

How Many Atoms

A typical human weighs about 12 stone or 170 pounds or 77 kg.

People are made up of atoms - mostly oxygen, carbon, hydrogen, nitrogen - arranged into molecules, some very big and some self replicating. Typically these atoms have about 10 neutrons or protons, each with a mass of $1.66 \times 10^{-27} \text{ kg}$, so have a mass of about $1.66 \times 10^{-26} \text{ kg}$.

The number of atoms in a human body is then about $\frac{77}{1.66 \times 10^{-26}} = 4.6 \times 10^{27}$.

If this sounds big, it is only a tiny fraction of the number of atoms in the Earth. The Earth has a mass of about $5.98 \times 10^{24} \text{ kg}$, so there are about

$\frac{5.98 \times 10^{24}}{1.66 \times 10^{-26}} = 3.60 \times 10^{50}$ atoms in the Earth.

The Sun has a mass of about $1.99 \times 10^{30} \text{ kg}$, so there are about

$\frac{1.99 \times 10^{30}}{1.66 \times 10^{-26}} = 1.20 \times 10^{56}$ atoms in the Sun.

These numbers all shrink compared to the number of atoms - mostly hydrogen in the Universe, believed to be about 10^{79} .