

An underwater scene featuring a large sea turtle swimming towards the right. Several pinkish fish are swimming above the turtle. In the background, a diver's headlight and a metal ring are visible, along with some coral and other smaller fish. The overall color is a deep blue.

Ocean Literacy

Mercury Text: The Essential Principles and
Fundamental Concepts of Ocean Sciences.

VERSION 3.2: JANUARY 2024

A Guide to Understanding Our Blue Planet.

Ocean literacy is an understanding of
the ocean's influence on you—and
your influence on the ocean.

YOU

THE OCEAN



An ocean-literate person:

- ✓ 1. Understands the Essential Principles and Fundamental Concepts.
- ✓ 2. Can communicate about the ocean in a meaningful way.
- ✓ 3. Is able to make informed and responsible decisions regarding the ocean and its resources.

A diver in a blue wetsuit and orange mask is underwater, holding a rope that is attached to a large, clear, cylindrical container. The container is suspended by a rope and has a smaller, similar container attached to its bottom. Bubbles are rising from the diver's equipment. The background is a deep blue ocean.

A Consensus for the Classroom and Beyond

The Problem: The original Ocean Literacy Campaign was launched to address the critical lack of ocean-related content in state and national science education standards.

The Solution: This framework is the result of a massive consensus-building process involving hundreds of scientists, educators, and policy makers. It establishes a unified voice on what every person should understand about the ocean.

The Outcome: The framework ensures ocean concepts are represented in the Next Generation Science Standards (NGSS) and serves as the primary roadmap for K-12 and informal education.

Understanding the ocean is essential to comprehending and protecting this planet on which we live.

01

Principle 01

Earth has one big ocean with many features.

02

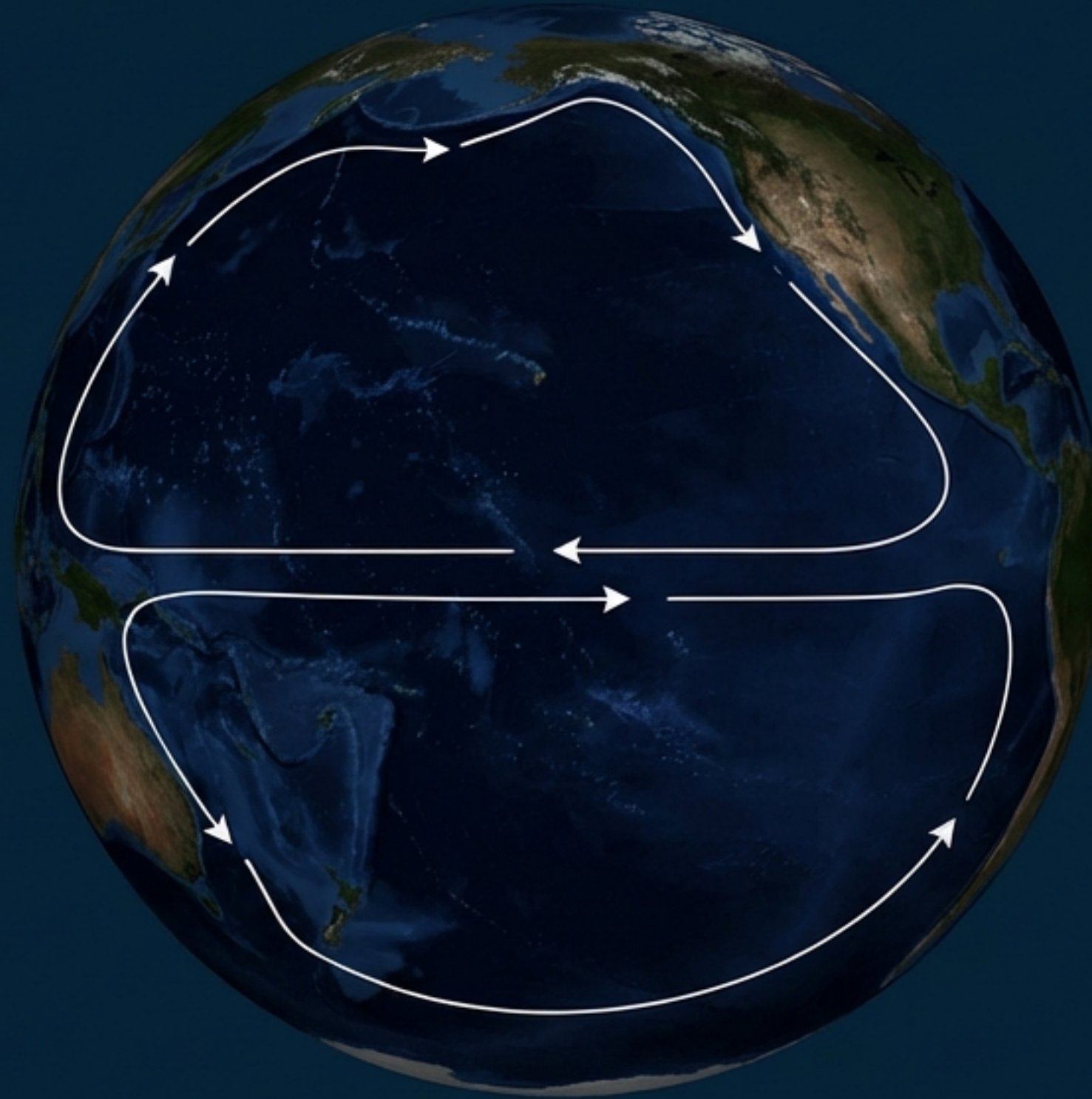
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ONE OCEAN

The ocean covers ~70% of the planet. While we name basins (Atlantic, Pacific, Arctic, etc.), it is one continuous system.

CIRCULATION

A global conveyor belt moves water throughout all basins, driven by wind, tides, density, and Earth's rotation. This transports heat, matter, and organisms.

GEOLOGY

The ocean contains Earth's highest peaks, deepest valleys, and flattest plains. 97% of Earth's water is held here.

01

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Principle 02: The ocean and life in the ocean shape the features of Earth.

06

THE SCULPTOR

Erosion creates coastal landforms. Waves redistribute sand and water sculpts the coastlines continuously.

07

THE BUILDER

Many sedimentary rocks on land (like limestone) originated in the ocean, formed from the accumulation of shells and ocean life.

THE CARBON TRAP

The ocean is the largest reservoir of rapidly cycling carbon on Earth, trapping distinct chemical signatures in the rock record.

01

Principle 03

02

The ocean is a major influence on weather and climate.

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04



Heat Battery: The ocean absorbs most solar radiation, driving the water cycle and atmospheric circulation.

05



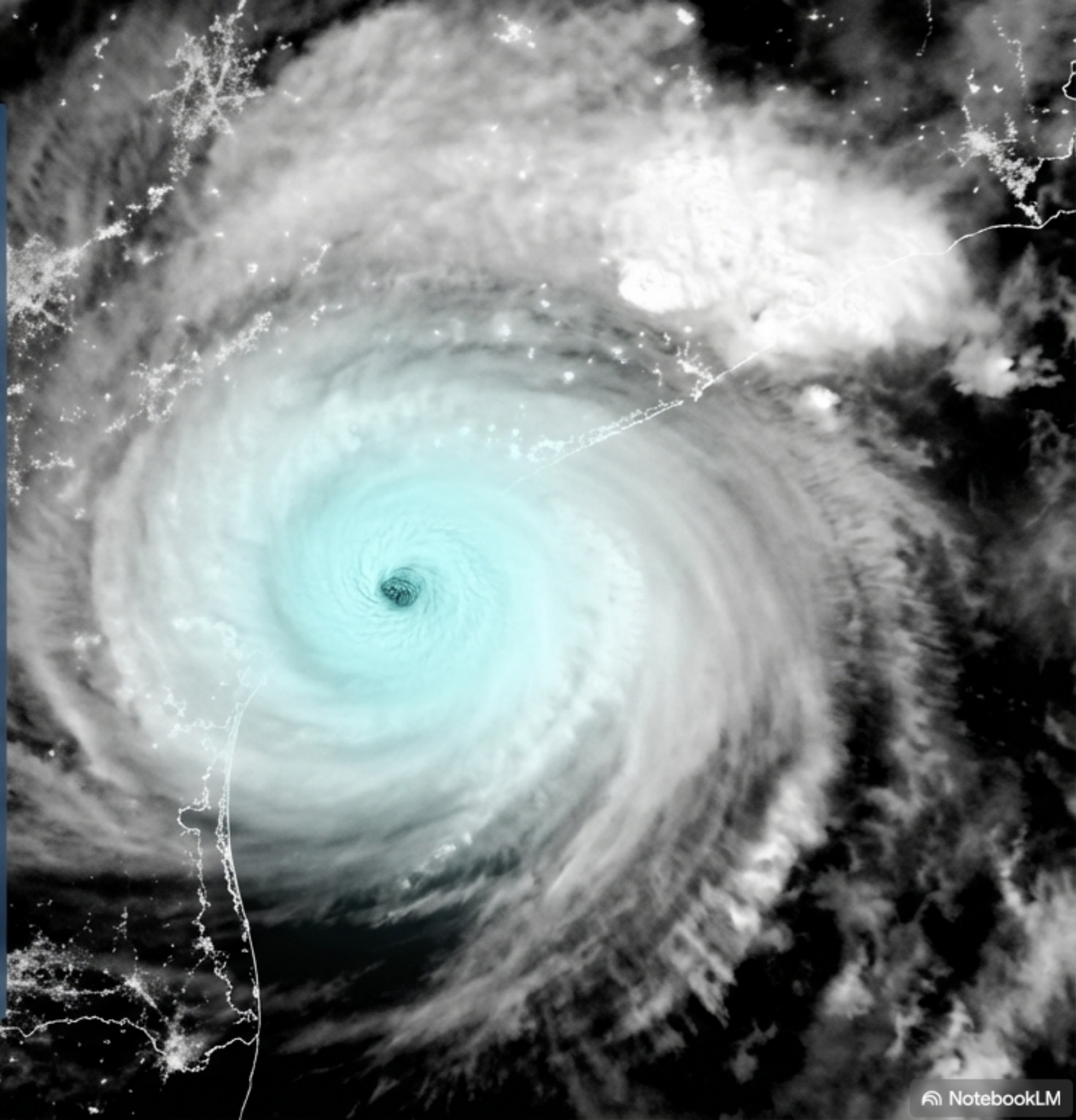
Weather Maker: Evaporation from warm seas fuels hurricanes. Patterns like El Niño shift global temperatures.

06



The Stabilizer: The ocean buffers climate change by absorbing heat and CO₂, but this capacity has limits.

07



01

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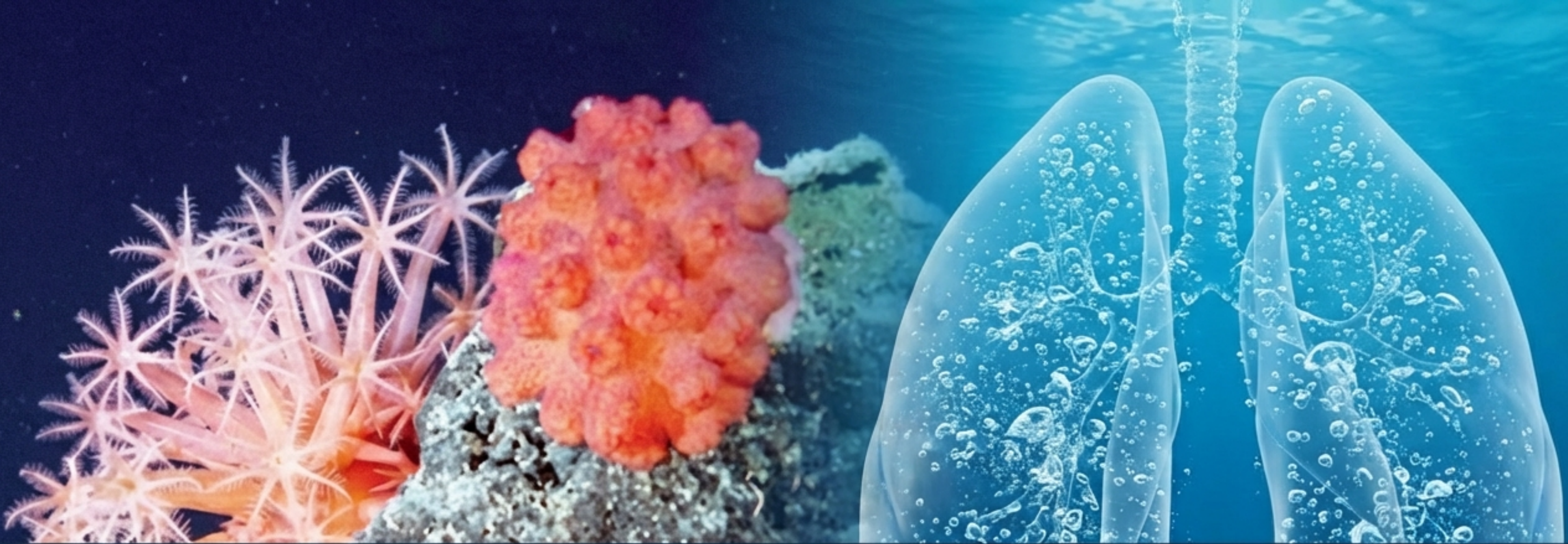
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Principle 04: The ocean makes Earth habitable.

THE AIR WE BREATHE

Most atmospheric oxygen originates from oceanic photosynthesis (phytoplankton).

THE CRADLE

Life began in the ocean. All species on Earth are related by descent from ancestors that evolved here.

THE SUSTAINER

The ocean provides water, oxygen, and nutrients essential for all life, not just marine life.

01

Principle 05

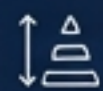
The ocean supports a great diversity of life and ecosystems.



- **SCALE:** Life ranges from microbes (the primary producers) to blue whales.



- **UNIQUENESS:** Deep ecosystems like hydrothermal vents rely on chemosynthesis, existing entirely without sunlight.



- **ZONATION:** Life is distributed by abiotic factors like pressure, oxygen, and light.



Vertical Zonation

Sunlight
Zone

Twilight
Zone

Midnight
Zone

Abyssal
Zone

02

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01

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Principle 06: The ocean and humans are inextricably interconnected.

THE GIVE

- Freshwater & Oxygen
- Food & Medicine
- Inspiration & Heritage

THE TAKE

- Pollution & Runoff
- Ocean Acidification
- Overfishing



THE RISK: Coastal hazards affect the majority of the human population living near the shore.

01

Principle 07: The ocean is largely unexplored.

02

03

04

The Future: Requires interdisciplinary teams—biologists, engineers, animators—and new technologies like unmanned submersibles and sensors.

05

06

07

< 20%

The Reality: Less than 20% of the ocean has been explored, mapped, and observed.

The Necessity: Survival hinges on understanding these systems for sustainability.

The Framework in Action

Scope & Sequence

28 conceptual flow diagrams mapping knowledge growth from K through 12.

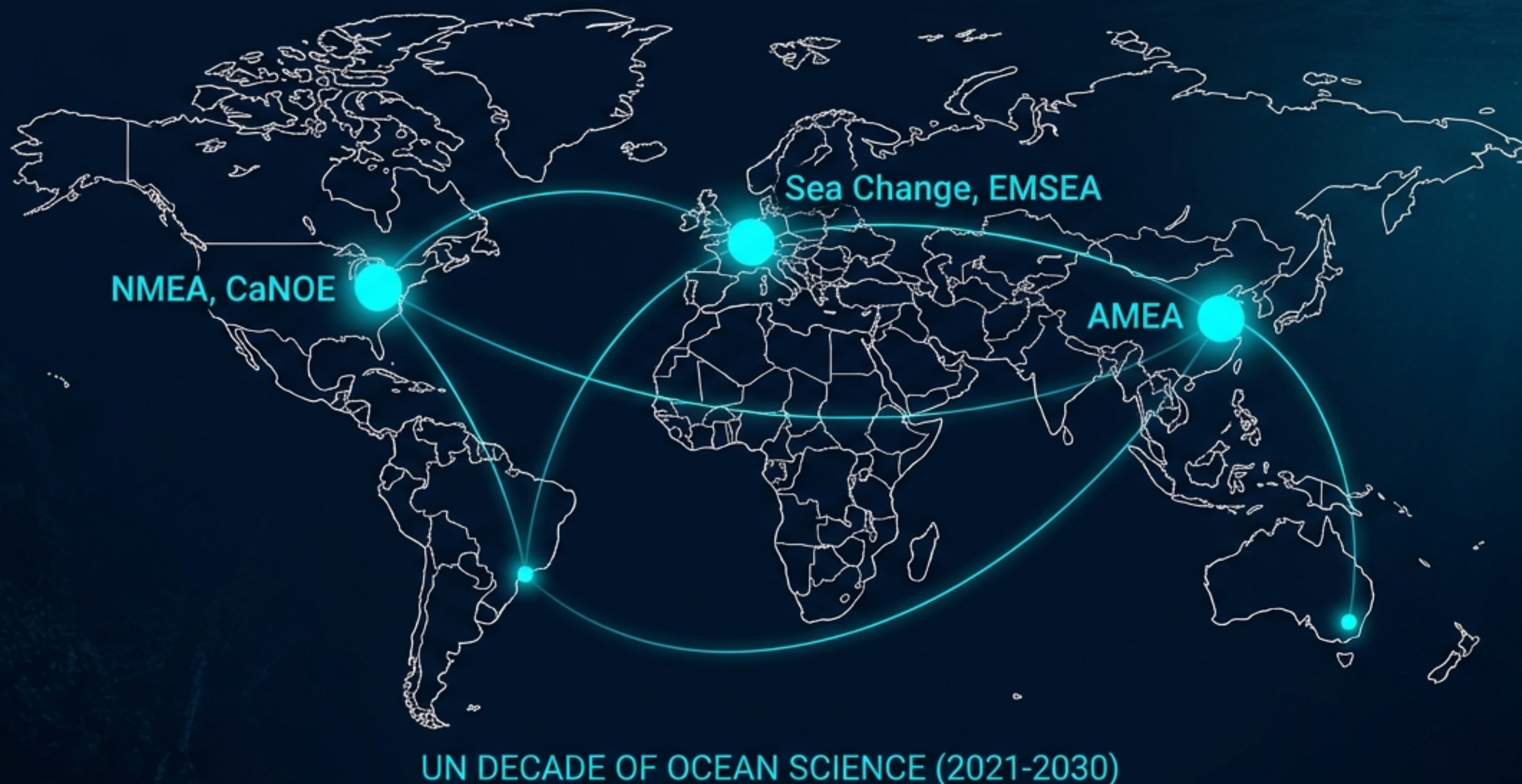
NGSS Alignment

Overcoming “terrestrial bias” by aligning ocean concepts with Next Gen Science Standards

Global Measurement

International Ocean Literacy Survey (IOLS) tracking knowledge in 15-17 year olds.

A Global Movement



"You cannot be science literate if you are not ocean literate."

A walrus is swimming in the ocean, its head and tusks visible above the water. The water is a deep blue color.

Join the Campaign

www.marine-ed.org

www.oceanliteracyNMEA.org

Our lives depend, now and forever, on the health of the ocean.