**Intro to Oceanography**

Date:

SWBAT: Describe and diagram the features of the continental margins and ocean basins.

Oceanography is the study of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* draws on geology, chemistry, physics and biology

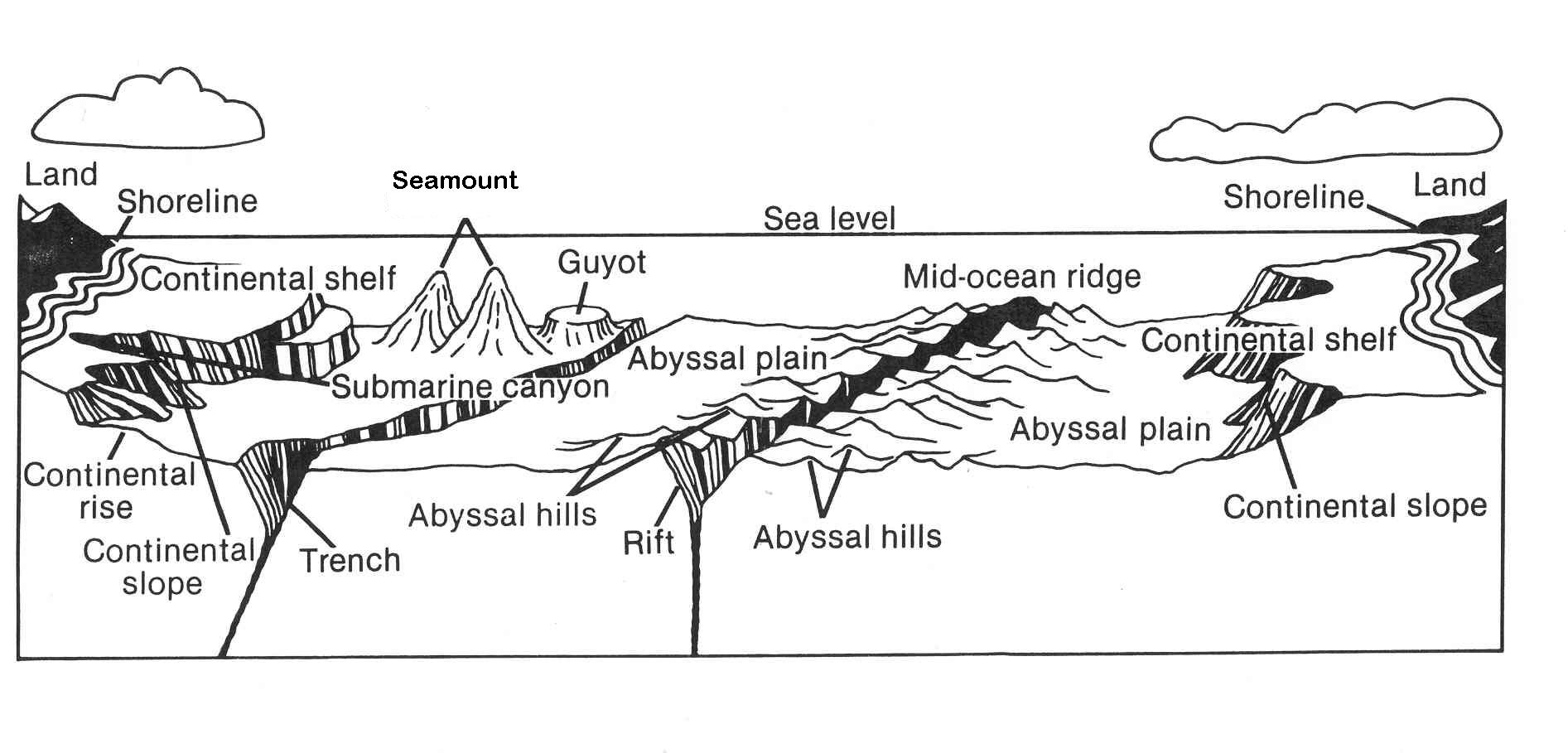
Sonar - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Works by transmitting sound waves toward the bottom of the ocean; sensitive receiver intercepts the echo reflected by the bottom
2. Speed of sound \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. The depths determined from monitoring the echoes

* Use for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The ocean floor is divided into 2 areas:

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| 1. Continental Margin:    1. Shallow parts of ocean made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    2. It is not always obvious; it’s not the shoreline    3. It is the dividing line between \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 1. Ocean Basin    1. Made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   It’s the area beyond the continental rise |



**Ocean Life and Aquaculture**

Date:

SWBAT: Categorize ocean dwellers by movement. Describe how we use the ocean as a food source.

**Classification of Marine Organisms:** Marine organisms can be classified according to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**\_\_**

Marine Ecosystems

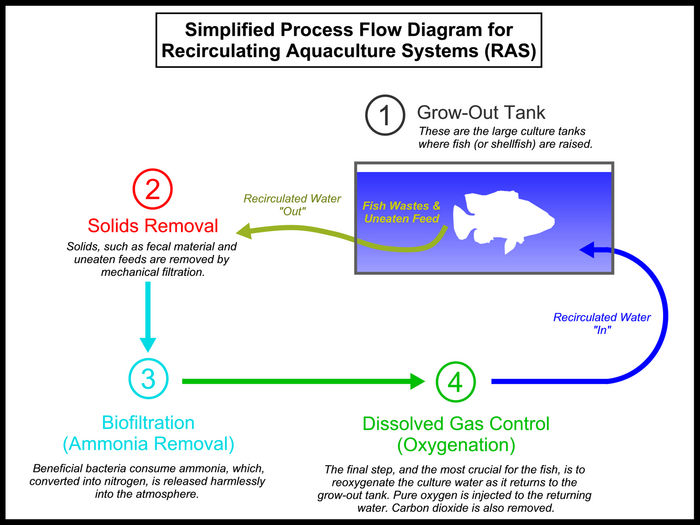
* Some of the most diverse marine ecosystems are:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – freshwater and seawater mix
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – near surface of tropical waters formed by skeletal deposits of coral

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| **Term** | **Description** |
| **Plankton** | All organisms (algae, animals and bacteria) that drift with the ocean currents.   * Phytoplankton are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   + Phytoplankton perform *photosynthesis*. * Zooplankton are free floating, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   + Zooplankton eat phytoplankton. |
| **Benthos** | any form of ocean life that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Nekton** | **nektos = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  Animals capable of moving independently of the ocean currents by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   * + Ex. Adult fish, squid, marine mammals and reptiles |

Food from the Ocean

* **Aquaculture**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + *Catfish, salmon, oysters, and shrimp*

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| **Traditional**  Land-based to ocean-based cultivation   * Fishing * Substantial contributions to food supplies * Destruction of coastal ecosystems | **Sustainable**  Land-based to ocean-based cultivation   * Fishing * Plant-based feeds * Does not negatively affect wildlife * Supports long-term economic and social well-being of local communities |



**Temperature, Salinity and Acidification**

Date:

SWBAT: Describe how the ocean temperature changes with depth; determine how salinity affects density.

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| **Temperature** | | |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the surface of ocean water (H2O)  3 temperature zones of ocean water:   * **Surface zone**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; sea level to 300m;   sunlight only penetrates a few meters, but wind and waves mix heat evenly throughout the surface zone.   * **Thermocline zone**: marked by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;   marks the boundary change between the surface zone and the deep zone  300-800m below sea level.   * **Deep zone**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 800m-ocean floor. | | http://madeiraislands.net/wp-content/uploads/2015/07/thermocline.jpg |
| **Salinity** | | |
| What’s in ocean water?   * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of ocean water is H2O * The other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is dissolved gases and solids such as salts   + (NaCl) Sodium Chloride is the main salt in the ocean | | |
| http://www.fao.org/docrep/r4082e/r4082e42.gifSalinity – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (mainly salts) present in ocean water.   * Average salinity of ocean water is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   + (%o = parts salt per 1000 parts ocean water)   + 50 million billion tons of salt in our seas   + **1,000 g of seawater consists of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of dissolved salts** * **Large amounts of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ salinity.** * Large amounts of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ salinity. | | |
| Each year, Earth's rivers carry more and more salt into the ocean. The water evaporates, but the salt is left behind in the ocean   * The principle source of dissolved salts in the ocean is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | http://www.msnucleus.org/membership/html/k-6/wc/oceans/4/images/wcoc4_2.gif | |
| Ocean Resources   * Desalination - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | |
| **Ocean Acidification** | | |
| Excess carbon dioxide from the atmosphere makes its way to the oceans   * + The oceans are a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * CO2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ acidity of ocean water * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ especially (CaCO3) calcium carbonate organisms   Negative impacts on fisheries   * + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   + Decrease in global shellfish production and disruption of livelihoods | | |

**Currents and Climate**

Date:

SWBAT: Categorize ocean currents by location, temperatures, surface and density.

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| **Term** | **Description** |
| Ocean Currents | Definition:   * Currents can be on the surface of the ocean or in deep water. |
| Surface Currents | Definition:   * The energy that drives surface ocean currents comes from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Gyres | http://columbia.superfame.us/wp-content/uploads/2014/09/Five-major-ocean-gyres1.jpgDefinition:  Why do currents move in a circular pattern?   * Because of the Earth’s rotation, currents are deflected to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   This is called the **Coriolis Effect** |
| Ocean Current Impact on Climate | * Oceans maintain the balance of heat energy by ocean currents cycling between \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   + When currents from low-latitude regions move into higher latitudes, they transfer heat from warmer to cooler areas on Earth * Ocean currents are especially important to coastal regions   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the air temperatures along these coastal regions   An example of this is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Deep (density) Currents | http://www.aoml.noaa.gov/hrd/Landsea/seasonal/fig5.gifDefinition:  **Factors that affect the density of seawater:**   * + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** * Decreasing temperature and increasing salinity cause water to become more dense.   Near Antarctica, surface conditions create the highest density water in the world.   * Evaporation results in increased salinity – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   A simplified model of ocean circulation is called conveyor belt |
| Upwelling | Definition:   * Winds blow the warm surface water away and it is replaced by cold waters (with lots of nutrients!)   + Deep water is very rich in nutrients and is brought to the surface.   What’s the impact of upwelling?   * Upwelling revitalizes the ocean and keeps the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Waves and the Shore**

Date:

SWBAT: Identify features of a wave and of wave erosion and deposition.

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| **Term** | **Description** |
| Waves | * Waves are ocean energy traveling along the boundary between the ocean and the atmosphere. * The power of the waves is most noticeable near the shore. |
| Swell | Definition: |
| Size of a Wave | 1. The **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of the wind. 2. The length of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** the wind blows. 3. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – the distance the wind blows |
| Part of a Wave | http://dtc.pima.edu/blc/183/09_183/wave_parts_answer.jpgCrest:  Trough:  Wave Height: distance between the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Wave Length: Distance between \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (either crest to crest or trough to trough.)   * The average wave length is 2-3 times the wave’s height * Waves break in water that is as deep as one half the wavelength.   Energy in a wave- As a wave moves across the surface of the ocean, only \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ …not the water! |
| Breakers | Definition:   * If the ocean floor is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the wave breaks \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * If the ocean floor is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the wave spills forward with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Longshore Currents | http://www.sepmstrata.org/CMS_Images/IMAGE003.gifDefinition:   * Occurs when waves approach the beach at an angle * They often form long sandbars. |
| Refraction | https://physi.files.wordpress.com/2010/02/1000px-refraction_-_huygens-fresnel_principle-svg.pngDefinition:   * Refraction causes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Undertow | Definition:  Generally a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that moves water and sand from the beach back to the shore. |
| Rip Current | Definition:  A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ current that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the beach carrying sand and water.   * How can a swimmer escape a rip current? Swim \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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| **Wave Erosion and Deposition** | |
| * Waves along the shoreline are constantly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   Many shoreline features can result from this activity. | |
| **Term** | **Description** |
| Wave-Cut Cliffs and Platforms | * Result from the cutting action of the surf \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Sea Arches and Sea Stacks | * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that extend into the sea, and are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on all sides because of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, are eroded in the center * First forming arches and then, when the arch caves in, forming a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Barrier Islands | https://upload.wikimedia.org/wikipedia/commons/thumb/4/48/Accreting_coast_Image6.svg/360px-Accreting_coast_Image6.svg.pngDefinition:   * + They are left over after a rise in sea level over time   + Or leftover sandbars after a drop in sea level |
| Spits | Definition: |
| Bars | Definition: |
| Tombolo | Definition: |
| Shoreline Stabilization | * Groins, breakwaters, seawalls, and beach nourishment are designed to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   + Groins, breakwaters, and seawalls require construction while beach nourishment does not   + Only offer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to shoreline problems. |
| Beach Nourishment | http://www.ecomare.nl/typo3temp/GB/07c0b6a3bf.pngDefinition:   * + Most sand comes from offshore.   + Can be very expensive.   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Tides**

Date:

SWBAT: Describe the moon’s effects on tides, calculate tidal variations, and identify the moon phases.

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| Term | Description | | | |
| Tides | It is caused by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   * The moon takes 24 hours and 50 minutes to orbit the earth. * Thus, tides shift by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | http://www.hagstone.net/tidalmonth.jpg | |
| Tidal Range | Definition: | |
| **Spring Tides** | | **Neap Tides** | | |
| Occurrence:  Produce:  Occurs during the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ phase   * When the Sun, Earth and Moon line up in a straight line, the combined gravity of the Sun and the moon have an effect on the earth’s oceans,   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   * Happen every \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Daily tidal range is at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | Occurrence:  Produce:  Occurs during the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ phase   * When the Sun, Earth and moon are perpendicular to each other, their gravitational pulls \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Daily tidal range is at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | |
| Friction created between the water and the ocean floor slows the rotation of the earth. (Slowed 10.8 minutes since the dinosaurs died) | | | | |
| Diurnal | Definition:  Example: Gulf of Mexico | | | http://www.hurricanescience.org/images/hss/tide7abc.jpg |
| Semidiurnal | Definition:  Example: East Coast | | |
| Flood Tide | Definition: | | | |
| Ebb Tide | Definition: | | | |
| Slack Water | Definition: | | | |
| Tidal Bore | Definition: | | | |