



# IMPACTS OF CLIMATE CHANGE ON EARTH'S ECOSYSTEMS

Explore how climate change is impacting different types of ecosystems.

Grade Level: 6-12 | Duration: 1-2 class periods

## Students Will Be Able To:

- Talk about how climate change affects the oceans
- Explain how carbon dioxide alters the ocean's chemistry
- Describe how climate change is expected to affect other ecosystems, such as forests, wetlands, mountains, freshwater lakes and rivers, prairies, tundras, and deserts

## Materials Needed:

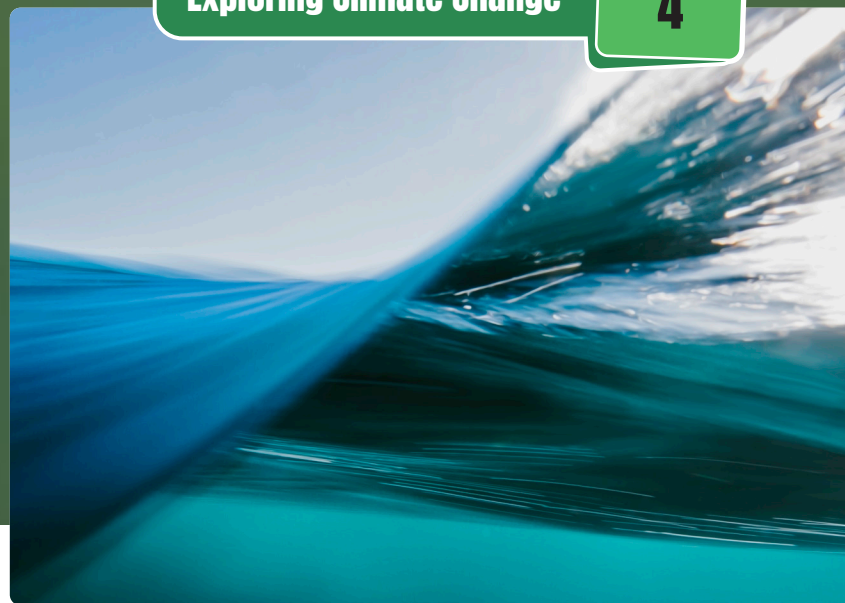
- Paper
- Pencils or pens
- Chalk, cups, vinegar, water
- Discussion cards
- Climate Change and Ecosystem Impact worksheet

## In the Teachers Guide

- Climate Change Impacts on Ecosystems
- Ocean Acidification
- Biodiversity Loss
- Ecosystem Services
- Mitigation and Restoration Efforts

## Exploring Climate Change

LESSON  
4



## RESOURCES

### Articles

- [Climate Change Impacts on Ecosystems](#)
- [Climate Change Impacts on the Ocean and Marine Resources](#)
- [Basic Information About Coral Reefs and Threats to Coral Reefs](#)
- [The Planet Has Lost Half of Its Coral Reefs Since 1950](#)
- [Warming Atlantic May Invite Greedy Lionfish to North Carolina Coast](#)

- [Fifth National Climate Assessment](#)

### Videos

- [Acid Oceans](#)
- [Climate Change: Ocean Temperatures Hit an All-Time High](#)
- [The Carbon Cycle Is Key to Understanding Climate Change](#)

Created in partnership with scientists and educators.

# IMPACTS OF CLIMATE CHANGE ON EARTH'S ECOSYSTEMS

Explore how climate change is impacting different types of ecosystems.

## 1 ENGAGE:

1. Begin by reviewing what students have learned so far about climate change. Encourage discussion about the most significant takeaways and any surprises they encountered.
2. Have students define ecosystems in their own words. Explain that ecosystems are communities of living things that interact with each other and their environment.
3. Emphasize the interconnectedness of ecosystems and their importance for both natural processes and human well-being.

## 4 ELABORATE:

1. Divide students into groups and assign each group a different ecosystem to research (e.g., forests, wetlands, mountains).
2. Have students explore ecosystem impacts. Use the provided worksheet.
3. Based on their findings, have groups create visual representations (posters, flowcharts, or digital presentations) of events triggered by climate change in their assigned ecosystem.



Use the Climate Change and Ecosystem Impact worksheet to guide research.

## 2 EXPLORE:

1. Discuss how climate change is impacting the ocean and watch suggested videos. Highlight factors such as warmer water temperatures, sea level rise, and ocean acidification.
2. Use a simple chalk-and-vinegar experiment to help students understand ocean acidification. Place a piece of chalk in a clear cup of vinegar and another piece of chalk in a clear cup of water. Ask students to observe what happens.
3. Explain that chalk is similar to the shells of some marine creatures and that vinegar is a weak acid. In the experiment, the vinegar's acid makes the chalk dissolve. In the ocean, the acidification of ocean water can affect animals' ability to make shells or skeletons and slow down growth of coral and coral reefs. If severe enough, coral skeletons can dissolve.

## 5 EVALUATE:

1. Have students share the ecosystem impacts they identified and offer ideas for solutions.
2. Give students options for how to share, such as a poster, an essay, or a speech. They should show both problems and solutions.

## 3 EXPLAIN:

1. Summarize the impacts of climate change on ecosystems, focusing on coral reefs as a case study.
2. Discuss biodiversity loss, ecosystem interactions, and ecosystem services affected by climate change. Use examples like coral bleaching and invasive species to illustrate these concepts.



Use the discussion cards to further conversations.

## CLOSURE OR EXIT TICKET:

Reflect on this lesson by thinking about these key questions:

1. How does climate change affect biodiversity within ecosystems?
2. Why is it important for us to understand the impacts of climate change on ecosystems?

# IMPACTS OF CLIMATE CHANGE ON EARTH'S ECOSYSTEMS

**Discussion Cards:** Use these questions to prompt discussions and encourage students to think critically about climate change and its implications.



How would you describe an ecosystem in your own words?



What are some examples of ecosystem services provided by nature?



How are warmer water temperatures affecting ocean ecosystems and what are the consequences?



Explain how climate change contributes to the acidification of oceans.



Explain how acidification can impact marine life.



What did the experiment with chalk in vinegar and water demonstrate about ocean acidification?



Discuss the significance of coral reefs as ecosystems and the impact of climate change on their biodiversity.



How does climate change influence the spread of invasive species like lionfish?

# IMPACTS OF CLIMATE CHANGE ON EARTH'S ECOSYSTEMS

**Discussion Cards:** Use these questions to prompt discussions and encourage students to think critically about climate change and its implications.



What are the consequences of climate change on native ecosystems?



Why are coral reefs essential for both marine life and human populations?



How might the loss of coral reefs due to climate change affect coastal communities and economies?



Choose one ecosystem other than the ocean. How is climate change impacting this ecosystem and what are the potential consequences?



Describe the steps you would take to research and create a visual representation of how climate change impacts a chosen ecosystem.



What can individuals do to minimize climate change and help protect ecosystems?



How can ecosystem restoration solutions contribute to mitigating the effects of climate change?



How can we raise awareness and inspire action around these issues within our communities?

# CLIMATE CHANGE AND ECOSYSTEM IMPACT WORKSHEET

Explore different types of ecosystems and how they are impacted by climate change.

**Directions:** Complete the worksheet with your research about your assigned ecosystem.

**Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

Created in partnership with scientists and educators.  
Teachers may make copies of this for school and classroom use.

Assigned Ecosystem: \_\_\_\_\_

## Biodiversity Loss

How has climate change affected biodiversity?  
Give examples.

Explain how changes in biodiversity affect ecosystem health.

## Ecosystem Interactions

Describe changes in species interactions due to climate change.

How do invasive species impact native species? Provide examples.

## Ecosystem Services

Identify three ecosystem services.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

How is climate change affecting these services? Give examples.

Discuss the implications of disrupted ecosystem services.

*Be prepared to summarize findings and present them to the class, discussing climate change effects and implications.*