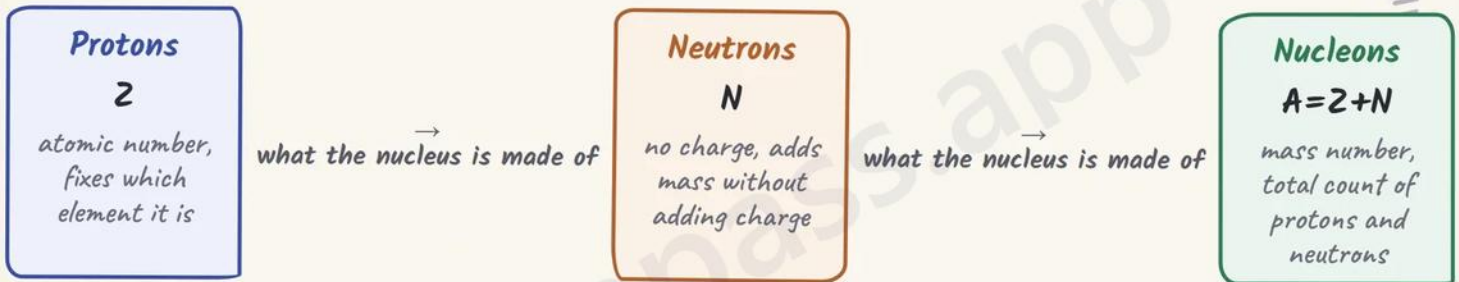


mass turns into binding energy, and binding energy is why splitting or joining nuclei releases power



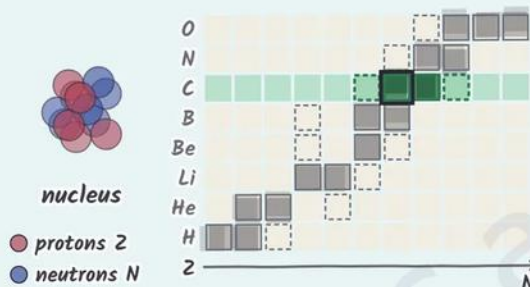
isotopes share Z but differ in N, so they're the same element with different mass numbers

Reading a nucleus *

- symbol ${}^A_ZX$: X the element, Z protons, A nucleons
- neutrons: $N=A-Z$
- nuclear sizes in fm: $1 \text{ fm} = 10^{-15} \text{ m}$
- atomic mass unit u: one twelfth of a carbon-12 atom
- 1 u is equivalent to 931.5 MeV
- nucleons are held by the strong nuclear force, not gravity or Coulomb

Isotopes, isobars, isotones

family	same	different	example
isotopes	Z	N and A	hydrogen, deuterium, tritium
isobars	A	Z and N	carbon-14 and nitrogen-14
isotones	N	Z and A	carbon-13 and nitrogen-14



isotopes: same Z, different N

isotopes: one row of the chart, the same Z with a different N, so one element

isotopes behave alike in chemistry, since the electrons are the same; they differ in mass