Mineral Identification

Mineral # _____

My color is: _____

Based on my color I could be: _____

Based on my color and streak I could be: _____

My mineral group is: _____

My mineral group tells you that I contain: _____

What mineral am I? _____

What elements do I contain? _____

My crystal system is: _____

My hardness is: _____

What is special about me? _____

_____

Mineral Identification

Mineral # _____

My color is: _____

Based on my color I could be: _____

Based on my color and streak I could be: _____

My mineral group is: _____

My mineral group tells you that I contain: _____

What mineral am I? _____

What elements do I contain? _____

My crystal system is: _____

My hardness is: _____

What is special about me? _____

Periodic Table of the Elements

1																	18
1 H Hydrogen 1.01	2											13	14	15	16	17	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	3	4	5	6	7	8	9	10	11	12	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 51.99	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 65.38	31 Ga Gallium 69.72	32 Ge Germanium 72.63	33 As Arsenic 74.92	34 Se Selenium 78.97	35 Br Bromine 79.90	36 Kr Krypton 84.80
37 Rb Rubidium 84.47	38 Sr Strontium 87.62	39 Y Yttrium 88.91	40 Zr Zirconium 91.22	41 Nb Niobium 92.91	42 Mo Molibdenum 95.95	43 Tc Technetium 98.91	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 127.6	53 I Iodine 126.90	54 Xe Xenon 131.25
55 Cs Cesium 132.91	56 Ba Barium 137.33	57-71 Lanthanides	72 Hf Hafnium 178.49	73 Ta Tantalum 180.95	74 W Tungsten 183.84	75 Re Rhenium 186.21	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.09	79 Au Gold 196.97	80 Hg Mercury 200.59	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium [208.98]	85 At Astatine 209.99	86 Rn Radon 222.02
87 Fr Francium 223.02	88 Ra Radium 226.03	89-103 Actinides	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 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium unknown	114 Fl Flerovium [289]	115 Uup Ununpentium unknown	116 Lv Livermorium [298]	117 Uus Ununseptium unknown	118 Uuo Ununoctium unknown

57 La Lanthanum 138.91	58 Ce Cerium 140.12	59 Pr Praseodymium 140.91	60 Nd Neodymium 144.24	61 Pm Promethium 144.91	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 173.06	71 Lu Lutetium 174.97
89 Ac Actinium 227.03	90 Th Thorium 232.04	91 Pa Protactinium 231.04	92 U Uranium 238.03	93 Np Neptunium 237.05	94 Pu Plutonium 244.06	95 Am Americium 243.06	96 Cm Curium 247.07	97 Bk Berkelium 247.07	98 Cf Californium 251.08	99 Es Einsteinium [254]	100 Fm Fermium 257.10	101 Md Mendelevium 258.1	102 No Nobelium 259.10	103 Lr Lawrencium [262]

http://sciencenotes.org/printable-periodic-table-chart/

azurite	beryl	fluorite
color: blue streak: blue mineral group: carbonate chemical formula: $Cu_3(CO_3)_2(OH)_2$ hardness: 3½-4 specific gravity: 3.8 luster: glassy diaphaneity: transparent in thin flakes crystal system: monoclinic (2)	color: green streak: white mineral group: silicate chemical formula: $Be_3Al_2(Si_6O_{18})$ hardness: 8 specific gravity: 2.6-2.8 luster: glassy diaphaneity: transparent to translucent crystal system: hexagonal (3)	color: green streak: white mineral group: halide chemical formula: CaF_2 hardness: 4 specific gravity: 3.0-3.3 luster: glassy diaphaneity: transparent to translucent crystal system: cubic (5)
I am blue. (2-1)	I am green. (3-1)	I am green. (5-1)
I have a blue streak. (2-2)	I have a white streak. (3-2)	I have a white streak. (5-2)
I belong to the carbonate group. (2-3)	I belong to the silicate group. (3-3)	I belong to the halide group. (5-3)

If you grind me up, I make a beautiful paint pigment. (2-4)	Small, perfect pieces of me are called aquamarine and are used in jewelry. (3-4)	I fluoresce if you shine an ultraviolet light on me. (5-4)
I am made of copper, carbon, oxygen, and hydrogen. (2-5)	I am made of beryllium, aluminum, silicon, and oxygen. (3-5)	I am made of calcium and fluorine. (5-5)
My chemical formula is $Cu_3(CO_3)_2(OH)_2$ (2-6)	My chemical formula is $Be_3Al_2(Si_6O_{18})$ (3-6)	My chemical formula is CaF_2 (5-6)
My crystal system is monoclinic. (2-7)	My crystal system is hexagonal. (3-7)	My crystal system is cubic. (5-7)

malachite	labradorite	sodalite
color: green streak: green mineral group: carbonate chemical formula: $Cu_2(CO_3)(OH)_2$ hardness: 3½-4 specific gravity: 3.9-4.0 luster: silky diaphaneity: opaque to translucent crystal system: monoclinic (8)	color: blue streak: white mineral group: silicate chemical formula: $(Ca,Na)[Al(Al,Si)Si_2O_8]$ hardness: 6 specific gravity: 2.5-2.6 luster: glassy diaphaneity: translucent to opaque crystal system: triclinic (7)	color: blue streak: white mineral group: silicate chemical formula: $Na_8(Al_6Si_6O_{24})Cl_2$ hardness: 5½-6 specific gravity: 2.2-2.3 luster: glassy diaphaneity: transparent to translucent crystal system: cubic (9)
I am green. (8-1)	I am green. (7-1)	I am blue. (9-1)
I have a green streak. (8-2)	I have a white streak. (7-2)	I have a white streak. (9-2)
I belong to the carbonate group. (8-3)	I belong to the silicate group. (7-3)	I belong to the silicate group. (9-3)

If you grind me up, I make a beautiful paint pigment. (8-4)	I look very pretty when I am cut and polished. (7-4)	I frequently contain white patches. (9-4)
I am made of copper, carbon, oxygen, and hydrogen. (8-5)	I am made of calcium or sodium, and aluminum, silicon, and oxygen. (7-5)	I am made of sodium, aluminum, silicon, oxygen, and chlorine. (9-5)
My chemical formula is $Cu_2(CO_3)(OH)_2$ (8-6)	My chemical formula is $(Ca,Na)[Al(Al,Si)Si_2O_8]$ (7-6)	My chemical formula is $Na_8(Al_6Si_6O_{24})Cl_2$ (9-6)
My crystal system is monoclinic. (8-7)	My crystal system is triclinic. (7-7)	My crystal system is cubic. (9-7)

celestite	amazonite	hemimorphite
color: blue streak: white mineral group: sulfate chemical formula: $SrSO_4$ hardness: 3-3½ specific gravity: 3.9-4.0 luster: glassy diaphaneity: transparent to translucent crystal system: orthorhombic (4)	color: green streak: white mineral group: silicate chemical formula: $KAlSi_3O_8$ hardness: 6 specific gravity: 2.5-2.6 luster: glassy diaphaneity: translucent to opaque crystal system: triclinic or monoclinic (1)	color: blue streak: white mineral group: silicate chemical formula: $Zn_4Si_2O_7(OH)_2H_2O$ hardness: 4½-5 specific gravity: 3.4-3.5 luster: glassy diaphaneity: transparent to translucent crystal system: orthorhombic (6)
I am blue. (4-1)	I am green. (1-1)	I am blue. (6-1)
I have a white streak. (4-2)	I have a white streak. (1-2)	I have a white streak. (6-2)
I belong to the sulfate group. (4-3)	I belong to the silicate group. (1-3)	I belong to the silicate group. (6-3)

I have beautiful crystals. (4-4)	Small pieces of me make beautiful almost turquoise-colored jewelry. (1-4)	I frequently form as a crust on other rocks and minerals. (6-4)
I am made of strontium, sulfur, and oxygen. (4-5)	I am made of potassium, aluminum, silicon, and oxygen. (1-5)	I am made of zinc, silicon, oxygen, and hydrogen. (6-5)
My chemical formula is $SrSO_4$ (4-6)	My chemical formula is $KAlSi_3O_8$ (1-6)	My chemical formula is $Zn_4Si_2O_7(OH)_2H_2O$ (6-6)
My crystal system is orthorhombic. (4-7)	My crystal system is triclinic or monoclinic. (1-7)	My crystal system is orthorhombic. (6-7)

AZURITE color: blue streak: blue hardness: 3½ - 4	BERYL color: green streak: white hardness: 8
FLUORITE color: green streak: white hardness: 4	MALACHITE color: green streak: green hardness: 3½ - 4
LABRADORITE color: blue streak: white hardness: 6	SODALITE color: blue streak: white hardness: 5½ - 6
CELESTITE color: blue streak: white hardness: 3 – 3½	AMAZONITE color: green streak: white hardness: 6
HEMIMORPHITE color: blue streak: white hardness: 4½ - 5	MINERALS

Mineral Identification Answer Key

Based on color:

Blue:	AZURITE, CELESTITE, HEMIMORPHITE, LABRADORITE, SODALITE
Green:	AMAZONITE, BERYL, FLUORITE, MALACHITE

Based on color and streak:

Blue, blue streak:	AZURITE	Blue, white streak:	CELESTITE, HEMIMORPHITE, LABRADORITE, SODALITE
Green, white streak:	AMAZONITE, BERYL, FLUORITE	Green, green streak:	MALACHITE

Mineral #1:	**AMAZONITE**
color:	green
streak:	white
mineral group:	silicate
contain:	silicon and oxygen
elements:	potassium, aluminum, silicon, oxygen
hardness:	6
crystal system:	triclinic or monoclinic

Mineral #2:	**AZURITE**
color:	blue
streak:	blue
mineral group:	carbonate
contain:	carbon and oxygen
elements:	copper, carbon, oxygen, hydrogen
hardness:	3½-4
crystal system:	monoclinic

Mineral #3:	**BERYL**
color:	green
streak:	white
mineral group:	silicate
contain:	silicon and oxygen
elements:	beryllium, aluminum, silicon, oxygen
hardness:	8
crystal system:	hexagonal

Mineral #4:	**CELESTITE**
color:	blue
streak:	white
mineral group:	sulfate
contain:	sulfur and oxygen
elements:	strontium, sulfur, oxygen
hardness:	3-3½
crystal system:	orthorhombic

Mineral #5:	**FLUORITE**
color:	green
streak:	white
mineral group:	halide
contain:	fluorine or chlorine
elements:	calcium, flourine
hardness:	4
crystal system:	cubic

Mineral #6:	**HEMIMORPHITE**
color:	blue
streak:	white
mineral group:	silicate
contain:	silicon and oxygen
elements:	zinc, silicon, oxygen, hydrogen
hardness:	4½-5
crystal system:	orthorhombic

Mineral #7:	**LABRADORITE**
color:	blue
streak:	white
mineral group:	silicate
contain:	silicon and oxygen
elements:	calcium, sodium, aluminum, silicon, oxygen
hardness:	6
crystal system:	triclinic

Mineral #8:	**MALACHITE**
color:	green
streak:	green
mineral group:	carbonate
contain:	carbon and oxygen
elements:	copper, carbon, oxygen, hydrogen
hardness:	3½-4
crystal system:	monoclinic

Mineral #9:	**SODALITE**
color:	blue
streak:	white
mineral group:	silicate
contain:	silicon and oxygen
elements:	sodium, aluminum, silicon, oxygen, chlorine
hardness:	5½-6
crystal system:	cubic

Rock Identification

Rock number	Rock name	Type (igneous, sedimentary, metamorphic)
21	travertine	
22	micrite limestone	
23	conglomerate	
24	fossil limestone	
25	sandstone	
26	oil shale	
27	arkose	
28	andesite	
29	obsidian	
30	tuff	

Rock number	Rock name	Type (igneous, sedimentary, metamorphic)
31	pumice	
32	granite	
33	gabbro	
34	basalt	
35	hornfels	
36	slate	
37	gneiss	
38	marble	
39	mica schist	
40	quartzite	

Rock Identification Answer Key

Rock number	Rock name	Type (igneous, sedimentary, metamorphic)
21	travertine	sedimentary
22	micrite limestone	sedimentary
23	conglomerate	sedimentary
24	fossil limestone	sedimentary
25	sandstone	sedimentary
26	oil shale	sedimentary
27	arkose	sedimentary
28	andesite	igneous
29	obsidian	igneous
30	tuff	igneous

Rock number	Rock name	Type (igneous, sedimentary, metamorphic)
31	pumice	igneous
32	granite	igneous
33	gabbro	igneous
34	basalt	igneous
35	hornfels	metamorphic
36	slate	metamorphic
37	gneiss	metamorphic
38	marble	metamorphic
39	mica schist	metamorphic
40	quartzite	metamorphic

MINERALS

ROCKS

Mineral: naturally occurring object, stable at room temperature, represented by a single chemical formula, usually abiogenic (not resulting from the activity of living organisms), has ordered atoms. More than 5,300 are known.

Color: different sensations on the eye as a result of the way the object reflects or emits light. Look at the sample.

Crystal habit: geometric shape of a crystal or mineral. Large crystals will be visible. Use a magnifier to see small crystals.

Cleavage: minerals break along particular planes of weakness. Look for broken minerals and observe how light reflects from them.

Fracture: minerals also break in places where they aren't weak, usually from impact. The breakage can be irregular, or conchoidal, meaning the break looks like broken glass.

Tenacity: refers to how resistant a mineral is to such breaking. Minerals can be described as brittle, ductile, malleable, sectile, flexible, or elastic.

Hardness: resistance to scratching or abrasion. Use the Moh's Hardness Scale to determine a mineral's hardness.

Luster: character of the light reflected by a mineral. Look at the mineral to determine if the mineral is metallic (looks like a chunk of metal), or non-metallic (doesn't look like a chunk of metal).

Streak: color of the mineral when it is scratched or powdered. Scratch the mineral on a streak plate or tile.

Diaphaneity: ability of light to pass through a mineral. Minerals can be opaque, allowing no light to pass through, translucent, allowing some light, and transparent allowing the most light. Use a flashlight.

Specific gravity: describes the density of a mineral. For minerals, it is the ratio of the density of a mineral to the density of water.

Fluorescence: the emission of light by a substance that has absorbed light or other electromagnetic radiation. Shine an ultraviolet light on the mineral.

Magnetism: the mineral may or may not be magnetic. Use a magnet.

Rock: a naturally occurring solid aggregate of one or more minerals.

Igneous rock: formed through cooling and solidification of *magma* or *lava* from partial melting of existing rock or from Earth's *mantle* or *crust*; rocks melt because of an increase in temperature, decrease in pressure, or change in composition. *Plutonic* or *intrusive* rocks result when magma cools and crystallizes slowly within the Earth's crust. A common example is granite. *Volcanic* or *extrusive* rocks result from magma reaching the surface as lava or fragmental *ejecta*. Examples are pumice and basalt. About 64.7% of the Earth's crust by volume consists of igneous rocks.

Sedimentary rock: formed at Earth's surface by *accumulation* and *cementation* of rock fragments, minerals, and organisms or as *chemical precipitates* in horizontal layers in water, a process called *sedimentation*. The particles then undergo *compaction*. Before being deposited, sediments are formed by *weathering* or earlier rocks by *erosion*, and then transported to the place of *deposition* by water, wind, ice, mass movement or glaciers. Mud rocks comprise 65%, sandstones 20 to 25%, and carbonate rocks 10 to 15%. About 7.9% of the crust by volume is composed of sedimentary rocks.

Metamorphic rock: formed by subjecting any type of rock to different temperature or pressure conditions than when formed. The temperatures and pressures required are always higher than those found at the Earth's surface. Metamorphic rocks compose 27.4% of the *crust* by volume. An *intrusion* of magma that heats the surrounding rock causes *contact metamorphism*. *Pressure metamorphism* occurs when sediments are buried deep under the ground. Where both heat and pressure are involved, it is called *regional metamorphism*, typically found in mountain-building regions.

Cu – Copper is a soft, bendable metal with high thermal and electrical conductivity. A freshly exposed surface of pure copper has a reddish-orange color. It is used as a conductor of heat and electricity, and as a building material. Found as a pure metal in nature, it is essential to all living organisms as a trace dietary mineral. In humans, copper is found mainly in the liver, muscle, and bone. The adult body contains between 1.4 and 2.1 mg of copper per kilogram of body weight. A healthy human with a mass of 60 kilogram contains approximately 0.1 g of copper, however, this small amount is essential to the overall human well-being.
(Source: https://en.wikipedia.org/wiki/Copper)

C – Carbon is nonmetallic and tetravalent, meaning that it has 4 electrons available to form covalent chemical bonds. Carbon is the 15th most abundant element in the Earth's crust, and the 4th most abundant element in the universe by mass after hydrogen, helium, and oxygen. Carbon's abundance, its unique diversity of organic compounds, and its unusual ability to form polymers at the temperatures commonly encountered on Earth enables this element to serve as a common element of all known life. It is the 2nd most abundant element in the human body by mass, about 18.5%, after oxygen.
(Source: https://en.wikipedia.org/wiki/Carbon)

O – Oxygen is a highly reactive nonmetal and oxidizing agent that readily forms oxides with most elements as well as other compounds. By mass, oxygen is the 3rd most abundant element in the universe, after hydrogen and helium. At standard temperature and pressure, two atoms of the element bind to form dioxygen, a colorless and odorless diatomic gas with the formula O_2. This is an important part of the atmosphere and diatomic oxygen gas constitutes 20.8% of the Earth's atmosphere. Oxides the element makes up almost half of the Earth's crust.
(Source: https://en.wikipedia.org/wiki/Oxygen)

H - Hydrogen is the lightest element on the periodic table. Its monatomic form, H, is the most abundant chemical substance in the universe, constituting roughly 75% of all baryonic mass. Most stars are composed of hydrogen in the plasma state. At standard temperature and pressure, hydrogen is a colorless, odorless, tasteless, non-toxic, nonmetallic, highly combustible diatomic gas with the molecular formula H_2. Since hydrogen readily forms covalent compounds with most nonmetallic elements, most of the hydrogen on Earth exists in molecular forms such as water or organic compounds.
(Source: https://en.wikipedia.org/wiki/Hydrogen)

Be - Beryllium is a rare element, usually occurring as a product of collisions with cosmic rays. It occurs naturally only in combination with other elements in minerals. Notable gemstones which contain beryllium include beryl, aquamarine, emerald, and chrysoberyl. As a free element it is a steel-gray, strong, lightweight and brittle alkaline earth metal. Beryllium improves many physical properties when added as an alloying element to aluminum, copper, iron, and nickel. Tools made of beryllium copper alloys are strong and hard. It has high flexural rigidity, thermal stability, thermal conductivity, and low density.
(Source: https://en.wikipedia.org/wiki/Beryllium)

Al - Aluminum is a silvery-white, soft, nonmagnetic, ductile metal, and the 3rd most abundant element in the Earth's crust after oxygen and silicon, and its most abundant metal. Aluminum makes up about 8% of the crust by mass. It is found combined in over 270 different minerals. The chief ore of aluminum is bauxite. Aluminum has low density and resists corrosion. Aluminum and its alloys are vital to the aerospace industry and important in transportation and structures, such as building facades and window frames. The oxides and sulfates are the most useful compounds of aluminum.
(Source: https://en.wikipedia.org/wiki/Aluminium)

Si – Silicon is a hard and brittle crystalline solid with a blue-gray metallic luster. It is a tetravalent metalloid, is rather unreactive, and has great chemical affinity for oxygen. Silicon is the 8th most common element in the universe by mass, but very rarely occurs as the pure element in the Earth's crust. It is most widely distributed in dusts, sands, planetoids, and planets as various forms of silicon dioxide, called silica or silicates. Over 90% of the Earth's crust is composed of silicate minerals, making silicon the 2nd most abundant element in the Earth's crust, about 28% by mass, after oxygen.
(Source: https://en.wikipedia.org/wiki/Silicon)

Ca – Calcium is a soft gray alkaline earth metal, and the fifth-most-abundant element by mass in the Earth's crust. Free calcium metal is too reactive to occur in nature. Calcium is produced in supernova nucleosynthesis. Calcium is essential for living organisms, particularly in cell physiology where movement of the calcium ion into and out of the cytoplasm functions as a signal for many cellular processes. As a major material used in mineralization of bone, teeth and shells, calcium is the most abundant metal by mass in many animals.
(Source: https://en.wikipedia.org/wiki/Calcium)

F – Fluorine is exists as a highly toxic pale yellow diatomic gas at standard conditions. As the most electronegative element, it is extremely reactive. Almost all other elements, including some noble gases, form compounds with fluorine. Among the elements, fluorine ranks 24th in universal abundance and 13th in abundance on Earth. Fluorite, the primary mineral source of fluorine, was first described in 1529; as it was added to metal ores to lower their melting points for smelting. Fluorine is difficult and dangerous to separate from its compounds.
(Source: https://en.wikipedia.org/wiki/Fluorine)

Na – Sodium is a soft, silvery-white, highly reactive metal. The free metal does not occur in nature. Sodium is the 6th most abundant element in Earth's crust, and exists minerals such as feldspars, sodalite, and rock salt. Many salts of sodium are highly water-soluble. Sodium ions have been leached by the action of water from the Earth's minerals over eons, and thus sodium and chlorine are the most common dissolved elements by weight in the oceans. Sodium hydroxide is used in soap manufacture, and sodium chloride is a de-icing agent and a nutrient for animals including humans. Sodium is an essential element for all animals and some plants.
(Source: https://en.wikipedia.org/wiki/Sodium)

Cl – Chlorine is a yellow-green gas at room temperature. It is an extremely reactive element and a strong oxidizing agent: among the elements, it has the highest electron affinity and the 3rd highest electronegativity, behind only oxygen and fluorine. Because of its great reactivity, all chlorine in the Earth's crust is in the form of ionic chloride compounds, which includes table salt. It is the 2nd-most abundant halogen, after fluorine, and 21st most abundant chemical element in Earth's crust. These crustal deposits are minimal compared to the huge reserves of chloride in seawater.
(Source: https://en.wikipedia.org/wiki/Chlorine)

Sr – Strontium is a soft silver-white or yellowish metallic element that is highly reactive chemically. The metal forms a dark oxide layer when it is exposed to air. Strontium has physical and chemical properties similar to those of its two vertical neighbors in the periodic table, calcium and barium. It occurs naturally in the minerals celestine, strontianite, and putnisite, and is mined mostly from the first two of these.
(Source: https://en.wikipedia.org/wiki/Strontium)

S – Sulfur is an abundant, multivalent nonmetal. Elemental sulfur is a bright yellow crystalline solid at room temperature. Chemically, sulfur reacts with all elements except for gold, platinum, iridium, nitrogen, tellurium, iodine and the noble gases. Elemental sulfur occurs naturally as the element native sulfur, but most commonly in combined forms as sulfide and sulfate minerals, used in the production of sulfuric acid for sulfate and phosphate fertilizers. The element sulfur is used in matches, insecticides, and fungicides. Hydrogen sulfide gives the characteristic odor to rotting eggs and other biological processes. Sulfur is an essential element for all life, but almost always in the form of organosulfur compounds or metal sulfides.
(Source: https://en.wikipedia.org/wiki/Sulfur)

Zn – Zinc is the 24th most abundant element in Earth's crust and has five stable isotopes. The most common zinc ore is sphalerite, a zinc sulfide mineral. Zinc is an essential mineral. Zinc deficiency affects about two billion people in the developing world and is associated with many diseases. In children, deficiency causes growth retardation, infection susceptibility, and other illnesses. Consumption of excess zinc can cause ataxia, lethargy and copper deficiency.
(Source: https://en.wikipedia.org/wiki/Zinc)

K – Potassium is a soft silvery-white alkali metal that oxidizes rapidly in air and reacts with water, generating heat to ignite hydrogen emitted in the reaction. It is found dissolved in sea water, which is 0.04% potassium by weight, and is part of many minerals. Potassium ions are necessary for the function of all living cells. Depletion can result in numerous abnormalities and medical problems. Fresh fruits and vegetables are good dietary sources of potassium. The body responds to the influx of dietary potassium, which raises serum potassium levels, with a shift of potassium from outside to inside cells and an increase in potassium excretion by the kidneys.
(Source: https://en.wikipedia.org/wiki/Potassium)

Element – refers to a group of atoms which all have the same number of protons, specified by the atom's atomic number. There are 118 elements that have been identified, of which the first 94 occur naturally on Earth. The remaining 24 are synthetic elements. There are 80 elements that have at least one stable isotope and 38 that have exclusively radioactive isotopes, which decay over time into other elements.
(Source: https://en.wikipedia.org/wiki/Chemical_element)

Atom - smallest constituent unit of ordinary matter that has the properties of a chemical element. Every solid, liquid, gas, and plasma is composed of neutral or ionized atoms. Atoms are very small, with typical sizes of 100 picometers (ten-billionth of a meter). The nucleus is made of one or more protons and typically a similar number of neutrons. More than 99.94% of an atom's mass is in the nucleus.
(Source: https://en.wikipedia.org/wiki/Atom)

Molecule – an electrically neutral group of two or more atoms held together by chemical bonds. Molecules as components of matter are common in organic substances. They also make up most of the oceans and atmosphere. The majority of familiar solid substances on Earth, including most of the minerals that make up the crust, mantle, and core of the Earth.
(Source: https://en.wikipedia.org/wiki/Molecule)

Isotope - variants of a particular chemical element which differ in neutron number. For example, carbon-12, carbon-13, and carbon-14 are three isotopes of the element carbon with mass numbers 12 (6 + 6), 13 (6 + 7) and 14 (6 + 8) respectively. The atomic number of carbon is 6, which means that every carbon atom has 6 protons, so that the neutron numbers of these isotopes are 6, 7, and 8 respectively.
(Source: https://en.wikipedia.org/wiki/Isotope)

Proton – positively charged particle in the nucleus of an atom. If an atom has more protons than neutrons, it has a net positive charge. (Source: https://en.wikipedia.org/wiki/Proton)	**Electron** – a subatomic particle, symbol with a negative elementary electric charge. Electrons orbit the nuclei of atoms. If an atom has more electrons than neutrons, it has a net negative charge. (Source: https://en.wikipedia.org/wiki/Electron)
Neutron – neutral particle, with no electric charge, in the nucleus of an atom, with a mass slightly larger than that of a proton. (Source: https://en.wikipedia.org/wiki/Neutron)	**Ion** – an atom or a molecule in which the total number of electrons is not equal to the total number of protons, giving the atom or molecule a net positive or negative electrical charge. (Source: https://en.wikipedia.org/wiki/Ion)