

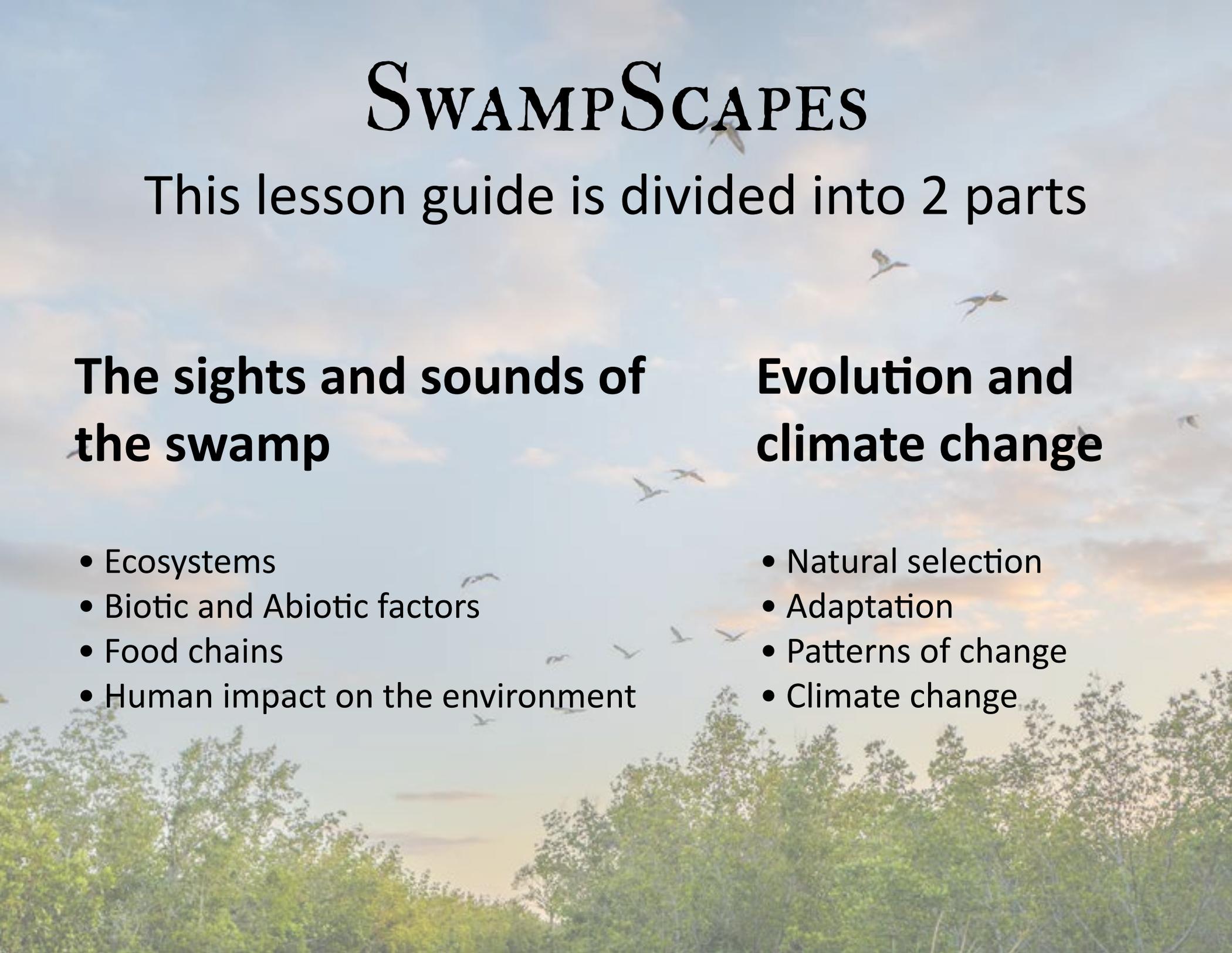
# SWAMP SCAPES

## LESSON GUIDE

[www.swampscapes.org](http://www.swampscapes.org)

Please refer to the SwampScapes Student Response Sheet that your teacher gave you as you follow this guide.

# SWAMPSCAPES



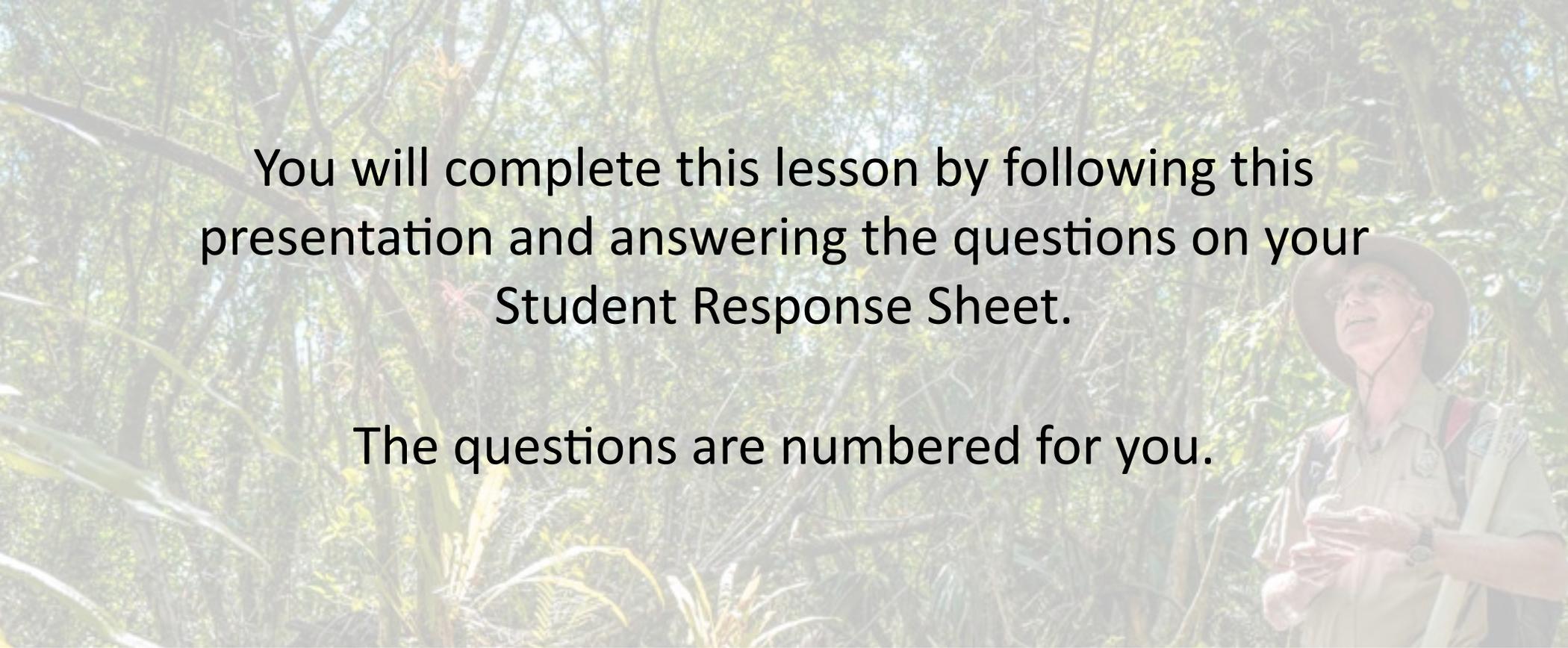
This lesson guide is divided into 2 parts

## **The sights and sounds of the swamp**

- Ecosystems
- Biotic and Abiotic factors
- Food chains
- Human impact on the environment

## **Evolution and climate change**

- Natural selection
- Adaptation
- Patterns of change
- Climate change

A person wearing a wide-brimmed hat and a light-colored uniform with a backpack is looking upwards in a dense, swampy forest. The background is filled with tall, thin trees and lush green foliage.

You will complete this lesson by following this presentation and answering the questions on your Student Response Sheet.

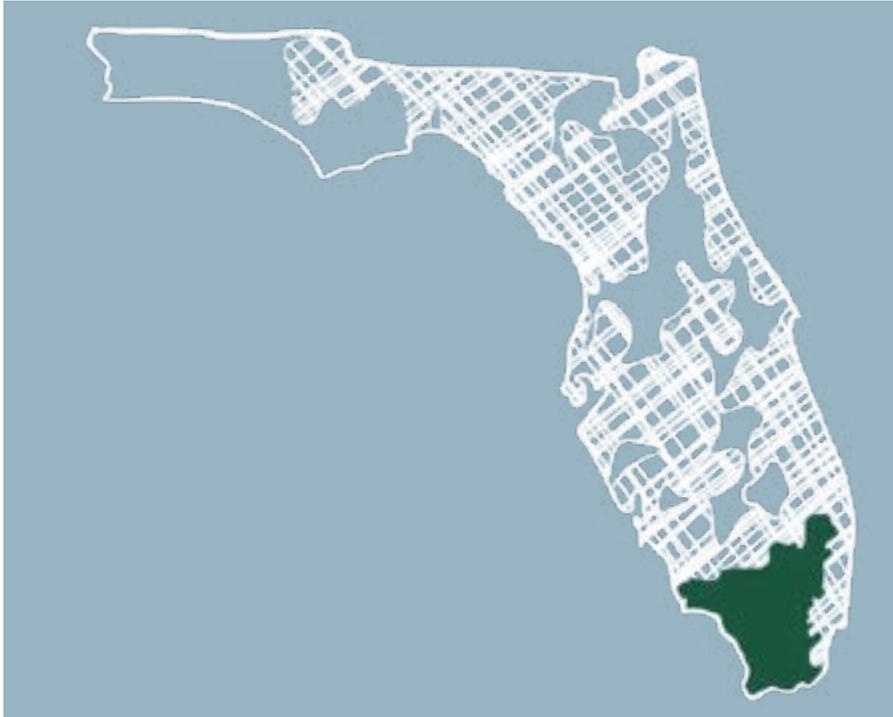
The questions are numbered for you.

Click here to start the lesson:

[SWAMPSCAPES WEBSITE](#)

A swampy landscape with mangrove trees and their characteristic prop roots. The ground is muddy and covered with fallen branches and debris. The scene is dimly lit, suggesting a dense, overgrown environment.

*Here we go!*



## I. What do you picture in your mind when you think of a swamp?

- Scientists say it is a “forested wetland.” Swamps are found in low-lying areas.
- Swamps are **ecosystems**, where living (biotic) and non-living (abiotic) things interact with one another.
- The **Everglades** is a swamp. It is a large region of tropical wetlands in the southern portion of the Florida.



[Click here for photos of the Everglades.](#)  
[Use the photos to help you answer #2-#3](#)

2. What kinds of biotic and abiotic factors can be found in the Everglades?
3. Can you think of a simple food chain you might find in a swamp?

*See the Student Response Sheet for more information about food chains.*

# Humans often leave their marks on a swamp

4. Click through the photos to identify the ones who show human activity in the swamp.



# 5. Why are swamps important?

- a. Wetlands are as critical as rainforests and coral reefs with regards to the number and variety of species they support.
- b. Globally, wetlands are estimated to store over a third of the world's terrestrial carbon.
- c. Coastal wetlands can provide critical protection against incoming hurricanes.
- d. Wetlands filter out excess nutrients and dangerous pollutants in rain and stormwater runoff.





# Let's view the SwampScapes films

Go to

<http://www.swampscapes.org/guides.html>

Answer questions 6 to 19  
on your SwampScapes Response Sheet  
as you view the 6 short films.

Mike Owen  
Betty Osceola  
Larry Brand  
Rev. Houston R Cypress  
Win Everham  
Donna Molfetto

You have met the six different people featured in these short films. For two of the films, click on 360° Landscape button to the right of the film's description. Fill out answers #20-#21 on your SwampScapes Worksheet.

# Swamp Symphony

Let's listen to some of the sounds of the swamp. Watch the videos on <http://www.swampscapes.org/guides.html>

*And now let's create our own symphony!*

Close your eyes. Imagine the sounds of a swamp.  
[Go to www.swampscapes.org/swamp-symphony.html](http://www.swampscapes.org/swamp-symphony.html)

Make your own swamp symphony.

In the online interactive version you can drag the different photos into the circles. You can make some sounds louder than the others by dragging the photographs left or right.

Answer #22-#23 on your SwampScapes Student Response Sheet



drag  
icon  
here

# Your very own Neighborhood Symphony

Using your phone or other recording device, step outside wherever you are now and record what you hear for 20 seconds. Be silent.

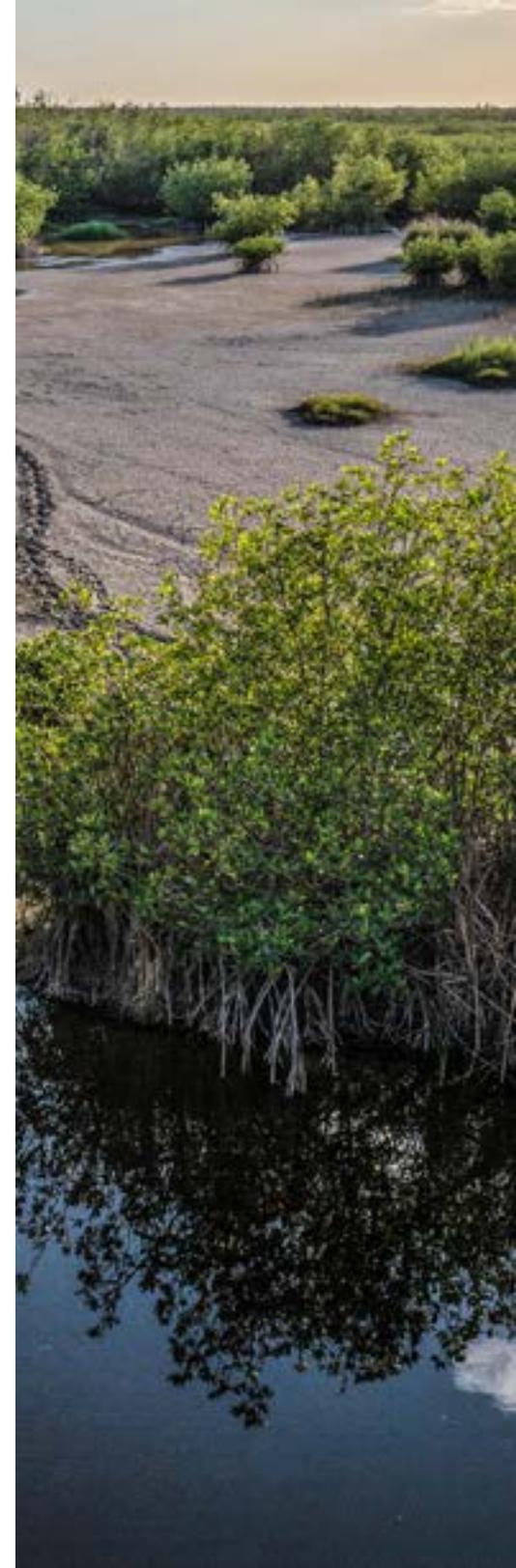
Answer #24 in your SwampScapes Student Response Sheet.

Can you tell which sounds are natural and which ones are human made?

# Evolution is a very important theme in science.

Evolution is a very important theme in science. It explains how so many living things have come to exist on Earth. These living things have changed over time for over hundreds of millions of years. Thanks to fossils, we know that the alligators in our swamps were roaming the Earth before the dinosaurs even evolved.

Species of living things have had to evolve (change over time) in order to adapt to new environments. In other words, as environments change, living things change. One of the ways this can happen is called natural selection.



# Adaptation

Natural selection occurs in a population (a group of individuals of the same species). Different individuals can have different traits or characteristics. Some individuals survive to reproduce and others do not, depending on which ones are best suited to live in the environment.

This little video will help you understand: [What is natural selection and adaptation.](#)

Stop and answer questions #25-#32 along the way.  
(The time stamps are on your Student Response Sheet)

# Extinction

Species do not always make it. Sometimes, none of the individuals in the species has what it takes to survive. Over the course of Earth's history, millions of species have not been able to change in response to new environments. This is called extinction.





# Climate Change and Extinction

People may say to you:

*“What’s the big deal?*

*There have always been natural climate changes on  
Earth.”*

They may also say:

*“Humans and animals breathe out carbon dioxide,  
are we causing climate change?”*



# First, it's all about the pace of change.

It's important to note that natural selection can take thousands of years. Many species have adapted because the changes in Earth's climate have also taken thousands of years.



However, in film #5, Win Everham mentioned that humans are changing the pace at which many environments are changing.



So, sure, there have been natural climate changes in the past, but the one today is happening way too fast for species to adapt. It's happening over 100-200 years instead of tens of thousands of years. Big difference.



**Because of climate change, environments are changing too quickly for species to keep up and adapt.**

Second, climate change is caused by the addition of carbon dioxide to our atmosphere from sources coming from underground the Earth.

Yes, our Earth's atmosphere naturally has carbon dioxide, and other greenhouse gases (heat-trapping gases). These gases help keep our temperatures relatively stable.

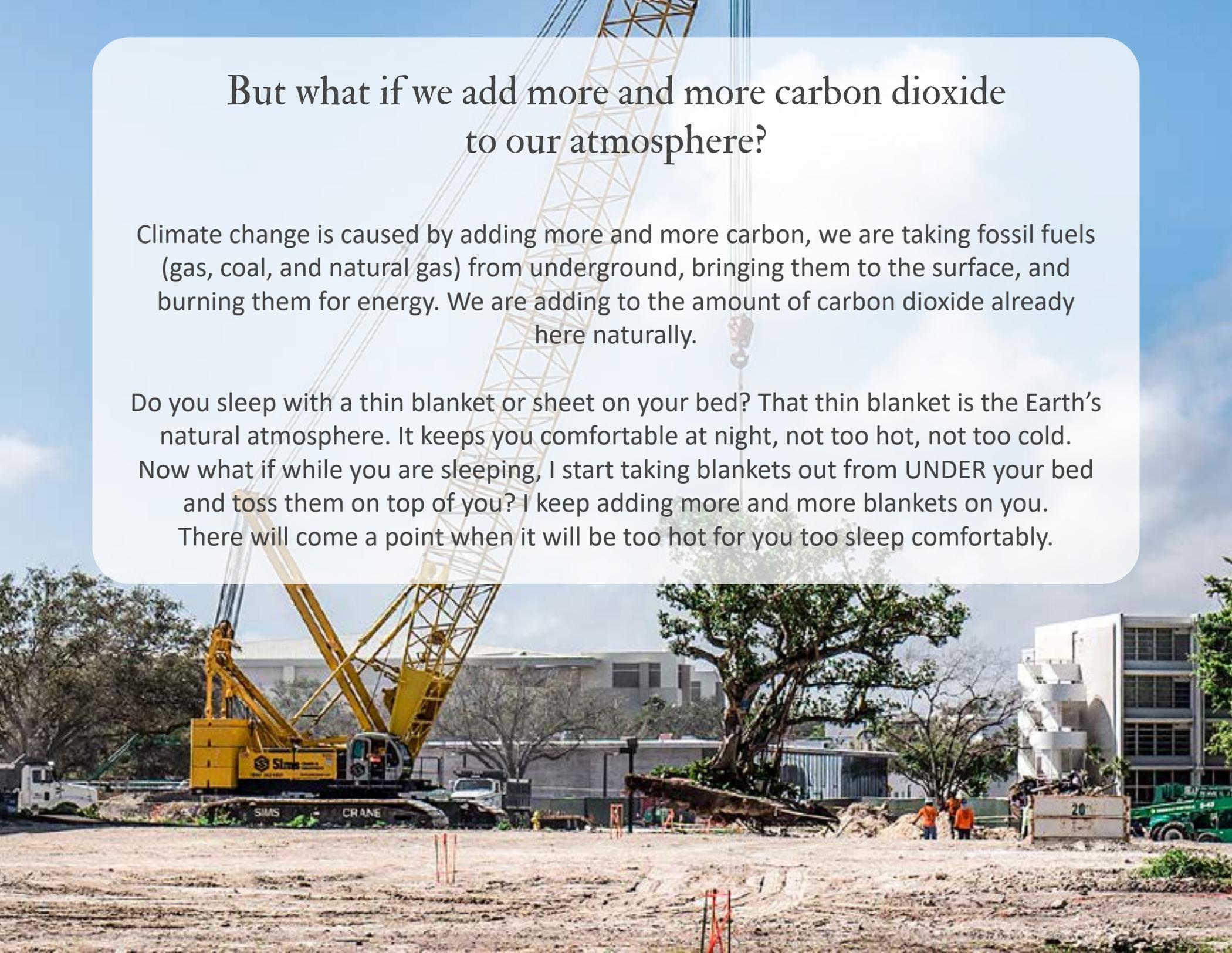
Take the planet Mercury, for example, which has no atmosphere. The temperature can range from 800 degrees Fahrenheit (427 degrees Celsius) during the day to minus 290 F (minus 180 C) at night. That's a swing of over 1,000 degrees Fahrenheit!!!



## But what if we add more and more carbon dioxide to our atmosphere?

Climate change is caused by adding more and more carbon, we are taking fossil fuels (gas, coal, and natural gas) from underground, bringing them to the surface, and burning them for energy. We are adding to the amount of carbon dioxide already here naturally.

Do you sleep with a thin blanket or sheet on your bed? That thin blanket is the Earth's natural atmosphere. It keeps you comfortable at night, not too hot, not too cold. Now what if while you are sleeping, I start taking blankets out from UNDER your bed and toss them on top of you? I keep adding more and more blankets on you. There will come a point when it will be too hot for you to sleep comfortably.



# Sea Level Rise and The Everglades

In film #4, Houston Cypress mentions sea level rise. This is one of the results of climate change.

33. What do you think is causing sea level rise?  
(Your answer should include the terms fossil fuels, carbon dioxide, global warming, and melting).





**It's your turn to help somebody else understand!**

**Answer questions #34-#35  
on your Student Response Sheet.**

**34. Somebody says to you:**

***"What's the big deal? There have always been natural climate changes on Earth."***

**(Hint: You can start with, "Of course there have always been changes, but...")**

**35. Now try answering this one:**

***"Humans and animals breathe out carbon dioxide, are we causing climate change?"***



# Lesson Extension I

SwampScapes offers VR “field trips” with experts and scientists in the field. The VR is free for educators. You can request a copy in English, French or Spanish on our website under “VR”.

Students can experience Swampscapes VR on a computer, on their phone or with an Oculus headset for a fully immersive experience. Ask students to compare the 2D and the 3D experiences and to imagine how scientists might use this technology in the future.

# Lesson Extension 2

Check out [The Shore Line project](#). This project is an engaging, interactive website where students can learn much more about the coastal regions and the threats of climate change.

