**Teaching Science as Inquiry (TSI) Lesson Plan**

**Module 2: Chemical Aquatic Science**

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Activity: Properties of Water

1. Why did you choose to do this activity?

We have done the penny activity but feel a re-do with a different focus on water instead of scientific method will be good refocus. It ties in most easy with what we are currently doing in class and I will use part D to do the Phases activity with.

1. What are your classroom learning goals?

I hope to have the students grasp the concepts of cohesion, adhesion and hydrogen bonds. My class has no prior knowledge (that I know of) in this area so I am interested and nervous to see how it will end up. My ultimate goal is that the student’s curiosity is sparked and that they have some movement in understanding water in more depth….

1. How does this activity tie into your classroom learning goals?

This activity will tie into my classroom learning goals by exposing students to new information and activities. If my students are curious and questioning and learning I have met my goals. I want my students to understand that water is what allows life to happen (since we are a life science class) and that our ocean is made of this interesting liquid.

1. What date do you plan to start this activity?

11/28/12

1. *If applicable:* HIDOE standards this lesson will address

7.1.1 Design and safely conduct a scientific investigation to answer a question or test a hypothesis

7.1.2 Explain the importance of replicable trials

7.1.3 Explain the need to revise conclusions and explanations based on new scientific evidence

**Ocean**

1. Describe how you will connect this activity to the ocean:

Since water is all around us everyday I think it will be easiest to connect to the ocean by bringing up days at the beach, wet hair, skimming rocks on the water and all of the things they in the ocean, many of them on a daily basis.

7. Select the Ocean Literacy Principle(s) that you anticipate this activity will address. (check all that apply)

X 1. The Earth has one big ocean with many features.

□ 2. The ocean and life in the ocean shape the features of the Earth.

□ 3. The ocean is a major influence on weather and climate.

□ 4. The ocean makes earth habitable

□ 5. The ocean supports a great diversity of life and ecosystems.

□ 6. The ocean and humans are inextricably interconnected

□ 7. The ocean is largely unexplored

**Preparation**

8. How will you prepare your students for this activity? (For example, review of prior knowledge.)

I will begin by revisiting the penny drop lab we did during the first weeks of school as a way to introduce the steps of the scientific method and lab procedures. I will link it by initiating a conversation about why or how the water bulges up and holds together like it did. We will re-do the activity with a new focus on properties of water. I will add the other 4 activities to firm up what they discover. I will need to review lab protocol and practices of scientists because the first time we did this lab was before the activity on the practices of scientists and there was a lot of squirting water around with the pipettes…

9. Explain any instructional struggles that you foresee and how you will address these issues. (For example, student misconceptions, classroom discussion, aspects most difficult for students to grasp, etc.)

I am worried that the behavior expectation will need to be revisited several times during this lab as I hadn’t set a very good tone for behavioral expectations/lab respect before we did part of this activity in the past. I think that the students will think the water has a skin on it (because I actually described it that way in the past….). Getting initial interest might be difficult because they think they already know what we are doing. I hope that the additional activities will re-initiate their interest. I am hoping to be able to explain or help to find the answers to any questions that come up because my knowledge base is limited on the chemistry aspects.

**Questioning and Assessment Strategies**

10. What *questioning strategies* will you use to help your students meet your learning goals?

\*predicting

\*inferencing

\*small group discussion

\*individual discussion with me

\*whole group questioning

\*homework will be reflective time to put into their own words what happened during the activities and what they learned

11. What *assessment strategies* will you use to help your students meet your learning goals and monitor their progress?

Students will keep predictions, questions, hypothesis and actual results in their lab notebooks. I will collect and grade those. Students will take a post module assessment to see what was learned during the activities. I will check for understanding continually throughout the activities.

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| Use the following table to plan your lesson using TSI.  For each phase:   * **Mode(s):** List the Mode(s) of Inquiry you will incorporate * **Teacher:** Describe what you will be doing * **Student:** Describe what your students will be doing * **Assess:** Describe how you will assess your students in this phase so you can monitor their progress through the activity   \*Modes: Curiosity, Description, Authoritative knowledge, Experimentation, Product evaluation, Technology, Replication, Induction, Deduction, Transitive knowledge |

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| **INTERPRETATION** | | **INITIATION** | |
| Mode(s) | Replication | Mode(s) | Curiosity |
| Teacher | Encouraging small group discussions  and comparison of results | Teacher | Initiating discussion within small groups, introduce procedures and vocabulary |
| Student | Re-testing, finding similarities, discussing connections | Student | Share personal experiences in groups, set up to do activity, test hypotheses |
| Assess (look for) | Consistency and transfer of knowledge from activity to why/how water has its unique properties | Assess (look for) | All participating positively and respectfully |
| **INSTRUCTION** | | | |
| Mode(s) | Authoritative knowledge, Induction | | |
| Teacher | Whole group procedures, circulate to check for understanding and keep students on task | | |
| Student | Note taking, setting up technology appropriately, experimenting, replicating | | |
| Assess (look for) | Following procedures, “success” in activities, sharing of data and information and results | | |
| **INVESTIGATION** | | **INVENTION** | |
| Mode(s) | Induction | Mode(s) | Induction |
| Teacher | Circulating to check that all students are on task and understand the activity parameters | Teacher | Illicit conversation to connect to previous knowledge |
| Student | Predicting, recording, manipulating, observing | Student | Generating questions they want answered |
| Assess (look for) | Lab notebooks being utilized, all students engaged, appropriate use of lab equipment | Assess (look for) | Active discussion participation |

12. Briefly describe how you will direct your students through the Phases of Inquiry.

My plan is to go back and forth between having the students run the activities and then bringing them back to discuss what they saw and formulate some reasons about why and how it happened. Getting them initiated seems to be fairly easy for me as they are excited to do anything that involves ‘technology’ in science class. Same with investigation and invention. I will need to focus on helping them to interpret what they have learned. I will use the tsi teacher text notes we were provided and the website links.

13. What will be the *overarching* mode(s) of this activity? Why?

Curiosity, Replication and Induction

Please provide any additional comments that will help you prepare to teach this activity or help the TSI facilitators understand how you plan to teach this activity.