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

**Module 1: Physical Aquatic Science**

**Name:** Anne McKnight

**Activity:** Density Bags

**Why did you choose to do this activity?**

This is not an optional lesson. I decided to do it 3rd because it is a good fit for my class for several reasons:

1. My students have really liked the TSI density activities we’ve tried so far.
2. My main focus for Q1 is always working on understanding the scientific method better. One of our class goals is to design inquiry projects for the State Science Fair. This activity is quite a good match for the type of inquisitive thinking I would like to promote because it investigates idiosyncrasies with everyday objects that my students might encounter on their own. They certainly like to drink soda!
3. One lab group has also been discussing designing a science fair project around finding the salinity rates needed to create neutral buoyancy in tomatoes, boiled eggs etc. due to a discussion they had about why certain fruits & vegetables sink or float in wash water. This lab group is not yet questioning what effect temperature might have on the test. We are keeping the fruits & veggies in the fridge to make sure they don’t decay before the lab is complete – coldness is a factor.

**What are your classroom learning goals?**

I would like students to leave with:

1) a clearer definition of density – what other variables can affect it

2) the idea that density is real & it affects all parts of the world around them (sometimes in surprising ways!) that it is not just something to be studied in class.

3) that scientists use measurements to help them nail down which variables actually impact outcomes.

4) that systematically organizing data in a table helps a scientist understand the complex interplay of variables.

**How does this activity tie into your classroom learning goals?**

Because my students will be participating in science fair inquiries, all measurement and data analysis activities are helpful! My students need to build the observation, measurement, and analysis skills they need to do inquiries with accuracy and understanding. We are still in pursuit of skills to do science the way “real scientists” do.

**What date do you plan to start this activity?**

I will begin the lesson on 10/24/12

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

The applicable standard is:

Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION: Discover, invent, and investigate using the skills necessary to engage in the scientific process.

Sc 8.1.1 Determine and analyze the logical link(s) between evidence and the conclusion(s) of an investigation and apply to the real world

Sc 8.1.2 Communicate, with clarity and detail, the components of the experimental design and results of a scientific investigation

Sc 8.8.6 Explain the relationship between density and convection currents and how they affect the ocean and atmosphere

**Ocean**

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

This activity expands on the concept of density and the internal make up of an object has on its internal density versus the density of the liquid (ocean or bucket of water) surrounding it. These concepts are introductory to understanding how ocean movements and water currents are formed .

1. 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.

x□ 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**

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

Because this activity will occur after the soda can activity, I’m expecting knowledge of the cans’ densities vs sink/float to play a significant part in student predictions. I also did the “Station B” activity and I think the students will probably remember the food coloring drops on the ice water dropping to the bottom of the beaker. Hopefully this will help them predict the effect of hot/cold water on floating.

1. 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 don’t think this one will be so hard for my students because they are beginning to really get the hang of density. The previous labs will have done a lot to clarify their understanding. They may have to think hard about which issue affects density more, salinity or temperature, but that will just be a question answered through discovery. I doubt it will lead to many misconceptions.

1. Select the TSI Mode(s) of Inquiry that you will focus on for this activity. (check all that apply)

X□ Curiosity

□ Description

X□ Authoritative knowledge

X□ Experimentation

□ Product evaluation

□ Technology

□ Replication

x□ Induction

x□ Deduction

X□ Transitive Knowledge

**Questioning and Assessment Strategies**

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

I will ask A LOT of questions! I want ELL students to talk more, talk in more detail, talk in more depth and also just talk MORE to build fluency with the vocabulary and concepts of density. For this part my questions will focus on getting students to think over previous density activities and make connections between the last activity and the current. I will also ask many questions aimed at reviewing previous learning and practice with safety, measurement (+ math skills,) scientific method and modes of thinking. I will also attempt to return every question with another question to build the atmosphere of inquiry and avoid the role of “authority”. We will see if it works…

1. What *assessment strategies* will you use to help your students meet your learning goals and monitor their progress?

I will ask students to discuss & write the post lab review questions together. We will create a class copy of the best explanations. I will also be taking pictures during the activity – I plan to ask students to explain what was happening and why in a series of follow up Bellwork and exit pass activities to assess understanding individually.

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.