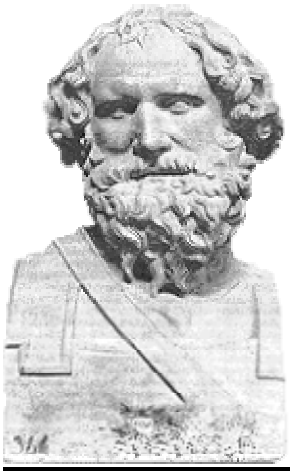
Archimedes Principle (sample activity 3)



Theory:

mass = density x volume
or
$\boldsymbol{m = pV}$

Archimedes (ca. 287-212 B.C.) discovered a simple principle that relates the buoyant force acting on an obect submerged (or floating) in a fluid to the density of the fluid that the object is in. Simply stated Archimedes' Principle states: **The buoyant force acting on an object *equals* the weight of fluid displaced by the object.**

Part 2: Make a Cartesian diver (**see Appendix**).

What happens to the air pressure inside the flask when you squeeze the bulb (**Increases/ Decreases**)

What happens to the size of the air bubble trapped in the test tube when the pressure bulb is squeezed? (**Increases/ Decreases**)

Does squeezing the pressure bulb increase or decrease the amount of water displaced by the test tube? (**Increases/ Decreases**)

Does squeezing the pressure bulb increase or decrease the buoyant force acting on the test tube? (**Increases/ Decreases**)

Appendix: Making a diver.

Completely fill a 2-liter pop bottle water.

	Partially fill a small test tube with water so that when it is inverted and placed in a beaker full of water it barely floats.
	When you have it just right put your finger over the test tube while it is still floating and transfer it from the beaker to the completely filled bottle. If all is going well the little test tube is now just barely floating in the bottle.

	Remove some of the water from the bottle by slowly pouring it out without sinking your diver. Place the lid on the bottle and squeeze. Although the test tube is hard to see from a distance, careful inspection reveals how the Cartesian diver works.
	Ketchup packages work well also and are much more visible from a distance. Not all ketchup packages are created equal. Find one that just barely floats.

	Squeeze the bottle and it the ketchup package should sink.