

EDUCATION



Hey! What's All That Commotion In Our Ocean? An Ocean Acidification Education Toolkit

The ocean acts as a great sponge for carbon dioxide and is the biggest carbon sink on the planet. It absorbs about 25% of the carbon dioxide from the atmosphere. While the ocean isn't acidic, the increase in absorption of carbon dioxide from carbon emissions changes the ocean's chemistry and increases its acidity. We call this process ocean acidification.

Over the past 150 years the amount of uncontrolled (rampant) carbon dioxide from fossil fuels in our atmosphere has increased the acidity of our ocean and led to a global decrease in pH, a measure of acidity or alkalinity (basic). Increased acidity in our ocean affects the amount of an important building block mineral called calcium carbonate available for calcifying marine life such as corals and shellfish to build their shells and skeletons. Ocean acidification can also impact the ability of other species to navigate and detect predators and prey. Increasing awareness around ocean acidification is essential for communities' mitigation and adaptation efforts as changing ecosystems can impact communities.

This toolkit utilizes effective communication strategies to convey the significance of ocean acidification effects and empower community mitigation and adaptive actions. This toolkit uses the FrameWorks Institute Strategic Frame Analysis to implement effective methods that will increase ocean acidification literacy.

FrameWorks Values: Resources to Inform Effective Ocean Acidification Communication

[FrameWorks Institute: Getting to the Heart of the Matter: Using Metaphorical and Causal Explanation to Increase Public Understanding of Climate and Ocean Change.](#)

This research report was developed to support science educators in effective communication to the public about ocean change and acidification. It provides tools in the form of 'explanatory metaphors and explanatory chains' to increase public literacy of ocean issues.

[FrameWorks Institute: How Talk about Climate Change and the Ocean: Prepared for the National Network for Ocean and Climate Change Interpretation with Support from the National Science Foundation.](#)

Reports on a series of studies designed to pinpoint successful communication in public understanding of ocean issues. Over 9,000 Americans were interviewed by scientific experts to determine effective explanations and to identify methods to re mediate 'gaps in understanding'.

[NOAA Ocean Acidification Program \(OAP\).](#) The OAP website provides the public with information on current research, monitoring, biological response to ocean acidification, data management, education and outreach, and human connections to OA.

[The Psychology of Climate Change Communication: A Guide for Scientists, Journalists, Educators, Public Aides, and the Interested Public.](#)

This guide details the barriers of scientific communication and offers tools to help public take actions through techniques such as:

- “Knowing Your Audience”
- “Get Your Audience’s Attention”
- “Translate Scientific Data into Concrete Experience”

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FrameWorks Values

The [FrameWorks Institute](#) research confirms that introducing OA to the public with one of the four values: protection, responsible management, interconnection, and innovation generates a successful interaction with the audience. These values establish what is at stake, or ‘why should they care?’ about ocean acidification. The following is the dialogue that the FrameWorks Institute has tested and found to be the most effective engaging audiences. Note that, dependent upon the audience demographic, the language should be adapted. (*Bales, 2015*).



Protection

It’s important that we protect people and places from harm. We can do this by actively solving the issues facing our environment. This means stepping in to ensure people’s safety and well-being to the best of our ability and safeguarding the places we depend on. We also need to take measures to eliminate or reduce risks, making sure that people are able to go about their lives freely. Concern for the welfare of others and vigilance in preserving our habitats are the hallmarks of a protective approach that ensures a healthy future for our ocean. Simply put, we have a duty to protect our surroundings. Protection is the right thing for us to do.



Responsible Management

It’s important that we take responsible steps to manage the issues facing our environment. This means thinking carefully about problems and focusing on the best ways to deal with the problems we face. We also need to keep future generations in mind while we look for the best solutions. Open-mindedness and long-term planning are the hallmarks of responsible management. Simply put, we should take a practical, step-by-step approach that relies on common sense and uses all the evidence we have to take care of our surroundings. Managing challenges responsibly is the right thing for us to do.

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Getting to Know Your Toolkit

This Ocean Acidification Toolkit includes four modules that have led to increased ocean acidification literacy for ages 9 and older. All modules can be used independently or in their entirety and average about 15 minutes. Every module includes the ocean acidification literacy goal, a value that can be used to better engage or connect with the audience, discussion points, supporting questions for the audience, and solutions in which the audience can take part. In addition, an optional script that uses specific language will guide the instructor in successful and effective ocean acidification dialogue. At the conclusion of the modules, students can take the Ocean Acidification Ambassador Pledge.

Consolidated materials list

Materials for 2 toolkits are included in shipment (~10 students each)

Module 1:

- 2 blue balloons (~50 included)
- 1 longneck lighter (2 included)

Module 2:

- 2 plastic containers labeled 'past' & 'present' (2 sets included)
- Small cups (60 included)

Module 3:

- 10 red stickers, 10 white stickers (160 of each color included)

Module 4:

- 10 blindfolds (2 sets included totaling 20)

Materials to be purchased locally and restocked:

- Spring water (2 gallons/ demonstration)
- Lemon flavored soda water (2 liters needed per demonstration)

If needed, to reorder any of the supplies:

- [Balloons](#) (100)
- [Longneck Lighter](#) (3)
- [Clear Plastic Containers](#)
- [Labels](#) w/white marker (14)
- [Small Cups](#) (100)
- [Blindfolds](#) (30)
- [Circle Stickers](#) (Quantity 1)
- [Blue Food Coloring](#) (Quantity 1)