

Reading the Periodic Table

An atom is made up of protons and neutrons which are in the nucleus, and electrons which are in the electron cloud surrounding the nucleus.

- **Group Number = family of elements**
 - o Groups are vertical columns; the numbers are found at the top of each column
 - o Note: Lanthanides and actinides are not assigned a group number (refer to them as “L” or “A”).
- **Atomic Number = number of protons (p^+)**
 - o Atomic Number is found above the atomic symbol on the periodic table
 - o It distinguishes one element from another (the number of p^+ makes each element unique)
- **Atomic Mass = # of protons + # of neutrons.**
 - o Atomic Mass is found below the name of the element on the periodic table
 - o It's based on an average of the isotopes of that element (different #'s of neutrons), thus the decimal
- **# of electrons (e^-) = # of protons** (in a neutral atom)
- **Classification = type of element** (metal, non-metal, metalloid)
- **Standard State = state of matter** (solid, liquid, gas) at standard temperature and pressure

Use the information above and a periodic table to help you complete the following chart.

Atomic Symbol	Element Name	Group #	Atomic #	Atomic Mass	# of p^+	# of e^-	Classification	Standard State
Mg	<i>magnesium</i>	<i>2</i>	<i>12</i>	<i>24.305</i>	<i>12</i>	<i>12</i>	<i>metal</i>	<i>solid</i>
K	<i>potassium</i>	<i>1</i>	<i>19</i>	<i>39.098</i>	<i>19</i>	<i>19</i>	<i>metal</i>	<i>solid</i>
Na	<i>sodium</i>	<i>1</i>	<i>11</i>	<i>22.990</i>	<i>11</i>	<i>11</i>	<i>metal</i>	<i>solid</i>
F	<i>fluorine</i>	<i>17</i>	<i>9</i>	<i>18.998</i>	<i>9</i>	<i>9</i>	<i>nonmetal</i>	<i>gas</i>
Al	<i>aluminum</i>	<i>13</i>	<i>13</i>	<i>26.982</i>	<i>13</i>	<i>13</i>	<i>metal</i>	<i>solid</i>
H	<i>hydrogen</i>	<i>1</i>	<i>1</i>	<i>1.008</i>	<i>1</i>	<i>1</i>	<i>nonmetal</i>	<i>gas</i>
Ag	<i>silver</i>	<i>11</i>	<i>47</i>	<i>107.87</i>	<i>47</i>	<i>47</i>	<i>metal</i>	<i>solid</i>
Ts	<i>tennessine</i>	<i>17</i>	<i>117</i>	<i>294</i>	<i>117</i>	<i>117</i>	<i>nonmetal</i>	<i>solid</i>
Cl	<i>chlorine</i>	<i>17</i>	<i>17</i>	<i>35.45</i>	<i>17</i>	<i>17</i>	<i>nonmetal</i>	<i>gas</i>
Be	<i>beryllium</i>	<i>2</i>	<i>4</i>	<i>9.0122</i>	<i>4</i>	<i>4</i>	<i>metal</i>	<i>solid</i>
Hg	<i>mercury</i>	<i>12</i>	<i>80</i>	<i>200.59</i>	<i>80</i>	<i>80</i>	<i>metal</i>	<i>liquid</i>
Au	<i>gold</i>	<i>11</i>	<i>79</i>	<i>196.97</i>	<i>79</i>	<i>79</i>	<i>metal</i>	<i>solid</i>
Zn	<i>zinc</i>	<i>12</i>	<i>30</i>	<i>65.38</i>	<i>30</i>	<i>30</i>	<i>metal</i>	<i>solid</i>
W	<i>tungsten</i>	<i>6</i>	<i>74</i>	<i>183.84</i>	<i>74</i>	<i>74</i>	<i>metal</i>	<i>solid</i>
Ca	<i>calcium</i>	<i>2</i>	<i>20</i>	<i>40.078</i>	<i>20</i>	<i>20</i>	<i>metal</i>	<i>solid</i>
Ne	<i>neon</i>	<i>18</i>	<i>10</i>	<i>20.180</i>	<i>10</i>	<i>10</i>	<i>nonmetal</i>	<i>gas</i>
Sb	<i>antimony</i>	<i>15</i>	<i>51</i>	<i>121.76</i>	<i>51</i>	<i>51</i>	<i>metalloid</i>	<i>solid</i>
Cn	<i>copernicium</i>	<i>12</i>	<i>112</i>	<i>285</i>	<i>112</i>	<i>112</i>	<i>metal</i>	<i>solid</i>
Fe	<i>iron</i>	<i>8</i>	<i>26</i>	<i>55.845</i>	<i>26</i>	<i>26</i>	<i>metal</i>	<i>solid</i>
Cu	<i>copper</i>	<i>11</i>	<i>29</i>	<i>63.546</i>	<i>29</i>	<i>29</i>	<i>metal</i>	<i>solid</i>

STRUCTURE OF ATOMS

Use a periodic table to help you identify & fill in the missing information for each element.

Element Symbol	Element Name	Group #	Atomic #	Atomic Mass (a.m.u.)	# of p+	# of e-	Classification	Standard State
Mn	manganese	7	25	54.938	25	25	metal	solid
Si	silicon	14	14	28.09	14	14	metalloid	solid
Cd	cadmium	12	48	112.41	48	48	metal	solid
Pt	platinum	10	78	195.08	78	78	metal	solid
Lv	livermorium	16	116	291	116	116	metal	solid
O	oxygen	16	8	15.999	8	8	nonmetal	gas
He	helium	18	2	4.0026	2	2	nonmetal	gas
La	lanthanum	L	57	138.91	57	57	metal	solid
C	carbon	14	6	12.011	6	6	nonmetal	solid
B	boron	13	5	10.81	5	5	metalloid	solid

Answer the following:

- 1) What is the relationship between the number of protons in an atom and that element's atomic number? Why is this number important?
The atomic number tells you the number of protons. This is important because the number of protons in the nucleus is what makes each element unique; it identifies each element.
- 2) What is the relationship between the number of protons and the number of electrons in a neutral atom? What would happen if the number of electrons increased or decreased?
In a neutral atom, the number of electrons must equal the number of protons in order for their charges to cancel out. Increasing or decreasing the number of electrons would result in a charged atom (an "ion"), meaning the atom would no longer be neutral.
- 3) What is the relationship between an element's atomic mass and the number of sub-atomic particles in its nucleus? What sub-atomic particles are mainly responsible for the atomic mass?
The atomic mass is an average of the number of particles in the nucleus of all of the isotopes of that element. It represents the average number of protons and neutrons in the nucleus.
- 4) Why is the atomic mass rarely a whole number (why do most have decimals)?
The atomic mass is rarely a whole number because it is an AVERAGE of all of the isotopes (atoms with different numbers of neutrons) of that element.
- 5) Describe the organization of the periodic table.
The periodic table is organized into rows (called periods) and columns (called groups). Elements are ordered horizontally (in periods) by increasing atomic number (number of protons). They are organized vertically (in groups) by similarities among their characteristics. The elements are arranged in "blocks" within the periodic table according to the arrangement of their electrons.