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

**Module 2: Chemical Aquatic Science**

Name: Joanna Lee Activity: Conductivity

1. Why did you choose to do this activity?

It was the simplest chemical TSI lesson for seventh graders to grasp without proper background.

2. What are your classroom learning goals?

 Ultimately, the goal is to cover the 7th grade life science standards, then to develop the students’ interest into becoming lifelong learners with a curiosity to learn about the world around them using an investigative, problem solving strategy. I would also like to see the student evolve through maturation in working independently so they are self-reliant while able to get along with others who are different from themselves. To accomplish this, the class is taught using differentiation so all students get varied modes of instruction so all can succeed. I use standardized grading so students learn to turn in quality work the first time and learn to revise work that is does not meet their/parents’ standard.

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

This lesson allowed students to see how the chemistry of water and its behavior has an effect on marine life. Students will see how changes in the water chemistry can affect organisms living at different levelsin the ocean.

4. What date do you plan to start this activity? Monday and Tuesday, January 14-15, 2013.

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

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| **Benchmark** [**SC.7.1.1**](http://165.248.30.40/hcpsv3/imr/report_by_code.jsp?code=SC.7.1.1) | Design and safely conduct a scientific investigation to answer a question or test a hypothesis |
| **Benchmark** [**SC.7.1.3**](http://165.248.30.40/hcpsv3/imr/report_by_code.jsp?code=SC.7.1.3) | Explain the need to revise conclusions and explanations based on new scientific evidence |

**Ocean**

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

Salinity of water affects the conductivity of ocean water. Some ocean creatures are affected by electrical currents in the water and may be able to adapt to it through its senses and may be able to defend itself.

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

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

□ 6. The ocean and humans are inextricably interconnected

**X** 7. The ocean is largely unexplored

**Preparation**

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

Students will review the water properties lesson and concepts and include an introduction of conductivity, electrical vocabulary with open and closed circuits and salinity.

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.)

Instructional struggles include just starting a new quarter, new seating arrangement, a large class size as well as new students to the class. An abbreviated review will be done with teacher arranged grouping will hopefully assist new students to the routine, strict instructions and guided exploration with teacher facilitation to make the lesson run smoother.

**Questioning and Assessment Strategies**

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

Strategies will include addressing student questions so they make predictions and inferences to come up with their hypothesis. I will ask them more questions as an answer to their questions so they discuss among themselves to find the answer or engage more in the invention phase of inquiry.

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

The assessment will be completion of the table on their worksheet and discussion among their group members. The activity completion, a closed circuit, the LED light lit up or not and their sharing during the interpretation phase of inquiry.

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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) | Technology, description, deduction | Mode(s) | Technology, description, curiosity |
| Teacher | Pose questions to students to explain what they did and observed and how it compared to from the actual results to their predictions about polar vs non-polar liquids and their properties as conductors.  | Teacher | Have supplies ready and ask students to tell how to assemble a closed circuit using the document camera Review basic assembly and demonstrate proper safety measures for meter assembly.  |
| Student | Explain the relationship between the LED light and conductivity of the liquids being tested | Student | Provide oral instruction for assembly and review safety rules |
| Assess (look for) | Explain the relationship between LED brightness and conductivity | Assess (look for) | Oral instruction for correct assembly of conductivity meter and safety rules followed |
| **INSTRUCTION** |
| Mode(s) | Authoritative knowledge |
| Teacher | Instruct students on how to conduct their investigation of conductivity. Introduce electrical circuits vocabulary and review safety rules and assign groups. |
| Student | Understand and follow worksheet with diagram |
| Assess (look for) | Following directions and answering questions on procedures for each activity |
| **INVESTIGATION** | **INVENTION** |
| Mode(s) | Technology, induction, curiosity, experimentation, description | Mode(s) | Curiosity, experimentation, description, induction, technology |
| Teacher | Further monitoring, asking questions to encourage students to make induction and deductions | Teacher | Prepare liquids for student lab use, facilitate safe use of supplies & equipment, monitor labs, ask questions to encourage experimentation |
| Student | Carry out investigations on conductivity of tap water, salt water, oil and other liquids bought to class; record data on table, | Student | Discuss and hypothesize predictions for table, gather equipment and organize materials, review safety rules |
| Assess (look for) | Record of data table for making predictions, observations, and inferences, safety rules followed  | Assess (look for) | Safety rules followed, recording of predictions on data table |

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

The students will receive directions about the construction of their design to evaluate the conductivity of water and the other solutions. I will refer to the Phases of Inquiry chart during the review before the lesson as well as after the lesson. They will complete a data table while doing conductivity tests. They will explain what they first observed, then how they decided to design their conductivity meter and analyze how it turned out. At the end, students will relate how ocean organisms are affected by the chemistry of ocean water such as salinity affects it by the organism’s adaptations.

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

 The focus mode of this lesson is basically technology and authoritative knowledge. The students will be making their simple conductivity meter to see how electrical ions behave and how salinity affects polar and non-polar liquids.

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.