Teaching Science as Inquiry (TSI) Lesson Plan
Module 1: Physical Aquatic Science

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Activity: Soda and Scientific Reasoning

Why did you choose to do this activity?

This activity is fun for students and piques their curiosity. It is the only density-related activity to choose from that will not disrupt the sequence of labs later in the semester (I already teach Density Bags when we do the unit on Density). We are currently finishing up the World Ocean unit that includes many activities related to maps, so I put this activity in on a day when the students did not finish their homework to give them a second chance and to meet the first deadline for TSI-A.

What are your classroom learning goals?

It is very important that my students are curious and are in the habit of formulating questions and possible explanations or hypotheses for what they observe in class on a regular basis.

How does this activity tie into your classroom learning goals?

Students will need to understand basic concepts of density in order to understand ocean circulation, which is due to convection currents. This activity helps them to hypothesize what factors may cause something to sink or float without being directly told what they are studying about.

What date do you plan to start this activity?

September 24, 2012

If applicable: HIDOE standards this lesson will address

Ocean

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

   This introductory activity to density will tie into ocean circulation in our next unit on Density. Relative densities of water in the ocean cause convection currents that drive circulation.

2. 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
   - ☐ 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.)

   I do not plan to prepare the students before this activity since it is meant to assess their prior knowledge of density and we will be following up with this in a few weeks when we reach our unit on Density.

2. 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.)

   Students may have prior knowledge of density and simplify the task by just focusing on whether the cans sink and float rather than on defining variables and looking for relationships between the physical cans and floating and sinking.

3. Select the TSI Mode(s) of Inquiry that you will focus on for this activity. (check all that apply)
   - X Curiosity
   - X Description
   - ☐ Authoritative knowledge
   - X Experimentation
   - X Product evaluation
   - ☐ Technology
   - X Replication
   - X Induction
   - X Deduction
   - ☐ Transitive Knowledge

Questioning and Assessment Strategies

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

   I will ask the students to explain why they chose the variables that they selected and prompt them to look not only at the presence or absence of something such as sugar, but to use the quantitative information that is on the cans to refine their predictions. If they cannot think of any variables, I will ask them questions to give them

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

   The students will be completing a worksheet as they go through the investigation, which I will collect at the end of class. This will be the basis of their grade and allow me to see in greater detail their thinking processes and the ideas that they have. I will also formatively assess the students individually and in their groups as I walk around during the activity and talk to them while checking that they are working together and completing the worksheet.

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.

This is the first time I am teaching this activity, and while I taught most of the Density unit last year, I feel that this fits in nicely because soda cans are something that students will be able to relate to. The Density Bags lab is much harder for students to comprehend and is logistically more difficult.