



Elizabeth River Project's Dominion Energy Learning Barge.

## Build a Barge

### Elementary Students

**Time: 1 hour**

#### Supplies:

- ✓ Heavy paper (card stock, card board, food containers)
- ✓ Duct tape
- ✓ Scissors
- ✓ Water – bucket, sink or bathtub

**Optional:** ruler, pipe cleaners, sharpies (waterproof), coins or small items to put on your barge to see how much weight it can carry before sinking – coins, paper clips, etc.)



#### How To:

1. **Make the flat bottom hull.**  
Options: You could use the bottom of a square box or you could use a square sheet of cardboard and fold up or attach the ends and sides.
2. **Waterproof**  
Cover everything with duct tape. Make sure no paper is exposed. Put several layers on to make it sturdy so it will hold its shape. Tip: the higher the sides the better. Higher sides keep the water from coming aboard.
3. **Is your barge seaworthy?**  
Test your boat out in a sink or a bathtub and see if there are any leaks. If it leaks, remove the barge from the water and allow it to dry. Patch holes with more tape. Keep testing until your barge is seaworthy! Once it is, considering seeing how many items it can hold before it sinks.
4. **Have fun and send a photo so we can celebrate.**



**Send photo to:** [rdunbar@elizabethriver.org](mailto:rdunbar@elizabethriver.org)  
or post on Facebook - Elizabeth River Project

## SCIENCE BEHIND THE EXPERIMENT

1. There are two primary forces acting on this science experiment. The first force is **gravity**. Gravity is trying to pull the barge and any items you loaded on your barge downward. The force of **buoyancy** is pushing the boat toward the surface.
2. The gravitational force is determined by the weight of the barge and the weight of the items in your barge. The force of buoyancy is the weight of the water displaced by the boat.
3. Your barge will float as long as the force of buoyancy is greater than the force of gravity and you do not overload the barge. If you overload – it may tip over, leak or sink.

### Words:

**barge** – a flat-bottomed vessel for carrying loads on rivers and can be pushed by a tug or have an engine.

**buoyancy** - the ability to float in water or air or some other fluid.

**gravity** - the force that attracts a mass toward the center of the earth or downward.

**hull** - main body of a ship or other vessel like a barge and it includes the bottom, sides and deck. It does not include the masts, rigging, engines or other items.

### Virginia Standards of Learning:

This is a **STEAM** (Science, Technology, Engineering, Art and Math) that addresses multidisciplines and grade levels. [http://www.doe.virginia.gov/testing/sol/standards\\_docs/](http://www.doe.virginia.gov/testing/sol/standards_docs/)

**Science:** Buoyancy & Gravity, Science Experiment, Prediction and Hypothesis

**Technology:** Using simple tools

**Engineering:** Constructing a mini-model

**Art:** Creating a design, building a mini-model, manipulation of materials

**Math:** Length, height and weight.

