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

**Module 3: Biological Aquatic Science**

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Activity: Language of Science

1. Why did you choose to do this activity?

I used this activity as a stand-alone review lesson of the scientific process and the language that is involved when we practice and share scientific study.

2. What are your classroom learning goals?

 I will be able to:

* Define the terms opinion, hypothesis, and theory.
* Apply the terms to specific examples.

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

 This activity helped me generate learning goals for the day. Accomplishing the activity would mean accomplishing the learning goals.

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

 February 22nd

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

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:

I related the lesson to the ocean by some of the examples that were used for “hypothesis”, “theory”, and “opinion”.

I didn’t necessarily see greater engagement among students when they were working on these examples, but the overall level of engagement during the activity was high, so there wasn’t much room for comparison.

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.)

 Students will be prepared for the activity by a brief lead-in discussion about the scientific community and how science is a field that does things in a specific way using specific and meaningful language. The point of this conversation will be to activate the prior knowledge students have of the scientific process.

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 predicting that student investment and engagement might be a possible issue during this activity. For this purpose, I will be using some of the modifications suggested by a fellow TSI-er, Dan Spitler. At the follow-up he shared both a worksheet activity and a gallery walk that he used to make the activity more of a group-oriented lesson. I will be employing both of these strategies.

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

During the gallery walk, I will walk around the room and ask students extending questions, pushing them to give me reasons for their categorizations. This will ensure that students can independently think about the meaning and correctly classify these three terms – not just rely on classmate answers.

After the conclusion of the gallery walk, I will ask lifting questions that have students distinguish between conflicting student opinions, have students convert opinions to hypotheses, and have students explain how they would test hypotheses. This will show that there are different ideas in the room and that classification of terms is not always a cut-and-dry process.

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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 | Circulating the room monitoring the gallery walk asking extending questions and supervising student progress. | Teacher | Will present the idea of the scientific community, which has a specific way of doing things that comes along with a specific vocabulary. |
| Student | Gallery walking, categorizing each statement and writing why. | Student | Silently listening with eyes on the teacher and hands raised silently to ask questions. |
| Assess  | Are students engaged and participating? Are they able to synthesize an answer and explanation? | Assess  | Are students silent with their eyes on me? This will tell me: Are they listening?  |
| **INSTRUCTION** |
| Teacher | Will be presenting the definitions of opinion, hypothesis, and theory to students. |
| Student | Silently listening with eyes on the teacher and hands raised silently to ask questions. They will be recording definitions on their note sheets. |
| Assess  | Are students silent with their eyes on me? This will tell me: Are they listening? Also, are students recording ALL of the definition? |
| **INVESTIGATION** | **INVENTION** |
| Teacher | Monitoring student progress, narrating student pairs who are conducting effective group work. | Teacher | Ask lifting questions to lead students to a higher synthesis and connection between the terms. |
| Student | Working in pairs fixing misused, bolded terms. | Student | Engage in a class discussion to change opinions to hypotheses and explain how hypotheses would be tested. |
| Assess | Are ALL students actively engaged in the activity? Are they working cooperatively? | Assess | Are all students engaged in the discussion? Can they synthesize these challenging ideas? |

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 – Lesson introduction: Science as a discipline has a special language.

Instruction – The definitions and examples of opinion, hypothesis and theory will be given to students

Investigation – Students will work in pairs to manipulate the misused terms in sentences.

Interpretation – Students will gallery walk and write what they think each term is and WHY.

Instruction – Whole-class discussion of how the students categorize each statement

Invention – Students will turn opinions into hypotheses and explain how they would test hypotheses.

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

Deduction – An overarching mode because the goal of the lesson is to teach students the \*general\* meaning of the terms opinion, hypothesis, and theory and have them apply them in the analysis of specific examples.

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.