

### **Tips for Boxes-A-Weigh measuring**

#### **Objectives**

- Articulating the importance of estimation
- The importance of zeroing the balance and proper use of balances
- Focus thinking and learning of the student

#### **Set Up:**

1. Remove each box from its' nesting set.
2. Each box has a colored dot on the bottom.
3. Group the boxes by color (red, green, blue, and yellow).
4. The code to the letters on the bottom of the boxes is on the “**Boxes-A-Weigh Key**” sheet.

#### **Equipment (and proper use of balance):**

1. The primary balance is a device that is used to measure mass. This device compared an objects' mass to a standard mass by comparing their weights. An object is placed in one container and the masses of known value are placed in the other. When the containers are balanced, the mass of the object being measured is equal to the mass in the other container. Gravity pulls with an equal force on the two sides of the balance when the masses are equal; so when the balance is balanced we know that the unknown mass is the same as the standard mass.
2. Before the primary balance is used, it should be zeroed (calibrated) to check to see if it is in balance. The two containers must hang evenly and the mid mark on the arm must be in line with the mark on the base. If it is not zeroed, you can carefully move the adjustment piece on the arm toward the high side of the balance. This usually requires a small adjustment.
3. The object of the unknown mass is placed on the left hand side of the balance and the masses are added to the right hand side until it is back in balance.

#### **Procedure:**

As a group, students put the boxes in the order that they predict represents their masses from lightest to heaviest. Then using the balance, determine the actual masses and compare with their predictions.