

RESOURCE LIBRARY  
ACTIVITY : 45 MINS

## Our Hydrosphere

Students investigate the interconnectedness of Earth's water reservoirs by learning about the hydrosphere. They then discuss ways in which humans are connected to and alter those reservoirs, especially the ocean.

### GRADES

9 - 12+

### SUBJECTS

*Earth Science, Oceanography, Geography, Physical Geography*

### CONTENTS

2 Videos, 2 Links

## OVERVIEW

Students investigate the interconnectedness of Earth's water reservoirs by learning about the hydrosphere. They then discuss ways in which humans are connected to and alter those reservoirs, especially the ocean.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/our-hydrosphere/>

## DIRECTIONS

### 1. Build background on the concept of the hydrosphere.

Display the Water Planet Mega Map, from the World Physical MapMaker Kit, on the wall. Ask: *What is the hydrosphere?* Elicit from students that *sphere* means “range of something” and *hydro* means “water.” Using the Mega Map to demonstrate, have small groups of students use their World Physical Tabletop Maps, also from the World Physical MapMaker Kit, to locate and

label the hydrosphere. Students will likely only label the surface water of oceans, lakes, and rivers. Explain that these areas where water is temporarily stored are called reservoirs. Ask: *Other than on the surface of Earth, where are other water reservoirs?* Explain to students that the hydrosphere also includes reservoirs of water below ground and in the atmosphere. Ask: *Even though the map shows one, is there an actual boundary between the ocean and land?* Elicit explanations from students and conclude that water connects the land, ocean, and atmosphere. Explain that in this activity they will be exploring this concept of “interconnectedness” by learning about the hydrosphere.

## **2. Introduce Earth as the “blue planet” and identify the major ocean basins.**

Have students analyze their Tabletop Maps. Ask: *Why is Earth referred to as the “blue planet?”* Explain that the “blue” ocean is the dominant feature on Earth—covering 70 percent of the planet’s surface and holding 97 percent of the Earth’s water. On their Tabletop Maps, have students label and outline the six major ocean basins: North and South Pacific, North and South Atlantic, Indian, and Arctic. When combined with surface freshwater, nearly 80 percent of the planet is covered in water. Have students locate and label five large freshwater lakes, two glaciers, and three rivers.

## **3. Discuss the interconnectedness of the hydrosphere.**

State that water molecules constantly move and change form. Ask: *What are some different forms of water? How does water “move?”* Elicit from students that forms of water include ice, gas (vapor), and liquid. Tell students to think about how liquid water moves across land. Have them imagine a large, flowing river. Define a *river* as a system that transports large amounts of water in a uniform direction. Ask: *What determines how or where a river flows?* Elicit from students that ultimately gravity—which is impacted by elevation, topography, and geology—determines where a river flows, and since the areas of lowest elevation are where the land meets the ocean, that’s where the rivers flow. Using their Tabletop Maps, have students select a nearby river and trace its path to the ocean. Ask: *Other than water molecules, what else do rivers carry to the ocean?* Elicit from students that other substances can be dissolved or suspended in the water and carried along with it—including pollution, chemicals, solid waste, salts, and sediment. Tell students that in addition to land-based rivers, there are “rivers” in the

ocean, atmosphere, and even in the ground. These “rivers” transport water and substances throughout the globe. Show the Rivers in the Atmosphere animation and use the MapMaker Interactive’s surface currents layer to illustrate these processes.

#### **4. Have students reflect on how humans are interconnected with the hydrosphere, especially the ocean.**

In their small groups, have students identify ways they are connected to the hydrosphere, and the ocean in particular. Generate ideas by asking: *What are ways that humans use water (and the ocean)? What are ways that humans change the distribution of water or how it flows? What are things that humans put into water (and the ocean)?* Remind students that in Step 3 they traced the path of a nearby river to the ocean. Ask: *Are there human activities or products that could negatively affect your local sources of fresh water? What about negative human impacts on the ocean?* Facilitate class discussion and conclude that the hydrosphere (water) connects all humans to all other ecosystems and organisms on Earth.

## Informal Assessment

As groups discuss their interconnectedness with the ocean, check student comprehension and facilitate discussion.

## OBJECTIVES

## Subjects & Disciplines

### Earth Science

- [Oceanography](#)

### Geography

- [Physical Geography](#)

## Learning Objectives

Students will:

- explain how the ocean is the dominant physical feature on Earth
- identify water reservoirs, including major ocean basins and freshwater rivers and lakes
- describe how the hydrosphere connects the ocean, land, and atmosphere

# Teaching Approach

- Learning-for-use

# Teaching Methods

- Cooperative learning
- Discussions
- Hands-on learning
- Information organization

# Skills Summary

This activity targets the following skills:

- 21st Century Themes
  - Global Awareness
- Critical Thinking Skills
  - Analyzing
  - Understanding
- Geographic Skills
  - Acquiring Geographic Information
  - Analyzing Geographic Information

# National Standards, Principles, and Practices

## NATIONAL GEOGRAPHY STANDARDS

- Standard 1:

How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information

- Standard 7:

The physical processes that shape the patterns of Earth's surface

## NATIONAL SCIENCE EDUCATION STANDARDS

- **(9-12) Standard B-2:**

Structure and properties of matter

- **(9-12) Standard B-4:**

Motions and forces

## OCEAN LITERACY ESSENTIAL PRINCIPLES AND FUNDAMENTAL CONCEPTS

- **Principle 1a:**

The ocean is the dominant physical feature on our planet Earth—covering approximately 70% of the planet’s surface. There is one ocean with many ocean basins, such as the North Pacific, South Pacific, North Atlantic, South Atlantic, Indian and Arctic.

- **Principle 6a:**

The ocean affects every human life. It supplies freshwater (most rain comes from the ocean) and nearly all Earth’s oxygen. It moderates the Earth’s climate, influences our weather, and affects human health.

### Preparation

### What You’ll Need

### MATERIALS YOU PROVIDE

- Colored markers
- Pencils

### REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per classroom, Projector, Speakers
- Plug-Ins: Flash

### PHYSICAL SPACE

- Classroom

### GROUPING

- Large-group instruction

## OTHER NOTES

Using the MapMaker Kit Assembly video as a guide, print, laminate, and assemble the Water Planet Mega Map and World Physical Tabletop Maps before starting this activity.

## BACKGROUND & VOCABULARY

### Background Information

The reservoirs and processes comprising the hydrologic, or water, cycle are responsible for the movement of water and substances throughout and between the land, ocean, and atmosphere, known collectively as the hydrosphere. The ocean is the dominant feature on Earth, covering 70 percent of the planet's surface and holding 97 percent of the Earth's water. The hydrosphere connects humans to the ocean, land, and atmosphere, making life on Earth possible.

### Prior Knowledge

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### Recommended Prior Activities

- None

### Vocabulary

<b>Term</b>	<b>Part of Speech</b>	<b>Definition</b>
<b>atmosphere</b>	<i>noun</i>	layers of gases surrounding a planet or other celestial body.
<b>hydrosphere</b>	<i>noun</i>	all the Earth's water in the ground, on the surface, and in the air.
<b>ocean basin</b>	<i>noun</i>	depression in the Earth's surface located entirely beneath the ocean.
<b>ocean circulation</b>	<i>noun</i>	worldwide movement of water (currents) in the ocean.
<b>reservoir</b>	<i>noun</i>	natural or man-made lake.

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## For Further Exploration

### Websites

- [National Geographic Education: National Teacher Leadership Academy \(NTLA\)](#)

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