Lab Activity: Counting by Using the Mass of a Known Quantity

**Purpose**

To discover a method of counting things that you are not able to see.

**Background**

When you buy eggs you usually ask for a \_\_\_\_\_\_\_\_ eggs. You know that one dozen of any item is \_\_\_\_\_\_\_\_\_\_. Paper is not packaged by the dozen. Paper is packaged as a ream. A ream of paper has 500 sheets.

Why is it useful to use units like a dozen or a ream?

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In this lab you will be creating a new counting unit, then using the mass of that new unit to convert mass of items to the number or quantity of those items.

**Safety, Handling, and Disposal**

Do not open the packages in the lab area. Follow your teacher’s instruction for disposal.

**Materials**

3 packages of different items balance

**Procedure**

1. Count and record the number of items in each package.
2. Measure the mass of each package and record in data table.

**Data**

|  |  |  |  |
| --- | --- | --- | --- |
| Items | Number of Items in package | Mass, g  of package  ***(Ignore the mass of bag)*** | Calculated Mass, g of one item in package |
| Pennies |  |  |  |
| Large Paper Clips |  |  |  |
| Beans |  |  |  |

**Analysis and Interpretation**

As you know, a dozen represents 12 items. Since I did not have enough items to make a dozen, I decided to make a new counting unit. This *new unit will be called a RAM* (after our school mascot.) Each of your packages contains \_\_\_\_\_\_\_ items. So the equivalent is:

1 dozen of something = 12 of something

1 RAM of something = 4 of something

1. A dozen oranges have \_\_\_\_\_ oranges. A RAM of oranges has \_\_\_\_ oranges
2. A dozen donuts have \_\_\_\_\_ donuts. A RAM of donuts has \_\_\_\_\_ donuts.
3. A dozen molecules of water have \_\_\_\_\_ molecules of water. A RAM of water molecules will have \_\_\_\_\_\_\_\_\_ water molecules.
4. A dozen atoms of iron have \_\_\_\_\_ atoms of iron. A RAM of atoms of iron will have \_\_\_\_\_ atoms.
5. How many Pennies are in 2 RAMS? ***Show work using a conversion factor!***
6. How many paper clips are in 10 RAMS? ***Show work using a conversion factor!***
7. How many beans are in 400 RAMS? ***Show work using a conversion factor!***

***Using Mass to Count:*** If you know the mass of a RAM of an item then you can use this as an equivalent to convert from mass to quantity. ***(look at your data table!)***

1 RAM of Pennies = \_\_\_\_\_\_\_\_\_\_ g

1RAM of paper clips = \_\_\_\_\_\_\_\_\_ g

1 RAM of beans = \_\_\_\_\_\_\_\_\_ g

1. If just the contents of a jar of pennies have a mass of 2000g how many pennies are in the jar? ***(you need to use 2 conversion factors)***
2. If a box of paper clips has a mass of 500 g how many paper clips are in the box? ***(you need to use 2 conversion factors)***
3. If a package of beans has a mass of 1500g how many beans are in the package? ***(you need to use 2 conversion factors)***