

# Underwater Habitats: Activity Guide

## Materials

- Water: From a tap in a large, clear storage bin, 5 gallon bucket, pool, bathtub
- Sheet of paper (any color or thickness)
- Small clear, restaurant to-go sauce cup with lid
- Crayons, pencil, marker, pen, paint to decorate with
- 4 paper clips
- Something pointed to poke holes through plastic lid (thumb tack, nail)
- Assorted weights: washers, nuts, fishing weight, beads, etc.

## Concepts and fun facts behind this activity

- **Archimedes Principle:** A body totally or partially immersed in a fluid is subject to an upward force equal in magnitude to the weight of fluid it displaces.
- **Example:** A ball displaces an amount of water with a mass of 5 liters weighing 11 pounds (5 kilograms). This means that the water will push up against the ball with a force of 11 pounds. If the ball weighs less than 11 pounds, that means it has a positive buoyancy and will float.
- **Positive Buoyancy:** Occurs when an object is lighter than the fluid it displaces. The object will float because the buoyant force is greater than the object's weight. An object's volume and density determines all levels of buoyancy.
- **Negative Buoyancy:** Occurs when an object is denser than the fluid it displaces. The object will sink because its weight is greater than the buoyant force.
- **Neutral Buoyancy:** Occurs when an object's weight is equal to the fluid it displaces.
- **Related Facts**
- Subs and some underwater habitats have ballast tanks designed to quickly fill with or expel water in order to change the density—causing the object to either sink, rise, or float mid-water.
- Saltwater is less dense than freshwater, providing a more buoyant force.

## Instructions

1. Take a pre-cut length of paper (or cut new one from provided template)
2. Decorate paper with portholes, interiors, habitat names, etc (anything that could be inside the habitat)
  - a. The top of the "habitat" will be the narrower curve. (See below)

3. Place paper along interior of plastic cup and connect lid to secure it and prevent water from entering
4. Using the pointed object, punch four holes through the lip of the cup and lid.
5. Bend the paperclips into a "S" shape and thread the shorter end through the punched hole. It may help to bend it back on itself, to keep it from popping out.
6. Demonstrate the weight system with paperclips and washers
7. Add some weight and test how many it takes to submerge the "habitat" (positive, neutral, and negative buoyancy)
8. You can remove lid and test again with open bottom (difference between diving bell and closed habitat)

