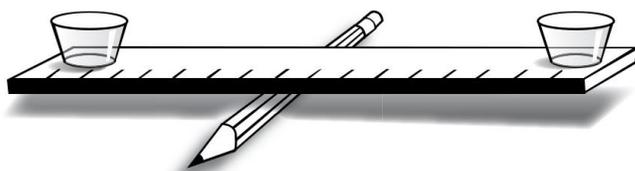


# thLAB: Building Your Balance



## OBJECTIVE



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), ruler, pencil, penny, nickel, dime, quarter

## PROCEDURE



1. You will need a simple balance for many of the activities this year. 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.
2. 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.
3. 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.
4. 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 data table the beginning and ending volumes in the syringe.
5. 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.
6. 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. Record the volumes used and the experimental masses of each coin in your data table. Find the accepted masses of the coins on the Internet and record the masses in the table.

**Data** (Copy this table onto a sheet of notebook paper.)

Coin	Syringe Beginning Volume (mL)	Syringe Ending Volume (mL)	Volume of water added (mL)	Mass of Coin (g) Experimental	Mass of Coin (g) from Internet
Penny Date _____					
Nickel					
Dime					
Quarter					

**Post-Lab Questions** (Answer the questions on a sheet of notebook paper.)

1. Calculate the percentage error between your measurement and the accepted mass (as provided by the Internet) for each coin. Show correct work – including formulas!
2. What do you think was the biggest contributor to that difference in your mass and the actual mass?
3. What do you think is the lightest mass that you could find using this balance?
4. How were you able to use the balance to find the mass of the coins?