

Activity: Relative Mass

Purpose

The purpose is to determine the relative mass of different kinds of hardware and to learn to count by massing.

Data

Hardware	Mass (g)
Empty vial	
Vial + Washers	
Vial + Hex Nuts	
Vial + Bolts	

Calculations

Set up the calculations on the back of this paper. Be sure to label your quantities!

1. A box of hardware contains 100 pieces. Assuming there are 25 pieces in each vial, calculate the mass of a box of each kind of hardware. Express these values in units of g/box.
2. If you had 1.00 kg of each kind of hardware, how many boxes of each would you have?
3. You learned that a barrel of the 1" bolts had a mass of 65.2 kg. The mass of the barrel was 9.6 kg. How many boxes of bolts are in the barrel?
4. Someone at the Home Depot tells you that a 2" bolt is 6.75 times as heavy as a washer. What would be the mass of a box of such bolts?
5. Suppose that you were given the job of shipping 25,000 hex nuts to a customer. How many boxes of hex nuts would this be? All you have is a hanging scale and a barrel of hex nuts. Describe how you could determine the proper number of pieces without physically counting them out.

Conclusion

Do you agree or disagree with the following statement? Support your answer.

“You can count by weighing.”

Extension

Each vial contains the same number of pieces of hardware. Calculate the *relative* mass of each kind of hardware. Divide each mass by the mass of the smallest. (The smallest will be 1.00)

Relative mass: Nuts _____ : Bolts _____ : Washers _____

Suppose that the washer represented an atom of the element carbon. From your relative masses, determine the elements that would be represented by the nut and the bolt.