

World Oceans Day: Currents, Climate, and Coastlines

Standard:

NCSS.III.1 — Understanding Human-Environment Interaction

NCSS.VIII.1 — Science and Technology in Society

TEKS §112.19(b)(10)(B) — Global Patterns and Local Weather

STUDENT EDITION



Coral bleaching turns once-colorful reefs ghostly white. Prolonged bleaching kills reefs that support roughly 25% of all marine species.

World Oceans Day: Currents, Climate, and Coastlines

The Ocean Is Closer Than You Think

Close your eyes and picture the ocean.

Maybe you imagine a beach vacation, a seafood dinner, or a nature documentary

about coral reefs. But here's something that might surprise you: even if you live hundreds of miles from the nearest coastline, the ocean

shapes your daily life in ways you probably never noticed. The air you breathe, the weather outside your window, and the food on your plate are all connected to the vast blue world that covers more than 70% of our planet. On World Oceans Day, celebrated every June 8th, scientists and communities around the globe pause to reflect on just how essential — and how fragile — that connection really is.



Coral bleaching turns once-colorful reefs ghostly white. Prolonged bleaching kills reefs that support roughly 25% of all marine species.

How Oceans Regulate Earth's Climate

Think of the ocean as Earth's thermostat. It absorbs about 90% of the excess heat that human activities add to the atmosphere through the burning of fossil fuels.

Without the ocean acting as a giant heat sponge, global temperatures would rise far more dramatically and far more quickly than they already are. The ocean doesn't just absorb heat passively — it stores it for decades and slowly releases it back into the atmosphere, which is why the effects of today's greenhouse gas emissions will continue to influence climate long into the future.

Oceans also produce roughly **50% of the oxygen** in Earth's atmosphere — not from trees, but from microscopic organisms called **phytoplankton**. These tiny marine plants drift near the ocean's surface, absorbing carbon dioxide and releasing oxygen through photosynthesis, just like land plants do. A single species, *Prochlorococcus*, is believed to be responsible for producing up to 20% of the oxygen in every breath you

take — making it arguably the most important organism on Earth that most people have never heard of.

Ocean Currents: The Planet's Conveyor Belt

One of the ocean's most powerful climate tools is its system of **currents** — massive rivers of water that flow through the ocean at different temperatures and depths. The most famous of these is the **Gulf Stream**, a warm current that flows northward along the eastern coast of North America and across the Atlantic Ocean toward Europe. Because of the Gulf Stream, cities like London, England, experience much milder winters than other cities at the same latitude, such as Calgary, Canada. The Gulf Stream moves roughly 30 times more water than all of the world's rivers combined, making it one of the most powerful forces shaping life on the planet.

When you look at an **ocean current map**, you'll notice two types of currents:

- **Surface currents**, driven by wind patterns and Earth's rotation
- **Deep-water currents**, driven by differences in water temperature and salinity (saltiness)

Together, these currents form what scientists call the **global ocean conveyor belt**, also known as thermohaline circulation. This system circulates heat, nutrients, and gases around the entire planet on a cycle that can take up to 1,000 years to complete one full loop. Disruptions to this system — caused by melting polar ice and rising ocean temperatures — can shift weather patterns thousands of miles inland, leading to more intense storms, droughts, and unpredictable seasons. Scientists have found evidence that the Atlantic portion of this conveyor belt, known as AMOC (Atlantic Meridional Overturning Circulation), has been weakening in recent decades, raising concerns about dramatic climate shifts for North America and Europe.

When the Ocean Warms: Real Consequences

Ocean warming isn't just an abstract scientific concern — it has direct, visible consequences for ecosystems and human communities.

Coral reefs, often called the "rainforests of the sea," are among the most biodiverse ecosystems on Earth. They cover less than 1% of the ocean floor but support approximately 25% of all marine species. When ocean temperatures rise even slightly

above normal, corals expel the colorful algae living in their tissues and turn ghostly white — a process called **coral bleaching**. Prolonged bleaching kills the reef, destroying habitat for thousands of fish species and removing a natural barrier that protects coastlines from storm waves. The Great Barrier Reef in Australia — the world's largest coral reef system — has experienced multiple mass bleaching events since 1998, with scientists warning that sustained warming could render large portions of it permanently uninhabitable for coral.

Sea level rise is another consequence of warming oceans. As water heats up, it expands — a process called thermal expansion — and as glaciers and ice sheets melt, they add even more water to the ocean. Together, these forces have raised global sea levels by about 8–9 inches since 1880, with the rate of rise accelerating in recent decades. Low-lying coastal cities like Miami, Jakarta, and Mumbai face increasing risks of flooding, saltwater intrusion into freshwater supplies, and the eventual displacement of millions of people.

Fisheries are also at risk. Billions of people worldwide depend on fish as their primary source of protein. As warming waters force fish populations to migrate toward cooler regions, fishing communities — especially in developing nations — face serious food security challenges. In some parts of the world, fish that were once abundant have shifted their ranges by hundreds of miles, leaving traditional fishing communities without their primary livelihood and forcing difficult economic and cultural transitions.

Evaluating a Common Claim

You may have heard the statement: "The ocean is so big, human activity can't really damage it." Is this accurate?

The evidence says otherwise. **Ocean acidification** is caused by the ocean absorbing excess CO₂ from the atmosphere. When CO₂ dissolves in seawater, it forms carbonic acid, making the water more acidic. Since the Industrial Revolution, ocean pH has dropped by about 0.1 units — which may sound small, but because pH is measured on a logarithmic scale, this represents roughly a 26% increase in acidity. This change makes it harder for shellfish, sea urchins, and corals to build their calcium carbonate shells and skeletons, threatening the base of many marine food webs.

Plastic pollution adds another layer of damage. An estimated 8 million metric tons of plastic enter the ocean every year. Much of it breaks down into **microplastics** — fragments smaller than 5 millimeters — which are now found in the deepest ocean trenches, in Arctic sea ice, and in the tissues of marine animals from zooplankton to whales. Microplastics have also been detected in human blood and lung tissue, meaning ocean pollution has become a human health issue as well.

Overfishing has depleted roughly one-third of the world's fish stocks beyond sustainable levels. The ocean is vast, but it is not invincible.

Connecting Ocean Health to Your Daily Life

Every choice you make has a ripple effect. Here are three concrete actions you can take right now:

1. **Reduce single-use plastics** — swap disposable bottles and bags for reusable ones to keep plastic out of waterways that flow to the sea.
2. **Choose sustainable seafood** — look for labels like the Marine Stewardship Council (MSC) certification when shopping or dining out, which signals that fish were caught responsibly.
3. **Conserve energy at home** — turning off lights and unplugging devices reduces fossil fuel use, which slows the ocean warming that threatens reefs and fisheries.

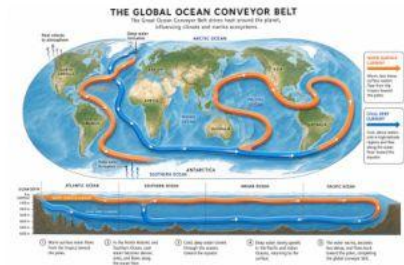
Small actions, multiplied across millions of people, add up to real change.

Summary

The ocean is not just a backdrop to human life — it is the engine that drives Earth's climate, weather, and food systems. Understanding how ocean currents work, why warming water matters, and how human decisions affect marine ecosystems is essential knowledge for every global citizen. The ocean's health is your health. And protecting it starts with understanding it — and then doing something about it.

Lesson Objective

By the end of this lesson, you will be able to explain how ocean currents and temperature changes affect climate and weather patterns around the world, including in places far from the coast. You will also analyze how human activities — such as burning fossil fuels and producing plastic waste — impact ocean health and, in turn, affect communities and ecosystems globally. Finally, you will evaluate what individuals and societies can do to protect the ocean and the systems that depend on it.



The global ocean conveyor belt circulates heat and nutrients around the entire planet on a cycle that can take up to 1,000 years to complete.

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Bloom's Level: Analyze

Bloom's Goal: Students will analyze the cause-and-effect relationships between human activities, ocean health, and climate and weather patterns at both local and global scales.

Explanation: This lesson moves beyond simply recalling facts about the ocean and asks students to break down complex systems — such as thermohaline circulation and ocean acidification — to understand how changes in one part of the system ripple outward to affect people, ecosystems, and weather worldwide. By examining evidence and evaluating claims about human impact on the ocean, students practice the higher-order thinking skills associated with the Analyze level of Bloom's Taxonomy.

Application Questions

Read each question carefully, think about what you learned in the article, and write a complete response using evidence and your own reasoning.

1. The article describes the ocean as Earth's 'thermostat.' Using evidence from the article, explain how the ocean regulates Earth's climate and what could happen if this system is disrupted.

Think about: What does the ocean absorb, and how does the global ocean conveyor belt connect to weather patterns far from the coast?

2. Some people claim that the ocean is too large for human activity to damage it. Do you agree or disagree with this claim? Use at least two specific pieces of evidence from the article to support your position.

Think about: Think about ocean acidification, plastic pollution, and overfishing — what do these examples tell you about the ocean's limits?

3. The article states that ocean health affects people who live far from the coast. Choose one example from the article and explain how a change in the ocean could impact the daily life of someone living in a landlocked region.

Think about: Consider how the ocean connects to food, weather, oxygen, or climate — which connection seems most surprising or important to you, and why?

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Data Table & Analysis

Study the data table below, which summarizes key ocean-related facts and measurements discussed in the lesson. Then answer the three analysis questions using evidence from the table and what you have learned.

Experiment: This data set summarizes measurable impacts of human activity on the world's oceans, drawn from scientific findings referenced in the lesson article. The data covers ocean warming effects, acidification, pollution, and ecosystem consequences to help students analyze human-environment interactions.

Ocean Issue (N/A)	Measured Change or Scale (varies)	Cause (N/A)	Ecosystem or Human Impact (N/A)
Ocean Heat Absorption	90% of excess atmospheric heat absorbed	Burning of fossil fuels	Slows surface warming but stores heat for decades
Sea Level Rise	8–9 inches since 1880	Thermal expansion and glacier melt	Flooding risk for coastal cities like Miami, Jakarta, and Mumbai
Ocean Acidification	pH dropped ~0.1 units (~26% more acidic)	Ocean absorbing excess CO ₂	Shellfish, sea urchins, and corals struggle to build shells and skeletons
Coral Bleaching	Less than 1% of ocean floor; supports ~25% of marine species	Ocean temperatures rising above normal	Reef death, loss of habitat, reduced coastline storm protection
Plastic Pollution	~8 million metric tons enter ocean per year	Single-use plastic waste from human activity	Microplastics found in deep trenches, Arctic ice, and human blood

Ocean Issue (N/A)	Measured Change or Scale (varies)	Cause (N/A)	Ecosystem or Human Impact (N/A)
Overfishing	~1/3 of world fish stocks depleted beyond sustainable levels	Excessive commercial fishing	Food insecurity for billions who rely on fish as primary protein
Phytoplankton Oxygen Production	~50% of Earth's atmospheric oxygen	Photosynthesis by marine phytoplankton	Essential for breathable air; one species produces up to 20% of oxygen
AMOC (Ocean Conveyor Belt)	Weakening detected in recent decades	Melting polar ice and rising ocean temperatures	Risk of dramatic climate shifts for North America and Europe

1. Based on the data table, which ocean issue do you think poses the greatest immediate threat to human communities, and why? Use at least two pieces of data from the table to support your answer.

2. The table shows that ocean acidification has increased by about 26% since the Industrial Revolution. How does this connect to human energy use, and what marine organisms are most directly harmed? Explain the cause-and-effect relationship using the table.

3. Look at the rows for plastic pollution and overfishing. What do these two issues have in common in terms of their cause? What actions from the lesson could help address both problems, and how do individual choices connect to large-scale ocean health?

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Hypothesis Builder

Read the context below carefully. Then complete each component to build a scientific hypothesis about the relationship described. Use evidence from what you have learned about oceans and climate to support your reasoning.

Scientists have observed that ocean temperatures around coral reefs have been rising due to increased absorption of heat from the atmosphere. When water temperatures rise even slightly above normal levels, corals expel the colorful algae living in their tissues and turn white — a process called coral bleaching. Researchers want to investigate how changes in ocean water temperature affect the rate of coral bleaching in reef ecosystems.

Independent Variable

What is the ONE factor the scientists are deliberately changing or testing in this investigation? Identify the variable that is being manipulated.

Dependent Variable

What is the factor that scientists will measure or observe as a result of changing the independent variable? What outcome are they tracking?

If

Write the 'If' part of your hypothesis by stating what happens to the independent variable. Begin your answer with the word 'If...'

Then

Write the 'Then' part of your hypothesis by predicting what will happen to the dependent variable as a result. Begin your answer with the word 'Then...'

Because

Write the 'Because' part of your hypothesis by explaining the scientific reasoning behind your prediction. What do you know about ocean warming and coral biology that supports this prediction?

Claim-Evidence-Reasoning (CER)

Read the phenomenon below carefully. Then complete each component of the Claim-Evidence-Reasoning (CER) framework by responding to the guiding prompt. Your responses should be written in complete sentences and demonstrate your understanding of how human activity affects the ocean and global climate.

Phenomenon: Scientists have observed that ocean temperatures around the world have been rising steadily over the past century. As a result, large sections of the Great Barrier Reef have undergone repeated coral bleaching events, and global sea levels have risen approximately 8–9 inches since 1880. At the same time, ocean water has become about 26% more acidic since the Industrial Revolution, threatening shellfish, corals, and other marine organisms that form the base of ocean food webs.

Claim

Based on the phenomenon described above, make a clear, testable claim that answers this question: How have human activities damaged ocean health and disrupted Earth's climate systems? Your claim should be one or two sentences and should NOT include evidence yet.

Evidence

Support your claim with at least two specific pieces of scientific evidence from the article. Include data, measurements, or named examples (such as specific percentages, locations, or scientific processes) that directly support your claim. Avoid vague or general statements.

Reasoning

Explain HOW and WHY your evidence supports your claim. Connect the scientific concepts — such as ocean acidification, thermal expansion, thermohaline circulation, or coral bleaching — to the real-world consequences described in the article. Why does this matter for both ocean ecosystems and human communities?

Independent / Dependent Variable Analysis

Read the scenario below carefully. Then, for each component listed, write a response that identifies and explains that part of the experiment. Use your knowledge of scientific variables and the information from the article to support your answers.

Scenario: A 7th-grade science class wants to investigate how rising ocean water temperature affects coral bleaching. They set up six identical aquarium tanks, each containing a small piece of the same coral species. Two tanks are kept at the normal reef temperature of 26°C, two tanks are raised to 28°C, and two tanks are raised to 30°C. All tanks receive the same amount of light, the same water salinity, and the same feeding schedule. After four weeks, students measure the percentage of coral surface area that has turned white (bleached) in each tank.

Independent Variable

What is the one factor the students are deliberately changing across the tanks? Identify it and explain why it qualifies as the independent variable in this experiment.

Dependent Variable

What outcome are the students measuring to determine the effect of their manipulation? Identify it and explain why it is considered the dependent variable.

Control Variables

What factors are kept the same across all tanks throughout the experiment? List at least three and explain why controlling these factors is important for the validity of the results.

Operationalized Definition

How is coral bleaching specifically measured in this experiment? Write an operationalized definition that explains exactly how the dependent variable is observed and recorded.

Reflection Questions

Answer each question in complete sentences, using evidence from the article to support your thinking.

1. How do ocean currents like the Gulf Stream affect the climate of places that are far from the ocean, and what could happen if those currents weaken?

Think about: Consider how the Gulf Stream compares temperatures in London and Calgary, and what scientists say about AMOC weakening.

2. The article challenges the claim that 'the ocean is so big, human activity can't really damage it.' Do you agree or disagree with that claim? Use at least two pieces of evidence from the article to explain your answer.

Think about: Think about ocean acidification, plastic pollution, and overfishing — what do the numbers and facts tell you about the ocean's limits?

3. How are human decisions on land — like burning fossil fuels or using single-use plastics — connected to problems in the ocean, and what can individuals do to help break that connection?

Think about: Trace the chain from a human action to a specific ocean consequence, then connect it to one of the solutions the article suggests.

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True / False

Read each statement carefully. Write T if the statement is true or F if the statement is false.

- The ocean covers more than 70% of Earth's surface.
 True False
- The ocean absorbs about 90% of the excess heat added to the atmosphere by human activities.
 True False
- Phytoplankton produce roughly 50% of the oxygen in Earth's atmosphere.
 True False
- The Gulf Stream is a cold current that flows southward along the eastern coast of North America.
 True False
- The global ocean conveyor belt can take up to 1,000 years to complete one full loop around the planet.
 True False
- Coral reefs cover less than 1% of the ocean floor but support approximately 25% of all marine species.
 True False

7. Coral bleaching occurs when rising ocean temperatures cause corals to absorb more colorful algae into their tissues.

- True False
-

8. Since the Industrial Revolution, ocean acidity has increased by roughly 26% due to the ocean absorbing excess carbon dioxide.

- True False
-

9. An estimated 8 million metric tons of plastic enter the ocean every year.

- True False
-

10. Choosing seafood with the Marine Stewardship Council (MSC) certification is one way individuals can help support sustainable fishing practices.

- True False

Multiple Choice

Choose the best answer for each question based on what you have learned about oceans, climate, and human-environment interaction.

1. Approximately what percentage of Earth's surface is covered by ocean?
 - A. More than 70%
 - B. About 50%
 - C. About 30%
 - D. More than 90%
2. What role do oceans play in regulating Earth's temperature?
 - A. They reflect sunlight back into space, cooling the planet.
 - B. They absorb about 90% of the excess heat added to the atmosphere by human activities.
 - C. They release large amounts of carbon dioxide that trap heat near the surface.
 - D. They have no significant effect on global temperatures.
3. Which microscopic organisms are responsible for producing roughly 50% of Earth's oxygen?
 - A. Coral polyps
 - B. Zooplankton
 - C. Phytoplankton
 - D. Sea urchins

4. What is the Gulf Stream, and why is it important?
- A. A deep-water current that carries cold water from the Arctic to the tropics
 - B. A warm ocean current that influences the climate of North America and Europe
 - C. A wind pattern that drives rainfall across the interior of continents
 - D. A tidal system that controls sea levels along the Atlantic coast
-

5. What is thermohaline circulation, also called the global ocean conveyor belt?
- A. A system of wind patterns that create surface waves across the ocean
 - B. The process by which phytoplankton absorb carbon dioxide near the surface
 - C. A global system of ocean currents driven by differences in water temperature and salinity
 - D. The cycle of evaporation and precipitation that forms clouds over the ocean
-

6. What happens to coral reefs when ocean temperatures rise above normal for an extended period?
- A. Corals grow faster and become more colorful.
 - B. Corals expel their algae and turn white, a process called coral bleaching, which can kill the reef.
 - C. Corals migrate to deeper, cooler water to survive.
 - D. Corals absorb more carbon dioxide and become more acidic.
-

7. What causes ocean acidification?
- A. Plastic pollution breaking down into chemicals that lower ocean pH
 - B. Rising ocean temperatures causing water molecules to split apart
 - C. The ocean absorbing excess CO₂ from the atmosphere, which forms carbonic acid
 - D. Overfishing removing species that naturally keep ocean water balanced
-

8. How does sea level rise threaten coastal communities?

- A. It causes ocean currents to reverse direction, changing wind patterns inland.
- B. It leads to increased flooding, saltwater intrusion into freshwater supplies, and displacement of people.
- C. It reduces the amount of sunlight reaching coastal cities, lowering temperatures.
- D. It causes fish populations to move away from coastlines, reducing local food supplies.

9. Which of the following best explains why the claim "the ocean is too big to be damaged by humans" is inaccurate?

- A. The ocean is actually smaller than most people think, covering less than half of Earth's surface.
- B. Evidence shows that human activities have caused ocean acidification, plastic pollution, and overfishing that harm marine ecosystems.
- C. Scientists have proven that ocean currents naturally clean up any pollution humans add.
- D. Human activity only affects freshwater systems, not saltwater oceans.

10. Which individual action can directly help slow ocean warming and protect marine ecosystems?

- A. Eating more seafood to support the fishing industry
- B. Conserving energy at home to reduce fossil fuel use
- C. Avoiding all beaches to reduce human impact on coastlines
- D. Using more single-use plastics because they are lightweight and efficient

Vocabulary

Study each term and its definition below. These words will help you understand how oceans, climate, and human activity are connected. Use these definitions to help you complete the lesson activities.

phytoplankton

Microscopic marine organisms that float near the ocean's surface and produce about 50% of Earth's oxygen through photosynthesis.

Explain in your own words:

currents

Large, continuous flows of ocean water that move through the sea at different temperatures and depths, helping to distribute heat around the planet.

Explain in your own words:

Gulf Stream

A powerful warm ocean current that flows northward along the eastern coast of North America and across the Atlantic Ocean, significantly influencing the climate of nearby regions.

Explain in your own words:

thermohaline circulation

The global system of ocean currents driven by differences in water temperature and salinity, sometimes called the global ocean conveyor belt, which circulates heat and nutrients around the entire planet.

Explain in your own words:

coral bleaching

A process in which corals expel the colorful algae living in their tissues and turn white when ocean temperatures rise above normal, which can lead to the death of the reef.

Explain in your own words:

sea level rise

The gradual increase in the average height of the ocean's surface caused by thermal expansion of warming water and the melting of glaciers and ice sheets.

Explain in your own words:

ocean acidification

The process by which the ocean becomes more acidic as it absorbs excess carbon dioxide from the atmosphere, making it harder for shellfish and corals to build their shells and skeletons.

Explain in your own words:

microplastics

Tiny plastic fragments smaller than 5 millimeters that result from the breakdown of larger plastics and are now found throughout the ocean, in wildlife, and even in human tissue.

Explain in your own words:

salinity

The measure of how much salt is dissolved in ocean water, which plays a key role in driving deep-water currents and the global ocean conveyor belt.

Explain in your own words:

thermal expansion

The process by which water takes up more space as it warms, contributing to rising sea levels as ocean temperatures increase.

Explain in your own words:

Exit Ticket

Answer both questions in 1-2 sentences using what you learned from today's lesson. Be specific and use evidence from the article.

1. Explain how the Gulf Stream affects the climate of cities in Europe, and why disruptions to ocean currents could impact weather patterns far from the ocean.

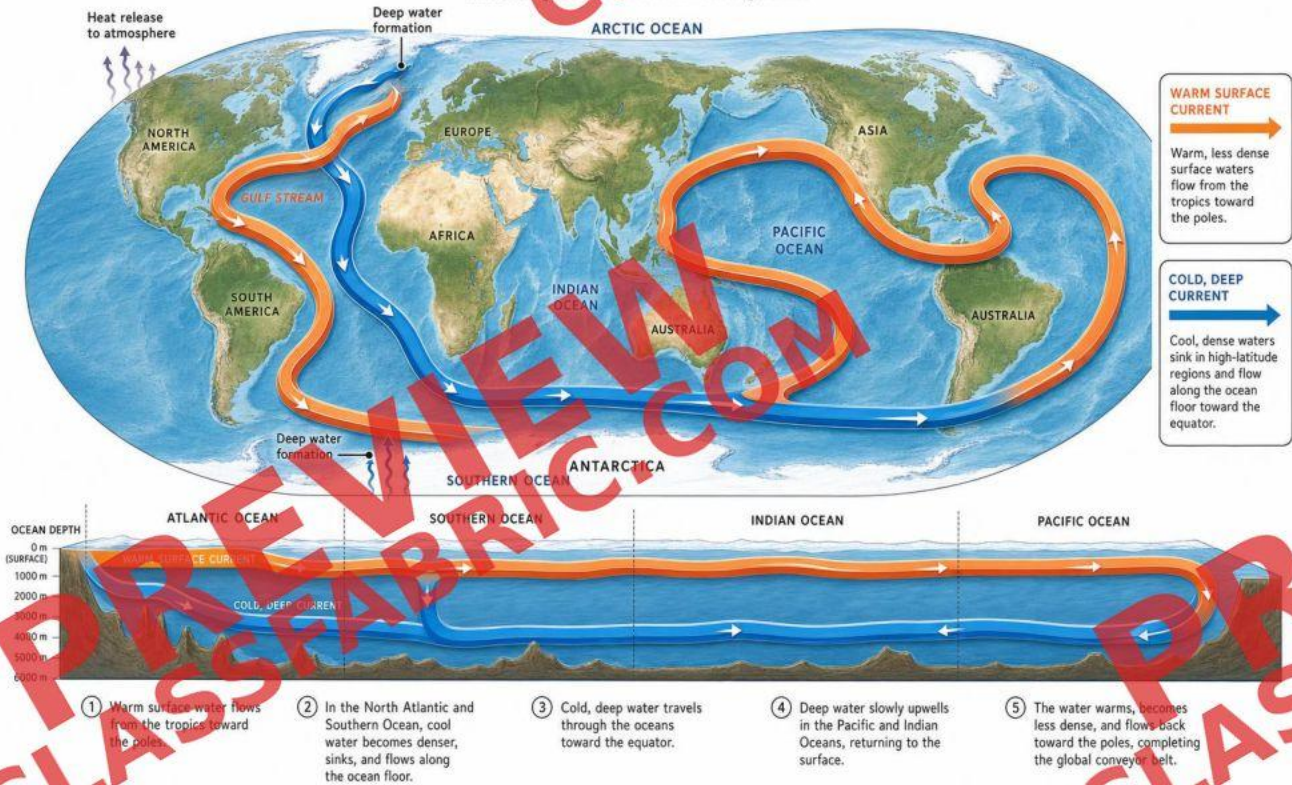
2. Identify ONE specific way that human activity is damaging the ocean and describe ONE action individuals can take to help reduce that damage.



Coral bleaching turns once-colorful reefs ghostly white. Prolonged bleaching kills reefs that support roughly 25% of all marine species.

THE GLOBAL OCEAN CONVEYOR BELT

The Great Ocean Conveyor Belt drives heat around the planet, influencing climate and marine ecosystems.



The global ocean conveyor belt circulates heat and nutrients around the entire planet on a cycle that can take up to 1,000 years to complete.

World Oceans Day: Currents, Climate, and Coastlines

CROSSWORD PUZZLE



World Oceans Day: Currents, Climate, and Coastlines

CROSSWORD PUZZLE

ACROSS

- The gradual increase in the average height of the ocean's surface caused by thermal expansion of warming water and the melting of glaciers and ice sheets.
- A process in which corals expel the colorful algae living in their tissues and turn white when ocean temperatures rise above normal, which can lead to the death of the reef.

DOWN

- Large, continuous flows of ocean water that move through the sea at different temperatures and depths, helping to distribute heat around the planet.
- The global system of ocean currents driven by differences in water temperature and salinity, sometimes called the global ocean conveyor belt, which circulates heat and nutrients around the entire planet.
- The process by which the ocean becomes more acidic as it absorbs excess carbon dioxide from the atmosphere, making it harder for shellfish and corals to build their shells and skeletons.
- Microscopic marine organisms that float near the ocean's surface and produce about 50% of Earth's oxygen through photosynthesis.
- The process by which water takes up more space as it warms, contributing to rising sea levels as ocean temperatures increase.
- Tiny plastic fragments smaller than 5 millimeters that result from the breakdown of larger plastics and are now found throughout the ocean, in wildlife, and even in human tissue.
- The measure of how much salt is dissolved in ocean water, which plays a key role in driving deep-water currents and the global ocean conveyor belt.
- A powerful warm ocean current that flows northward along the eastern coast of North America and across the Atlantic Ocean, significantly influencing the climate of nearby regions.

World Oceans Day: Currents, Climate, and Coastlines

WORD SEARCH

T H E R M O H A L I N E C I R C U L A T I O N K
B K K B D L C L G C W K B A W C B B N V W L T Q
O H L A L Z Z T B S O I O T P K K T K A X F X F
C U R R E N T S R U S E X W E V Y R I F I I A P
N N N F O F J A S Q P V R L P B M Z N F C W F T
C O H X H O Y W M D D Q E G U L F S T R E A M H
O M H X P J A K I G X M U J K J M C R G Z D W E
R D M Q M D N X S G Q I F J P G G V H F A U V R
A G Q S A L I N I T Y C L P P Z H N D R K K M
L K V A X Z T F A K R P N K Z F Q Z M O D J S A
B Z F A Q Y W U H Z H O Z G C P G I T J B Q F L
L Q C X L O E K N E A P S E R C E S N Q D D G E
E L F G V Y Q D K N T L Z W D R R E O M Q K M X
A B H V K C P J S Z A A Q W A B I A L U T D S P
C S I D S L C T D K K S W H P R P L Z Y A I U A
H S J Z Q K P H B F I T Q N F B U E H S O O W N
I Q U P F I E K L Z E I A D X P K V G E X W R S
N P L N S T D M Q Y S C N B B F X E N U R C I I
G T H O K K O Z U O C S Q X H L R L T M M A N O
P H Y T O P L A N K T O N V G S T R N J W X P N
N Z L L I Z S A I E H M P J F H Y I G M C S T Z
K R J B Q C S F G I I E B N W I C S S O R O V N
C U M C N N W R Y Y D U O G V R L E X F A R C F
F V N L O C E A N A C I D I F I C A T I O N W F

FIND THESE WORDS

thermohaline circulation
microplastics
currents

ocean acidification
phytoplankton
salinity

thermal expansion
sea level rise

coral bleaching
Gulf Stream