

million dot project

A central issue which confuses discussions of the development of life forms on the planet is the inherent difficulty involved in intuitively grasping the size of large numbers. It is interesting that these numbers (million, billion, even trillion) have common usage, for example, in the press, usually when discussing cost, in dollars, of some governmental program. In the digital world, *mega-*, *giga-*, and *tera-* denote sizes of invisible processes that we take for granted. However, these words do not translate adequately or meaningfully into our perception of their true size, since they are so far outside any range with which we have intimate experience. When we then incorporate these words (million, billion) into sentences describing a process occurring over so many years (when our own personal experience of years is less than a hundred), the ability to communicate important concepts on an intuitive level is exceedingly difficult.

Using a simple graphical demonstration, the reality of this conceptual difficulty may be illustrated. By creating a new Word document, and setting the format to a size 11 font, then entering dots (periods) as “.....”, one can fill a standard 8 ½ ” X 11” page with **10,000 dots**.

Copying this sheet 100X will yield 100 pages - each containing 10,000 dots - **1 million dots** total. Positioned **side by side**, these 100 sheets can be stretched out in a hallway to a length of **71 feet** (8 ½” X 100). Walking along this display, one may observe 1,000,000 dots. [*Please note: actually doing this simple project delivers quite a different effect than simply pondering it.]*

This gives a visual method to begin to obtain an intuitive concept of terms used when discussing the enormity of time.

10,000	8.5inches
100,000	7 feet
1 million	71 feet
65 million	0.87 miles
245 million	3.3 miles
545 million	7.3 miles
1 billion	13 miles
3.5 billion	47 miles
4.5 billion	61 miles
15 billion	202 miles

Imagining these visual comparisons and then translating them into the relative number of years since various milestones occurred (transition of human hunter-gatherers to the first agricultural societies @ 10,000 y. ago, extinction of dinosaurs @ 65 million y. ago, Cambrian explosion @ 545 million y. ago, first life @ 3.5 billion y. ago, Big Bang @ 15 billion y. ago) gives a starting point to understand the enormity of time available (and necessary) for a process so outrageous, at first blush, as the progressive development – by variation and natural selection – of all life forms from a common single-cell ancestor over the past 3.5 billion years.

