

**ACTIVITY** ■ The Nature of Forces

**At the Center of the Gravity Matter**

Have you ever balanced a ruler on your finger? If so, you know that it balances only when its center is placed on your finger. Placing any part of the ruler other than its center on your finger will not provide the desired result. This is because the center of the ruler is where the ruler's center of gravity is located. All objects have a center of gravity. The center of gravity of an object is the point on which gravity seems to pull. In reality, gravity pulls downward on every point on an object. Yet when the forces on all of the points are added together, it is as if the total force of gravity pulls on only one point—the center of gravity.

Not all objects are quite as predictable as a ruler. In fact, the center of gravity for some objects is not even on the object! Do you know where your center of gravity is? Find out by gathering a bandana or handkerchief and a wooden block or chalkboard eraser and performing the following steps.

**What to Do**

1. Stand with the entire left side of your body against a wall. Make sure your left foot is up against the wall. Now try to lift your right foot. What happens?

---

---

---

---

2. Now stand with your back against a wall. Be sure your heels are touching the wall. Drop a bandana or handkerchief just in front of your toes. Try to pick it up without bending your knees or moving your feet. Describe what happens.

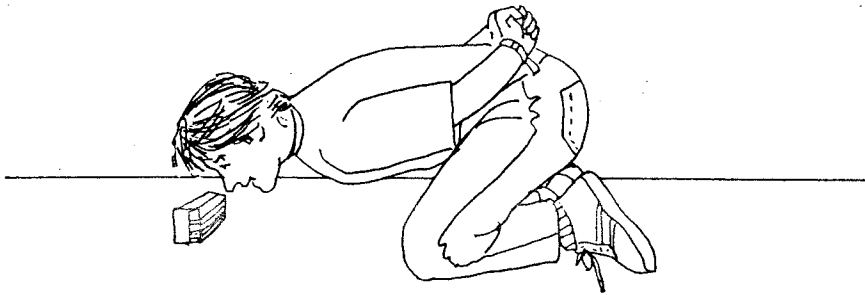
---

---

---

---

3. Place a mat or blanket on the floor. Get down on your elbows and knees on top of the mat or blanket. Place your elbows on the floor right in front of your knees. At the tip of your middle fingers, place a wooden block or blackboard eraser on its edge. With your hands behind your back, lean forward and try to knock the block over with your nose. Can you do it?



### What to Think About

Make a chart showing the results for your class—who was able to hit the eraser and who wasn't. Overall, are girls or boys more successful? Why do you think this is so?

### Try Again

Repeat step 3 but this time place weights in your back pockets or on your ankles. If weights are not available, have a friend hold your ankles down. Does this change your results?

### What to Understand and Apply

1. Why do you think it is important for the center of gravity of a car or truck to be located in a proper position? What can happen if it is too high?

2. Why do you think tightrope walkers use long poles to help balance themselves?