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

**Module 2: Chemical Aquatic Science**

Name: Justin Yamagata

Activity: Cohesion and Adhesion

1. Why did you choose to do this activity?

Seemed like the best fit for introducing concepts of adhesion/cohesion and the chemistry of water to students.

2. What are your classroom learning goals?

Get students to understand that water is a molecule that has polarity, can stick to each other, can stick to other substances, are chemically bonded, and are what makes Earth unique.

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

It addresses all the goals above.

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

11/22/12

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

SC 8.8.7 – Describe the physical characteristics of oceans.

**Ocean**

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

It will set the foundation for talking about how water dissolves ionically bonded substances like salt and therefore its molecular structure is essential in creating the oceans.

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 plan to preface it with the question: “Is water ‘sticky’? Explain.” My hope is that the students will begin thinking about how water behaves which will then get them to visualize the molecules of water when I begin the explanation of cohesion and adhesion. From there, as they conduct the activities, I will continue bring to their attention what they observe and have them connect it (explain) using the terms we discuss (adhesion/cohesion).

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.)

Explaining and having the students grasp the abstractness of the atoms/molecules and the polarities, electrons, protons, neutrons, and the types of bonding.

**Questioning and Assessment Strategies**

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

I will be asking the students to explain to me what they are seeing, then have them explain it using the terminology we’ve been using.

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

Lab follow-up questions, pair share, and random calling on students to answer questions.

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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) | Deduction | Mode(s) | Curiosity |
| Teacher | - Give follow-up questions for students to answer- Guide in thinking about how the concepts of adhesion/cohesion can be used to describe and understand what was observed in the activities. | Teacher | - Using the introductory question, “Is water ‘sticky’? Explain.”- Will use the incentive of doing lab activities as another initiation piece that draws on their curiosity to do and know what is going on. |
| Student | - Describe using the proper terms what they observed and what properties are causing the phenomena observed. | Student | - Answer the introductory question.- Thinking about “why did I ask that question” (this is standard in every class anyway) and what they will be doing for their activity. |
| Assess (look for) | - Answers to follow-up questions. | Assess (look for) | - What they already know based on the intro question |
| **INSTRUCTION** |
| Mode(s) | Authoritative knowledge |
| Teacher | - Leading lecture on atoms, molecules, polarity, bonding- Drawing diagrams, leading discussion, getting student input |
| Student | - Drawing diagrams, building knowledge, creating definition of cohesion and adhesion through lecture and discussion. |
| Assess (look for) | - Definition of cohesion and adhesion congruent to lecture and discussion.- Ability of student to use cohesion and adhesion in proper context via given examples. |
| **INVESTIGATION** | **INVENTION** |
| Mode(s) | Experimentation, Description | Mode(s) | Transitive knowledge |
| Teacher | - Give students driving questions and some direction in conducting activities  | Teacher | - Give students driving questions for activities |
| Student | - Conduct activities using previous knowledge about experimentation and transfer it to this series of activities. | Student | - Students determine how they are going to go about the investigation phase using their prior knowledge about conducting investigations |
| Assess (look for) | - Data tables, drawings and diagrams | Assess (look for) | - Observe/listen to students determine the method which to conduct each activity. |

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

I have the poster with the phases of inquiry on display in front of the class. I will try to point out which phase of inquiry the students (or myself) are in at the time and explain why each fit into the phases.

 At the end of all the activities, I will let the students reflect back on the phases and have them describe what their thought processes were for doing things like they did.

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

I want to try and focus more on deduction and description. One reason, I have been lacking in the interpretation aspect, which deduction plays well into. The mode of description is another key aspect, I feel, in helping to understand the concepts within this module, as so many are abstract in nature.

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.