

**Polyatomic Cations:**

Ammonium	NH <sub>4</sub> <sup>+</sup>
Hydronium	H <sub>3</sub> O <sup>+</sup>

**Polyatomic Anions:**

Acetate	C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> <sup>-</sup>
Acetate	CH <sub>3</sub> COO <sup>-</sup>
Bicarbonate	HCO <sub>3</sub> <sup>-</sup>
Bromate	BrO <sub>3</sub> <sup>-</sup>
Carbonate	CO <sub>3</sub> <sup>2-</sup>
Chlorate	ClO <sub>3</sub> <sup>-</sup>
Chlorite	ClO <sub>2</sub> <sup>-</sup>
Chromate	CrO <sub>4</sub> <sup>2-</sup>
Cyanide	CN <sup>-</sup>
Dichromate	Cr <sub>2</sub> O <sub>7</sub> <sup>2-</sup>
Hydroxide	OH <sup>-</sup>
Hypochlorite	ClO <sup>-</sup>
Nitrate	NO <sub>3</sub> <sup>-</sup>
Nitrite	NO <sub>2</sub> <sup>-</sup>
Oxalate	C <sub>2</sub> O <sub>4</sub> <sup>2-</sup>
Perchlorate	ClO <sub>4</sub> <sup>-</sup>
Permanganate	MnO <sub>4</sub> <sup>-</sup>
Peroxide	O <sub>2</sub> <sup>2-</sup>
Phosphate	PO <sub>4</sub> <sup>3-</sup>
Sulfate	SO <sub>4</sub> <sup>2-</sup>
Sulfite	SO <sub>3</sub> <sup>2-</sup>

**Polyvalent Ions:**

Antimony	Sb <sup>3+</sup>	Sb <sup>5+</sup>
Bismuth	Bi <sup>3+</sup>	Bi <sup>5+</sup>
Chromium	Cr <sup>2+</sup>	Cr <sup>3+</sup>
Cobalt	Co <sup>2+</sup>	Co <sup>3+</sup>
Copper	Cu <sup>+</sup>	Cu <sup>2+</sup>
Gold	Au <sup>+</sup>	Au <sup>3+</sup>
Iron	Fe <sup>2+</sup>	Fe <sup>3+</sup>
Lead	Pb <sup>2+</sup>	Pb <sup>4+</sup>
Manganese	Mn <sup>2+</sup>	Mn <sup>4+</sup>
Mercury	Hg <sup>2+</sup>	Hg <sub>2</sub> <sup>2+</sup>
Niobium	Nb <sup>3+</sup>	Nb <sup>5+</sup>
Platinum	Pt <sup>2+</sup>	Pt <sup>4+</sup>
Tin	Sn <sup>2+</sup>	Sn <sup>4+</sup>
Titanium	Ti <sup>3+</sup>	Ti <sup>4+</sup>
Vanadium	V <sup>3+</sup>	V <sup>5+</sup>

**Prefixes:**

1 Mono-	2 Di-
3 Tri-	4 Tetra-
5 Penta-	6 Hexa-
7 Hepta-	8 Octa-
9 Nona-	10 Deca-

**Diatomic Elements:**

Bromine	Br <sub>2</sub>
Chlorine	Cl <sub>2</sub>
Fluorine	F <sub>2</sub>
Hydrogen	H <sub>2</sub>
Iodine	I <sub>2</sub>
Nitrogen	N <sub>2</sub>
Oxygen	O <sub>2</sub>

**Common Acids:**

Acetic	HC <sub>2</sub> H <sub>3</sub> O <sub>2</sub> (aq)
Hydrobromic	HBr (aq)
Hydrochloric	HCl (aq)
Hydrofluoric	HF (aq)
Hydroiodic	HI (aq)
Nitric	HNO <sub>3</sub> (aq)
Nitrous	HNO <sub>2</sub> (aq)
Oxalic	H <sub>2</sub> C <sub>2</sub> O <sub>4</sub> (aq)
Phosphoric	H <sub>3</sub> PO <sub>4</sub> (aq)
Sulfuric	H <sub>2</sub> SO <sub>4</sub> (aq)
Sulfurous	H <sub>2</sub> SO <sub>3</sub> (aq)
Carbonic	H <sub>2</sub> CO <sub>3</sub> (aq)

**Activity Series of Metals:**

Lithium	...Cobalt
Potassium	Nickel
Barium	Tin
Calcium	Lead
Sodium	Hydrogen
Magnesium	Copper
Aluminum	Mercury
Manganese	Silver
Zinc	Platinum
Chromium	Gold
Iron	
Cobalt...	

1A	2A	3B	4B	5B	6B	7B	8B						1B	2B	3A	4A	5A	6A	7A	8A
H																			He	
2.1																			--	
Li	Be												B	C	N	O	F	Ne		
1.0	1.5												2.0	2.5	3.0	3.5	4.0	--		
Na	Mg												Al	Si	P	S	Cl	Ar		
0.9	1.2												1.5	1.8	2.1	2.5	3.0	--		
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr			
0.8	1.0	1.3	1.5	1.6	1.6	1.5	1.8	1.9	1.9	1.9	1.6	1.6	1.8	2.0	2.4	2.8	--			
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe			
0.8	1.0	1.2	1.4	1.6	1.8	1.9	2.2	2.2	2.2	1.9	1.7	1.7	1.8	1.9	2.1	2.5	--			
Cs	Ba	Ln	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn			
0.7	0.9	1.0	1.3	1.5	1.7	1.9	2.2	2.2	2.2	2.4	1.9	1.8	1.9	1.9	2.0	2.2	--			
Fr	Ra	Ac	Th	Pa	U															
0.7	0.9	1.0	1.2	1.5	1.7															

**Formulas:**

Mass-Energy	$E = mc^2$
Temperature Change	$Q = mC_p\Delta T$
Phase Change	$Q = mH_x$
Ideal Gas Law	$PV = nRT$
Combined Gas Law	$P_1V_1T_2 = P_2V_2T_1$
Partial Pressure	$P_{total} = P_1 + P_2 + P_3...$

**Constants:**

Speed of Light	$c = 3.00 \times 10^8 \text{ m/s}$
Planck Constant	$h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$
Boltzmann Constant	$k_B = 1.381 \times 10^{-23} \text{ J/K}$
Avogadro's Number	$6.02 \times 10^{23} \text{ rp/mol}$
Volume of Ideal Gas	$22.4 \text{ L/mol}$
Faraday Constant	$F = 96485.309 \text{ C/mol}$
Ideal Gas Constant	$R = 8.31 \text{ (L}\cdot\text{kPa)/(K}\cdot\text{mol)}$ $R = 0.0821 \text{ (L}\cdot\text{atm)/(K}\cdot\text{mol)}$ $R = 62.396 \text{ (L}\cdot\text{mm Hg)/(K}\cdot\text{mol)}$
Standard Pressure	$1 \text{ atm} = 760 \text{ mm Hg} = 101.325 \text{ kPa}$
Specific Heat Water	$C_p = 1.00 \text{ cal/(g}\cdot\text{°C)} = 4.18 \text{ J/(g}\cdot\text{°C)}$

**Unit Conversion:**

SI Volume	$1 \text{ mL} = 1 \text{ cm}^3$
Absolute Temperature	$K = \text{°C} + 273$
SI Temperature	$\text{°C} = 5/9 (\text{°F} - 32)$
Calorie-Joule	$1 \text{ cal} = 4.184 \text{ J}$
Pressure	$1 \text{ atm} = 760 \text{ mm Hg} = 101.325 \text{ kPa}$

Name:

Period:

1 1A																	18 8A						
1 <b>H</b> Hydrogen 1.01																	2 <b>He</b> Helium 4.00						
2 <b>Li</b> Lithium 6.94	3 <b>Be</b> Beryllium 9.01																	13 3A <b>B</b> Boron 10.81	14 4A <b>C</b> Carbon 12.01	15 5A <b>N</b> Nitrogen 14.01	16 6A <b>O</b> Oxygen 16.00	17 7A <b>F</b> Fluorine 19.00	18 8A <b>Ne</b> Neon 20.18
3 <b>Na</b> Sodium 22.99	4 <b>Mg</b> Magnesium 24.31	3 3B	4 4B	5 5B	6 6B	7 7B	8 8B	9 8B	10 8B	11 1B	12 2B	13 3A <b>Al</b> Aluminum 26.98	14 4A <b>Si</b> Silicon 28.09	15 5A <b>P</b> Phosphorus 30.97	16 6A <b>S</b> Sulfur 32.07	17 7A <b>Cl</b> Chlorine 35.45	18 8A <b>Ar</b> Argon 39.95						
4 <b>K</b> Potassium 39.10	20 <b>Ca</b> Calcium 40.08	21 <b>Sc</b> Scandium 44.96	22 <b>Ti</b> Titanium 47.87	23 <b>V</b> Vanadium 50.94	24 <b>Cr</b> Chromium 52.00	25 <b>Mn</b> Manganese 54.94	26 <b>Fe</b> Iron 55.85	27 <b>Co</b> Cobalt 58.93	28 <b>Ni</b> Nickel 58.69	29 <b>Cu</b> Copper 63.55	30 <b>Zn</b> Zinc 65.39	31 <b>Ga</b> Gallium 69.72	32 <b>Ge</b> Germanium 72.61	33 <b>As</b> Arsenic 74.92	34 <b>Se</b> Selenium 78.96	35 <b>Br</b> Bromine 79.90	36 <b>Kr</b> Krypton 83.80						
5 <b>Rb</b> Rubidium 85.47	38 <b>Sr</b> Strontium 87.62	39 <b>Y</b> Yttrium 88.91	40 <b>Zr</b> Zirconium 91.22	41 <b>Nb</b> Niobium 92.91	42 <b>Mo</b> Molybdenum 95.94	43 <b>Tc</b> Technetium (98)	44 <b>Ru</b> Ruthenium 101.07	45 <b>Rh</b> Rhodium 102.91	46 <b>Pd</b> Palladium 106.42	47 <b>Ag</b> Silver 107.87	48 <b>Cd</b> Cadmium 112.41	49 <b>In</b> Indium 114.82	50 <b>Sn</b> Tin 118.71	51 <b>Sb</b> Antimony 121.76	52 <b>Te</b> Tellurium 127.60	53 <b>I</b> Iodine 126.90	54 <b>Xe</b> Xenon 131.29						
6 <b>Cs</b> Cesium 132.91	56 <b>Ba</b> Barium 137.33	57 <b>La</b> Lanthanum 138.91	72 <b>Hf</b> Hafnium 178.49	73 <b>Ta</b> Tantalum 180.95	74 <b>W</b> Tungsten 183.84	75 <b>Re</b> Rhenium 186.21	76 <b>Os</b> Osmium 190.23	77 <b>Ir</b> Iridium 192.22	78 <b>Pt</b> Platinum 195.08	79 <b>Au</b> Gold 196.97	80 <b>Hg</b> Mercury 200.59	81 <b>Tl</b> Thallium 204.38	82 <b>Pb</b> Lead 207.2	83 <b>Bi</b> Bismuth 208.98	84 <b>Po</b> Polonium (209)	85 <b>At</b> Astatine (210)	86 <b>Rn</b> Radon (222)						
7 <b>Fr</b> Francium (223)	88 <b>Ra</b> Radium (226)	89 <b>Ac</b> Actinium (227)	104 <b>Rf</b> Rutherfordium (261)	105 <b>Db</b> Dubnium (262)	106 <b>Sg</b> Seaborgium (266)	107 <b>Bh</b> Bohrium (264)	108 <b>Hs</b> Hassium (269)	109 <b>Mt</b> Meitnerium (268)															

**Key**

11	—	Atomic number
<b>Na</b>	—	Element symbol
Sodium	—	Element name
22.99	—	Average atomic mass*

\* If this number is in parentheses, then it refers to the atomic mass of the most stable isotope.

58 <b>Ce</b> Cerium 140.12	59 <b>Pr</b> Praseodymium 140.91	60 <b>Nd</b> Neodymium 144.24	61 <b>Pm</b> Promethium (145)	62 <b>Sm</b> Samarium 150.36	63 <b>Eu</b> Europium 151.96	64 <b>Gd</b> Gadolinium 157.25	65 <b>Tb</b> Terbium 158.93	66 <b>Dy</b> Dysprosium 162.50	67 <b>Ho</b> Holmium 164.93	68 <b>Er</b> Erbium 167.26	69 <b>Tm</b> Thulium 168.93	70 <b>Yb</b> Ytterbium 173.04	71 <b>Lu</b> Lutetium 174.97
90 <b>Th</b> Thorium 232.04	91 <b>Pa</b> Protactinium 231.04	92 <b>U</b> Uranium 238.03	93 <b>Np</b> Neptunium (237)	94 <b>Pu</b> Plutonium (244)	95 <b>Am</b> Americium (243)	96 <b>Cm</b> Curium (247)	97 <b>Bk</b> Berkelium (247)	98 <b>Cf</b> Californium (251)	99 <b>Es</b> Einsteinium (252)	100 <b>Fm</b> Fermium (257)	101 <b>Md</b> Mendelevium (258)	102 <b>No</b> Nobelium (259)	103 <b>Lr</b> Lawrencium (262)

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