**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 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
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| **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 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
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| **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).
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| **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
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| **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 \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
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| **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.
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| **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
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| **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 \_\_\_\_\_\_\_\_\_\_\_\_\_.
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| **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 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
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| **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.
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