

# Periodic Table of the Elements

(based on  $^{12}_6\text{C} = 12.0000$ )

| Group                                |                                        |                   |                  |                  |                  |                  |                  |                  |                 |                 |                 | Representative Elements               |                                      |                                        |                                   |                                       |                                    |
|--------------------------------------|----------------------------------------|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|-----------------|-----------------|---------------------------------------|--------------------------------------|----------------------------------------|-----------------------------------|---------------------------------------|------------------------------------|
| 1                                    | 2                                      |                   |                  |                  |                  |                  |                  |                  |                 |                 |                 | 13                                    | 14                                   | 15                                     | 16                                | 17                                    | 18                                 |
| 1A                                   | 2A                                     |                   |                  |                  |                  |                  |                  |                  |                 |                 |                 | 3A                                    | 4A                                   | 5A                                     | 6A                                | 7A                                    | 8A                                 |
| 1<br><b>H</b><br>Hydrogen<br>1.008   |                                        |                   |                  |                  |                  |                  |                  |                  |                 |                 |                 |                                       |                                      |                                        |                                   |                                       | 2<br><b>He</b><br>Helium<br>4.003  |
| 2<br><b>Li</b><br>Lithium<br>6.941   | 4<br><b>Be</b><br>Beryllium<br>9.012   | Transition Metals |                  |                  |                  |                  |                  |                  |                 |                 |                 | 5<br><b>B</b><br>Boron<br>10.81       | 6<br><b>C</b><br>Carbon<br>12.011    | 7<br><b>N</b><br>Nitrogen<br>14.007    | 8<br><b>O</b><br>Oxygen<br>15.999 | 9<br><b>F</b><br>Fluorine<br>18.998   | 10<br><b>Ne</b><br>Neon<br>20.180  |
| 3<br><b>Na</b><br>Sodium<br>22.990   | 12<br><b>Mg</b><br>Magnesium<br>24.305 | 3<br><b>B</b>     | 4<br><b>B</b>    | 5<br><b>B</b>    | 6<br><b>B</b>    | 7<br><b>B</b>    | 8<br><b>B</b>    | 9<br><b>B</b>    | 10<br><b>B</b>  | 11<br><b>B</b>  | 12<br><b>B</b>  | 13<br><b>Al</b><br>Aluminum<br>26.982 | 14<br><b>Si</b><br>Silicon<br>28.086 | 15<br><b>P</b><br>Phosphorus<br>30.974 | 16<br><b>S</b><br>Sulfur<br>32.06 | 17<br><b>Cl</b><br>Chlorine<br>35.453 | 18<br><b>Ar</b><br>Argon<br>39.948 |
| 4<br><b>K</b><br>Potassium<br>39.098 | 20<br><b>Ca</b><br>Calcium<br>40.078   | 21<br><b>Sc</b>   | 22<br><b>Ti</b>  | 23<br><b>V</b>   | 24<br><b>Cr</b>  | 25<br><b>Mn</b>  | 26<br><b>Fe</b>  | 27<br><b>Co</b>  | 28<br><b>Ni</b> | 29<br><b>Cu</b> | 30<br><b>Zn</b> | 31<br><b>Ga</b>                       | 32<br><b>Ge</b>                      | 33<br><b>As</b>                        | 34<br><b>Se</b>                   | 35<br><b>Br</b>                       | 36<br><b>Kr</b>                    |
| 5<br><b>Rb</b><br>Rubidium<br>85.468 | 38<br><b>Sr</b><br>Strontium<br>87.62  | 39<br><b>Y</b>    | 40<br><b>Zr</b>  | 41<br><b>Nb</b>  | 42<br><b>Mo</b>  | 43<br><b>Tc</b>  | 44<br><b>Ru</b>  | 45<br><b>Rh</b>  | 46<br><b>Pd</b> | 47<br><b>Ag</b> | 48<br><b>Cd</b> | 49<br><b>In</b>                       | 50<br><b>Sn</b>                      | 51<br><b>Sb</b>                        | 52<br><b>Te</b>                   | 53<br><b>I</b>                        | 54<br><b>Xe</b>                    |
| 6<br><b>Cs</b><br>Cesium<br>132.905  | 56<br><b>Ba</b><br>Barium<br>137.327   | 57<br><b>La</b>   | 72<br><b>Hf</b>  | 73<br><b>Ta</b>  | 74<br><b>W</b>   | 75<br><b>Re</b>  | 76<br><b>Os</b>  | 77<br><b>Ir</b>  | 78<br><b>Pt</b> | 79<br><b>Au</b> | 80<br><b>Hg</b> | 81<br><b>Tl</b>                       | 82<br><b>Pb</b>                      | 83<br><b>Bi</b>                        | 84<br><b>Po</b>                   | 85<br><b>At</b>                       | 86<br><b>Rn</b>                    |
| 7<br><b>Fr</b><br>Francium<br>223    | 88<br><b>Ra</b><br>Radium<br>226.025   | 89<br><b>Ac</b>   | 104<br><b>Rf</b> | 105<br><b>Db</b> | 106<br><b>Sg</b> | 107<br><b>Bh</b> | 108<br><b>Hs</b> | 109<br><b>Mt</b> |                 |                 |                 |                                       |                                      |                                        |                                   |                                       |                                    |

## Inner Transition Metals

### Lanthanide series

|                                       |                                            |                                        |                                          |                                         |                                         |                                         |                                         |                                           |                                           |                                        |                                            |                                         |                                           |
|---------------------------------------|--------------------------------------------|----------------------------------------|------------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-------------------------------------------|-------------------------------------------|----------------------------------------|--------------------------------------------|-----------------------------------------|-------------------------------------------|
| 58<br><b>Ce</b><br>Cerium<br>140.12   | 59<br><b>Pr</b><br>Praseodymium<br>140.908 | 60<br><b>Nd</b><br>Neodymium<br>144.24 | 61<br><b>Pm</b><br>Promethium<br>144.913 | 62<br><b>Sm</b><br>Samarium<br>150.36   | 63<br><b>Eu</b><br>Europium<br>151.96   | 64<br><b>Gd</b><br>Gadolinium<br>157.25 | 65<br><b>Tb</b><br>Terbium<br>158.925   | 66<br><b>Dy</b><br>Dysprosium<br>162.50   | 67<br><b>Ho</b><br>Holmium<br>164.930     | 68<br><b>Er</b><br>Erbium<br>167.26    | 69<br><b>Tm</b><br>Thulium<br>168.934      | 70<br><b>Yb</b><br>Ytterbium<br>173.04  | 71<br><b>Lu</b><br>Lutetium<br>174.967    |
| 90<br><b>Th</b><br>Thorium<br>232.038 | 91<br><b>Pa</b><br>Protactinium<br>231.036 | 92<br><b>U</b><br>Uranium<br>238.029   | 93<br><b>Np</b><br>Neptunium<br>237.048  | 94<br><b>Pu</b><br>Plutonium<br>244.064 | 95<br><b>Am</b><br>Americium<br>243.061 | 96<br><b>Cm</b><br>Curium<br>247.070    | 97<br><b>Bk</b><br>Berkelium<br>247.070 | 98<br><b>Cf</b><br>Californium<br>251.080 | 99<br><b>Es</b><br>Einsteinium<br>252.083 | 100<br><b>Fm</b><br>Fermium<br>257.095 | 101<br><b>Md</b><br>Mendelevium<br>258.099 | 102<br><b>No</b><br>Nobelium<br>259.101 | 103<br><b>Lr</b><br>Lawrencium<br>260.105 |

### Actinide series