Santa Clara County Office of Education

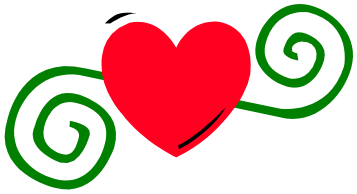
Assessment and Accountability Network Meeting

February 9, 2011

9:00-11:00am

Oak Grove Room

TOPIC	OUTCOMES	PERSON	TIME
Welcome and Introductions	Valentine's Warm-up Activity	Bill Conrad	9:00-9:10am
Meeting Outcomes	Team review of meeting outcomes	Bill Conrad	9:10-9:15am
How Do We Know if Our Benchmark Assessments are Working?	Team members will learn how to use a variety of technology-rich tools to evaluate the validity and reliability of a benchmark assessment before and after it is given. Team members will use a variety of Wright maps to evaluate the results of administered benchmark assessments.	Bill Conrad and Diana Wilmot	9:15-10:00am
Online Simulated Science Assessment	Team members will learn about innovative online simulated science performance assessments. Team members will explore grant opportunities to begin to use these assessments.	Mike Timms, WestEd	10:00-10:45am
District Perspective	Team members will hear a district's perspective on leading this work in the classroom.	Shannon Potts, Santa Clara USD	10:45-10:50am
Meeting Evaluation and Next Steps	Evaluation of meeting and planning next steps	Bill Conrad and Team	10-:50-11:00am
MeasureResults®	Team members will hear about an online program evaluation service.	Denis Newman, Empirical Education	11:00-11:30am



Next meeting: April 14, 2011

I love my Valentine more than……

The number of hearts in this jar!
You estimate and win

The number of insects on the earth…..
It has long been recognized and documented that insects are the most diverse group of organisms, meaning that the numbers of species of insects are more than any other group. In the world, some 900 thousand different kinds of living insects are known. This representation approximates 80 percent of the world's species. The true figure of living species of insects can only be estimated from present and past studies. Most authorities agree that there are more insect species that have not been described (named by science) than there are insect species that have been previously named. Conservative estimates suggest that this figure is 2 million, but estimates extend to 30 million. In the last decade, much attention has been given to the entomofauna that exists in the canopies of tropical forests of the world. From studies conducted by Terry Erwin of the Smithsonian Institution's Department of Entomology in Latin American forest canopies, the number of living species of insects has been estimated to be 30 million. Insects also probably have the largest biomass of the terrestrial animals. At any time, it is estimated that there are some 10 quintillion (10,000,000,000,000,000,000) individual insects alive.
Source: http://www.si.edu/Encyclopedia_SI/nmnh/buginfo/bugnos.htm

The number of people on the earth…….
According to the International Programs Center, U.S. Census Bureau, the total population of the World, projected to 06/05/09 at 12:33 GMT (EST+5) is

6,784,538,543

Source(s):
Quoted from: http://www.census.gov/ipc/www/popclockwo…

The number of stars in the universe….
For the Universe, the galaxies are our small representative volumes, and there are something like 10^{11} to 1012 stars in our galaxy, and there are perhaps something like 10_{11} or 10^{12} galaxies.

With this simple calculation you get something like 10^{22} to 10^{24} stars in the Universe. This is only a rough number, as obviously not all galaxies are the same, just like on a beach the depth of sand will not be the same in different places.
Source: http://www.esa.int/esaSC/SEM75BS1VED_index_0.html

The number of grains of sand on the earth……
Apparently this calculation tells you how they made up that there are (aproximately) 700,500,000,000,000,000,000 grains of sand on earth (or seven quintillion five quadrillion for the likes of me)
Source: http://www.thenakedscientists.com/forum/index.php?topic=19016

The number of atoms in the human body….

What fascinates me though is that there are more atoms that this in your body, an estimated 7,000,000,000,000,000,000,000,000,000
Source: http://www.thenakedscientists.com/forum/index.php?topic=19016

The number of atoms in the earth……
But different materials have different weights. For instance, we know that there is a lot of silicon, water, oxygen, etc. on Earth. In order to do the calculation better, you would need to know what fraction of the Earth's mass is in each material. I'm guessing that the fact that the different fractions of these elements are not incredibly well known. On the other hand, we know that it can't be too different than iron. Silicon is half the mass of iron, so if the earth were entirely silicon, there'd be twice as many atoms. I bet we can say that the number of atoms in the earth is something like 10^{49}-10^{50}.

Source: http://www.fnal.gov/pub/inquiring/questions/atoms.html

The number of molecules in the ocean…….

The total volume of the earth's oceans is estimated at 1.3 x 10^9 cubic kilometers of liquid water. My source (http://hypertextbook.com/facts/2001/SyedQadri.shtml) gives four different scientific estimates which all agree to two significant figures. So don't expect an answer better than within one percent of actual.

$4.4*10^{46}$

Let's start by assuming the oceans are pure water.

The gram molecular weight of H2O is 1+1+16 = 18 grams per mole. How many grams are there? Let us calculate

Grams of ocean water =

(1.3*10^9 cubic km)(10^9 cubic m / 1 cubic km)(10^6 cubic cm/1 cubic m)(1 gram of water/1 cubic cm of water)

= 1.3*10^24 grams.

Divide by 18 to get 7.2*10^22 moles of water. Using good ol' Avogadro's number: (6.02*10^23 molecules/mole) (7.2*10^22 moles)

= 4.3*10^46 molecules of water in the oceans.

Seawater, of course, has dissolved sodium chloride and other solutes including heavy metals. Let's just say for now that it's pure NaCl.

At.Wt of sodium=23, chlorine=35; so 23+35 = 58 grams/mole

Now it gets a little tricky. Since each molecule of sodium chloride dissolved in water is actually ionized into Na+ and Cl-, I would count each NaCl as TWO molecules, because the sodium and chlorine atoms are swimming around independently, not bound to each other.

So 58 grams represents not one but two moles, making the effective gram molecular weight of salt (remember, the question is 'how many molecules?') would be 29 grams/mole.

On average, seawater in the world's oceans has a salinity of ~3.5% (http://en.wikipedia.org/wiki/Seawater). So each cubic centimeter of ocean water (containing exactly one gram of water) also contains an additional .035 grams of salt, representing (.035 grams)(1 mole/29 grams) = .0012 moles of salt per cc seawater,

whereas for pure water, one cubic centimeter contains 1/18 = .055 moles per cc. So the salt adds a correction factor .0012/.055 = .021 = 2.1 percent more molecules of ocean saltwater compared to pure water.

So adding 2% to 4.3*10^46 bumps it up to to 4.4*10^46.

There would be additional molecules of other solute species, as noted earlier. You can see, however, that the molecule count is dominated by H2Os and I doubt would change the overall figure by an appreciable amount.