

## Millet by the Million

*Adapted from an activity created by Kay Sorg, of Albany Middle School.*

---

Many numbers that we use in science classes are quite large, and students (and many adults) don't have ways to relate to what those large numbers mean. Have you ever seen a million objects, and known that what you saw represented that number? When we see 3 apples or 5 pencils or 10 books, we know what number is represented by each collection. Even when the number of the objects gets too large to count quickly, we estimate to get an idea of what 20 or 50 objects looks like. In this activity, we will "count" a million objects – pieces of millet – to see what a million looks like.

### Materials:

about 10 lbs. of millet or other small grain/bean/seed  
stop watches or a clock with second hand  
a commercial water cooler bottle, or a large rectangular tub (with clear sides)  
scale or balance  
small containers:  
    at least 3 small cups per student  
    some larger cups or beakers  
6 chenille stems, optional

### Procedure:

1. Make sure all students have access to millet by putting some in a cup on each table.
2. Each student will count pieces of millet, building the powers of 10 as they count.
3. Count 1 piece, and place it in a cup. Then fill in the data table for 1.
4. Count 10 pieces and place them in a second cup. Then fill in the data table for 10.
5. Before counting 100 pieces, take note of the time.
6. Count 100 pieces of millet and place them into a small cup. Record how long it takes to count 100 pieces.
7. Fill in the data table for 100.

*Do you feel like counting any more? How can we get to 1000 without counting 1000 pieces?*

8. Ten people pool their millet to make 1000 pieces.
9. Fill in the data table for 1000.

*How many collections of 1000 would it take to make a million? (1000 – the word "Million" comes from the Latin mille, meaning thousand). How can we get to 10,000? Even in a class of 35 students, if everyone pooled their 100 pieces of millet, we would only have 3500 pieces of millet – not 10,000 and nowhere near 1,000,000.*

What if we find the mass of 1000 pieces of millet?

10. Find the mass of 1000 pieces of millet in grams. (I got 5.7 g)
11. If we multiply the mass of 1000 pieces by 10, we will get the mass of 10,000 pieces of millet. (By my measurement, 10,000 pieces will mass 57 g)
12. Use mass to “count” 10,000 pieces. Fill in data table.
13. Combine ten 10,000s to make 100,000 and fill in data table.
14. Combine ten 100,000s to make 1,000,000 pieces of millet and fill in data table.

Alternatively, you can find the mass of the total number of pieces of millet counted by your entire class, and use the following proportion:

$$\frac{\text{1,000,000 pieces of millet}}{\text{Total number of pieces counted by the class}} = \frac{\text{Total number of grams needed to make 1,000,000 pieces}}{\text{Mass of the number of pieces counted by the class in g}}$$

Put the measured millet into the large container. Marvel at a million pieces of millet.

**Extensions:**

Have students use their data to find out how long it would take to actually count 1,000,000 pieces of millet.

What is another way to visualize a million pieces of millet? By volume! Lay 100 pieces of millet, side by side, next to a ruler. Recall that 1,000,000 is a cubic number, as it is  $100 \times 100 \times 100$  or  $100^3$ . Measure the length of 100 pieces of millet. Then use the chenille stems to construct a cube whose length, width and height equal the length of 100 pieces of millet. When you fill the cube, you will have about 1,000,000 pieces of millet.

How much is 1 billion? 1000 of these cubes!

**More extensions:**

How long would it take to count 1,000,000 pieces of millet?

Our sun is about 150,000,000 km from the earth. How long would it take to count 150,000,000 objects?

Alpha Centauri, our next nearest star system is about 40,000,000,000,000 km away. When we start to talk about numbers this large, we sometimes change the units. The Alpha Centauri system is about 4.4 light years away.

**Source for Cen Tech Digital Pocket Scale ITEM # 93543-0VGA**

<http://www.harborfreight.com/cpi/ctaf/displayitem.taf?Itemnumber=93543>

## Millet by the Million Data Table

Number of pieces	As a Power of 10	Time it takes to count, if applicable	Mass, if applicable	
1		n/a	n/a	
10		n/a	n/a	
100			n/a	
1000				
10,000				
100,000				
1,000,000				

