

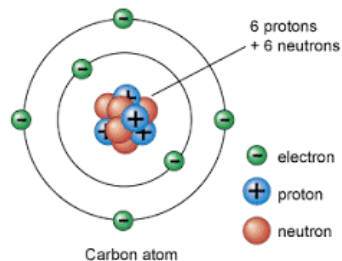
Science 8

Subatomic Particles

Name: *Key*
Date:
Block:

In an atom, there are three subatomic particles.

1. *protons*
2. *electrons*
3. *neutrons*



The proton:

- This is found in the nucleus (core)
- It has a charge of +1.
- Its mass is 1 amu (atomic mass unit)
- The atomic number represents the number of protons

Practice! Find the number of protons for the following elements!

- | | | |
|------------------------|----------------------|---------------------------|
| 1. Sodium: <i>11</i> | 2. Neon: <i>10</i> | 3. Einsteinium: <i>99</i> |
| 4. Chlorine <i>17</i> | 5. Tin: <i>50</i> | 6. Platinum <i>78</i> |
| 7. Tungsten: <i>74</i> | 8. Copper: <i>29</i> | 9. Gold: <i>79</i> |

The electron:

- This is found in the electron shells.
- It has a charge of -1. In a neutral atom, the overall charge is 0.
- Example: If an atom has 17 protons, it must have 17 electrons.
- Its mass is 0 amu (about)

Practice! Find the number of electrons for the following elements!

- | | | |
|----------------------|-------------------------|------------------------|
| 1. Silver: <i>47</i> | 2. Palladium: <i>46</i> | 3. Gallium: <i>31</i> |
| 4. Fluorine <i>9</i> | 5. Cesium: <i>55</i> | 6. Krypton <i>36</i> |
| 7. Lead: <i>82</i> | 8. Actinium: <i>89</i> | 9. Vanadium: <i>23</i> |

The neutron:

- This is found in the Nucleus (core)
- It has a charge of zero.
- Its mass is 1 amu.
- The Atomic weight (mass) represents the number of protons and neutrons.
- Example.
 - Neon has a mass number of 20.1 and an atomic number of 10. Therefore the number of neutrons is $20.1 - 10 = 10$

Practice! Find the number of neutrons for the following elements!

1. Manganese:

$$54.9 - 25 = 30$$

2. Bismuth:

$$209 - 83 = 126$$

3. Osmium:

$$190.2 - 76 = 114$$

4. Potassium

$$39.1 - 19 = 20$$

5. Sulfur:

$$32.1 - 16 = 16$$

6. Arsenic

$$74.9 - 33 = 42$$

7. Zinc:

$$65.4 - 30 = 35$$

8. Scandium:

$$45 - 21 = 24$$

9. Helium:

$$4 - 2 = 2$$

Fill in the following table:

Element Name	Element Symbol	Atomic Number	Mass Number	# of Protons	# of Neutrons	# of Electrons
1. chlorine	Cl	17	36	17	19	17
2. Silver	Ag	47	108	47	61	47
3. Oxygen	O	8	16	8	8	8
4. Aluminum	Al	13	27	13	14	13
5. Cesium	Cs	55	133	55	78	55
6. Palladium	Pd	46	106	46	60	46
7. Ruthenium	Ru	44	101	44	57	44
8. Tungsten	W	74	184	74	110	74
9. Europium	Eu	63	152	63	89	63
10. Protactinium	Pa	91	231	91	140	91

The Periodic Table

Dmitri Mendeleev

- His first periodic table was published in 1869
- Listed the elements in order of increasing atomic mass
- Mendeleev included gaps and predicted the properties of missing elements
- *He was surprisingly accurate in his predictions*

Major divisions within Periodic Table

- • Period: *The set of all the elements in a given row going across the table*
- ↓ • Group/Family: *the set of all the elements in a given column going down the table*

Alkali Metals

- Group 1
- *Highly reactive*
- *Never found in elemental form in nature*
- List all alkali metals from your Periodic Table:
Li, Na, K, Rb, Cs, Fr

Alkaline Earth

- Group 2
- *Somewhat reactive*
- List all alkaline earth metals from your Periodic Table:
Be, Mg, Ca, Sr, Ba

Transition Metals

- Group 3 to 12

Halogens

- Group 17
- *Very reactive non-metals*
- List all halogens from your Periodic Table:
F, Cl, Br, I

Noble Gases

- Group 18
- *They are odourless, colourless gases with very low reactivity*
- List all noble gases from your Periodic Table:
He, Ne, Ar, Kr, Xe

