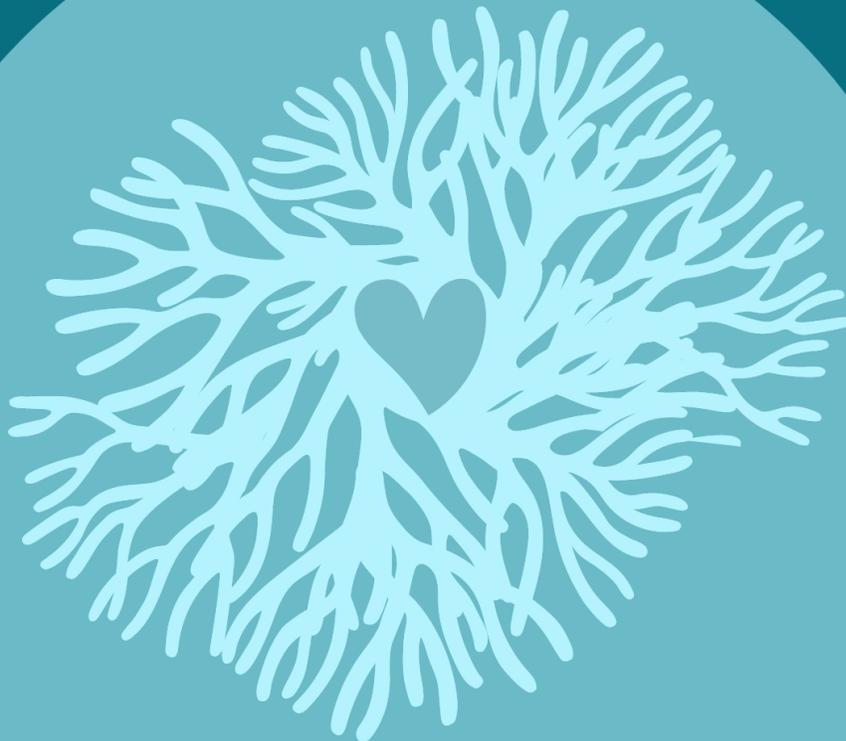


*Climate Science &*  
**OCEANS**



climate kids

**traveling trunk**



CLIMATE  
SCIENCE  
ALLIANCE

The Climate Science & Oceans Traveling Trunk contains the resources and lessons needed for educators to help students gain a better understanding of the ocean's role as the heart of our planet, the importance of stable marine ecosystems for the environment, and how oceans and marine ecosystems are being impacted by climate change. The hands-on science activities, storytelling, and art materials in this trunk specifically target students from lower Elementary through High School based on Next Generation Science Standards, and can be adapted for most K-12 classroom settings and grade compositions. Using real data that is regionally-specific, the activities in this trunk will bring to life oceans and marine ecosystems, help students investigate the impacts of ocean acidification and ocean warming, and help them understand the connections these impacts have for our communities. Most importantly, students will work to develop their own solutions to help reduce the impacts of climate change in their communities and help support a thriving ocean and its marine ecosystems.

## ocean acidification module overview

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**Grade Level:** Lower Elementary, Upper Elementary, Middle School, High School

**Subject Areas:** Science, Fine Arts, Language Arts

**Duration:**

- Preparation time: Part I (Science): 25 minutes; Part II (Art): 25 minutes; Part III (Storytelling): 15 minutes
- Activity time: Part I (Science): 1 hour; Part II (Art): 1 hour; Part III (Storytelling): 1 hour

**Setting:** Classroom, Field Trip Sites (reach out to [info@climatesciencealliance](mailto:info@climatesciencealliance) for our list of recommended field trips!)

**Vocabulary:** Climate Change, Adaptation, Ocean Acidification, Carbon Dioxide, Greenhouse Gasses, Carbonate, Calcium Carbonate, pH

**Essential Question:** What is ocean acidification and how will it affect the species that live in the ocean and the food we eat

**Summary:** While participating in the Climate Kids activities of art, science and storytelling, students will learn about the importance of marine ecosystems for the environment and understand how these ecosystems are being affected by climate change and ocean acidification.

**Objectives:**

Students will:

Learn about local marine species and their roles

- Brainstorm and explore the direct and indirect impacts of climate change and ocean acidification on marine and terrestrial species
- Explain the importance of a stable marine ecosystem for the environment
- Analyze marine specimens that utilize calcium carbonate to build their shells and determine impacts of ocean acidification
- Discuss possible adaptations or solutions animals will undertake for survival
- Develop solutions to reduce impacts caused by increased human activities
- Create and design artwork to portray impacts on or solutions for marine resiliency
- Model healthy and unhealthy marine environments and explain how ocean acidification will affect shelled organisms and carbonate structures, like coral reefs
- Experiment with carbon dioxide to identify pH and temperature changes and their effects on carbonate objects

## ocean warming module overview

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**Grade Level:** Lower Elementary, Upper Elementary, Middle School, High School

**Subject Areas:** Science, Fine Arts, Language Arts

**Duration:**

- Preparation time: Part I (Science): 25 minutes; Part II (Art): 25 minutes; Part III (Storytelling): 15 minutes
- Activity time: Part I (Science): 1 hour; Part II (Art): 1 hour; Part III (Storytelling): 1 hour

**Setting:** Classroom, Field Trip Sites (reach out to [info@climatesciencealliance](mailto:info@climatesciencealliance) for our list of recommended field trips!)

**Vocabulary:** Adaptation, Carbon Sink, Carbon Dioxide, Climate Change, Food Web, Fossil Fuels, Greenhouse Gasses, Phytoplankton

**Essential Question:** How do we know the oceans are getting warmer and how do rising amounts of CO<sub>2</sub> in our atmosphere cause ocean (and land) temperatures to get warmer?

**Summary:** While participating in the Climate Kids activities of art, science and storytelling, students will gain an understanding of the current science behind ocean warming and the impacts rising ocean temperatures have on marine organisms vital to the food web.

**Objectives:**

Students will:

- Learn about the tools scientists use to measure ocean temperature
- Brainstorm and explore the direct and indirect impacts of climate change and ocean warming
- Explain the importance of a stable marine ecosystem for the environment
- Perform a class experiment about heat capacity
- Analyze how marine organisms are impacted by changing ocean conditions
- Interpret graphical data about ocean warming
- Develop solutions to reduce impacts caused by increased human activities
- Create and design artwork to portray impacts on or solutions for marine resiliency

## what's inside

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***Climate Change Primer:***

- Heat Trapping Blanket Demonstration
- The Incredible Carbon Cycle Game
- Greenhouse Gas Game
- Climate Kids “10 Things” Posters (English and Spanish)

***Oceans Acidification Module:***

- Mega Building Blocks
- Rolling Dice
- Bromothymol Blue 0.04% (100mL)
- pH Paper test Strips
- Beaker (400 mL)
- Plastic Measuring Cups (100 mL)
- Lab Safety Goggles
- Plastic Pipettes
- Collapsible Funnel

***Oceans Warming Module:***

- Heat Lamp with Light Bulb

- Balloons
- Alka Seltzer
- Digital Thermometer
- Ball Mason Jars (1 pint)

***Storytelling Books:***

- Earth's Fever
- Fever in the Oceans
- Sea Change
- Squidtoons
- A House for Hermit Crab
- Here We Are/The New Ocean
- Here Now, Gone Tomorrow

***Art Ideas:***

- Craft Examples
- Climate Kids Coloring Book

***Activities, Resources & Worksheets:***

- Teacher Curriculum Binder
- USB with powerpoint

***Tribal Perspectives:***

- Tribal Climate Educational Repository
- Indians of the Oaks
- My Ancestor's Village
- One Day at Batiquitos Lagoon

***Regional Impacts:***

- San Diego Ecosystems Assessment
- Pocket Guide
- Regional Impacts Game Cards
- 10 Things for Wildlife Poster