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

**Module 2: Chemical Aquatic Science**

Name: Leigh Hicks

Activity: Cohesion and Adhesion

1. Why did you choose to do this activity?

To familiarize marine science students with some of the unique properties of water.

2. What are your classroom learning goals?

Students will be able to describe cohesion and adhesion.

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

Students will be able to not only describe but also demonstrate the unique properties of water.

4. What date do you plan to start this activity? 12/6/12

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

**Marine Science Standard 1: Scientific Investigation—Discover, invent, and investigate using the skills necessary to engage in the scientific process**

**Marine Science Standard 3: Oceanography —Understand the physical features of the ocean and its influences on weather and climate.**

**Ocean**

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

Students will discover the unique properties of water, the chemical structure, and how ocean water is a hospitable environment for many marine organisms.

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.

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

X 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.)

Prior knowledge from electrolysis lab, with new vocabulary introduction, will help to prepare students for this lab.

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.)

Students may struggle with understanding what causes adhesion and cohesion beyond the basic definition. This will be addressed by a review of the molecular structure of water.

**Questioning and Assessment Strategies**

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

The class will begin our activity with using a table for lab group predictions and results for activity “A”. Students will work with their lab groups to answer lab questions.

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

Students will complete an exit card as a formative assessment upon completion of class. Students will also be assessed on their response to lab questions related to their understanding of adhesion and cohesion.

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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 | Will look for accuracy of response in written questionsDiscuss answers with students | Teacher | Engaging students with a challenge and predictions for first activity |
| Student | Students will chart and compare data and answer TSI activity questions | Student | Based upon instruction about the properties of water, they make predictions with their lab partner regarding activity A. |
| Assess (look for) | Response, engagement | Assess (look for) | Participation, predictions, and related questioning |
| **INSTRUCTION** |
| Mode(s) | Authoritative Knowledge  |
| Teacher | Brief lecture on adhesion and cohesionPresent lab proceduresAssess for student understanding |
| Student | Take notes, answer questions in writing |
| Assess (look for) | Student engagement, ability to answer related questions |
| **INVESTIGATION** | **INVENTION** |
| Mode(s) | Replication | Mode(s) | Product Evaluation |
| Teacher | Answers questions, question students about their findings related to their prior knowledge. | Teacher | Assist students with activity/lab set up |
| Student | Carry out experiments, observe, record data | Student | Acquire necessary materials, ask related questions |
| Assess (look for) | Recorded data, accuracy in implementation | Assess (look for) | Engagement with lab group, proper set-up |

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

We will begin with student instruction to ensure student understanding of vocabulary and lab procedures. Curiosity will be embedded into the instruction with the class predications for activity A. Then students will invent, investigate, and interpret for each activity following the TSI activity instructions.

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

The overarching modes of this activity are curiosity and replication. Curiosity really stands out as an overarching mode because the students will be interested in seeing how their predictions compare with the actual results.

Replication is another overarching mode. The student’s ability to follow laboratory instructions and repeat a procedure is crucial for the proper execution of this lab.

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.