Curiosity Guide #305
Buoyancy

Accompanies Curious Crew, Season 3, Episode 5 (#305)

Sinking Stones

Investigation #3

Description

Learn how to calculate the volumes of objects with different shapes.

Materials

- Small rocks
- Graduated cylinders
- Water
- Eye droppers
- Pencil and paper or whiteboard and markers
- Clay

Procedure

1) Fill each graduated cylinder with water to 100 milliliters or some easy measurement.
2) Use the eye dropper to get the level accurate, and be sure to read the water line at its lowest point.
3) Record the volume of water in the cylinder.
4) Carefully slide the stone inside the cylinder. Be careful not to cause a splash because in all trials, to compare results, you need to control the same starting volume.
5) Once the stone has settled in the water, measure and record the new volume.
6) Subtract the smaller original number from the larger second number.

7) The difference is the stone's volume.
8) Repeat with two equal masses of clay. Shape one of the masses into a ball and shape the other into a boat.
9) What do you notice about the different displacements of water?

My Results

Explanation

Any object submerged in a fluid will displace or push aside its own volume. By measuring the water level in the graduated cylinder before and after the stone is added, you can calculate the volume of the stone regardless of its shape. If the number difference is 8 milliliters, then the volume of the stone is also 8 milliliters. And because 1 milliliter is the same as 1 cubic centimeter, the stone has a volume of 8 cubic centimeters. The clay ball and the boat both have the same mass and are made of the same material, yet the clay boat displaces more water. A larger water displacement increases the upward force and allows the boat to float.

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