

# 611-2266 (30-200) Hydrostatic Studies Kit

## Warranty and Parts:

We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.

## Kit contents:

- 611-2085 Overflow Can
- 611-2090 Catchbucket
- 611-2055 Specific Gravity Set
- 611-2005 Equal Mass Set
- 611-2110 Bucket and Cylinder
- 611-0005 Spring scale

## Applications:

Use these items for demonstrations of specific concepts either separately, using the individual instructions included with each component, or grouped in the following ways.

## Other materials needed:

Spring balance

### How To Teach with Hydrostatics Kit:

**Concepts:** Buoyancy - relation to weight and volume; of immersed body vs. of displaced liquid. Principle of Archimedes. Flotation. Density and Specific Gravity.

**Curriculum Fit:** PS & CS/ Matter, Properties. *Unit: Observation & Measurement of Physical Properties.*

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## Immersion and Liquid Displacement:

**You Need:** 611-2266 Overflow Can,  
611-2090 Catchbucket  
611-2055 Specific Gravity Samples

- 1. Demonstrate the concept:** A body immersed in a liquid displaces its own volume of the liquid.
  - a. Use any regular object from the samples, immerse it in water in the overflow can and measure the volume of the water that gushes out into the bucket. Compare this with the calculated volume of the object.
- 2. Measure irregular volumes**
  - a. Immerse the irregular object from the sample (or other body, for example, a small stone) in water (or other liquid) in the overflow can. Measure the volume of the liquid that runs off into the bucket using a graduated measure, which gives the volume of the body.

[Note: if using the styrofoam lump, use one of the cylinders in the sample set as a "sinker" in order to totally immerse it. Tie them together and immerse. To compute the volume of styrofoam, subtract the (known) volume of the cylinder from the total volume of water displaced.]

## Buoyancy Kit:

**You Need:** 611-2085 Overflow Can

611-2090 Catchbucket

611-2055 Specific Gravity Samples

611-2005 Equal Mass Samples

611-0005 Spring Scale

1. **Demonstrate the concept of buoyancy.** Show that it is a function of volume only (of the immersed body), not of mass.
  - a. Immerse, one by one, several of the *Equal Volume* cylinders (611-2055) into water in the overflow can. Verify that the bucket catches the same amount of water in all cases.
  - b. Repeat, now using the *Equal Mass* Sample (from 611-2055). Show that the water displaced is NOT the same in all the cases.
2. **Use Overflow Can and Catchbucket to study floating versus sinking.**
  - a. Show that a “sinking” body (use a metal cylinder) is heavier than the upward push or buoyancy it suffers, by comparing its weight with the weight of the water in the bucket. In the case of a “floating” object, show that the opposite is true. The displaced water actually weighs more than the object. [Note: You might need the help of a sinker.]
3. Repeat the floating and sinking experiments with the overflow can and catchbucket using liquids other than water. Teach concepts of density and specific gravity.

## Archimedes Principle:

**You Need:** 611-2110 Bucket and Cylinder Set

611-2085 Overflow Can

611-2090 Catchbucket

Spring balance

1. **Study Archimedes’ Principle** in an ingeniously simplified and a more convincing way using the Bucket and Cylinder Set in conjunction with the overflow can and catchbucket.
2. Suspend the 611-2110 from a spring balance in such a way that the bucket is hooked to the balance and the cylinder is hooked to the bucket (cylinder is solid, bucket hollow.) Set the overflow can, filled with water, next to the catchbucket.
3. Lower the cylinder attached to the spring scale and bucket so that just the cylinder is immersed.

Catch the water that flows out of the can in the catchbucket and save it. Note that the spring balance shows a “loss” in weight.

4. “Restore” this weight loss (make the spring balance go back to its original reading) simply by pouring into the bucket portion of the Bucket and Cylinder the water in the Catchbucket (which had flowed out of the Overflow Can.)
5. The concept of "buoyancy" is very convincing since the weight loss suffered by the cylinder in water is shown to be equal to the weight of the water it actually displaces into the bucket.

## Related Products:

**611-2100 Density Rod and 611-2105 Reverse Density Rod:** The aluminum rod floats in cold water and sinks in hot. The plastic (reverse) rod does just the opposite. Teaches concepts of buoyancy, flotation vs sinking, and specific gravity.

**611-2060 Specimen Set** - 4 metal cylinders with same volume. Fits most graduated cylinders. Teaches concepts of mass, volume, specific gravity; buoyancy, flotation.

**611-2025 Density Cubes (10) and 611-2026 Density Cubes (12):** These sets contain real materials to study the real world. 1" cubes in aluminum, steel, brass, copper, acrylic, nylon, PVC, oak, pine, poplar (plus Lignum vitae and polypropylene in 611-2026)

**611-2140 Mystery Density Set:** Compute density with specimens that look identical. 12 samples, 6 of each of two plastics; wood holder; instructions.

**611-2000 Density ID Set:** Twelve samples with different densities. Ask your class to identify each by determining their density. Aluminum, brass, copper, acrylic, pyrex™, rubber, tecaform™, teflon™, nylon, PVC, poplar, oak, in wood holder.

**611-2125 "What's the Density?" Curriculum Kit:** Model solids, liquids and gases and watch how they behave. Build dough figures and float them in water. Includes magic dough; 30-092 set; 12 containers; 250 toothpicks; 300 blue foam squares; instructions with student journal pages, teacher pages and challenge questions.

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