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Chapter (Lesson) 3. The Sea Around Us: life and reciprocity, part 1

Lesson Three Intentions:

- Students consider their relationship to the ocean, and the importance of the world's oceans.
- Students explore the composition of water, and its relationship to the human body/human being.
- Students discuss the impact of pollution + acidification on the world's oceans, reefs and ecosystems.
- Students identify reasons for ocean pollution and consider differential impacts on global communities.

Lesson Three

This lesson explores the question, **what is our relationship to water?** Students consider how water came into existence (as a molecule), the composition of the Earth and the human body (both at least 70% salt water; at least the human being at birth), and the ways water has cycled across time through the bodies of dinosaurs, trees, oceans, rivers, rain, lakes, streams, and all of us—always the same water, cycling and recycling. In this third part of the journey, students are invited to think deeply about how water impacts the conditions for life and health—for the planet and for people—and to consider what we might learn from the way water **moves, changes state/form, and nourishes life**. This includes thinking about the way water has influenced human civilizations over time, with particular focus on oceans. This lesson also focuses on what is happening to the world's oceans in the current time (rising temperatures, ocean acidification, pollution). Water is the Earth's first resource, and **connects us all**, how is it being protected? Who is thinking about environmental justice, protection and repair with respect to water and

Key Themes:

- Curiosity and observation
- Relationship b/t universe, Earth, human beings
- Importance of/what we can learn from water (nourishing life)
- Ocean temperatures/acidification; plastic pollution; sea level rise
- What we can do to help protect/repair the oceans

Duration: This lesson is designed for 30 mins., but can be done in 15-20, or expanded to 45-80 mins.

Lesson Components:

- Slides (in Google slides format; adaptable for educator needs/preferences)
- VIDEO: "Why the Ocean Matters"; "One Step Closer"; "Even Little Things"; "Reefs at Risk"; "Coral Reefs of Vanuatu"
- WRITING/REFLECTION: personal reflection; research - diversity and marine science
- Resources, activities and extension ideas (see end of lesson)

Materials:

- Educators: Lesson PDF, access to online media (for video viewing), slide deck (customizable)
- Students: pencil/pen and paper

Connections (see extensions/resources and standards below; full standards for this project [here](#)):

Justice, Environment
Film, Reading/Writing; History; STEM
Mini-challenge (can be used as a way of assignment/
assessment) Further Reading; Watching; Exercises

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An Initial Reflection

Slide 3

Before looking at what anyone else says about the ocean, what can it show us **for each of us first to ask ourselves** what we think of, feel, remember, or imagine about the ocean...

Invite students to reflect in their own way on the line below/on Slide 3. Let students know that there is no right way to respond; **the only thing to focus on is their own experience.**

This might mean writing a story of an experience they had first seeing or learning about the ocean; imagining what it's like to stand at the edge of the sea; daydreaming about creatures in the ocean or its unseen depths; or listening inwardly for the rhythm of waves.

Students could write a brief story or poem, draw, or find a different way of recording any reflection.

When I think of the ocean, I think of, feel, remember... (or imagine...)

Encourage students to see if they can keep with this reflection for a little while, even **beyond the first few thoughts, memories, or impressions.** This reflection can **wander** – it might be a combination of memory and imagination, and it might be interesting to see what comes of inquiring with different senses (when you think of the sight of an ocean (the surface or deep), the sounds of an ocean, the smell of the ocean, the texture of waves). It is not necessary ever to have been to an ocean to do any part of this reflection.

When the right amount of time for you and your class or student has passed (you might do this with them too), you might invite students who would like to do so to share something that was present for them.



Slide 4

Further considering our relationship to the ocean:

“People ask: Why should I care about the ocean? Because the ocean is the **cornerstone** of earth's life support system, it shapes climate and weather. It holds most of life on Earth. 97% of Earth's water is there. **It's the blue heart of the planet** – we should take care of our heart.” – [Sylvia Earle](#)

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Invite someone to read Sylvia Earle's quote and explore:

- What does Sylvia Earle's quote mean to you, or make you think about? What stands out?
- What myths and stories of oceans emerged in different places in the world?
 - What has the ocean represented? Inspired?
 - Do we see images or stories of the ocean anywhere in our daily lives?
- Is there a story you most remember learning that in some way included the ocean
 - Books? Movies/shows? Photographs? Objects? Metaphors?
- Another word for ocean? ("sea", "marine", "deep blue",...?)
 - How does a different word bring a different feeling or story to mind?
- How do scientists study the world's oceans? What do they want to understand?
- At what point in the timeline of the Earth do the oceans appear?
 - How can this be studied?
- What might Sylvia Earle mean when she calls the ocean the "**cornerstone** of earth's life"?
- Why might she call the ocean "**the blue heart of the planet**"?
 - What are ways oceans support life on Earth? Are all creatures reliant on oceans?
 - What do you find in oceans, and what can we learn from what's beneath the water?
 - What sorts of creatures (plants, microorganisms, bacteria, animals)?

Exploring the Origins of Ocean (a few short videos you might include/explore): Where Did Earth's Water Come From? (<https://youtu.be/Rwt004EXgUE>)

You might also ask if anyone knows anything else about [Sylvia Earle](#)? (more in lesson extras)

Sylvia Earle founded [Mission Blue](#), and has devoted her life to **protecting the Earth's oceans**....

Connection to the Sea

Slide 5

Another way of exploring similar considerations and questions might be this quote from Callum Roberts:

"People have a **deep emotional connection to the sea**. The oceans inspire, thrill, and soothe us. Some think we owe our clever brains and the success they brought to our ancestors' close link to the sea. But relationship with the sea stretches back through time much further than this: all the way to the origins of life itself. **We are creatures of the ocean.**" – **Callum Roberts**, *The Ocean of Life*

- For what reasons do we consider and trace the "origins" of something?
 - What about when the "origins" are not obvious/visible?
 - Do we think of the ocean as part of our own origins and living/inherited/unfolding history?
- What if you live far from an ocean, or have never seen/heard/experienced an ocean, how does the ocean impact life for communities living nowhere near a coastline? How can this be sensed?



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Can You Guess.....?

(This quiz can also be done via Kahoot: [here](#))

Slide 6

- Our oceans cover more than _____ percent of the Earth's surface? (more than 70%).
- Less than ____ percent of the planet's oceans have been explored. (less than 5%).
- Between _____ and ____ percent of the oxygen we breathe is produced by oceanic plankton (plants, algae and bacteria that can photosynthesize). ([between 50 and 70%](#))
- When we're born, our bodies are approximately _____ % water. As we age, that number drops below _____ %, but the brain continues to be _____ % water. (78%, 60% as we age, 80% brain continues)
- It's estimated that 80 percent of the world's population lives within _____ miles of the coastline of an ocean, lake, or river. (60 miles)

A few other questions you might explore ([History](#)):

- What are the first records of ocean exploration?
- How have the oceans impacted the ways human beings have built cities and communities?

The Human Being and Water

Slide 7

You might invite students to talk about whether any of this is new information. If so, what stands out? If not, what did they already know? Do we think of ourselves as composed of water, as inseparable from oceans, no matter how far we live from one?

Does every person have opportunities to learn this information, and, even more, to experience their own connection to water and oceans? How does understanding of the ocean become more than just information; how does it become a deeper living part of our personal/shared stories?

Additionally, you might also explore:

- How have scientists been able to understand percentages just discussed? What tools do they use?
 - What questions are they asking, trying to answer? Why? For what does it matter?
- **What kind of water** is in blood, muscle, even bone? (freshwater, saltwater?)
- What about other creatures—how much of a whale's body, cat's body, bird's body **is water**?
- We may think about trees and oxygen/breathing, but do we think about the ocean and breath?

*** And, with every breath, we breathe with the ocean....**

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Slide 8

[“Why the Ocean Matters”](#) and [“One Step Closer”](#) (video options)

You might show the short video “Why the Ocean Matters” (linked to the image and the text on this slide - it will take you to the National Geographic page for the video, and from there you can enlarge the video to full size).

This video emphasizes **the link between healthy oceans and our health.**

- What most stayed with you from this video after watching it?
- What are two facts that caught your attention in this video?
- What are two images that catch your attention in this video?

Show One Step Closer (video option). This film, made by a student in the Redford Center Challenge last year, focuses on the California kelp forest ecosystem.

- What are some of the ways (techniques) of storytelling you notice in this video?
- How do the different elements influence your experience of the story? Interviews? Video footage? Sound? Text?
- What feeling/message are you left with after watching?

What’s Happening to the World’s Oceans

Slide 9

- What do we know about ocean health right now?
- What can we understand about ocean health even just from this image?
- How does what happens on land impact the ocean? And vice versa?
- How could we research some of these questions?
- What are examples of films that have been made about the ocean?
- Is ocean pollution ever shown in shows or films that you see?

Slide 10

About **17.6 billion pounds** of plastic is finding its way into the ocean every year. At this rate, **by 2050** ocean plastic will outweigh all of the ocean’s fish. (Source and more info: [Conservation International](#))

Invite students to respond:

What do you think are the most commonly found plastic items in the ocean/on beaches?

You might make a list, or have the class work in breakout groups to come up with a list together, and then see which items you all have identified. This is also sometimes called “[marine debris](#).”

Slide 11

Most commonly found:

cigarette butts; food wrappers; plastic beverage bottles; plastic bottle caps; plastic grocery bags other plastic bags; straws, stirrers; plastic takeout containers; plastic lids and utensils; foam takeout containers; fishing gear/nets

(*See the [Ocean Research Project](#) for more details. Also National Geographic’s resources on [Marine](#)

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[Debris.](#))

Slide 12



[Even Little Things](#)

Now we will watch the short film, Even Little Things, made by another student from the Stories Challenge last year.

- What is the difference between the 'theme' and the 'characters'?
- How do the characters help bring the theme to life?
- What's the purpose of this video?
- What message(s) are you left with? What is the call to awareness/action?
- Do you see any different actions you could take after watching this video?

Looking more specifically at systems, what are some of the [impacts of marine debris/pollution](#)? Specifically on marine ecosystems? What about coral reefs?...

Slide 13

Coral Reefs and Ocean-Human Health (This quiz can also be done via Kahoot: [here](#))

What do we know about coral reefs? (If teaching online, you could create this as a quiz with students putting answers in the chat, or use a padlet):

- What does MPA stand for related to ocean health? (Marine Protected Areas)
- What are coral reefs made of? Are they plants or animals? (animals, they don't make their own food)
- What are some things people do that directly impact coral reefs around the world?(Plastic pollution, chemical pollution, habitat destruction causes sediment to flow into the ocean)
- What do coral reefs need to survive? (Sunlight, clean water, water temperature, saltwater)
- What is "**biodiversity**"? (the variety of living species found in a particular place, region, ecosystem, planet)

* Coral reefs are believed to have the **highest biodiversity of any ecosystem**

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Slide 14

Reefs at Risk (two films)

In addition to plastic entering the ocean, what else is contributing to pollution and rising temperatures? What else is contributing to declining ocean health, particularly the **health of coral reefs**?

Set on the beautiful beaches of Hawaii, the short film [Reefs at Risk](#) explores the harmful effects some sunscreen chemicals have on coral reefs, marine life and people. In order to protect this fragile ecosystem, Hawaii lawmakers pass a bill to ban the sale of sunscreens with oxybenzone and octinoxate, and hope that other states and nations will follow (website: <https://thecoverupfilm.com/reefs-at-risk/>).

People are exploring how to save reef ecosystems all across the world's oceans. We will now watch this clip of [Adaptation: Coral Reefs of Vanuatu](#) (start at 11:58 to the end) where the impacts of human activities have resulted in outbreaks of crown-of-thorn starfish who destroy the reefs. But, the creative and innovative people of Vanuatu are using creative and innovative ideas to revive their reefs.

- What stayed with you after watching these videos?
- What are two facts that caught your attention in these videos?
- What are two images that catch your attention in these videos?
- What are some of the ways the filmmakers used storytelling in these videos?
- How do the filmmaking elements work together to tell a story? Such as interviews, narration, imagery, sound, music, and text.



Slide 15

★ Lesson 3 Challenge Prep: Character

Develop a character to create awareness about a problem facing the world's oceans or communities affected by threats to our oceans. The character can be a person, place, object, or animal. Create a social media informational carousel (5-10 slides) or a poster with the character sharing an important informational message and a call to action. This is called a Public Service Announcement.

When thinking about characters, remember that characters can help us humanize problems that we do not experience first hand and help spread messages or information. For example, think of Smokey the Bear asking us to prevent forest fires.

When thinking about the message of the poster, ask students to consider the following:

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- How can you identify/research threats to the ocean such as marine pollution, ocean acidification, or sea level rise?
- What solutions have been tried?
- What are things individual people can do?
- What systemic changes are needed?
- What behavioral change do you hope to people will make, and how can you help inspire this change?
- What person, place, thing, or animal representative of the issue would people empathize with in order to move them to act or change?

For the social media slides, students can use software with templates such as Canva, Adobe Spark, or Apple Pages.

(*We'd love to help share these! Feel free to send them to stories@redfordcenter.org)

Additional Activity Options:

Home Survey ("home waste audit")

★ Short version: Find (and bring back) **3 objects** that you might find washed up on a beach during a beach cleanup...

★ [Extended version](#)

A few other questions you might explore ([Science](#)):

Wallace Nichols writes in his book [Blue Mind](#) about the health benefits "being in, on, under, or simply near water," and even of the color blue. **What do you think some of the benefits are?** You can check out a short video detailing some of the findings re: stress, learning, mental states [here](#).

Becoming/Being a Marine Scientist

Dr. Ayana Elizabeth Johnson (speaking in the [Throw Away Culture](#) video) "is a marine biologist, policy expert, writer, and Brooklyn native. She is founder and CEO of Ocean Collectiv, a consulting firm for conservation solutions grounded in social justice, and founder of Urban Ocean Lab, a think tank for coastal cities. [She works] at the nexus of science, policy, and communication, building community around climate solutions."

How does someone become an ocean scientist – a marine biologist, oceanographer, marine engineer, etc.? (possible video to include: How Do You Become a Marine Biologist?)

Do all people have the same opportunities to become involved in marine science? To begin to explore this, you might show the very short video: What It Means to Be a Marine Biologist.

For student research: People of color are historically underrepresented in marine science – who is not yet well known for their contributions to the field, and what can be done to change this? What stories are not yet told?

For example, who was Ernest Everett Just? Who was Samuel Milton Nabrit, and Matilene Spencer Berryman? And read blogs and reflections on experience like: Diversity in Ocean Science. Also see Ida-Wenona Hendricks.

Explore "Celebrating Hispanic and Latinx Ocean Champions": [HERE](#)

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Anote's Ark ([trailer](#))

As the planet warms, communities around the world also face the threat of sea level rise. [Anoke's Ark](#) explores the question, what happens when a nation disappears forever? Somewhere in the middle of the Pacific, the Republic of Kiribati will be swallowed by the sea within decades.

By interweaving stories of survival and resilience, *Anote's Ark* explores what happens when a people face losing their homeland.

Suggested Standards: Language Arts and History/Social Studies

This lesson gives students multiple opportunities to engage with **language, images and text**, with particular focus on how point of view impacts the story one tells. Students also have a chance to reflect on their own experience and point of view in **conversation and writing**.

CCSS.ELA-LITERACY.CCRA.R.4

Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

CCSS.ELA-LITERACY.CCRA.R.7

Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

CCSS.ELA-LITERACY.CCRA.SL.2

Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

CCSS.ELA-LITERACY.CCRA.L.3

Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

CCSS.ELA-LITERACY.CCRA.W.6

Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

CCSS.ELA-LITERACY.CCRA.W.9

Draw evidence from literary or informational texts to support analysis, reflection, and research.

CCSS.ELA-LITERACY.CCRA.SL.1

Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

Suggested Standards: STEM (Science, Technology, Engineering, Math)

Throughout this lesson students are encouraged to understand the primacy of **observation**, and the need to attend closely to **patterns and relationships**, and to be able to envision **the impact of actions**.

- Patterns and relationships
- Precision and depth in observation
- Inference and probability
- Ratios and proportional relationships

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Suggested Connections: NGSS/Environment

Students are encouraged to make connections between the health of natural systems and the health of human beings and human communities. In addition, phenomena and change may be observable at one scale and not another, or may require a different way of inquiry and attention to detect and understand.

- Health of human lives and health of natural systems
- Flow of energy and matter at the scale of the entire planet
- Exchange of matter between natural systems and human societies affects long-term functioning of both
- Phenomena that can be observed at one scale may not be noticed/observable at another scale
- Systems interact with other systems
- Stability might be disturbed either by sudden events or gradual changes that accumulate over

Suggested Connections: Social Justice

The integration of perspectives and voices in this lesson is intended to encourage greater appreciation for the depth of

one's own identity, and **respectful curiosity about others' lived experience**.

Diversity. Students will respectfully express curiosity about the history and lived experiences of others and will exchange ideas and beliefs in an open-minded way.

Action. Students will recognize their own responsibility to stand up to... injustice.

Suggested Connections: Social Emotional Learning Competencies

Components of this lesson are meant to support students' sense of **confidence and agency**, as well as their social-awareness and sense for relationships; as well as how much relationships need tending, both with **respect** to our relationship with the natural world and each other.

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- Self-awareness (confidence, self-efficacy)
 - Social-awareness (perspective-taking, appreciating diversity, respect for others)
 - Social skills (communication, relationship building)
 - Responsible decision-making (evaluating, reflecting)

Suggested Connections: UN Sustainability Goals

(*Click the images to go to pages on the UN's website that detail the goals and intentions behind each.)

