In 1963 I was in seventh grade and taking “New Math” in Jr. High. My teacher put a million dots on the wall and I've never forgotten it. It took him a very long time to do it, and it took up most of the wall. A million is REALLY at lot of dots. He used a manual typewriter (Honest. 1963! Not electric) to put row after row after row of periods onto a Ditto master. Ten dots per inch across 8” of page and 6 rows per inch down 10” of page gave 4800 dots per page. Then “ran off” 209 copies and hung them on the wall. This was pre photocopier (at least my school didn't have one) and 209 sheets was way too many for carbon paper, but just in the range of Ditto. My school didn't use mimeograph (as far as I remember) until a few years later. So we got nice blue smelly dots.

Years went by. More school. College. Grad school. Work.

After years of teaching technicians in the lab how to do serial dilutions, plate bacteria, count colonies, and then calculate the titer (bacteria per ml) of the original culture, I decided that people just don't have a feeling for orders of magnitude and really big numbers. Oh, they learned it, and did the math, and got the right answer, but every once in a while some glitch made me wonder if the concepts went more than skin deep. After nearly 20 years in the lab, I retired from research to pursue my long-standing interest in science education, working as an outreach specialist with teachers and students K-12. I finally had time and excuse to think about a million dots.

So now I display one million one hundred eleven thousand one hundred eleven dots on the wall. This shows that a million is a lot, that our numbering system is base 10, that logarithmic growth is (well) logarithmic, that there are lots of ways to express big numbers, that $10^6 - 10^3$ is close enough to 10^6 that I can just ignore the subtrahend (I only have 2 significant digits most of the time anyway), and many many more straightforward concepts. I've used this visual display with students from kindergarten through college, and it seems to be a helpful aid at all levels.

How to:
print out the files of dots and the labels and arrange on a wall
dots are arranged as:

1 dot,
10 dots – a row of 10 equally spaced dots (about a half inch long row),
100 dots – 10 rows of 10 dots (about ½ in X ½ in)
1000 dots – a row of 10 squares of 100 dots (about a 7 in long row)
10,000 dots – 10 rows of 10 squares (about 7 in X 7 in note that each of the 100 squares is 100 dots)
100,000 dots – a row of 10 square of 10000 dots. (about 6 feet long row)
1,000,000 dots – 10 rows of 10 squares (about 6 ft X 6 ft each of the 100 squares is 10,000 dots)

To make 100,000 dots, photocopy the 10,000 dots square and tape together 10 photocopies in a row.
To make 1,000,000 dots, photocopy the 10,000 dots square and tape together 100 photocopies in a square of 10X10.

I like to label every set of dots with the number (expressed in digits with commas), as English word, and as exponential notation.

Donna Daniels
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Wisconsin Teacher Enhancement Program, Dept of Genetics, UW-Madison