

# Seawater Soup

The oceans contain more than 330 million cubic miles of water. We often think of sea water as just salt water. Actually, there is a great variety of salts and minerals in sea water. The salinity, or salt content, of sea water is fairly constant at 3.5 percent.

Oxygen, carbon dioxide, and nitrogen are found dissolved in sea water. Marine animals breathe the dissolved oxygen, and the green plants of the sea use the carbon dioxide for their photosynthesis.

Some of the elements found in sea water are found in high enough concentrations to be commercially valuable. Common table salt is collected from salt water in large quantities. In smaller amounts, magnesium and bromine are also harvested.

Many other elements present in sea water are found in such low concentrations that their extraction is not currently practical. Gold, for example, is found at a rate of 38 pounds per cubic mile. That's about one cent's worth of gold in a million gallons of water!

How do all of these elements get into the water? Weathering or erosion is taking place all the time. Wind, rain, freezing, and thawing are constantly breaking down the earth's surface. As these minerals are broken down and exposed to water, some of them become dissolved in the water. Eventually, the water reaches the sea. The oceans are the great sediment basins of Earth. In some spots, the sediment is 1,200 feet thick. The sediment comes from runoff from the land masses, dust particles from volcanic activity, and from the shells or skeletons of dead marine plants and animals. The floor of the oceans itself is a source of elements normally found in sea water.

Aquatic Biomes

Seawater Soup: Elements of the Sea in Order of Abundance

## Seawater Soup: Elements of the Sea in Order of Abundance

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|----------------|------------------|---------------|
| 1. Oxygen      | 21. Iridium      | 41. Cerium    |
| 2. Hydrogen    | 22. Zinc         | 42. Yttrium   |
| 3. Chlorine    | 23. Iron         | 43. Silver    |
| 4. Sodium      | 24. Aluminum     | 44. Lanthanum |
| 5. Magnesium   | 25. Molybdenum   | 45. Krypton   |
| 6. Sulfur      | 26. Barium       | 46. Neon      |
| 7. Calcium     | 27. Lead         | 47. Bismuth   |
| 8. Potassium   | 28. Tin          | 48. Tungsten  |
| 9. Bromine     | 29. Copper       | 49. Xenon     |
| 10. Carbon     | 30. Arsenic      | 50. Germanium |
| 11. Strontium  | 31. Protactinium | 51. Cadmium   |
| 12. Boron      | 32. Selenium     | 52. Chromium  |
| 13. Silicon    | 33. Vanadium     | 53. Scandium  |
| 14. Fluorine   | 34. Manganese    | 54. Mercury   |
| 15. Argon      | 35. Titanium     | 55. Gallium   |
| 16. Nitrogen   | 36. Thorium      | 56. Tellurium |
| 17. Lithium    | 37. Cesium       | 57. Niobium   |
| 18. Rubidium   | 38. Antimony     | 58. Helium    |
| 19. Phosphorus | 39. Cobalt       | 59. Gold      |
| 20. Iodine     | 40. Nickel       | 60. Radium    |
|                |                  | 61. Radon     |

The two most common elements, oxygen and hydrogen, combine to make water ( $H_2O$ ). The formula for salt,  $NaCl$ , reflects the next two most common elements in sea water, chlorine (Cl) and sodium (Na).

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

For the student:

1. How salty is the ocean?

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2. Why are the carbon dioxide and oxygen that are found in the oceans important?

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3. What types of elements do humans take from the oceans because of their value?

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4. How do elements end up in sea water?

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5. How thick can sediments get in the oceans?

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6. How many different elements are found in sea water?

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7. What are the four most common elements in sea water?

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8. What minerals are commonly available in sea water due to weathering and erosion?

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