



What is Salt Water?

1. **Circle** the word **TRUE** if the statement is TRUE or **Circle** the word **FALSE** if it is FALSE.

a) All the oceans contain salt water.

TRUE **FALSE**

b) Some parts of the oceans are deeper than others.

TRUE **FALSE**

c) Surfaces of the oceans are at different levels.

TRUE **FALSE**

d) Salt in salt water is the same kind of salt people sprinkle on food.

TRUE **FALSE**

e) Only oceans contain salt water.

TRUE **FALSE**

2. Put a check mark (✓) next to the answer that is most correct.

a) Which of these is *not* the name of an ocean?

- A Arctic
- B Indian
- C Mediterranean
- D Pacific

b) Which is a typical depth of the ocean far from land.

- A 100 feet
- B 300 feet
- C 1 mile
- D 3 miles

c) Why are there no plants at the bottom of the ocean?

- A because it is too cold
- B because no fish live there
- C because the pressure is too great
- D because sunlight cannot reach there

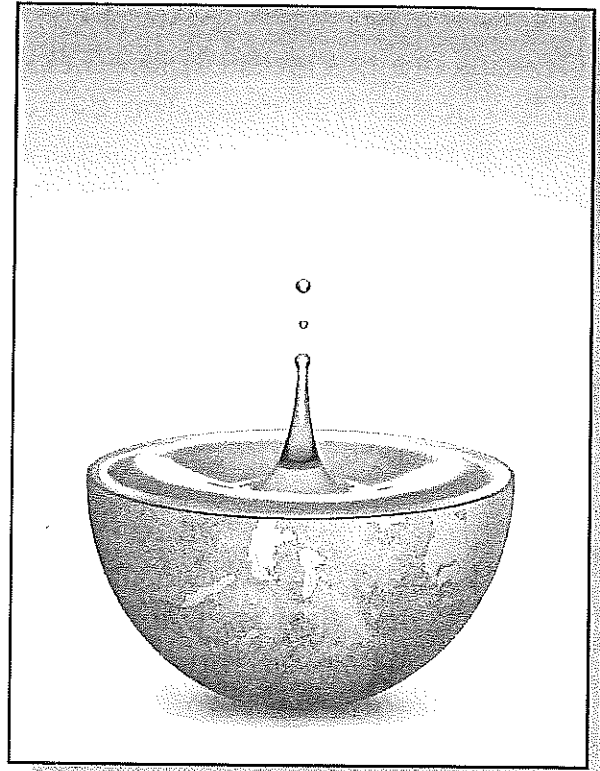


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Of all the planets in our solar system, only Earth has **oceans**. Of course, Earth also has liquid water in lakes, rivers, and underground aquifers. The most important difference between the oceans and lakes is that **ocean** water is salty and most lakes contain **fresh water**. Oceans also hold much more water than any of the other places where water is found. In fact, oceans contain 97.5% of Earth's water and cover 71% of its surface.

Salt water, by definition, is any water that contains more than 1% salt by weight. All oceans are about 3.5% salt. A few lakes are even saltier than the ocean. The salt in **seawater** is mostly, but not completely, the same salt that we sprinkle from salt shakers onto our food. This kind of salt is called **sodium chloride**, which has the chemical formula **NaCl**.

How many oceans are there? Most maps give names to four or five oceans, but we could also say there is *just one* ocean. Look at a world map, and you will notice that all the oceans are connected somewhere. This is a very important characteristic of oceans, because it means that what is true of one ocean is usually true of all oceans. All oceans have the same salt **concentration**. The surface of all oceans is at the same average height. (This height is called **sea level** and is used to represent zero altitude.) If a poisonous chemical flows into the ocean from a river, that poison will eventually travel to all parts of the ocean.



Why do all oceans have about the same concentration of salt?



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Oceans are the least explored part of our planet. This is partly because most of the ocean is so deep. The average ocean depth is about 2-1/3 miles. It is difficult and expensive to build underwater craft that can survive the enormous pressure at such a great depth. Consider these facts:

- All of Earth's land surfaces have been carefully mapped.
- Much of the ocean floor remains unmapped.
- The highest point on Earth was first reached by humans in 1953.
- The deepest part of the ocean was first reached by humans in 1960.

The upper 2,000 feet (about 1/3 mile) of ocean water is a very important part of the ocean. This is how far sunlight can reach. Only where there is light energy can there be **photosynthesis**. Only where there is photosynthesis can there be food for animals. Therefore, all the food for almost all things that live in the ocean is produced in the upper 2,000 feet of ocean water. The plants and animals that live on the deep, dark floor of the ocean survive on food that slowly floats down from near the surface. The ocean has also always been a major source of food for people. Later we will learn about the serious problems facing the harvest of the ocean's food resources.

Another valuable ocean resource is transportation. Since prehistoric times, people have used the ocean for short boat trips along the coast. In the past few hundred years, people have traveled more and more across oceans from continent to continent. Today billions of tons of goods and materials are sent on large ocean-going ships from country to country.

One obvious salt water resource is salt. When salt water is allowed to completely **evaporate**, the salt is left behind. Although some salt comes from salt mines, much of it is produced by evaporating seawater. Another material that is usually produced by removing it from seawater is the metal called magnesium. Magnesium is useful because it is very light compared to other common metals.



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1. Put a check mark (✓) next to the answer that is most correct.

a) Which of these is the name of an ocean?

- A Caribbean
- B Caspian
- C Indian
- D Superior

b) What is the percentage of salt in ocean water?

- A 1.0 %
- B 3.5 %
- C 35 %
- D 70 %

c) What is the chemical formula of most of the salt in the oceans?

- A $C_6H_{12}O_6$
- B CO_2
- C H_2O
- D $NaCl$

2. Use one of the numbers below to complete each sentence. Use each number once.

2.3

3.5

71

97.5

2000

- a) About _____ % of Earth's surface is covered by water.
- b) Only the upper _____ feet of ocean water receives enough sunlight to support photosynthesis.
- c) The oceans contain _____ % of Earth's water.
- d) Ocean water is about _____ % salt, by weight.
- e) The average depth of the oceans is _____ miles.



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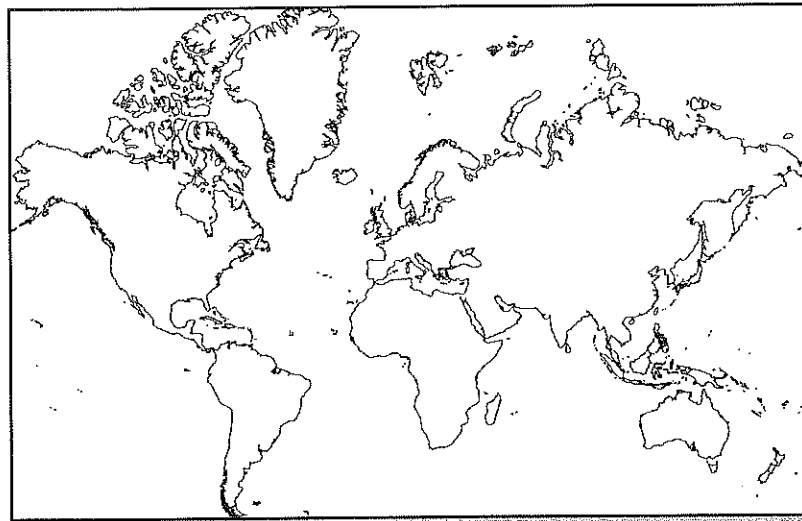
3. Answer the questions in complete sentences.

a) Explain why all the oceans have the same water level.

b) Explain why it is more difficult to explore and map the ocean floor than almost any place on land.

Extension & Applications

An unlabeled map of the world is shown below.



Use the map to answer these questions.

a) Label the Atlantic Ocean, Pacific Ocean, Arctic Ocean, and Indian Ocean by writing the names on the map.

b) When European sailors first explored the world in ships, the Panama and Suez canals had not been built, and there was too much ice in the Arctic Ocean to sail across it. Draw lines on the map to show **two** ocean routes explorers could have taken to get from England to China.