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

**Module 4: Ecological Aquatic Science**

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Activity: Plankton Samples

1. Why did you choose to do this activity?

This activity seems to tie in well with the TSIA pedagogies, as well as our unit on ecology and study of “samples”.

2. What are your classroom learning goals? Students will become familiar with marine microbe collection techniques, observe and identify organisms from multiple samples, and study the role of plankton both within the food web and as a major producer of oxygen on Earth.

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

This activity ties into more than one learning goal. It also allows students to use recently acquired knowledge about sampling design to assess the methods used for the plankton samples. The lesson allows the student to be scientist.

4. What date do you plan to start this activity? 4/23/13

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

**Standard 1: Scientific Investigation—Discover, invent, and investigate using the skills necessary to engage in the scientific process**

**Standard 4: Ecological Systems—Understand the locations and characteristics of marine ecosystems.**

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

Observations and connections are two themes of TSIA that strongly correlate to this lesson. Students will be asked to make observations of the organisms they must identify in this activity, and making connections to the sampling design lesson in relation to how our plankton samples are collected.

**Ocean**

7. Describe how you will connect this activity to the ocean: This activity is connected to the ocean entirely due to the nature of the samples and topic. If we had more time or resources it may be interesting to compare microbial life in fresh water to our marine samples.

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

□ 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.

X 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

□ 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 complete a pre-lab activity prior to this activity that will include a ppt introduction on plankton and related vocabulary. We will also discuss harvesting/sampling techniques as they relate to our current ecology studies.

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.)

Some students may have difficulty identifying plankton as they are moving about in the slide or petri dish. Other students may begin the lesson with misconceptions about holoplankton vs. meroplankton or the even the basic difference between zooplankton and phytoplankton. I hope to cover this in a pre-lab introductory lesson as well as review prior to the lab activity.

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 focusing, summarizing, and possibly clarifying questioning strategies for this lesson.

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 plan to use “Teacher as research director, students as scientists” strategies to help meet our learning goals.

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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 | Facilitates classroom discussion sharing of species found, number of species found, and locations found | Teacher | Shares activity, where samples are from and how they were collected. Tie in recent sampling activities and compare/contrast methods used. |
| Student | Analyze data related to types and number of types of species found at differing locations | Student | Asks questions, shares personal experiences and opinions on sampling methods/design |
| Assess | Data colletion, answering related questions | Assess | Students recall and comment on sampling methods, recall some new vocabulary |
| **INSTRUCTION** | | | |
| Teacher | Pre-lab review of vocabulary and instructions for viewing, identifying, and documenting marine microbes. | | |
| Student | Listens, answers review questions, asks questions | | |
| Assess | Answering questions | | |
| **INVESTIGATION** | | **INVENTION** | |
| Teacher | Monitors classroom lab activity, answers questions, directs “student scientists” | Teacher | Guide students through collecting their own samples, microscopes, and lab tools for activity with partner |
| Student | Conducts plankton research with partner, records observations | Student | Acquires necessary materials, identification sheets, and documentation materials |
| Assess | Observations recorded, identification techniques followed | Assess | Student preparedness with all necessary materials |

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).

Initiation- Sharing samples and techniques for sampling

Instruction- How the class will observe and document findings within sample

Invention- Set up of lab activity

Investigation- Activity and observations

Interpretation- Compare student data

Instruction- Discuss sampling techniques post-observation and possible alternatives to design

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 I am planning on are description and induction. Students must be descriptive in recording of observations both written and drawn. Students will use induction to hypothesize about findings/data shared as a class.

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 plan to follow a portion of the lesson as taught using the c-more science kit activities. This allows our class to use invaluable materials that we would not otherwise have the access to, as well as the identification guides.