Oceans of the World

Atlantic Ocean | Pacific Ocean | Indian Ocean | Arctic Ocean | Southern Ocean
Glossary | Oceans Crossword Puzzle | Charts and Graphs | Certificates

The total surface area of Planet Earth is 196,937,502 sq mi. Of that surface area, the land area is 57,392,903 sq mi and the total water area is 139,544,598 sq mi. Earth is covered with one layer of connecting water. Oceans cover 71% of the Earth's surface – 129,443,784 sq mi.

The ocean wraps the globe and is divided into four major regions: the Atlantic Ocean, the Pacific Ocean, the Indian Ocean, and the Arctic Ocean. Some scientists consider the waters around Antarctica to be a separate, fifth ocean as well. These oceans, although distinct in some ways, are all Interconnected; the same water is circulated throughout them all. The average depth of the ocean is 4 km. Despite the demarcation of this "new" ocean, it's likely that the debate over the number of oceans will continue nonetheless. After all, there is but one "world ocean" as all five (or four) oceans on our planet are connected.

Beneath the world's oceans lie rugged mountains, active volcanoes, vast plateaus and almost bottomless trenches. The deepest ocean trenches could easily swallow up the tallest mountains on land. Around most continents are shallow seas that cover gently sloping areas called continental shelves. These reach depths of about 650 feet (200 m). The continental shelves end at the steeper continental slopes, which lead down to the deepest parts of the ocean.

Beyond the continental slope is the abyss. The abyss contains plains, long mountains ranges called ocean ridges, isolated mountains called seamounts, and ocean trenches which are the deepest parts of the oceans. In the centers of some ocean ridges are long rift valleys, where Earthquakes and volcanic eruptions are common. Some volcanoes that rise from the ridges appear above the surface as islands.

Ocean Water: Salinity

Did you ever wonder why the oceans are filled with salt water instead of fresh water? Just where did the salt come from? And is it the same salt you find on a dining room table? Most of the salt in the oceans came from land. Over millions of years, rain, rivers, and streams have washed over rocks containing the compound sodium chloride (NaCl), and carried it into the sea. You may know sodium chloride by its common name: table salt! Some of the salt in the oceans comes from undersea volcanoes and hydrothermal vents. When water evaporates from the surface of the ocean, the salt is left behind. After millions of years, the oceans have developed a noticeably salty taste.

Different bodies of water have different amounts of salt mixed in, or different salinities. The average ocean salinity is 35 ppt. This number varies between about 32 and 37 ppt. rainfall, evaporation, river runoff, and ice-formation cause the variations. For example, the Black Sea is so diluted by river run-off; its average salinity is only 16 ppt.

Freshwater salinity is usually less than 0.5 ppt. Water between 0.5 ppt and 5 ppt is called brackish. Estuaries are examples of brackish waters.

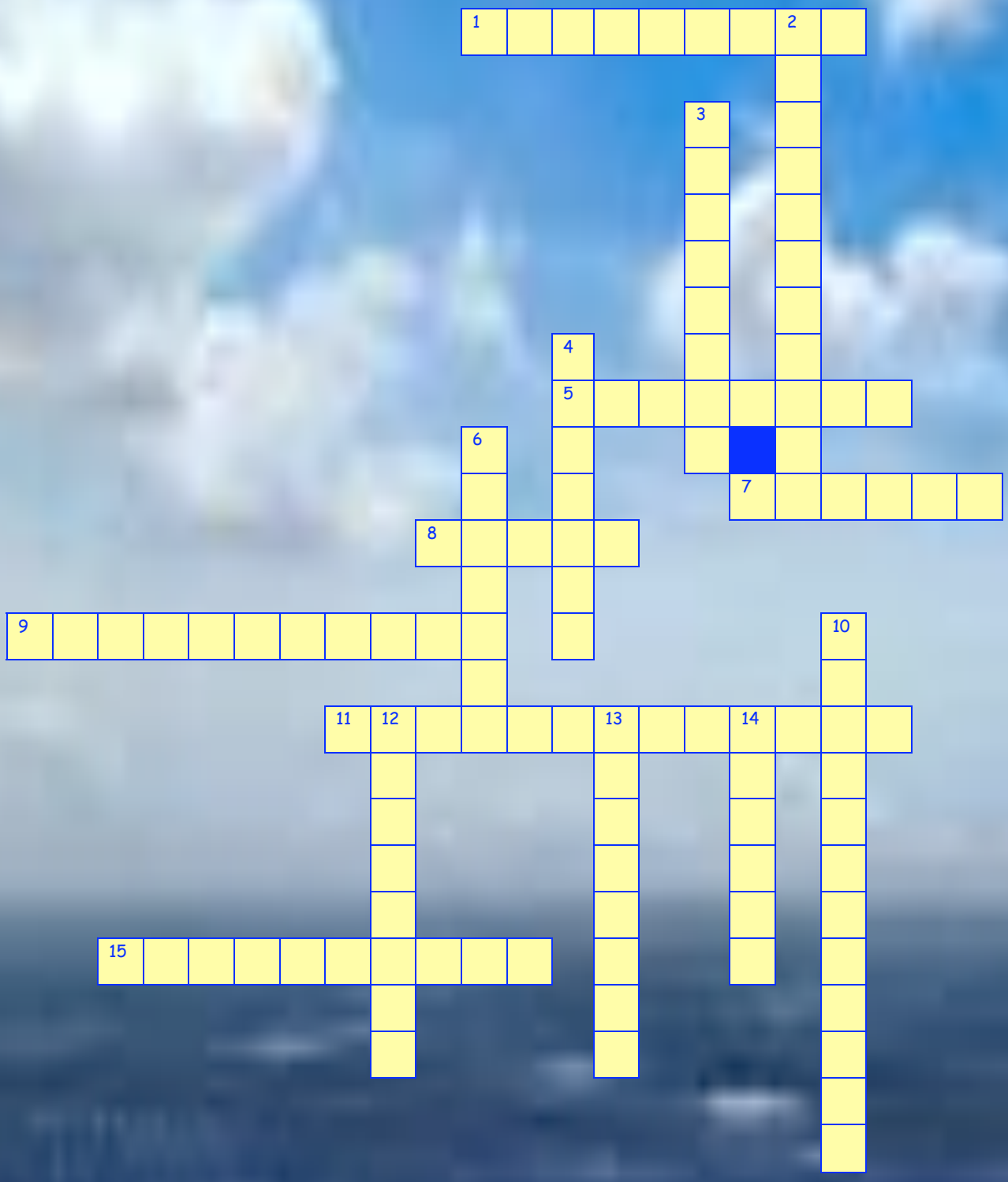
Today most of the salt in the oceans comes from the continual rinsing of the earth. Rain falling on the land dissolves the salts in eroding rocks, and these salts are carried down the rivers and out to sea. The salts accumulate in the ocean as water evaporates to form clouds. The oceans are getting saltier every day, but the rate of increase is so slow that it is virtually immeasurable.

GLOSSARY

Brackish Water	Somewhat salty water, a mixture of fresh and salt water, having a ppt of between .5 and 17, found in Esturaries.
Estuaries	Where fresh river water meets salty ocean water, brackish water.
Evaporation	A process in which something is changed from a liquid to a vapor without its temperature reaching the boiling point.
Fresh Water	Water containing less than .5 ppt or parts per thousand.
Ice Formation	Water that has frozen into solid form over a period of time.
Rainfall	The amount of rain that falls in a particular location over a particular period of time.
River Runoff	A natural formation in which fresh water forms a wide stream that runs across the land until it reaches the sea or another area of water.
Salinity	Salinity is expressed by the amount of salt found in 1,000 grams of water. Therefore, if we have 1 gram of salt and 1,000 grams of water, the salinity is 1 part per thousand, or 1 ppt.
Salt Water	The water of the sea and coastal inlets that contains approximately 35 ppt or parts per thousand.

Crossword Puzzle

You may print out the definitions on the following page for easier access to the clues



Clues for Crossword Puzzle

Across

1 The water of the sea and coastal inlets that contains approximately 35 ppt or parts per thousand

5 The amount of salt found in 1,000 grams of water. Therefore, if we have 1 gram of salt and 1,000 grams of water, the salinity is 1 part per thousand, or 1 ppt.

7 The third largest of the world's oceans

8 Large body of salt water

9 A natural formation in which fresh water forms a wide stream that runs across the land until it reaches the sea or another area of water.

11 Somewhat salty water, a mixture of fresh and salt water, having a ppt of between .5 and 17, found in Estuaries.

15 Water containing less than .5 ppt or parts per thousand.

Down

2 A process in which something is changed from a liquid to a vapor without its temperature reaching the boiling point.

3 The ocean that lies between the North American continent and the European continent

4 Where fresh river water meets salty ocean water, brackish water.

6 The largest ocean in the world

10 Ice formation

12 The amount of rain that falls in a particular location over a particular period of time.

13 The newest ocean to be identified. It was given status in 2000

14 Ocean surrounding the North Pole

Atlantic Ocean

The Atlantic Ocean is the second-largest of the world's oceans. It has a total area of about 106.4 million square kilometers (41.1 million square miles). It covers approximately one-fifth of the Earth's surface. Its name, derived from Greek mythology, means the "Sea of Atlas."

A component of the all-encompassing World Ocean, the Atlantic Ocean is connected in the north to the Arctic Ocean (which is sometimes considered a sea of the Atlantic), and to the Pacific Ocean in the southwest, the Southern in the south and the Indian Ocean in the southeast. It occupies an elongated, S-shaped basin extending longitudinally between the Americas to the west, and Eurasia and Africa to the east. The equator subdivides it into the North Atlantic Ocean and South Atlantic Ocean.

Pacific Ocean

The Pacific Ocean (from the Latin name Mare Pacificum, "peaceful sea",) is the largest of the Earth's oceans. It extends from the Arctic in the north to the Antarctic in the south, bounded by Asia and Australia on the west and the Americas on the east. At 169.2 million square kilometers (65.3 million square miles) in area, this is the largest ocean of the World Ocean – and covers about 46% of the Earth's water surface and about 32% of its total surface area, making it larger than all of the Earth's land area combined. The equator subdivides it into the North Pacific Ocean and South Pacific Ocean.

Indian Ocean

The Indian Ocean is the third largest of the world's oceans. It covers about 20% of the Earth's water surface. It is bounded on the north by Asia, including the Indian subcontinent for which it is named; on the west by Africa; on the east by the Malay Peninsula, the Sunda Islands, and Australia; and on the south by Antarctica. This ocean is nearly 10,000 kilometers wide at the southern tips of Africa and Australia; its area is 73,556,000 square kilometers, including the Red Sea and the Persian Gulf.

Small islands dot the continental rims. Island nations within the ocean are Madagascar, the world's fourth largest island; Comoros; Seychelles; Maldives; Mauritius; and Sri Lanka. Indonesia borders it. The ocean's importance as a transit route between Asia and Africa has made it a scene of conflict. Because of its size, however, no nation had successfully dominated most of it until the early 1800s when Britain controlled much of the surrounding land. Since World War II, the ocean has been dominated by India and Australia.

Southern Ocean (Antarctica Ocean)

The World's Newest Ocean

In 2000, the International Hydrographic Organization created the fifth world ocean - the Southern Ocean - from the southern portions of the Atlantic Ocean, Indian Ocean, and Pacific Ocean. The Southern Ocean completely surrounds Antarctica.

At approximately 20.3 million square kilometers (7.8 million square miles) and about twice the size of the U.S.A., the new ocean is the world's fourth largest (following the Pacific, Atlantic, and Indian but larger than the Arctic Ocean.)

The Southern Ocean extends from the coast of Antarctica north to 60 degrees south latitude. Some consider the Arctic, Atlantic, Indian, and Pacific to be the world's four oceans. Now, those that side with the number five can add the fifth ocean and call it the Southern Ocean or the Antarctic Ocean, thanks to the International Hydrographic Organization (IHO).

There are 68 member countries of the IHO and membership is limited to non-landlocked countries. Twenty-eight countries responded to the IHO's request for recommendations on what to do about the Southern Ocean. All

responding members except Argentina agreed that the ocean surrounding Antarctica should be created and given a single name. Eighteen of the twenty-eight responding countries preferred calling the ocean the Southern Ocean over the alternative name Antarctic Ocean so the former is the one that was selected.

Why the need for a Southern Ocean? According to Commodore John Leech of the IHO, "A great deal of oceanographic research in recent years has been concerned with ocean circulations, first because of El Nino, and then because of a wider interest in global warming. This research identified that one of the main drivers of ocean systems is the 'Southern Circulation,' which sets the Southern Ocean apart as a separate eco-system. As a result the term Southern Ocean has been used to define that huge body of water which lies south of the northern limit.

Arctic Ocean

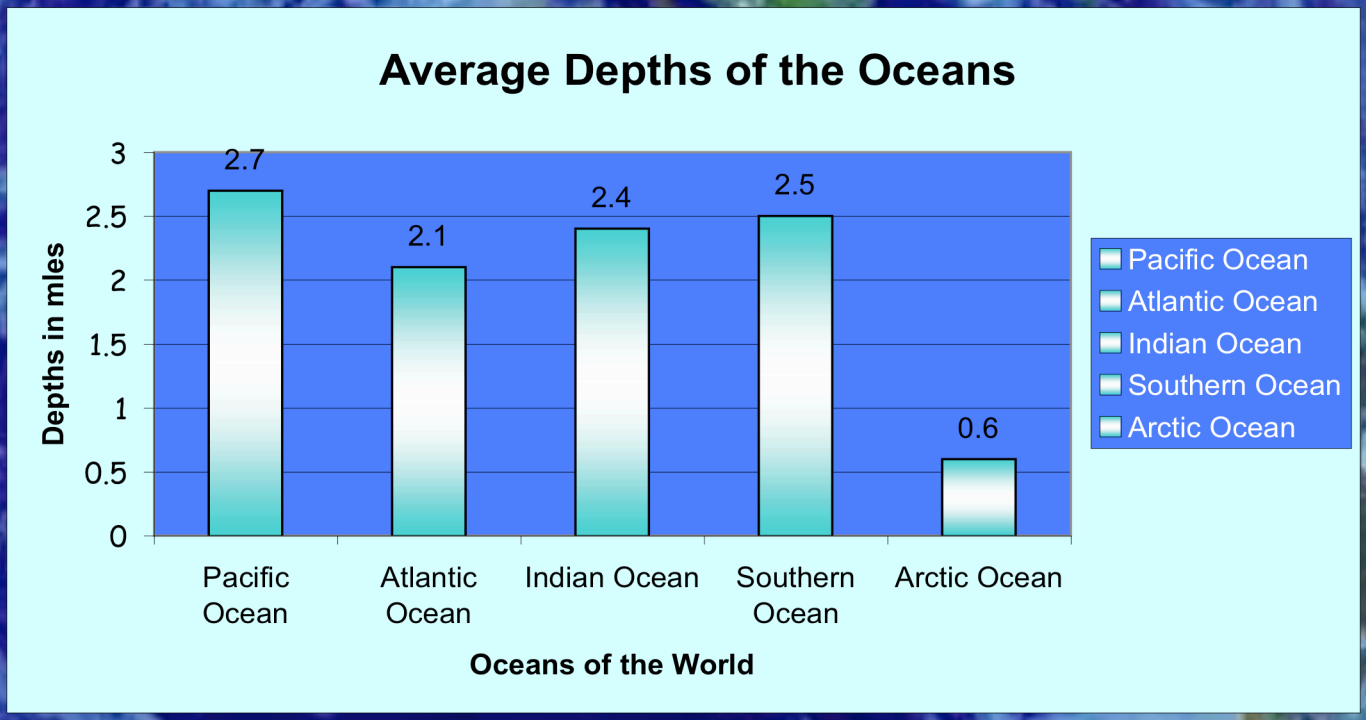
The Arctic Ocean is located in the northern hemisphere and mostly in the Arctic North Polar Region. It is the smallest of the world's five major oceans and the shallowest. The Arctic Ocean is the northernmost ocean of the all-encompassing World Ocean.

Almost completely surrounded by Eurasia and North America, the Arctic Ocean is largely covered by sea ice throughout the year. The Arctic Ocean's temperature and salinity vary seasonally as the ice cover melts and freezes. Its salinity is the lowest on average of the four major oceans, due to low evaporation, as well as limited outflow to surrounding waters with heavy freshwater inflow. The summer shrinking of the icepack has been quoted at 50%

The Arctic Ocean has an area of 14,090,000 sq km and an average depth of 3,658 m off of the continental shelf. The Artic Ocean has the widest continental shelf of all the oceans. The central part of the ocean is permanently covered in about ten feet of ice.

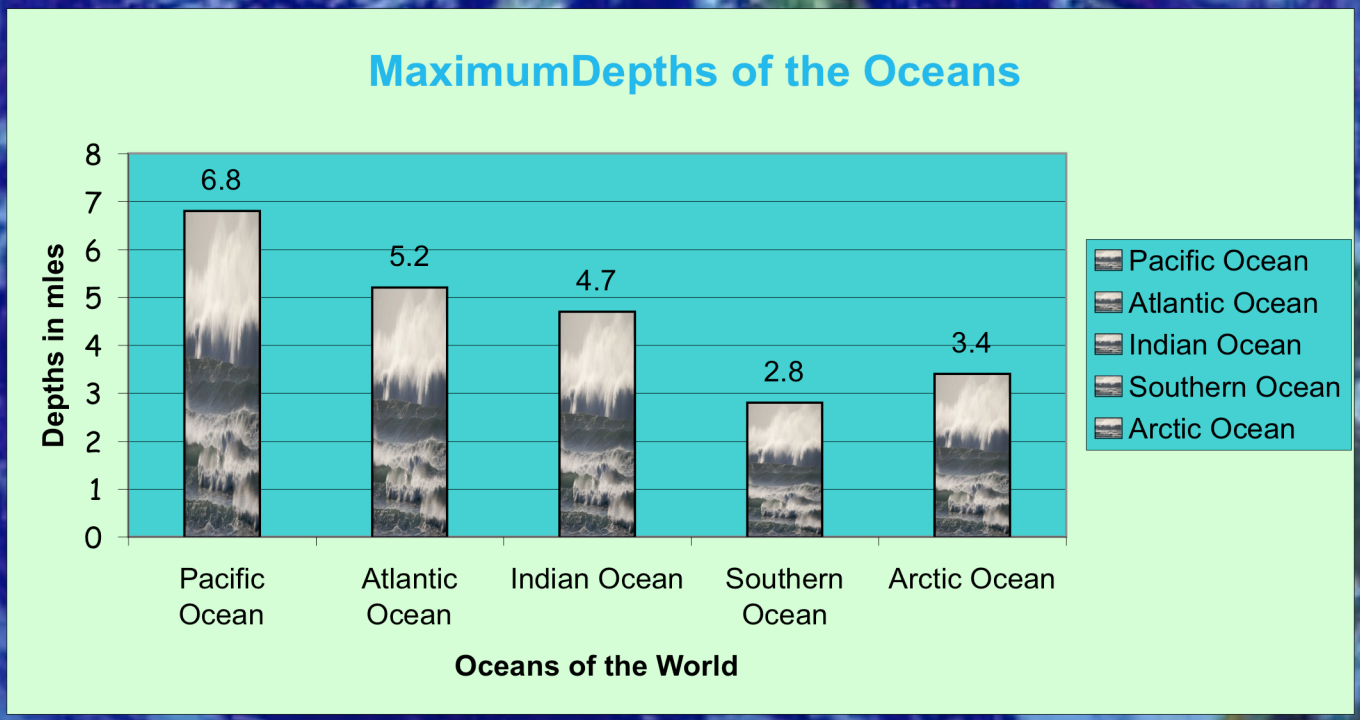
Charts and Graphs

Average Depths



Charts and Graphs

Maximum Depths



Charts and Graphs

Area in Sq. Miles