Name: _____ Date: _____ Period: _____

Thermocline and Halocline Graphing Lab
Ocean Stratification

Directions: Below are the temperature and salinity data for three different oceanographic research cruises. These cruises have taken multiple measurements over many years at various depths. Those data have been condensed into the following columns to better illustrate the positions of the thermocline and halocline at various latitudes. All data are from cruises done in the year 2000. The low latitude data is located around Hawaii (and done in the summer), and the high latitude data was taken around that same time in the Bering Strait. The data from the mid latitudes was taken in July and January off the coast of southern California and should show the variations between seasons at these latitudes. The graph should be set up with temperature at the top (x) and depth along the left-hand side (y axis). Depth should start at 0m at the top and increase in depth towards the bottom of the page. Salinity will also be graphed using salinity (in ppt) along the top.

Temperature data (°C):

Depth	High Latitude	Mid Latitude Winter	Mid latitude Summer	Low latitude
0	12.3	16	17.6	25.8
2	12.3	16	17.6	25.8
10	12.3	16	17.6	25.8
16	11.9	16	17.6	25.8
20	11.4	16	17.3	25.8
30	10.1	16	16.7	25.8
50	7.1	16	15.9	25.1
60	6.4	16	14.8	24.3
75	5.5	16	13.6	23.5
85	5.5	15.9	12.4	23
100	5.7	14.2	11.4	22.5
125	5.7	13.8	10.3	21.6
150	5.6	12.2	9.8	20.5
200	5.6	10	8.7	17.8
250	5.6	8.8	8	14.9
300	5.6	7.8	7.3	12.9

Salinity Data (ppt):

Depth	High Latitude	Mid Latitude Winter	Mid latitude Summer	Low latitude
0	27.9	33.4	33.3	35.3
2	27.9	33.4	33.3	35.3
10	28.7	33.4	33.3	35.3
16	29.2	33.4	33.3	35.3
20	30	33.4	33.3	35.3
30	30.8	33.4	33.3	35.3
50	31.4	33.4	33.3	35.3
60	31.6	33.4	33.3	35.3
75	31.9	33.4	33.4	35.4
85	32	33.4	33.3	35.3
100	32.2	33.5	33.4	35.3
125	32.5	33.6	33.5	35.2
150	32.8	33.6	33.7	35.2
200	33.1	33.8	33.9	34.8
250	33.2	33.9	34	34.5
300	33.2	34	34	34.3

Questions:

1. Why is the location of the thermocline so much deeper in the winter at mid latitudes than the summer at mid latitudes?

   _____
   _____

2. At about what depth does the thermocline occur for the mid latitude winter data?

   _____

3. Why does a thermocline exist in the high latitude data when there normally would not be one?

   _____
   _____

4. Why does salinity start so low at high latitudes and increase with depth?

   _____
   _____

5. Why does the salinity at the surface vary so much between high and low latitudes?

   _____
   _____