Name: Handed out on 1/9

Test Date: 1/23

Oceans Study Guide

Parent Signature: ____

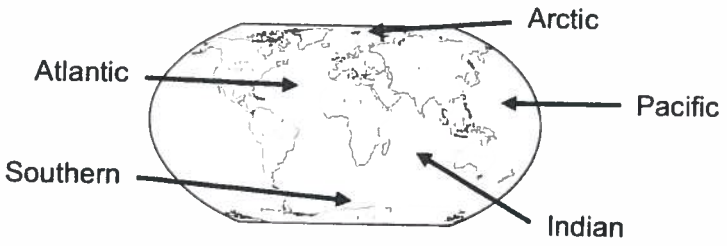
The ocean is an important and unique ecosystem that supports many kinds of organisms.

Oceans:

First, what is an ocean? An **ocean** is a large body of salt water surrounding large land masses. Oceans cover about 71% of Earth's surface. They contain about 97% of Earth's water. This means that changes to the ocean can have many effects on the planet.

Earth has five major oceans:

- Arctic Ocean
- Atlantic Ocean
- Indian Ocean
- Pacific Ocean
- Southern Ocean



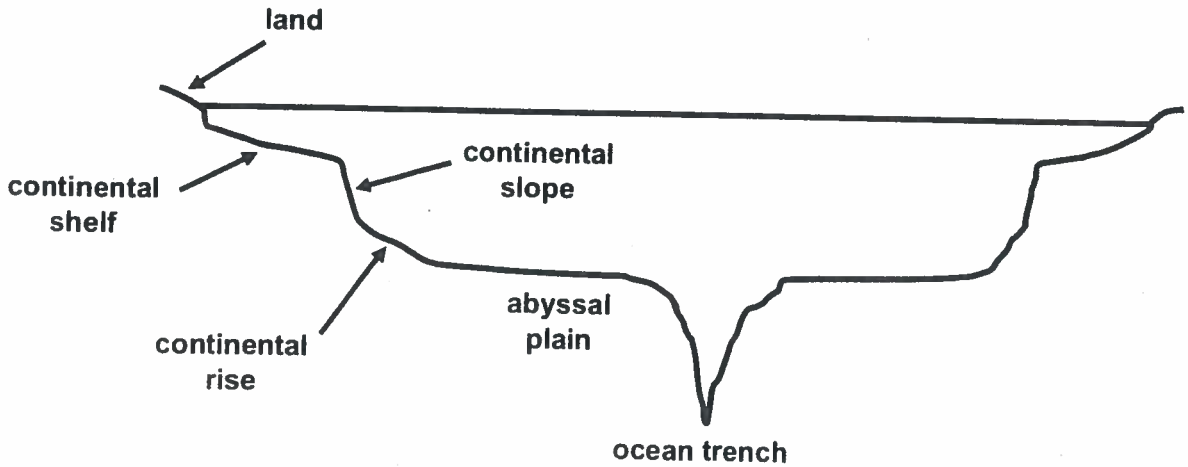
An ocean is a **marine** ecosystem. The word "marine" means anything that is found in, or made by, the sea.

Major Ocean Features:

The bottom of the ocean is called the **ocean floor**. It is not all flat. It has many different geographic features just like the rest of Earth's surface. The **depth** of the ocean floor varies. This means that the distance from the surface of the water to the ocean floor can be short (shallow) or long (deep). For example, the continental shelf is fairly shallow, but ocean trenches are very deep.

As the depth of the ocean water increases, the environment changes. The temperature of the water decreases, as well as the amount of light. This means that very deep parts of the ocean are cold and dark. Also, the amount of pressure and salinity (salt in the water) increase as you move farther down toward the ocean floor.

Important features of the ocean floor include the **continental shelf**, **continental slope**, **continental rise**, **abyssal plain**, and **ocean trench**.



- **continental shelf**: the part of the ocean floor that is closest to land. It slopes gradually away from the shore down to the continental slope and is covered by shallow water. Most of the wildlife in the ocean is found here. (depth up to 200 m)

- **continental slope**: a steep slope between the continental shelf and the rest of the ocean floor. (depth of 200 m to 4,000 m)

- **continental rise**: the transition area between the continental slope and the abyssal plain. This is where the ocean floor begins.

- **abyssal plain**: a flat underwater plain that is considered to be the true ocean floor. These cover about half of the Earth's surface. (depth of 4,000 m to 6,000 m)

- **ocean trench**: a trench at the bottom of the ocean where two continental plates collide. These can reach very high depths and are the least explored part of the ocean.

Most areas of the ocean floor are covered with thick layers of **sediments** (sand, mud, and rocks).

Ocean Water:

The water in Earth's oceans is a mixture of gases, water, and dissolved solids. **Marine organisms**, or plants and animals that live in the ocean, depend on the dissolved gases (like oxygen) for survival.

Salinity is the measure of all salts dissolved in water. The salinity of ocean water around the world varies based on factors like water depth, rate of evaporation, melting icebergs, and amount of runoff from nearby land.

Currents and Tides:

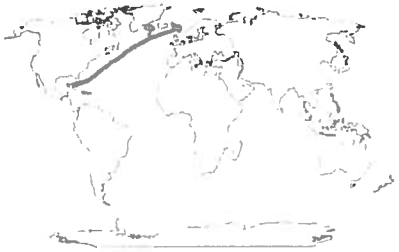
Ocean water moves. An ocean **current** is a body of water moving in a certain direction. Currents are caused by wind patterns and by differences in water (due mainly to temperature):

- wind creates **surface currents** along the surface of the ocean
- **deep water currents** are created when cold water from the earth's poles sinks and travels along the bottom of the ocean to the equator, where it warms and rises to the surface

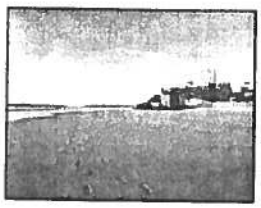
Ocean currents affect the mixing of ocean waters (which can affect plants and animals). They also affect navigation routes. Ships have to plan their travel routes based on currents.

Currents are represented on maps by arrows (red for warm currents and blue for cold ones).

The **Gulf Stream** is a warm Atlantic Ocean current that begins in the Gulf of Mexico. It moves along the eastern coast of the United States and crosses the Atlantic Ocean to northern Europe. The presence of the Gulf Stream affects the climate of the eastern part of the United States.



Tides are the rise and fall of ocean waters. They are caused by the gravitational pull of the moon and sun. If you visit the beach, you can observe tides as a rise and fall in the water level twice a day. At low tide, there is a period of shallow water, and you will likely see more sand on the beach. At high tide, the water level is higher, and it looks like there is less beach.



A beach at low tide.

Ocean Life:

Diverse organisms are found in different parts of the ocean. Marine plants and animals have adapted to life in the ocean environment.

The ocean's organisms are grouped according to how they move through the water:

- **floating organisms**: organisms that float along with the current (like plankton)
- **swimming organisms**: organisms that can move about the water (like sharks)
- **non-moving organisms:** organisms that adhere, or stick, to the ocean floor (like coral)

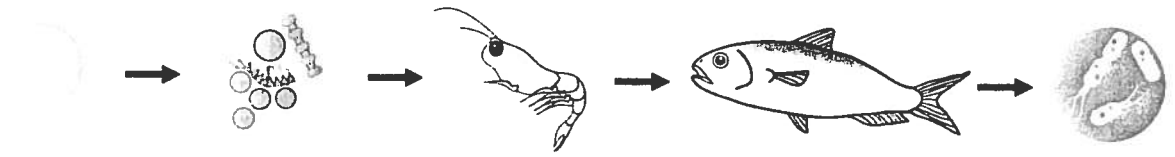
Like other ecosystems on Earth's surface, ocean organisms interact with each other and with non-living factors in their environment. They depend on each other.

Marine organisms also play a role in ocean **food chains**. Marine food chains and food webs show how the energy in the ocean environment is passed along from one organism to the next.

- **Producers** include plants and floating organisms (like algae and phytoplankton). They use the sun's energy to make their own food.
- **Consumers** get their energy by eating other organisms.
- **Decomposers** break down dead plants and animals in the ocean, helping to release energy back into the ecosystem.

If something happens to one part of the food chain, it can affect everything else that depends on it.

Here is an example of an ocean food chain with two consumers:



sun → phytoplankton *producer* → zooplankton *consumer* → herring *consumer* → bacteria *decomposer*