

Write with SNot!

Name: _____

Some numbers are a real pain to write out and work with because they have so many digits. What scientists do to make life easier is convert numbers from Standard Notation into Scientific Notation (SNot for short). To write in SNot you need to do three things:

1. Move the decimal so there is just one digit from 1 to 9 to the left of the decimal.
2. Multiply the new number by an appropriate power of 10 so that the new form has the same value as it did before. (Remember, each decimal place is a power of 10.)
3. Double-check your work!

Example: Inside of each cell of your body there are over 3,160,000,000 base pairs of DNA. Let's convert that to SNot. First, move the decimal 9 places over so that it's just to the right of the 3. Next, multiply by a power of ten so that it still has the same value.
Answer: 3.16×10^9

Part I: Write the numbers from each of the following problems in Scientific Notation.

1. All living things need liquid water, which only exists within a narrow range of 100°C .
2. Protons are 1836 times more massive than electrons. If the electron to proton mass ratio was larger or smaller, molecules wouldn't form, and life would be impossible.
3. If the Earth weren't just the right distance from Jupiter, life would be impossible. This is because there would be about 10,000 times more comet collisions with the Earth.
4. In the simplest, tiny microorganisms there are at least 600,000 base pairs of DNA.
5. There are about 50,000,000,000,000 cells in the average human body.
6. The DNA from just one cell of your body would extend about 7 ft when laid out.
7. If stretched out and laid end to end, the total length of all the blood vessels in your body is about 60,000 miles, long enough to travel around the Earth a couple times!
8. If you were to squeeze all the empty space out of all the atoms in your body, you would be 0.0000000000001 the size you are now. You would be too small to be seen with the naked eye! (This also means it's mostly empty space between your ears. 😊)

Part II: Write out the numbers in standard notation.

9. Astronomers estimate there to be a maximum of 1×10^{23} planets in the universe.
10. In math, odds less than 1×10^{-50} are considered to mean statistically impossible.
11. The odds that any given planet in the universe would possess the necessary conditions to support intelligent life are less than 1×10^{-173} . (So how did we get here?)

