

Bell Ringer

1. What are the five components of the water cycle?
2. Are clouds composed of liquid water or gaseous water (water vapor)? How do you know?
3. How are glaciers formed?

Salt Water - Oceans

Characteristics

Features

Life Forms



The World's Oceans

- 71% of the Earth's surface is covered by water.
- The oceans contain 97% of the earth's water.
- All the oceans and seas are actually one continuous body of water.
- Oceanographers are scientists who study the ocean and its processes.



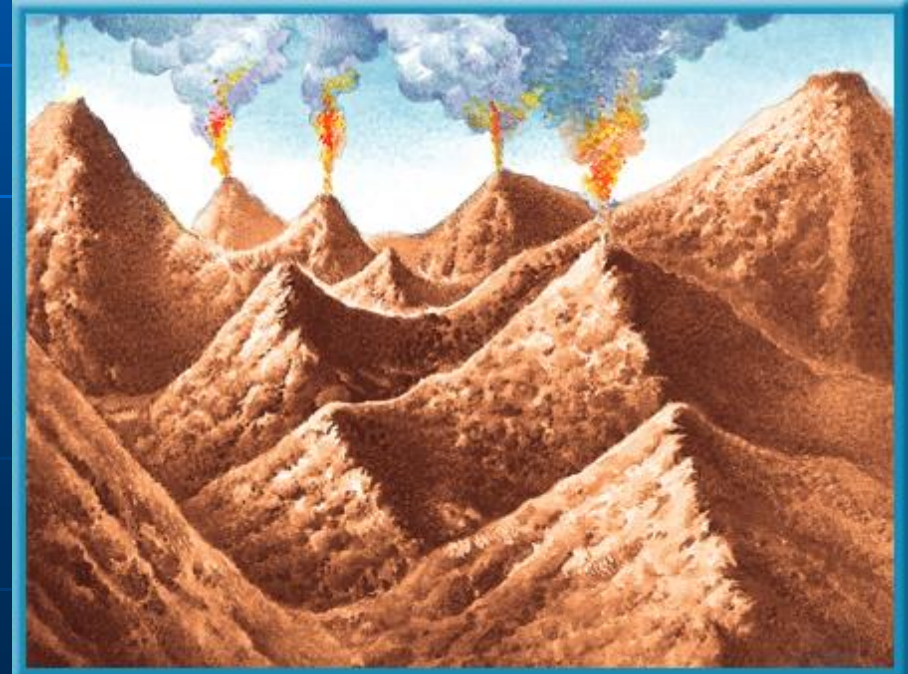
Importance of Oceans

- Oceans affect all living things— even those far from the shore.
How?
- Oceans provide a place for many organisms to live.



How were the oceans formed?

- **When Earth was still a young planet, many active volcanoes existed. As they erupted, lava, ash, and gases were released from deep within the Earth.**
- **One of these gases was **water vapor.****



Formation of Oceans

- Over millions of years, the **water vapor** cooled enough to condense and form clouds. Then torrential rains began to fall from the clouds.
 - Eventually, much of the land was covered by water that formed



Oceans

- The oceans are the Atlantic, Pacific, Indian, and Arctic.
- The Pacific Ocean is the largest ocean.
- The area and volume of the Pacific Ocean are greater than the Atlantic and Indian combined.



Seas

A sea is one of the largest bodies of salt water, less than an ocean, found on the earth's surface.



The Mediterranean, Arctic and Black Sea are really part of the Atlantic Ocean.



Properties of Ocean Water

- Ocean water is a mixture of gases and solids dissolved in pure water.
- Oceanographers believe oceans contain all the natural elements on Earth.
- 85 of 90 have been found in the ocean.

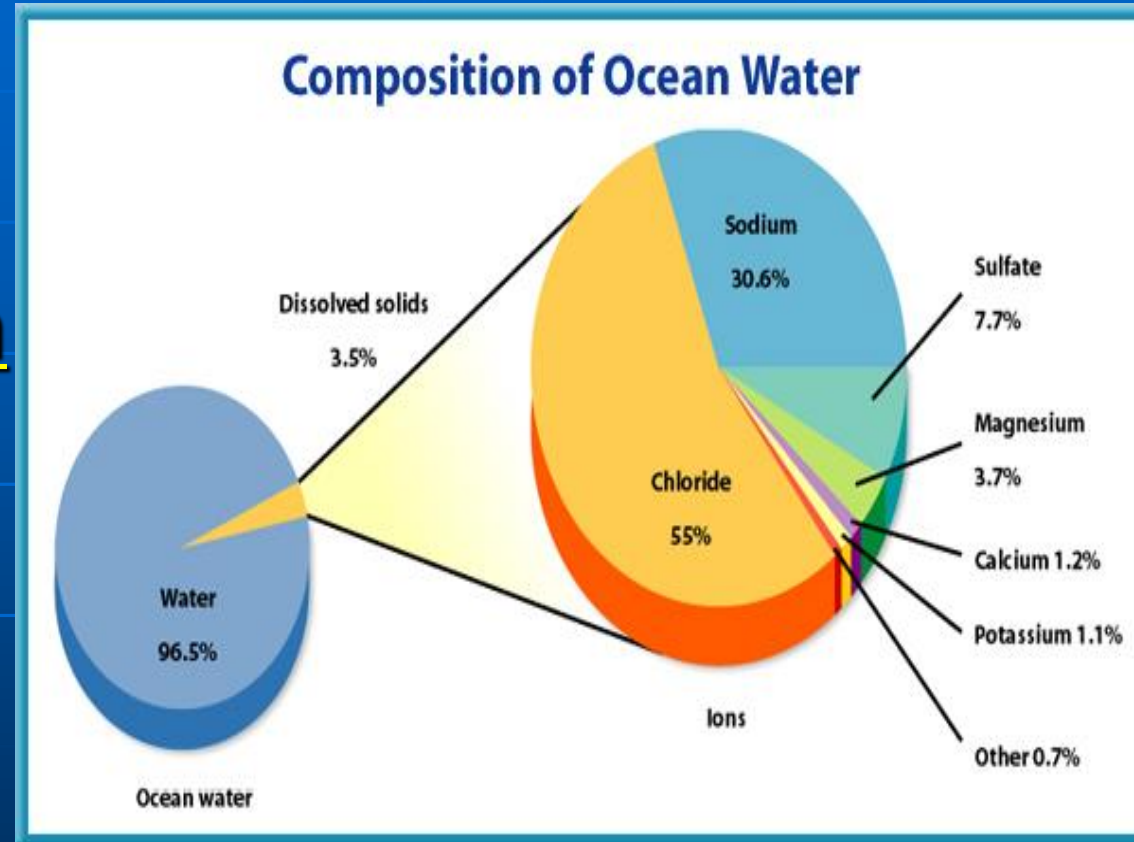
Major Elements in the Ocean

- Ocean water is 96% pure water.
- Chlorine (1.9) and sodium (1.1) make up the next largest concentration of elements.
- Sodium chloride is table salt.



Salinity

- Salinity describes the amount of dissolved salt in the ocean.
- Salinity is expressed in parts per thousand.



Gases in Ocean Water

- The most abundant gases in ocean water are nitrogen, carbon dioxide and oxygen.
- The amounts of these elements vary with depth. They are more abundant at the ocean's surface. Why?

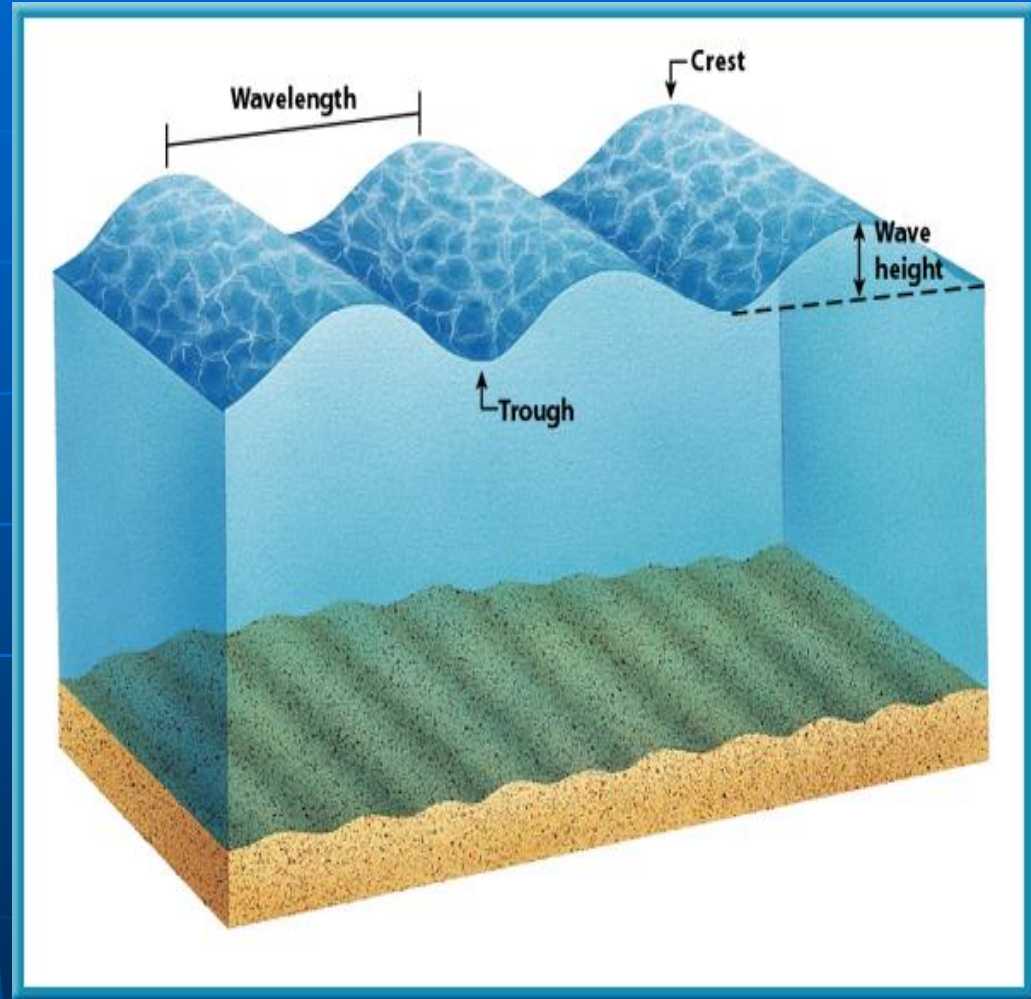


Temperature of Ocean Water

- When ocean water is cold, like in polar regions, it sinks and carries oxygen rich water to the ocean depths.
- As a result, fish and other animals can live in deep parts of the ocean.
- <https://www.youtube.com/watch?v=GxDEwVwW9to>

Waves

- A **wave** in water is a rhythmic movement that carries energy through the water.
- Waves are caused by high winds blowing on top of the water.

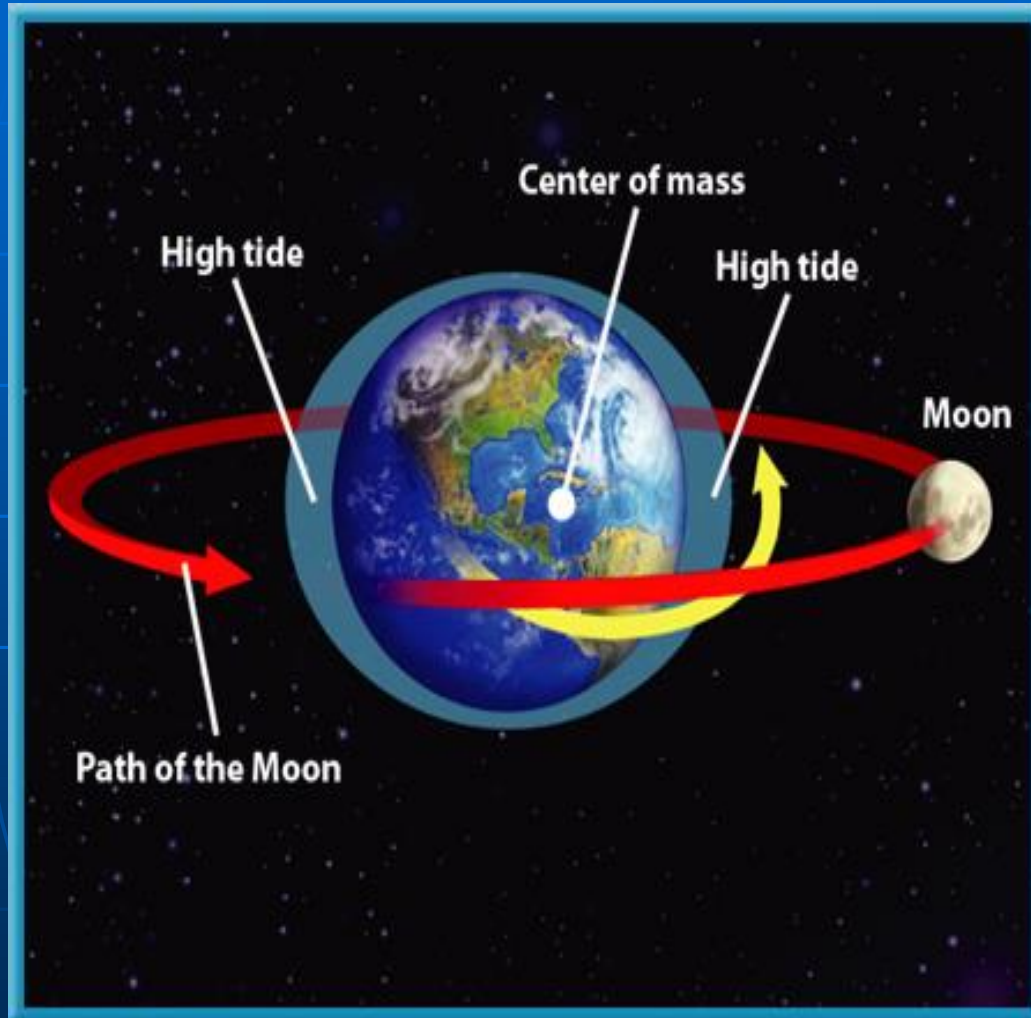


Tides

- Throughout a day, the water level at the ocean's edge changes. This rise and fall in sea level is called a **tide.**
- Tides are created by the gravitational attraction of Earth and the Moon and of Earth and the Sun.

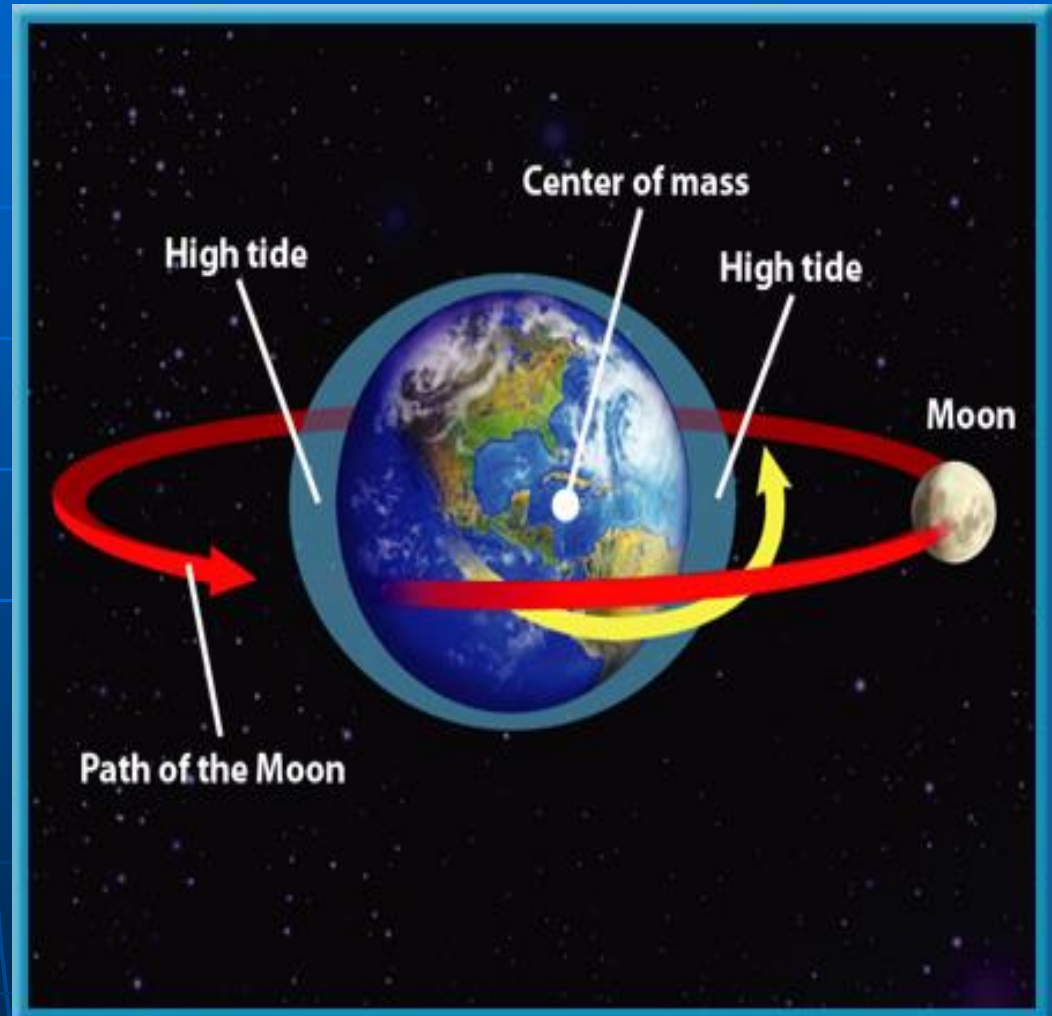
<https://www.youtube.com/watch?v=KIWpFLfLFBI>

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Tides

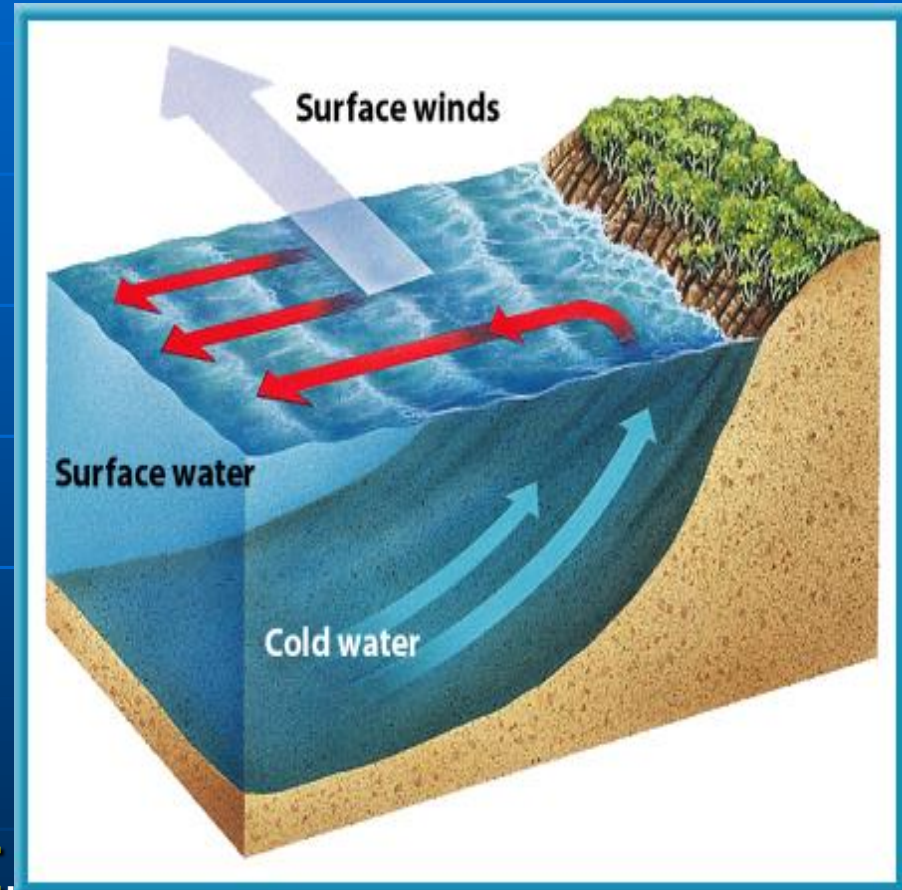


Movement of Water

- Upwelling is the upward movement of cold water from the ocean depths.

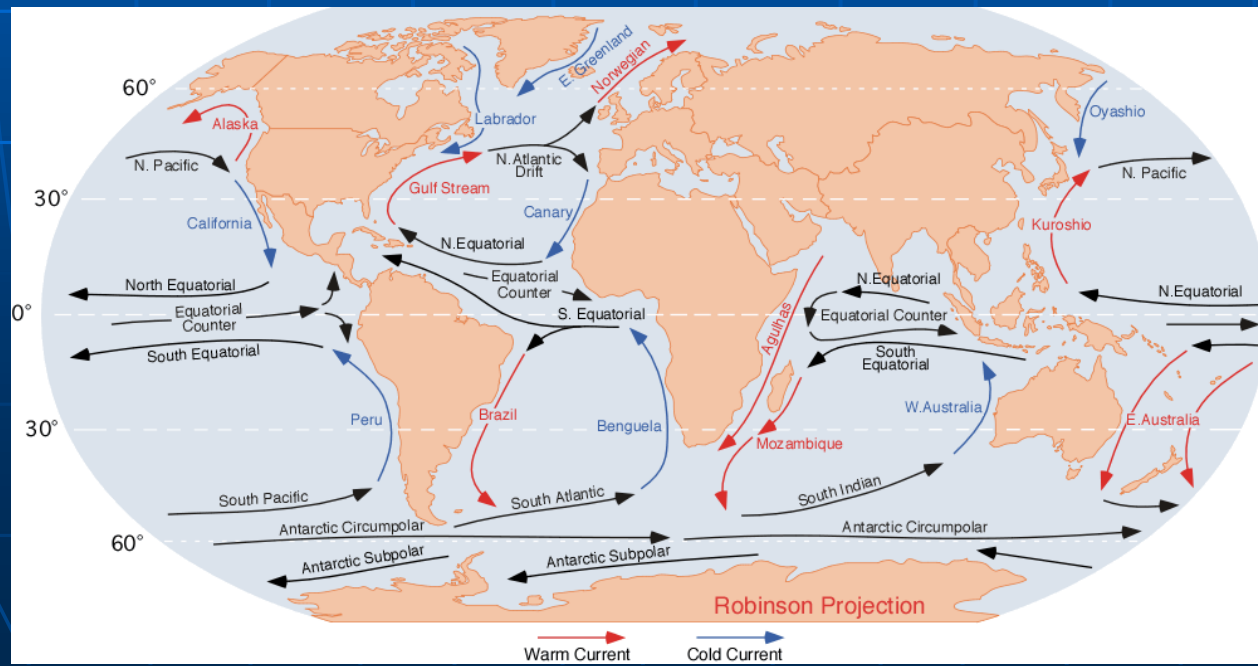
Upwelling

Upwelling brings up tiny ocean organisms, minerals, and other nutrients from the deeper layers of the water; without upwelling the surface of the ocean would be nutrient deficient.



Movement of Water - Currents

- Where is water heated the most?
- Where do you think water usually loses its heat?
- The ocean as a whole is dominated by large scale movements called currents

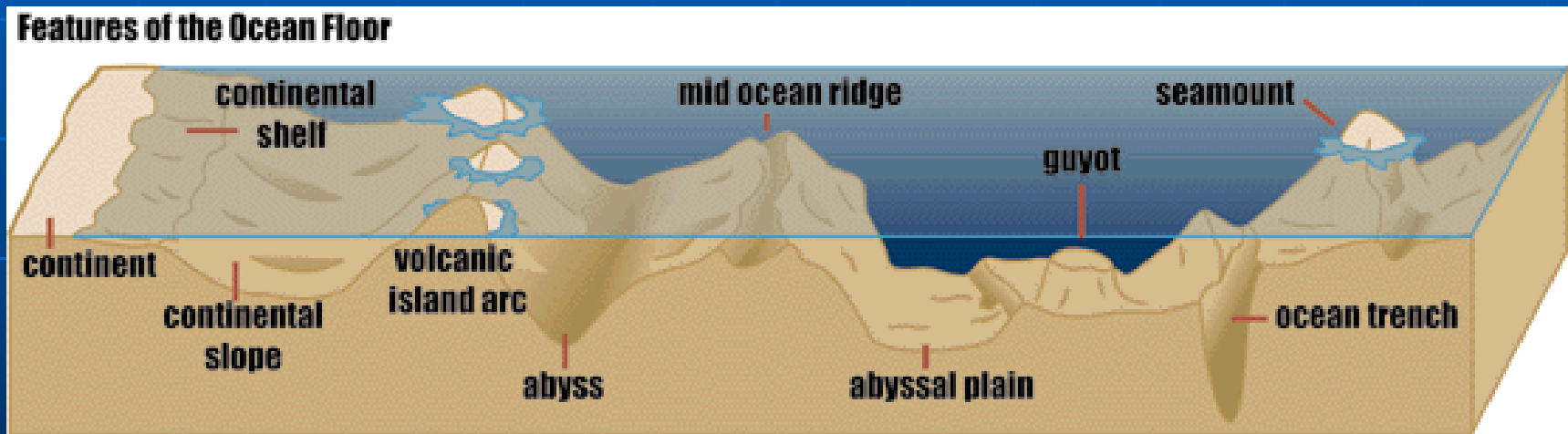


Ocean Currents Lab

- <https://earth.nullschool.net/#current/ocean/surface/currents/orthographic=-125.89,33.31,554/loc=-111.555,25.515>

The Ocean Floor

- The ocean floor has higher mountains, deeper canyons, and larger flatter plains.



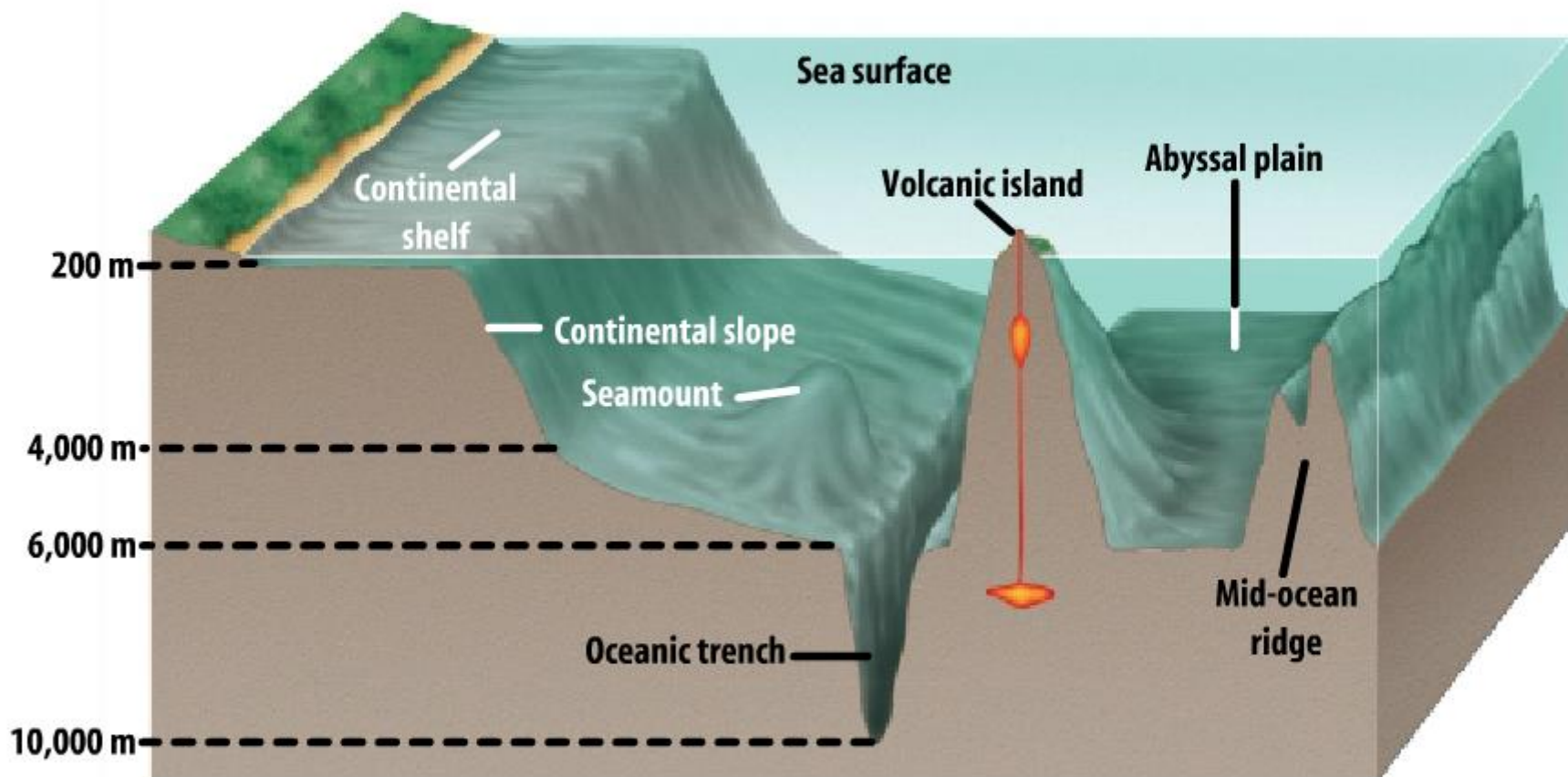
Continental Shelf

- The **continental shelf** is the gradually sloping end of a continent that extends under the ocean.
- Large mineral, oil and natural gas deposits are found here.
- https://www.youtube.com/watch?v=7MT7L7g_hpA
- Pros? Cons?

Continental Slope

- At the edge of the continental shelf, the ocean floor plunges steeply 4 to 5 kilometers.
- The **continental slope** extends from the outer edge of the continental shelf down to the ocean floor.

Ocean Basin Features



Abyssal Plains

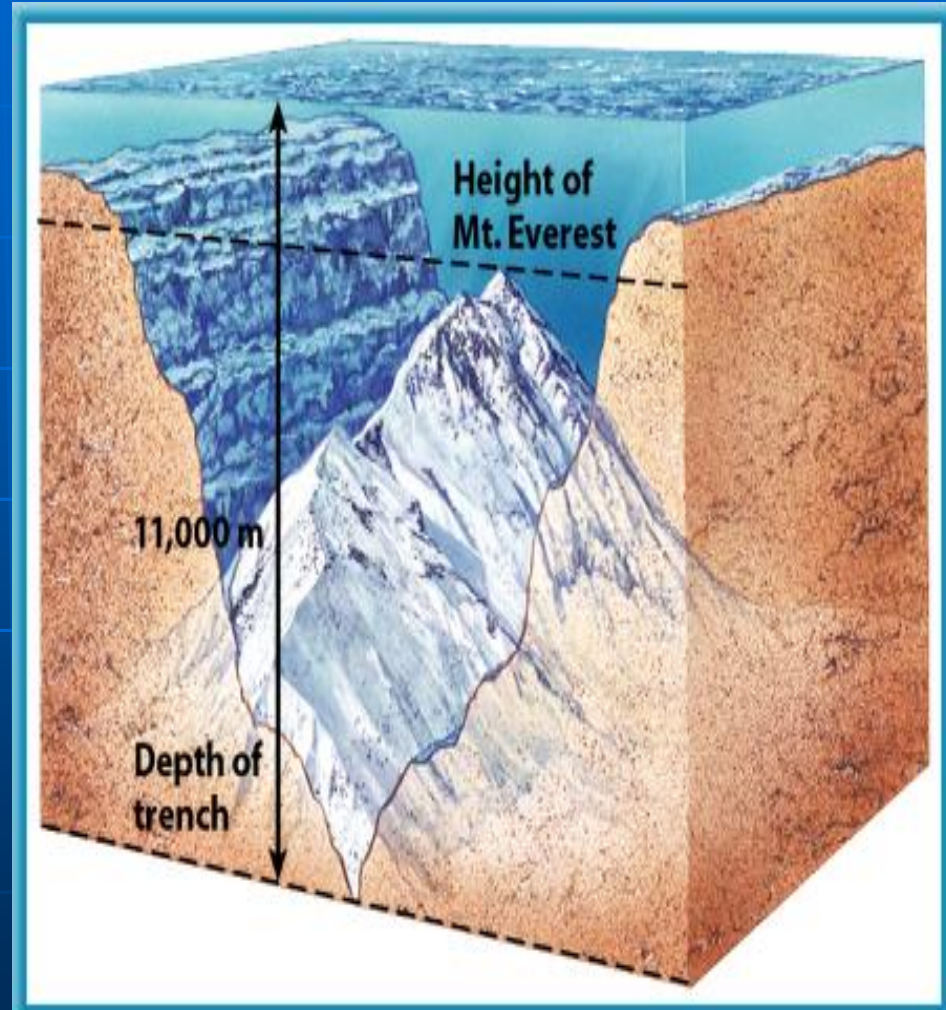
- Large, flat areas on the ocean floor are called abyssal plains.
- The abyssal plains are larger in the Atlantic and Indian than in the Pacific due to the deposition of sediments by large rivers.
- The Pacific Ocean has large cracks that trap sediments and result in smaller abyssal plains.

Abyssal Plains

- Abyssal plains are close to the continent and are made of mud, sand and silt.
- Farther out on the abyssal plains, some of them contain the remains of tiny organisms that form ooze.
- Where ocean life is not abundant, the floor of the ocean is covered with red clay.

Trenches

- Trenches are the deepest parts of the ocean found along the edge of the ocean floor.
- The Mariana Trench in the Pacific Ocean contains the deepest spot (1100 meters) on Earth known as Challenger Deep.
- How are trenches formed?



Mid-ocean Ridges

- A **mid-ocean ridge** is the area in an ocean basin where new ocean floor is formed.
- The mid-ocean ridges form an almost continuous mountain belt that extends from the Arctic Ocean down through the middle of the Atlantic Ocean around Africa into the Indian Ocean and across the Pacific Ocean.
- In the Atlantic it is called the mid-Atlantic Ridge and in the Pacific, the Pacific-Antarctica Ridge.

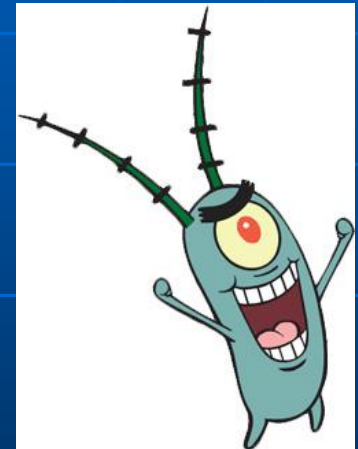
Major Groups of Ocean Life

- Plants and animals in the ocean are classified into three major groups based on their habits and the depth of the water in which they live.
- The three major groups are plankton, nekton and benthos.



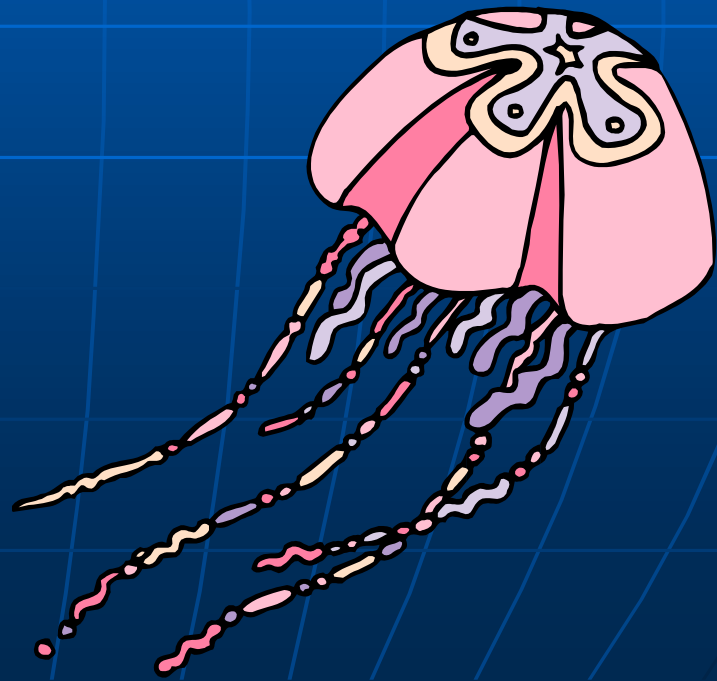
Plankton

- Plankton float at or near the surface where sunlight can penetrate.
- Most of the plankton are very small, such as algae.
- These organisms drift with the currents or tides.
- Plankton are the main food for many larger organisms. They account for most of the organisms in the ocean.



Plankton

- Jellyfish, which float on the ocean surface, is one example of plankton.



Nekton



- Whales, seals, dolphins, squid octopuses, barracuda and other fish are all nekton.
- Nekton are free-swimming organisms that feed on other nekton as well as on plankton.
- Many have adaptations enabling them to function at depths that have great pressure and no light.



Nekton or Plankton?

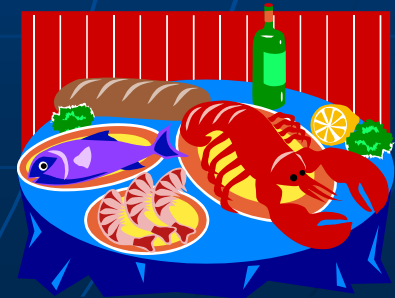
- This beautifully colored fish is classified as:
- Nekton





Benthos

- Organisms that live on the ocean floor are benthos.
- Crabs, and lobster are just a few examples of benthos.
- The deep bottom environments are sparsely populated with benthos.
- Some benthos are plants that live on the ocean floor in shallow waters where sun can penetrate.



Benthos

- A starfish is an example of benthos.

