

OCEAN ZONES

- How are the intertidal, neritic, and oceanic zones different?
- How deep does sunlight travel into the ocean and how does that affect plants and animals?
- What technology is used to explore the ocean?
- What are hydrothermal vents and why are they important?

OCEAN ZONES

There are lots of names for the ocean zones. The ones you need to be familiar with are

- Intertidal zone
- Neritic Zone
- Oceanic Zone
- Euphotic Zone
- Aphotic Zone

INTERTIDAL ZONE

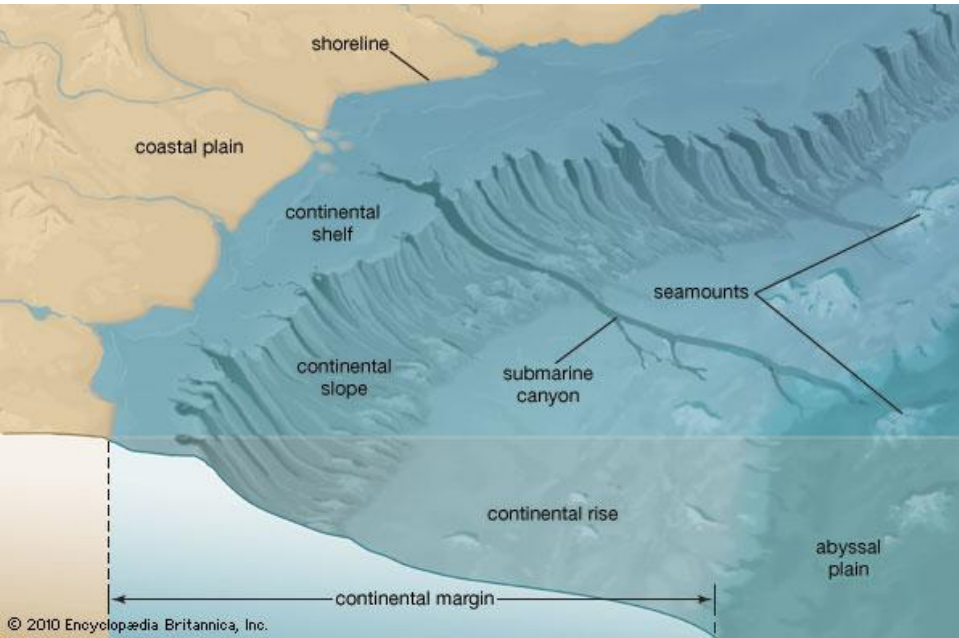


The intertidal zone is the area between high tide and low tide. Think tide pools

Creatures that live here

- Crabs
- Starfish
- Sea Urchins
- Anemones
- Clams
- Oysters
- Octopuses
- Some Fish
- Some Zooplankton

NERITIC ZONE



The neritic zone is the area on top of the continental shelf.

It is between the intertidal and oceanic zones.

Ecosystems

- Coral Reefs
- Kelp Forests
- Seagrass Meadows

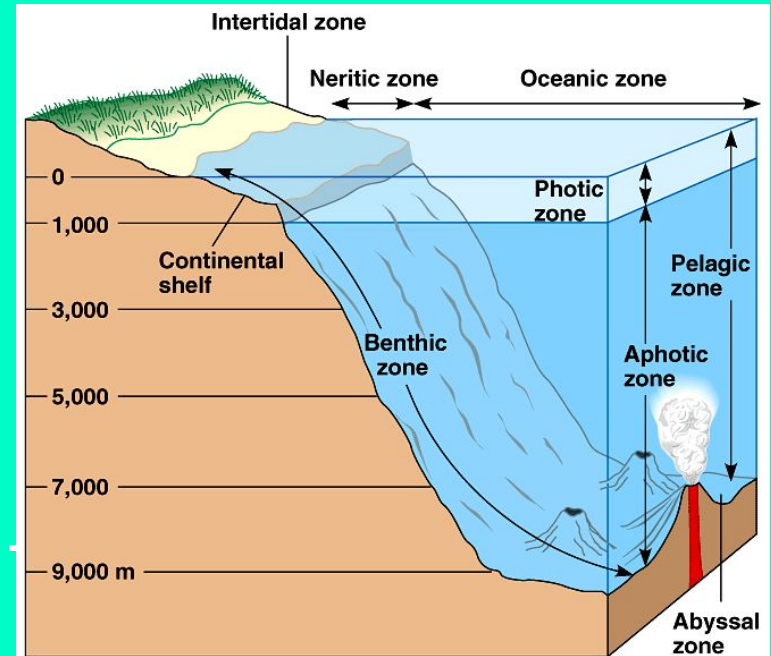




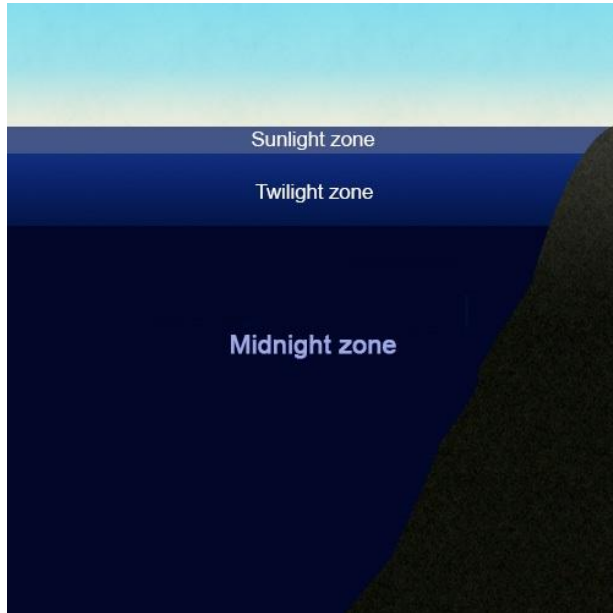
OCEANIC ZONE



Past the continental shelf is the open ocean. Most of the ocean is open ocean.



EUPHOTIC ZONE

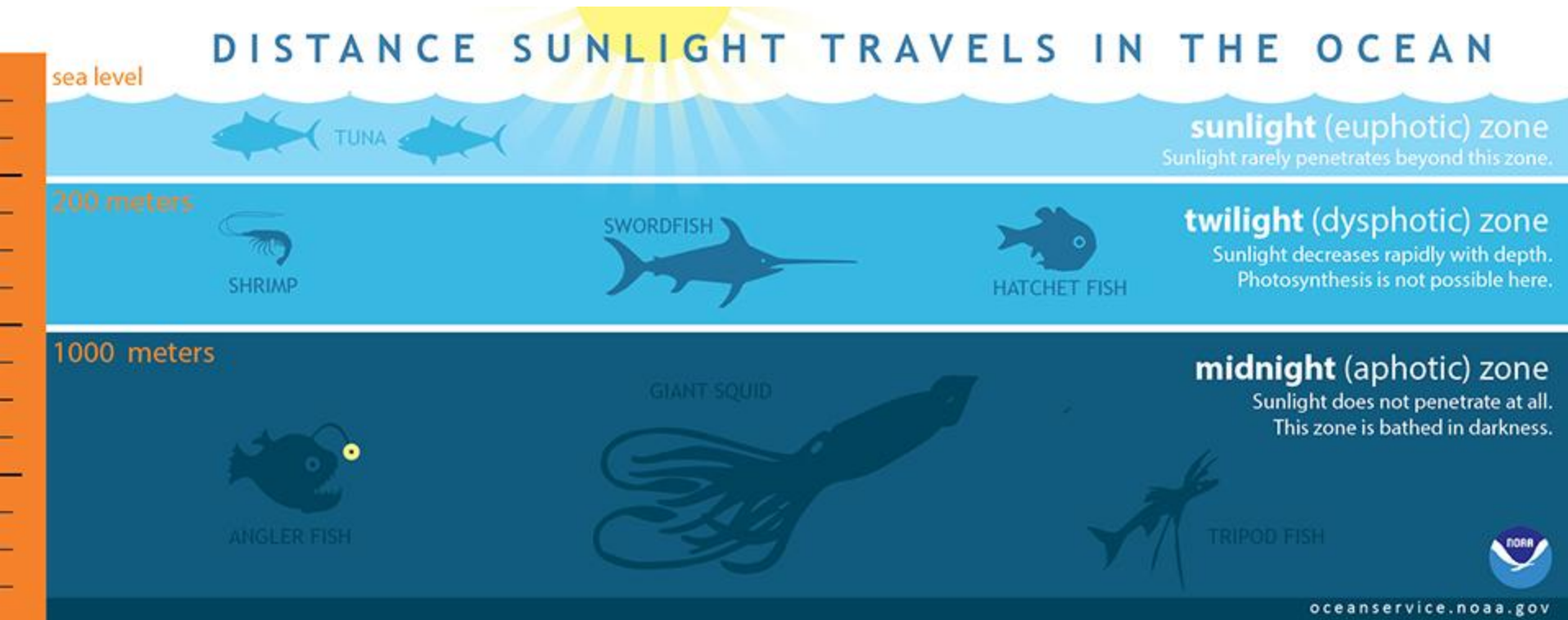


The Euphotic zone is the top 200 meters of the ocean.

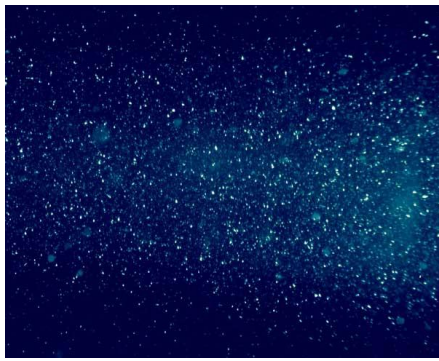
This zone contains all of the oceans plants and most of the oceans animals.



Plants only grow in the top 200m of water



All food for the deep zones drifts down from the euphotic zone

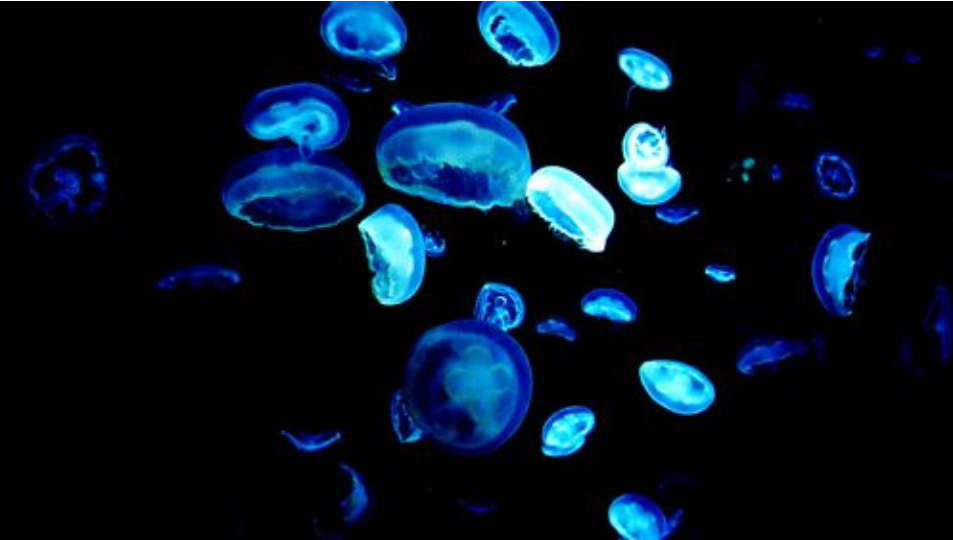


APHOTIC ZONE

Past 200 meters down the sunlight does not penetrate far enough for plants. The only light here is from creatures with bioluminescence.

Life here collects its energy from what drifts down like...

- Dead whales and fish
- Detritus



FIRST PERSON TO SAY DUMBO OCTOPUS GETS A CANDY

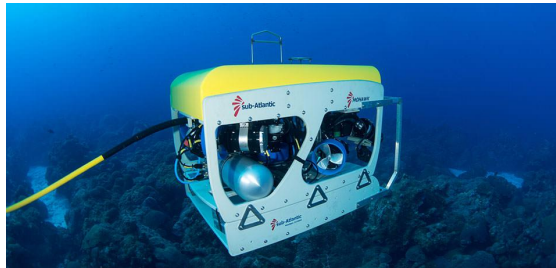


OCEAN EXPLORATION TECHNOLOGY

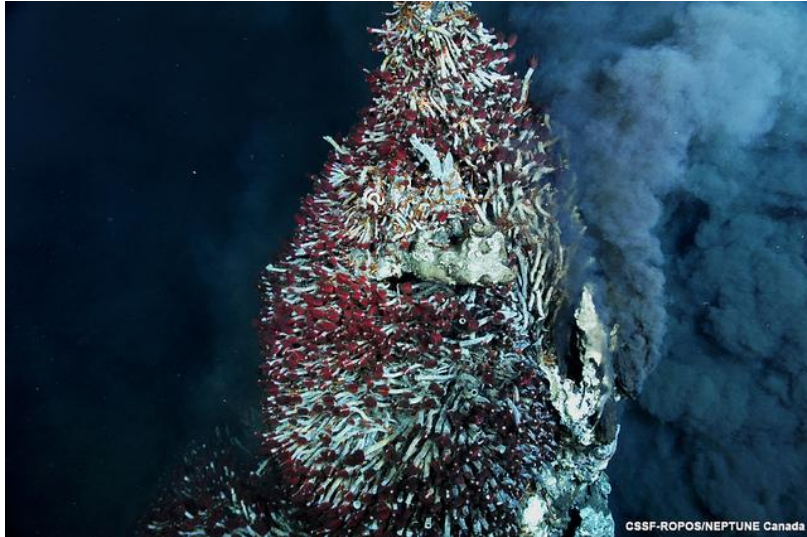
Sonar uses sound waves to measure the depth of the water.

Submarines allow for a small number of people to travel underwater. They have traveled to the deepest parts of the ocean.

ROV are the most common method of exploring the deep ocean. They are piloted from the surface.



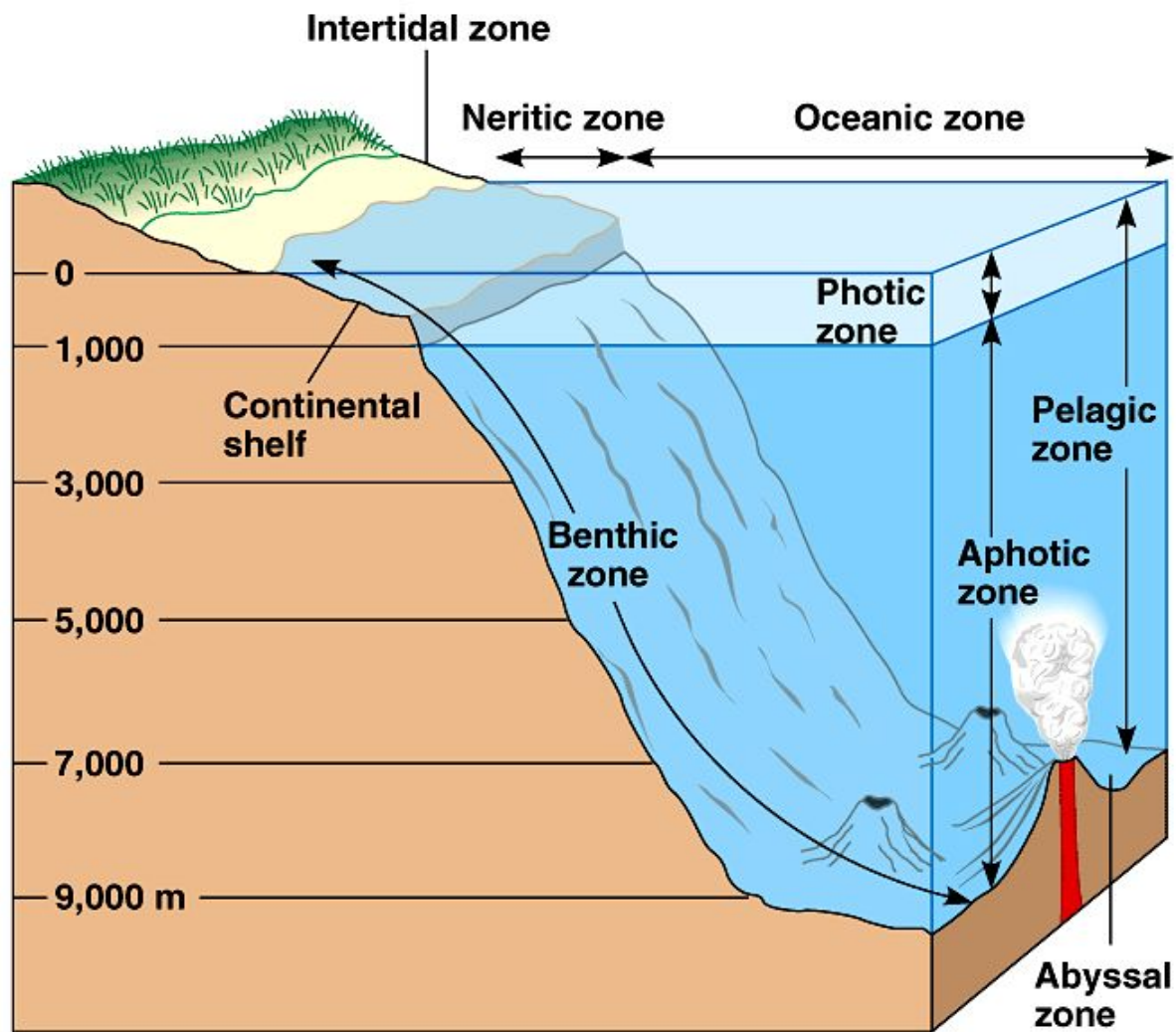
HYDROTHERMAL VENTS



Hydrothermal vents are places underwater where hot water and chemicals are released into the ocean.

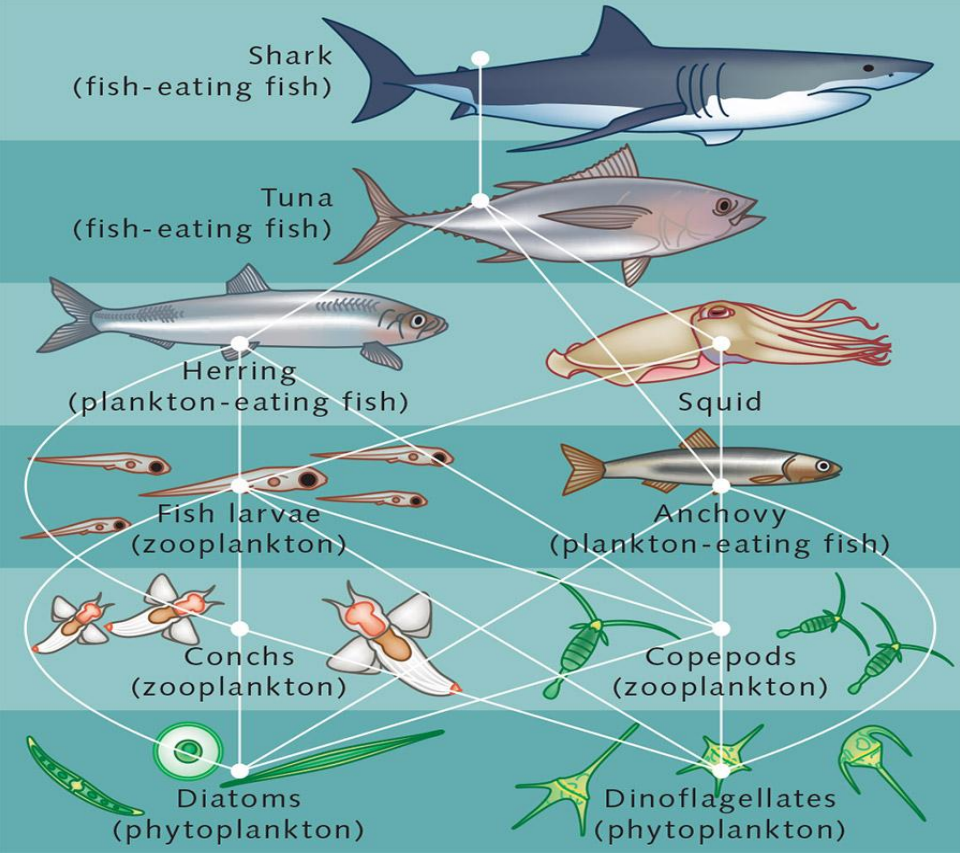
Chemosynthetic bacteria turn the chemicals into energy. A whole ecosystem is built on these bacteria. Bacteria - shrimp - fish - squid - whales.

This unique ecosystem isn't powered by the sun.



OCEAN ECOSYSTEMS

- What is the source of energy for ocean ecosystems?
- How are the oceans involved in oxygen production and carbon capture?
- What are the major threats to ocean ecosystems?



Plants photosynthesize sunlight and turn it into chemical energy

The ocean is a complex food web made of thousands of food chains.

The sun is the source of energy for nearly all ocean foodchains.

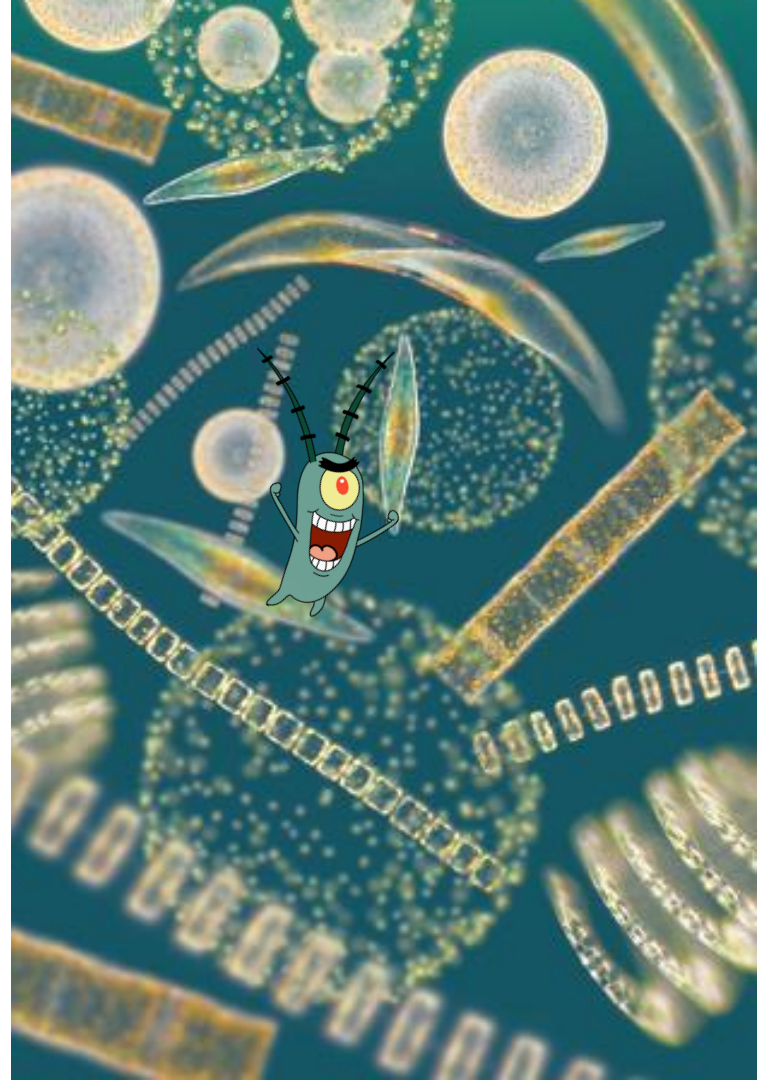
Some ocean food webs include land animals. For example seals eat fish and polar bears eat seals.

PHYTOPLANKTON

Ocean plants include sea grass, kelp, corals, and most importantly phytoplankton.

The most abundant ocean plants are phytoplankton. Phytoplankton are any microscopic floating plants like algae.

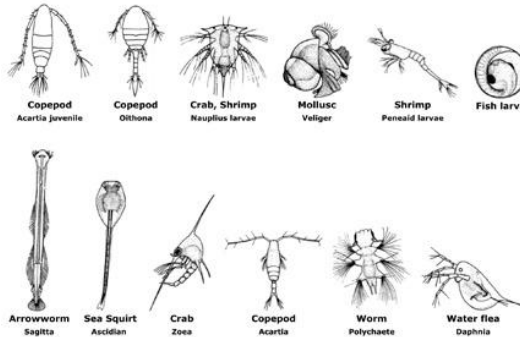
Phytoplankton absorb energy from the sun and nutrients from the water to make their own food.



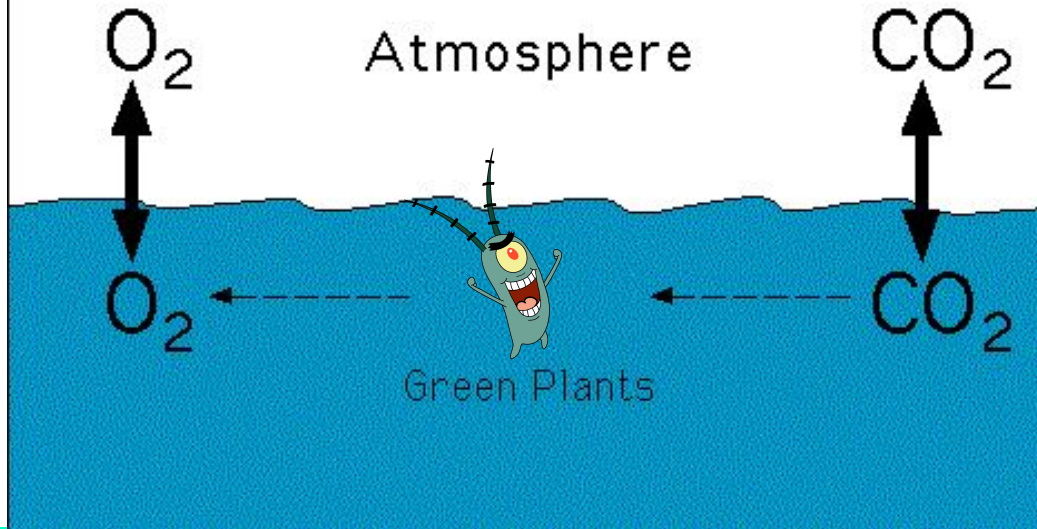
ZOOPLANKTON

Phytoplankton are tiny plants that are consumed by tiny animals called zooplankton.

Zooplankton are an extremely important part of ocean foodwebs. Zooplankton support massive populations of whales, fish, penguins, and many other creatures. Krill are one of the most successful species of zooplankton.



Gas Exchange



Phytoplankton and other ocean plants create oxygen during photosynthesis. Those plants remove massive amounts of CO_2 from the atmosphere. 50%–70% of the oxygen we breath comes from the ocean

CLIMATE AND CURRENTS AND RESOURCES

- How does the ocean regulate the climate of the planet?
- What are currents? What causes currents? Why are they important?
- What is upwelling and why is it important?
- What are some of the resources provided by the ocean?
What are some concerns about using those resources?

CLIMATE

Water regulates the temperature of the planet because

- **it keeps warm areas cool and cold areas warm.**
- **aquatic plants and phytoplankton remove CO₂ from the air during photosynthesis. CO₂ is a greenhouse gas that warms atmosphere when hit by sunlight.**
 - **The ocean is a massive carbon sink. Carbon is sequestered (captured).**
- **weather patterns are determined by and begin in the ocean**

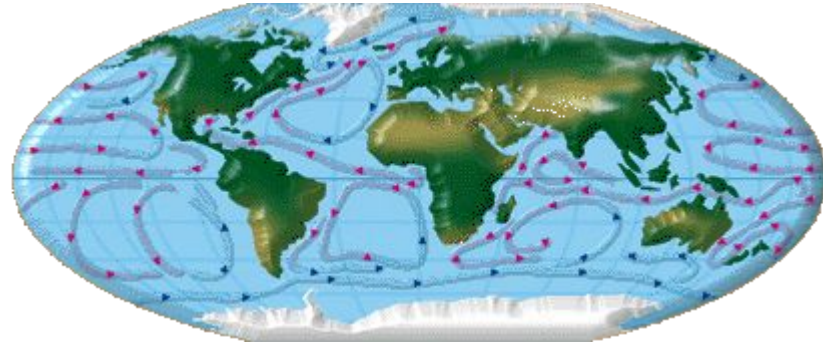
CURRENTS

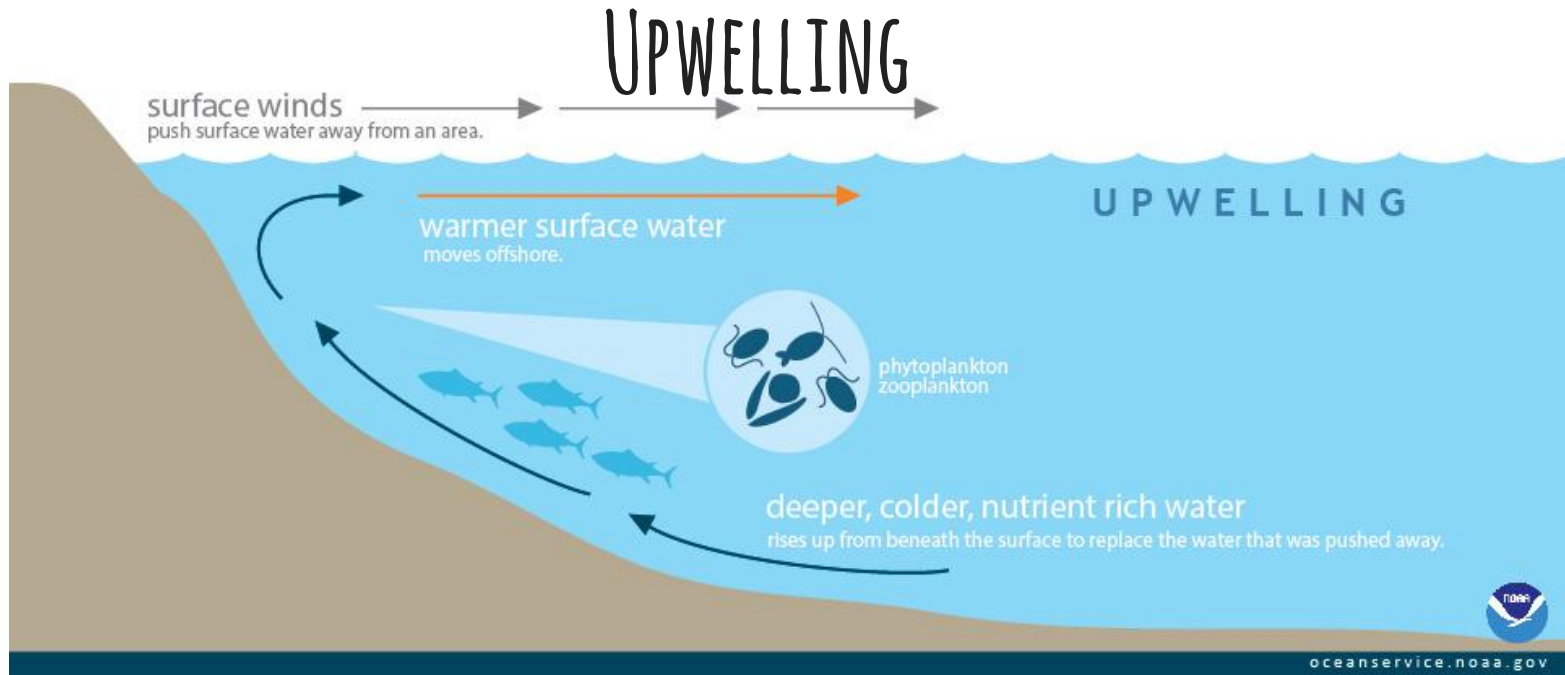
Currents are the continual flow of water in the ocean.

Currents are caused by

- **Winds pulling at the surface**
- **Water warming up at the equator**
- **Water cooling down at the poles**

Currents bring warm water to cold places. England would be much colder without the gulfstream current.





Coastal winds bring up nutrient rich water from the deep ocean.

The current provides a constant supply of nutrient rich water that allows lots of plants to grow, feeding many animals.

25% of all fish caught are caught in areas with upwelling.

OCEAN RESOURCES - FISHING

Ocean Fishing provides food for millions of people across the planet like tuna, oysters, fish, scallops and many many more.

Overfishing and by-catch are major threats to ocean ecosystems.

- Overfishing=Catching fish faster than they reproduce. 58% of fish populations are overfished or collapsed.
- Bycatch=Catching species you didn't mean to catch. Like turtles, sharks, and dolphins.

OCEAN RESOURCES - OIL

Ocean drilling for oil has become very popular to meet energy demands.



Oil spills are terrible for wildlife.

- Animals become coated in oil and it seeps into their skin and lungs and digestive systems.
- Oil can remain in ecosystems for decades.



OCEAN RESOURCES - TOURISM + SHIPPING

Ocean tourism is big business across the entire world including

- Beaches
- Cruises
- Snorkeling
- Fishing
- Scuba Diving



Ocean tourism can be damaging to the environment if done in an unsustainable way.

Ocean shipping allows businesses to move massive amounts of goods of any size in the cheapest way possible.

Shipping creates a moderate amount of pollution due to oil and debris.

