

LAB 4: MEASUREMENT UNCERTAINTY DISCOVERY LAB: WHERE IS IT?

Generally when an object burns, the quantity of ashes that remain is smaller than the original object that was burned. What happened to the rest of the object? In order to answer this question, students will use quantitative observations by measuring the mass of a match before and after burning.

Hint: Notice this information gets you started on the introduction of the lab report? Your team should also form a **hypothesis**.

Methods and materials

1. Measure the mass of a match. Record this measurement as well as detailed observations about the match. [You are using **quantitative** and **qualitative** observations.]
2. Carefully strike the match and allow it to burn for five seconds. Blow out the match. Record your observations after the flame is out.
3. Allow the match to cool. Measure and record the mass of the burned match.
4. Place the burned match in a labeled beaker of water.
5. Repeat steps 1-4. Compare your data from the two trials.

Analysis

1. Why did you do two trials? [Hint: **accuracy**, **precision**, and **error**]
2. How do you account for the change in mass? [Hint: Phlogiston theory was prominent during the life time of Antoine Lavoisier. Did it stand the test of time?]
3. Where is the matter that appears to have been lost? [Hint: look up combustion]

Laboratory Report

Students will individually complete a blank lab report form.

How to use a Triple Beam Balance

- The triple beam balance is used to measure masses very **precisely**; the reading error is 0.05 gram.
- With the pan empty, move the three sliders on the three beams to their leftmost positions, so that the balance reads zero. If the indicator on the far right is not aligned with the fixed mark, then calibrate the balance by turning the set screw on the left under the pan.
- Once the balance has been calibrated, place the object to be measured on the pan.
- Move the 100 gram slider along the beam to the right until the indicator drops below the fixed mark. The notched position immediately to the left of this point indicates the number of hundreds of grams.
- Now move the 10 gram slider along the beam to the right until the indicator drops below the fixed mark. The notched position immediately to the left of this point indicates the number of tens of grams.
- The beam in front is not notched; the slider can move anywhere along the beam. The boldface numbers on this beam are grams and the tick marks between the boldface numbers indicate tenths of grams.
- To find the mass of the object on the pan, simply add the numbers from the three beams.
- As with a ruler, it is possible to read the front scale to the nearest half tick mark.

