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

**Module 4: Ecological Aquatic Science**

Name: *Dan VanRavenswaay*

Activity: *Sampling for Abundance*

1. Why did you choose to do this activity?

 *a) It’s a required activity for our TSI-A training.*

 *b) This looks like a great way to practice transecting before taking kids into*

 *the field…something I hope to do more of in the near future.*

2. What are your classroom learning goals?

 *That my students have opportunities to see and practice what scientists do.*

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

 *Very nicely. And, this follows the Sampling Design lesson (w/ M&M’s) so they*

 *have already been introduced to several of the important concepts, e.g. bias,*

 *random sampling, etc.*

4. What date do you plan to start this activity? *Tuesday, May 14, 2013*

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

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

*Several come to mind with this lesson. We will be comparing three common methodologies (metacognition). We are modeling science by practicing commonly used field methods. We will making observations.*

**Ocean**

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

*I can give examples of marine surveys I’ve been a part of using these methodologies and others touched on in the reference materials: I’ve done quadrate percent cover in the NWHI. Belt transects on the Big Island. And transect point intercepts in the Philippines.*

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

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

X 6. The ocean and humans are inextricably interconnected

X 7. The ocean is largely unexplored

**Preparation**

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

*We just completed the Sampling Design lesson the week before I’m doing this lesson. Some of the terminology should still be fresh in their minds. The slides that were shared with us during and after the Mod 4 workshop will be very useful for*

*this lesson.*

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.)

*\*To have data that compares the three benthic survey methods I’d like to leave the*

*simulated habitat set up for a few days. This may be a problem for my impulsive students who have a hard time not messing with stuff in the room.*

*\*The significance of the math is beyond many of my students.*

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)

 *All of them? It seems like I’m constantly focusing, redirecting, and asking*

 *them questions to get them to recall what they’ve learned and/or are currently*

 *observing in order for them to come up with the answers to questions they ask*

 *me during these lessons.*

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)

*Science as a Discipline: We’re using a common field science methodology.*

*Teacher as Research Director: Once they’ve set their protocols, let students collect data with as little input from me as I can get away with.*

*Instructional Strategies: Review and then give additional opportunities to practice.*

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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 | Initiate and Guide discussion of comparison of our three sampling methods.  | Teacher | Set up a portion of my classroom with the simulated benthic habitat.  |
| Student | Students complete the appropriate  | Student |  |
| Assess  | Students do the math and graphs, and contribute to the discussion that follows.  | Assess  | Exhibit some curiosity about what they’re going to be doing.  |
| **INSTRUCTION** |
| Teacher | Guide students through the procedures and discussions.  |
| Student | Follow directions and participate in discussions. Ask questions as needed.  |
| Assess  | Attention and Participation. |
| **INVESTIGATION** | **INVENTION** |
| Teacher | Help students plan and collect data.  | Teacher | Raise the question: What would you do next time? |
| Student | Students do the needed planning before collecting data, then collect and record the data on the tables provided.  | Student | Students share ideas of how they could improve on what they already did.  |
| Assess | Student complete the data collection and analysis.  | Assess | Participation by as many of the students as possible.  |

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).

*See table above. Initiation > Instruction > Investigation > Interpretation > Invention*

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

*Replication & Product Evaluation.*

*Collecting and analyzing the data may take the largest portion of time, but they’ve collected data before. Trying out multiple sampling methods on the same set of data and then comparing the results is what’s new.*

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.

*As I mentioned in a TSI-A website discussion and again above, I think this is a great lesson to prepare students for field studies, especially if you have limited opportunities tor time to practice in the field.*