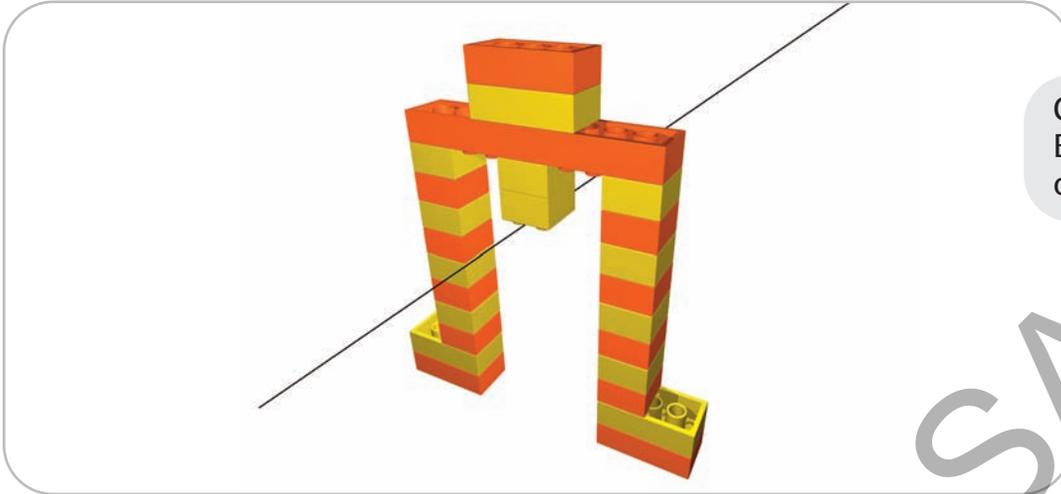


# BRICK PHYSICS

## PROJECT 1: CENTER OF GRAVITY

GRADES 4-6

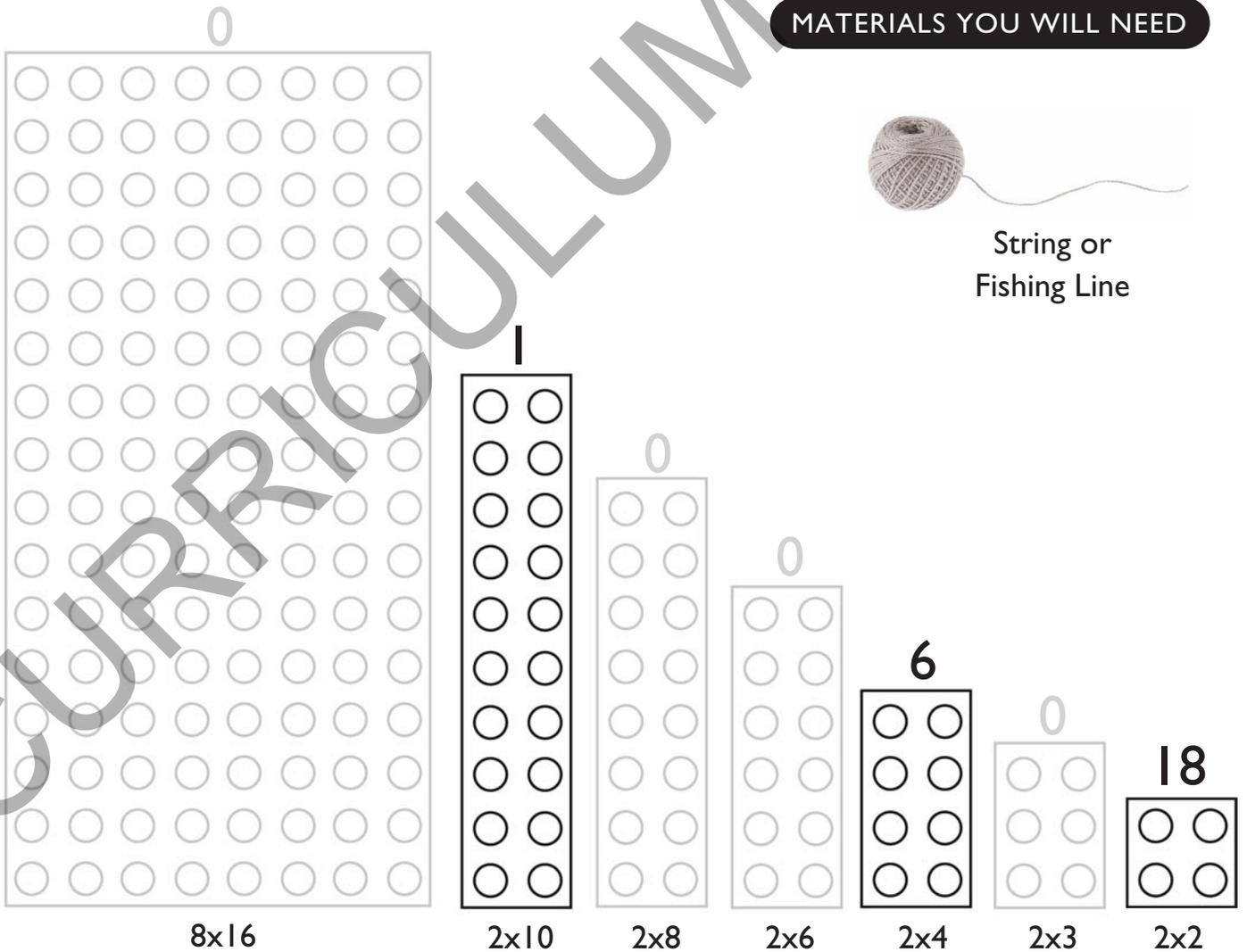


Create a "Balance Buddy" that balances on a piece of string.

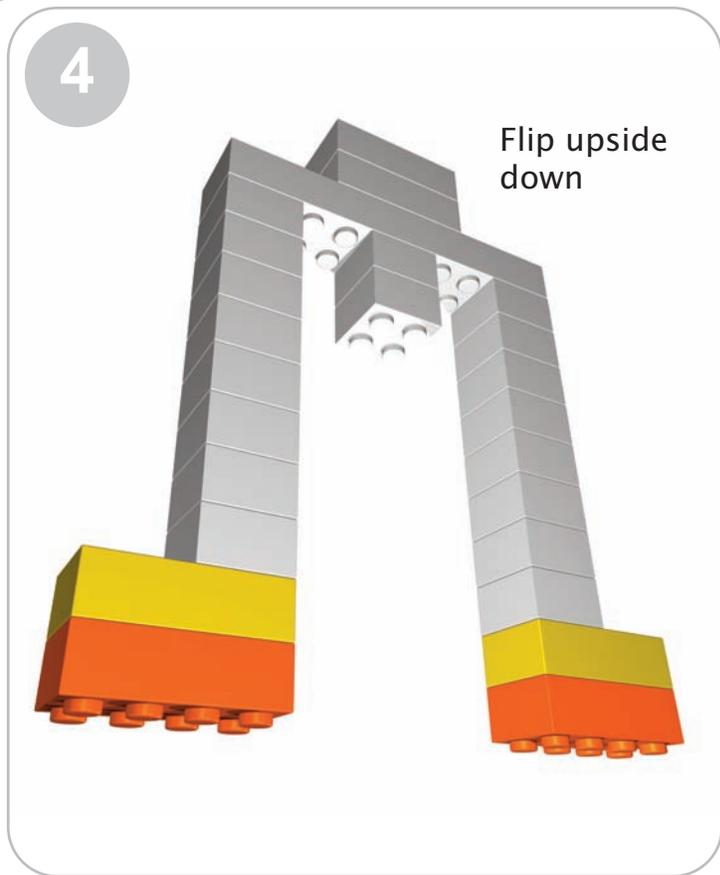
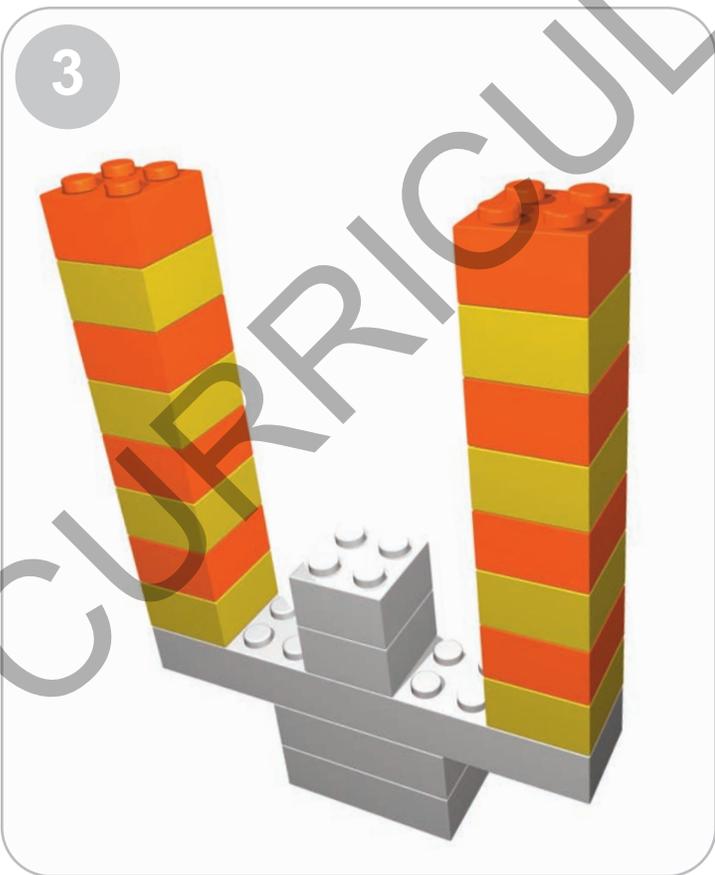
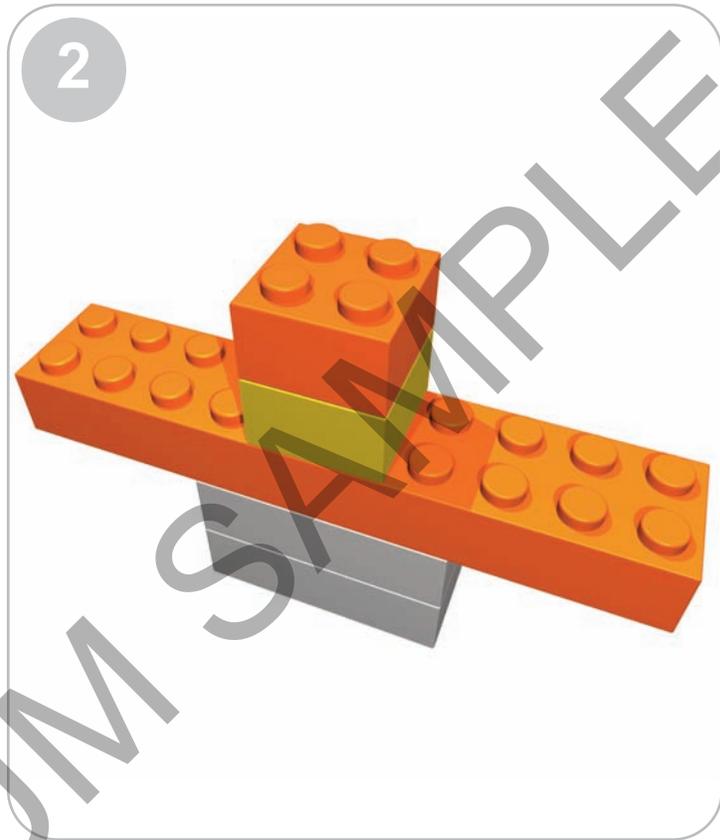
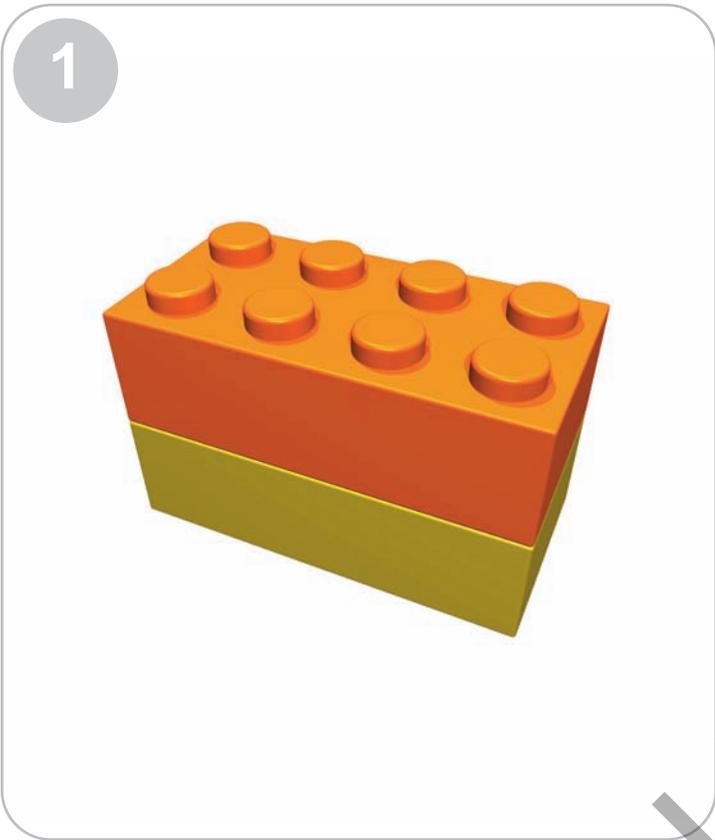
### MATERIALS YOU WILL NEED



String or Fishing Line

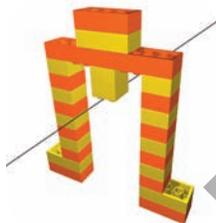


CONSTRUCTION



## Steps for Experiment

1. Demonstrate the center of gravity by balancing an object, such as a yardstick, or pencil, on two fingers. Note that as you shift the weight of the object back and forth to make it balance, you are trying to identify the center of gravity of the object.
2. Tie a string between two places of equal height, such as between desks. The string should be tight without a lot of slack.
3. Place the Balance Buddy on the string and wiggle the string. Note the results. Try to find the center of gravity.



## Challenge

Identify and diagram real world examples of the center of gravity in action. Clearly label the center of gravity in each diagram.



## Think About

In physics, the center of gravity is the point or location in a body of matter where its weight is balanced in all directions. If an object is placed so that its center of gravity is directly above the point where its weight is resting (such as on the ground), the object will not fall over, since no single direction will have a greater gravitational pull than any other.

Gravity, studied by Sir Isaac Newton, is the attractive force exerted by objects with mass. All objects, even humans, have their own gravitational pull. This gravitational pull, however, is unnoticed because of the much greater gravitational pull of larger objects, such as the Earth.

High wire performers take advantage of the center of gravity to help maintain their balance. High wire performers often carry a large pole perpendicular to their bodies to make their center of gravity more stable.



## Now Try

Invent and build new, unique objects using BrickLab that can be balanced on the string. Test and evaluate these objects and identify their center of gravity.

Keep in mind that objects that hang lower than the string (such as the Balance Buddy) have their center of gravity below the string, and objects that don't, have their center of gravity above the string. Which one is easier to balance?

## Test Yourself

Use a separate sheet of paper to answer the following questions.

Multiple Choice:

1. Gravity is...
  - a. An attractive force exerted by objects with mass
  - b. Stronger than magnetism
  - c. An attractive force only exerted by planetary-size objects
  - d. An attractive force exerted only by magnetized metal
  
2. The center of gravity...
  - a. Is best described as the center of a collapsed sun
  - b. Is a point in an object where all weight is equally balanced in all directions
  - c. Is not important in matters of balance
  - d. Is not affected by the law of gravity
  
3. The "Balance Buddy" balances easily because...
  - a. All brick items are designed to balance naturally
  - b. Its center of gravity is lower than the string on which it balances
  - c. The object weighs less than the weight of the string
  - d. None of the above

Questions to Ponder:

1. Why do high-wire performers hold a long bar that extends out to each side?
2. Why would it be more difficult to make the Balance Buddy balance if it were turned upside down?
3. What is one example of how you take advantage of the center of gravity in your daily life?

answers: 1) a 2) b 3) b