

Council's Own: Water Sampling Design Challenge  
Cadettes, Seniors, Ambassadors

Complete all the following:

- 1) Define buoyancy.
- 2) Define forces.
- 3) Define mass and density.
- 4) Relate the concepts of buoyancy, force, mass, and density in a picture.
- 5) *Describe a sonde and explain what it is used for and why.*
- 6) Explain all the steps of the Engineering Design Process and give examples of each step.
- 7) Create a clay boat that can hold 50 grams.
- 8) Answer/Test your answer:
  - a. If a large, heavy rock is floating on a boat in a pond, and the rock is thrown overboard, will the water level in the pond increase, decrease, or do nothing?
- 9) Design a water sampling device attachment that will float at a specific depth.

Choose one:

- 10) Create a device that sinks but then harnesses the reaction of baking powder and water to rise back up to the surface
  - a. Experiment with the reaction of baking powder and water
  - b. Describe how the buoyancy changes as the reaction takes place
- 11) Create a motor system for your water sampling device using rubber bands.
  - a. Define potential and kinetic energy
  - b. Describe the forces at work on your boat as it moves through the water