GS106
Lab Key #3

**Be sure to have all the oceans, major bodies of water and currents noted on your map that the lab said to write down. You will need them for the quiz!**

1) To calculate the % of the surface of the earth that is ocean:
(360,000,000km$^2$ / 510,000,000 km$^2$) *100 = 70.5%

2) To calculate the % that is land: 100%-70.5% = 29.5%

The water hemisphere is the southern hemisphere

4) % of the surface that is ocean at
N 40° = 62.8% S40° = 93%
N60° = 42% S60° = 100%

N 40° Land area is ~75 mil km$^2$ and ocean is ~110 mil km$^2$ so: (110 mil km$^2$ / 185 mil km$^2$ )*100
N 60° Land area is ~75 mil km$^2$ and ocean is ~55 mil km$^2$
S 40° Land area is ~12 mil km$^2$ and ocean is ~160 mil km$^2$
S 60° Land area is 0 mil km$^2$ and ocean is ~125 mil km$^2$

The width of the oceans in the northern hemisphere declines as you move to the pole. In the southern hemisphere the oceans stay fairly constant until about 60° then they start getting smaller

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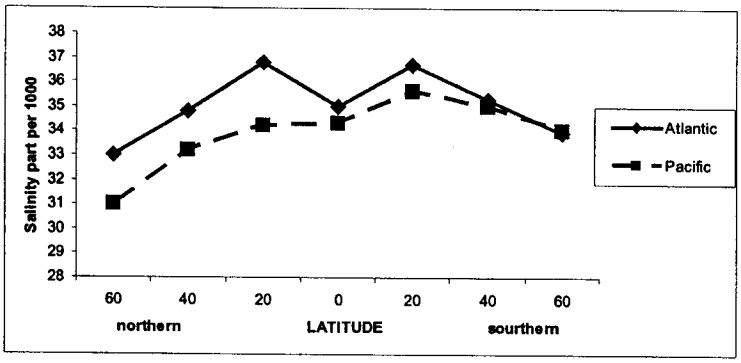
The pacific ocean covers the most area

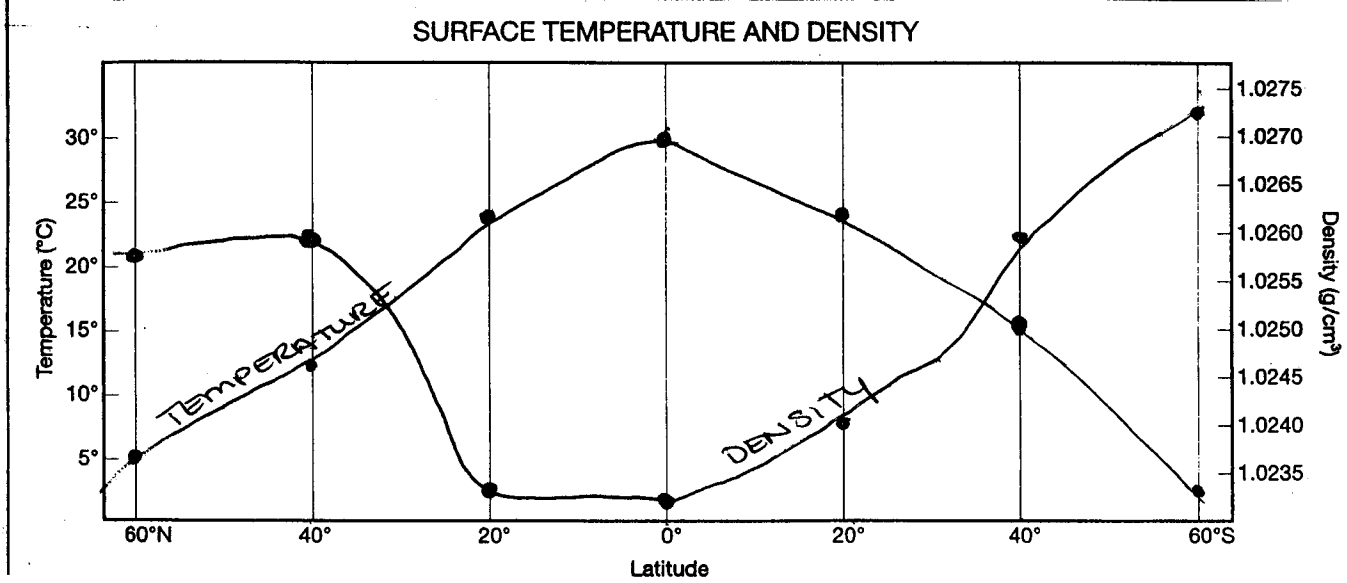
**Part B**

Solution B had the greatest density...think about it ...it took less time for it to get to the bottom of the test tube.

Cold water will be more dense than hot water. This is consistent with what we talked about last week with convection cells




The salinity is the highest at around 20° and 30°. The reason for the higher rates of salinity is due to the fact that at these latitudes is where many of the earth's deserts are located and the evaporation rate of water is high. The dip at the equator is due to the large amounts of rainfall that occur there.
The Atlantic ocean has the highest salinity. A couple of possible reasons for this include the size of the ocean. It is the smaller of the two so evaporation processes will concentrate the salts. Another possible reason is that the Atlantic ocean has a midocean ridge running through it. This is a volcanic feature which adds volcanic gasses (therefore salts) to the ocean water.




As temperature increases density decreases. Therefore at the equator we have high temperature and low density water. At the poles, as the water cools the density increases.

In the southern Hemisphere, we have very cold water and a ocean ridge that adds salts to the water. Therefore the water in the southern hemisphere has a slightly higher density than that in the N. Hemisphere.

Based on the two diagrams above, we see that at 20° latitude we have high levels of salts in the water due to evaporation. If the salt level is high we should therefore have high densities. However, if we look at the other diagram we see that density at this latitude is low but temperature is high. This suggests that temperature controls density more than salinity.

**Part C**

The ocean current that travels around the globe is the westwind drift.
The Gulf Stream current is a warm current that flows along the east coast of NA.
The California current travels along the Oregon coast and it is a cold water current.
In the N Atlantic the circulation is Clockwise and in the south Atlantic the circulation is counter clockwise.

**Post Lab (highlights)**

When calculating the longitude and latitude of a location…Longitude is read from the top and the bottom of the map and is reported as E or W of Greenwich mean. Latitude is read from the left or right side of the map and is reported as N or S of the equator. Therefore the longitude and latitude of the following:

Mediterranean Sea: 15°E 35°N  Sea of Japan: 135°E 40°N
Indian Ocean: 70°E 30°S

Density is controlled by the amount of salts dissolved in water and the temperature of the water. It varies in the following manner:

High salinity→ higher density
High temperature→ lower density
Low salinity → lower density
Low temperature→ high density

To think about the vertical movement of water we think about what is going to cause water to sink. High salinity or low temperature. Since temperature is the controlling factor we can say the polar regions will be where the circulation downward begins.

**Addendum**

The salinity gradually increases as the readings move away from the shoreline. A reason why the salinity is lower near the shoreline is due primarily to rivers flowing into the ocean diluting the seawater. The ocean current that flows through this area is the Gulf stream current and it is associated with warm water currents. The salinity pattern does parallel the current as well as the coast line. A couple of possible reasons for the increased regions of salinity could be that the water is being brought in by the current from the south or it is possible there is a bar there or shallow that allows evaporation to have a greater effect in this region than in the surrounding area. The salinity in the estuaries should be higher than the river but less than the ocean. Estuaries occur where rivers empty into the ocean. They are said to have a mix of the two waters and the term used to describe them is "brackish"