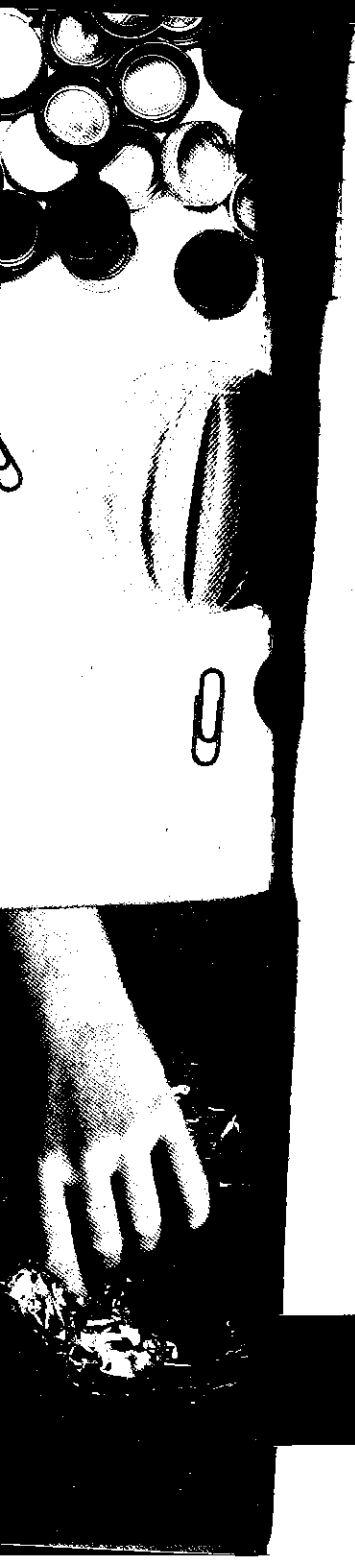


Float Your Boat

LET'S LOOK AT THE PROBLEM

A cow, a donkey, a pig, a sheep, and a mouse take a boat ride. As each one enters, the boat sinks lower and lower, until it finally sinks completely.

The mouse was the smallest animal, but the boat sank after he got in! What do you think happened? What makes an object sink or float?

MATERIALS

- ☐ Reusable resources such as aluminum foil
- ☐ Tools such as scissors, measuring tapes, and rulers
- ☐ Objects that sink or float such as pennies, packing peanuts, bottle caps, rubber bands, paper clips, pebbles, different types of balls, and marbles
- ☐ Large container of water
- ☐ Paper and markers, crayons, or pencils

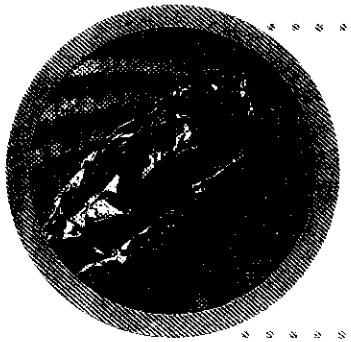
TINKER WITH THE MATERIALS

Which objects do you think will float? Which will sink? Test your predictions. What do you notice? Can you do something with the objects that float so they will sink? Can you find a way to make the objects that sink float instead?

STEM CONCEPTS

buoyancy / density / design engineering / geometry / gravity / measurement / properties of matter / scientific inquiry / sinking and floating

Float Your Boat



THE DESIGN CHALLENGE

Making Use foil to build a boat that floats.

Engineering Use 10-inch square pieces of foil to build boats that float and hold as many pennies (or other lightweight objects) as possible before sinking.

WORKING ON THE DESIGN CHALLENGE

- **Think about it.** How are boats shaped? Look at the materials. How can you form them into a boat that will float? Draw or sketch your ideas.

  Engineering. How can you make a boat that will stay afloat when you add weight to it? Predict the number of pennies your boat will hold.

- **Build or create it.** Build your boat. What shape do you think will work the best?

  Engineering. Build several boats from foil. Make each a different shape.

- **Try it.** Does your boat float? If not, does it sink all at once or over time? Why do you think this happened?

  Engineering. Add pennies one at a time to your boat. How many pennies can you add to your boats before they will sink? Which shape holds the most pennies?

- **Revise or make it better.** If the boat doesn't float, what do you think the reason is? What can you change to make the boat float?

  Engineering. How can you change your boat so that it can carry more weight? Why would making this change work?

- **Share.** Explain to someone how you made your boat, and show them how it works.

  Engineering. Explain to someone which design allows the boat to hold the most weight without sinking and why.

Float Your Boat

QUESTIONS AND COMMENTS

I wonder what would happen if you used wet pennies instead of dry pennies.

What shape do you think will make the best boat for floating? for moving through the water?

What did you think about when you designed your boat?

BACK TO THE PROBLEM IN THE BOOK

The first four animals affect the balance of the boat by where they sit. What happens when the cow gets in on one end? Why? Where does the sheep sit to help keep the boat balanced? How is *your* boat affected by where you place the pennies?

GOING DEEPER

- What other materials could you use to build a boat? How would this affect its ability to hold weight?
- Make a boat that's a different shape than your first one, like a barge or a canoe. Compare how they float and how much weight they can hold. Do you get the same results for both boats? If not, why?
- What would happen if you tried to float your boat in a liquid other than water? Try it to find out.
- How many pennies do you think your boat would hold if it were twice as big? Only half as big?

OTHER BOOKS TO USE

The Gingerbread Boy / Paul Galdone

Mr. Gumpy's Outing / John Burningham

Toy Boat / Randall de Sève, illustrated by Loren Long