**Science – Grade 6**

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| **Name: “It Floats, It Sinks” – 90 minute activity** | | **Date: to be done Sept 2011**  **Submitted on 7/20/11** |
| **Content Area: Science** | **Grade Level(s): 6** | **Topic(s): Density**  **Measurement ( Intro. Unit )** |

**Standards (SOL)**

SOL 6.1 The student will plan and conduct investigations in which :

b – a classification system is developed based on multiple attributes

c – precise and approximate measures are recorded

h – data are collected, recorded, analyzed, and reported using appropriate

metric measurement

i – data are organized and communicated through graphical representations ( graphs, charts and diagrams )

k – an understanding of the nature of science is developed and reinforced.

SOL 6.5 The student will investigate and understand the unique properties of water and its role in the natural and human-made environment. Key concepts include :

b – the properties of water in all three states

**Objectives**

The students will determine if objects will float or sink by comparing the mass to volume ratio.

The students will be active, productive members of a collaborative group.

**Materials & Resources**

Each lab station should be equipped with :

* Triple Beam Balance
* Calculators
* 10 assorted objects that will fit into the mouth of graduated cylinder
* Graduated cylinders ( various sizes – 500 mL, 250 mL, 100 mL, 50 mL )

**Safety Considerations**

Review relevant safety rules from Safety Contract on Day # 1, including use of goggles, UV sanitizer, proper behavior and clean / neat organization of station

**Engage – Time Estimate \_\_\_5 min.\_\_\_\_**

*Demonstrate two objects ( one floats, one sinks ) at teacher lab station. Ask students prompt questions from Daily Start Up format ( Bell Ringer ) and select two volunteers to drop the object into the water.*

**Explore – Time Estimate \_\_30 min.\_\_\_\_**

“Design and conduct your own investigation to predict whether an irregular solid object will float or sink. Record your procedure, the data you collect and display the results using a graphical representation.”

After 7 – 8 minutes, distribute WS ( Data Sheet ) to each group. If after 15 minutes a group is still struggling, offer assistance to the group leader by asking questions. If still struggling after another 5 minutes, demonstrate and explain how to use the Water Displacement Method to determine volume.

**Explain -- Time Estimate \_\_10 min.\_\_\_\_**

Ask each group to report back to the class the procedure and their results.

**Extend -- Time Estimate \_\_30 min.\_\_\_**

Rotate to a new group ( “leaders” and “data hounds” stay, “supply guys” move clockwise, and “graphic designers” moves counter-clockwise ). Share prepared flipchart on Promethean Board for key concepts :

* Vocabulary : Physical Property, Buoyancy, Water Displacement, Density
* How to use a Triple Beam Balance to determine mass
* How to use the Water Displacement Method to determine volume
* Calculation for Density = Mass / Volume ( to the nearest whole # )

**Evaluate -- Time Estimate \_\_15 min. \_\_**

Distribute WS ( Connecting Learning ). Have “Data Hounds” and “Graphic Designers” report to class the accuracy, as a percentage, of their predictions.

**Plans for Diversity**

Four “Honors Science 6” classes will perform work in pre-arranged groups of 4 with strong & weak math students paired. Two “Academic Science 6” classes will also be in groups of 4 but will have guided key questions as prompts throughout the “Explore” phase written out on 3” x 5” cards and distributed by teachers aide to the leader of each group. The Academic classes will NOT switch partners during the “Extend” phase as there are many special needs students who would have difficulty re-gaining focus. Rounding and use of calculators can be used to aide in math computation.

**Connections**

Loudoun County Public Schools lays out a detailed curriculum that closely aligns with the VA State SOL’s. One of the first key concepts is measurement, so the first few weeks of the year I use an introductory skill unit spanning measurement, how to use equipment, lab principles and “how to think like a scientist”. This lesson will fall near the end of September and aide students on their SOL benchmark assessments later in November.

A Real-World application of this lab could be to relate it to how the volume of a swimmer changes based on inhaling / exhaling because mass cannot change. Another application could be how the surface area of the hull of a massive ship can allow it to float. An extension activity as a HW assignment can be to have students research more details of how buoyancy is effected in either case. Math connections to algebraic thinking and ratios is reinforced.

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