

Ocean Literacy Quiz Answers

1. **What is ocean literacy?** Ocean Literacy is understanding the ocean's influence on you and your influence on the ocean.

Principle 1: The Earth has one big ocean with many features.

2. **How many oceans are there?** One. There is only one global ocean although the seas are geographically divided into the Atlantic, Pacific, Indian, Arctic, and Antarctic Oceans. These five oceans are not separate bodies of water; they form one continuous oceanic mass. The boundaries between these five oceans arose over time for a variety of historical, cultural, geographical, and scientific reasons.
3. **How much of the planet is covered in ocean?** About 70%.
4. **How much of Earth's total water is in the ocean?** About 97 percent of the water on Earth is in the ocean. Of the tiny percentage that's not in the ocean, about two percent is frozen up in glaciers and ice caps. Less than one percent of all the water on Earth is fresh. A tiny fraction of water exists as water vapor in our atmosphere.
5. **Why is the ocean salty?** Salt in the ocean comes from rocks on land which are eroded by rainfall. The rain contains some dissolved carbon dioxide from the surrounding air which causes it to be slightly acidic which causes it to breakdown the rocks. This process creates ions, or electrically charged atomic particles. These ions are carried away in runoff to streams and rivers and, ultimately, to the ocean. Many of the dissolved ions are used by organisms in the ocean and are removed from the water. Others are not used up and are left for long periods of time where their concentrations increase over time. Two of the most prevalent ions in seawater are chloride and sodium. Together, they make up over 90 percent of all dissolved ions in the ocean. Sodium and Chloride are 'salty.' The concentration of salt in seawater (salinity) is about 35 parts per thousand. Stated in another way, about 3.5 percent of the weight of seawater comes from the dissolved salts.
6. **Why is the ocean blue?** The ocean is blue because water absorbs colors in the red part of the light spectrum. Like a filter, this leaves behind colors in the blue part of the light spectrum for us to see. The ocean may also take on green, red, or other hues as light bounces off of floating sediments and particles in the water. Most of the ocean, however, is completely dark. Hardly any light penetrates deeper than 200 meters (656 feet), and no light penetrates deeper than 2,000 meters (3,280 feet).

Principle 2: The ocean and life in the ocean shape the features of the Earth.

7. **What is the global ocean conveyor belt?** The ocean is not a still body of water. There is constant motion in the ocean in the form of a global ocean conveyor belt. This motion is due to thermohaline currents (thermo = temperature; haline = salinity). Cold, salty water is dense and sinks to the bottom of the ocean while warm water is less dense and rises to the surface. The ocean conveyor gets its "start" in the Norwegian Sea, where warm water from the Gulf Stream heats the atmosphere in the cold northern latitudes. This loss of heat to the atmosphere makes the water cooler and denser, causing it to sink to the bottom of the ocean. As more warm water is transported north, the cooler water sinks and moves south to make room for the incoming warm water. This cold bottom water flows south of the

equator all the way down to Antarctica. Eventually, the cold bottom waters are able to warm and rise to the surface, continuing the conveyor belt that encircles the globe. It takes almost 1,000 years for the conveyor belt to complete one "cycle."

8. **What is the largest mountain range on Earth?** The longest mountain range on Earth is called the mid-ocean ridge. Spanning 65,000 kilometers (40,389 miles) around the globe, approximately 90 percent is under the ocean. This system of mountains and valleys criss-crosses the globe, resembling the stitches in a baseball. It's formed by the movement of the Earth's tectonic plates. As the great plates push apart, mountains and valleys form along the sea floor as magma rises up to fill the gaps. As the Earth's crust spreads, new ocean floor is created. This process literally renews the surface of our planet. If you look at a map of the world's volcanoes, you'll find that most of them form along the boundaries of this great system. In fact, the global mid-ocean ridge system forms the largest single volcanic feature on the Earth. The mid-ocean ridge consists of thousands of individual volcanoes or volcanic ridge segments which periodically erupt.
9. **Where does beach sand come from?** Though sand accounts for two percent of our planet's crust, the *Encyclopedia of Earth and Physical Sciences* (Marshall Cavendish, 1998) reported that sandy beaches are "relatively rare," "considering how much coastline there is on Earth." Beaches are normally rocky or gravelly strips of land. Most of the world's sand lies in rivers, desert dunes and on the floors of oceans. Sand is created from the breakdown of larger rocks and its color, grain size and location will depend on the geographical area. Sand can come from the erosion of rocks on land or in the sea. In Florida and in most of the U.S. Gulf Coast region, sand comes from the adjacent continental shelf and is pushed onshore by wind and waves, although erosion of the Appalachian Mountains through rivers is a contributing factor in Florida. The white sand beaches on Florida's Gulf Coast are mostly quartz crystals which makes them white and fluffy.
10. **What is sea level?** Tide stations measure **Local Sea Level**, which refers to the height, or level, of the ocean surface relative to a specific point on land. The term **Mean Sea Level** refers to locally-derived observations at tide stations, averaged over a 19-year period, known as the National Tidal Datum Epoch (NTDE). The term **Global Sea Level** is the average height of all the Earth's oceans.
11. **Is sea level constant?** There are a number of factors that contribute to long and short-term variations in sea level. Short-term variations generally occur on a daily basis and include waves, tides, or specific flood events, such as those associated with hurricanes. Long-term variations in sea level occur over various time scales, from monthly to several years, and may be repeatable cycles, gradual trends, or intermittent anomalies. Seasonal weather patterns, variations in the Earth's declination, changes in coastal and ocean circulation, anthropogenic influences (such as dredging), vertical land motion, and the El Niño Southern Oscillation are just a few of the many factors influencing changes in sea level over time. When estimating sea level trends, a minimum of 30 years of data are used in order to account for long-term sea level variations. "Global Sea Level Rise" refers to the increase currently observed in the average **Global Sea Level Trend**. The two major causes of global sea-level rise are thermal expansion caused by the warming of the oceans (since water expands as it warms) and the loss of land-based ice (such as glaciers and polar ice caps) due to increased melting.

Principle 3: The ocean is a major influence of weather and climate.

12. What's the difference between weather and climate? The difference between weather and climate is a measure of time. Weather is what conditions of the atmosphere are over a short period of time, and climate is how the atmosphere "behaves" over relatively long periods of time. Another way to think of it is that weather is a data point, while climate is a collection of data.

13. What has the largest influence on climate? The Ocean does, for a variety of reasons. When the earth's surface cools or is heated by the sun, the temperature change is greater - and faster - over the land than over the oceans which affects wind and weather patterns. Ocean currents and upwelling also effect temperature and weather patterns.

14. Most rain that falls on land came from where? The Ocean because it provides an evaporative surface for water to transfer to the air and become vapor.

Principle 4: The ocean makes Earth habitable.

15. Where does most of the oxygen in the atmosphere come from? In the global oceans, a wide range of organisms contribute to the overall amount of atmospheric oxygen. Phytoplankton includes diatoms, blue green algae, and other very small but very important ocean organisms. The large numbers of phytoplankton in the ocean are photosynthesizing constantly, creating a steady flow of atmospheric oxygen which can be used by other animals. These organisms are also a food source for marine animals, which in turn provides energy to some land animals and birds which are capable of catching ocean fish.

Principle 5: The ocean supports a great diversity of life and ecosystems.

16. What percentage of life is estimated to be in the ocean? The ocean represents our planet's largest habitat, containing 99% of the living space on the planet. This vast area supports the life of nearly 50 percent of all species on Earth.

17. What is the largest animal on Earth? The Blue Whale

Principle 6: The ocean and humans are inextricably interconnected.

18. How does the ocean support human life? It provides oxygen, food and economic opportunities, to name a few.

19. How many people in the U.S. live by the coasts? According to 2002 data from NOAA, over 50 percent of people in the United States live within 50 miles of the ocean or Great Lakes. The narrow fringe comprising 17 percent of the contiguous U.S. land area is home to more than half of the nation's population. Between the years 1980 and 2003, population in coastal counties increased by 33 million people or by 28 percent. In 2003, 23 of the 25 most densely populated counties were in coastal areas. By the year 2008, coastal county population was expected to increase by approximately seven million.

20. What types of pollution impact the ocean? Eighty percent of pollution to the marine environment comes from the land. One of the biggest sources is called nonpoint source pollution, which occurs as a result of runoff. Nonpoint source pollution includes many small sources, like septic tanks, cars, trucks, and boats, plus larger sources, such as farms,

ranches, and forest areas. Millions of motor vehicle engines drop small amounts of oil each day onto roads and parking lots. Much of this, too, makes its way to the sea. Some water pollution actually starts as air pollution, which settles into waterways and oceans. Dirt can be a pollutant. Top soil or silt from fields or construction sites can run off into waterways, harming fish and wildlife habitats.

Principle 7: The ocean is largely unexplored.

- 21. How much of the ocean has been explored?** 95 percent of this realm remains unexplored and unseen by human eyes.
- 22. What are some techniques used to understand and study the oceans?** From mapping and describing the physical, biological, geological, chemical, and archaeological aspects of the ocean to understanding ocean dynamics and developing new technologies, to name a few.

Gulf of Mexico Ocean Literacy Quiz Answers

- 23. Why does the Gulf of Mexico look green?** Phytoplankton gives the Gulf its greenish tinge.
- 24. Why do Gulf of Mexico coastal waters sometimes look dark brown?** Tannins in the water from degrading tree leaves and other plant materials give rivers and coastal water in Florida a brownish color.
- 25. How many miles across from east to west is the Gulf of Mexico?** Approximately 1,000 miles.
- 26. How many rivers drain into the Gulf of Mexico?** 20 major river systems drain into the Gulf of Mexico, with the Mississippi River having the largest effect.
- 27. What is the deepest part of the Gulf of Mexico? How deep?** Named after Charles Dwight Sigsbee whose crews with hydrographic service discovered in the 1880's. It's an irregular trough in the Gulf about 300 miles across and about 17,000 feet deep in the southwestern part of the Gulf.
- 28. Name the only National Marine Sanctuary in the Gulf of Mexico.** Flower Garden Banks National Marine Sanctuary is located about 115 miles directly south of the Texas/Louisiana border. The Flower Garden Banks were discovered by snapper and grouper fishermen in the late 1800's. They named the banks after the brightly colored sponges, plants, and other marine life they sometimes snagged and brought to the surface. The Flower Garden Banks National Marine Sanctuary contains the northernmost coral reefs in the continental United States.
- 29. How many oil and gas platforms are in the Gulf of Mexico?** More than 4,000.
- 30. Name some major Gulf of Mexico features?** Continental shelf, Bay of Campeche, the Loop Current, Sigsbee Deep, Flower Garden Banks, US States of Florida, Alabama, Mississippi, Louisiana and Texas...

Most of this information comes from <http://oceanservice.noaa.gov/facts/>. This document was created 9/09 by staff from the Florida Department of Environmental Protection's Office of Coastal and Aquatic Managed areas as part of an EPA Gulf of Mexico Program grant to the Rookery Bay and Apalachicola National Estuarine Research Reserves to support the Gulf of Mexico Alliance.