

# Color Coding the Periodic Table

## Student Information Sheet

The Periodic Table is a list of all the known elements. It is organized by increasing atomic number. There are two main groups on the periodic table: metals and nonmetals. The left side of the table contains elements with the greatest metallic properties. As you move from the left to the right, the elements become less metallic with the far right side of the table consisting of nonmetals. The elements in the middle of the table are called “transition” elements because they are changed from metallic properties to nonmetallic properties. A small group whose members touch the zigzag line are called metalloids because they have both metallic and nonmetallic properties.

The table is also arranged in vertical columns called “groups” or “families” and horizontal rows called “periods.” Each arrangement is significant. The elements in each vertical column or group have similar properties. Group 1 elements all have the electron in their outer shells. This gives them similar properties. Group 2 elements all have 2 electrons in their outer shells. This also gives them similar properties. Not all of the groups, however, hold true for this pattern. The elements in the first period or row all have one shell. The elements in period 2 all have 2 shells. The elements in period 3 have 3 shells and so on.

There are a number of major groups with similar properties. They are as follows:

**Hydrogen:** This element does not match the properties of any other group so it stands alone. It is placed above group 1 but it is not part of that group. It is a very reactive, colorless, odorless gas at room temperature. (1 outer level electron)

**Group 1:** Alkali Metals – These metals are extremely reactive and are never found in nature in their pure form. They are silver colored and shiny. Their density is extremely low so that they are soft enough to be cut with a knife. (1 outer level electron)

**Group 2:** Alkaline-earth Metals – Slightly less reactive than alkali metals. They are silver colored and more dense than alkali metals. (2 outer level electrons)

**Groups 3 – 12:** Transition Metals – These metals have a moderate range of reactivity and a wide range of properties. In general, they are shiny and good conductors of heat and electricity. They also have higher densities and melting points than groups 1 & 2. (1 or 2 outer level electrons)

**Lanthanides and Actinides:** These are also transition metals that were taken out and placed at the bottom of the table so the table wouldn't be so wide. The elements in each of these two periods share many properties. The lanthanides are shiny and reactive. The actinides are *all* radioactive and are therefore unstable. Elements 95 through 103 do not exist in nature but have been manufactured in the lab.

**Group 13:** Boron Group – Contains one metalloid and 4 metals. Reactive. Aluminum is in this group. It is also the most abundant metal in the earth's crust. (3 outer level electrons)

**Group 14:** Carbon Group – Contains one nonmetal, two metalloids, and two metals. Varied reactivity. (4 outer level electrons)

**Group 15:** Nitrogen Group – Contains two nonmetals, two metalloids, and one metal. Varied reactivity. (5 outer level electrons)

Group 16: Oxygen Group – Contains three nonmetals, one metalloid, and one metal. Reactive group. (6 outer level electrons)

Groups 17: Halogens – All nonmetals. Very reactive. Poor conductors of heat and electricity. Tend to form salts with metals. Ex. NaCl: sodium chloride also known as “table salt”. (7 outer level electrons)

Groups 18: Noble Gases – Unreactive nonmetals. All are colorless, odorless gases at room temperature. All found in earth’s atmosphere in small amounts. (8 outer level electrons)

### Color Coding the Periodic Table

This worksheet will help you understand how the periodic table is arranged. Using colored pencils, color the periodic table on the next page according to the directions below., color each group on the table as follows:

1. Color the square for Hydrogen pink.
2. Color the groups with very reactive metals red (alkali)
3. Color and label the noble gases orange.
4. Color the transition metals green.
5. Using black, mark the zigzag line that show the position of the metalloids.
6. Color the metalloids purple.
7. Use blue to color all of the nonmetals that are not noble gases.
8. Color the metals in Groups 13-16 brown.
9. Circle and label the lanthanides red.
10. Circle and label the alkaline-earth metals in purple.
11. Circle and label the halogens in green
12. Color all the actinides yellow.

When you are finished, make a key that indicates which color identifies which group.

### Periodic Table of the Elements

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About Chemistry

1A 1 H 1.00794 Hydrogen																	8A 2 He 4.002602 Helium	
3 Li 6.941 Lithium	2A 4 Be 9.012182 Beryllium											3A 5 B 10.811 Boron	4A 6 C 12.0107 Carbon	5A 7 N 14.0067 Nitrogen	6A 8 O 15.9994 Oxygen	7A 9 F 18.99840322 Fluorine	10 Ne 20.1797 Neon	
11 Na 22.989769 Sodium	12 Mg 24.3050 Magnesium											13 Al 26.9815386 Aluminum	14 Si 28.0855 Silicon	15 P 30.973762 Phosphorus	16 S 32.065 Sulfur	17 Cl 35.453 Chlorine	18 Ar 39.948 Argon	
19 K 39.0983 Potassium	20 Ca 40.078 Calcium	3B 21 Sc 44.955912 Scandium	4B 22 Ti 47.867 Titanium	5B 23 V 50.9415 Vanadium	6B 24 Cr 51.9961 Chromium	7B 25 Mn 54.938045 Manganese	8B 26 Fe 55.845 Iron		27 Co 58.933195 Cobalt	28 Ni 58.6934 Nickel	29 Cu 63.546 Copper	30 Zn 65.38 Zinc	31 Ga 69.723 Gallium	32 Ge 72.64 Germanium	33 As 74.92160 Arsenic	34 Se 78.96 Selenium	35 Br 79.904 Bromine	36 Kr 83.798 Krypton
37 Rb 85.4678 Rubidium	38 Sr 87.62 Strontium	39 Y 88.90585 Yttrium	40 Zr 91.224 Zirconium	41 Nb 92.90638 Niobium	42 Mo 95.96 Molybdenum	43 Tc [98] Technetium	44 Ru 101.07 Ruthenium	45 Rh 102.90550 Rhodium	46 Pd 106.42 Palladium	47 Ag 107.8682 Silver	48 Cd 112.411 Cadmium	49 In 114.818 Indium	50 Sn 118.710 Tin	51 Sb 121.760 Antimony	52 Te 127.60 Tellurium	53 I 126.90447 Iodine	54 Xe 131.290 Xenon	
55 Cs 132.9054519 Cesium	56 Ba 137.327 Barium	57-71 Lanthanides	72 Hf 178.49 Hafnium	73 Ta 180.94788 Tantalum	74 W 183.84 Tungsten	75 Re 186.207 Rhenium	76 Os 190.23 Osmium	77 Ir 192.217 Iridium	78 Pt 195.084 Platinum	79 Au 196.966569 Gold	80 Hg 200.59 Mercury	81 Tl 204.3833 Thallium	82 Pb 207.2 Lead	83 Bi 208.98040 Bismuth	84 Po [209] Polonium	85 At [210] Astatine	86 Rn [222] Radon	
87 Fr [223] Francium	88 Ra [226] Radium	89-103 Actinides	104 Rf [261] Rutherfordium	105 Db [262] Dubnium	106 Sg [271] Seaborgium	107 Bh [272] Bohrium	108 Hs [270] Hassium	109 Mt [278] Meitnerium	110 Ds [281] Darmstadtium	111 Rg [280] Roentgenium	112 Cn [285] Copernicium	113 Uut [284] Uhuthrium	114 Uuq [289] Ununquadium	115 Uup [288] Ununpentium	116 Uuh [293] Ununhexium	117 Uus [294] Ununseptium	118 Uuo [294] Ununoctium	
Lanthanides																		
57 La 138.90547 Lanthanum	58 Ce 140.116 Cerium	59 Pr 140.90765 Praseodymium	60 Nd 144.242 Neodymium	61 Pm [145] Promethium	62 Sm 150.36 Samarium	63 Eu 151.964 Europium	64 Gd 157.25 Gadolinium	65 Tb 158.92535 Terbium	66 Dy 162.500 Dysprosium	67 Ho 164.93032 Holmium	68 Er 167.259 Erbium	69 Tm 168.93421 Thulium	70 Yb 173.054 Ytterbium	71 Lu 174.9668 Lutetium				
Actinides																		
89 Ac [227] Actinium	90 Th 232.03806 Thorium	91 Pa 231.03688 Protactinium	92 U 238.02891 Uranium	93 Np [237] Neptunium	94 Pu [244] Plutonium	95 Am [243] Americium	96 Cm [247] Curium	97 Bk [247] Berkelium	98 Cf [251] Californium	99 Es [252] Einsteinium	100 Fm [257] Fermium	101 Md [258] Mendelevium	102 No [259] Nobelium	103 Lr [262] Lawrencium				
Alkali Metals	Alkaline Earth	Basic Metal	Halogen	Noble Gas	Non Metal	Rare Earth	Semi Metal	Transition Metal										

Follow the instructions below to label the major groups and divisions of the periodic table.

1. The vertical columns on the periodic table are called \_\_\_\_\_.
2. The horizontal rows on the periodic table are called \_\_\_\_\_.
3. Most of the elements in the periodic table are classified as \_\_\_\_\_.
4. The elements that touch the zigzag line are classified as \_\_\_\_\_.
5. The elements in the far upper right corner are classified as \_\_\_\_\_.
6. Elements in the first group have one outer shell electron and are extremely reactive. They are called \_\_\_\_\_.
7. Elements in the second group have 2 outer shell electrons and are also very reactive. They are called \_\_\_\_\_.
8. Elements in groups 3 through 12 have many useful properties and are called \_\_\_\_\_.
9. Elements in group 17 are known as “salt formers”.  
They are called \_\_\_\_\_.
10. Elements in group 18 are very unreactive. They are said to be “inert”. We call these the \_\_\_\_\_.
11. The elements at the bottom of the table were pulled out to keep the table from becoming too long.  
The first period at the bottom called the \_\_\_\_\_.
12. The second period at the bottom of the table is called the \_\_\_\_\_.
13. What are the two rows placed at the bottom of the periodic table?