

Follow-up Activities

- Help students to imagine that all the water has been drained from the oceans on Earth, making it possible to walk on the ocean floor. Encourage students to write a travel log of their journeys across the ocean floor, describing the physical features that they observe. Students can extend this activity by creating a model of the physical features on the ocean floor using clay or papier-mâché.
- Conduct a class research project on the work of oceanographers and the technological developments that have influenced the study of the ocean. Visit the Woods Hole Oceanographic Institution's "Dive and Discover" Web page (www.divediscover.whoi.edu) to discover more information about scientists' work in the ocean depths.
- Design a "Save the Oceans" campaign to raise awareness of the importance of protecting the oceans from pollution and other threats. Students can create fact sheets, posters or newsletters to share the information they have learned about the health of the oceans.
- Using tide information from a farmer's almanac or the local newspaper, have students graph the high and low tide heights for the month. Compare the phases of the moon with the tide graphs. What do students observe about the influence of the moon on the tides?

Suggested Internet Resources

Periodically, Internet Resources are updated on our Web site at www.libraryvideo.com

- www.mos.org/oceans/index.html
The "Oceans Alive!" Web site provides facts about the ocean and its physical features, profiles of several different oceans and information about the movement of the ocean. Activities and resources for the classroom are also available.
- www.cnmoc.navy.mil/educate/neptune/neptune.htm
The Naval Meteorology and Oceanography Command sponsors "Neptune's Web," a site that contains ocean facts, trivia and information about oceanography. This site also provides lesson plans and suggestions for teachers.
- www.onr.navy.mil/focus/ocean/
This site developed by the Office of Naval Research discusses various aspects of oceanography, including sections on ocean movement, various ocean habitats, marine mammals and characteristics of ocean water.
- educate.si.edu/resources/lessons/currkits/ocean/main.html
The Smithsonian Institute presents six different interdisciplinary lesson plans on the ocean as part of their exhibit called "Ocean Planet." These lessons address ocean resources, pollution, marine life and similar topics.

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- vishnu.glg.nau.edu/wsspc/tsunami/HI/Waves/waves00.html
"Tsunamis: The Great Waves" is an online brochure that details information about the cause, strength and potential damage of tsunamis.

Suggested Print Resources

- Fredericks, Anthony D. *Exploring the Oceans: Science Activities for Kids*. Fulcrum Resources, Golden, CO; 1998.
- Lambert, David. *Seas and Oceans*. Raintree Steck-Vaughn, Austin, TX; 1994.
- Polking, Kirk. *Oceanographers and Explorers of the Sea*. Enslow Publishers, Springfield, NJ; 1999.
- Smith, P. Sean and Brent A. Ford. *Project Earth Science: Physical Oceanography*. NSTA Press, Washington, DC; 1994.

TEACHER'S GUIDE CONSULTANT

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Oceans

Grades 5-8

Students in grade 5-8 classrooms possess a wide range of background knowledge. Student response to this video program is sure to be varied, so the teachers at these grades need all the help they can get! This guide has been designed to help the 5-8 science teacher by providing a brief synopsis of the program, previewing and follow-up questions, activities, vocabulary and additional resources.

Before Viewing: Extensive research tells how important it is for the teacher to discover what the students know — or think they know — about a topic, before actually starting a new unit. Therefore, after prompting discussion with the pre-viewing questions, lead your class to create an "Everything We Think We Know About..." list. You may also wish to preview key vocabulary words, and have students raise additional questions they hope will be answered.

After Viewing: Have your students share video excerpts that fascinated or surprised them, then challenge your students to prove or disprove the accuracy of the facts they put on their "Everything We Think We Know About..." list. Discuss what else they learned and use the follow-up questions and activities to inspire further discussion. Encourage students to research the topic further with the Internet and reading resources provided.

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Program Summary

Earth is often called the “water planet” because 71% of its surface is covered by water. In fact, 97% of all the Earth’s water is salty ocean water! Although each ocean has a separate name like the Atlantic or Pacific Ocean, all of the world’s oceans are actually interconnected as one large body of water. On average, ocean water consists of 96.5% pure water and 3.5% dissolved salts. Most of the elements found on the Earth are present in ocean water; however, sodium chloride (table salt) makes up most of the 3.5%. Salinity is the amount of dissolved salts in ocean water. Gases like nitrogen, carbon dioxide and oxygen are also dissolved in ocean water.

There are three temperature zones in the ocean. In the surface zone, the sun heats the water, the water mixes as a result of waves and currents, and marine life flourishes. All of the marine plants that need sunlight for photosynthesis are in this zone. In the thermocline, water temperatures drop rapidly, almost reaching the freezing point. Creatures in this zone survive by eating other animals or capturing food particles that sink from the surface. Finally, in the deep zone, the water is always extremely cold and ocean life is scarce.

Ocean water moves in many different ways, such as currents, waves and tides. Ocean currents are like rivers within the ocean, caused by wind patterns and differences in water density. Wind not only influences ocean currents, it affects ocean waves as well. Most waves are caused by the pushing of wind, which sends an energy ripple through the surface. Ocean tides are primarily caused by the gravitational pull of the moon, usually causing a twice or once daily rise and fall of the ocean’s water level.

Oceans contain rich resources for humans, including food, oxygen, minerals and oil resources. Evaporation from the oceans creates much of our weather and fresh water supply. People are becoming more responsible about protecting one of Earth’s greatest resources — the ocean.

Vocabulary

The following words are included for teacher reference or for use with students. They are listed in the order in which they appear in the video.

ocean — The interconnected body of salt water that covers 71 % of the Earth’s surface.

sea — A body of salt water, smaller than an ocean, which is at least partly surrounded by land.

salinity — The amount of salts dissolved in water.

sodium chloride — The most common salt dissolved in ocean water. Sodium chloride is made of two elements, sodium and chlorine, and is generally known as table salt.

surface zone — The layer at the surface of the ocean, characterized by sun-heated water, waves and currents, plentiful marine life and many marine plants.

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thermocline — The middle ocean zone that is characterized by increasingly cold to near freezing water.

deep zone — The bottom ocean zone, which is extremely dark and cold with a scarcity of marine life.

phytoplankton — The tiny plants of the surface zone that use sunlight to create food and provide oxygen. Phytoplankton are a major food source for marine animals.

current — The movement of ocean water caused by wind patterns and differences in water density. Currents can occur at the surface or deeper in the ocean, and can be temporary or permanent.

upwelling — The rising of deep ocean currents to the surface. Upwelling is caused when a deep current meets an obstruction and the water is deflected to the surface.

wave — The movement at the surface of the ocean caused by pulses of energy moving through the water, raising and lowering it. The most common source of energy for waves is wind.

tides — The daily rise and fall of the water level at the shoreline caused primarily by the gravitational pull of the moon.

tsunami — A giant wave caused by ocean floor earthquakes. These waves can reach 500 miles per hour and 100 feet high.

seamount — An underwater mountain on the ocean floor. Tall seamounts can reach above the water line, creating islands and coral atolls.

continental shelf — The submerged, relatively flat land at the edge of a continent where the ocean floor and continent meet.

continental slope — The rapidly dropping area from the edge of the continental shelf to the abyssal plains.

abyssal plains — Huge, flat areas on the ocean floor.

Pre-viewing Discussion

Before students generate their list of “Everything We Think We Know About...” for this topic, stimulate and focus their thinking by raising these questions so that their list will better reflect the key ideas in this show:

- What do you know about oceans? If you have ever visited an ocean, provide some of your observations about its characteristics, movement, marine life and temperature.
- Why do you think oceans are important for humans?

After the class has completed their “Everything We Think We Know About...” list, ask them what other questions they have that they hope will be answered during this program. Have students listen closely to learn if everything on their class list is accurate and to hear if any of their own questions are answered.

Focus Questions

1. How much of the Earth’s surface is covered by ocean water?
2. How many oceans have been named on Earth? What are they?
3. What is the difference between a sea and an ocean?
4. What does table salt have to do with the ocean?
5. What is salinity and why is it important?
6. Why do things float better in salt water than in fresh water?
7. How does the sun influence the oceans?
8. What are the characteristics of each of the ocean’s temperature zones?
9. What influences the movement of ocean water?
10. What are tides, waves and currents? How are they similar and different?
11. What are the differences and similarities between the types of currents such as surface and deep currents, and temporary and permanent currents?
12. Describe the differences in density between warm and cold water, and salt and fresh water.
13. What is an upwelling, and what causes this type of current?
14. Describe the movement of a wave in the ocean.
15. How are ocean tides influenced by the moon?
16. What are tsunamis? Why is it technically incorrect to say that tsunamis are tidal waves?
17. Describe some physical features of the ocean floor.
18. What are the continental shelf, continental slope and abyssal plains?
19. Why is the ocean regarded as a major natural resource?
20. What are some threats to the health of the Earth’s oceans?

Follow-up Discussion

Research indicates that students will retain their previous misconceptions about a topic, in preference to new information, until they actively recognize and correct their own errors. Therefore, it is important to have your students re-examine the facts/beliefs they put on their “Everything We Think We Know About...” list. It might also be helpful to review the list by marking each entry with a “+” or “-” to show which facts were correct and which were incorrect.

Thought-provoking discussions provide a good way to assess the overall depth of student understanding. The following are some suggested discussion topics.

- How do factors like salinity, temperature, sunlight, wind, depth and ocean floor contour affect marine life?
- What suggestions do you have for protecting the oceans from the threat of pollution?