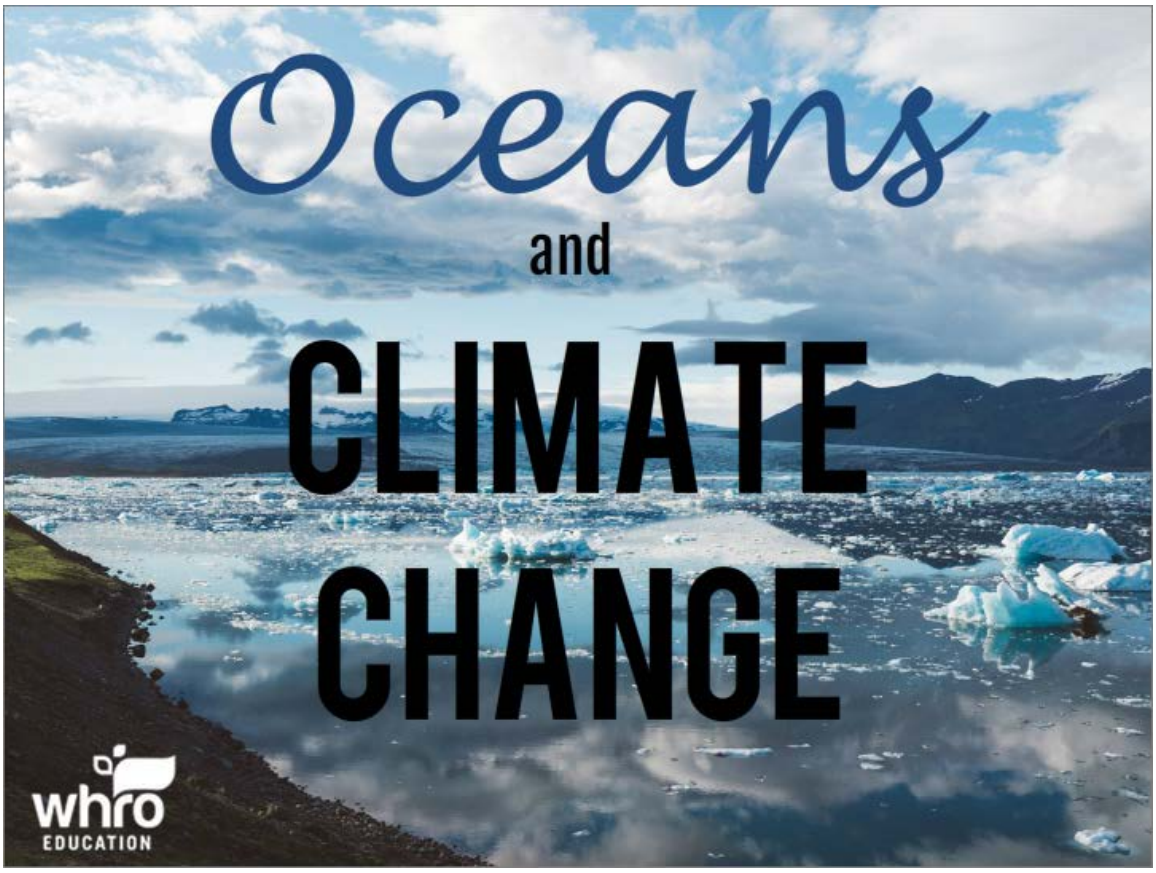
Module 12: Oceanography
Topic 6 Content: Oceans and Climate Change Notes

Introduction



With water covering a large portion of the planet, it is very important to monitor the consequences of global warming in the oceans. Click ***NEXT*** to learn about the potential consequences for the oceans if global warming continues.

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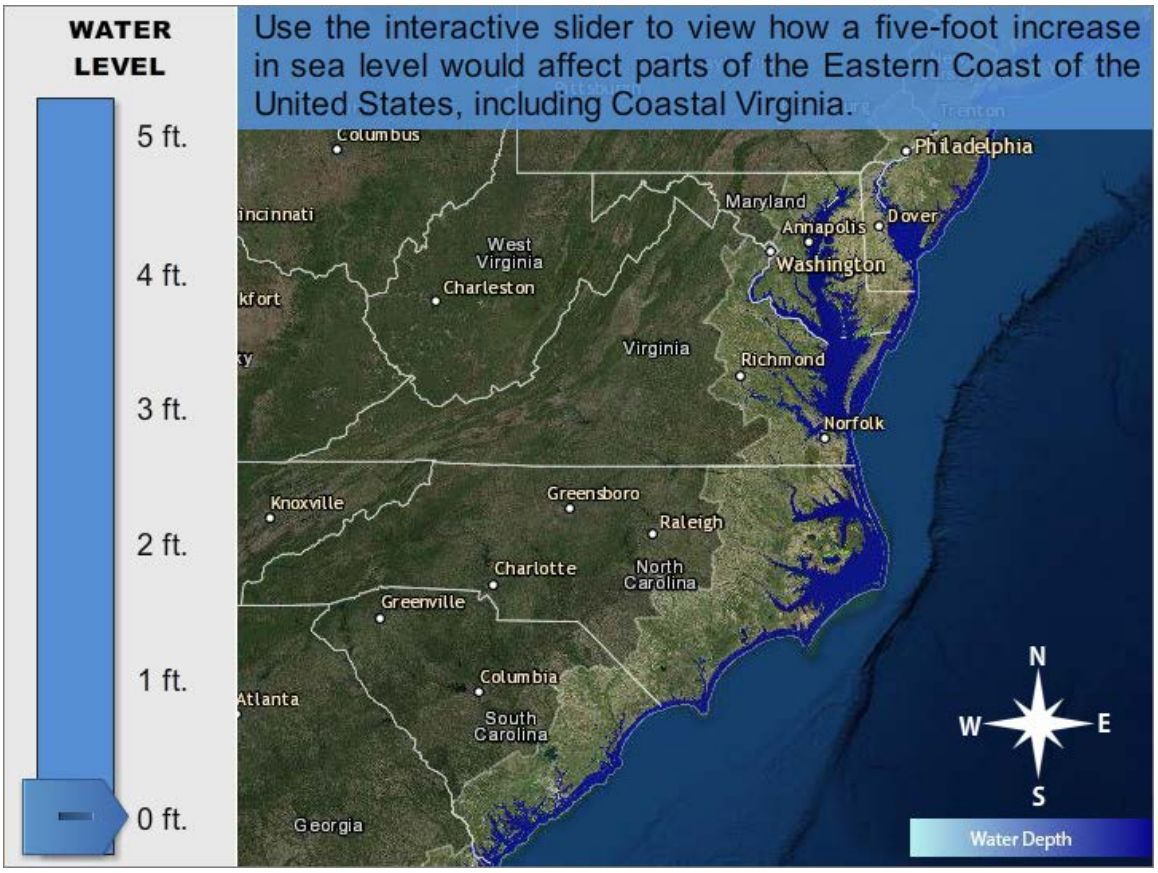
Sea Level Rise

One of the widest impacts of climate change is sea level rise. Modest estimates based on scientific evidence predict a one-to-five-foot rise in sea level by 2050.

Why would the sea level rise? As ocean temperatures increase, polar ice melts. Scientists studying Greenland and Antarctica have already noticed a rapid shrinking of polar ice, which adds freshwater to the oceans.

The image shows the level of arctic ice in 1979. Click the image to view how the levels of Arctic ice changed from 1979 until 2011.

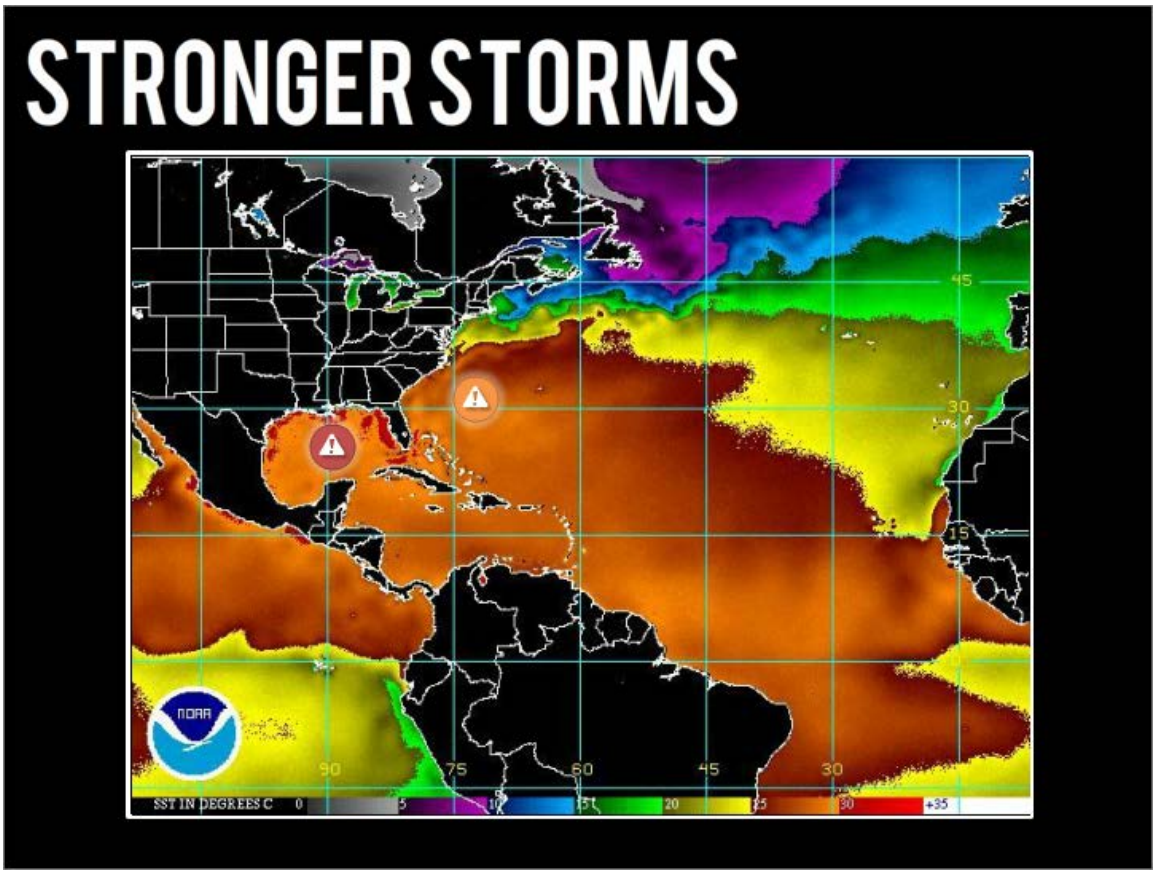
Sea Level Rise (continued)



Although a one-to-five-foot rise in sea level seems small, that level of sea level rise would devastate many of the major coastal cities in the United States.

Use the interactive slider to view how a five-foot increase in sea level would affect parts of the Eastern Coast of the United States, including Coastal Virginia.

Stronger Storms

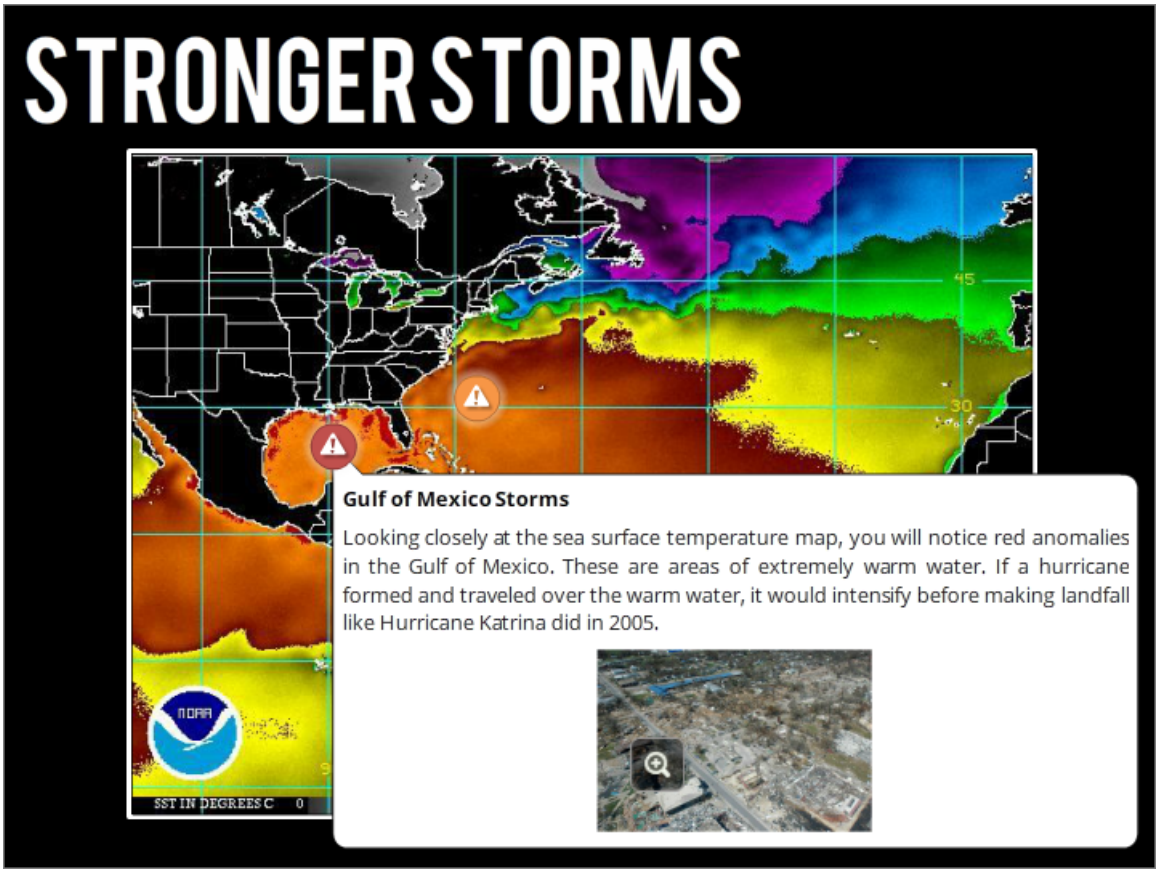


Environmental disasters, such as hurricanes, could grow stronger and more frequent as ocean water temperatures rise. This increases the risk of devastating damage to life, property, and the economy.

The image shows the sea surface temperature in the Atlantic Ocean and Gulf of Mexico. While the temperatures of these bodies of water fluctuate during the seasons, the overall data shows that the temperatures of these bodies of water are increasing.

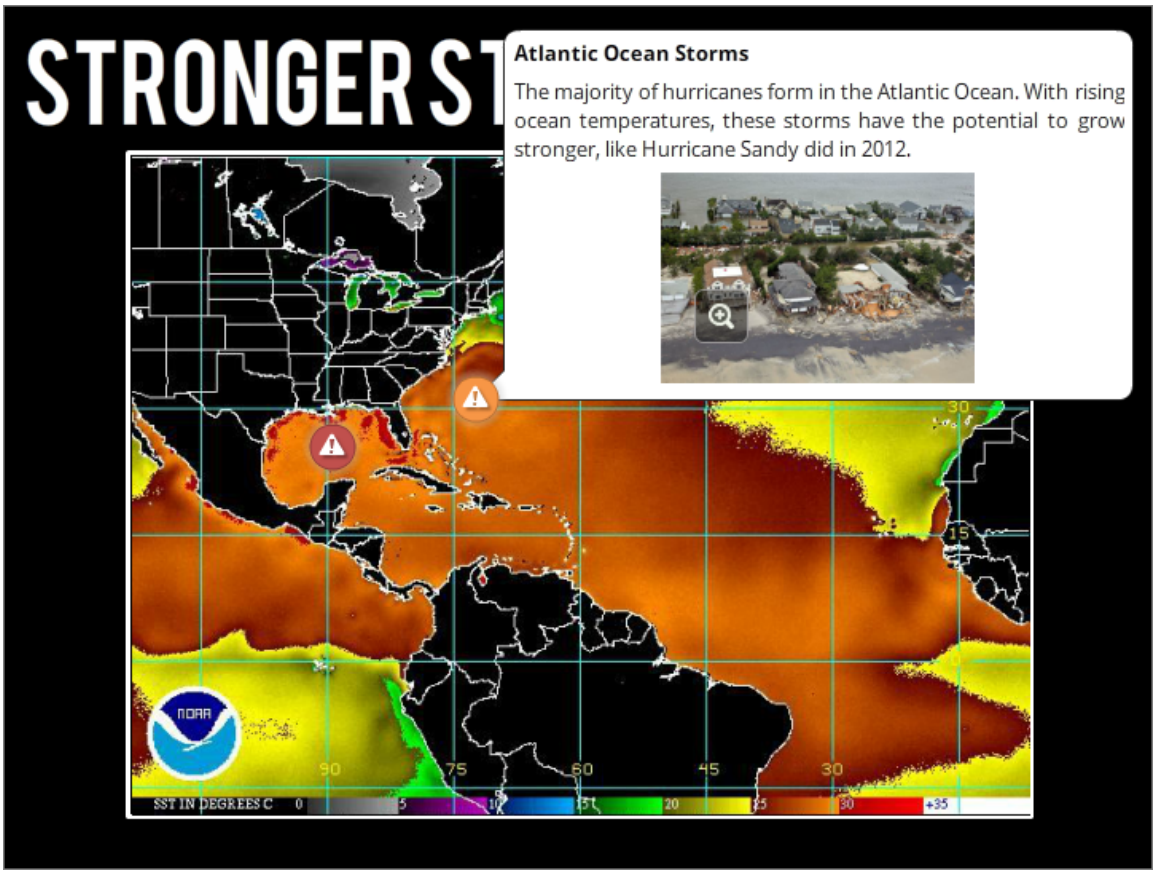
Click each marker to explore how warm sea surface temperatures are leading to stronger hurricanes in both the Gulf of Mexico and the Atlantic Ocean.

Gulf of Mexico Storms



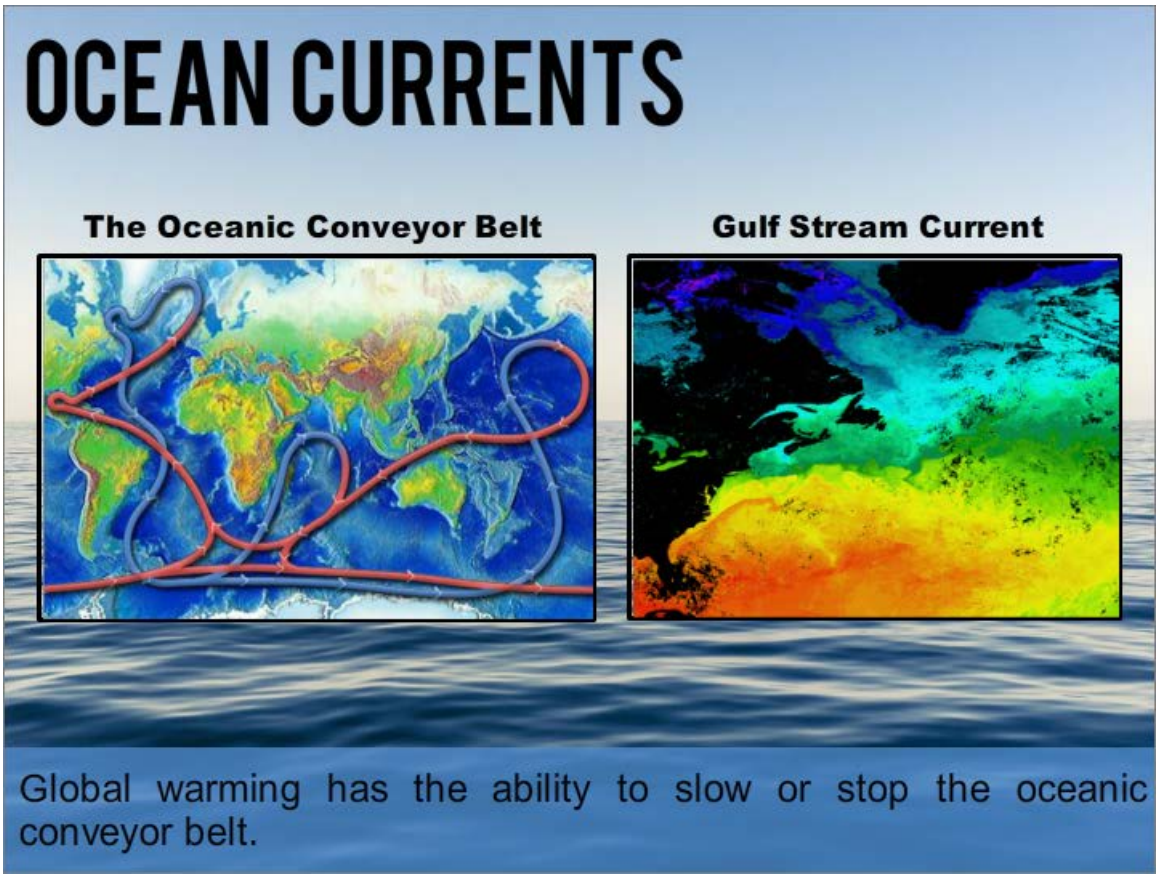
Looking closely at the sea surface temperature map, you will notice red anomalies in the Gulf of Mexico. These are areas of extremely warm water. If a hurricane formed and traveled over the warm water, it would intensify before making landfall like Hurricane Katrina did in 2005.

Atlantic Ocean Storms



The majority of hurricanes form in the Atlantic Ocean. With rising ocean temperatures, these storms have the potential to grow stronger, like Hurricane Sandy did in 2012.

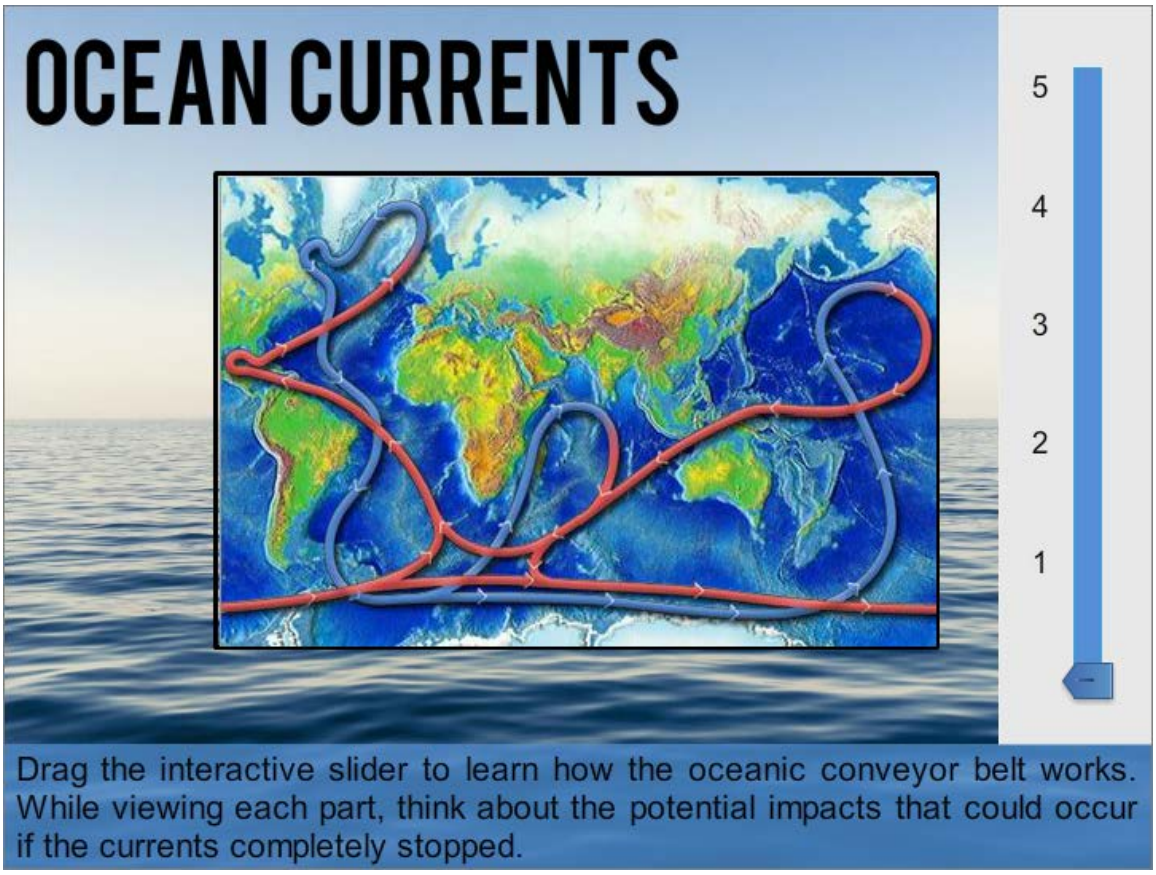
Ocean Currents



Global warming has the ability to slow or stop the oceanic conveyor belt. This would affect the global circulation of ocean water.

The image shows the heat distributed by the Gulf Stream current. This current distributes warm ocean water across the Atlantic Ocean to Europe. What would happen if the Gulf Stream slowed? Scientists believe that areas in Europe would experience extremely cold temperatures.

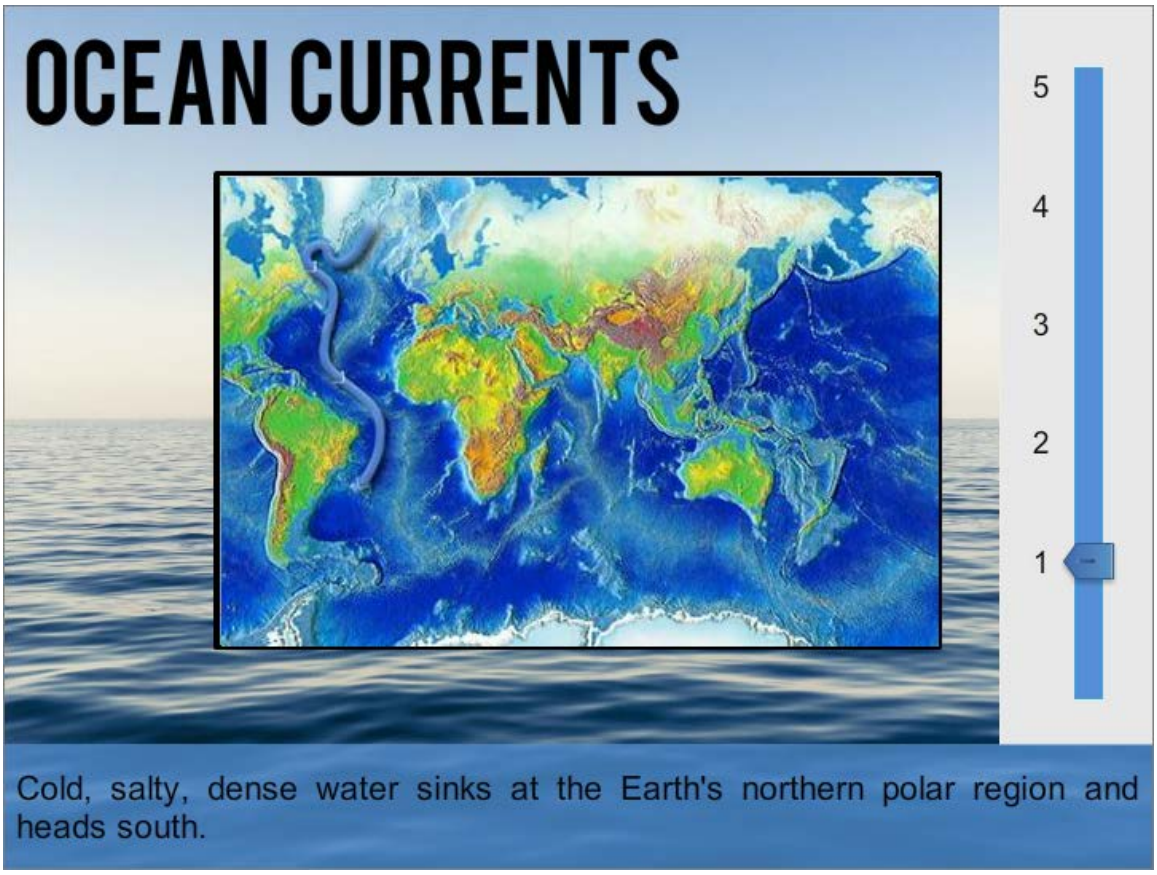
Ocean Currents (continued)



The ocean currents are connected. Stopping or slowing one current affects the entire conveyor belt.

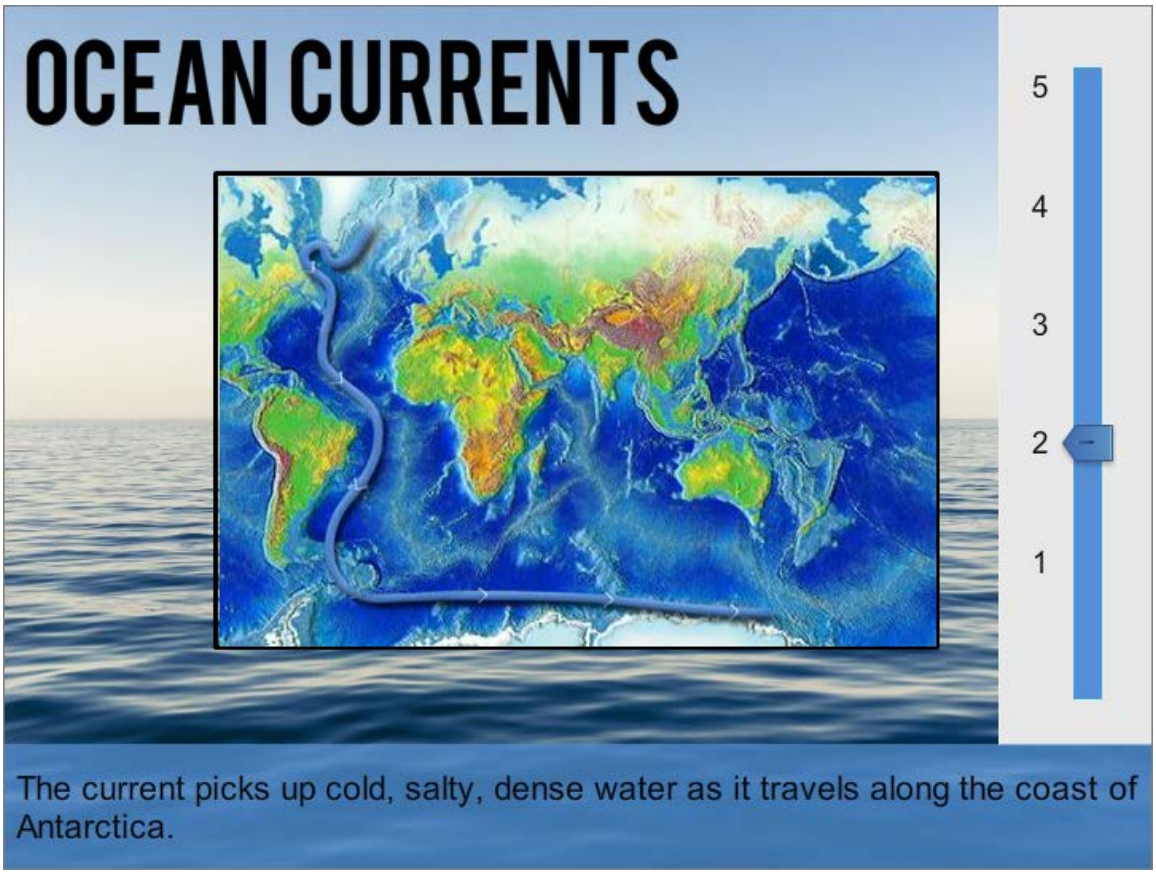
Drag the interactive slider to learn how the oceanic conveyor belt works. While viewing each part, think about the potential impacts that could occur if the currents completely stopped.

Ocean Currents (continued)



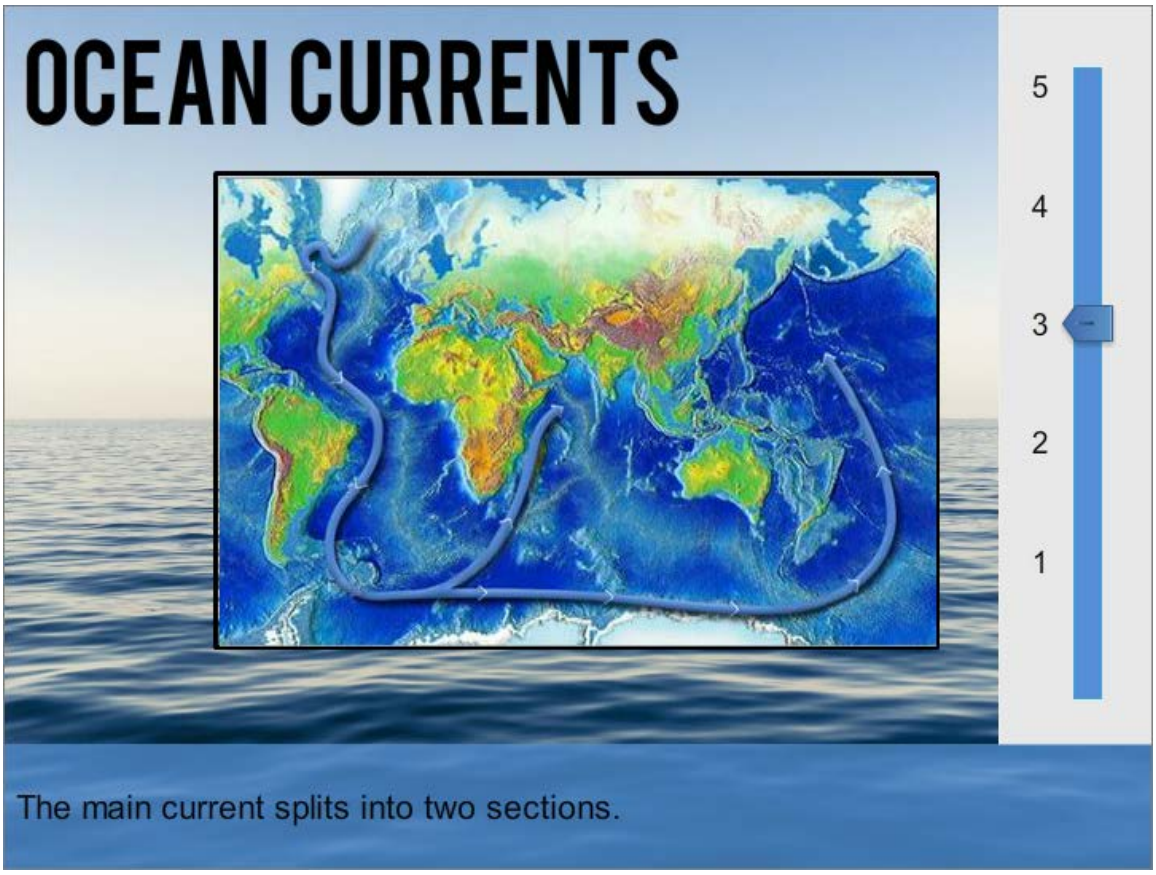
Cold, salty, dense water sinks at the Earth's northern polar region and heads south.

Ocean Currents (continued)



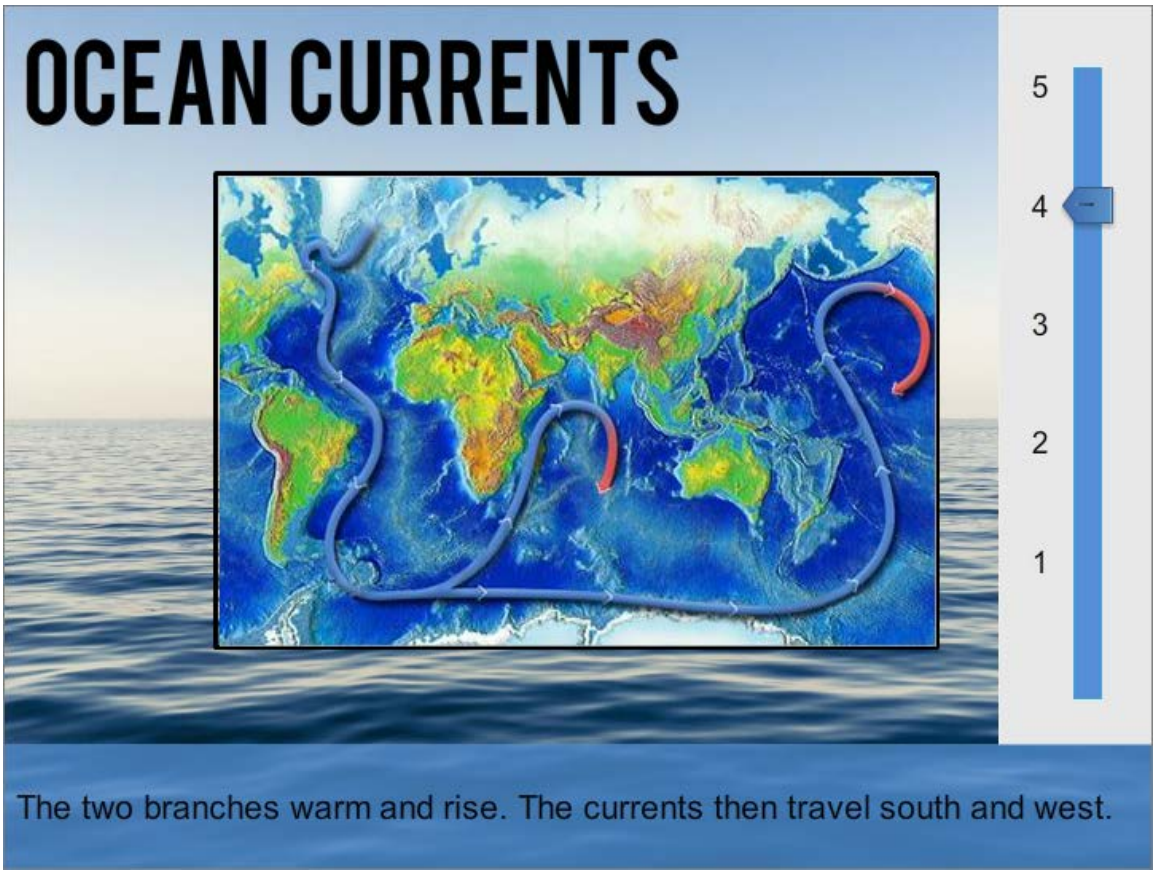
The current picks up cold, salty, dense water as it travels along the coast of Antarctica.

Ocean Currents (continued)



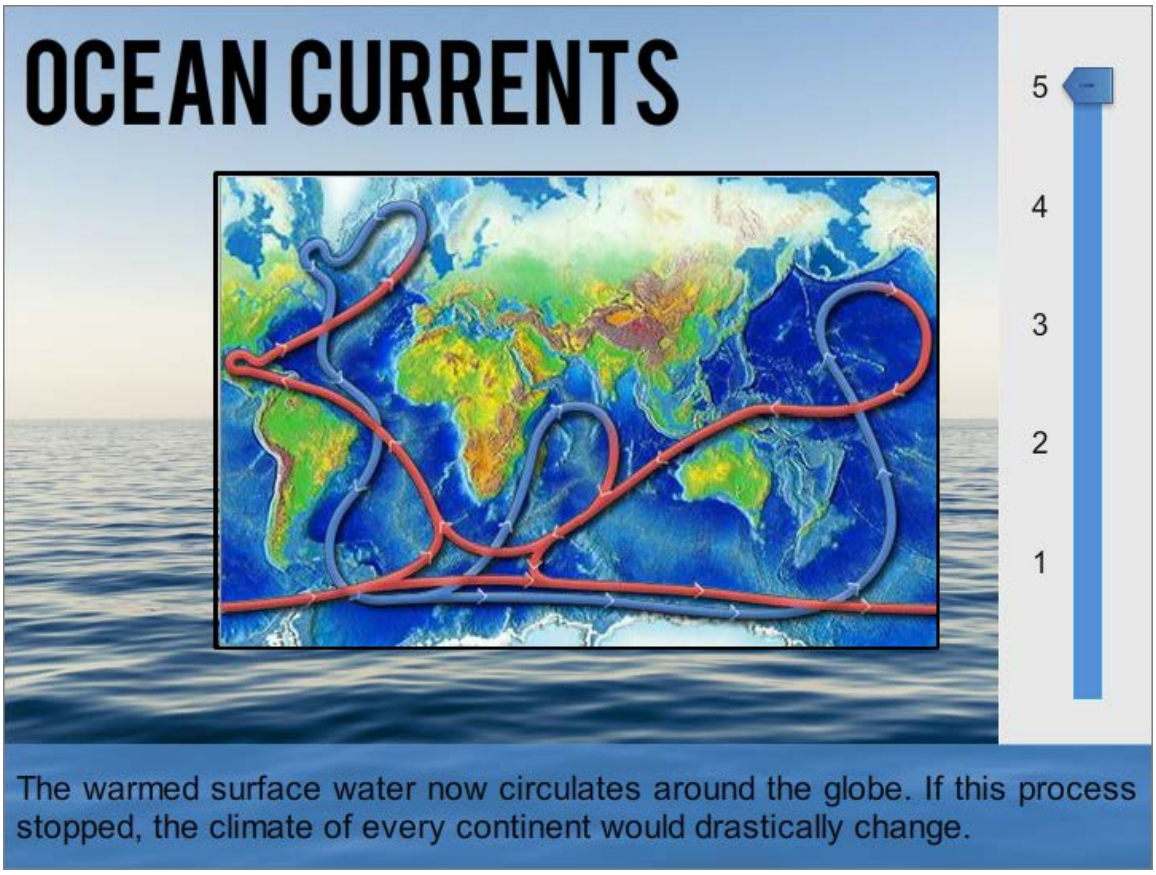
The main current splits into two sections.

Ocean Currents (continued)



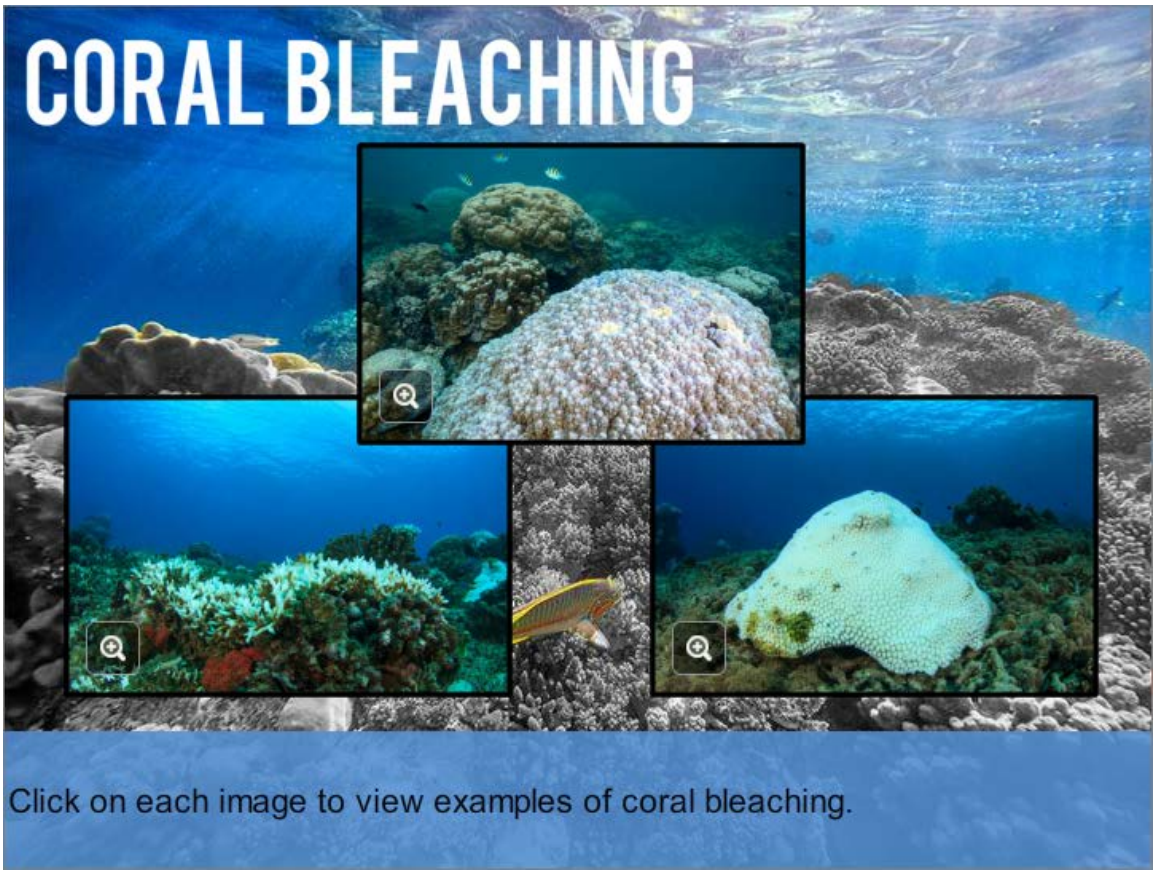
The two branches warm and rise. The currents then travel south and west.

Ocean Currents (continued)



The warmed surface water now circulates around the globe. If this process stopped, the climate of every continent would drastically change.

Coral Bleaching



Rising water temperatures also affect ocean species, causing damage to the ocean food chains and decreasing the global food supply. Entire ecosystems that support tourism revenues around the world, such as coral reefs, are at high risk of collapse due to an increase in temperature. Any change to the water temperature where coral lives can kill these delicate organisms. When the coral dies, it leaves behind a white skeleton. This is called coral bleaching.

Click on each image to view examples of coral bleaching.