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

**Module 3: Biological Aquatic Science**

Name: Kevin Johnson

Activity: Fish Imprinting, Gyotaku.

1. Why did you choose to do this activity?

It is mandatory.

2. What are your classroom learning goals?

I would like to get students to handle fish and think about their hydrodynamics.

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

Not at all, really. It is a chemistry class.

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

February 13, 2013.

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

**Benchmark** [**SC.BS.5.2**](http://165.248.30.40/hcpsv3/imr/report_by_code.jsp?code=SC.BS.5.2)**, Biological Evolution.** Use the theory of natural selection to analyze the differences between related organisms.

**Ocean**

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

Well, fish frequently come from the ocean. So we will discuss how strange it would be to live on Hawaii and not handle a fish. Because, the ocean supports a great diversity of life and ecosystems and fish are a major part of that.

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.

x 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 plan a brief summary of how atoms make molecules by forming bonds and those molecules make cells and living organisms and these fish are the result of chemistry and chemical evolution.

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 anticipate it will be difficult to get some students to actually handle and manipulate real fish.

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

 All of them.

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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 | Examination of how effectively the prints captured the details of the fish anatomy. | Teacher | Start an open discussion of how effectively fish morphology reflects adaptations to its ecology. |
| Student | Self-assess of how effectively the prints captured the details of the fish anatomy. | Student | Participate in and think about the discussion. |
| Assess  | Exam the fish prints | Assess  | Ask them to describe the fish print details. |
| **INSTRUCTION** |
| Teacher | Explain that the goal is to effectively capture the minute details of the fish anatomy, yet at the same time create an artistic impression of a living fish in its natural habitat. |
| Student | Listen. |
| Assess  | Exam the prints. |
| **INVESTIGATION** | **INVENTION** |
| Teacher | Observe the process of fish imprinting. | Teacher | Yes, how to capture the essence of a fish through the art of gyotaku. |
| Student | Feel the process of fish imprinting. | Student | Come to a realization regarding fish. Is there anything so beautiful? |
| Assess | Have the counselor who is a professional fish printer assess the student work. | Assess |  |

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 begin with Instruction, then move to Initiation and then investigation and finally to Interpretation.

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

Interpretation.

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.

When I first described the activity to the class they were very skeptical of the educational value to fish printing in an 11th and 12th grade honors chemistry class. We'll see how it goes!