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

**Module 2: Chemical Aquatic Science**

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Activity: Phases and Modes of Scientific Practice

1. Why did you choose to do this activity?

This activity introduced the learning goals and project-based learning for semester 2. Students will review the scientific method and learn how to use inquiry-based science with project-based learning.

2. What are your classroom learning goals?

One goal is for students to improve meta-cognition and think more like scientists using the scientific method for procedural writing and Phases and Modes of Scientific Practice for inquiry. Students will practice following instructions and documenting actions and reactions in scientific experiments and observations.

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

Students will begin an underwater robotics project in a few weeks. This activity laid the foundation for inquiry-based projects.

4. What date do you plan to start this activity? January 14, 2012

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

**Strand 1, Standard 1, Grade 7: Scientific Process, Scientific Investigation. Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION: Discover, invent, and investigate using the skills necessary to engage in the scientific process**

**Ocean**

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

Students will wear their "scientist hats" many times this semester with projects focused on the ocean, such as underwater robotics, reef teach, and recreating polynesian navigation techniques.

7. 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**

8. How will you prepare your students for this activity? (For example, review of prior knowledge.) I will follow the suggested lesson plan in the TSI manual but include an anticipatory activity to get students interested in the subject.

9. 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 am worried that students will be confused about why we're using the TSI model and not the Scientific Method, or when to use one method instead of the other. I am still grasping this concept so I hope to deliver a clear lesson instead of a confusing one. I also worry that students will be bored *or* get distracted by the candy in the box and completely miss the point of the activity.

**Questioning and Assessment Strategies**

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

I will ask students how Invention differs from the Scientific Method step of Hypothesis. I will ask students to evaluate which method they prefer. I will ask students to discuss why one method might be better used in certain situations than the other.

11. What *assessment strategies* will you use to help your students meet your learning goals and monitor their progress? I will assess students' understandings through observation and their Cornell Notes' summary.

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| Use the following table to plan your lesson using TSI.  For each phase:   * **Mode(s):** List the Mode(s) of Inquiry you will incorporate * **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   \*Modes: Curiosity, Description, Authoritative knowledge, Experimentation, Product evaluation, Technology, Replication, Induction, Deduction, Transitive knowledge |

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| **INTERPRETATION** | | **INITIATION** | |
| Mode(s) | Curiosity, Transitive Knowledge | Mode(s) | Transitive Knowledge, Description |
| Teacher | Anticipatory Set | Teacher | Questioning strategies |
| Student | Using prior knowledge to complete the anticipatory set | Student | Involved in discussion. Writing Cornell Notes. |
| Assess (look for) | Did it work according to plan?  Were they able to answer questions correctly? | Assess (look for) | Engagement. Intelligent questions and answers. |
| **INSTRUCTION** | | | |
| Mode(s) | Description, Transitive Knowledge | | |
| Teacher | Describing Phases of Inquiry | | |
| Student | Active Listening and taking notes. | | |
| Assess (look for) | No blank expressions. Completing Cornell Notes | | |
| **INVESTIGATION** | | **INVENTION** | |
| Mode(s) | Experimentation | Mode(s) | Authoritative knowledge, Deduction, Transitive knowledge |
| Teacher | Monitoring progress. | Teacher | Monitoring team discussions. |
| Student | Looking for clues and answers | Student | Coming up with a hypothesis. |
| Assess (look for) | Is it working? | Assess (look for) | Does it make sense? |

12. Briefly describe how you will direct your students through the Phases of Inquiry.

Smoothly!

Since this lesson plan introduces the TSI Phases of Inquiry to the students, I will use two class periods to direct the students through the Phases of Inquiry. The first day, we will use the anticipatory set and a hands-on activity (from the manual) to walk through the Phases of Inquiry. On Day 2, students will play a game to organize the Phases of Inquiry in order based on different examples.

13. What will be the *overarching* mode(s) of this activity? Why?

The overarching modes are curiosity, description, deduction, and transitive knowledge. Students will need to be curious to understand how they TSI model is different from the Scientific Method. They will use their transitive knowledge to discuss why the TSI model is better for project-based learning, and use description to write a short summary about their thoughts (also an example of metacognition). They will use deduction to figure out the anticipatory set and the Day 2 activity.

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.