

OBJECTIVE: The student will use the triple beam balance correctly and understand the precision of the triple beam balance. Assignment due on _____

Mr. Mason
Physical Science

Name: _____
Hour: _____ Date: _____

Metric Measurement: Mass

Triple Beam Balance

Background Information

The ability to accurately measure the mass of an object is an important skill in the physical science laboratory. The triple-beam balance is the instrument most frequently used to measure the mass of an object. There are three ways in which the triple-beam balance may be used to measure mass:

1. **Measuring mass directly:** the object is placed on the pan of the balance and the riders are moved into position on the beams until the pointer is balanced at the zero point. The mass is determined by the positions of the riders on the beams.
2. **Finding mass by difference:** this procedure is most frequently used to find the mass of a liquid in a container. The mass of the empty container is subtracted from the combined mass of the container and the liquid.
3. **Measuring out a substance:** it is necessary to use this procedure to obtain an exact amount of a solid chemical substance. Chemicals should never be placed directly on the balance pan, so it is necessary to first find the mass of the weighing paper or container. Add this amount to the desired mass of the chemical, and preset the riders to this number. The chemical is then added to the paper a little at a time until the pointer is balanced at the zero point.

The triple beam balance is a device used to measure the mass of matter using grams as its units of measure. The balance is a sensitive device that needs to be treated with care so as to get the most accurate data from it. Always carry the balance with two hands. Never allow liquid or solid matter into the balance mechanism. Wipe it off and keep it clean. Once the balance has been calibrated, avoid moving it for any reason. If it is moved, you must recalibrate it.

Purpose: to learn how to use the triple beam balance correctly and to learn how accurate it is.

Hypothesis: State your hypothesis below

Materials:

400 mL beaker
50 mL graduated cylinder
#4 solid stopper
Triple Beam Balance

Procedure:

1. Zero your scale. Make sure the riders are moved all the way to the left and that the pointer rests on zero.
2. Find the mass of an empty beaker and record on the data chart.
3. Find the mass of beaker and 50 ml of water and record.
4. Mass the beaker with 100 ml of water in it.
5. Mass the beaker with 200 ml of water in it. (Do not discard the beaker and water. You will use it later.)
6. Mass a #4 solid stopper to the nearest hundredth of a gram and record it.
7. Mass your beaker with 200 ml of water to the nearest hundredth of a gram of water and record.
8. Repeat procedure #6 and #7 four more times.

Data Charts:

	50 ml of water	100 ml of water	200 ml of water
Mass of empty beaker	Grams	Grams	Grams
Mass of beaker & water	Grams	Grams	Grams
Mass of water only	Grams	Grams	Grams

	Mass of #4 Stopper	Mass of Beaker & 200 ml of water
Trial #1	Grams	Grams
Trial #2	Grams	Grams
Trial #3	Grams	Grams
Trial #4	Grams	Grams
Trial #5	Grams	Grams

Find the difference between your largest and smallest readings for each column if any.

Difference for #4 stopper column: _____ g.

Difference for beaker & water column: _____ g.

Metric Measurement: Mass
Triple Beam Balance
Data Questions

1. Describe how you determined the mass of 50 ml of water? Show your calculations.
2. Which rider on the balance should always be moved first when finding the mass of an object?
3. What is the mass of the largest object your balance is able to measure?
4. What is the mass of the smallest object your balance is able to measure accurately? (think about the results of your lab experiment).
5. In this lab, you found the mass of 50 ml of water. Calculate the mass of 1 ml of water—do not use the balance.
6. Describe how you could find the mass of a certain quantity of milk that you poured into a drinking glass.
7. If you were baking a cake and the recipe called for 250 grams of sugar, how would you use the triple-beam balance to obtain this amount?
8. After using your balance, how should it always be left?