Teaching Sciences by Ocean Inquiry
SMS 491/ EDW 472
Spring 2008

Assessments

The following activities were presented in class as examples of different kinds of assessments and to review buoyancy.

Assessment I: quiz.
Step 1: students answer the quiz individually and turn in their answers.
Step 2: students repeat the quiz, but in a group. Students discuss each question, agree on a correct answer and use a scratch paper to discover if their answer is correct (a star is revealed if the answer is correct).

Assessment II: debate (rock in a boat)
Students are presented with a problem.
Class Problem:

"You have a large rock on a boat that is floating in a pond. If you throw the rock into the water and it sinks, what will happen to the water level of the pond?"
Give the students a few minutes to think about the problem then communicate their prediction by a vote. Students are then grouped according to their "vote". Each group has to come up with an argument that supports their prediction (or discover in the process that their prediction needs to be revised) and present it to entire class. After each group has presented its argument, a demonstration will be presented in class. (Materials: *A plastic boat, a weight or large rock, a container with water, lab tape to mark water level*)

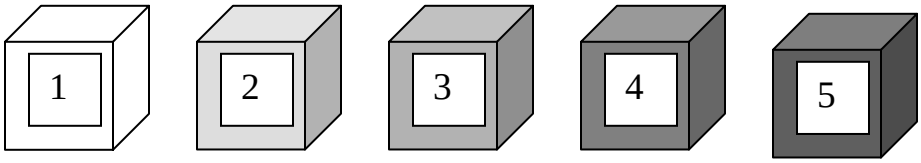
Assessment III: role play: teaching assignment (Cartesian diver)
Materials:

- A soda bottle filled with tap water (colored water works best)
- A plastic pipette balanced with a washer

A Cartesian diver (named after René Descartes, a French philosopher, mathematician and scientist; the "father of modern philosophy") is a classic science experiment that demonstrates buoyancy (Archimedes' principle) and the ideal gas law.

Your superintendent urged all the science teachers in your district to make sure that students understand this experiment because it is going to be one of the questions in the Maine Learning Results assessment. As a result, teachers decided to get together and write a clear explanation for the experiment and the underlying principles it demonstrates. The explanation will be distributed to all the students in the district (after the demonstration was done in class), so they can review it before the exam. Discuss this experiment with your group and submit your explanation (one per group).

Assessment IV: Pictorials and drawings: block diagram (Loverude et al. 2003)
The 5 blocks below have the same size and shape but differ in their masses. The blocks are numbered in order of increasing mass.



$m_1 < m_2 < m_3 < m_4 < m_5$

All the blocks are held approximately halfway in an aquarium filled with a fluid and then released. The final positions of blocks 2 and 5 are shown below. On the diagram sketch the final position of blocks 1, 3 & 4. Explain your reasoning and if you make some assumptions, state them clearly. You are allowed to discuss it within your group, but each student shall submit an explanation written in her/his own words.