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

**Module 2: Chemical Aquatic Science**

Name: Selene M.

Activity: PROPERTIES OF WATER

1. Why did you choose to do this activity?

Water is a substance we often study in chemistry and is the most known chemical formula, so it is good to start learning chemistry concepts with. This is also a mandatory target activity for module 2.

2. What are your classroom learning goals?

My goals are safety, focus on Standard 6 Nature of Matter and Energy for the 2nd quarter, practice being a scientist (Standard 1), and learning by doing.

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

This is a required activity that has a lot of interesting phenomenon with a familiar substance that students will find fascinating. The hands on approach will allow students to practice taking on the demeanors and practices of scientists. It also fits in nicely with our chemistry unit.

4. What date do you plan to start this activity? November 28, 2012

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

Standard 1 The Scientific Process: Discover, invent and investigate using the skills necessary to engage in the scientific process.

PS 1.3 Defend and support conclusions, explanations, and arguments based on logic, scientific knowledge, and evidence from data.

PS 1.7 Revise, as needed, conclusions and explanations based on new evidence.

Standard 6 Nature of Matter and Energy: Understand the nature of matter and energy.

PS.6.8 Describe interactions among molecules.

**Ocean**

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

Most of the water in the Earth is in the ocean. Water has unique properties that make it different from other liquids. The properties of water make it possible for insects to walk on the surface and water droplets to stick together as rain falls.

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.

X 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.)

The students will have previously learned the difference between physical and chemical properties. They are also at the end of the chemistry unit. The most talked about molecule in our class thus far has been H2O, water.

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.)

My students go to the beach almost every day and are very familiar with water.

The only thing that I can think of that would be a problem would be mixing up the difference between adhesion and cohesion.

**Questioning and Assessment Strategies**

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

I will ask the main questions for parts A-E and let the students come up with the answers. I will go around to the different tables and ask questions to guide them if they are puzzled or not sure what to do. They should be able to come to some conclusion if they try to explain it first without the teacher’s interference. This is true inquiry.

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

Towards the end of the class I will introduce the words cohesion and adhesion and have them use that information to explain properties of water. They will fill out a worksheet & table.

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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) | Transitive Knowledge, Induction, Deduction | Mode(s) | Curiosity, Authoritative Knowledge, Description |
| Teacher | Ask students questions about what their results mean and how the behavior of water in the lab activity relates to water in their everyday life. | Teacher | I will start by a question on the board: How many drops of water can you fit on a penny? Show a brief PowerPoint about water and introduce words adhesion, cohesion, surface tension. Relate this lesson to water in the ocean. |
| Student | Students discuss why their number of drops is different from their previous trials or from other student groups. They try to put what they see into words. | Student | Watch PowerPoint, take notes and discuss answers to questions. Start to think about the challenge question. |
| Assess (look for) | A written hypothesis and discussion between students and between teacher and students in class discussion or small group discussion about why water behaves a certain way. Use of words: adhesion and cohesion. | Assess (look for) | Listen to their answers and their questions that come up in a class discussion |
| **INSTRUCTION** |
| Mode(s) | Transitive Knowledge, Authoritative Knowledge, Replication |
| Teacher | Read through the lab instruction sheet and show the supplies they will use. Have them write three safety rules.  |
| Student | Students will read directions along with the teacher and write safety rules to consider. They will make sure they have a hypothesis written. |
| Assess (look for) | Prior knowledge of students who did something similar in another science class might have preconceived ideas of how many drops of water can fit on a penny. I will listen to how the experiment evolves with these students in their groups. |
| **INVESTIGATION** | **INVENTION** |
| Mode(s) |

|  |  |
| --- | --- |
| Transitive Knowledge, Induction, Deduction, Authoritative Knowledge | Mode(s) |

 | Mode(s) | Experimentation, Induction, Replication |
| Teacher | Ask students questions and encourage them to use proper vocabulary and behave like scientists. Encourage experimentation.  | Teacher | Observe and monitor students making hypothesis about the number of drops to form a bubble on the penny and items inserted into water and listen to students explain to each other why they observed what they did. Observe anything else students do that is different. |
| Student | Students read and discuss procedures and record observations on the activity sheet. They also use trial and error and problem solve for the activities. | Student | Will make predictions and hypotheses for each part of the activity and record them on activity sheet. |
| Assess (look for) | Proper answers to questions, data and results observed from the experiment on their worksheet. Discussion and sharing of observations with other groups. Students showing others new ways of doing the activities. | Assess (look for) | Hypothesis written down. Some students will invent new ways of doing certain parts of the activity. |

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

I will keep asking the students questions and direct them to go to the next step in the activity if they take too long on one thing. They will have time to experiment but will have to keep the whole activity within the timeframe of the period.

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

The overarching modes of inquiry will be experimentation, induction, and curiosity. I think the students will be extremely interested/curious because water has been a part of their lives since they were born and on our side of the island over half of the students go to the beach just about every day.

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.