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

**Module 4: Ecological Aquatic Science**

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Activity: Sampling for Abundance

1. Why did you choose to do this activity?

I chose this activity because I am looking forward to having students design their own investigation for a beach inquiry lesson using what we learn from Ecological Sampling and Sampling for Abundance.

2. What are your classroom learning goals?

My classroom learning goals are focused on inquiry, forces and motion, and waves.

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

This activity ties into my learning goals as students par take in inquiry, using equipment and tools appropriately to form and test hypothesis.

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

The plan is to start this activity on April 22nd of the year 2013 even if it rains.

5. *If applicable:* HIDOE standards this lesson will address standard 6.1.1, scientific Inquiry. Formulating and testing hypothesis

6.1.2, scientific Inquiry. Use appropriate tools, equipment, and techniques safely to collect, display and analyze data.

SC MS 1.2 Design and safely implement an experiment including the appropriate use of tools and techniques to organize analyze and validate data

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

SC MS 1.4 determine the connections among hypotheses, scientific evidence, and conclusions

SC MS 1.7 Revise as needed conclusions and explanations based on new evidence

6. Describe how this activity relates to at least one of the TSIA PD Themes.

Themes: Community, Metacognition, Science as a Human Endeavor, Observations and Inference, Modeling Science, Scientific Language, Connections

In my opinion this activity relates and connects to all the TSIA PD Themes, working as a team, thinking individually and together on the connections being made, that as scientists we have a responsibility to society, to develop observation skills and inference making based on facts as we do science like older scientists do, using scientific language as we communicate our findings and our learning to establish connections between ourselves and other scientists.

**Ocean**

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

To connect to the ocean I will discuss how sampling can be useful to determine what is in an environment on land and how this may be a reason why we know so little about the ocean which is all around us.

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

□ 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**

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

We will review our last activity, Ecological Sampling, and our M & M results and activity questions.

10. 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 can see that this activity will have to be developed through actually doing the activity prior to discussions with students. Just reading the background information will be over their heads with the vocabulary used.

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

What types of questioning or approaches to discussion will you take to support student

engagement and learning? See questioning handout for suggestions (Mod 3 Binder under “TSI Pedagogy and online in Mod 3 PD section)

To help my students meet my learning goals, I will use ‘extending’ question types to have students extend their responses for clarification and ‘lifting’ as I push students to think away from what is comfortable and known.

12. What ***TSI practices of inquiry teaching strategies*** will you focus on implementing to help your students meet your learning goals?

See TSI Practices of Inquiry teaching strategies handout for suggestions (Mod 4 Binder under “TSI Pedagogy” and online in Mod 4 PD section)

The teaching strategy for this activity will be ’teacher as research director’ and ‘science as a discipline’ because I want students to recognize that there is multiple pathways to knowledge generation, and that my expectations are that they exhibit the ‘demeanors of scientists’, as they work with each other. Even though my tongue gets twisted around words sometimes, I like using the vocabulary we are covering to make those relationships stronger. I want to encourage student input and feedback so that this activity has ownership and they are connected. As the activity nears its goal, the ‘teacher as research director’ comes into focus as I engage students in the practices of science.

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| Use the following table to plan your lesson using TSI.  For each phase:   * **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 |

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| **INTERPRETATION** | | **INITIATION** | |
| Teacher | I will have students reflect on the gathered data.  I will use questioning strategies for clarification and lifting purposes. | Teacher | I will establish curiosity by showing the tools that will be used for this activity, the transect and the quadrats. |
| Student | Students will record team data and class data for reflection on methods. | Student | The students will look at the tools to be used. |
| Assess | I will assess students individual thinking through the activity questions, student engagement and what would be the next step | Assess | To assess their understanding they will check with each other on what the tools are to be used for. |
| **INSTRUCTION** | | | |
| Teacher | I will have students review the last activity questions and then suggest that we take the sampling activity to a larger scale. I will have them ready their notebooks. I so want to take them outside for this sampling for abundance activity. | | |
| Student | The students will check their responses with each other for clarity and talk with each other to establish their understanding of their partner’s responses. | | |
| Assess | I will assess this activity step by student engagement and scored response sheet. | | |
| **INVESTIGATION** | | **INVENTION** | |
| Teacher | I will have students lay out the transects, observe the method they used to lay out of the transects, demonstrate the use of the taking on samples based on the distance they agree on. The use of the quadrants for gathering data. | Teacher | I will ask students what they think these tools are to be used for and then give them the vocabulary to be used in this activity.  I will bring students outside the classroom under the large trees and ask them what is most abundant under these trees? |
| Student | Students working together will notice how they laid out the transect. Work together on taking information every data point. Use quadrants for every data point | Student | Students will be creating predictions based on prior knowledge of the previous activity and outside school experiences |
| Assess | I will assess students by the focus they have for the task and the data collected at the data points | Assess | I will assess this activity with student engagement and interest level |

11. Briefly describe how you will guide your students through the TSI Phases of Inquiry. (You are the research director of your classroom, and thus guide or facilitate the learning in your classroom, even if an activity is very student-directed).

As the ‘research director I will engage in the instructional phase, and develop curiosity in the initiation phase, then push them into making their own predictions in the invention phase. I will facilitate the investigation phase as I ask students to explore ideas and methods using questions directed to the sampling activity and then students in the interpretation phase will have time to evaluate the outcome through responses,

12. What *overarching* TSI mode(s) will you focus on for this activity? Why?

Modes: Curiosity, Description, Authoritative knowledge, Experimentation, Product evaluation, Technology, Replication, Induction, Deduction, Transitive knowledge

The overarching TSI modes will be authoritative knowledge as I explain how to use quadrats and transects, and description as the students describe what they found using the quadrats.

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.