

THE GREEN PEA ANALOGY

(This analogy was lifted from the Sept. 1983 Newsletter of the New Jersey Science Teachers Association Inc. and is from Fundamental Chemistry by Andrews and Kokes.)

If you could count out a hundred (10^2) average-sized peas, you will find that they occupy roughly the volume of a cubic inch. A million (10^6) peas are just enough to fill an ordinary household refrigerator and a billion (10^9) peas will fill a whole house from cellar to attic; thus a trillion (10^{12}) peas will fill a thousand houses, the number you might find in a medium-sized town; and a quadrillion (10^{15}) peas will fill all the buildings in one of our larger cities like Philadelphia or Baltimore.

You can see that you will run out of buildings very soon at this rate, so let us try a larger measure, for instance, the state of Pennsylvania. Suppose that there is a blizzard over Pennsylvania, but, instead it snows peas. We get Pennsylvania covered with a blanket of peas about four feet deep all the way from New Jersey out to Ohio and all the way from Maryland to New York State. This blanket drifts over the roads and banks up against the sides of the houses, and covers all the fields and forests. Think of flying across the State with the blanket of peas extending out as far as you can see. This gives you an idea of our next number, for in this blanket are about a quintillion (10^{18}) peas.

Imagine that this blizzard of peas falls over the entire land of the globe, North America, South America, Europe, Australia, Asia and Africa, so that all the continents are covered with peas four feet deep. This global blanket will contain sextillion (10^{21}) peas.

Then imagine that the oceans are frozen over and the blanket of peas covers the entire area of the earth. Go out among the neighboring stars and collect two hundred and fifty planets the size of the earth and cover each of these with a blanket of peas four feet deep. Then you will have a septillion (10^{24}) peas.

Finally, collect two hundred and fifty thousand planets, each the size of earth; cover each of these with a blanket of peas four feet deep and then, at least, you will have octillion (10^{27}) peas, the number of atoms in your body!