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

**Module 4: Ecological Aquatic Science**

Name: Kathryn Smith

Activity: Sampling Design

1. Why did you choose to do this activity?

This activity helps the students to focus on standardization and replication in sampling.

2. What are your classroom learning goals?

I’m expecting the students to grasp the importance of accurate sampling techniques along with standardization and replication when sampling.

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

This lesson helps my students’ further study sampling techniques and use newly acquired math skills (fractions to percents).

4. What date do you plan to start this activity? 5/6/13

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

SC 5.1.2 The Scientific Process: Scientific Investigation

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

Connections: This lesson illustrates the connections between Science and Math. My students have recently been learning how to report numbers as fractions, ratios, decimals, and percents. This lesson will connect to these new math skills.

**Ocean**

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

We recently conducted the Sampling for Abundance lesson. I will talk about sampling design in a tide pool using what we did and learned in the previous lesson.

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

X 7. The ocean is largely unexplored

**Preparation**

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

I will review our Sampling for Abundance lesson and discuss how this lesson relates. I will also inform students that they can use the math skills they have to complete the 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.)

I will have to make a deal with the students to make sure they don’t eat any of the M&Ms before we finish the lesson.

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)

I’ll be listening to the students carefully, accepting what I hear, and then tie the students’ responses to initiate other questions. I will:

Ask questions that elicit comparisons or contrasts (i.e. Comparing their results to the M&M company data on the percentages of colors)

Ask questions that connect to their everyday life (i.e. Why did you choose this \_\_\_\_\_\_\_(color) as the most or least abundant? Has that been your personal experience?

Ask questions that gain insight into student thought processes (i.e. What might happen if we increase the number or sample size of the M&Ms we take from the bag?)

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)

At this point in our TSI class, I am using all of the practices of inquiry to varying degrees in all of my lessons. I believe I was using some of all of them prior to this course, but now I am much more mindful of them before and during teaching a lesson. As I go through the list after my lesson, I find I implement even more of what I planned from the list during my teaching as I ‘get in the flow’. I have become much more of a facilitator across my curricula than the instructor I used to be.

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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 | Will apply the lesson to the real world, in and out of the classroom | Teacher | Tie the lesson to sampling in the real worldLink the lesson to Sampling for Abundance |
| Student | Will discuss how the lesson applies to the real world | Student | Discuss how sampling design was implemented in previous lesson and how it can apply to real world sampling |
| Assess  | Listen carefully to the students and ask further questions | Assess  | Listen carefully to the students and ask further questions |
| **INSTRUCTION** |
| Teacher | Will discuss experiences, go over methods, help students compare results |
| Student | Critique their methods, discuss their experiences, compare their results |
| Assess  | Ask students to the board to list results and facilitate their comparisons along with final percentages of colors |
| **INVESTIGATION** | **INVENTION** |
| Teacher | Provide sample materialsGuide the students through data charting | Teacher | Will provide sampling definitionsAsk for predictions and hypothesesFacilitate throughout as needed |
| Student | Will sample the bagCollect the dataConduct data analysis | Student | Make predictions and create hypothesesFollow the procedures |
| Assess | Observe how students follow procedures | Assess | Observe paperwork and date resultsListen to students comparisons and help record the data |

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).

I will ask inquiry-based questions.

I will listen carefully to students’ answers and discussions.

I will act as the facilitator or research director allowing the lesson to be student-driven.

I will ask students to periodically pause the activity in order to facilitate discourse.

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

Curiosity: Students will wonder what colors are in the bag and in what proportions.

Deduction: Students will make a prediction about what color will be most abundant and what color will be least abundant. They will then observe what happens and compare their results to each other and to the factory data.

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.

I have 50 minutes to conduct this lesson and hope that I am able to complete the entire procedure.