**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?

 I had to teach evolution previously, earlier in the year, according to the ‘pacing

 guide I was meant to follow for the year. It went badly – lots of resistance

 because the discussion went straight to macroevolution concept. An

 opportunity to re-do.

2. What are your classroom learning goals?

 To help students understand how microevolution can effect a small group of bacteria.

 Grasp that it takes time, survivors, reproduction options and numbers to effect a

 population. I have a constant theme of hands on and fun learning objectives. This

 activity was both.

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

 I got to re-visit an unsuccessful coverage of a topic and make it more meaningful

 by ‘bringing it down a notch’. I could better understand the concept and therefore the students were more willing to ‘come with me’.

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

 February 7th and 8th

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

7.5.6

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| Explain why variation(s) in a species' gene pool contributes to its survival in a constantly changing environment |

7.5.4

Analyze how organisms' body structures contribute to their ability to survive and reproduce

7.1.3

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| Explain the need to revise conclusions and explanations based on new scientific evidence |

7.1.2

Explain the importance of replicable trials

7.1.1

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| Design and safely conduct a scientific investigation to answer a question or test a hypothesis |

**Ocean**

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

Since it’s all one, connected ocean, contamination and disease can have far reaching impacts. “Germs” are small and there changes can effect many species.

7. Select the Ocean Literacy Principle(s) that you anticipate this activity will address. (check all that apply)

X 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.)

 Re-visit/remember evolution reading and discussion from past class. Talk about

 the concepts of not effectively saying what you wanted to or how you wanted to

 and that an option to re-do something can be beneficial to all involved. Discuss

 who’s been sick and seen it pass on to someone else. Who’s taken antibiotics? Can bacteria get “stronger”?

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.)

My last attempt at evolution just simply reinforced their pre-existing misconceptions.

Re-defining evolution might be hard. The game was a bit confusing for me at first

so I hope they will ‘get it’. I have some very low performing students that are surely

going to struggle. Will choose the partners for this activity.

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

 Accepting and Clarifying

 Focusing Discussion

 Withholding Judgment

 Accepting Feelings

 It’s a heated and personal issue for some so keeping the focus through

 these strategies will help me and the students have a ‘safe’ learning

 environment.

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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 | Discuss replication, re-define and emphasize the importance of it.Variation happens! | Teacher | Talk about making mistakes and the chance of revisiting to make it better. Discuss being sick, being on antibiotics and what they do |
| Student | Re write definition of replication in lab notebooks. Discuss and report results. | Student | Listening and questioning in pairs and with whole class. |
| Assess  | Participation in results given to chart as a class. Answer activity questions individually at end. | Assess  | Engaged questioning. Listening. Actively participating in game. |
| **INSTRUCTION** |
| Teacher | Discuss how to ‘play game. Demonstrate a couple of rounds all of the way through. |
| Student | Listening, referring to notes on board. Obtaining materials, recording, reflecting, answering questions. |
| Assess  | Circulate and check that all are participating. Answering questions, helping partner, sharing and comparing with whole group. |
| **INVESTIGATION** | **INVENTION** |
| Teacher | Encourage discussion with partner about emerging patterns. Circulate to all pairs. | Teacher | Ask for predictions and check for understanding on procedures. |
| Student | Playing the game, recording results, discussing with partner | Student | All make predictions in lab notebooks |
| Assess | Taking turns, recording, worksheets (table and graph) are graded | Assess | Lab notebooks and worksheets graded |

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).

Instruction – admit when something was done less than satisfactorily and ask for an opportunity to re do it. Could also be initiation. Instruction on game ‘rules’ and procedures and about variation and diversity. Let them investigate through ‘playing’ and recording during the game. Interpret via graphing and sharing out and discussion as whole group.

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 – to see if results are the same or different across 14 pairs to discuss viability.

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.