

# 31

## Where's Your CG?

### Purpose

To locate your center of gravity.

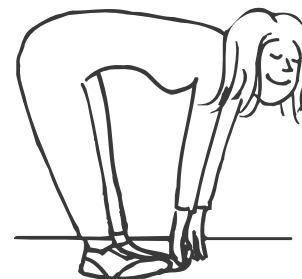
### Required Equipment/Supplies

2 bathroom scales  
 8' × 2" × 12" "reaction" board  
 meterstick  
 bricks or old books  
 2 large triangular supports (such as 1-inch angle iron or machine-shop files)

### Discussion

For a symmetrical object such as a ball or donut, the center of gravity, or CG, is located in the geometric center of the object. For asymmetrical objects, such as a baseball bat or a person, the CG is located closer to the heavier end. When your arms are at your side, your center of gravity is near your navel, where your umbilical cord was attached. This is no coincidence—unborns sometimes rotate about their CG.

Your CG is a point that moves when you move. When you raise your hands above your head, your CG is a little higher than when your hands are by your sides. In this activity, you will locate your CG when your hands are by your sides.



Activity

### Procedure

**Step 1:** Using a bathroom scale, weigh yourself and then a reaction board. Record these weights.

weight of self = \_\_\_\_\_ weight of board = \_\_\_\_\_

**Step 2:** Measure your height in centimeters.

height = \_\_\_\_\_

**Step 3:** Place one triangular support on each bathroom scale. You may need to add bricks or books between the scale and the support if the bubble on the scale causes the support to rock. Position the scales so that the tops of the triangular supports are separated by a distance equal to your height. Place the reaction board on the two supports. *The overhangs of the ends of the reaction board on each support should be equal.*

*Weigh yourself.*

*Measure your height.*

*Position reaction board.*

Read the weight reading on each bathroom scale. These readings should each be half the weight of the reaction board (plus the books or bricks, if any). If they are not, either adjust the calibration knob on one scale until the readings are equal or record the readings for future calculations.

*Position yourself on reaction board.*

**Step 4:** Lie down on the reaction board so that the tip of your head is over one support and the bottoms of your feet are over the other support, as in Figure A. Remain flat on the board with your hands by your sides. Have someone record the reading on each bathroom scale.

weight at head = \_\_\_\_\_ weight at feet = \_\_\_\_\_

*Adjust your position.*

**Step 5:** After you are informed of the weight readings, adjust your position along the length of the board until the two readings become equal. Have someone measure how far the bottoms of your feet are from the support near your feet.

distance from support to feet = \_\_\_\_\_



Fig. A

1. Did you have to move toward the foot end or toward the head end?

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2. When the readings on the scales are equal, where is your CG in relation to the supports?

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*Determine your CG.*

**Step 6:** Determine the location of your CG, in relation to the bottoms of your feet.

location of CG = \_\_\_\_\_ cm from the feet

Place your finger on your navel and have someone measure the distance from the bottom of your feet to your navel.

location of navel = \_\_\_\_\_ cm from the feet

## Analysis

3. How close is your CG to your navel?

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4. What would happen if the two weight readings of the board were not equal?

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5. When an astronaut spins when doing acrobatics aboard an orbiting space vehicle, what point does the body spin about?

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