FIRST SEMESTER CHEMISTRY WITH MARINE SCIENCE THEME

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"The goal of all this effort: To allow you to gain an oceanic perspective. *Perspective mean.s heing able to view things in terms of their relative importance or relationship to one another.* An oceanic perspective lets you see this misnamed planet in a new light, and helps you plan for its future. You will see that water, continents, seafloors, sunlight, storms, seaweeds, and society are connected in subtle and beautiful ways," Tom Garrison (1996).

Gaffield High School is a school that has 99 % Latino population. It is located at the heart of the East Los Angeles community. Garfield brags about its 90% graduation rate, a very high rate considering the socio-economic background of the school's student population. About 80% of the graduating class go to college (two-four year colleges). The other 20 % go to technical schools.

Out of my 200 chemistry students only 6 students (3%) wanted to go into pure science careers. Out of the 3%, only l student (0.5%) wanted to take chemistry. The above statistics imply that high school students do not want to go into pure science careers. There are several possible reasons and these could be: (1) Science labs are not oflen interesting; (2) science labs are not usually challenging; and (3) experiments are not meaningfull or relevant to the students' lives.

We feel that here is where LIMS is going to make a difference. We could make chemistry more relevant to my students by using the marine science perspective

Week 2 - 3

Chapter 2: Measuring and Calculating *(The concepts in the Chapter will be used in the entire chemistry course. Thi.s will only.serve as an introduction.)*

Objectives:

- List and use the SI base units for mass, length, time, and temperature
- Express and convert quantities using the common Sl prefixes.
- Use significant digits and express exactness of measurements (accuracy and precision).
- Perform calculations using density measurements.

National Science Standards	Activities
Structure of the earth system	1 Layers of the earth (LIMS, Fluid Earth, *p.* 59-61)
*The solid earth is layered with a lithosphere hot, convecting mantle and dense metalliccor*e	2 Density calculations - construct and standardize a hydrometer (LIMS, Fluid Earth, *p.* 164-170)
Lithospheric plates on the scales of continents and oceans constantly move at rates of centimeters per year in response to movement in the mantle.	alternate activity- Won't you BB my hydrometer (LIMS, Project Earth Science, pp 57-61)
The outward transfer of earth's interrnal heat drives convection circulation in the mantle that propels the plates comprising earth's surface across the face of the globe	*3.* Plate tectonics and density (LlMS, Fluid Earth, p62-70)
	4 Newspaper tectonics (LIMS)

LAUSD STANDARDS: Science .standards #10, 11, 14, 15, 17

CULMINATING ACTIVITY: A group activity on thermohaline circulation, (LIMS, Fluid Earth, p. 173-175,)

ASSESSMENT: Individually the students will answer the following questions:

I.What conditions increase the density of seawater? What conditions decrease the density?

2. Arrange the following list from most dense to least dense:
   A. seawater at the surface in a tropical rainstorm
   B. seawater at the surface around Antarctica during water.
   C. seawater at the sorface in tropical sun.
   D. seawater at the surface in the tropics at night.
   E. seawater directly beneath a mass of polar ice.

LONG TERM ASSESSMENT: At the beginning of the semester the students are assigned a group project (group of no more than three students). One of the suggested topics would be: The impact of the density gradients on the ocean currents and how these changes affect the Earth. Students are encouraged to access information from the internet, network with oceanographers and professors from neighboring Universities and the extensivly use the Library. Students are also required to keep a portfolio of all their activites for the entire year.

Week 3 - 4

Chapter 3: Matter

Objectives: Describe and distinguish heterogenous and homogeneous materials, substances, mixtures, and solutions. Describe and give examples of elements and compounds. Classify examples of matter. Classify changes in matter as physical or chemical. Classify changes in matter as physical or chemical. Distinguish among extensive, intensive, physical and chemical properties.

National Science Standards: Structure and properties of matter	Activities
: An element is composed of a single type of atom	1. Sea water: Is it a substance or a rnixture? (LIMS, Fluid Earth p.249-250)
A compound is formed when two or more kinds of atoms bind together chemically.	2. Chromatography: HPLC - in Kool Aid (LIMS activity)
Solids, liquids, and gases differ in distances between individual unit (molecule/atom) and therefore the energy that bind them together	3. Elements found in sea water. (LIMS, Fluid Earth, p.238)
	4. How matter holds heat (LIMS, Project Earth Science, pp. 41-44)
:Chemical reactions may release or consume energy	5. Measuring pH (LIMS, Fluid Earth, p. 291 - 292).
	6. The incredible joumey (LIMS, Project Wet, pp. 161 - 165).
Geochemical cycles - The earth is a system containing essentially a fixed amount of each stable chemical atoms or element. Each element can exist in several different chemical	7. A drop in the bucket (LIMS, Project Wet pp. 238 - 240)

LAUSD Standards: Science standards 111, 11, 15, and 1 7.

CULMINATING ACTIVITY: Student in groups will choose an activity for investigating pH and acid rain. After their investigation, students will share their results with their explanation to the class (LIMS, Fluid Earth, p 297).

1. Simulate the effects of acid rain in metal.
2. Test what acid rain does to materials made of calcium carbonate; i.e. chalk, coral, seashells marble and limestone.
3. Simulate acid rain being diluted in progressively larger bodies of fresh water.

Using a student made rubric. the students will grade the group's presentation.

ASSESSMENT: The class will make a field trip to Hyperion Plant. Individually, the students will make a schematic diagram of the Hyperion Plant processes, label the diagrams using terms/vocabulary from the chapters; also indicating if the changes are physical or chemical.