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

**Module 3: Biological Aquatic Science**

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Activity: Modeling Microevolution

1. Why did you choose to do this activity?

This activity seems like an appropriate tie-in to discussing marine adaptations for the organisms we study this semester (both fishes and invertebrates).

2. What are your classroom learning goals?

Students will be able to explain how and why some adaptations occur within a population.

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

This activity models how adaptations occur on a small scale, but can be translated to a greater scale.

4. What date do you plan to start this activity? 3/11/13

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

Standard 5: Diversity, genetics, and evolution

**Ocean**

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

We will use the power point slides to show the adaptations of different fish species. We will also discuss additional marine species we are currently studying and adaptations that have developed over time.

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

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**

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

We will review some DNA basics and how mutations occur. We will use some of the TSI power point slides to spearhead this discussion about genetic mutations.

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 expect some students to struggle with recalling some of the terms related to genetic mutation. We will hopefully address this with the review. I plan to assess their prior knowledge with a warm-up question regarding DNA and genetics.

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

In our initial instructions/discussion I plan to use clarifying and focusing questions. I hope that after the activity students will be able to answer extending and summarizing questions.

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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 | Asks students to share results and discuss some of the questions on the activity sheet. | Teacher | Warm-up question: What do you know about genetic mutations? |
| Student | Share results/graph on the elmo and discuss related questions. | Student | Writes down a few key terms that they recall from biology class, any other prior knowledge |
| Assess | Students see patterns in results; can identify how genetic mutations occur in populations, etc. | Assess | Student response and input will help direct how much authoritative knowledge is needed during the instructional phases. |
| **INSTRUCTION** | | | |
| Teacher | Teacher will review genetics/genetic mutations to an extent based upon initiation responses. | | |
| Student | Will contribute to the instructional phase by sharing prior knowledge with classmates. | | |
| Assess | Student input and prior knowledge, appropriate use of vocabulary terms | | |
| **INVESTIGATION** | | **INVENTION** | |
| Teacher | Monitors student progress, answers questions | Teacher | Will help students identify instructions and materials. |
| Student | Completes activity and works with shoulder partner to answer related questions. | Student | Will read through instructions and identify necessary materials. |
| Assess | Students making connections and comparing data to other groups. Graphing results and answering questions. | Assess | Students preparing to engage in the modeling microevolution activity, working with shoulder partners, asking appropriate questions. |

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).

Students will begin by discussing their knowledge of genetic mutations, have some instruction to fill in any gaps, and then engage in the modeling microevolution activity. Students will then work with partner on graphing data and collaborate on responses to the activity questions. As a class we will look at results, students will share data, and discussion regarding activity questions will take place.

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 modes will be replication and description. We will engage in replication as we repeat the activity at the start of each generation. Students will be asked to share results and patterns amongst the class. They will need to put to words what took place, and use description to answer related short answer questions.

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.