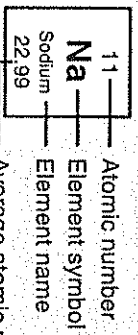


BRINCHOF = diatomic X₂

Key



1 1A		2 2A		3 3B										4 4B										5 5B										6 6B										7 7B										8 8B										9 9B										10 10B										11 11B										12 12B										13 3A										14 4A										15 5A										16 6A										17 7A										18 8A																																																			
1 H Hydrogen 1.01		2 He Helium 4.00		3 Li Lithium 6.94		4 Be Beryllium 9.01		5 B Boron 10.81		6 C Carbon 12.01		7 N Nitrogen 14.01		8 O Oxygen 16.00		9 F Fluorine 19.00		10 Ne Neon 20.18		11 Na Sodium 22.99		12 Mg Magnesium 24.31		13 Al Aluminum 26.98		14 Si Silicon 28.09		15 P Phosphorus 30.97		16 S Sulfur 32.07		17 Cl Chlorine 35.45		18 Ar Argon 39.95		19 K Potassium 39.10		20 Ca Calcium 40.08		21 Sc Scandium 44.96		22 Ti Titanium 47.87		23 V Vanadium 50.94		24 Cr Chromium 52.00		25 Mn Manganese 54.94		26 Fe Iron 55.85		27 Co Cobalt 58.93		28 Ni Nickel 58.69		29 Cu Copper 63.55		30 Zn Zinc 65.39		31 Ga Gallium 69.72		32 Ge Germanium 72.61		33 As Arsenic 74.92		34 Se Selenium 78.96		35 Br Bromine 79.90		36 Kr Krypton 83.80		37 Rb Rubidium 85.47		38 Sr Strontium 87.62		39 Y Yttrium 88.91		40 Zr Zirconium 91.22		41 Nb Niobium 92.91		42 Mo Molybdenum 95.94		43 Tc Technetium (98)		44 Ru Ruthenium 101.07		45 Rh Rhodium 102.91		46 Pd Palladium 106.42		47 Ag Silver 107.87		48 Cd Cadmium 112.41		49 In Indium 114.82		50 Sn Tin 118.71		51 Sb Antimony 121.76		52 Te Tellurium 127.60		53 I Iodine 126.90		54 Xe Xenon 131.29		55 Cs Cesium 132.91		56 Ba Barium 137.33		57 La Lanthanum 138.91		58 Ce Cerium 140.12		59 Pr Praseodymium 140.91		60 Nd Neodymium 144.24		61 Pm Promethium (145)		62 Sm Samarium 150.36		63 Eu Europium 151.96		64 Gd Gadolinium 157.25		65 Tb Terbium 158.93		66 Dy Dysprosium 162.50		67 Ho Holmium 164.93		68 Er Erbium 167.26		69 Tm Thulium 168.93		70 Yb Ytterbium 173.04		71 Lu Lutetium 174.97		87 Fr Francium (223)		88 Ra Radium (226)		89 Ac Actinium (227)		90 Th Thorium 232.04		91 Pa Protactinium 231.04		92 U Uranium 238.03		93 Np Neptunium (237)		94 Pu Plutonium (244)		95 Am Americium (243)		96 Cm Curium (247)		97 Bk Berkelium (247)		98 Cf Californium (251)		99 Es Einsteinium (252)		100 Fm Fermium (257)		101 Md Mendelevium (258)		102 No Nobelium (259)		103 Lr Lawrencium (262)		104 Rf Rutherfordium (261)		105 Db Dubnium (262)		106 Sg Seaborgium (266)		107 Bh Bohrium (264)		108 Hs Hassium (269)		109 Mt Meitnerium (268)		110 Uu Ununium (270)		111 Uub Ununium (271)		112 Uuq Ununium (272)		113 Uuq Ununium (273)		114 Uuq Ununium (274)		115 Uuq Ununium (275)		116 Uuq Ununium (276)		117 Uuq Ununium (277)		118 Uuq Ununium (278)	

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

Common Ion Chart

Positive Ions (Cations)

Negative Ions (Anions)

Aluminum	Al ⁺³
Ammonium	NH ₄ ⁺
Barium	Ba ⁺²
Cadmium	Cd ⁺²
Calcium	Ca ⁺²
Chromium (II)	Cr ⁺²
Chromium (III)	Cr ⁺³
Cobalt (II)	Co ⁺²
Copper (I)	Cu ⁺
Copper (II)	Cu ⁺²
Hydrogen	H ⁺
Hydronium	H ₃ O ⁺
Iron (II)	Fe ⁺²
Iron (III)	Fe ⁺³
Lead (II)	Pb ⁺²
Lead (IV)	Pb ⁺⁴
Lithium	Li ⁺
Magnesium	Mg ⁺²
Manganese (II)	Mn ⁺²
Mercury (I)	Hg ₂ ⁺²
Mercury (II)	Hg ⁺²
Potassium	K ⁺
Silver	Ag ⁺
Strontium	Sr ⁺²
Sodium	Na ⁺
Tin (II)	Sn ⁺²
Tin (IV)	Sn ⁺⁴
Zinc	Zn ⁺²

Acetate	C ₂ H ₃ O ₂ ⁻ / CH ₃ COO ⁻
Bromide	Br ⁻
Carbonate	CO ₃ ⁻²
Hydrogen Carbonate Ion / Bicarbonate	HCO ₃ ⁻
Chlorate	ClO ₃ ⁻
Chloride	Cl ⁻
Chlorite	ClO ₂ ⁻
Chromate	CrO ₄ ⁻²
Cyanide	CN ⁻
Dichromate	Cr ₂ O ₇ ⁻²
Fluoride	F ⁻
Hydride	H ⁻
Hydroxide	OH ⁻
Hypochlorite	ClO ⁻
Iodate	IO ₃ ⁻
Iodide	I ⁻
Nitrate	NO ₃ ⁻
Nitride	N ⁻³
Nitrite	NO ₂ ⁻
Oxalate	C ₂ O ₄ ⁻²
Oxide	O ⁻²
Hydrogen Oxalate Ion	HC ₂ O ₄ ⁻
Perchlorate	ClO ₄ ⁻
Permanganate	MnO ₄ ⁻
Peroxide Ion	O ₂ ⁻²
Phosphate	PO ₄ ⁻³
Monohydrogen Phosphate	HPO ₄ ⁻²
Dihydrogen Phosphate	H ₂ PO ₄ ⁻
Silicate	SiO ₃ ⁻²
Sulfate	SO ₄ ⁻²
Hydrogen Sulfate Ion / Bisulfate	HSO ₄ ⁻
Thiosulfate	S ₂ O ₃ ⁻²
Sulfide	S ⁻²
Hydrogen Sulfide Ion / Bisulfide	HS ⁻
Sulfite	SO ₃ ⁻²
Hydrogen Sulfite Ion / Bisulfite	HSO ₃ ⁻

1 – mono	5 – penta	9 – nona
2 – di	6 – hexa	10 – deca
3 – tri	7 – hepta	
4 – tetra	8 – octa	

↙ For Sem. 2 STUDY and Exam use

Information: Steps for Drawing Lewis Structures for Covalent Compounds

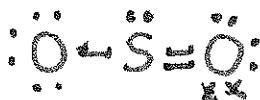
Study the two examples in the table of how to write structures for CO_3^{2-} and NH_3 . Make sure you understand each of the five steps.

	CO_3^{2-}	NH_3
Step #1: Add up the number of valence electrons that should be included in the Lewis Structure.	$4 + 3(6) + 2 = \mathbf{24}$ (carbon has four and each oxygen has six; add two for the -2 charge)	$5 + 3(1) = \mathbf{8}$ (nitrogen has five; each hydrogen has one)
Step #2: Draw the "skeleton structure" with the central atoms and the other atoms, each connected with a single bond.		
Step #3: Add six more electron dots to each atom <i>except</i> the central atom. Also, never add dots to hydrogen.		
Step #4: Any "leftover" electrons are placed on the central atom. Find the number of leftovers by taking the total from Step #1 and subtracting the number of electrons pictured in Step #3.	$24 - 24 = 0$ leftover electrons 	$8 - 6 = 2$ leftover electrons; placed around nitrogen
Step #5: If the central atom has 8, then you are done. If not, then move two electrons from a different atom to make a multiple bond. Keep making multiple bonds until the central atom has 8 electrons.	a total of 4 electrons are shared here 	(no change)

Critical Thinking Questions

15. Write the Lewis Structure for nitrate, NO_3^{-1} . Hint: when you are done it should look very similar to CO_3^{2-} in the table above.

16. Draw the Lewis Structure for SO_2 .



Handwritten calculation for nitrate:
 $5 + 6 \times 3 + 1 = 24 \text{ v.e.} - \checkmark$

