

RECITATION #1

When the Moon is in the $[\sum_1^7 1]$ th House and Jupiter's coefficient of variation with Mars = 0...
...it's the Age of Aquariums!

1) So, we all know that water is a nifty molecule. Hydrogen bonds are pretty much the answer for all questions asking for an explanation of some funky property of water. But it's not the knowledge that counts; it's how you use it.

- a) What is the temperature (at 0 salinity and 1 atm pressure) of maximum density of water?
- b) How does this funky property explain seasonal mixing in lakes? And just how many times does a lake mix?

2) Why does a small volume of water look clear, a large volume blue, deep oceans black, and stormy skies red?

3) My apologies, but this is something you will have to memorize. Names, numbers, and charges, and order...

- a) What are the 6 major ions in seawater (in order of decreasing concentration)?
- b) What are their concentrations (to 2 significant digits)?
- c) Contrasting, what are the 6 major ions on average river water, and what are the 2 most abundant?
- d) Why did you put the concentrations in molal, and not molar?
- e) Since most of the water input comes from rivers, why isn't the list of major ions the same in rivers and oceans?

4) What is the "current" SI unit for salinity measured by a salinometer (ha ha, horrible pun)?

5) Let your mind drift to the figure with all the wiggles (which one?), describing the evaporation rate, precipitation rate, and (E - P) over various latitudes.

a) The lowest salinities are at the (poles / equator / tropics), where evaporation is (> / <) precipitation

b) The highest salinities are at the (poles / equator / tropics), where evaporation is (> / <) precipitation

c) The surface north Atlantic is (more salty / less salty) than the surface north Pacific, mostly because the N. Atlantic has (higher / lower) evaporation rates than the N. Pacific

d) The formation of sea ice at the poles (increase / decrease) the salinity of the non-frozen water

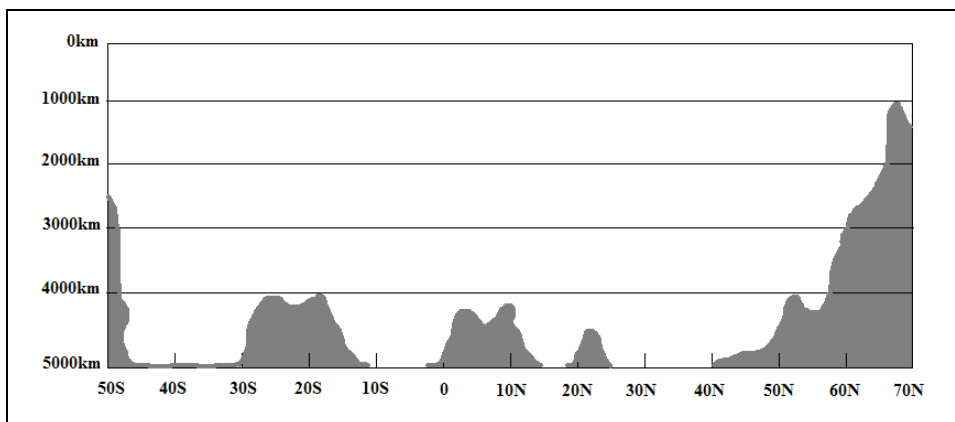
6) The average density of seawater is about 1027 kg/m^3 .

a) $\sigma =$

b) If $\rho = 1026 \text{ kg/m}^3$ at 25°C , $\sigma_t =$

c) If water at 2°C and 3km depth is adiabatically raised to the surface and after that $\rho = 1028 \text{ kg/m}^3$, $\sigma_\theta =$

7) The figure below depicts (ok, is supposed to depict) the Atlantic Ocean basin:



a) Draw and label the 4 main Atlantic Ocean water masses and their direction of flow.

b) What is the origin/ventilation site of each water mass?

c) What are the differences leading to the arrangement of the water masses?

8) The following data comes from me sampling a banana split. Create a T-S (Temperature-Sugar) plot. How many distinct layers are in my dessert? [arranged as: Sample number (equal to depth), Temperature, Sugar]

1,21,32	2,23,30	3,24,28	4,26,26	5,27,25	6,30,24	7,28,22
8,24,21	9,22,20	10,19,20	11,16,19	12,13,18	13,12,17	14,11,15
15,12,14	16,12,13	17,13,13	18,19,12	19,23,12		