Investigating Matter (part II)

Physical Properties

Quantitative → Think « quantity »

- Gold has a ***density*** of 19,3 g/cm^3 at 20°C
- Gold has a melting point of 1062° C
- Etc.

Anything measurable

Qualitative → Think « quality »

- Gold has a shiny texture
- At room temperature, gold is in the « solid » state
- Etc.

Anything that is observable, but that cannot be measured

Physical Property	Description
Qualitative	
State	Solid, liquid, gas
Colour	Colour
Malleability	Ability to be beaten into sheets
Ductility	Ability to be drawn into wires
Crystalinity	Shape of crystals
Magnetism	Attraction to magnets
Quantitative	
Solubility	Ability to dissolve in water
Conductivity	Ability to conduct heat/electricity
Viscosity	Resistance to flow
Density	Ratio → mass to volume
Melting/Freezing point	Temperature of melting/freezing
Boiling/condensing point	Temperature of boiling/condensation

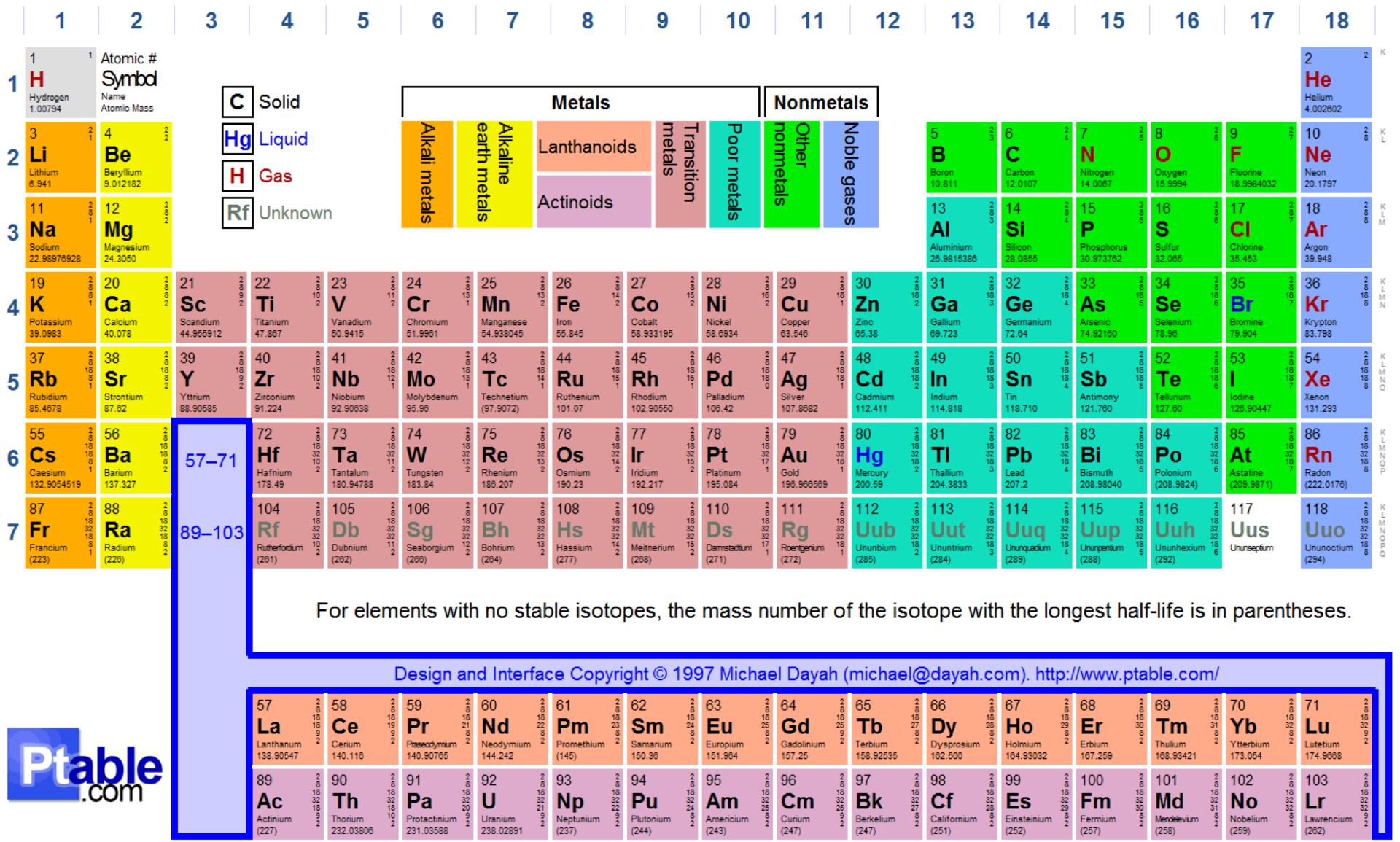
Pure Substances

- A substance that is made up of only one kind of **matter**
- Ex : H_2O, O_2, Gold (Au), etc.

Elements

- A pure substance made up of only one atom
- This cannot be broken down/separated into anything smaller
- Ex : Carbon (C), hydrogen (H)

Periodic Table of Elements



For elements with no stable isotopes, the mass number of the isotope with the longest half-life is in parentheses.

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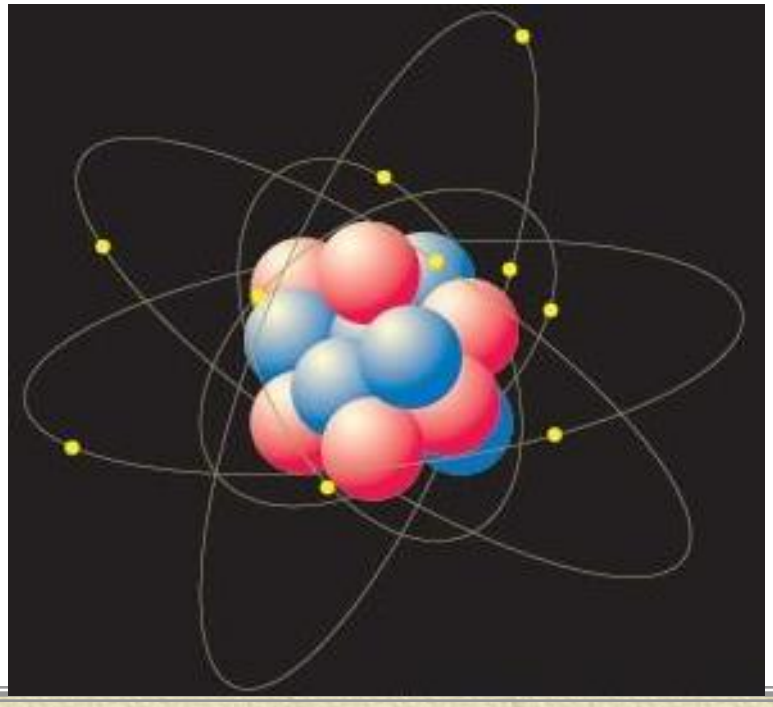
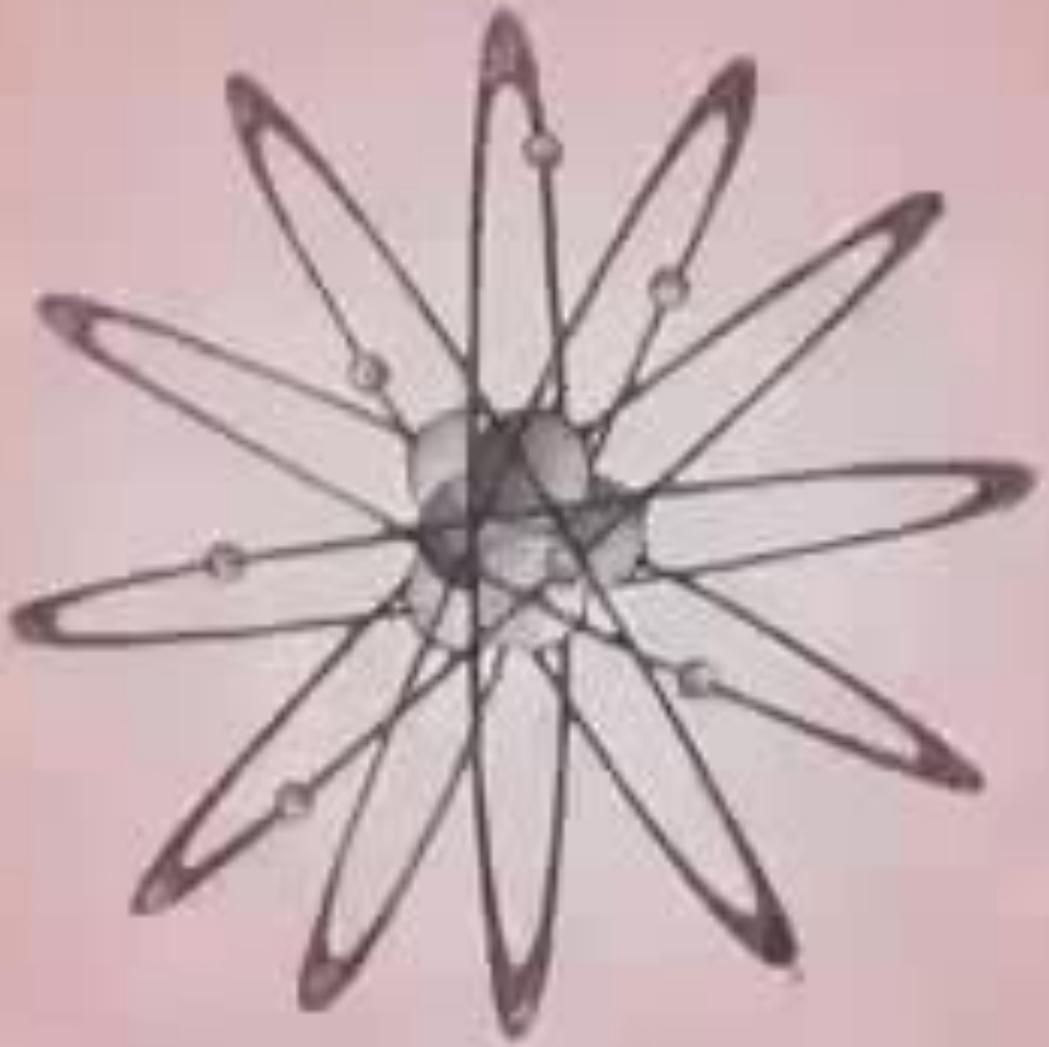
Compound

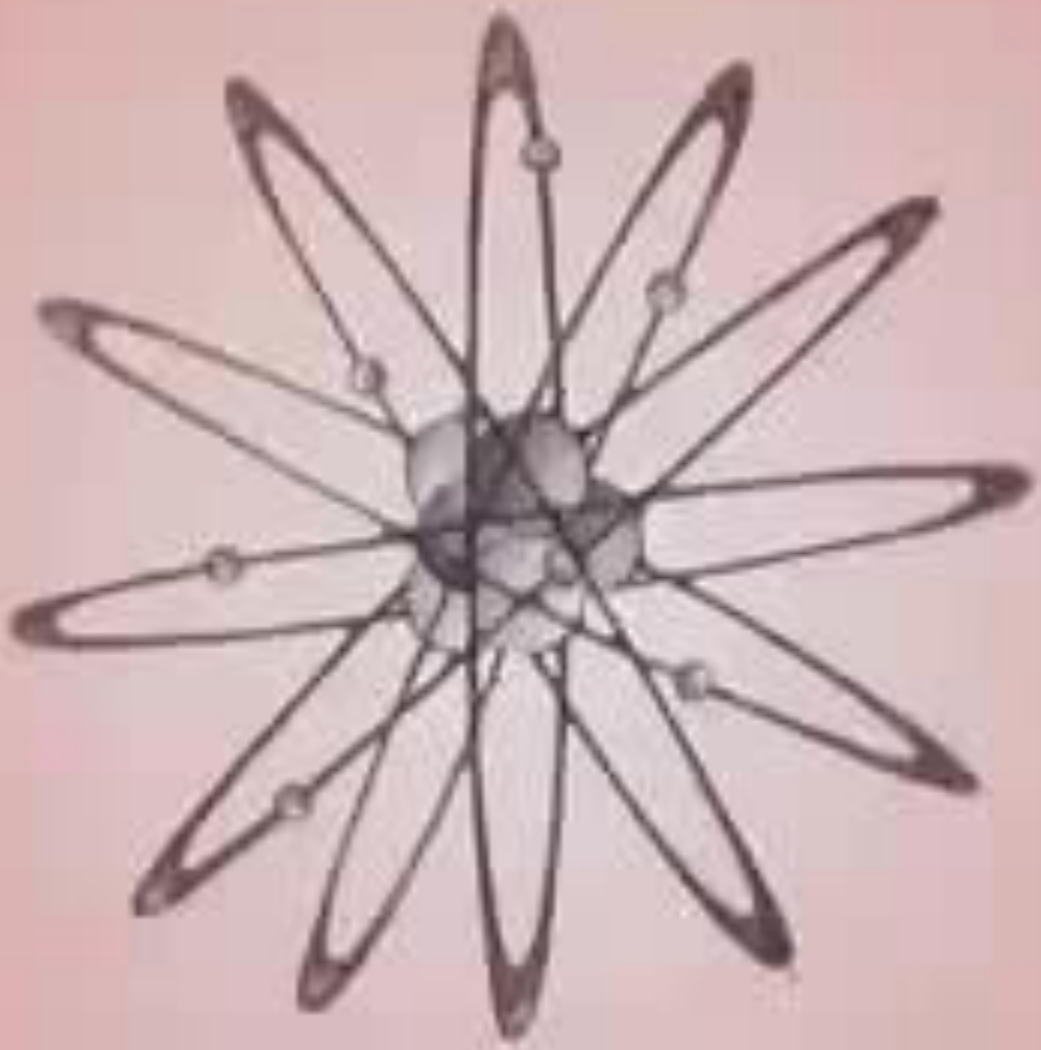
- A pure substance made up of more than one atom
- Ex : water (H_2O), carbon dioxide (CO_2)

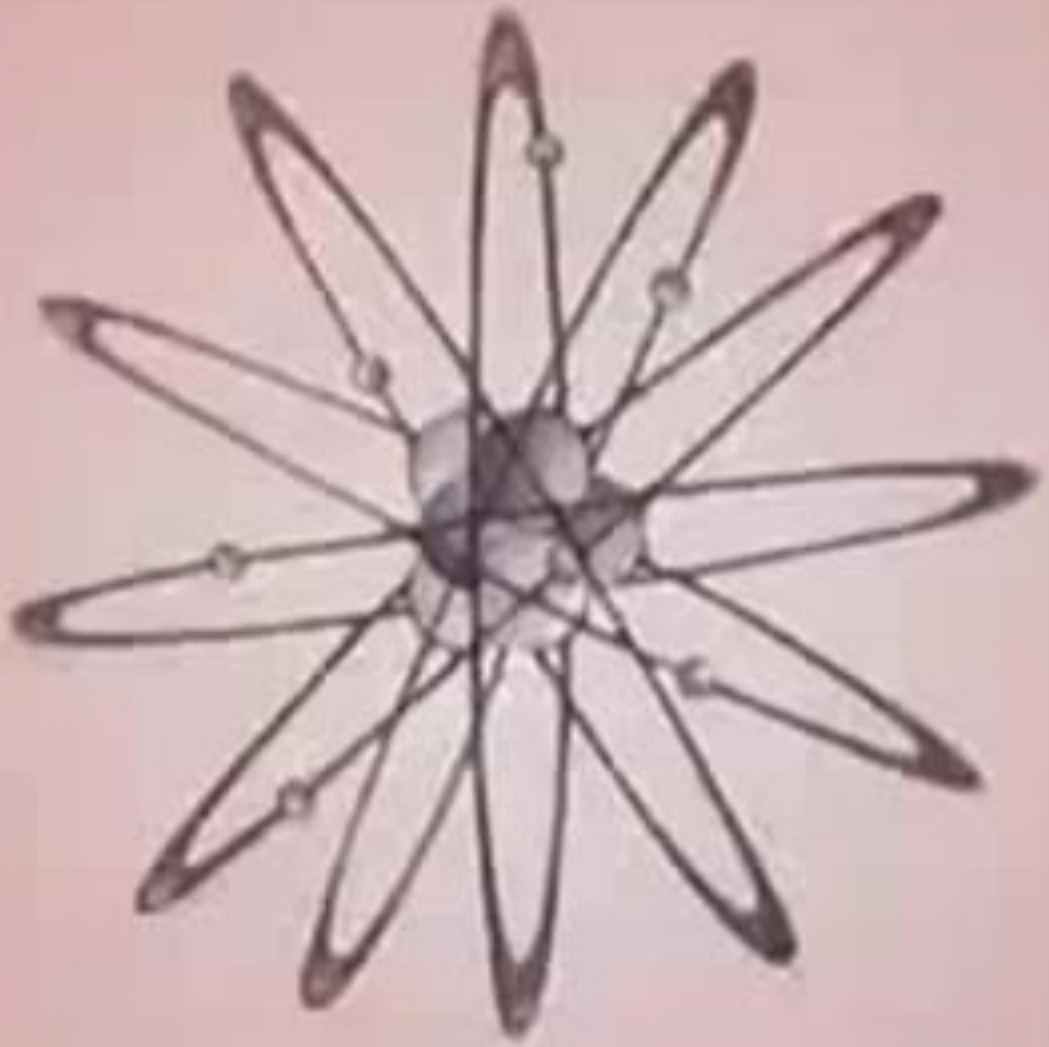
The Atom

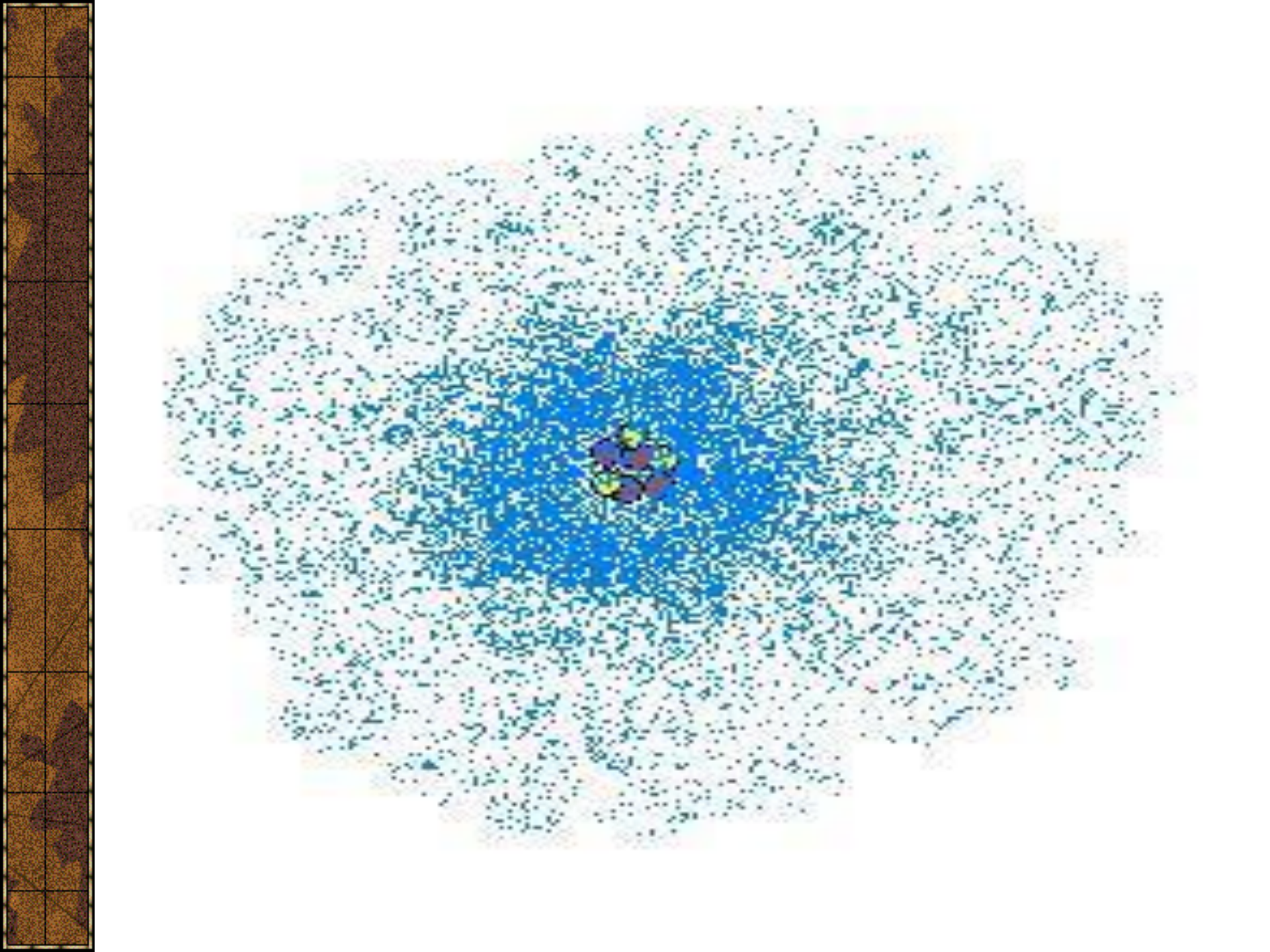
- The smallest particle of an element that retains the properties of that element
- Made up of a nucleus (proton(s) + neutron(s)) and of electron(s)





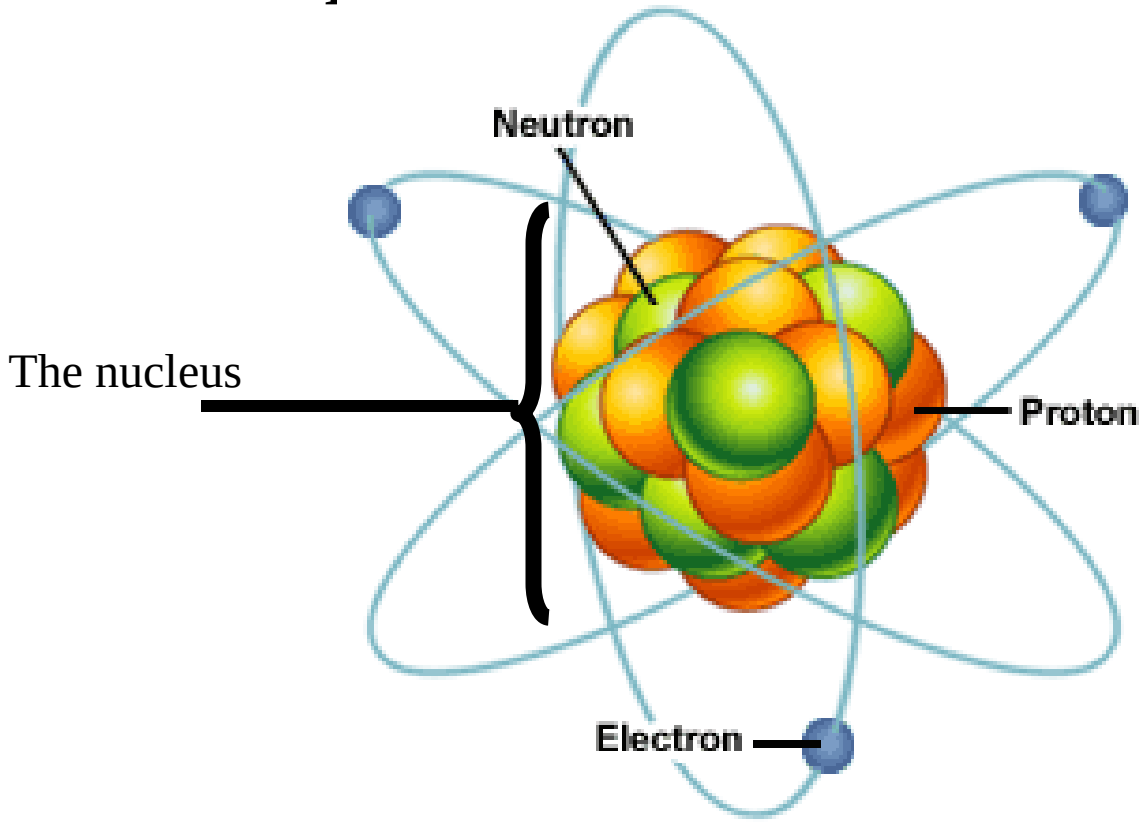


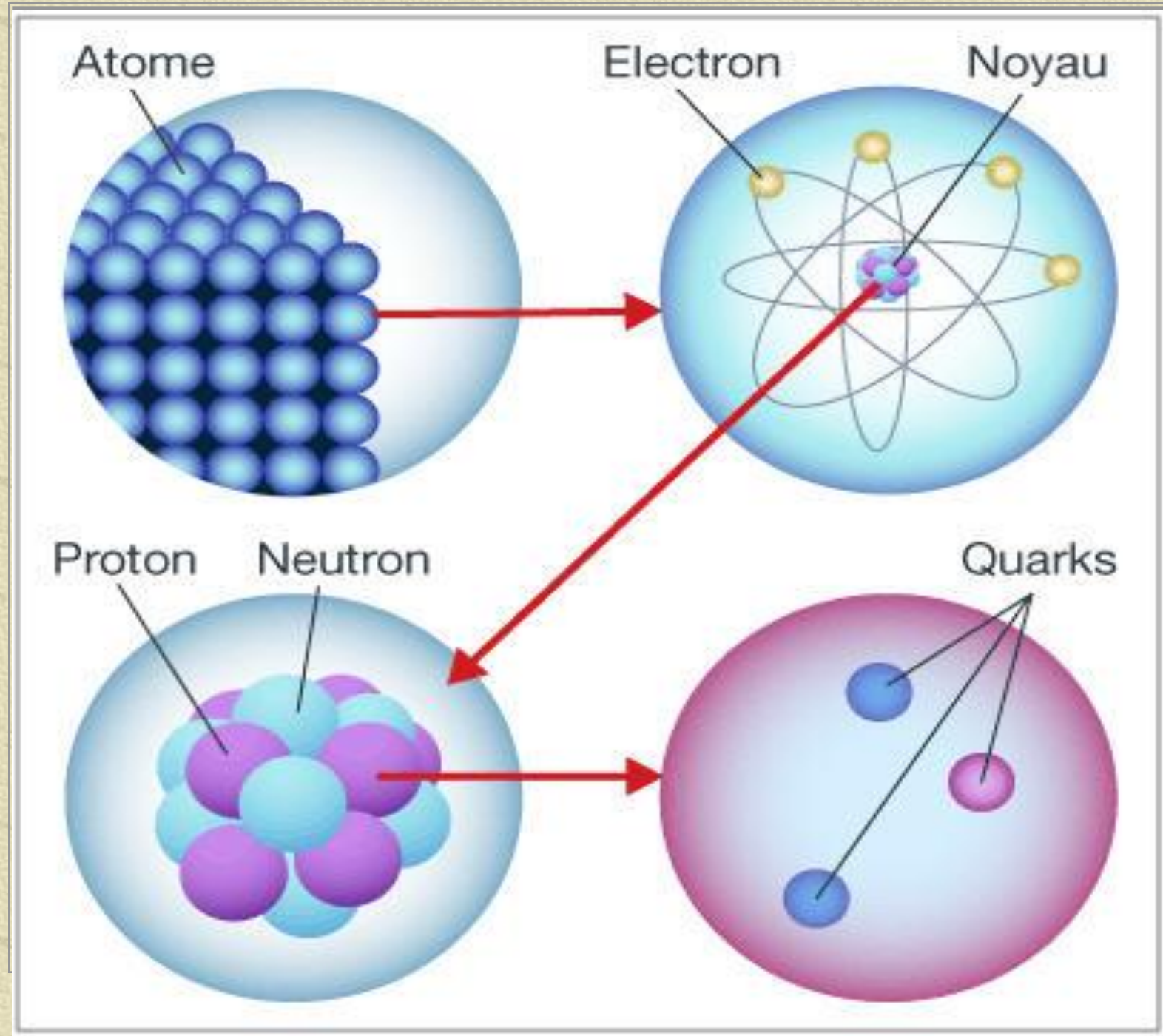




The nucleus

- Located at the centre of the atom
- Made up of neutron(s) and proton(s)




Atome
Electron
Noyau
Proton
Neutron
Quarks

Protons and neutrons

- Protons → positive charge
- Neutrons → neutral (no) charge
- Make up the nucleus
- Represents 99,9% of the atomic mass
- The nucleus is very dense but very small

Electron

- Subatomic particle that is negatively charged
  - Orbits the nucleus on an « electronic shell »
- The region an electron occupies represents 99.99% of the atom’s volume