

# Periodic Table of the Elements (Used for Grade 8 and High School)

California Science Test

		Key																					
		11																					
		Na																					
		Sodium																					
		22.99																					
		Average atomic mass*																					
	1																	18					
	1A																	8A					
1	1	<b>H</b> Hydrogen 1.01															2	<b>He</b> Helium 4.00					
	2	3	4													13	14	15	16	17			
	2A	<b>Li</b> Lithium 6.94	<b>Be</b> Beryllium 9.01													<b>B</b> Boron 10.81	<b>C</b> Carbon 12.01	<b>N</b> Nitrogen 14.01	<b>O</b> Oxygen 16.00	<b>F</b> Fluorine 19.00	10		
2		<b>Na</b> Sodium 22.99	<b>Mg</b> Magnesium 24.31	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18				
	3			3B	4B	5B	6B	7B	8B			1B	2B	<b>Al</b> Aluminum 26.98	<b>Si</b> Silicon 28.09	<b>P</b> Phosphorus 30.97	<b>S</b> Sulfur 32.07	<b>Cl</b> Chlorine 35.45	<b>Ar</b> Argon 39.95				
3		<b>Na</b> Sodium 22.99	<b>Mg</b> Magnesium 24.31											<b>Al</b> Aluminum 26.98	<b>Si</b> Silicon 28.09	<b>P</b> Phosphorus 30.97	<b>S</b> Sulfur 32.07	<b>Cl</b> Chlorine 35.45	<b>Ar</b> Argon 39.95				
4		<b>K</b> Potassium 39.10	<b>Ca</b> Calcium 40.08	<b>Sc</b> Scandium 44.96	<b>Ti</b> Titanium 47.87	<b>V</b> Vanadium 50.94	<b>Cr</b> Chromium 52.00	<b>Mn</b> Manganese 54.94	<b>Fe</b> Iron 55.85	<b>Co</b> Cobalt 58.93	<b>Ni</b> Nickel 58.69	<b>Cu</b> Copper 63.55	<b>Zn</b> Zinc 65.39	<b>Ga</b> Gallium 69.72	<b>Ge</b> Germanium 72.61	<b>As</b> Arsenic 74.92	<b>Se</b> Selenium 78.96	<b>Br</b> Bromine 79.90	<b>Kr</b> Krypton 83.80				
5		<b>Rb</b> Rubidium 85.47	<b>Sr</b> Strontium 87.62	<b>Y</b> Yttrium 88.91	<b>Zr</b> Zirconium 91.22	<b>Nb</b> Niobium 92.91	<b>Mo</b> Molybdenum 95.94	<b>Tc</b> Technetium (98)	<b>Ru</b> Ruthenium 101.07	<b>Rh</b> Rhodium 102.91	<b>Pd</b> Palladium 106.42	<b>Ag</b> Silver 107.87	<b>Cd</b> Cadmium 112.41	<b>In</b> Indium 114.82	<b>Sn</b> Tin 118.71	<b>Sb</b> Antimony 121.76	<b>Te</b> Tellurium 127.60	<b>I</b> Iodine 126.90	<b>Xe</b> Xenon 131.29				
6		<b>Cs</b> Cesium 132.91	<b>Ba</b> Barium 137.33	<b>La</b> Lanthanum 138.91	<b>Hf</b> Hafnium 178.49	<b>Ta</b> Tantalum 180.95	<b>W</b> Tungsten 183.84	<b>Re</b> Rhenium 186.21	<b>Os</b> Osmium 190.23	<b>Ir</b> Iridium 192.22	<b>Pt</b> Platinum 195.08	<b>Au</b> Gold 196.97	<b>Hg</b> Mercury 200.59	<b>Tl</b> Thallium 204.38	<b>Pb</b> Lead 207.2	<b>Bi</b> Bismuth 208.98	<b>Po</b> Polonium (209)	<b>At</b> Astatine (210)	<b>Rn</b> Radon (222)				
7		<b>Fr</b> Francium (223)	<b>Ra</b> Radium (226)	<b>Ac</b> Actinium (227)	<b>Rf</b> Rutherfordium (261)	<b>Db</b> Dubnium (262)	<b>Sg</b> Seaborgium (266)	<b>Bh</b> Bohrium (264)	<b>Hs</b> Hassium (269)	<b>Mt</b> Meitnerium (268)	<b>Ds</b> Darmstadtium (281)	<b>Rg</b> Roentgenium (280)	<b>Cn</b> Copernicium (285)	<b>Nh</b> Nihonium (284)	<b>Fl</b> Flerovium (289)	<b>Mc</b> Moscovium (288)	<b>Lv</b> Livermorium (293)	<b>Ts</b> Tennessine (294)	<b>Og</b> Oganesson (294)				
		58	59	60	61	62	63	64	65	66	67	68	69	70	71								
		<b>Ce</b> Cerium 140.12	<b>Pr</b> Praseodymium 140.91	<b>Nd</b> Neodymium 144.24	<b>Pm</b> Promethium (145)	<b>Sm</b> Samarium 150.36	<b>Eu</b> Europium 151.96	<b>Gd</b> Gadolinium 157.25	<b>Tb</b> Terbium 158.93	<b>Dy</b> Dysprosium 162.50	<b>Ho</b> Holmium 164.93	<b>Er</b> Erbium 167.26	<b>Tm</b> Thulium 168.93	<b>Yb</b> Ytterbium 173.04	<b>Lu</b> Lutetium 174.97								
		90	91	92	93	94	95	96	97	98	99	100	101	102	103								
		<b>Th</b> Thorium 232.04	<b>Pa</b> Protactinium 231.04	<b>U</b> Uranium 238.03	<b>Np</b> Neptunium (237)	<b>Pu</b> Plutonium (244)	<b>Am</b> Americium (243)	<b>Cm</b> Curium (247)	<b>Bk</b> Berkelium (247)	<b>Cf</b> Californium (251)	<b>Es</b> Einsteinium (252)	<b>Fm</b> Fermium (257)	<b>Md</b> Mendelevium (258)	<b>No</b> Nobelium (259)	<b>Lr</b> Lawrencium (262)								
		* If this number is in parentheses, then it refers to the atomic mass of the most stable isotope.																					
		Alkali Metal		Alkaline Earth		Transition Metal				Basic Metal		Semimetal		Nonmetal		Halogen		Noble Gas		Lanthanide		Actinide	

## Formulas

**Ideal Gas Law:**  $PV = nRT$

**Combined Gas Law:**  $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

**Pressure Formula:**  $P = \frac{F}{A}$

**Mass-Energy Formula:**  $E = mc^2$

**Calorimetric Formulas –**

**No Phase Change:**  $Q = m(\Delta T)C_p$

**Latent Heat of Fusion:**  $Q = m\Delta H_{\text{fus}}$

**Latent Heat of Vaporization:**  $Q = m\Delta H_{\text{vap}}$

## Constants

**Volume of Ideal Gas at STP:**  $22.4 \frac{\text{L}}{\text{mol}}$

**Speed of Light in a Vacuum:**  $c = 3.00 \times 10^8 \frac{\text{m}}{\text{s}}$

**Specific Heat of Water:**  $C_p(\text{H}_2\text{O}) = 1.00 \frac{\text{cal}}{(\text{g } ^\circ\text{C})} = 4.18 \frac{\text{J}}{(\text{g } ^\circ\text{C})}$

**Latent Heat of Fusion of Water:**  $\Delta H_{\text{fus}}(\text{H}_2\text{O}) = 80 \frac{\text{cal}}{\text{g}} = 334 \frac{\text{J}}{\text{g}}$

**Latent Heat of Vaporization of Water:**  $\Delta H_{\text{vap}}(\text{H}_2\text{O}) = 540 \frac{\text{cal}}{\text{g}} = 2260 \frac{\text{J}}{\text{g}}$

## Unit Conversions

**Calorie-Joule Conversion:**  $1 \text{ cal} = 4.184 \text{ J}$

**Absolute Temperature Conversion:**  $\text{K} = ^\circ\text{C} + 273$

**Pressure Conversions:**  $1 \text{ atm} = 760 \text{ mm Hg} = 760 \text{ Torr} = 101.325 \text{ kPa} = 14.7 \frac{\text{lbs.}}{\text{in.}^2} = 29.92 \text{ in. Hg}$