

# Cartesian Diver Worksheet

## Objectives

- To demonstrate understanding of Boyle's law
- To use a Cartesian diver based on understanding of density, buoyancy, and gas laws

## Definitions

1. Boyle's law \_\_\_\_\_  
\_\_\_\_\_
2. density \_\_\_\_\_  
\_\_\_\_\_
3. volume \_\_\_\_\_  
\_\_\_\_\_
4. mass \_\_\_\_\_  
\_\_\_\_\_
5. buoyancy \_\_\_\_\_  
\_\_\_\_\_
6. pressure \_\_\_\_\_  
\_\_\_\_\_

## Relationship Questions

1. What is the relationship between volume, mass, and density?
2. What is the relationship between the volume of a gas and pressure?

# Cartesian Diver Worksheet

## Materials

- Micro pipet
- Small hex nut
- Plastic bottle w/ lid
- Small cup
- Water
- Scissors

## Procedure

1. Cut off the pipet so that there is just 1 cm of thin plastic below the bulb
2. Screw the hex nut onto the bottom of the pipet.
3. Fill the small cup with water
4. Using the cup of water, squeeze the pipet to add water inside the bulb. Adjust the amount of water and air inside the Cartesian diver (pipet) until it just barely floats on top of the water in the cup.
5. Fill the plastic bottle with water
6. Place the Cartesian diver (pipet) inside the bottle
7. Screw the cap on the bottle so it is closed securely
8. Squeeze the bottle and observe what happens to the Cartesian diver

## Questions

1. What happens when the bottle is squeezed? \_\_\_\_\_  
\_\_\_\_\_
2. What happens when the bottle is released? \_\_\_\_\_  
\_\_\_\_\_
3. What variables affect an object's ability to float? \_\_\_\_\_  
\_\_\_\_\_
4. Use the variables you listed in question 3 to explain what is happening inside the bottle. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. How does Boyle's law apply to the Cartesian diver? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_