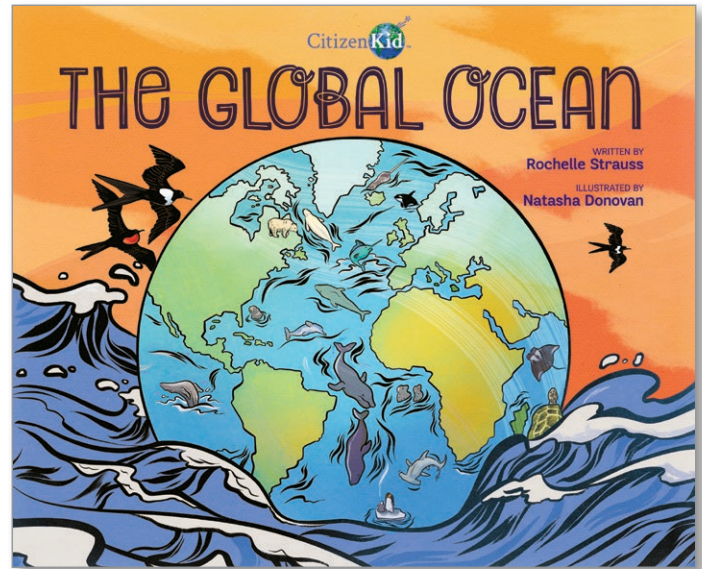


THE GLOBAL OCEAN - TEACHING GUIDE

About the Book

The global ocean is in trouble. This beautiful and important book explores the issues — and what we can do to help.

Though we think of Earth's five oceans as separate and distinct, they are actually a linked system of circulating water that is one single ocean — the global ocean. This comprehensive and accessible overview explores the global ocean's enormous influence on the planet, as well as humans' often-detrimental influence on the ocean. But it also highlights some of the many ways people are working to restore and heal the global ocean — from everyday actions to large institutional projects — making the message of urgency as hopeful as it is accurate. Filled with fascinating information, stunning visuals and plenty of calls to action, readers will be inspired to discover what they can do to help heal Earth's most important feature and, ultimately, our planet.



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About the Author

ROCHELLE STRAUSS is an award-winning author, freelance writer and education consultant in Toronto, Ontario. A graduate of McGill University and York University, Rochelle specializes in the development and implementation of environmental education, communication and outreach initiatives. Rochelle has consulted on national and international projects and her clients have included museums, architects, designers, parks, NGOs, governments, schools and school boards. Visit her website at www.rochellestrauss.com or on Instagram [@rochellestraussauthor](https://www.instagram.com/rochellestraussauthor).

About the Illustrator

NATASHA DONOVAN is an award-winning illustrator originally from Vancouver, British Columbia. She is a member of the Métis Nation of British Columbia. Natasha now lives on a tiny farm along with several wonderful creatures — both of the human and the nonhuman variety — in Deming, Washington.

Outline Of Activities

- Activity One: Exploring the Ocean Zones
- Activity Two: Get with the Flow — Ocean Currents in Action!
- Activity Three: Ocean Acidification Experiment
- Activity Four: An Ode to the Ocean
- Activity Five: Speaking Up for Ocean Action



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Activity One: Exploring the Ocean Zones

In this craft activity, students learn more about the five different ocean zones (layers), and the animals that live there. This activity can be done as one large group project to create a giant poster for your classroom, or students can work individually or in pairs.

Before you begin, read the following pages out loud:

- Earth's Beating Heart (p. 4)
- An Ocean of Diversity (p. 9)

MATERIALS

- Paint, markers, crayons
- Mural paper or craft paper
- Glue or tape
- Scissors

STEPS

1. As a class, learn more about each of the ocean's five layers — sunlight zone, twilight zone, midnight zone, abyss and trenches. Questions to consider:
 - a) What are the characteristics of each zone?
 - b) What are the light levels?
 - c) Who lives there?
2. Working as a class, in pairs or on their own, students paint, color or draw each ocean layer, making sure that the blue is shaded darker as they get deeper into the ocean, so that the mural reflects all five layers.
3. Next, students may add silhouettes of the trenches, coral, rocks or other sea floor elements.
4. Finally, students draw and cut out images of their favorite sea creatures and glue them in or close to the ocean zone where they are found.



Activity Two: Get with the Flow — Ocean Currents in Action!

Through this demonstration, students see first-hand what happens when cold and warm water meet! The effect illustrates how ocean currents flow through the sea.

You can plan to do this demonstration for the entire class, or depending on the age of your class and comfort level with them using hot water, students can work in smaller groups to conduct the demonstration themselves.

Review the following chapters from *The Global Ocean* for an introduction to this activity:

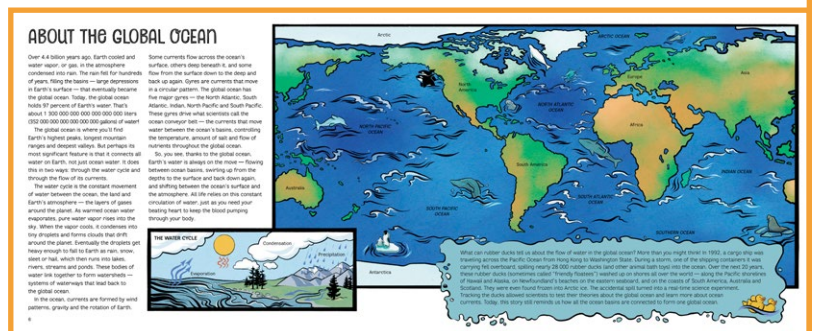
- Earth's Beating Heart (p. 4)
- About the Global Ocean (p. 6)

MATERIALS

- Cold water
- Ice cubes (about 1–2 cups per demonstration)
- Boiling water (about 4 cups per group)
- Red and blue food coloring
- Clear glass baking dish
- Notebooks, pens, pencils
- Optional: ocean animal toys for fun if you have them

STEPS

1. Start by getting the hot water ready — fill the kettle and bring it to a boil.
2. Fill a glass baking dish with cold water — about $\frac{1}{3}$ of the way. Make sure to leave room because you will be adding ice and hot water later.



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3. Add a few drops of blue food coloring. Be sure to add just a few drops. The water should be light in color so that you can see the currents later.
4. Add sea animal toys if you are using them.
5. Now add ice cubes to the baking dish — about 1–2 cups — and stir gently.
6. Let the ice melt into the water for a few minutes. The ice cubes don't have to be fully melted. The ice is just helping to make the water cold!
7. When the hot water is ready, measure four cups and add a few red drops of food coloring to the water. This demonstration works best when the water is quite red.
8. Now, slowly pour the red, boiled water into the corner of the baking dish and watch what happens!
9. If working in smaller groups, students should be encouraged to take notes about what they see. Later, these observations can be shared when the class regroups.

WHAT'S HAPPENING?

The hot water pushes its way through the cold water, creating water currents that the students will be able to see for themselves. This is much like what happens in the ocean, when warm and cold water meet. Some students may even observe eddies or circular swirls. These are the equivalent of ocean gyres — currents that flow in a circular pattern in the ocean. The global ocean is home to five major gyres.

Activity Three: Ocean Acidification Experiment

In this experiment, students observe first-hand the impact that ocean acidification has on shelled animals. This activity can be done in groups, pairs or individually.

Before you begin, read the following chapters from *The Global Ocean*:

- Changing Climate, Changing Ocean (p. 12)
- Sinking the Carbon Sink (p. 16)

MATERIALS

- Seashells (these can be purchased at a craft store if you don't have any on hand)
- 1 glass jar per group
- White vinegar
- Toothpicks
- Notebooks, pens, paper
- Camera (optional)

Note: If you don't have any seashells, you can do this experiment with eggshells (or even a whole egg).

STEPS

1. Take a close look at the shells. Make some notes about what the shell looks like and feels like. You can also take a photo of your shell for future reference.
2. Place the shell in a clear glass container or jar.
3. Pour enough vinegar into the jar to cover the shell.
4. Observe and make notes about what you see happening as the vinegar comes in contact with the shell. Take more photos if you'd like.
5. Over the next seven to ten days, check on the shell and make notes of any changes you observe. You can use a toothpick to poke at it or even remove it for closer examination. Take more photos if you want to document.
Note: Thin shells will react faster than thick ones. For thicker ones, you may also want to change up the vinegar every few days.
6. Upsize this experiment by creating four test scenarios. You will need four glass jars per group for this activity extension.
 - a) In one jar, pour salt water (1½ teaspoons of salt mixed with one cup of water) over the shell. This will be your control.



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- b) In the second jar, pour salt water mixed with a ¼ cup of vinegar.
- c) In the third jar, make the mixture half salt water and half vinegar.
- d) And in the final jar, fill it only with vinegar.
- e) Now compare and contrast the speed of change to the shells over several days.

WHAT'S HAPPENING?

Shellfish shells, like those of oysters, crabs, scallops and clams, are made of calcium carbonate (eggshells are, too). As you added vinegar to the jar, you should have immediately noticed bubbles rising from the shells. This is a chemical reaction: the calcium carbonate in the shells is a base, while the vinegar is an acid. Over time, the acid (vinegar) will eat away at the shells and the shells will lose their structure and integrity, becoming more fragile and softer. This is similar to the impact that a more acidic ocean (or ocean acidification) will have on shellfish in the global ocean.

Activity Four: An Ode to the Ocean

In this activity, students use poems, songs, short stories or even photo stories to express how they feel and/or what they love about the ocean.

MATERIALS

The materials will vary, depending on how your students want to express themselves, but it's helpful to have the following things on hand:

- Pens, crayons, markers
- Paper and/or notebooks
- Magazines (as a source of images for collages or to cut out words to make found poems)
- Printer for photo stories
- Any other art supplies, as needed

STEPS

1. Begin this activity by reading *The Global Ocean* — either the whole book or a few sections. You can also read some ocean poems or listen to ocean sounds (like whale songs) — anything you can think that might inspire creativity.
2. Now invite students to write a poem or create a found poem using words from a magazine, to write a song or a short story, or even create a photo collage that expresses their feelings about the ocean. They can choose any ocean topic they want, for example, the incredible diversity of species within the ocean, how the ocean is changing, how they feel about the ocean, or what they want to do to protect it.
3. When their projects are complete (this could take several periods in class or at home), students can share their work with the class and/or display their work in their classroom, school library or home.

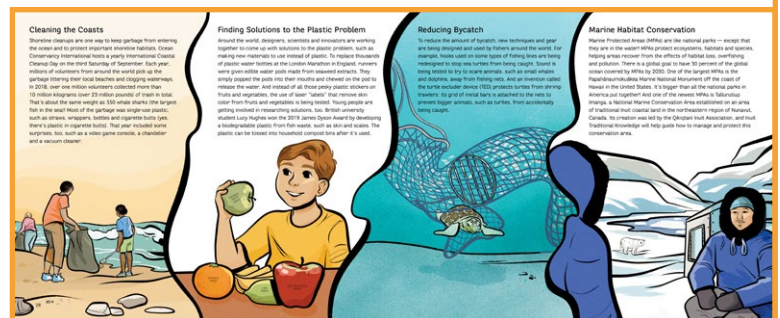


Activity Five: Speaking Up for Ocean Action

Learning more about the ocean is vital to helping protect the health of the global ocean. Through this activity, students learn more about the issues impacting the ocean and create campaigns championing ocean conservation. Students can work in groups, pairs or on their own. For this activity, reference pages 10–25 in *The Global Ocean* for more information about the ocean issues. You can also reference the “Ripple of Change” stories throughout the book and on pages 26–32 for ocean actions.

MATERIALS

- Markers, crayons, paints, pens
- Poster board
- Any other art supplies, as needed



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STEPS

1. As a class, brainstorm the issues impacting the global ocean.
2. Have each student or group select an issue they feel passionate about and do some additional research to learn more. Remind them to look for stats, data and facts, as well as positive actions.
3. Next, create a "Speak Up for Ocean Action" poster that calls attention to the issue they have selected. Students should use the stats, data and facts they found and create slogans that champion others to take action.
4. Hang the finished posters throughout the school to help other students learn more and encourage them to take action to protect the ocean.
5. Extension: Explore opportunities to post the posters throughout your school's community — at coffee shops, community centers or libraries to help spread the word!

Read on!

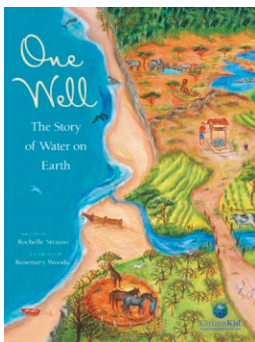
Rochelle Strauss, author of *The Global Ocean*, has also written the bestselling books *One Well: The Story of Water on Earth*, about conserving and protecting Earth's water, and *Tree of Life: The Incredible Biodiversity of Life on Earth*, about all life on Earth.



A collection of books that inform children about the world and inspire them to be better global citizens

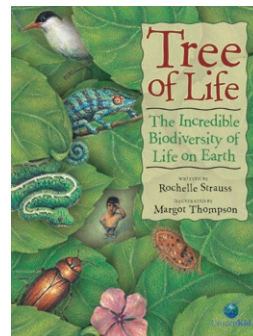


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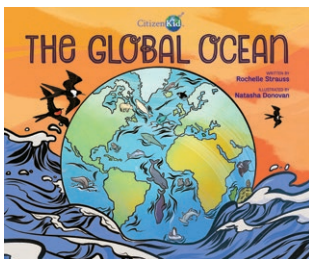
SDG 6 Book Club Selection,
Clean Water and Sanitation

SDG 14 Life Below Water



SDG 15 Book Club Selection,
Life on Land

SDG 14 Life Below Water



SDG 6 Clean Water and Sanitation

SDG 14 Life Below Water

For additional activities, videos and more, visit CitizenKidCentral.com



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