebrae or a backbone, such as mammals, fish, amphibians, reptiles, or birds.

Final task - find the eye near Threats and Actions in Biodiversity and vote for your favorite location!