

## Module 6: Ocean Water Chemistry

### Topic 2 Content: Salinity and Dissolved Substances Notes

#### Salinity and Dissolved Substances

##### Introduction



If you have ever tasted seawater by accident, you know that it has a very salty taste. But, why is seawater so salty? Seawater owes its salty taste to the high quantities of dissolved salts, gasses, and other minerals in the water. In this interactivity, use the previous and next buttons to explore salinity and the dissolved substances in seawater.



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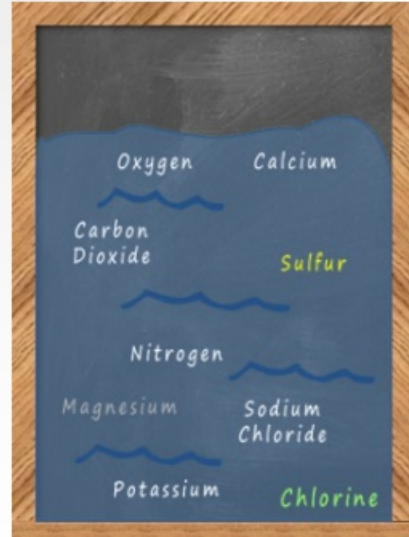
# Module 6: Ocean Water Chemistry

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### Salinity and Dissolved Substances

#### Dissolved Substances

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##### Amount of Salinity

Scientists measure the amount of dissolved substances in seawater to determine its salinity. Although the salinity of seawater varies from place to place, in general it has a salinity of about 3.5%. This means that the remaining 96.5% of seawater is pure water. As you can imagine, it doesn't take much to make seawater so salty!



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##### Pure Water vs. Seawater

When comparing pure water to seawater, it's important to note several differences. Pure water is an odorless, colorless liquid because it doesn't contain any dissolved substances. You can find pure water at your grocery store labeled as distilled water.

In contrast, seawater has a salty taste and a distinct smell due to the various concentrations of dissolved substances and organic matter. All these dissolved substances, especially the salts, change the freezing and boiling points of seawater. As you may know, pure water freezes at  $0^{\circ}$  Celsius and boils at  $100^{\circ}$  Celsius. Seawater has a slightly lower freezing point at  $-1.91^{\circ}$  Celsius, and a slightly higher boiling point at  $100.56^{\circ}$  Celsius.



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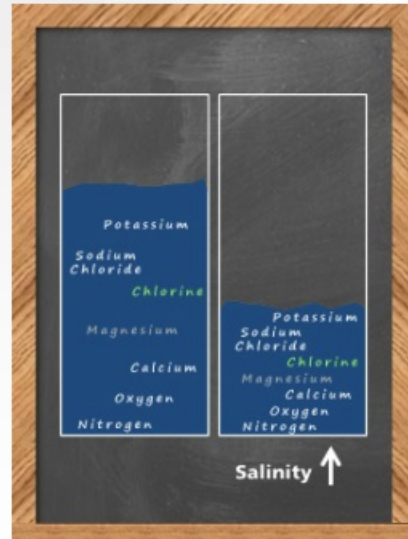
## Topic 2 Content: Salinity and Dissolved Substances Notes

### Salinity and Dissolved Substances

#### Variation In Salinity

As mentioned previously, the salinity of seawater varies from place to place. What causes these variations? Although both water and dissolved substances constantly cycle into and out of the ocean, water cycles through much more rapidly than do the dissolved substances. In fact, so much water cycles through that when measuring changes in salinity, it's not the amount of dissolved substances that changes; rather, it's the amount of water that changes.

Shown here are two containers filled with equal amounts of dissolved substances, but with different amounts of water. Which container do you think has the higher salinity? As demonstrated in the left container, when water cycles into seawater through precipitation, runoff, and melting icebergs, the concentration of dissolved substances decreases, thus lowering the overall salinity. As demonstrated in the right container, when water cycles out of the seawater through the formation of sea ice and evaporation, the concentration of dissolved substances increases, thus raising the overall salinity.



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##### Entering the Oceans

How do dissolved substances like salts and minerals enter the oceans in the first place? Dissolved substances enter the oceans through stream runoff, volcanic eruptions and from the atmosphere. For example, streams dissolve ions found in rocks. These ions are then carried to the oceans where they mix with other dissolved substances.



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##### Escaping the Oceans

Dissolved substances escape seawater as well. For example, when waves crash into the shore, the spray releases salts into the air. This is why the air near large bodies of seawater always tastes and smells a bit salty. Other dissolved substances escape seawater in deposits in ocean sediments, such as the shells and waste from living organisms. Coral reefs are an excellent example of how dissolved calcium escapes seawater. The tiny organisms that build coral extract calcium directly from the seawater to build their protective shells.



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