

SEAS THE DAY

EXPERIMENT: PADDLE BOAT

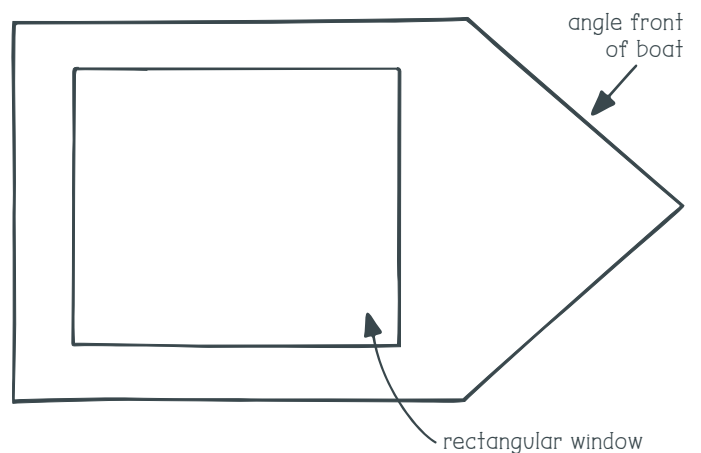
Steam-powered paddle wheel boats were common on American rivers in the 1800s, but now you're more likely to see smaller versions paddled by people. Both kinds work the same way, by pushing water with paddles mounted on wheels. Build your own boat that uses kinetic energy stored in rubber bands to move.

MATERIALS

- Cardboard
- Ruler
- Scissors
- Duct and clear tape
- Rubber bands
- Bin
- Water
- Craft sticks or straws
- Lightweight, lidded plastic bottle or container, such as one for margarine

INSTRUCTIONS

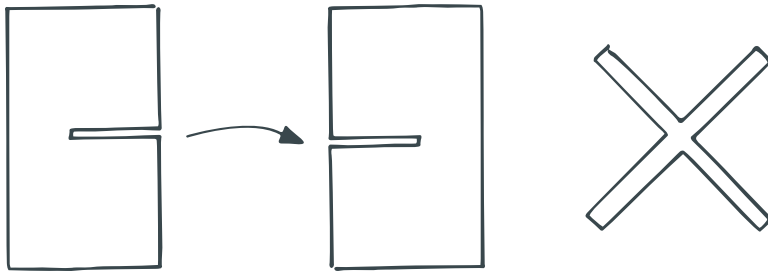
Cut the cardboard into several pieces of these dimensions: one piece that is 5 inches by 10 inches, and two pieces that are 1.5 inches by 2.5 inches each. The large piece is the body of the boat. On one end of this piece, cut a rectangular window that measures 3 by 4 inches and is 1 inch from the edges. This is the back of the boat. On the front of the boat, cut the corners on an angle so the front is pointed.



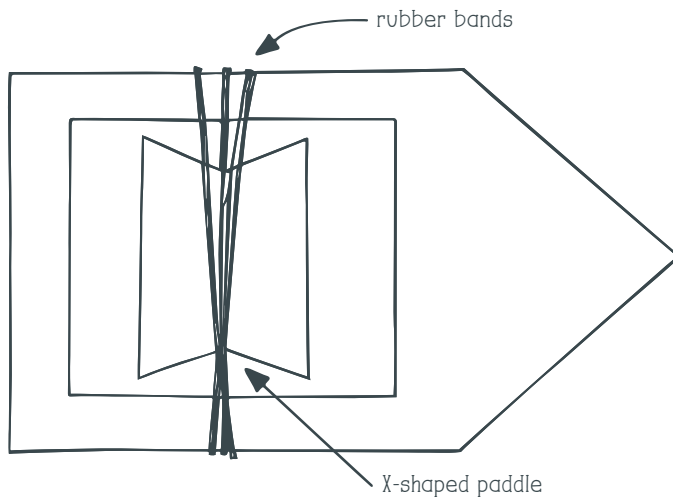
Cover the entire body of the boat with duct tape. This will help make it waterproof. The better you cover everything, especially the tricky inside corners, the longer your boat will last.



On the smaller pieces, cut a slit in the center of the long edge that goes half way through. Do the same with the other piece. Fit the two slits together in an X or “plus” shape. This is your paddle wheel. Cover the X shape with duct tape.



To attach the paddle wheel to the boat body, stretch two rubber bands across the center of the boat’s back window. Place the paddle between the rubber bands, with one on each side of the X.



Wind up the boat by turning the paddle backwards. Hold on to the paddle as you place the boat in water, then let it go!

WHAT'S HAPPENING?

When you wind up the paddle, the rubber band stores energy. This is potential energy, which occurs because the twisted rubber band is not in equilibrium—you have to hold it in place or it will unwind. When you let go of the paddle, the rubber bands unwind to rotate the paddle and push the boat forward. That unwinding is the conversion of potential energy to kinetic energy, which is the energy of motion. The rubber band moving the paddle and the paddle pushing on the water and the boat moving forward are all examples of kinetic energy.



GAME ON

Change your boat design to see if you can make it move faster or travel farther. Use a lightweight plastic container, tape two craft sticks or straws on either side and attach the rubber bands and paddle to the end of the craft sticks. Try other materials that float and don't get soggy in water, such as wood or Styrofoam. Decorate your boat, and see if you can give a toy figure a ride!

RECOMMENDED READING

Things That Float and Things That Don't by David Adler, illustrated by Anna Raff

Boats Float! by George Ella Lyon