

Elements vs. Compounds

Background:

Pure substances can be divided into two categories, elements and compounds. You already know that elements are pure substances that cannot be broken down into simpler substances. When elements combine, they form new substances called compounds. Compounds have entirely new properties, different from the properties of the elements that it contains. Compounds are pure substances made of two or more kinds of atoms bound together. Compounds can also be broken down into simpler substances.

Some elements have one letter for their symbol while other elements have two letters. When we write symbols for a compound it is called a *formula*. For example, table salt is a compound made up of one sodium atom (Na) and one chlorine atom (Cl). Its formula is written as NaCl. The carbon dioxide gas (CO₂) you breathe out is a compound that will always be made of one carbon atom (C) and two oxygen atoms (O₂). Scientists use the element symbols to write chemical formulas for compounds. Notice that if there is only one element in the compound there is no subscript written. If there is more than one element in the compound a subscript number is placed after the element in the formula.

Activity:

Determine which substances listed below are elements, and which are compounds. Write an “E” for element or a “C” for compound. Use the periodic table on the back for help!

Substance	Element or Compound
H	
CO ₂	
Co	
CaCO ₃	
Cl	
N	
H ₂ O	
O ₂	

Periodic Table of the Elements

Atomic number — 14
 Symbol — **Si**
 Atomic mass — 28.085
 Name — Silicon

Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	H 1 1.008 Hydrogen	He 2 4.0026 Helium											B 5 10.81 Boron	C 6 12.011 Carbon	N 7 14.007 Nitrogen	O 8 15.999 Oxygen	F 9 18.998 Fluorine	Ne 10 20.179 Neon
2	Li 3 6.941 Lithium	Be 4 9.012 Beryllium											Al 13 26.982 Aluminum	Si 14 28.086 Silicon	P 15 30.974 Phosphorus	S 16 32.066 Sulfur	Cl 17 35.453 Chlorine	Ar 18 39.948 Argon
3	Na 11 22.990 Sodium	Mg 12 24.305 Magnesium	Sc 21 44.956 Scandium	Ti 22 47.88 Titanium	V 23 50.942 Vanadium	Cr 24 51.996 Chromium	Mn 25 54.938 Manganese	Fe 26 55.847 Iron	Co 27 58.933 Cobalt	Ni 28 58.69 Nickel	Cu 29 63.546 Copper	Zn 30 65.39 Zinc	Ga 31 69.72 Gallium	Ge 32 72.61 Germanium	As 33 74.922 Arsenic	Se 34 78.96 Selenium	Br 35 79.904 Bromine	Kr 36 83.80 Krypton
4	K 19 39.098 Potassium	Ca 20 40.08 Calcium	Sc 21 44.956 Scandium	Ti 22 47.88 Titanium	V 23 50.942 Vanadium	Cr 24 51.996 Chromium	Mn 25 54.938 Manganese	Fe 26 55.847 Iron	Co 27 58.933 Cobalt	Ni 28 58.69 Nickel	Cu 29 63.546 Copper	Zn 30 65.39 Zinc	Ga 31 69.72 Gallium	Ge 32 72.61 Germanium	As 33 74.922 Arsenic	Se 34 78.96 Selenium	Br 35 79.904 Bromine	Kr 36 83.80 Krypton
5	Rb 37 85.468 Rubidium	Sr 38 87.62 Strontium	Y 39 88.906 Yttrium	Zr 40 91.224 Zirconium	Nb 41 92.906 Niobium	Mo 42 95.94 Molybdenum	Tc 43 (98) Technetium	Ru 44 101.07 Ruthenium	Rh 45 102.906 Rhodium	Pd 46 106.42 Palladium	Ag 47 107.868 Silver	Cd 48 112.41 Cadmium	In 49 114.82 Indium	Sn 50 118.71 Tin	Sb 51 121.763 Antimony	Te 52 127.60 Tellurium	I 53 126.904 Iodine	Xe 54 131.29 Xenon
6	Cs 55 132.905 Cesium	Ba 56 137.33 Barium	La 57 138.905 Lanthanum	Hf 72 178.49 Hafnium	Ta 73 180.948 Tantalum	W 74 183.84 Tungsten	Re 75 186.207 Rhenium	Os 76 190.23 Osmium	Ir 77 192.22 Iridium	Pt 78 195.08 Platinum	Au 79 196.967 Gold	Hg 80 200.59 Mercury	Tl 81 204.383 Thallium	Pb 82 207.2 Lead	Bi 83 208.980 Bismuth	Po 84 (209) Polonium	At 85 (210) Astatine	Rn 86 (222) Radon
7	Fr 87 (223) Francium	Ra 88 226.025 Radium	Ac 89 227.028 Actinium	Rf 104 (261) Rutherfordium	Db 105 (262) Dubnium	Sg 106 (263) Seaborgium	Bh 107 (264) Bohrium	Hs 108 (265) Hassium	Mt 109 (266) Meitnerium	110 110 (266) Darmstadtium								

Lanthanide Series

Actinide Series

Ce 58 140.12 Cerium	Pr 59 140.908 Praseodymium	Nd 60 144.24 Neodymium	Pm 61 (145) Promethium	Sm 62 150.36 Samarium	Eu 63 151.97 Europium	Gd 64 157.25 Gadolinium	Tb 65 158.925 Terbium	Dy 66 162.50 Dysprosium	Ho 67 164.930 Holmium	Er 68 167.26 Erbium	Tm 69 168.934 Thulium	Yb 70 173.04 Ytterbium	Lu 71 174.967 Lutetium
Th 90 232.038 Thorium	Pa 91 231.036 Protactinium	U 92 238.029 Uranium	Np 93 237.046 Neptunium	Pu 94 (244) Plutonium	Am 95 (243) Americium	Cm 96 (247) Curium	Bk 97 (247) Berkelium	Cf 98 (251) Californium	Es 99 (252) Einsteinium	Fm 100 (257) Fermium	Md 101 (258) Mendelevium	No 102 (259) Nobelium	Lr 103 (262) Lawrencium

Mass numbers in parentheses are those of the most stable or most common isotope.