



A few exercises on the structure of the atom

For each of these sentences, tell if it's true or false. Justify your answer.

1. The diameter of an atom is equal to the diameter of its nucleus.
2. An electron of a magnesium atom is different of an electron of a chlorine atom.
3. The nucleus of an atom contains electrons.
4. Between the nucleus and the electrons, there are gases.
5. A neutron has a negative charge.
6. A nucleon is the addition of 1 proton and 1 electron.

Complete the following table

Atom	Number of electrons	Number of protons	Number of neutrons	Number of nucleons
Gallium	?	31	38	?
Einsteinium	?	99	?	252
Yttrium	?	?	50	89
Ruthénium	44	?	58	?

Magnesium chlorine

Magnesium chlorine is a solid made of elements magnesium and chlorine.

1. Give the composition (number of protons, neutrons, electrons) of a magnesium atom (${}_{12}^{24}\text{Mg}$), and of a chlorine atom (${}_{17}^{35}\text{Cl}$).
2. Determine the mass of a magnesium atom.
3. Determine the mass of a chlorine atom.
4. The nucleus of a magnesium atom has a diameter of approximately $d_{\text{nucleus}} = 10 \times 10^{-15} \text{ m}$, while the diameter of the atom itself is approximately $d_{\text{atom}} = 300 \times 10^{-12} \text{ m}$.

If we use a piece of grape ($d_{\text{grape}} = 1.5 \text{ cm}$) to represent the nucleus, what would the diameter of the representation of the atom be?

atome par un grain de raisin de 1,5 cm de diamètre, quelle serait la dimension de la représentation de l'atome ?

Data: $m_{\text{neutron}} = m_{\text{proton}} = 1.67 \times 10^{-27} \text{ kg}$