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

**Module 4: Ecological Aquatic Science**

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Activity: Design Your Own TSI Lesson – Moth Hunt Activity

1. Why did you choose to do this activity?

The Moth Hunt activity is something I do every year with my students, because it’s fun for the students yet they still learn about adaptations and how it relates to the environment.

2. What are your classroom learning goals?

* Students will be able to make hypotheses on what the surviving moths look like, based on the environment/habitat (classroom)
* Students will be able to identify common traits in the surviving moths, and provide explanations for why those moths survived
* Students will be able to analyze how the surviving moths’ traits contributed to their survival in their environment/habitat (classroom)
* Students will be able to analyze how the non-surviving moths’ traits did not contribute to their survival in the environment/habitat (classroom)

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

The Moth Hunt activity will give my students a fun way to learn more about adaptations and how they are closely tied to the environment.

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

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

* 7.5.4: Analyze how organisms’ body structures contribute to their ability to survive and reproduce

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: Students will have to make close observations of the moths’ environment in order to properly design their moth to survive. They will also have to infer what will be the common traits of the surviving moths, based on their observations of the classroom.
* Modeling Science: This activity is a simulation of how adaptations help an organism survive in a particular environment.

**Ocean**

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

A follow-up question will be to ask students what kinds of adaptations they see in ocean life.

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

**X 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**

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

I will arouse their curiosity by announcing that we will be playing a game today. I will also have the students talk to their partners about what it means “to adapt”. This should be a review because we’ve discussed adaptations in previous lessons.

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.)

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| INSTRUCTIONAL ISSUES | HOW I WILL ADDRESS THE ISSUES |
| Students may think it’s not fair that I will be “hunting” for the moths so up close (when I’m supposed to be a bird). | I will explain to them that I’m hunting without my glasses, to simulate that I’m actually a bird flying high in the sky, far away from the moths. |
| Students not participating in class discussion | Students already know that they are accountable to participate in class discussions, due to my popsicle stick name-calling. I will walk around the room to monitor conversations in groups and/or partners. |

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)

* Focusing: students typically have a lot of fun with this activity, and I will probably need to do a lot of focusing questioning to get the students focused back on the purpose of the activity
* Formulating a Hypothesis: students will be asked to hypothesize what traits they think most of the surviving moths will have
* Analyzing Results: students will answer follow-up questions to help them analyze the results of the moth hunt
* Summarizing/Clarifying: students will write a constructed response at the end of the activity to summarize how the moth hunt activity did and did not simulate the natural selection process

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)

* Science as a Discipline
* Teacher as Research Director
* Metacognition
* Communication
* Assessment & Guidance
* Instructional Strategies

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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 | Display the surviving and non-surviving moths on the board. Provide guidance as students are answering follow-up questions. | Teacher | Announce to students that we’ll be playing a game (to arouse curiosity). Describe game to students. |
| Student | Answer follow-up questions. | Student | Talk to partner about what it means to “adapt”. Share answers with class. |
| Assess | Follow-up questions will be included in the overall assessment. | Assess | Pull popsicle sticks to randomly call names for students to share their answers on what it means to adapt. |
| **INSTRUCTION** | | | |
| Teacher | Teacher will lead a class discussion on the common traits of the surviving and non-surviving moths. | | |
| Student | Make observations of the surviving and non-surviving moths. Participate in class discussion. | | |
| Assess | Class discussion will help students to answer the follow-up questions, which is part of the overall assessment of this activity. | | |
| **INVESTIGATION** | | **INVENTION** | |
| Teacher | Teacher will hunt for moths in a 2-minute time frame. | Teacher | Instruct students to look around the classroom environment. Tell students to brainstorm ideas of how to design their moths, and where to hide them. |
| Student | Students will design their moths and hide their moths. | Student | Brainstorm ideas in partners or groups. Make a hypothesis about what traits the surviving moths will have in common, based on their observations of the environment. |
| Assess | Check to make sure that all moths are accounted for at the end of the hunt (survivors and non-survivors). | Assess | Students will write their hypotheses in “If, then, because” format; this will be graded as part of their overall assessment. |

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 stick post-its on my poster to show the students which phase of inquiry we are currently in throughout the activity. I’ll also draw arrows on the poster to show students the “path” we took while engaging in inquiry.

I will also stick post-its on the overarching modes of this activity, just like how the TSI facilitators do in the module workshops.

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

* Replication: students will see if there are any trends/patterns in the traits of the surviving moths and the non-surviving moths
* Product Evaluation: students can compare different methods of coloring or hiding to see which was more effective in making a moth adapt to the classroom environment
* Induction: students will make hypotheses on the surviving moths’ traits, based on their careful observations of the classroom environment.

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.