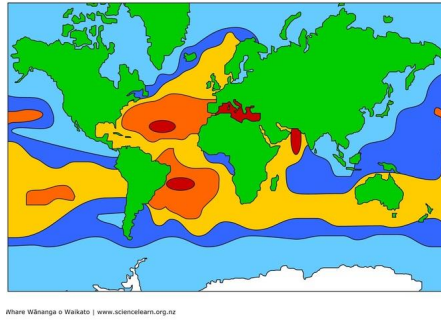


Salinity Graphing Activity



Names:

1.

Work collaboratively with your lab group

CHARACTERISTICS OF OCEAN WATER

Ocean circulation has two primary components: surface ocean currents and deep ocean currents. While surface currents like the famous "Gulf Stream" are driven primarily by the prevailing world winds, the deep ocean circulation is largely the result of differences in ocean water density (mass per unit volume of a substance). A density current is the movement (flow) of one body of water over, under, or through another caused by density differences and gravity. Variations in salinity and temperature are the two most important factors in creating the density differences that result in the deep ocean circulation.

SALINITY

Salinity is the amount of dissolved solid material in water, expressed as parts per thousand parts of water. The symbol for parts per thousand is ‰. Although there are many dissolved salts in seawater, sodium chloride is the most abundant.

Variations in the salinity of seawater are primarily a consequence of changes in the water content of the solution. In regions where evaporation is high, the proportionate amount of dissolved materials in seawater is increased by removing the water and leaving behind the salts. On the other hand, in areas of high precipitation and high runoff, the additional water dilutes seawater and lowers the salinity. Since the factors that determine the concentration of salts in seawater are not constant from the equator to the poles, the salinity of seawater also varies with latitude and depth.

The table to the right lists the approximate surface salinity at various latitudes in the Atlantic and Pacific Oceans. Using the data, construct a salinity curve on the next page for each ocean on the graph. Plot the data points with Latitude as the X-axis and Salinity as the Y-axis. Connect each data point with curved lines. Use a different colored pencil for each ocean. Once you are completed, answer the questions that follow.

Latitude	Atlantic Ocean	Pacific Ocean
60°N	33.0 0/00	31.0 0/00
50°	33.7	32.5
40°	34.8	33.2
30°	36.7	34.2
20°	36.8	34.2
10°	36.0	34.4
0°	35.0	34.3
10°	35.9	35.2
20°	36.7	35.6
30°	36.2	35.7
40°	35.3	35.0
50°	34.3	34.4
60°S	33.9	34.0

INSERT GRAPH BELOW

1. At which latitudes are the highest surface salinities located?

2. What are two factors that control the concentration of seawater?

Refer to the factors listed in the question above.

3. What is the cause of the difference in surface water salinity between equatorial (0°-20°) and subtropical (20°-40°) regions in the Atlantic Ocean?

4. Of the two oceans, the _____ Ocean has higher average surface salinities.

5. Suggest a reason for the difference in average surface salinities between the oceans.

BOLD your answer in parentheses. 6. In general, salinity (increases, decreases) with depth in the equatorial and tropical regions and increases, decreases) with depth at high latitudes.

7. Why are the surface salinities higher than the deep water salinities in the lower latitudes?

8. What is the halocline?

BOLD your answer in parentheses. 9. Below the halocline the salinity of ocean water (increases rapidly, remains fairly constant, decreases rapidly).

The table to the right shows the average surface temperature and density of seawater at various latitudes. Using the data in the table, plot 2 line on the graph for temperature and a separate graph for density . Then answer the questions that follow	Surface	
	Latitude	Temperature (C°)
	60°N	5
	40°	13
	20°	24
	0°	27
	20°	24
	40°	15
	60°S	2
Surface Density (g/cm ³)		
60°N		1.0258
40°		1.0259
20°		1.0237
0°		1.0238
20°		1.0241
40°		1.0261
60°S		1.0272

Insert Temperature Graph Below	Insert Density Graph Below
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Bold your answer in parentheses. 10. (Warm, Cool) surface temperatures and (high, low) surface densities occur **in** the equatorial regions. While at high latitudes, (warm, cool) surface temperatures and (high, low) surface densities are found.

11. What is the reason for the fact that higher average surface densities are found in the Southern Hemisphere?

12. In the first question, you concluded that surface salinities were greatest at about latitudes _____ N and _____ S

13. Refer to the density curve **in** your graph above. What evidence supports the fact that the temperature of seawater is more of a controlling factor of density than salinity?

BOLD your answer in parentheses. 14. Temperature decreases most rapidly with depth at (**high**, low) latitudes. Give the reason that the **decrease** with depth **is** most rapid at these latitudes.

15. What **is** the thermocline?

BOLD your answer in parentheses. 16. Below the thermocline the temperature of ocean water (increases rapidly, remains fairly constant, decreases rapidly).