

## The Ocean

- The oceans of the world are all \_\_\_\_\_. Together they form \_\_\_\_\_ world ocean. There is more water than \_\_\_\_\_ on earth. Oceans cover about \_\_\_\_\_ of the earth's surface.
- There are \_\_\_\_\_ oceans. These oceans are the \_\_\_\_\_, Atlantic, Indian and \_\_\_\_\_

### Formation of Oceans

- When the Earth was a young planet, it had many active \_\_\_\_\_.
- As they \_\_\_\_\_, many gases were released into the \_\_\_\_\_.
- These gases included \_\_\_\_\_. The water vapor began to accumulate over millions of years. When the vapor began to cool, \_\_\_\_\_ formed and torrential rains fell filling the lowest \_\_\_\_\_ with water.

### Why is the Ocean important?

- The ocean contains \_\_\_\_\_% of the Earth's water supply.
- The oceans of Earth serve many functions, especially affecting the \_\_\_\_\_ and temperature.
- The ocean is home to an incredibly diverse web of \_\_\_\_\_

### Why is the ocean blue?

- The ocean appears blue because it \_\_\_\_\_ the blue color of the sky. On a cloudy, gray day, the ocean will appear \_\_\_\_\_.

### How deep is the ocean?

- Average ocean depth ~ \_\_\_\_\_ meters
- This is about 4X \_\_\_\_\_ than the average elevation of our continents

### Measuring Depth

- Old way – the \_\_\_\_\_ method Describe:
- New way – \_\_\_\_\_ (echo-sounding system) Describe:

### Temperature – based on latitude

- Temperature based on \_\_\_\_\_
- Where are temps the highest? \_\_\_\_\_

Draw graph:

### Three temperature zones:

- Surface Layer – warmest Why? \_\_\_\_\_
- Middle Layer – rapid temp change Why? \_\_\_\_\_
- Deep Layer – very cold Why? \_\_\_\_\_

### Water temperature and pressure

- Pressure- as you go deeper into the ocean the pressure starts to \_\_\_\_\_ objects could implode.
- \_\_\_\_\_ - the border between temperatures in the ocean.
- You then have the surface layer above the thermocline and the deep layer below.

## Why are the oceans salty?

● As water flows in \_\_\_\_\_, it picks up small amounts of mineral salts from the rocks and soils of river beds. This very-slightly salty water flows into the oceans and seas. The water in the ocean leaves by \_\_\_\_\_, but the salt remains dissolved in the ocean. As time passes, the ocean gets \_\_\_\_\_.

## Salinity

- A measure of the dissolved \_\_\_\_\_ in ocean water.
  - The most abundant dissolved solids are \_\_\_\_\_, sodium, and sulfate.
- Average Salinity = \_\_\_\_\_‰ (35 parts per 1000)

## Factor that Increase Salinity:

- \_\_\_\_\_
- \_\_\_\_\_

## Factors that Decrease Salinity:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

## Ocean Currents

- Surface currents due to \_\_\_\_\_
- \_\_\_\_\_, rain, evaporation, river runoff, and \_\_\_\_\_ topography can all affect the movement of upper ocean water
- Each current has its \_\_\_\_\_ salinity, density, and temperature
- The Gulf Stream runs along the \_\_\_\_\_ coast of US from south to \_\_\_\_\_.
- Water flows around the world in large \_\_\_\_\_ that have similarities in temperature, salinity, & chemical \_\_\_\_\_.

## Main Types of Ocean Currents:

- Surface – driven by \_\_\_\_\_ patterns
- Density – \_\_\_\_\_-moving currents caused by changes in the water mass's \_\_\_\_\_

## What is Upwelling?

- Cold water comes to the \_\_\_\_\_ to \_\_\_\_\_ the surface water that the winds have pushed \_\_\_\_\_ from the coast.

## Why is upwelling important?

- \_\_\_\_\_ water is filled with nutrients from \_\_\_\_\_ organisms that died & sank to the \_\_\_\_\_.

## Carbon Cycle

- Process used to \_\_\_\_\_ carbon in our air and \_\_\_\_\_.
- Gases are exchanged \_\_\_\_\_ at ocean surface.
- Ocean accumulates two \_\_\_\_\_ of carbon per year.

## Oceans and Carbon Dioxide

- Oceans absorb a large amount of \_\_\_\_\_.
- If oceans could not support this, then \_\_\_\_\_ more CO<sub>2</sub> in the atmosphere. Deep water formation assists with CO<sub>2</sub> removal, GCB may \_\_\_\_\_ from atmosphere for \_\_\_\_\_ years. Life would cease to \_\_\_\_\_.

## Effect of El Nino

Warming of the East Pacific Waters prevents \_\_\_\_\_, causing \_\_\_\_\_ temperatures, heavy \_\_\_\_\_ in some places, \_\_\_\_\_-like conditions in others.

## Life in the Ocean

- \_\_\_\_\_ of all life on earth is found \_\_\_\_\_ the ocean surface.
- Ocean life consists of \_\_\_\_\_ as well as animals.
- Most of the ocean life is found at the \_\_\_\_\_

## OCEAN LIFE:

### PLANKTON

■ tiny marine animals that \_\_\_\_\_ on the surface of the ocean water, most are \_\_\_\_\_ organisms

### NEKTON

■ Animals that can actively \_\_\_\_\_ rather than float in currents

### BOTTOM DWELLERS

■ Are animals that \_\_\_\_\_ on the bottom of the ocean floor  
■ In \_\_\_\_\_ areas only

● \_\_\_\_\_ life is found in the surface layer

● Why?

need \_\_\_\_\_  
need \_\_\_\_\_  
need \_\_\_\_\_

● But...there are strange creatures \_\_\_\_\_ in the ocean. List some: \_\_\_\_\_

● Black Smokers - Deep ocean-floor vents that provide \_\_\_\_\_ & sulfur gases for certain \_\_\_\_\_ (called sulfur-loving bacteria) that are the base of the food chain for \_\_\_\_\_ dwelling creatures.

## Oceans Role in Climate Change

- The oceans have an enormous ability to \_\_\_\_\_ and transport heat.
- Heat capacity is \_\_\_\_\_ times of the atmosphere.
- Capacity of the ocean is huge, will take \_\_\_\_\_ for water to respond to warmth.

## Change of Climate

- Earth's climate has \_\_\_\_\_ in recent years (100).
- If present trends continue, glaciers will \_\_\_\_\_.
- The arrows point to the former extent of the glacier in 1850, 1937, and 1968.

## Potential Sea Level Changes

Area in red shows the effects of a 10 to 12 meter \_\_\_\_\_ in sea level, this would affect approximately \_\_\_\_\_ of US population.

**Sketch the map:**