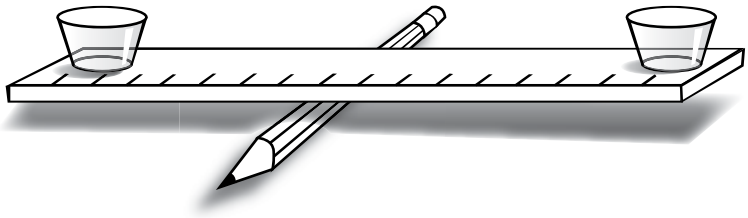
ACTIVITY 2: BUILDING YOUR BALANCE



QUESTION

How does a single-beam balance work?

SAFETY

Use only clean water in your syringe. Slowly push the plunger to avoid splashing the water. Never work near an electrical outlet or source. Clean up any spills when finished to avoid slips and falls.

MATERIALS

2 small cups (preferably plastic), plastic ruler, pencil, penny, nickel, dime, quarter

PROCEDURE

You will need a simple balance for many of the activities in this book. To build your balance, you will put a cup on each end of the ruler and balance the ruler on a pencil or pen placed under the middle of the ruler. Attach the cups with tape or glue, then make adjustments in the balance point by adding small extra pieces of tape or clay until the ruler is balanced. When balanced, the ruler may not be perfectly level, but you will be able to tell that tapping it can cause it to sway to either side. When the ruler is not balanced, it will only sway to one side. You should check the empty balance point before each time you use it and make adjustments as necessary. The object that you want to find the mass of should be put in one cup, then you can

use the syringe to fill the other cup with water until you have a balance, recording in your lab notebook the beginning and ending volumes in the syringe. Make sure that your balance is on a flat table with both cups over the table. If one side gets too heavy, you do not want the whole balance to fall on the floor.

Remember that the density of water is 1.0 g/ml. That means that 1 ml of water has a mass of 1 g. If it takes 27 ml of water to balance out the sample, then the mass of the sample is 27 g.

This is just one type of simple balance. Other balances might hang from a string or involve other methods. If this one does not work well for you, investigate other methods online and build another type of balance. As long as the balance has a beam that can be balanced with water, it will be fine for all of these activities.

Testing Your Balance

Test your balance by finding the masses of four different coins, and record those masses below. The accepted masses will be given to you by your teacher to ensure that you use the balance correctly.

Data

Mass of penny _____ g
Date on penny _____

Mass of nickel _____ g

Mass of dime _____ g

Mass of quarter _____ g

Post-Lab Questions

1. What was the percentage difference between your measurement and the accepted mass (as provided by your teacher)? Percent difference = ([difference between the two answers] ÷ [accepted answer]) × 100
2. What do you think was the biggest contributor to that difference?
3. What do you think is the lightest mass that you could find using this balance?