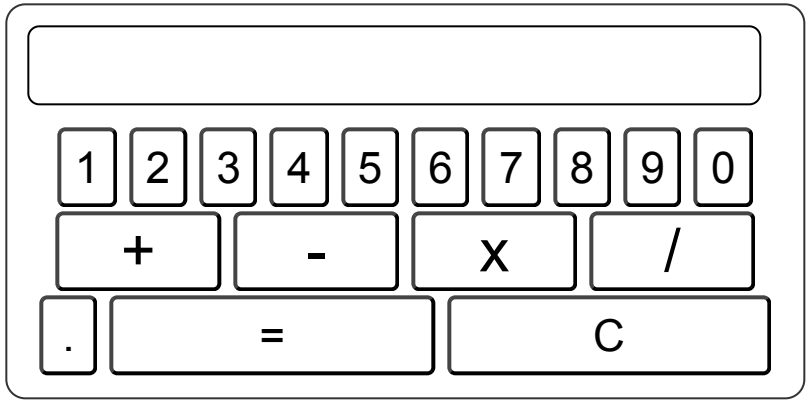
How to Convert Grams to AMU

By Chris Deziel; Updated April 26, 2018

Here's a Calculator to Help You



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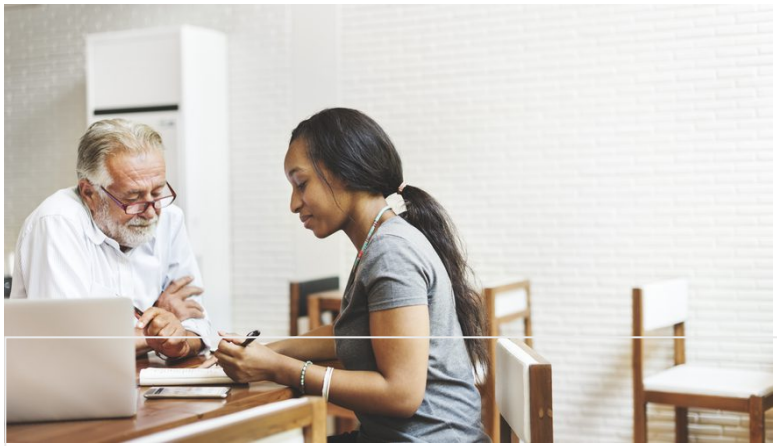

If you want to know the atomic mass of an element, you'll find it listed under the symbol for that element in the periodic table. The units aren't included with the mass, but they are understood to be atomic mass units (AMU) or, more correctly, unified atomic mass units (u). In macroscopic [illegible] refers to the weight of a [illegible]s Avogadro's number of a[illegible]

TL;DR (Too Lon[illegible]

One AMU is equivalent [illegible] equivalent to 6.022 x 10[illegible]

The Unified Atomic Mass Unit

The unified atomic mass unit (u), also known as the Dalton (Da), is the standard unit for atomic and molecular weights in the SI (metric) system of measurement. Both acronyms amu and AMU remain acceptable abbreviations for these units and are commonly used. By definition, 12 AMU is the exact mass of one atom of carbon-12. The nucleus of carbon-12 contains six protons and six neutrons, so 1 AMU is the mass of one nucleon. Electrons are so light that their mass is considered negligible when determining atomic and molecular weights.

A Mole of Carbon Atoms

Chemists measure macroscopic quantities of atoms in units called moles. By definition, a mole is the number of atoms in exactly 12 grams of carbon-12. That number turns out to be Avogadro's number, which is 6.022×10^{23}. This creates a relationship between the atomic mass and macroscopic weight of every element. For any element, its atomic mass in AMU is equal to the weight of 1 mole of the element in grams. For example, all natural isotopes of oxygen collectively have an atomic mass of 15.999 AMU, so one mole of oxygen weighs exactly 15.999 grams. Similarly, one mole of hydrogen weighs 1.008 gram, because the collective atomic mass of all isotopes of hydrogen is 1.008 AMU.

What Is One AMU in Grams?

A mole of carbon-12 atoms weighs 12 grams, and there are 6.022×10^{23} atoms in a mole. Dividing 12 grams by this incredibly large number of atoms tells us that one carbon-12 atom weighs 1.99×10^{-23} grams. Since a carbon atom weighs 12 AMU, one AMU is equivalent to 1.66×10^{-24} grams. Conversely, one gram is equivalent to 6.022×10^{23} AMU, which is Avogadro's number.

Things Needed

- Periodic table
- Calculator
- Pencil

References

- ThoughtCo: Atomic Mass Unit Definition (amu)
- University of Missouri: Atomic Mass
- Royal Society of Chemistry: Periodic Table

About the Author

Chris Deziel holds a Bachelor's degree in physics and a Master's degree in Humanities, He has taught science, math and English at the university level, both in his native Canada and in Japan. He began writing online in 2010 with the goal of exploring scientific, cultural and practical topics, and at last count had reached over a hundred million readers through various sites.