You are responsible for knowing about 6 particular and unique aquatic biomes. These biomes are:

<table>
<thead>
<tr>
<th>Abyssal Zone</th>
<th>Bathyal Zone</th>
<th>Coral Reefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estuary</td>
<td>Euphotic Zone</td>
<td>Intertidal Zone</td>
</tr>
</tbody>
</table>

**Part One: Key Vocabulary Associated with Biome Discussions**

Match these words from marine biomes up with their definition:

- Pelagic: A. Found on the bottom of a body of water
- Benthic: B. Mixture of salty and fresh water
- Zooxanthallae: C. The region of the ocean that is deep, offshore, and relating to open seas
- Brackish: D. Mutualistic algae that is linked with coral that gives coral food and some color

**Part Two: Match the biome to the descriptions given on the defining features of them.**

**BIOME #1 - What Biome is This?:**

- Transitional zone between land and the ocean
- Water from ocean influxes in & out of every 6 hours. The area will be inundated during high water times and dry with small pools & sea spray during low water influx periods.
- Has rocky substrates & surroundings, bust some zones that have soft bottoms/substrates
- High levels of sun exposure due to shallow nature of water inundated areas
- Fairly high biodiversity of species due to many groups of organisms adapted to different levels of water inundation.

**Make some predictions about this biome:**

- Is salinity in this biome likely: **HIGH** or **LOW** or **VARIABLE**
- Organisms have to adapt to: **CONSTANT TEMPS** or **VARIED TEMPS**
  - Why did you say this?:

**BIOME #2 - What Biome is This?:**

- Biome consisting of keystone species animal that forms a calcium carbonate shell.
- The animal forms the shell & feeds on small food bits by extending out of shell to get food
- Incredibly high biodiversity found here.
- High productivity of biomass due to location in mostly shallow seas, high exposure to sunlight, and high density of producers

**Make some predictions about this biome:**

- Is salinity in this biome likely: **HIGH** (marine) or **LOW** (freshwater) or **VARIABLE**
- Organisms have to adapt to: **CONSTANT TEMPS** or **VARIED TEMPS**
BIOME #3 - What Biome is This?: _________________________________________________

- Transitional biome where a freshwater system empties into or combines with a salt water system (river empties into a sea or ocean)
- High biodiversity due to the mixing of different water types, and thus the combination of two different communities of organisms.
- High exposure to sun lets producers be highly productive to create a large food chain base
- Water volume in the biome changes regularly as tides come in and out as well as river output changes as the flow of the river changes throughout the year.

Make some predictions about this biome:
  o Is salinity in this biome likely: HIGH (marine) or LOW (freshwater) or VARIABLE
  o Organisms have to adapt to: CONSTANT TEMPS or VARIED TEMPS

BIOME #4 - What Biome is This?: _________________________________________________

- Pelagic biome that receives large amounts of sunlight
- Deep water with slightly colder water temperatures compared to transitional aquatic biomes due to depth of water
- Little to no substrate for organisms to attach to
- High biodiversity for pelagic zone due to high sunlight, leading to high production from producers to create a large base for the food chain.

Make some predictions about this biome:
  o Is salinity in this biome likely: HIGH (marine) or LOW (freshwater) or VARIABLE
  o Organisms have to adapt to: CONSTANT TEMPS or VARIED TEMPS

BIOME #5 - What Biome is This?: _________________________________________________

- Pelagic biome that receives little to no sunlight
- Lack of any substrate in this biome for organisms to affix themselves to
- Lack of producers to create a strong base to the food chain
- Low biodiversity of organisms in this level
- Cold water due to lack of sunlight in the deep water of this biome

Make some predictions about this biome:
  o Is salinity in this biome likely: HIGH (marine) or LOW (freshwater) or VARIABLE
  o Organisms have to adapt to: CONSTANT TEMPS or VARIED TEMPS

BIOME #6 - What Biome is This?: _________________________________________________

- Pelagic biome that receives no sunlight
- Bottom of the biome is the ocean floor where organisms to attach to and move along
- Nutrients from upper levels of other aquatic biomes fall to this level
- Producers do not use sunlight (algae). They are bacteria that turn poisonous gases from underwater vents into their own tissue.
- Low biodiversity of organisms in this level
- Cold water due to lack of sunlight in the deep water of this biome

Make some predictions about this biome:
  o Is salinity in this biome likely: HIGH (marine) or LOW (freshwater) or VARIABLE
  o Organisms have to adapt to: CONSTANT TEMPS or VARIED TEMPS
Part Three: Pick which biome would fit with the list of adaptations needed by organisms to live there

What biome is this?: ___________________________________________________________

- Adaptations Organisms Need To Thrive Here:
  - Ability to tolerate varying salinity conditions
  - Ability to tolerate changing water volumes
  - Ability to tolerate different levels of sediment (washing in from rivers or being churned up during tides)
  - Ability to grip onto substrates or burrow into sediment to avoid predators or major fluctuations in the environment

What biome is this?: ___________________________________________________________

- Adaptations Organisms Need To Thrive Here:
  - Ability to float in the water column without attaching onto anything for a grip
  - Ability to detect prey in low to no levels of light
  - Production of bioluminescence (light production for low light level environments)
  - Tolerate lower water temperatures
  - Ability to gather nutrients floating in the water column

What biome is this?: ___________________________________________________________

- Adaptations Organisms Need To Thrive Here:
  - Ability to cling to rocks or surroundings with incoming and outflowing water
  - Ability to survive for multiple hours outside of water and ability to survive multiple hours in inundated areas
  - Ability to move out of the area temporarily with incoming water to environment
  - Ability to tolerate changing water temperatures
  - Ability to tolerate changing salinity levels

What biome is this?: ___________________________________________________________

- Adaptations Organisms Need To Thrive Here:
  - Ability to detect prey in low to no levels of light
  - Production of bioluminescence (light production for light level environments)
  - Tolerate lower water temperatures
  - Ability to collect detritus and nutrient flakes from water column and ocean floor
  - Scavenging adaptations to take advantage of carcasses on ocean floor
  - Ability to withstand high water pressures

What biome is this?: ___________________________________________________________

- Adaptations Organisms Need To Thrive Here:
  - Ability to form symbiotic relationships with other organisms for one’s benefit
  - Prey species with the ability to hide in crevices in the environment’s structure
  - Large ability to camouflage amongst the surrounding environment
  - Specialization in eating different food sources due to high biodiversity of the environment (resource partitioning)
What biome is this?: _______________________________________________________

- Adaptations Organisms Need To Thrive Here:
  - Ability to float or swim in the water column
  - Ability to filter feed and gather large amount of algae and aquatic producers
  - Ability of predators to swim fast and chase prey in open waters for ambush
  - Ability for prey species to gather together in groups for protection from predators in open ocean
  - Ability to swim easily to find pockets of nutrients and producers in the ocean for consumption

LAST, but not least:

- Which biome(s) relate to each term?:
  - Pelagic
  - Benthic:
  - Zooxanthallae:
  - Brackish:

____________________________________________________________

OVERFISHING AND AQUATIC BIODIVERSITY INFORMATION

Go to this website:  http://www.seafoodwatch.org/ocean-issues/wild-seafood

This is a website from the Monterrey Aquarium (a very famous and well respected aquarium located in California). It addresses issues surrounding seafood catch and consumption in the U.S. and the world.

- You are on the Wild Seafood homepage. Click on the tab saying “Overfishing”. Read the page about overfishing and answer the following questions:
  - What size of fish are the first to be lost to overfishing?: ______________________
    What are two reasons that these types of fish disappear first?:

  - What happens when fishing down the food web occurs? Why does it occur?
- Go to the top of the page and now select the tab that says “Bycatch”. Read the information on the page and answer these questions:
  o What is bycatch?

  o Which fishery industry is the worst with bycatch? What is the statistic given for that industry?

  o Name 2 forms of fishing that get lots of bycatch.

  o What is one form of fishing that does NOT get a lot of bycatch? Why?

  o Name a group of fish that are particularly threatened due to bycatch: ____________
  o List three other species of non-fish that also get caught up as bycatch:

PART TWO: Fishing Techniques
Now go to the top of the page and hover your mouse over the choice labeled “Ocean Issues” on the top bar of the page. From the list that drops down, select “Fishing & Farming Methods”.

Match each fishing technique with the picture and give a short description of how it catches fish in your own words.

The fishing techniques you need to match to the appropriate pictures are:
  Purse Seine, Longline, Harpoon, Trawl/Dredge, Gill Netting, Trolling, Traps and Pots

Which is this a picture of:

- [Image 1]
- [Image 2]
- [Image 3]
- [Image 4]
- [Image 5]
- [Image 6]
DESCRIPTIONS OF METHODS

- **Purse Seine** -
  
  Rating of Bycatch: Low / Medium / High

- **Longline** -
  
  Rating of Bycatch: Low / Medium / High

- **Harpoon** -
  
  Rating of Bycatch: Low / Medium / High

- **Trawl/Dredge** -
  
  Rating of Bycatch: Low / Medium / High

- **Gillnetting** -
  
  Rating of Bycatch: Low / Medium / High

- **Troll** -
  
  Rating of Bycatch: Low / Medium / High

- **Traps and Pots** -

  Rating of Bycatch: Low / Medium / High

Some of these techniques are destructive as well because they also rip up the abiotic ocean environment (mainly rip up the ocean floor). Name the technique above that is the most likely to do this: _________________________________