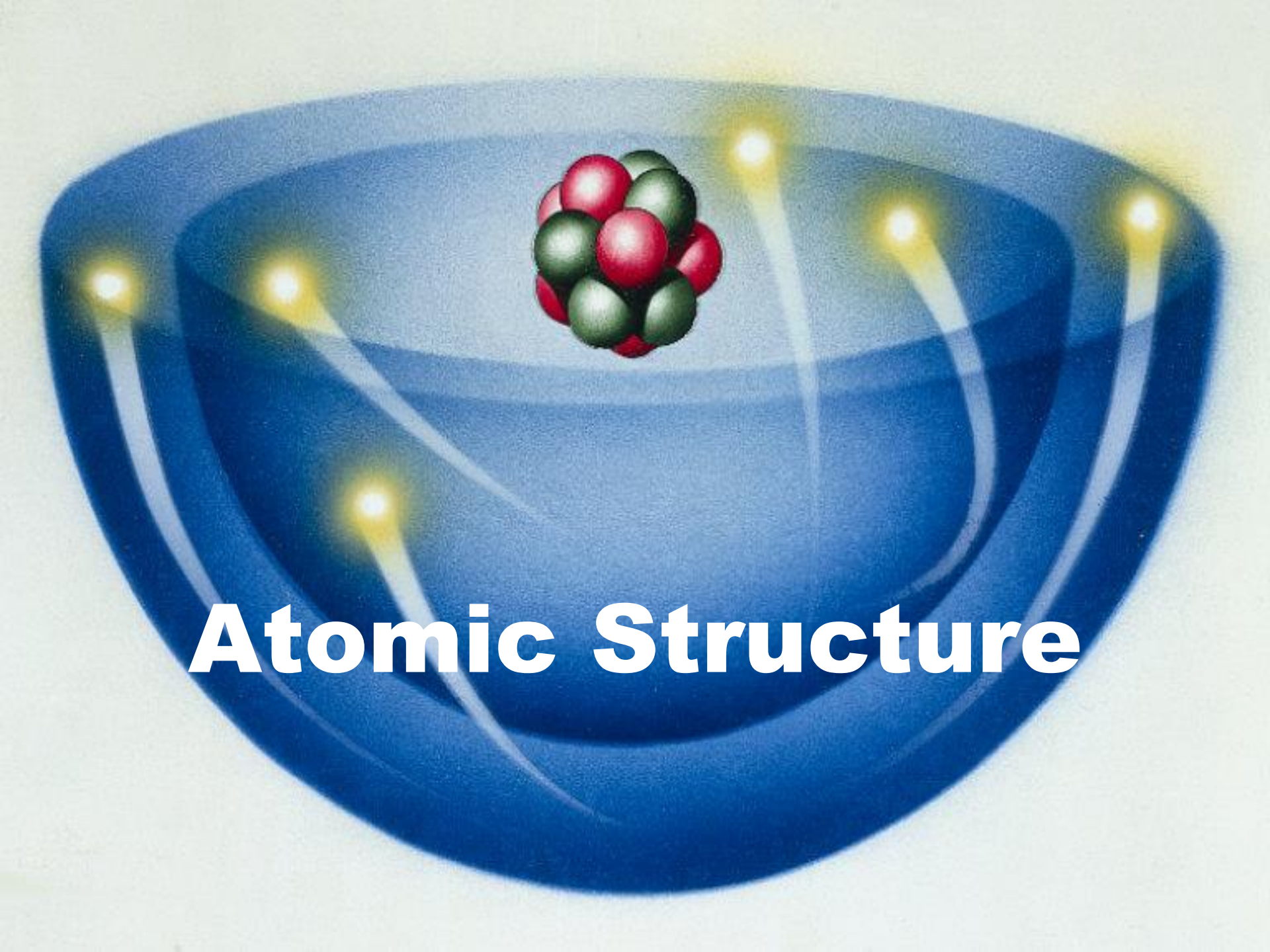

Atomic Structure

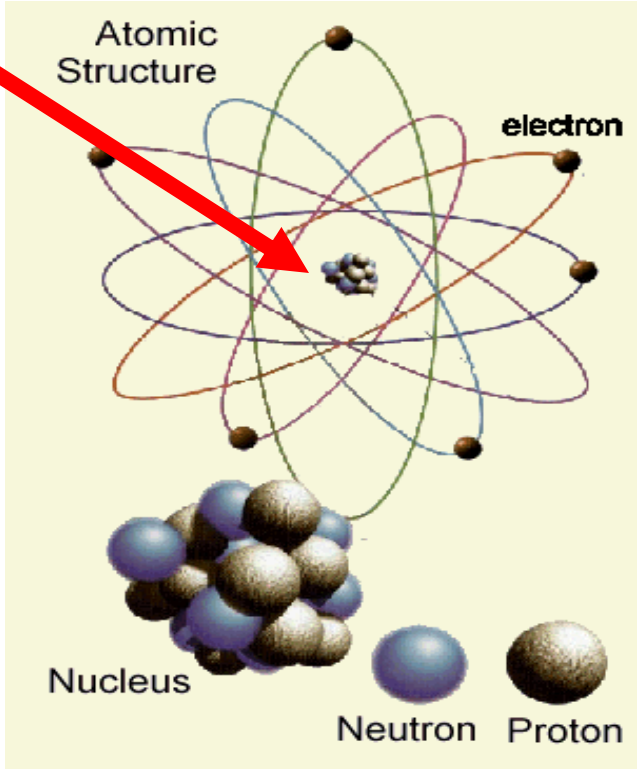
The Structure of the ATOM

The atom is made of:
Nucleus – center of the atom - overall positive charge

Protons – positive charge, live in nucleus

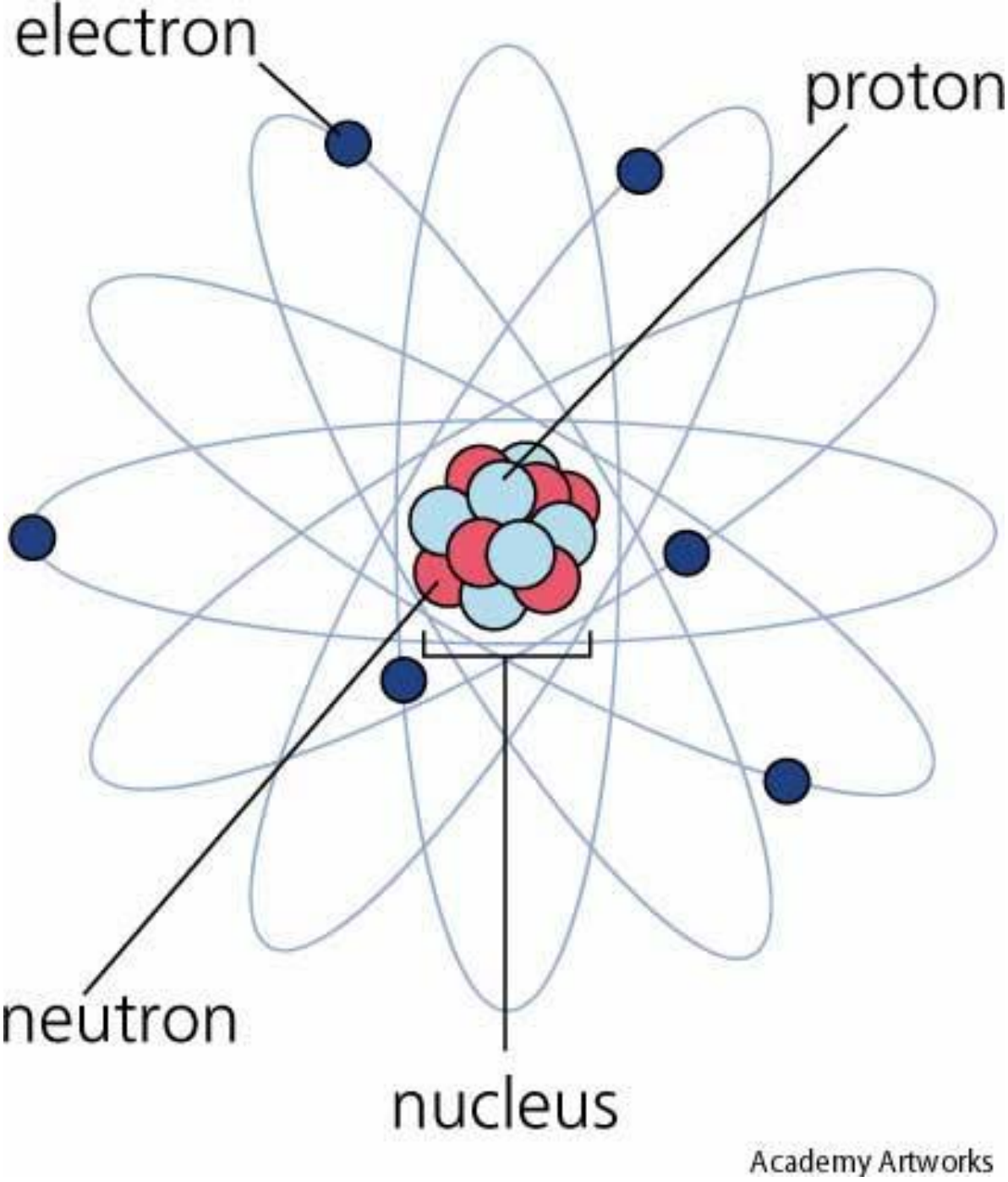
Neutrons – no charge, live in nucleus

Electrons – negative charge – live in energy levels outside the nucleus in the Electron Cloud that surrounds the nucleus



***The whole atom is usually neutral in charge because the + protons and – electrons are equal.**

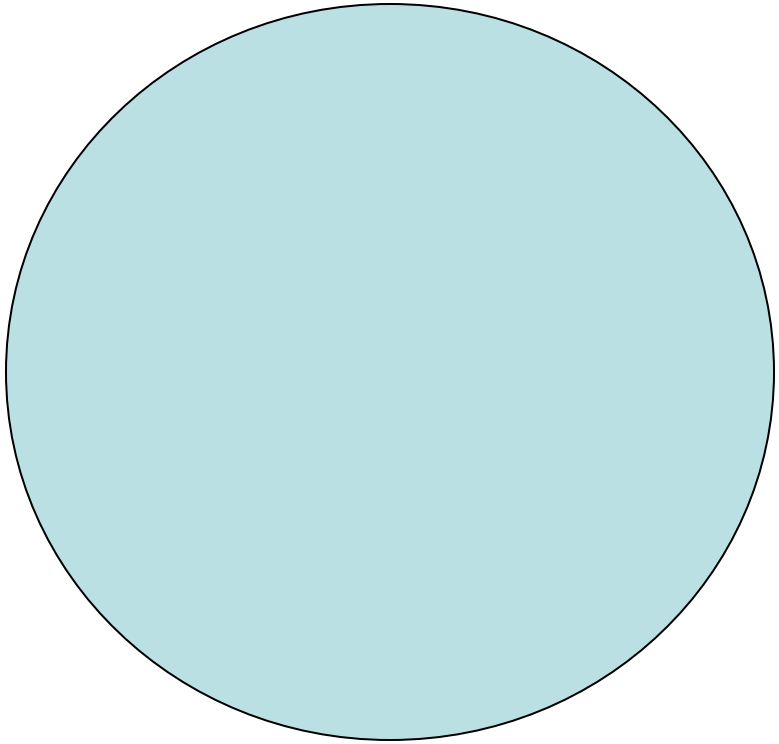
Draw this picture of the atom and label each of the parts.



Protons and neutrons have a mass 1840 times greater than that of an electron!!!

- Proton
- Neutron

- Electron



The nucleus of the atom contains most of the mass of the atom

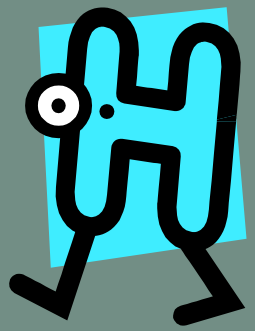
Electrons are at various distances from the nucleus

- **Electrons near the nucleus have lower energy**
- **Electrons farther away from the nucleus have higher energy**
- **Every electron cloud of every element has different energy levels**

Atomic Number tells the # of protons in the nucleus

equal to the # of electrons

Isotopes atoms of the same element with different #'s of neutrons

EXAMPLES:	Hydrogen-1	Hydrogen-2	Hydrogen-3
	1 proton	1 proton	1 proton
	0 neutrons	1 neutron	2 neutrons
	protium	deuterium	tritium

* each of these examples all have one proton, so they are all hydrogen, but their neutrons differ, so they are isotopes of each other

Isotopes

- To write the name of an isotope we use hyphen notation.
- Carbon with a mass of 12 would be written
- Carbon-12 or C-12
- Sodium with a mass of 23 would be written
- Sodium-23 or Na-23

- If the mass number is not given to you and you do not know the number of neutrons… round the average mass unit (decimal number) to the nearest whole number.
- Example:
- What is the mass number of O, Oxygen?

Mass Number

- **The number of protons and neutrons in an atom**
- **# of neutrons only = mass # *minus* atomic #**

- *****the unit for how much an element weighs is "amu" or atomic mass unit… It is the average mass of all the element's isotopes**
- **Example: Carbon's weight on the Periodic Table is 12, so we would write "12 amu."**

EXAMPLES:

What is the element name?

1. S 2. Ba 3. Fe

What is the atomic number?

1. Li 2. Sn 3. Ge

What is the mass number [to the nearest whole #]

1. Ne 2. Na 3. I

How many protons? 1. Mg 2. P 3. K

How many electrons? 1. H 2. Ca 3. Al

How many neutrons? 1. Cu 2. Ag 3. Ni