Summary on Ocean Acidification

This document summarizes the background material about ocean acidification covered in the introductory section of the educational game **Ocean Protector**.

Contents

What is ocean acidification?

One of the human-caused threats to our oceans is that ocean water is becoming more acidic. This threat is called ocean acidification, and it is caused by too much carbon dioxide gas dissolving into our oceans' water. Ocean acidification hurts life throughout our oceans, including us.

What causes ocean acidification?

Burning Fossil Fuels

As humans, we produce large amounts of carbon dioxide gas when burning fossil fuels to drive cars, fly planes, make electricity, and run factories.

Our oceans absorb much of this excess carbon dioxide gas. This mixing causes a chemical reaction that increases the acidity of our oceans.
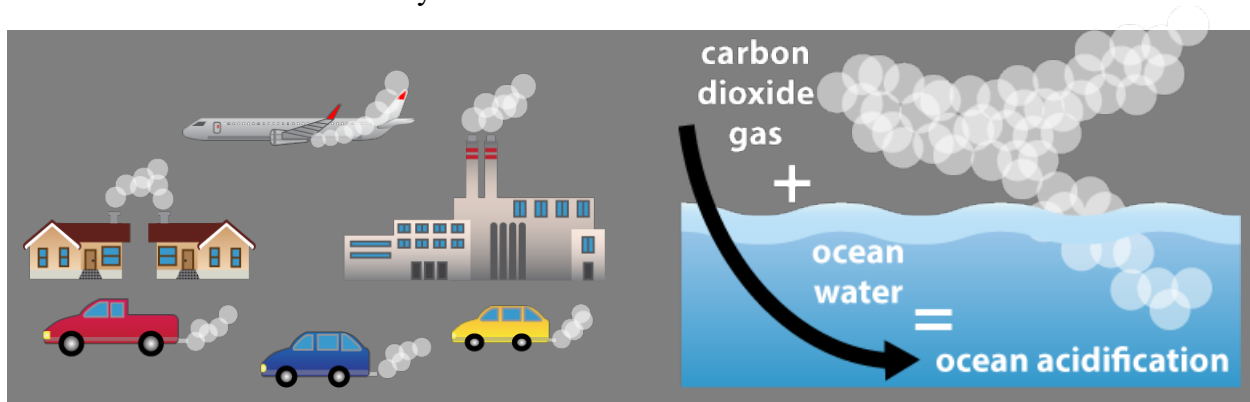
Nutrient Pollution

Acidification can also occur due to excess nutrient pollution such as excess fertilizers and garbage. Nutrient pollution that runs into the ocean can trigger a sequence of events that leads to more carbon dioxide in the water, which increases ocean acidification.
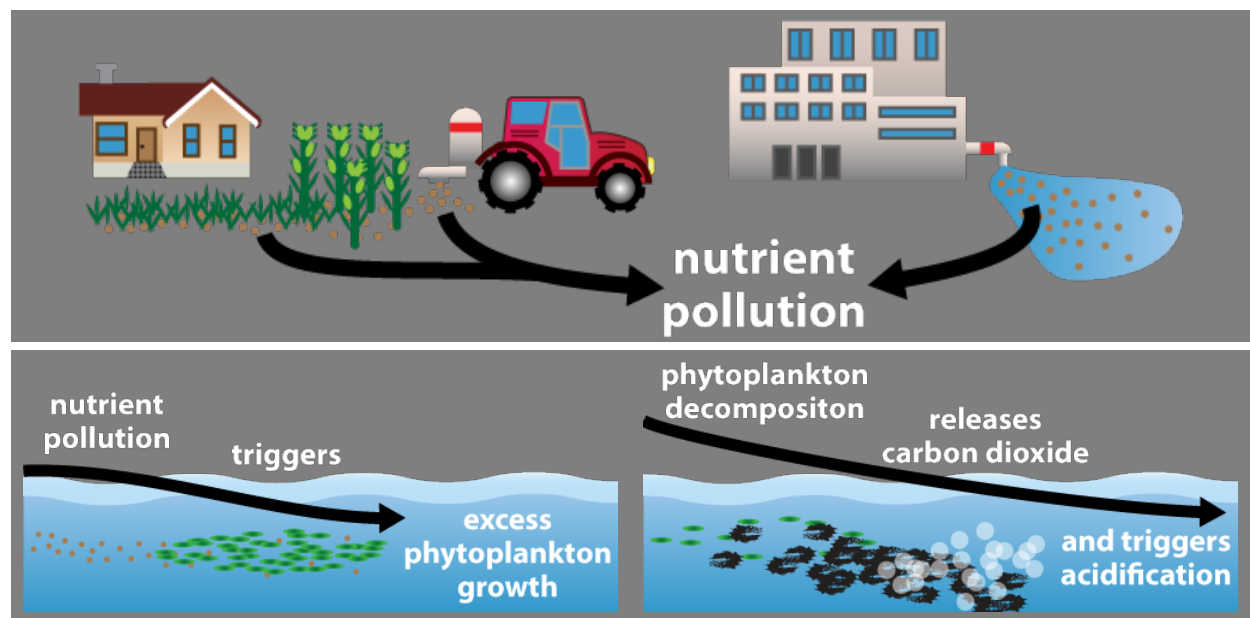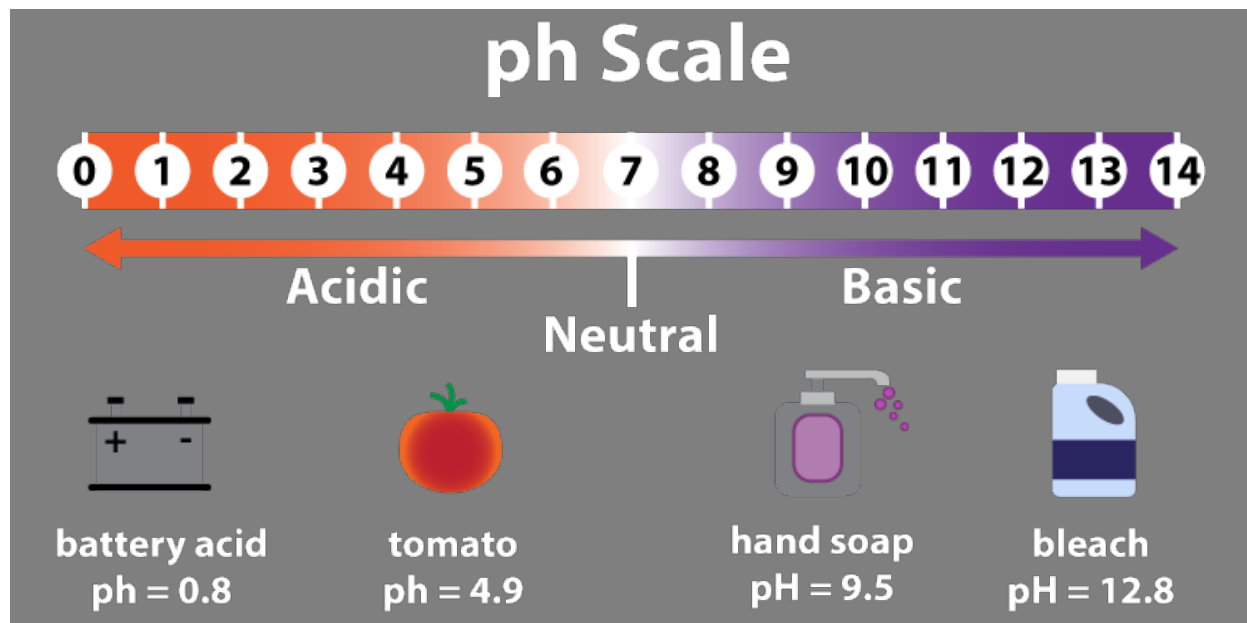
How do we measure ocean acidification?

We use the pH scale to measure how acidic or basic something is.

The pH scale runs from 0 to 14, with 7 being a neutral pH.

Values above 7 are basic, or alkaline. Values below 7 are acidic.

How has ocean pH changed over time?

Comparing pH of today's oceans to pH measurements of the past shows that pH today is 30% lower than the pH measured over 150 years ago. The decrease in pH means our oceans have become significantly more acidic, which hurts ocean life and humans.
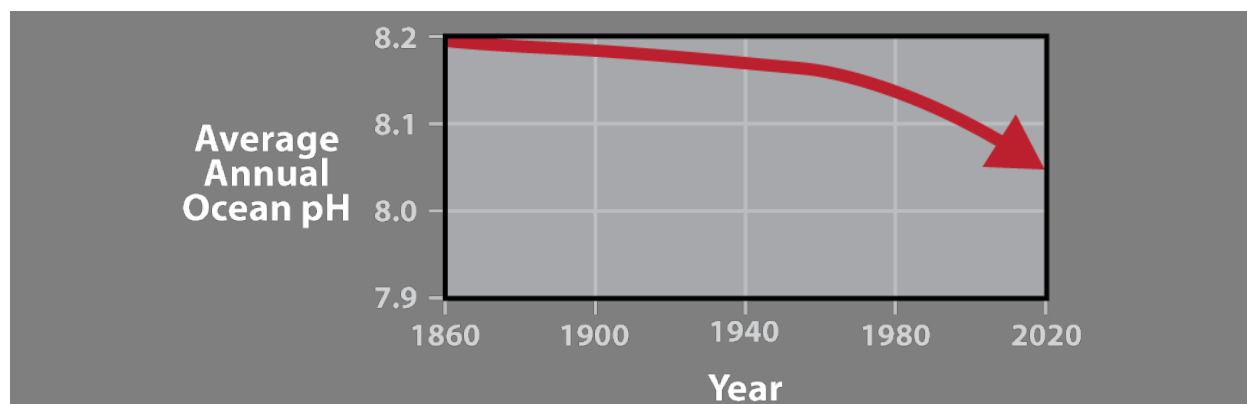
How does ocean acidification harm ocean life and people?

Ocean acidification hurts life throughout our oceans, including us. As you play **Ocean Protector** you will see many examples of how ocean acidification harm groups of life. Some specific examples are also listed below.

For example, increased ocean acidity reduces fish size and populations. Some fish grow slower while others have more difficulty avoiding predators, and less will survive. Lower fish populations negatively affect many animals that rely on them for food, including humans.

Ocean acidification also can substantially harm coral and other ocean life. Many animals, such as coral and oysters, build shells and exteriors from a compound called carbonate. Ocean acidification causes chemical changes that make carbonate become scarce, which results in many animals having weaker and unhealthy shells and exteriors.
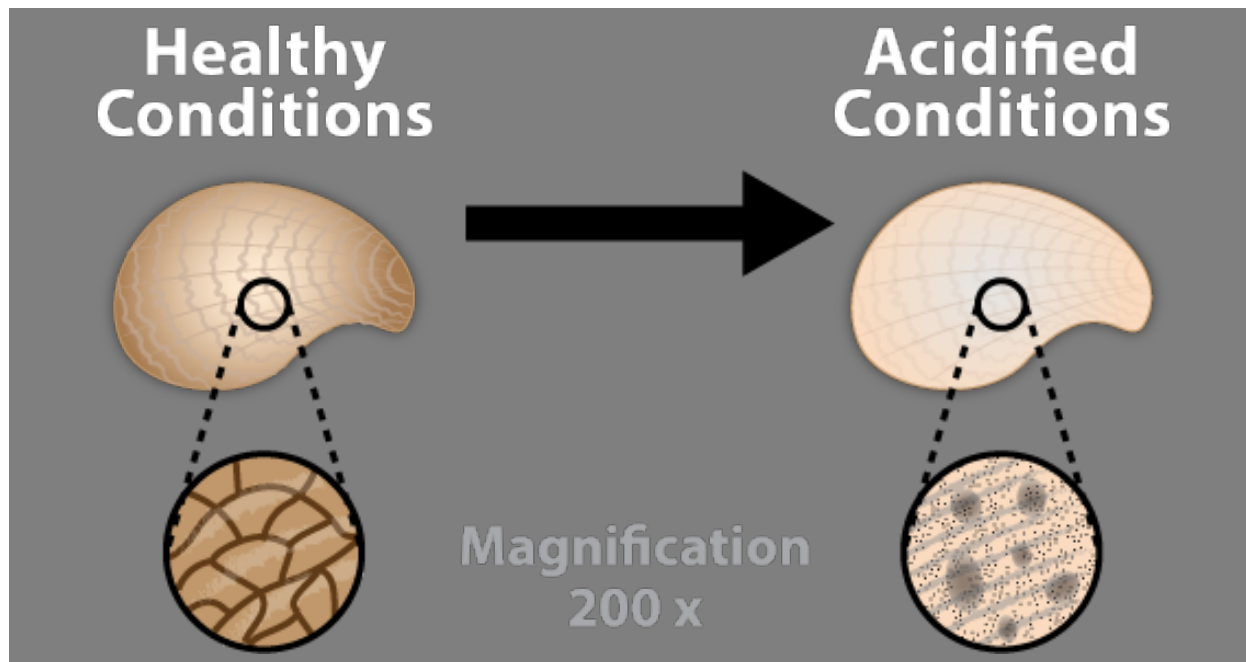
Overall, ocean acidification impacts many animals in the ocean that humans rely on for food and to make a living. Also, unhealthy oceans mean that potential new medicines from our oceans are less likely to be discovered.

<u>What can we do to help?</u>

Our oceans affect us all, even those of us who live far away from the coast. It's up to all of us to help protect the oceans and reduce ocean acidification.

Overall ways that will help prevent ocean acidification include:
- Reducing the amount of carbon dioxide gas we emit as humans.
- Reducing the amount of nutrient pollution that runs into our oceans.

As you continue through the game you will be presented with many different options on how to possibly reduce ocean acidification. After selecting each choice, you will also see how your decision affects ocean life and people.

To learn more about ocean acidification check out other great resources from NOAA here:
https://oceanacidification.noaa.gov/