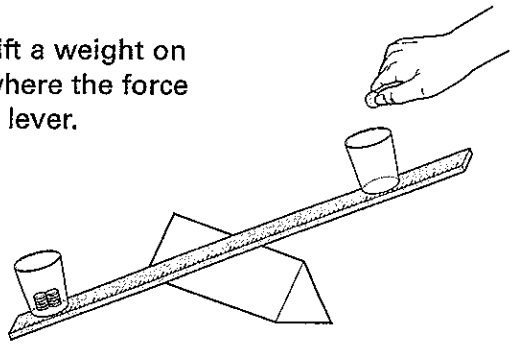
Name_____ Date_____

Lifting Lever

Science The amount of force needed to lift a weight on one end of a lever depends on where the force is placed on the other end of the lever.



Stuff Heavy cardboard (6 inches × 6 inches); yardstick; sharp knife or scissors; masking tape; two 3-ounce paper cups; scrap of paper; 100 pennies

What to Do

1. Measure two inches in from one edge of the cardboard, and draw a line parallel to that edge. Measure two inches from the line you just drew, and draw another line parallel to the first. Use a knife or scissors to score the lines.
2. Bend the cardboard away from the scored lines to form a triangle. Tape the triangle along the top edge. You have made a *fulcrum.* Place the fulcrum on the table, taped edge up.
3. Tape one of the paper cups to the yardstick, so that the center of the bottom of the cup is positioned on the two-inch mark of the yardstick.
4. Cut a piece of masking tape four inches long. Stick a piece of paper that is two inches long and a little wider than the tape in the middle of the tape, so that about one inch of sticky tape is exposed on each end.
5. Place the tape under the yardstick at the 34-inch mark, with the sticky side facing up. Place the second paper cup on the yardstick, and attach the sticky ends of the tape to the sides of the cup. The cup should be able to slide on the yardstick but should not fall off of it.
6. Place the yardstick on the fulcrum so that the 18-inch mark is directly over the top edge.
7. Place ten pennies in the first cup (the cup at the two-inch mark); this is called the *load.* Count how many inches the load is from the center of the yardstick. Place pennies in the second cup, one at a time, until the first cup begins to lift off the table. The number of pennies needed to lift the load is called the *effort.* Count how many inches the effort is from the center of the yardstick..
8. Repeat step 7 with the movable paper cup at 32 inches, 30 inches, 28 inches, 26 inches, 24 inches, 22 inches, and 20 inches.

What's Going On Here

As the effort is moved toward the fulcrum, more pennies are needed to lift the load. The distance from the fulcrum to the load multiplied by the number of pennies in the load is equal to the distance from the fulcrum to the effort multiplied by the number of pennies in the effort.