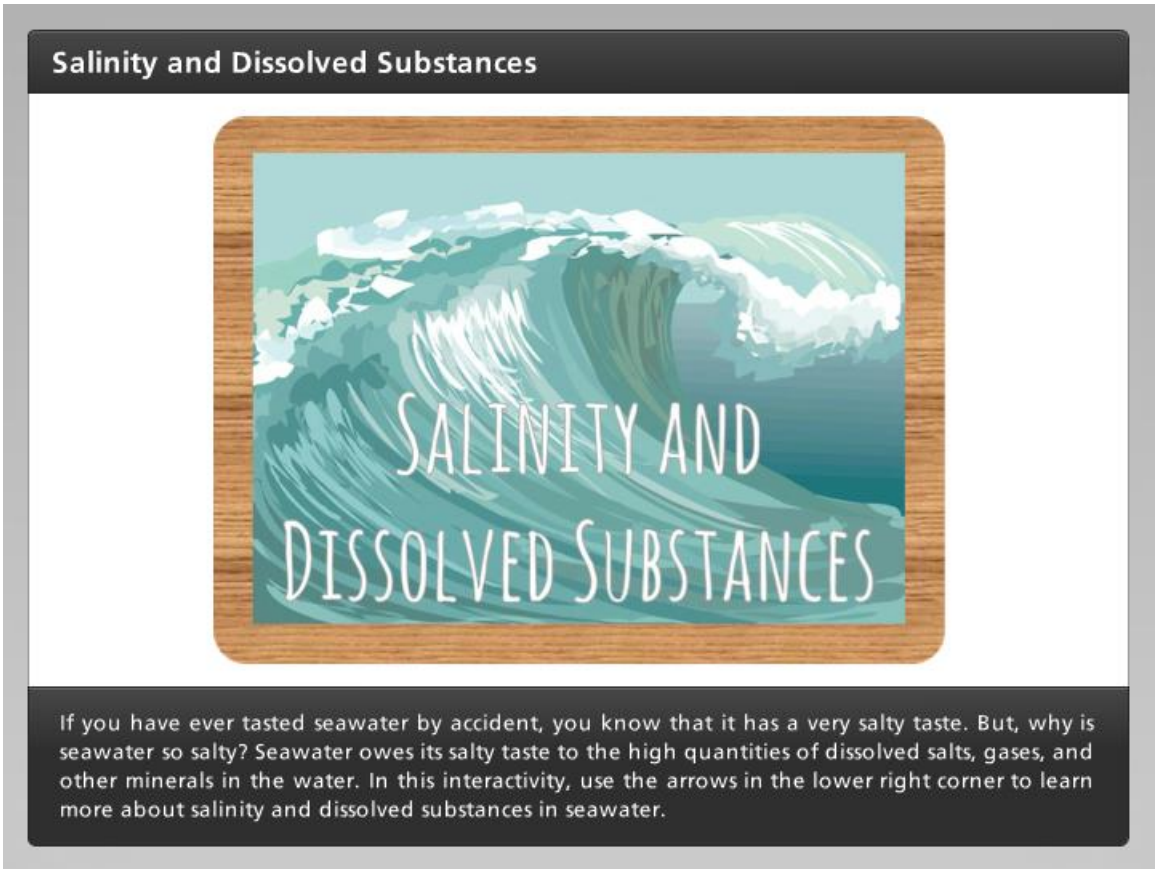
Module 12: Oceanography
Topic 3 Content: Salinity and Dissolved Substances Notes



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, gases, and other minerals in the water. In this interactivity, use the arrows in the lower right corner to learn more about salinity and dissolved substances in seawater.

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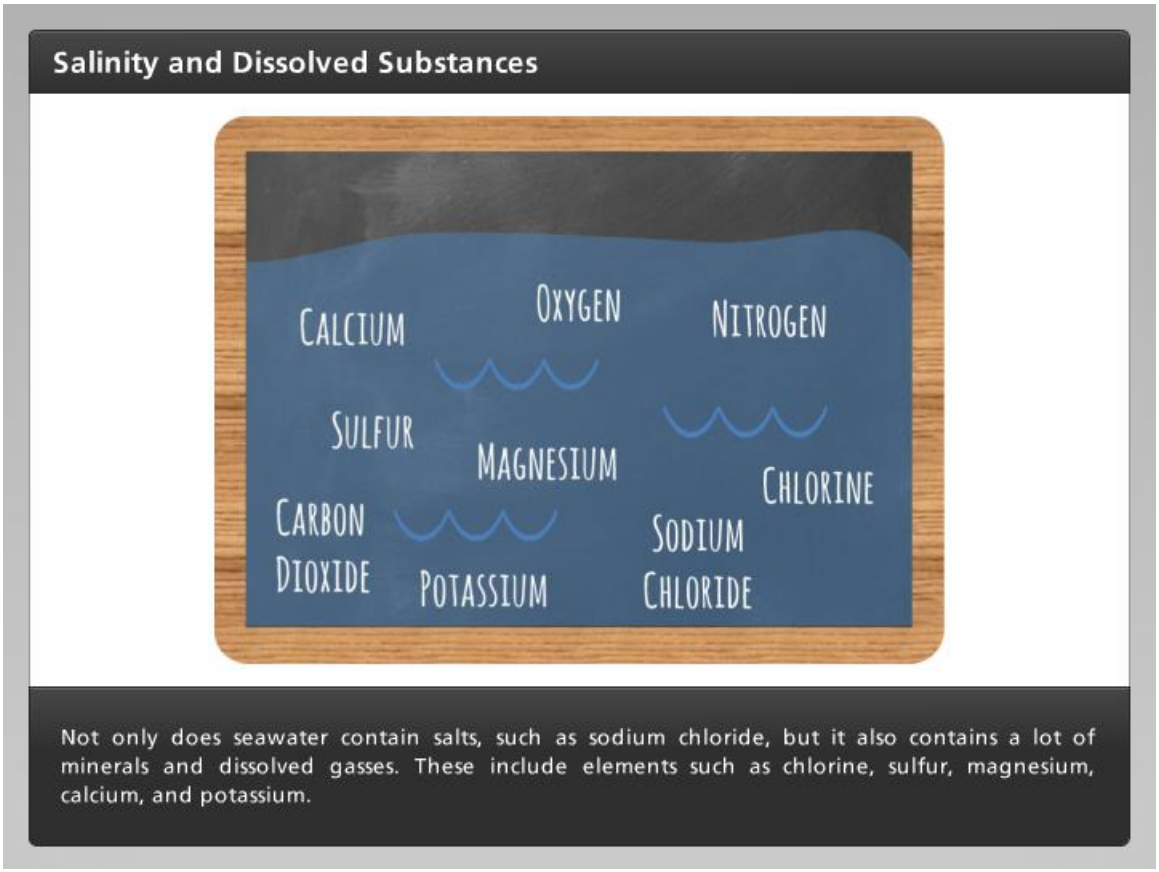
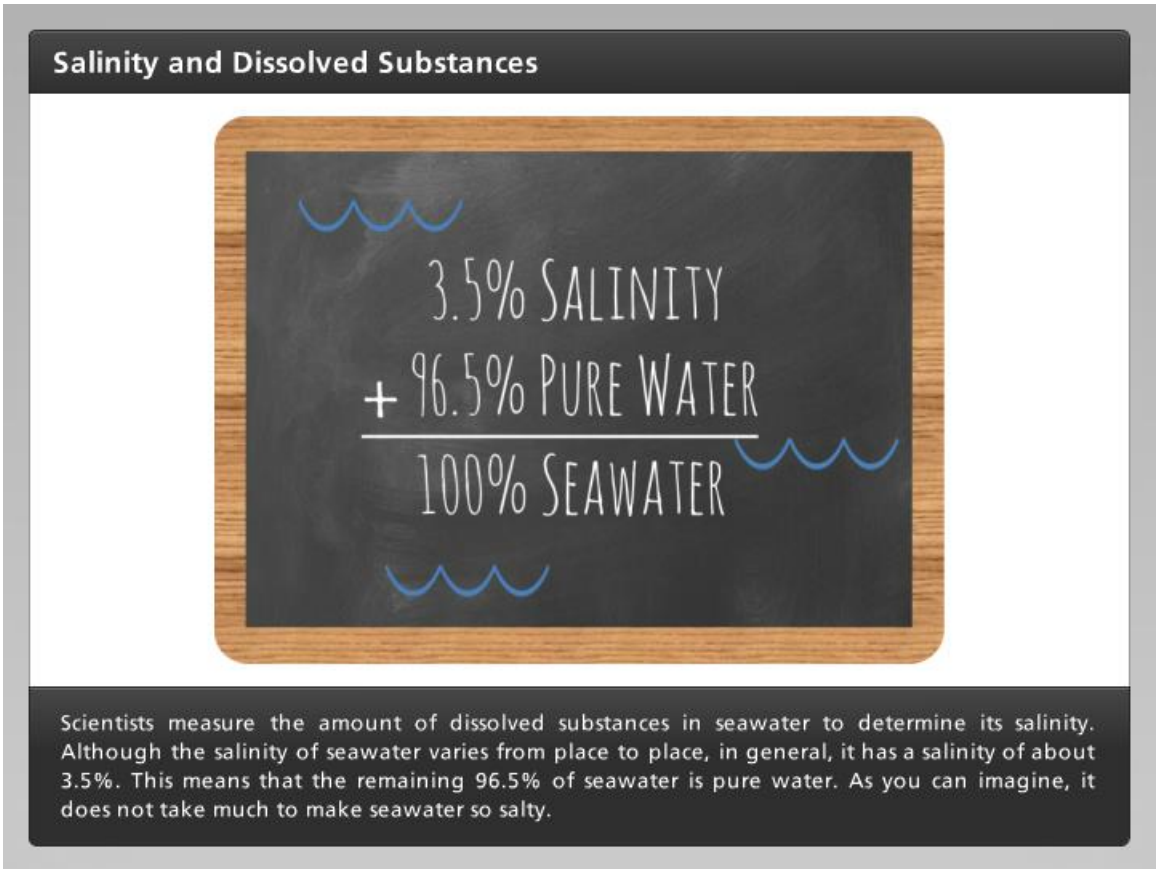
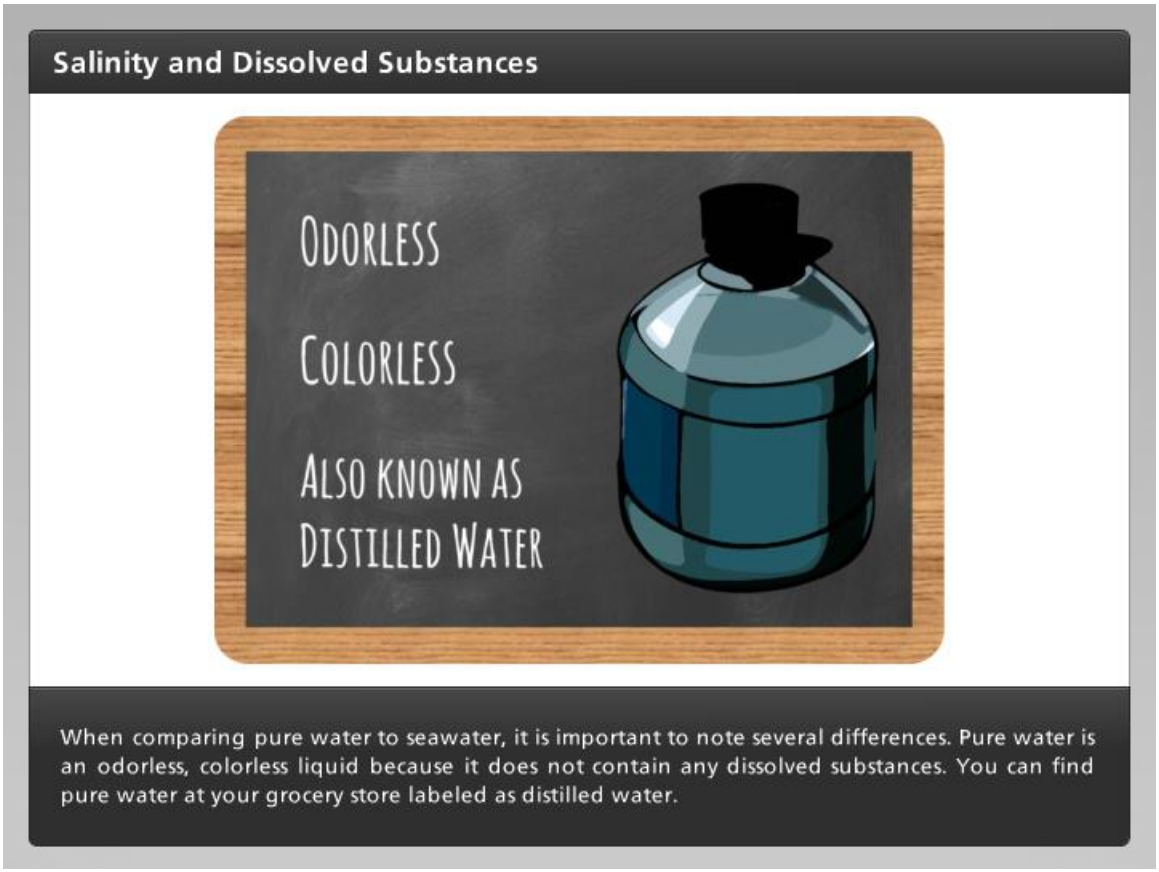


Not only does seawater contain salts, such as sodium chloride, but it also contains a lot of minerals and dissolved gasses. These include elements such as chlorine, sulfur, magnesium, calcium, and potassium.

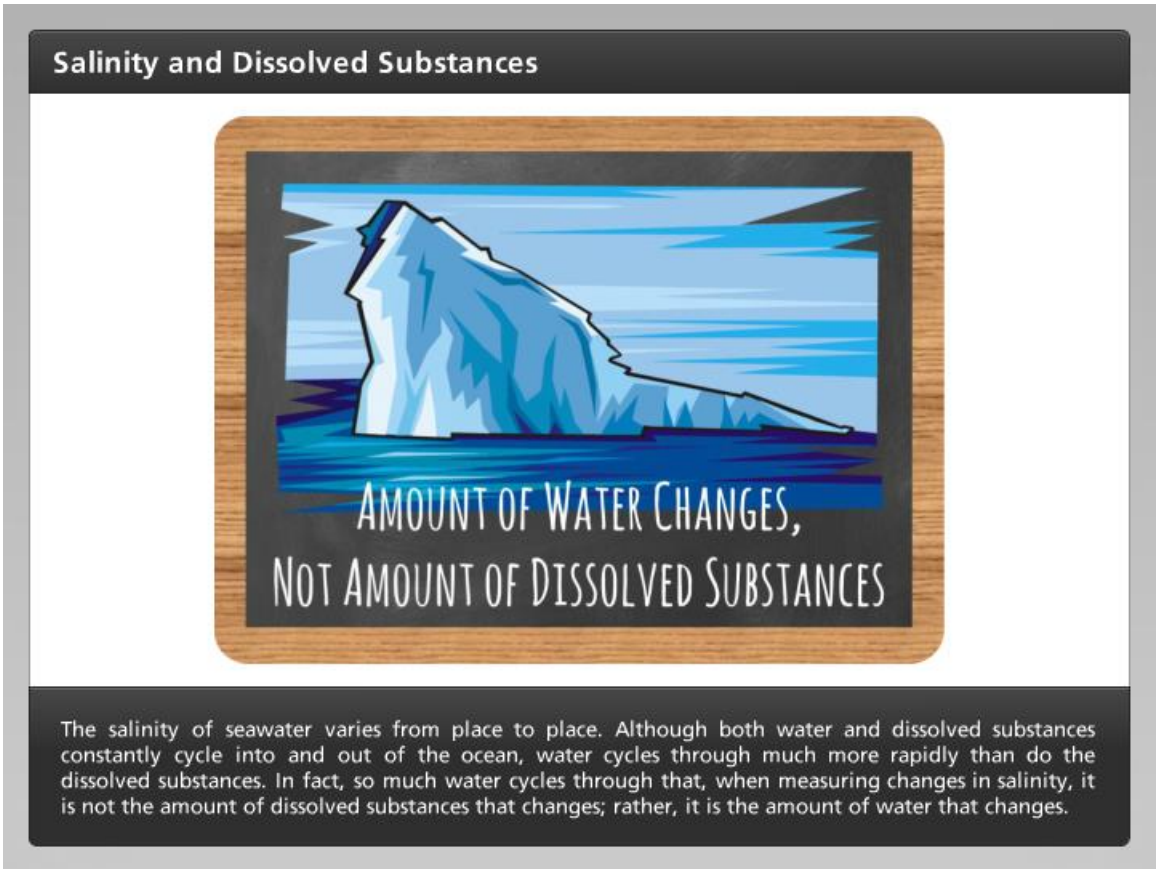


Scientists measure the amount of dissolved substances in seawater to determine its salinity. Although the salinity of seawater varies from place to place, in general, it has a salinity of about 3.5%. This means that the remaining 96.5% of seawater is pure water. As you can imagine, it does not take much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

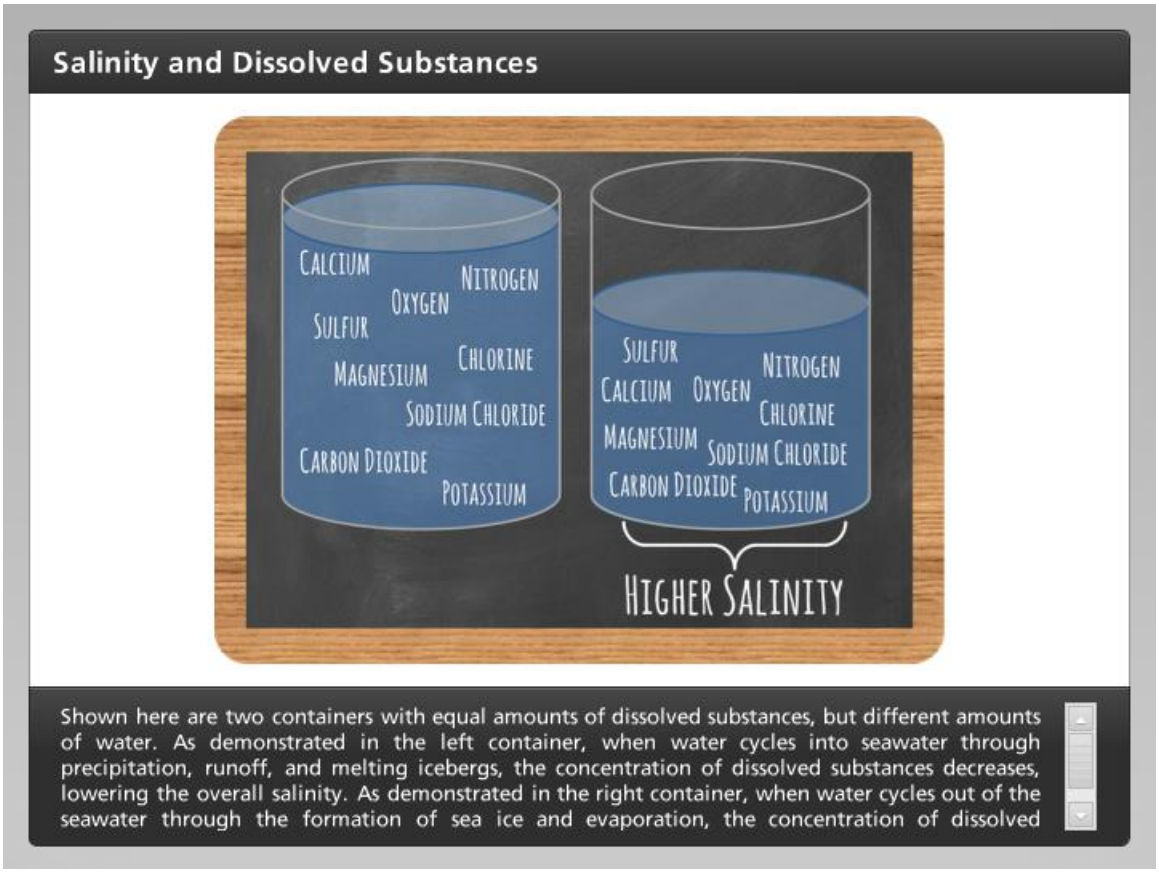


When comparing pure water to seawater, it is important to note several differences. Pure water is an odorless, colorless liquid because it does not contain any dissolved substances. You can find pure water at your grocery store labeled as distilled water.

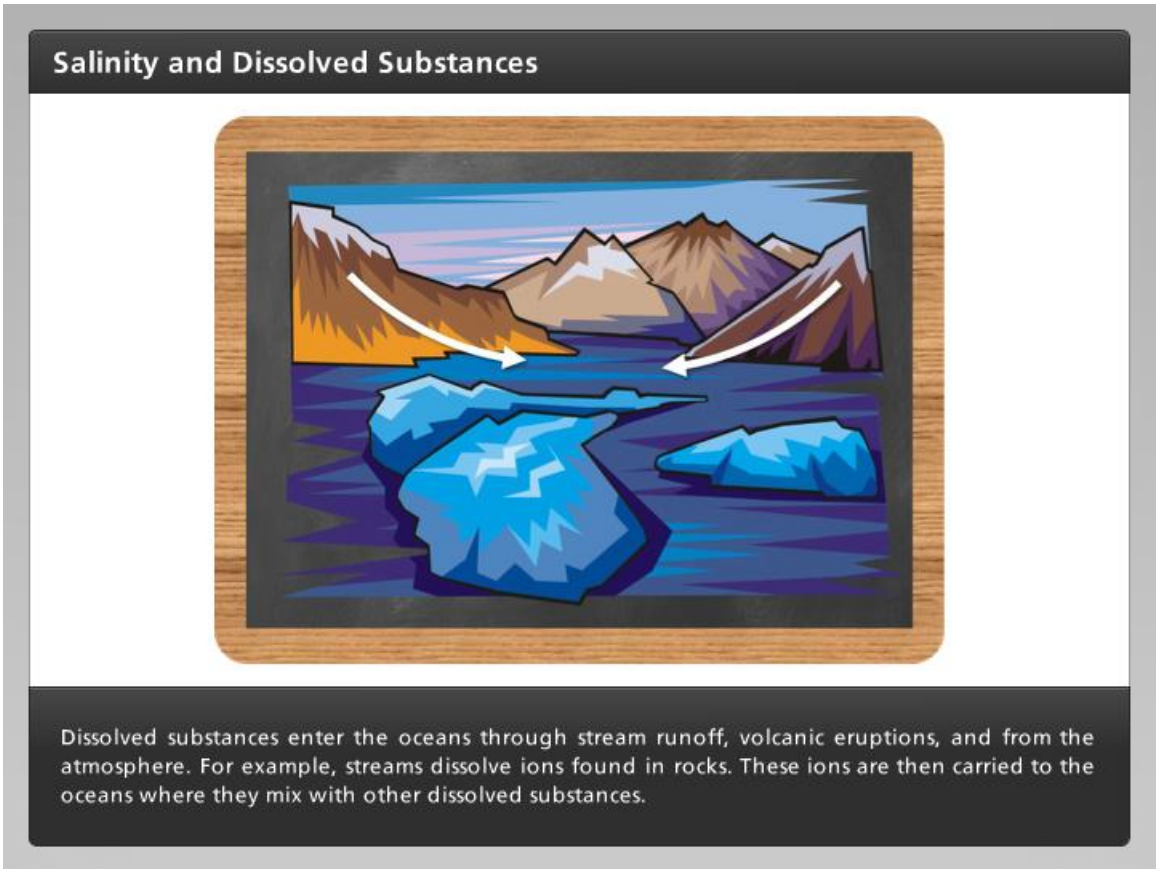
In contrast, seawater has a salty taste and a distinct smell due to the various concentrations of dissolved substances and organic matter. All of these dissolved substances, especially the salts, change the freezing and boiling points of seawater. Pure water freezes at 0º Celsius and boils at 100º Celsius. Seawater has a slightly lower freezing point at -1.91º Celsius, and a slightly higher boiling point at 100.56º Celsius.



The salinity of seawater varies from place to place. 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 is not the amount of dissolved substances that changes; rather, it is the amount of water that changes.



Shown here are two containers with equal amounts of dissolved substances, but different amounts of water. As demonstrated in the left container, when water cycles into seawater through precipitation, runoff, and melting icebergs, the concentration of dissolved substances decreases, 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, raising the overall salinity.



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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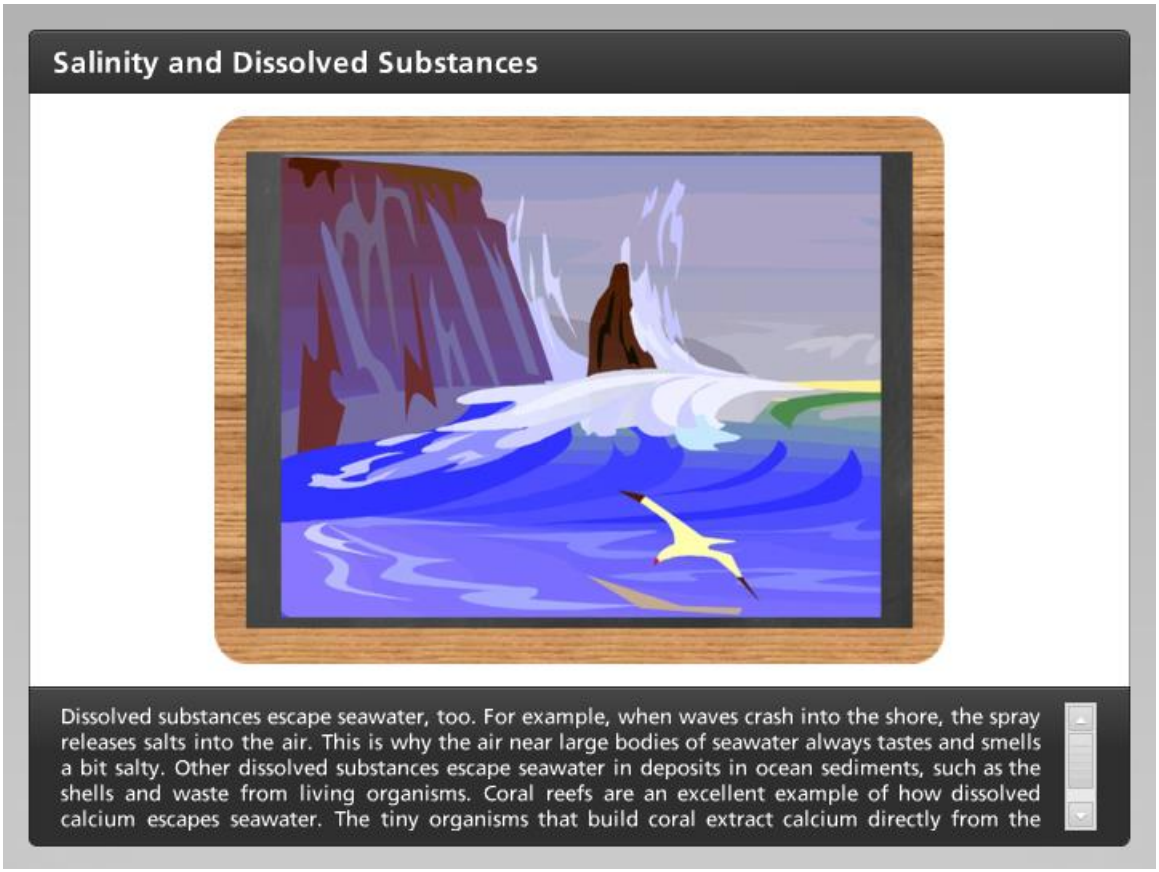
5 seconds



Step Text

Dissolved substances escape seawater, too. 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.