

# Atomic Number and Isotopes

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# Review

- \* There are three types of subatomic particles in the atom.

	Protons	Neutrons	Electrons
Location	Nucleus	Nucleus	Orbiting
Charge	+	0	-
Weight	1	1	0

# Atomic Number

\* **Atomic Number (Z):** is the number of protons in the nucleus of the atom.

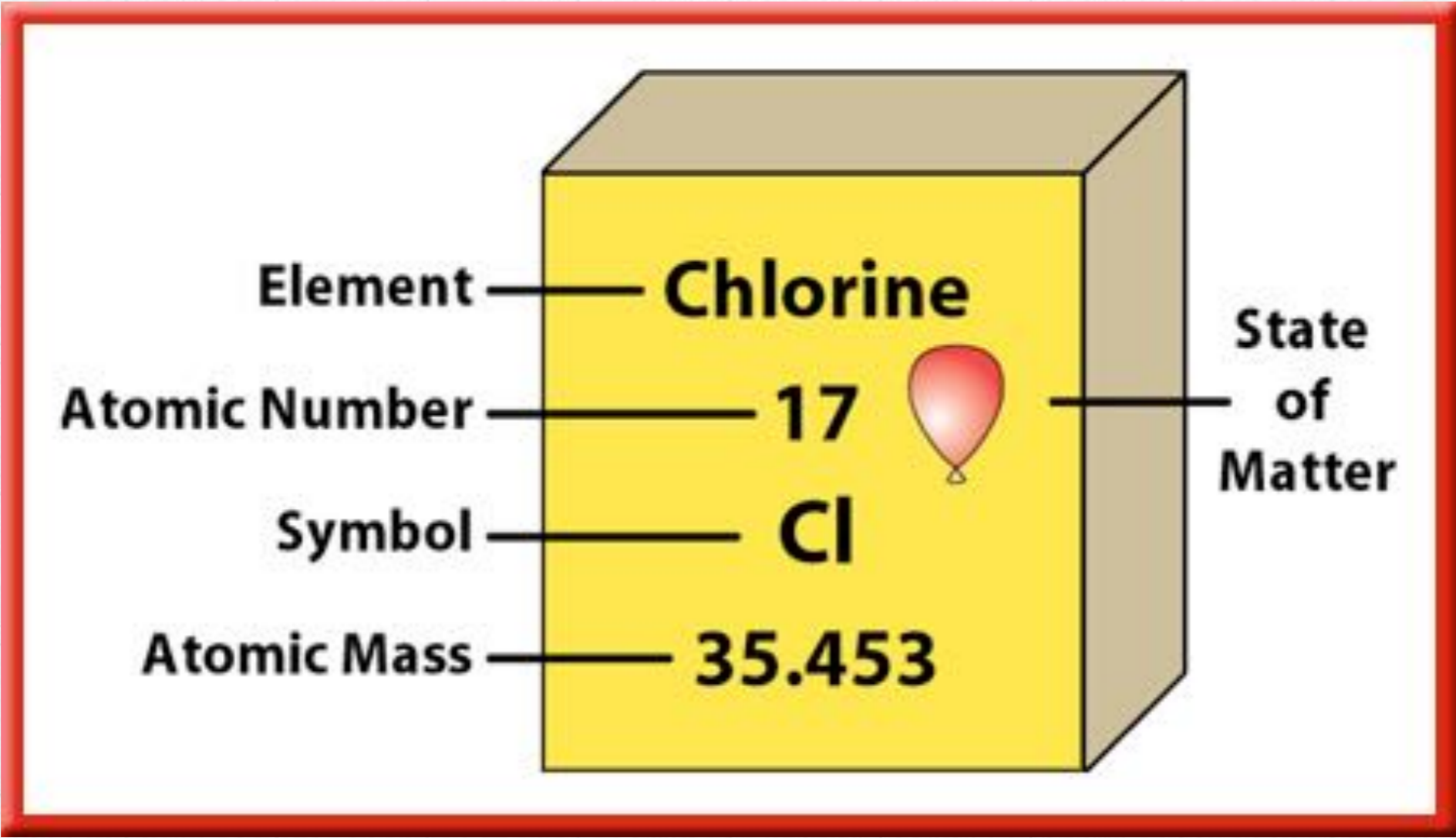
\*  $Z = \#$  of protons

# Atomic Number

- \* The number of protons (atomic number) determine the identity of an element.

**\* Atoms have no overall electrical charge so an atom must have as many electrons as there are protons in its nucleus.**

**\* Therefore atomic number = number of electrons.**



# Mass Number (A):

- \* The sum of the protons and neutrons in the nucleus.
- \*  $A = \# \text{protons} + \# \text{neutrons}$

Mass number =  
 $A = Z + N$

**A**

Chemical symbol  
for the element.

**X**

Atomic number =  
number of protons

**Z**

**N** = neutron number

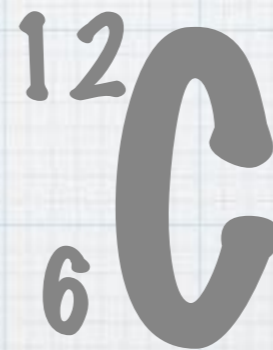
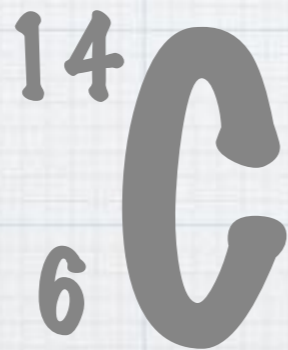


# Isotopes

- \* Isotopes of an element have a different mass number but they have the same atomic number.
- \* This means they must have a different number of neutrons.

# Examples

- \* You may have heard of 'Carbon 12' or 'Carbon 14' from carbon dating.



This means that carbon-12 has 6 protons while carbon -14 only has 7.

# Atomic Mass Unit

- \* **Atomic Mass Unit is a unit used to compare the masses of atoms and has the symbol u or amu.**
- \* **1 amu is approximately equal to the weight of one proton or one neutron.**

**\* Atomic mass is the weighted average mass of all the naturally occurring isotopes of that element.**