

Chemistry

(January 13-March 10)

TEKS: (6.5) Matter and energy.

The students knows the differences between elements and compounds

- A. know that an element is a pure substance represented by chemical symbols
- B. recognize that a limited number of the many known elements comprise the largest portion of solid Earth, living matter, oceans, and the atmosphere
- C. Differentiate between elements and compounds on the most basic level
- D. Identify the formation of a new substance by using the evidence of a possible chemical change such as production of a gas, change in temperature, production of a precipitate, or color change

(6.6) The student knows matter has physical properties that can be used for classification.

- A. Compare metals, nonmetals, and metalloids using physical properties such as luster, conductivity, or malleability
- B. calculate density to identify an unknown substance.

Element Notes

TEKS

- know that an element is a pure substance represented by chemical symbols
- recognize that a limited number of the many known elements comprise the largest portion of solid Earth, living matter, oceans, and the atmosphere
- calculate density to identify an unknown substance.

Elements

- Building blocks of matter
- Pure substances that can't be broken into simpler substances
- Made of only one kind of atom
- Examples:
- Oxygen – in the air
- Silicon – in computer chips
- Gold and Silver – in jewelry
- Carbon – in all living things

Most common elements	Density (g/cm ³)
O – Oxygen	1.43
N – Nitrogen	1.25
H – Hydrogen	.09
C-Carbon	2.26
Si – Silicon	2.33
Al – Aluminum	2.7
Cl – Chlorine	3.21
Na – Sodium	.97
Fe – Iron	7.87

Vocab.

- Mass – measure of the amount of matter in an object
- Matter – anything that has mass and takes up space
- Volume – amount of space an object takes up
- Density – amount of matter in a given volume.
- Calculate – perform a mathematical process

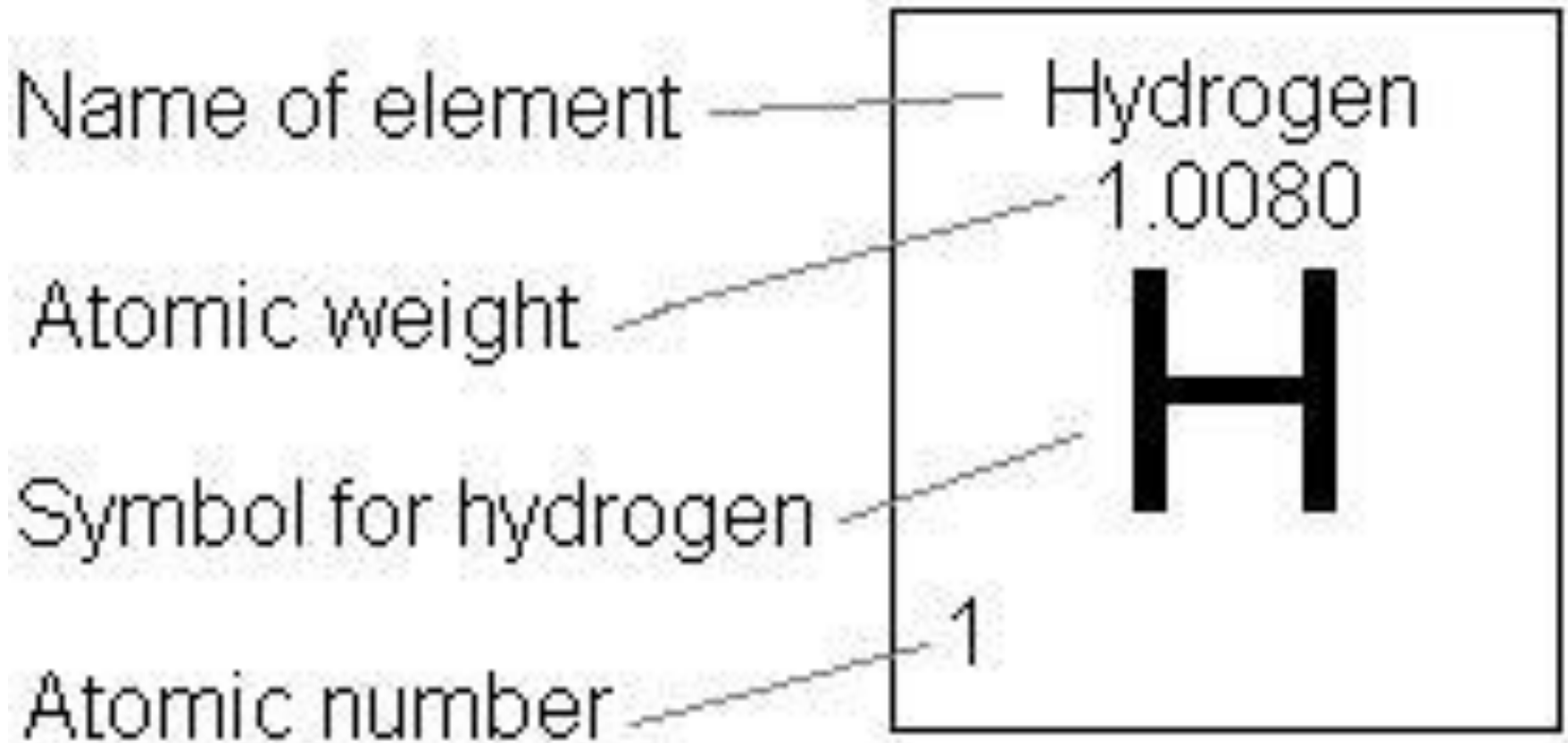
Chemical Symbols

- Chemical symbols are an abbreviation of the name of a chemical element
- 1. The first letter is always capitalized
- 2. If the symbol has two letters, the second letter is lower case

Periodic Table

- Demetri Mendeleev created the first periodic table in 1869.
- Elements are divided into three groups on the Periodic Table – metal, non metals, and metalloids
- Each element has a different density.

Each square on the periodic table contains information specific to that element.



PERIODIC TABLE OF THE ELEMENTS

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1A 1																	8A 18
1 H Hydrogen 1.00794	2A 2											3A 13	4A 14	5A 15	6A 16	7A 17	2 He Helium 4.00260
3 Li Lithium 6.941	4 Be Beryllium 9.01218											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.998403	10 Ne Neon 20.1797
11 Na Sodium 22.98977	12 Mg Magnesium 24.305	3B 3	4B 4	5B 5	6B 6	7B 7	8B 8	9	10	1B 11	2B 12	13 Al Aluminum 26.98154	14 Si Silicon 28.0855	15 P Phosphorus 30.97376	16 S Sulfur 32.066	17 Cl Chlorine 35.4527	18 Ar Argon 39.948
19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.9559	22 Ti Titanium 47.88	23 V Vanadium 50.9415	24 Cr Chromium 51.9961	25 Mn Manganese 54.9380	26 Fe Iron 55.847	27 Co Cobalt 58.9332	28 Ni Nickel 58.6934	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Ga Gallium 69.723	32 Ge Germanium 72.61	33 As Arsenic 74.9216	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.80
37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	39 Y Yttrium 88.9059	40 Zr Zirconium 91.224	41 Nb Niobium 92.9064	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.9055	46 Pd Palladium 106.42	47 Ag Silver 107.8682	48 Cd Cadmium 112.411	49 In Indium 114.82	50 Sn Tin 118.710	51 Sb Antimony 121.757	52 Te Tellurium 127.60	53 I Iodine 126.9045	54 Xe Xenon 131.29
55 Cs Cesium 132.9054	56 Ba Barium 137.327	57 *La Lanthanum 138.9055	72 Hf Hafnium 178.49	73 Ta Tantalum 180.9479	74 W Tungsten 183.85	75 Re Rhenium 186.207	76 Os Osmium 190.2	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.9665	80 Hg Mercury 200.59	81 Tl Thallium 204.3833	82 Pb Lead 207.2	83 Bi Bismuth 208.9804	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)
87 Fr Francium (223)	88 Ra Radium 226.0254	89 †Ac Actinium 227.0278	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (263)	107 Bh Bohrium (262)	108 Hs Hassium (265)	109 Mt Meitnerium (268)	110 (269)	111 (272)	112 (277)						

*Lanthanide Series	58 Ce Cerium 140.115	59 Pr Praseodymium 140.9077	60 Nd Neodymium 144.24	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.965	64 Gd Gadolinium 157.25	65 Tb Terbium 158.9254	66 Dy Dysprosium 162.50	67 Ho Holmium 164.9303	68 Er Erbium 167.26	69 Tm Thulium 168.9342	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.967
† Actinide Series	90 Th Thorium 232.0381	91 Pa Protactinium 231.0359	92 U Uranium 238.0289	93 Np Neptunium 237.048	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 (260)

Density

- Density is the amount of space an object takes up in its volume. $\text{Mass} / \text{Volume}$
- Mass is the amount of matter in an object
- The density of distilled water is 1 g/cu.cm
- When 2 substances have the same volume, the one with greater mass has greater density.

Elements vs Compounds

- Elements are represented by chemical symbols (ex. Cl - Chlorine Na - Sodium)
- Compounds are made of 2 or more elements chemically combined.
- Compounds are represented by chemical formulas (ex. Sodium Chloride -NaCl)