**Notes: The Ocean**

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| **What is the ocean?** | * \_\_\_\_\_\_\_\_\_\_\_\_\_\_ water covers most of Earth.   + \_\_\_\_\_\_\_% of water on Earth is sea/salt water.   + All sections of the ocean are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
| **Why is the ocean important?** | * The ocean covers \_\_\_\_\_\_\_\_\_\_ of Earth’s surface. * It is an important source of \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ resources. * We use it for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * The ocean stores \_\_\_\_\_\_\_\_\_\_—water has high \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, so it takes a lot of \_\_\_\_\_\_\_\_\_\_\_\_\_ to heat it up. Water holds on to this \_\_\_\_\_\_\_\_\_\_ energy and stays \_\_\_\_\_\_\_\_\_\_\_\_\_\_ longer than the \_\_\_\_\_\_\_\_\_\_\_\_.   + The stored \_\_\_\_\_\_\_\_\_ in the ocean drives much of Earth’s \_\_\_\_\_\_\_\_\_\_\_\_ and causes \_\_\_\_\_\_\_\_\_\_\_\_ near the ocean to be \_\_\_\_\_\_\_\_\_\_\_\_\_ than climate in the interior of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * Ocean \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ distribute energy (\_\_\_\_\_\_\_\_\_\_\_) and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
| **What is the relationship between density and salinity?** | * Ocean water contains \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_.   + Ocean water has all \_\_\_\_\_\_\_\_ natural elements.   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_: a measure of the amount of dissolved \_\_\_\_\_\_\_ contained in water     - many kinds of \_\_\_\_\_\_\_\_\_ in the ocean (mostly \_\_\_\_\_\_\_\_\_)     - \_\_\_\_\_\_\_\_\_ water is more \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (heavier) than fresh water.   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: a measure of the amount of \_\_\_\_\_\_\_\_\_\_\_ packed into a given \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (mass/volume)     - More \_\_\_\_\_\_\_\_\_ = greater \_\_\_\_\_\_\_\_\_\_\_\_\_\_ = more objects \_\_\_\_\_\_\_\_\_\_\_     - Ex. Dead Sea is \_\_\_\_\_\_\_\_\_\_\_ dense! * Salinity & density \_\_\_\_\_\_\_\_ in the ocean (different depending on \_\_\_\_\_\_\_\_\_\_\_\_ you are).   + \_\_\_\_\_\_\_\_\_\_\_\_\_ salinity: \_\_\_\_\_\_\_\_\_\_\_ areas (freshwater), \_\_\_\_\_\_\_\_\_\_\_\_\_ areas (more evaporation)   + \_\_\_\_\_\_\_\_\_ salinity: areas where ocean is \_\_\_\_\_\_\_\_\_\_\_ by freshwater (\_\_\_\_\_\_\_\_\_\_\_—where \_\_\_\_\_\_\_\_\_\_\_ meet the ocean—or where a lot of \_\_\_\_\_\_\_\_\_ falls). |
| **What gases are dissolved in the ocean?** | * Ocean water has many different \_\_\_\_\_\_\_\_\_ dissolved in it, mostly nitrogen, \_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * The movement of \_\_\_\_\_\_\_\_\_\_ over the ocean and waves \_\_\_\_\_\_\_\_\_\_\_\_ (mixes up) the water at the \_\_\_\_\_\_\_\_\_\_\_\_, speeding up the exchange of \_\_\_\_\_\_\_\_\_\_\_\_ between the ocean and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (like shaking a soda bottle!). * \_\_\_\_\_\_\_\_\_\_\_\_\_ (ocean) plants need \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dissovled in the water to go through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪photosynthesis releases \_\_\_\_\_\_\_\_\_ into the water, which is then used by ocean organisms (like \_\_\_\_\_\_\_\_\_) to go through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * As atmospheric levels of \_\_\_\_\_\_\_\_\_\_\_ rise, so do levels of those gases \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in ocean water |
| **Why is carbon dioxide so important?** | * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is one of the most important gasses dissolved in the ocean (along with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!) * Some carbon dioxide stays \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as \_\_\_\_\_\_\_\_, but most \_\_\_\_\_\_\_\_\_\_\_\_ with water to form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or reacts with other carbonates to form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ carbon dioxide from water.   + Bicarbonates are used by many \_\_\_\_\_\_\_\_\_\_\_\_ organisms to form calcium carbonate \_\_\_\_\_\_\_\_\_\_\_. When these organisms die, some of the bicarbonate is returned to the \_\_\_\_\_\_\_\_\_\_\_, but a lot of it settles into the \_\_\_\_\_\_\_\_\_\_\_\_\_\_. This process locks up \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that originated as carbon dioxide in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for long periods of \_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
| **How much gas can be dissolved in seawater?** | * \_\_\_\_\_\_\_\_\_\_\_\_ water holds \_\_\_\_\_\_\_\_\_\_\_\_\_\_ gas than warm water. * Seawater with \_\_\_\_\_\_\_\_\_\_\_ salinity holds \_\_\_\_\_\_\_\_\_\_\_\_ gas than high salinity water. * \_\_\_\_\_\_\_\_\_\_ water, which has a high \_\_\_\_\_\_\_\_\_\_\_\_\_, holds \_\_\_\_\_\_\_\_ gas than shallow water. |
| **What is the temperature of the ocean?** | * Ocean is divided into \_\_\_\_\_\_ layers based on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_ layer🡪\_\_\_\_\_\_\_\_\_\_\_\_\_, varies with depth     - warm water is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, stays on top   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪temperature \_\_\_\_\_\_\_\_\_\_\_ with depth   + \_\_\_\_\_\_\_\_\_\_\_\_ water🡪 \_\_\_\_\_\_\_\_\_\_\_ all year long, barely above freezing   Draw: |
| **How does the ocean affect our climate?** | * The ocean is an important factor in the global \_\_\_\_\_\_\_\_\_\_\_\_\_ because it \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ water, \_\_\_\_\_\_\_\_\_\_\_\_\_, and carbon dioxide   + These components are constantly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between the \_\_\_\_\_\_\_\_\_\_\_\_ and hydrosphere (water on Earth)     - Ex: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: water goes from the hydrosphere to the atmosphere * Because the ocean can store so much \_\_\_\_\_\_\_\_\_\_, seasons occur \_\_\_\_\_\_\_\_\_ than they would and air above the ocean is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * \_\_\_\_\_\_\_\_\_\_\_ energy stored in the ocean in one \_\_\_\_\_\_\_\_\_\_\_\_ will affect the \_\_\_\_\_\_\_\_\_\_\_\_ almost an entire season later. * Air \_\_\_\_\_\_\_\_\_\_\_\_\_ around the world are regulated by movement of \_\_\_\_\_\_\_\_ in the \_\_\_\_\_\_ * Most \_\_\_\_\_\_\_\_\_ in the ocean is stored in the top \_\_\_\_\_ meters because seawater has a \_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ and high specific \_\_\_\_\_\_\_\_—this allows the ocean to store a lot of \_\_\_\_\_\_\_.   + The ocean can then buffer changes in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_\_\_\_\_ and releasing \_\_\_\_\_\_\_\_\_\_.   + Evaporation \_\_\_\_\_\_\_\_\_\_ ocean water (just like sweat cools your body), which cools the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This is more important near the \_\_\_\_\_\_\_\_\_\_\_\_\_\_, where there’s a lot of evaporation, than near the \_\_\_\_\_\_\_\_\_\_\_. * Moving \_\_\_\_\_\_\_ (wind) causes moving \_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_). * \_\_\_\_\_\_\_\_\_\_\_\_ currents: help distribute \_\_\_\_\_\_\_\_\_ around the globe   + Ex. Gulf Stream \_\_\_\_\_\_\_\_\_\_\_\_\_ causes the climate in Great Britain to be \_\_\_\_\_\_\_\_\_, whereas at the same latitude in Canada, there would be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * A \_\_\_\_\_\_\_\_\_\_\_ in surface currents can cause a \_\_\_\_\_\_\_\_\_\_ change in \_\_\_\_\_\_\_\_\_\_\_ patterns.   + no \_\_\_\_\_\_\_\_\_ = no surface \_\_\_\_\_\_\_\_\_\_\_\_ = different \_\_\_\_\_\_\_\_\_\_\_\_/weather   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_     - \_\_\_\_\_\_\_\_\_\_\_\_ Ocean: wind normally blows \_\_\_\_\_\_\_\_ (🡨), some years it’s not as \_\_\_\_\_\_\_\_\_\_\_\_\_     - causes changes in weather around the \_\_\_\_\_\_\_\_\_\_; lasts \_\_\_\_\_\_\_\_\_\_\_\_ months |
| **How does wind affect the ocean?** | * Wind causes waves:   + A \_\_\_\_\_\_\_\_\_ is an up-and-down motion along the \_\_\_\_\_\_\_\_\_\_\_ of a body of water.   + Moving air drags across the water’s surface and gives energy to the \_\_\_\_\_\_\_\_\_\_\_\_, causing \_\_\_\_\_\_\_\_\_\_\_\_\_. * Wind blows over the ocean, causing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   + carry \_\_\_\_\_\_\_\_\_\_\_ water away from the \_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_ water away from the \_\_\_\_\_\_\_\_\_\_\_\_   + Earth’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_ makes them spin in \_\_\_\_\_\_\_\_\_\_\_ (clockwise in N. Hemisphere, counterclockwise in S. Hemisphere) * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: mass of \_\_\_\_\_\_\_\_\_\_ water; many currents in the ocean distribute \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Currents move \_\_\_\_\_\_\_\_\_\_\_\_, waves move \_\_\_\_\_\_\_\_\_\_\_\_\_. |
| **What are deep ocean currents?** | * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are caused by differences in \_\_\_\_\_\_\_\_\_\_ (due to temp, \_\_\_\_\_\_\_\_\_\_, etc)   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: water moving from the surface \_\_\_\_\_\_\_\_ to the bottom     - carries \_\_\_\_\_\_\_\_\_\_\_\_\_ down     - allows animals to live in the \_\_\_\_\_\_\_\_\_\_\_ ocean   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: water moving \_\_\_\_\_\_\_\_\_\_\_ to the surface     - Occurs when \_\_\_\_\_\_\_\_\_\_ surface water is blown offshore by wind. This allows the \_\_\_\_\_\_\_\_\_\_ water at the bottom of the ocean to \_\_\_\_\_\_\_\_\_.     - carries \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ up     - large numbers of \_\_\_\_\_\_\_\_\_\_\_\_\_ gather in areas where upwelling occurs because of the availability of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   Draw Upwelling: |
| **What are tides?** | * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ waters rise and fall each day   + The water level on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ varies with the \_\_\_\_\_\_\_\_\_\_ of day. This periodic \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ of the water level of the ocean is called the \_\_\_\_\_   + The water level is highest at \_\_\_\_\_\_\_\_ tide, submerging parts of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_.   + The water level is lowest at \_\_\_\_\_\_\_\_\_ tide, exposing more of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
| **What is a tidal dam?** | * Tides can be used to generate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   + A tidal \_\_\_\_\_\_\_\_ is a dam built near a coast in the path of \_\_\_\_\_\_\_\_\_\_\_\_\_ waters.   + How tidal dams work:     - Dam’s \_\_\_\_\_\_\_\_\_\_\_\_ are open as the tide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.     - When tide \_\_\_\_\_\_\_\_\_\_\_\_, gates \_\_\_\_\_\_\_\_\_\_\_\_\_, trapping water.     - At \_\_\_\_\_\_\_\_ tide, gates \_\_\_\_\_\_\_\_\_\_\_ and water rushes out, turning \_\_\_\_\_\_\_\_\_\_\_\_ and making electricity.   + Benefits: renewable \_\_\_\_\_\_\_\_\_\_\_\_, less \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   + Costs: can only be done in a \_\_\_\_\_\_\_\_\_\_\_ places, blocks paths of \_\_\_\_\_\_\_\_ and can hurt \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ life. |