BSC 307 Laboratory Teaching Lesson Plan

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| **Title:** H2O fo’Sho! | **Grade Level:** 9 |
| **Objectives:**  Students will be able to define, identify and explain the properties of cohesion, adhesion, and capillary action as seen with water. Students will also be able to understand the term “surface tension”  Students will be able to apply this knowledge to the outside world. Examples: How these properties allow tall trees to grow leaves at the very top.  Students will understand the difference between polar and non-polar molecules.  Students will be able to experimentally discover that mixing water with other substances can change it’s density. | |
| **Illinois Learning Standards:**   * 11.A.4b – Conduct controlled experiments or simulations to test hypotheses. * 11.A.4c – Collect, organize and analyze data accurately and precisely. * 12C – 3 – 3.Apply scientific inquiries or technological designs to examine the chemical and physical characteristics of matter, constructing and discussing models and charts that explain these properties, investigating the relationships among atoms, molecules, elements, and compounds, classifying objects and mixtures based on these properties, explaining the organization of elements in the Periodic Table, or investigating the properties of gases at varying temperatures and pressures. | |
| **Academic Language Demands:** Polar, non-polar, molecules, negative and positive charges, surface tension, solvent, solute, cohesion, adhesion, capillary action, density. | |
| **Engagement:** To engage the students I will begin with a “What do you know?” worksheet. In this students will have about 5 minutes to fill out any previous knowledge they have on the upcoming subject. I will begin with a short lecture/class response on some of the interesting properties of water. This lecture will correspond with their worksheet. This should spark interest since water is around them every day, and we take it’s unique properties for granted. | |
| **Exploration**: Students will have a 5 station lab that will explore the unique properties of water including: adhesion, cohesion, surface tension, capillary action and polarity. At each station there will be different molecules or compounds that show different properties than water, and students will have questions that ask them to hypothesize as to why these materials are different, or why they react the way they do. This is a very exploration based lab, where students are able to make hypotheses and be incorrect, but then through the next step, explanation, understand the correct answer and *why* it is correct. | |
| **Explanation:**  After the lab is complete students will get to take the lab home to complete any questions they might have missed. The next day students would turn in the lab. I would then put the lab up on the projector or smart board and go through the questions in a class discussion. Through this I would give students plenty of opportunity to talk to the class and share their own thoughts and confusions on some of these harder to understand abstract ideas. | |
| **Extension:** To extend these concepts students will be given a variety of situations where water’s unique properties are shown. Students will then have to identify the different properties that are being exhibited. To create more critical thinking however I will also have students create 2 new situations where they see water’s unique properties. Students will have to look at the world around them and identify these properties without any prompting. | |
| **Evaluation(Assessment Strategies):** My evaluation would be assessing their performance in lab skills, participation, ability to follow directions, stay on task, collect data, and create meaningful rationales and hypotheses. Their labs will also be collected to see how much effort each student put in. | |
| **Rationale:**  Water is everywhere. It is used in every single science from Physics to Astronomy, Biology and beyond. Understanding the fundamental properties of water is a key component to understanding details in future classes.  The amazing properties of water are taken for granted every day. Learning about how precious water is can also allow students to see that we are an extremely fortunate planet to have so much of this rare resource. There is no substitute for water in daily life, and without it life would not exist. If students can understand this and how unique water is, it could help open up their eyes to water management and conservation as well. | |
| **Resources:**    Water lab – Mrs. Lisa Tomlin, MS Education from ISU 1990. Currently employed at Normal Community West High School, Normal IL. Science Department Head Chair. Date used: April 11th, 2012  Illinois State Board of Education. (1997). Illinois State Learning Standards. [On-  line]. Retrieved on April 11, 2012. Available:  http://www.isbe.net/ils/Default.htm. | |