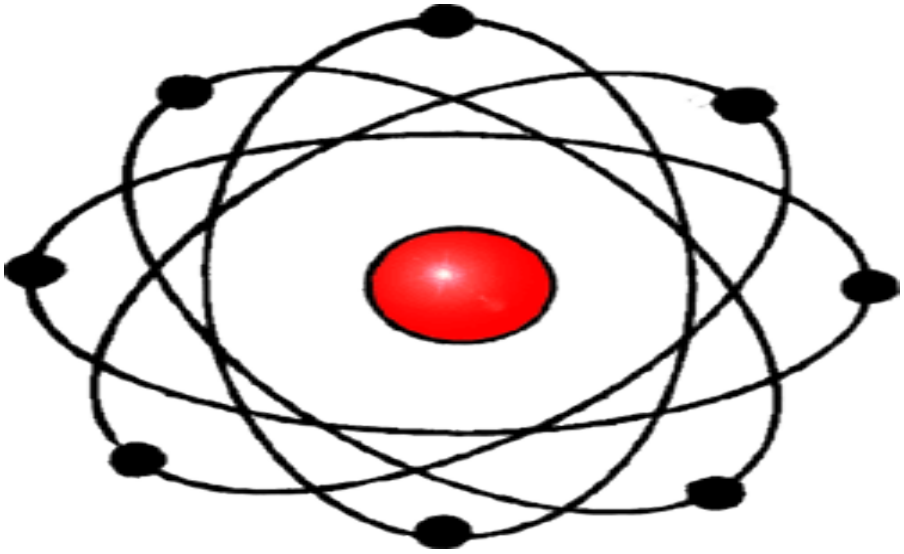
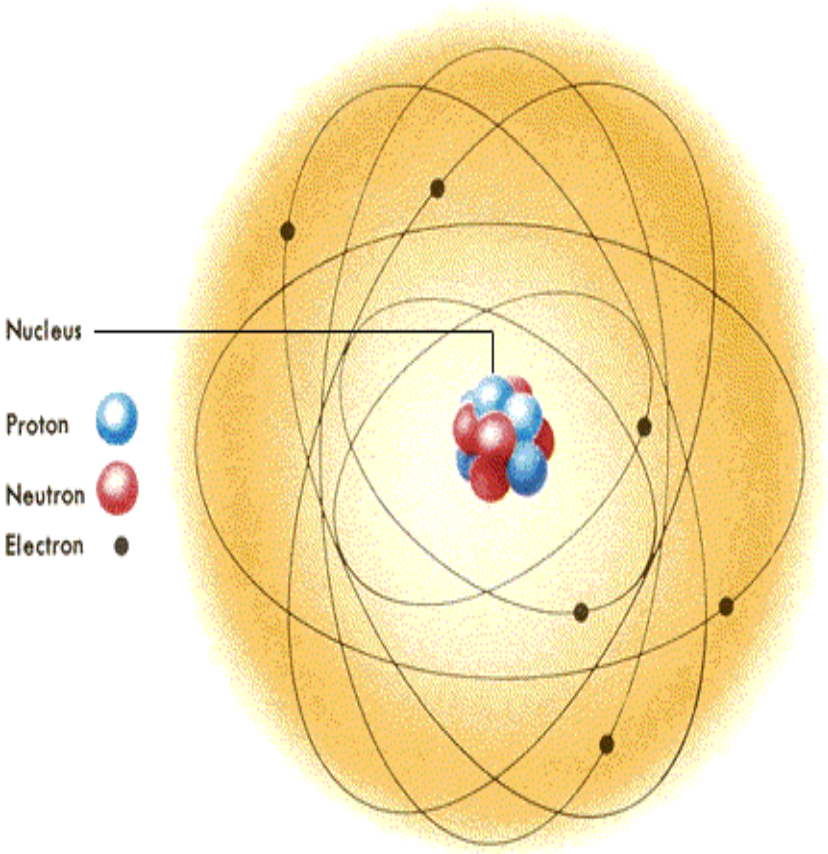
The Atom



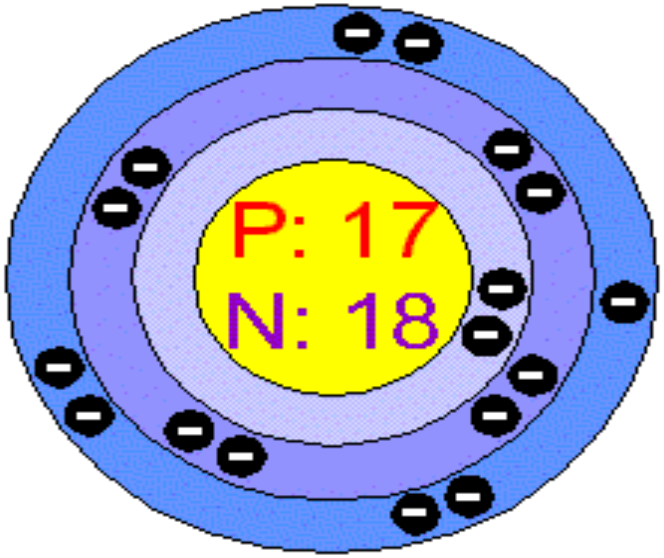
The smallest particle into which an element can be divided and still retain all of the properties of that element.

Parts of an Atom



- **Nucleus- Contains Protons & Neutrons**
- **Protons- (+) charge, mass = 1 amu**
- **Neutrons - no charge, mass = 1 amu**
- **Electron Clouds - contain electrons**
- **Electrons - (-) charge mass almost 0**

Protons Determine Element Identity

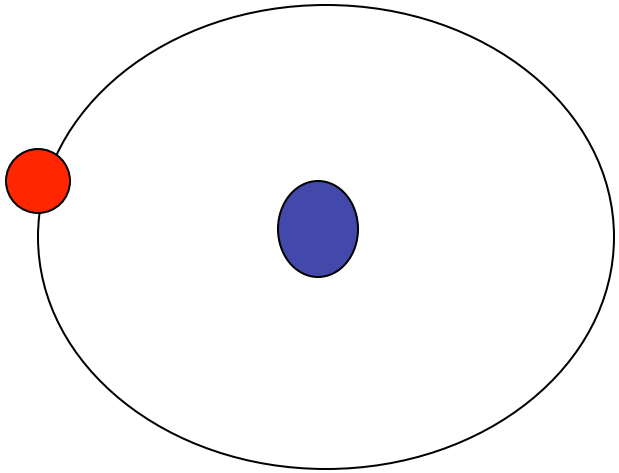


- Atomic Number measures the number of protons in an atom.
- The number of protons establishes the identity of the element.

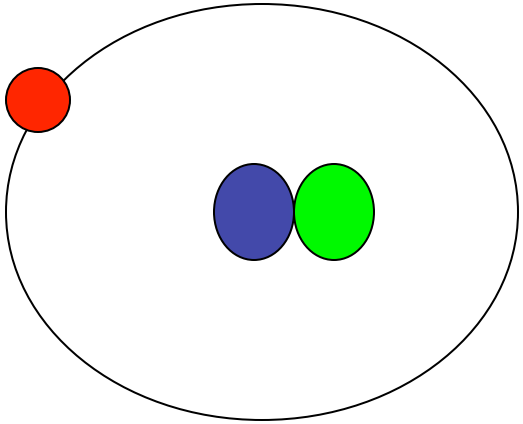
This atom is Chlorine because it has 17 protons. It is neutral because it has 17 electrons.

Isotopes

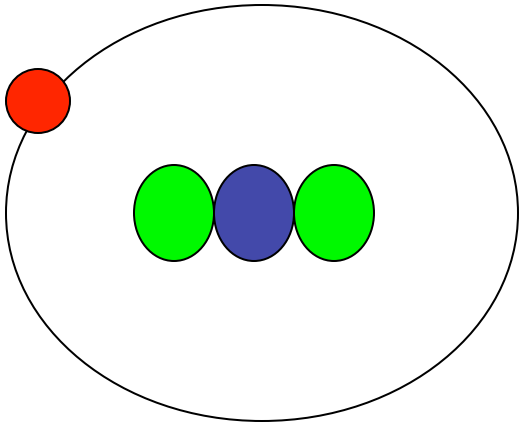
- Atoms that have the same number of protons but have a different number of neutrons



Hydrogen ^{1}H

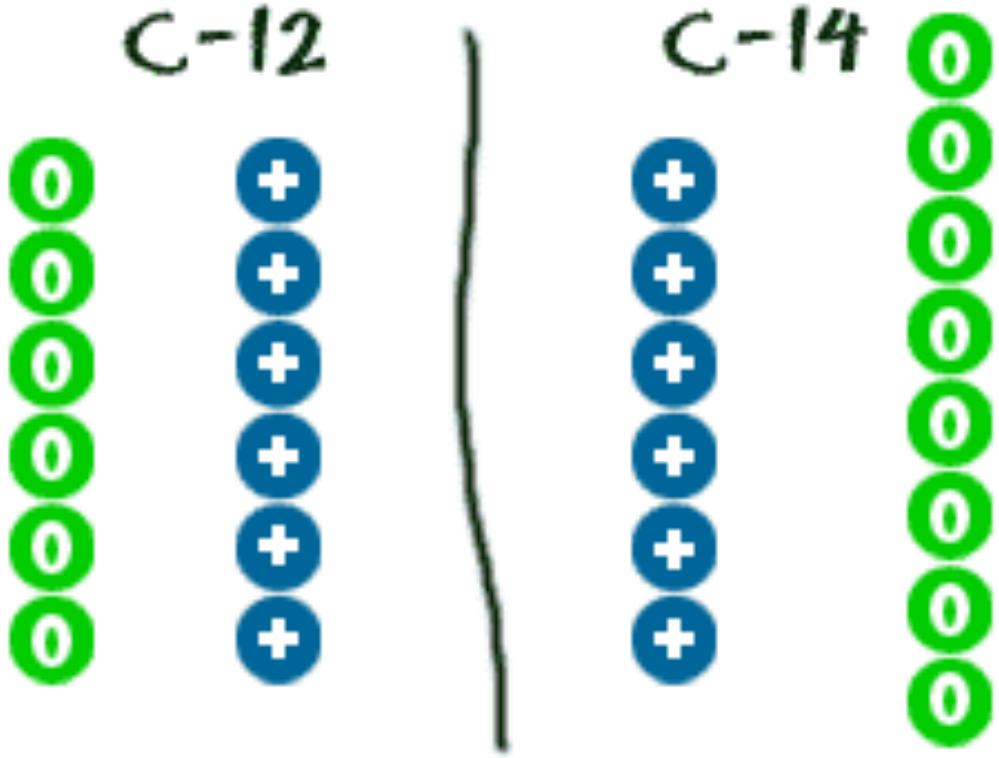


Hydrogen ^{2}H (Deuterium)

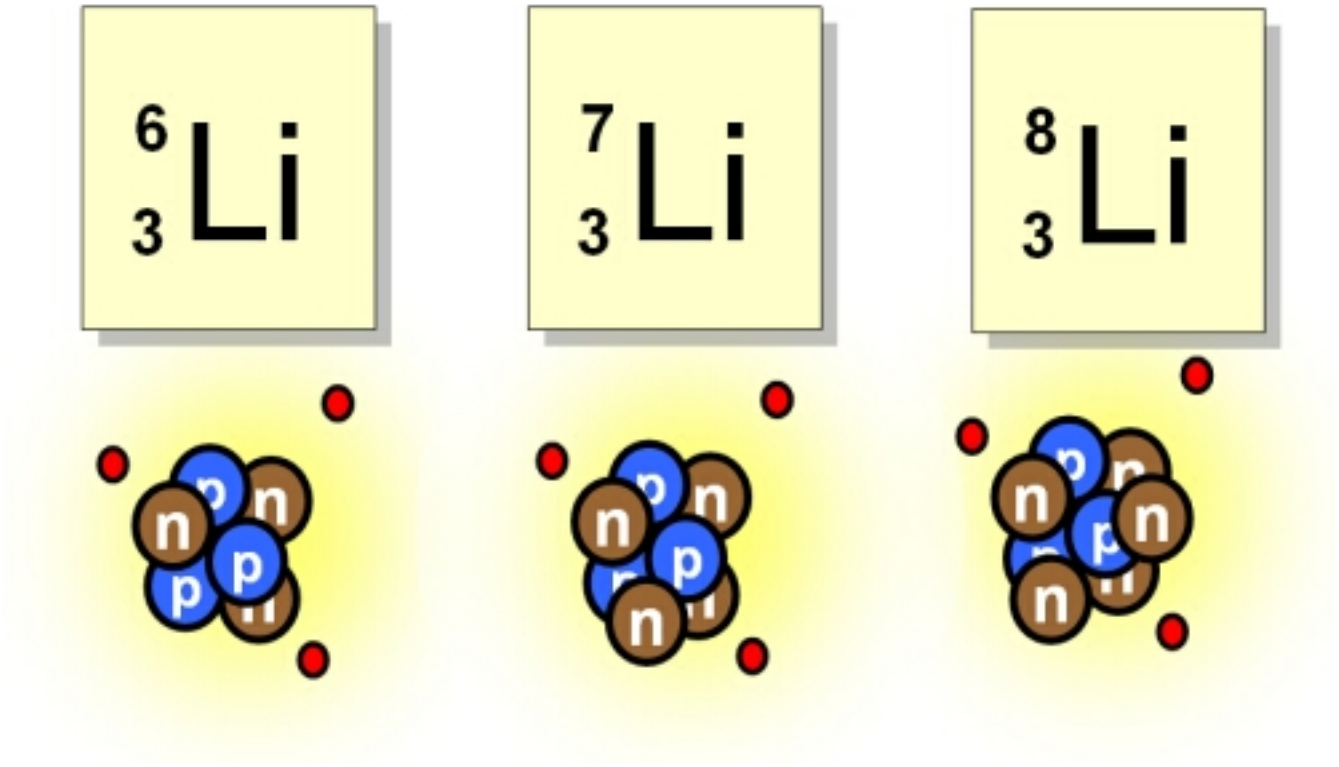


Hydrogen ^{3}H (Tritium)

A different number of neutrons does not change the atom's identity but it does change the atom's mass

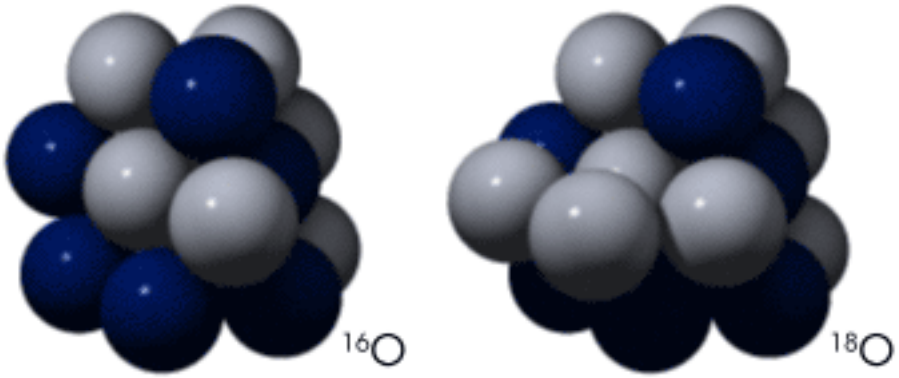


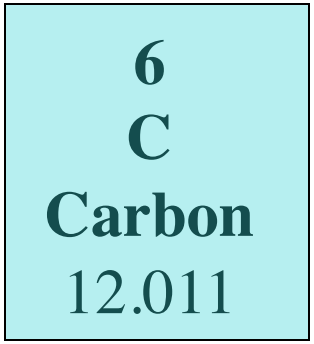
A different number of neutrons also does not change the atom's chemical properties but it does change the atom's mass



Because different isotopes of the same elements can vary in slightly different scenarios, they can be used as “tracers”.

Example: oxygen exists in the atmosphere as O-16, O-17 and O-18. Because the lighter atoms are more likely to evaporate, ratios of the lighter to heavier isotopes in marine sediments, ice cores and fossils can give us information about past climates.





Squares on the periodic table include

- Atomic number (number of protons)
- Chemical symbol
- Element name
- Atomic mass (weighted average of all naturally occurring isotopes)