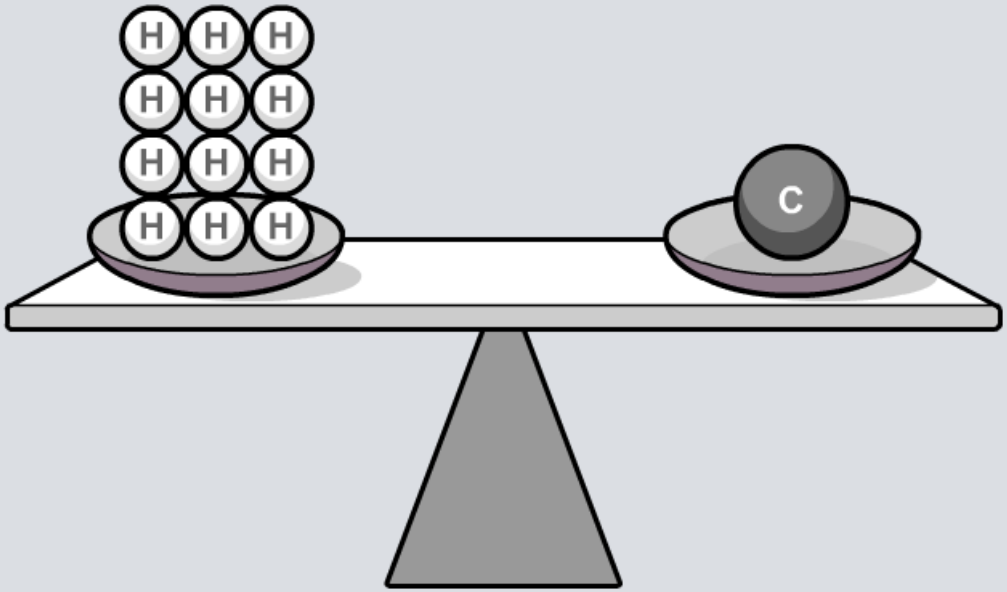
Relative Atomic Mass



How is the mass of atoms measured?

One grain of sand contains millions of atoms, so atoms must be really small. How is the mass of an atom measured?

Atoms are so small that their masses are not measured directly.

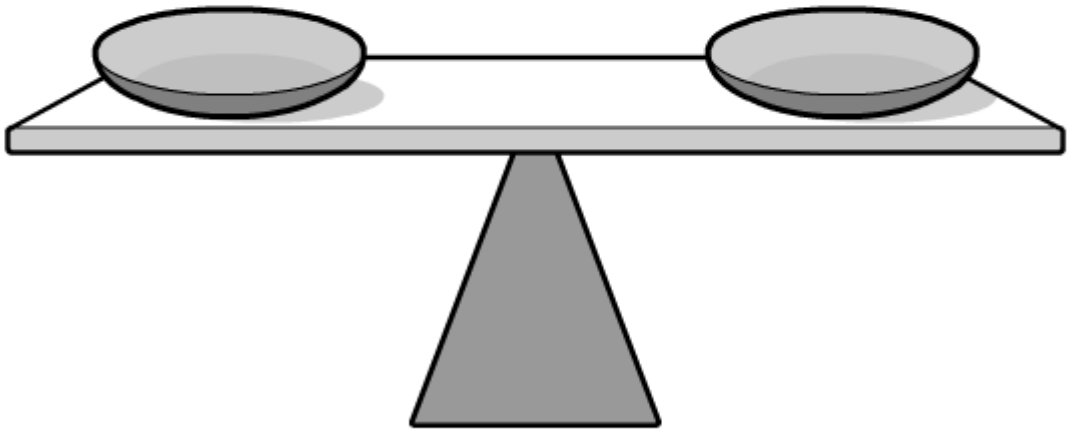
Instead, all atoms are compared with the mass of carbon-12. The mass of an atom on this scale is called its **relative atomic mass**.

What is relative atomic mass?

The **relative atomic mass** (r.a.m.) of an element is the mass of its atoms compared with the mass of an atom of carbon-12.

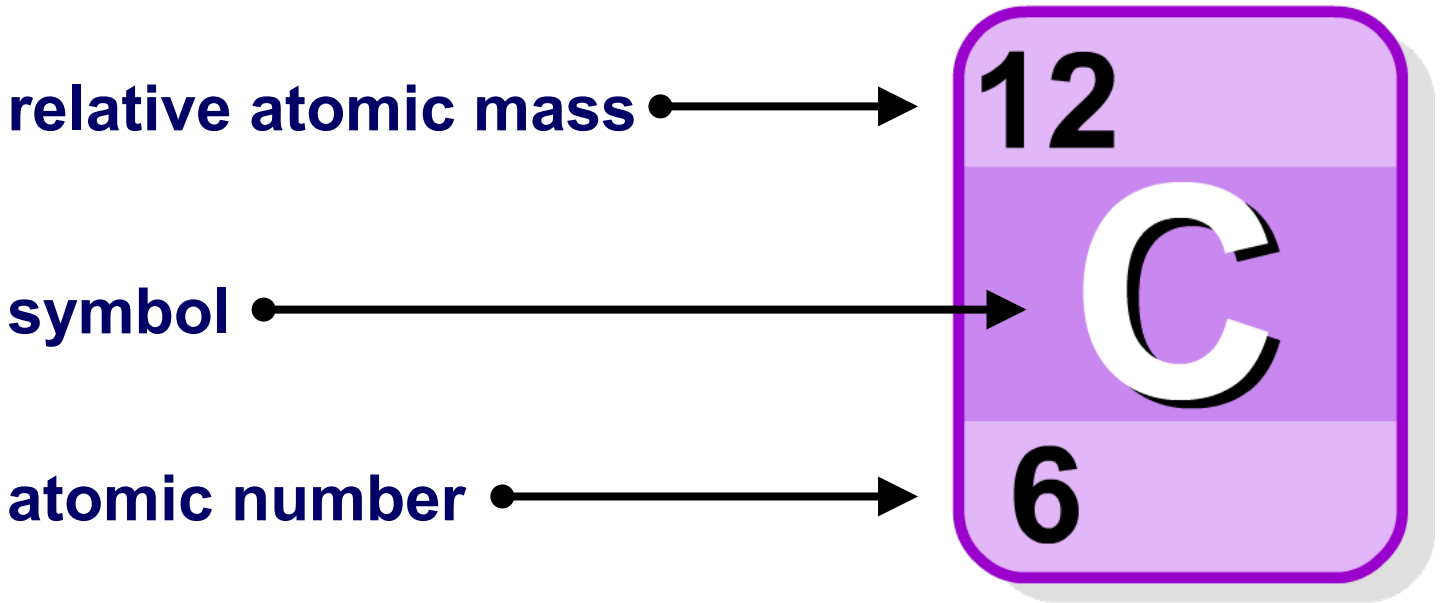
Each element has a different r.a.m. value.

Click "**play**" to find out more .



Where are r.a.m. values found?

The values of relative atomic mass (r.a.m.) are usually given in a data book or found in the periodic table. So you don't have to figure them out or remember them all!



When looking up relative atomic mass in the periodic table, remember that it always the larger of the two numbers given.

What is the other number?

Identifying relative atomic mass

What is the relative atomic mass of each element?

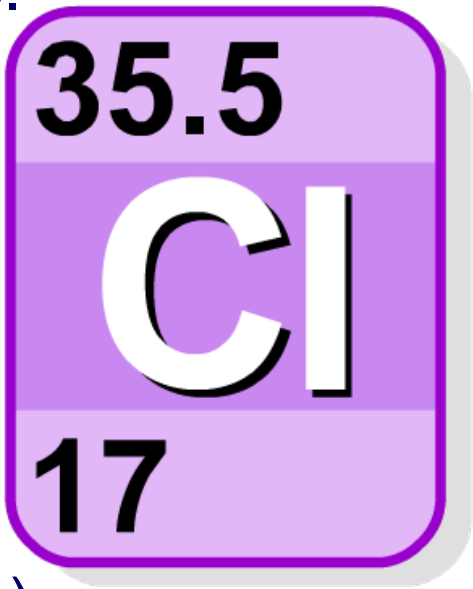
4	oxygen (O)
9	helium (He)
16	molybdenum (Mo)
40	krypton (Kr)
84	beryllium (Be)
96	silver (Ag)
108	calcium (Ca)

?

solve

Why isn't r.a.m. always a whole number?

Relative atomic mass (r.a.m.) is not always a whole number. For example, the r.a.m. of chlorine is **35.5**.



The standard r.a.m. value of each element is actually the **average** relative atomic mass, which takes all the isotopes of each element into account.

Chlorine has two isotopes:
chlorine-35 (75%) and **chlorine-37** (25%).

average r.a.m. of chlorine = (35 x 75%) + (37 x 25%)
= (35 x 0.75) + (37 x 0.25)
= 26.25 + 9.25
= **35.5**

Calculating average r.a.m. from isotopes

To calculate the average r.a.m. of a mixture of isotopes, multiply the percentage of each isotope by its relative atomic mass and then add these together.

Naturally-occurring bromine is composed of two isotopes: bromine-79 (50.5%) and bromine-81 (49.5%).

What is the average r.a.m. of naturally-occurring bromine?

average r.a.m. = (79 x 50.5%) + (81 x 49.5%)
= (79 x 0.505) + (81 x 0.495)
= 39.895 + 40.095
= **79.99**

This figure can be rounded up.