

Notes: The Ocean

<p>What is the ocean?</p>	<ul style="list-style-type: none"> • _____ water covers most of Earth. <ul style="list-style-type: none"> - _____ % of water on Earth is sea/salt water. - All sections of the ocean are _____.
<p>Why is the ocean important?</p>	<ul style="list-style-type: none"> • 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 _____: <ul style="list-style-type: none"> - 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 _____.
<p>What is the relationship between density and salinity?</p>	<ul style="list-style-type: none"> • Ocean water contains _____ and _____: <ul style="list-style-type: none"> - Ocean water has all _____ natural elements. - _____: a measure of the amount of dissolved _____ contained in water <ul style="list-style-type: none"> • 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) <ul style="list-style-type: none"> • More _____ = greater _____ = more objects • Ex. Dead Sea is _____ dense! • Salinity & density _____ in the ocean (different depending on _____ you are). <ul style="list-style-type: none"> - _____ salinity: _____ areas (freshwater), _____ areas (more evaporation) - _____ salinity: areas where ocean is _____ by freshwater (_____—where _____ meet the ocean—or where a lot of _____ falls).
<p>What gases are dissolved in the ocean?</p>	<ul style="list-style-type: none"> • 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 _____ dissolved 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.
<p>Why is carbon dioxide so important?</p>	<ul style="list-style-type: none"> • _____ 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. <ul style="list-style-type: none"> - 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 _____.

	<p>This process locks up _____ that originated as carbon dioxide in the _____ for long periods of _____.</p>
<p>How much gas can be dissolved in seawater?</p>	<ul style="list-style-type: none"> • _____ 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.
<p>What is the temperature of the ocean?</p>	<ul style="list-style-type: none"> • Ocean is divided into _____ layers based on _____. - _____ layer → _____, varies with depth <ul style="list-style-type: none"> • warm water is _____, stays on top - _____ → temperature _____ with depth - _____ water → _____ all year long, barely above freezing <p>Draw:</p>
<p>How does the ocean affect our climate?</p>	<ul style="list-style-type: none"> • The ocean is an important factor in the global _____ because it _____ and _____ water, _____, and carbon dioxide <ul style="list-style-type: none"> - These components are constantly _____ between the _____ and hydrosphere (water on Earth) <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> - 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. <ul style="list-style-type: none"> - no _____ = no surface _____ = different _____/weather - _____ <ul style="list-style-type: none"> • _____ Ocean: wind normally blows _____ (←), some years it's not as _____ • causes changes in weather around the _____; lasts _____ months
<p>How does wind affect the ocean?</p>	<ul style="list-style-type: none"> • Wind causes waves: <ul style="list-style-type: none"> - 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 _____.

	<ul style="list-style-type: none"> - 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 _____.
<p>What are deep ocean currents?</p>	<ul style="list-style-type: none"> • _____ are caused by differences in _____ (due to temp, _____, etc) <ul style="list-style-type: none"> - _____: water moving from the surface _____ to the bottom <ul style="list-style-type: none"> • carries _____ down • allows animals to live in the _____ ocean - _____: water moving _____ to the surface <ul style="list-style-type: none"> • 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 _____. <p>Draw Upwelling:</p>
<p>What are some effects of waves?</p>	<ul style="list-style-type: none"> • Waves cause _____ near the shore. <ul style="list-style-type: none"> - The _____ of swimmers down the beach is due to a _____ current, which moves water _____ to the shore. <ul style="list-style-type: none"> • Occurs in places where _____ meet the land at an _____ instead of head-on. - The movement of waves and longshore currents can build up _____ in the waters near a shore. <ul style="list-style-type: none"> • Sandbars are long _____ or piles of _____ that can form _____ to the coastline. • _____ may collect behind the sandbars. - _____ currents are _____ streams of water that break through _____ and drain _____ back to sea. <ul style="list-style-type: none"> • Rip currents occur when high _____ or _____ cause a larger-than-usual amount of water to wash back from the _____. • _____ currents can be dangerous for _____ • Rip currents are too strong to swim against, but they are _____. Swimming _____ to the _____ is the best way to escape a rip current.
<p>What are tides?</p>	<ul style="list-style-type: none"> • _____ waters rise and fall each day <ul style="list-style-type: none"> - 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 _____.
<p>What causes tides?</p>	<ul style="list-style-type: none"> • The _____ of the _____ and the _____ causes tides. <ul style="list-style-type: none"> - In response to the moon's _____ pull, Earth's water _____ on the side _____ the moon (_____ high tide). Earth gets pulled toward the moon leaving a _____ of water on the side of Earth facing _____ from the moon (_____ high tide). <p>Draw Direct/Indirect Tides:</p>

What is a tidal range?	<ul style="list-style-type: none"> Some places experience _____ high tides and _____ low tides. The _____ of the land above and _____ the water affects tidal _____. A _____ is the difference in _____ between a high tide and the next low tide.
What are monthly tides?	<ul style="list-style-type: none"> The _____ is the main cause of tides, but the _____ affects tides too. Twice a month—at the _____ moon and the _____ moon—the _____, _____, and _____ line up. The _____ of the sun and the _____ of the moon combine to pull Earth's waters in the _____ direction. The result is an _____ tidal bulge and an _____ tidal dip, called a _____ tide. During _____ and _____ quarter moons, the sun and moon are not _____ up with Earth. The gravity of each pulls from a _____ direction. The result is a _____ tidal bulge and tidal _____, called a _____ tide. During a _____ tide, high and low tides are _____. <p>Draw Spring/Neap Tide: Spring: _____</p> <p>Neap: _____</p>
What is a tidal dam?	<ul style="list-style-type: none"> Tides can be used to generate _____. – A tidal _____ is a dam built near a coast in the path of _____ waters. – How tidal dams work: <ul style="list-style-type: none"> 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.

Complete the crossword:

Across

3. causes waves

4. the difference between high and low tide

6. the ocean distributes _____ and nutrients.

8. Density _____ as salinity increases.

9. most heat is stored in the top _____ meters of the ocean.

10. uses tides to generate electricity

13. a mass of moving ocean water

16. water has a high _____, which lets it store heat.

19. the rising and falling of water at the coast

20. water moving oxygen down to the bottom

Down

1. the amount of dissolved salt contained in water

2. used to make calcium carbonate shells for organisms.

5. when waves move parallel to the shore

7. holds more dissolved gas than warm water.

11. mass/volume

12. the _____ of the moon and sun causes tides

14. tides with little difference between high and low tide

15. when water breaks through a sandbar and drains quickly back to sea

17. extreme tides

18. water moving nutrients up to the surface