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

**Module 4: Ecological Aquatic Science**

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Activity: M&M Sampling

1. Why did you choose to do this activity?

Target activity, engaging way to show sampling formats

2. What are your classroom learning goals?

To set procedures and guidelines for sampling surveys that drive hypothesis in further studies.

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

This is mirrored in Standard one in designing and executing field experiments and data collection.

4. What date do you plan to start this activity? Apr 2

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

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| **Scientific Inquiry** *Determine the link(s) between evidence and the conclusion(s) of an investigation* |
| **Scientific Inquiry** *Communicate the significant components of the experimental design and results of a 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

Observations and Inference is the PD theme this will align with, as it is making a question drawn from past knowledge on what is the most/least abundant in a bag of plain M&M’ s. Observations in the sampling draw and compared with others.

**Ocean**

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

The Earth is one big ocean and it is largely unexplored. I plan to keep the students in the dark about what we will sample referring to it as an organism. And applying the theme to collection in the reef zone.

8. 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

□ 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 want to use the Pizza square and talk about what sampling is. Why did it instead of 100% coverage. Go over the types and procedures, make a plan, prediction and gather data.

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.)

The general misconceptions of language use and getting vocabulary terms in line will be some of the struggles. I also see keeping the kids from eating their subject study pieces.

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 am planning to use the questioning strategies to summarize, elaborate and elevate their thinking about sampling and ocean settings.

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)

I am looking at instructional strategies: teacher as research director, and communication between each other, groups, and whole class.

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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 | Explain how sampling is used by scientists and how it provides a lot of information for us. | Teacher | Explain to students about what sampling is. Tell them we will practice the concept. Do not reveal M&M yet |
| Student | Use of sampling technics to collect data | Student | Write notes, provide examples they have seen. Look at possible uses. |
| Assess | Use in real-life situations outside of class. | Assess | Hoe engaged they are on the topic, judge by off topic behavior. |
| **INSTRUCTION** | | | |
| Teacher | First set up what are types and procedures of Sampling, Focus on random, size, collection, safety, and census. | | |
| Student | Provide feedback to questions. Self-reflection of personal experiences. Predictions and conclusions with data gathered by individual and class. | | |
| Assess | Students answering questions and staying on task. Students working together in the activity- staying on task | | |
| **INVESTIGATION** | | **INVENTION** | |
| Teacher | Build up to what they are sampling, Safety, pass out organisms. | Teacher | Give definition of “sampling”.  Encourage to predict and hypothesize. |
| Student | Don safety equipment, collect sample size from bag | Student | Come up with class procedures. Set sample size, how to collect and keeping it random, eliminating Bais.  Predict and Hypothesize. |
| Assess | Safely work and keep accurate data. | Assess | Written hypothesis.  Procedure is reasonable. |

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 want to keep the idea of MM out of the equation as long as possible to drive the allure. I want to cover types of sampling and have them apply to their own experiences. Starting off with pizza activity then working in reef zone monitoring to build up to the practice part. Then conduct the prediction, sample, data and compare results, like we did in class. All the time asking students to put their own interpretation on the activity as I guide them through each step.

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

I would like the students at this point to be able to pick three of the Modes we have covered in other lessons and point out how they are represented n the activity and the reason for it. Hoping for induction, Replication, and transitive knowledge.

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.

