



# Squiddy, the Little Diver

## (Guide)

### Leading questions:

Some sea creatures, like squids, can sink or float whenever they want.

- Why does an object float in water?
- What might you do to make the same object sink?

**Explain:** An object will float when the force of the water pushing up is greater than the force of gravity pulling it down.

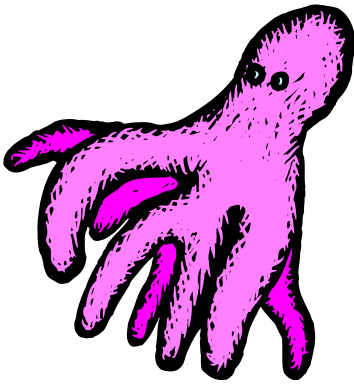
### What to do:

1. Begin by screwing a weight on the tip of a plastic dropper. The dropper will become your Little Diver.
  - What happens when you place your diver in a cup of water.
  - Explain what you think causes your diver to float.  
**Explain:** The diver is filled with air. Air displaces water. The force of the water pushing up is greater than the force of gravity pulling it down.
  - What do you think you would have to do to make it sink? Try it!  
**Explain:** When the air inside the diver is displaced by water, the force of gravity becomes greater than the upward force of the water
2. Now, try to make your diver **just barely float**, so that it submerges a little when you lightly touch it. This will be a little difficult so keep trying!
3. Without losing any water inside from inside your diver, **carefully** drop it into to a plastic bottle containing some water. Screw on the cap tightly.
  - What happens when you squeeze the bottle?
  - Can you explain why this happens? (Hint – watch for changes inside the diver when you squeeze and release the bottle.)  
**Explain:** Look carefully; the amount of water inside the diver increases, causing the diver to sink.

### Summary:

The ability of one object to float in another is called buoyancy. Buoyancy is related to the force of gravity pulling down and the buoyant force of water pushing up. The added mass of the water inside the diver decreases its buoyancy, causing it to sink.

**Explain:** When you squeeze the bottle, the increased pressure causes the air (a gas) inside the diver to be compressed, allowing more water to enter. The volume of a gas is inversely proportional to the pressure exerted on it.



# Squiddy, the Cartesian Diver

## Leading questions:

Submarines and some sea creatures can sink or float whenever they want.

- When would something float in water?
- What might you do to make the same object sink?

## What to do:

1. Begin by screwing a weight on the tip of a plastic dropper. The dropper will become your Cartesian Diver.
  - What happens when you place your diver in a cup of water?
  - Explain what you think causes your diver to float?
  - What do you think you would have to do to make it sink? Try it!
2. Do what you can to make to make your diver **just barely float**, so that it sinks when you touch it. This will be a little difficult, so keep trying!
  - Why do you think the diver doesn't float as well as it did before?
3. Without losing any water from inside your diver, carefully drop it into a plastic bottle containing some water. Screw the cap on tightly.
  - What happens when you squeeze the bottle?
  - Can you explain why this happens? (Hint - watch for changes inside the diver when you squeeze the bottle.)

## Summary:

The property of one thing being able to float in another is called **buoyancy**.

- What do you think is happening that makes your Cartesian Diver able to both sink and float?