ELEMENT FAMILIES
of the Periodic Table
TEACHER NOTES

Give your students a visual introduction to the families of the periodic table! This product includes eight mini-posters, one for each of the element families on the main group of the periodic table: Alkali Metals, Alkaline Earth Metals, Boron/Aluminum Group (Icosagens), Carbon Group (Crystallogens), Nitrogen Group (Pnictogens), Oxygen Group (Chalcogens), Halogens, and Noble Gases. The mini-posters give overview information about the family as well as a visual of where on the periodic table the family is located and a diagram of an atom of that family highlighting the number of valence electrons. Also included is the student packet, which is broken into the eight families and asks for specific information that students will find on the mini-posters.

The students are also directed to color each family with a specific color on the blank graphic organizer at the end of their packet and they go to the fantastic interactive table at www.periodictable.com to learn even more about the elements in each family. Furthermore, there is a section for students to conduct their own research on the element of hydrogen, which does not belong to a family.

When I use this activity, I print two of each mini-poster in color (pages 8 through 15 of this file), laminate them, and lay them on a big table. I have students work in partners to read about each family, one at a time, and complete that section of the student packet (pages 16 through 21 of this file). When they finish, they bring the mini-poster back to the table for another group to use. Another option is to make stations and have the students walk around.

GOOGLE: I have also included links for you to Make A Copy of the information posters and/or the student packet as a Google Slides document. You can share these documents with your students on Google Classroom, or give each student the links so they can Make A Copy in their own Google Drive. To save some paper but to make the transfer of information a bit more manageable for your students than having two windows open at the same time, you could also just share the information packet or just the student packet via Google Classroom, and have the other one printed as a paper copy. ***To use the Student Packet on Google, the students should be able to Type in the boxes. For the colored table, they can use rectangle Shapes to 'color' the families and layer the shapes behind the table so that the columns will appear 'colored'!***

This activity helps students to extract the big ideas from informational text while also giving a solid visual of the locations of the element families. The interactive portion gets them excited to learn more about the chemistry of the elements!

Pages 3 - 7 of this file are answer keys to the student packet and the colored graphic organizer.

Thank you for your purchase! Please considering leaving feedback at TeachersPayTeachers.com if this product has met your needs. Also feel free to email me at SunriseScienceTPT@gmail.com if you have any questions or concerns.

kimberly geswein fonts kg

ELEMENT FAMILIES

of the Periodic Table

Google Drive Directions

Below are some instructions for how to download this product and share it with your students via Google Drive. Just a note– although this is a digital resource, please know that it is for personal classroom use for only you and your students to share via email, Google Drive, or Google Classroom. Please do not upload this resource online where it can be accessed by the general public.

CLICK ON THIS LINK TO ACCESS THE ELEMENT FAMILY INFORMATION PACKET IN GOOGLE!:

https://tinyurl.com/ydyamjcu

CLICK ON THIS LINK TO ACCESS THE STUDENT PACKET IN GOOGLE!:

https://tinyurl.com/yb43c4al

When you click the links above, you'll be taken to a screen that says "Copy Document". Click the blue button that says "Make a Copy". This will transfer the file to your own Google Drive account.

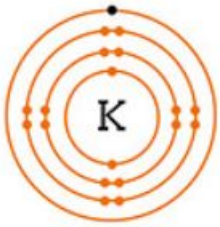
Once all of your students have their own Google Drive account (drive.google.com), share the link with them and have them make their own copy of the assignment into their own Google Drive OR share the document(s) with students via your Google Classroom page.

THE ALKALI METALS GROUP

→ Color this family **GREEN** on the blank table

Group #: 1

Draw the example atom and make the *outermost electron(s)* in **bold.**



Family Members (by symbol and atomic #): Li (3), Na (11), K (19), Rb (37), Cs (55), Fr (87)

List **5** properties/trends of the members:

1. Good conductors of heat and electricity
2. Soft and can be easily cut
3. Low densities
4. The most chemically reactive metals (never free in nature)
5. Usually form ionic compounds

Why are these metals the most chemically reactive metals?

They have only one loosely-held valence electron, which is easily lost to 'strong' atoms.

What are several general uses of the Alkali Metals?

Used to produce chemicals, metals, soaps, glass, ceramics, petroleum products, textiles.

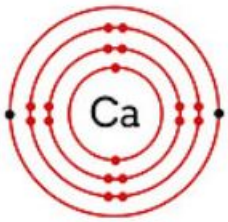
Go to www.periodictable.com and hover over each of the Alkali Metals. Write down 2 or 3 interesting facts about them:

THE ALKALINE EARTH METALS GROUP

→ Color this family **LIGHT BLUE** on the blank table

Group #: 2

Draw the example atom and make the *outermost electron(s)* in **bold.**



Family Members (by symbol and atomic #): Be (4), Mg (12), Ca (20), Sr (38), Ba (56), Ra (88)

List **5** properties/trends of the members:

1. Silvery-colored
2. Soft
3. Low densities
4. Melting point decreases with increasing atomic mass (except Mg)
5. Become increasingly soluble with decrease in temperature

Why does the reactivity increase as you move down the group?

The valence electrons are further from the nucleus and easier to remove in an ionic bond.

What are several general uses of the Alkaline Earth Metals?

Magnesium for chlorophyll, calcium for building materials, strontium for fireworks, radium for glow in the dark paint.

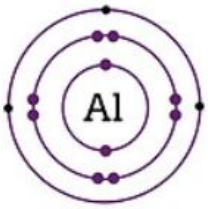
Go to www.periodictable.com and hover over each of the Alkaline Earth Metals. Write down 2 or 3 interesting facts about them:

THE BORON/ALUMINUM GROUP

→ Color this family **YELLOW** on the blank table

Group #: 13

Draw the example atom and make the *outermost electron(s)* in **bold.**



Family Members (by symbol and atomic #): B (5), Al (13), Ga (31), In (49), Tl (81), Nh (113)

List **5** properties/trends of the members:

1. Form many stable covalent compounds
2. Relatively rare, except for Al
3. Wide range of melting points
4. Wide range of boiling points
5. Wide range of densities

What are two *types* of elements included in this group?

(Poor) metals and a metalloid (Boron)

What are several general uses of the Icosagens?

Aluminum for utensils, ornaments, aircraft; gallium for thermometers and lasers, thallium in insecticides and medicine, photocells; boron in aerospace.

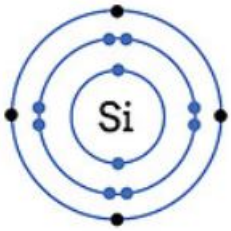
Go to www.periodictable.com and hover over each of the Icosagens. Write down 2 or 3 interesting facts about them:

THE CARBON GROUP

→ Color this family **PINK** on the blank table

Group #: 14

Draw the example atom and make the *outermost electron(s)* in **bold.**



Family Members (by symbol and atomic #): C (6), Si (14), Ge (32), Sn (50), Pb (82), Fl (114)

List **5** uses/existences of the members:

1. Carbon exists as amorphous soot, graphite, and crystalline diamond
2. Germanium and silicon are semi-conductors
3. Silicon and germanium are used in computer industry
4. Tin and lead are both conductors and form metal alloys
5. Lead is used in batteries, ammunition, gasoline, paint, and plumbing

Why are carbon and silicon especially relevant to us?

Carbon makes up 18.5% of the human body and carbs, proteins, and fats contain it. Silicon is the second most abundant element in the Earth's crust– sand, clay, and glass.

What are several properties of the Crystallogens?

Melting and boiling points decrease with increasing atomic mass, wide range of melting points and boiling points

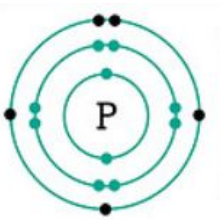
Go to www.periodictable.com and hover over each of the Crystallogens. Write down 2 or 3 interesting facts about them:

THE NITROGEN GROUP

→ Color this family **DARK BLUE** on the blank table

Group #: 15

Draw the example atom and make the *outermost electron(s)* in **bold.**



Family Members (by symbol and atomic #): N (7), P (15), As (33), Sb (51), Bi (83), Mc (115)

List **5** uses/existences of the members:

1. Nitrogen and phosphorous are necessary for life (genetic material)
2. Phosphorous is used in fertilizers, steels, water softeners
3. Arsenic, antimony, and bismuth are used in medicine
4. Antimony alloys are used in batteries
5. Bismuth is used to make iron malleable

What does this group include that is similar to the carbon group?

Non-metals, metalloids, and a metal

What are several properties of the Pnictogens?

There is a large range of melting points, boiling points, and densities, which increase with increasing atomic mass.

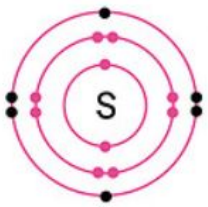
Go to www.periodictable.com and hover over each of the Pnictogens. Write down 2 or 3 interesting facts about them:

THE OXYGEN GROUP

→ Color this family **LIGHT GREEN** on the blank table

Group #: 16

Draw the example atom and make the *outermost electron(s)* in **bold.**



Family Members (by symbol and atomic #): O (8), S (16), Se (34), Te (52), Po (84), Lv (116)

List **5** properties/trends of the members:

1. Melting and boiling points increase with increasing atomic mass
2. Oxygen is gaseous, but all others are soft solids
3. Don't conduct heat well
4. Very reactive with metals (second to Halogens)
5. Most have several allotropes

Why is oxygen such an important element?

It is the most abundant element on Earth, the third most in the sun, and it makes up 65% of human body.

What is an allotrope?

An element that has two or more forms in the same physical state; for example, sulfur can exist in rings or chains

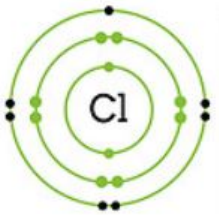
Go to www.periodictable.com and hover over each of the Chalcogens. Write down 2 or 3 interesting facts about them:

THE HALOGENS GROUP

→ Color this family **RED** on the blank table

Group #: 17

Draw the example atom and make the *outermost electron(s)* in **bold.**



Family Members (by symbol and atomic #): F (9), Cl (17), Br (35), I (53), At (85), Ts (117)

List **5** properties/trends of the members:

1. Densities are greater than density of air
2. Form diatomic compounds (except for astatine)
3. Iodine and astatine are solids at room temperature
4. Extremely reactive
5. Only group that contains elements in all three states of matter

What does the word *halogen* mean?

Salt-former

What types of bonds do the Halogens form?

Ionic bonds with metals, and covalent bonds with one another and with non-metals

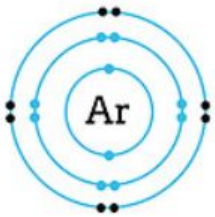
Go to www.periodictable.com and hover over each of the Halogens. Write down 2 or 3 interesting facts about them:

THE NOBLE GASES GROUP

→ Color this family **PURPLE** on the blank table

Group #: 18

Draw the example atom and make the *outermost electron(s)* in **bold.**



Family Members (by symbol and atomic #): He (2), Ne (10), Ar (18), Kr (36), Xe (54), Rn (86), Og(118)

List **5** uses of the members:

1. Helium is used to fill balloons, as a refrigerant, and in nuclear reactors
2. Neon is a refrigerant and for advertising signs
3. Most are used for advertising signs and lasers
4. Krypton is used in electron tubes and stroboscopic lights
5. Radon is used in cancer treatment

Why are the Nobel Gases so unreactive?

They have a full valence shell (8 electrons).

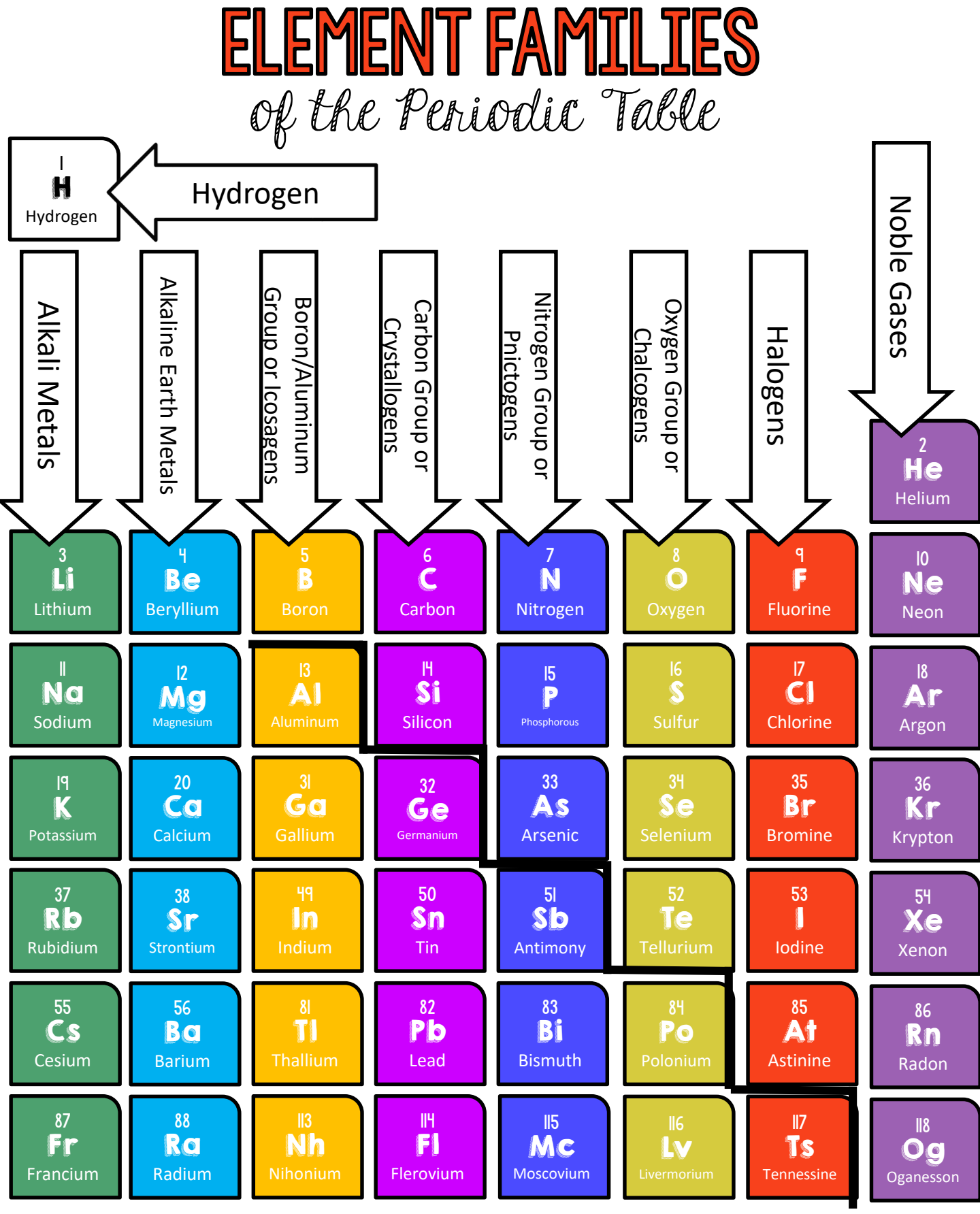
What are some special facts about helium?

Helium is the second-most abundant element in the universe (after hydrogen). The energy of the stars and hydrogen bomb comes from the fusion of hydrogen into helium.

Go to www.periodictable.com and hover over each of the Noble Gases. Write down 2 or 3 interesting facts about them:

ELEMENT FAMILIES

of the Periodic Table



THE ALKALI METALS GROUP

3
Li
Lithium

11
Na
Sodium

19
K
Potassium

37
Rb
Rubidium

55
Cs
Cesium

87
Fr
Francium

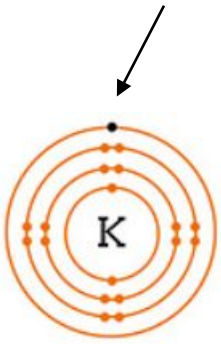
The Alkali Metals are members of Group 1 of the periodic table. They include lithium (Li), sodium (Na), potassium (K), rubidium (Rb), cesium (Cs), and francium (Fr). These elements are very good conductors of heat and electricity. They are soft and can be cut easily with a knife. Group 1 elements have low densities, ranging from 0.53 g/cm^3 (lithium) to 1.90 g/cm^3 (cesium).

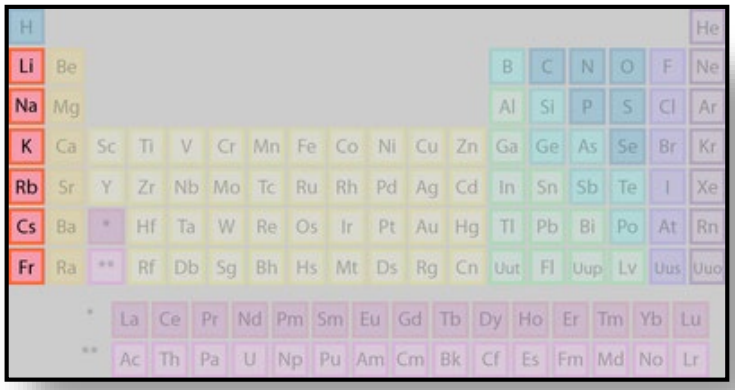
The Alkali Metals are the most chemically reactive metals because they have only one electron in their outermost energy level. They are so reactive that they are never found free in nature! Pure samples of Alkali Metals are stored in oil so that they cannot react with oxygen or water in the air. Alkali Metals usually form ionic compounds. Each Alkali Metal atom has one electron in its highest energy level. This loosely held electron can easily combine with a nonmetal atom to form a pair of ions. These ions then form an ionic compound.

The ions of the Alkali Metals can be identified by using the flame test: a small amount of an unknown metal in an ionic compound is heated in a flame. (An ionic compound forms when one type of atom gives its outermost electrons to another type of atom and the two become attracted because of the positive and negative charges of the resulting ions, or charged atoms.) The color of the flame indicates which metal ion is present. For example, sodium's flame is bright yellow, and potassium's is pale pink.

Alkali Metals are used to produce chemicals, metals, soap, glass, ceramics, petroleum products, and textiles. Cesium and rubidium are used in photoelectric cells. Potassium—in the form of potassium carbonate, or potash– is used as plant fertilizer. Sodium, combined with chlorine to form sodium chloride (table salt), makes the ocean salty. Potassium and sodium ions are essential for life for most organisms.

NOTE: Hydrogen is in the same column as the Alkali Metals, but hydrogen is NOT an Alkali Metal!





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THE ALKALINE EARTH METALS GROUP

4
Be
Beryllium

12
Mg
Magnesium

20
Ca
Calcium

38
Sr
Strontium

56
Ba
Barium

88
Ra
Radium

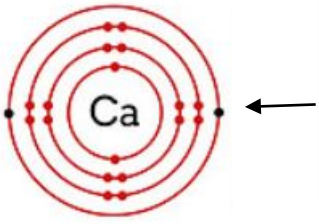
The Alkaline Earth Metals are members of Group 2 of the periodic table. They include beryllium (Be), magnesium (Mg), calcium (Ca), strontium (Sr), barium (Ba), and radium (Ra).

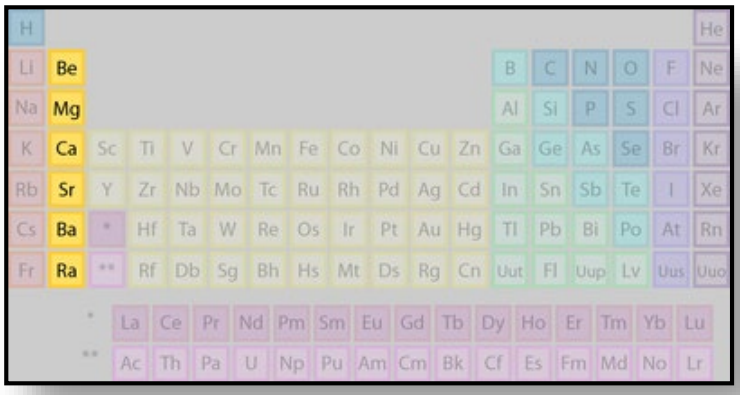
The Alkaline Earth Metals are silvery colored, soft, low density metals. Their melting points generally decrease with increasing atomic mass, except for magnesium, which has a lower melting point than all the other family members.

They each have two electrons in their outermost energy level, so like the Alkali Metals, the Alkaline Earth Metals are very chemically reactive. They are rarely found free in nature Alkaline Earth Metals usually form ionic compounds by giving away the two elections in their highest energy level and forming ions. An ionic compound forms when one type of atom gives its outermost electrons to another type of atom and the two become attracted because of the positive and negative charges of the resulting ions, or charged atoms. The reactivity of the group 2's metals increases down the group as the outer electrons get further from the nucleus and become easier to remove.

One of the signature properties of this group of elements is that they become increasingly soluble with a decrease in temperature. This is usually true only for gases. Just imagine stirring sugar into a glass of tea. If you want to make really sweet tea, you need to add the sugar before adding the ice. Hot tea will dissolve more sugar in the same volume than cold tea. If the sugar were calcium, more calcium would dissolve into the liquid as you added the ice.

Magnesium is an important element for all living things and is a major constituent of chlorophyll in plants. Calcium compounds are used in building materials like limestone, gypsum, and marble. Strontium is used in fireworks. Radium is a radioactive element that used to be used to make glow in the dark paint.





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THE BORON/ALUMINUM GROUP (A.K.A. THE ICOSAGENS)

5
B
Boron

13
Al
Aluminum

31
Ga
Gallium

49
In
Indium

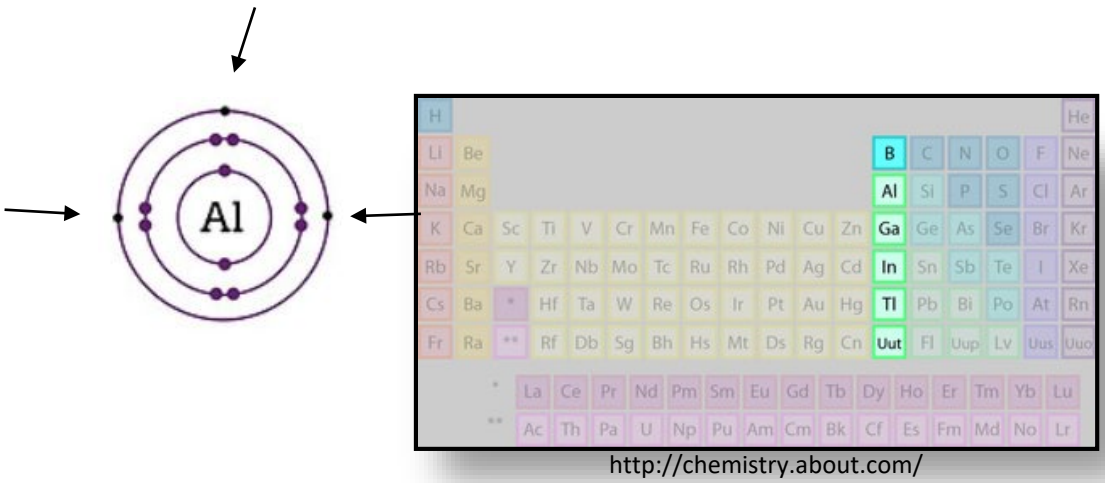
81
Tl
Thallium

113
Nh
Nihonium

The boron/aluminum group, the elements of which are more properly called the Icosagens, includes the metals aluminum (Al), gallium (Ga), indium (In), and thallium (Tl). It also includes the metalloid boron (B). These elements are in Group 13 on the periodic table.

Group 13 elements have a wide range of melting points from 29.78°C (gallium) to 2079°C (boron). Boiling points range from 1457°C (thallium) to 2550°C (the temperature at which boron crystals vaporize). The Icosagens' densities range from about 2.35 g/cm^3 (boron) to 11.85 g/cm^3 (thallium). The boron/aluminum group elements form many stable covalent compounds (these are compounds in which the outermost electrons are *shared* by two or more atoms). All elements in this group are relatively rare, except aluminum, which is the third most abundant element in the earth's crust.

There are many uses for Group 13 elements. Aluminum alloys have been used in cooking utensils, ornaments, aircraft, and rockets. Gallium and indium are combined to make special alloys that melt at low temperatures. An alloy is a metal made by combining two or more metallic elements. An alloy of 24 percent indium and 76 percent gallium is liquid at room temperature. Gallium is also used in high-temperature thermometers and in the electronics industry, and the compound gallium arsenide is used in lasers. Thallium compounds have been used in insecticides, rodent killers, and medicine, but it is now generally considered too toxic. Thallium is also used in photocells and glass production. Boron and its compounds are used in glass, water softeners, and enamels. Boron is also used in the aerospace industry.



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THE CARBON GROUP
(A.K.A. THE CRYSTALLOGENS)

6
C
Carbon

14
Si
Silicon

32
Ge
Germanium

50
Sn
Tin

82
Pb
Lead

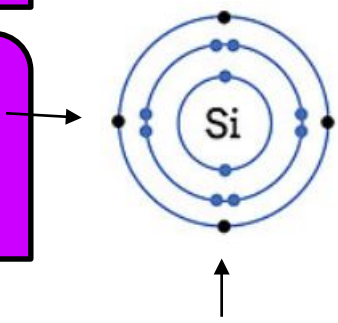
114
Fl
Flerovium

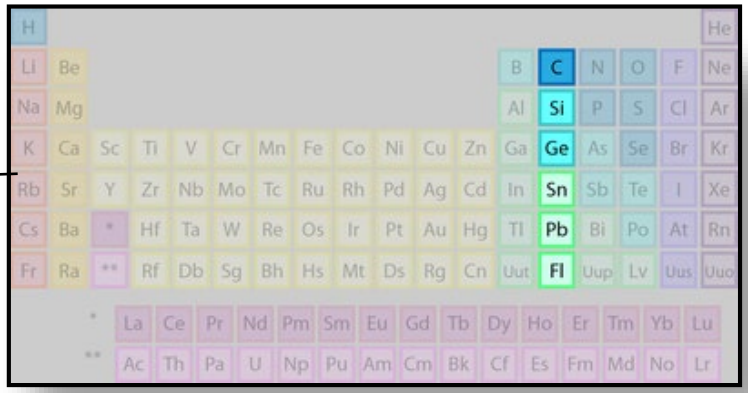
The carbon group elements are members of Group 14 on the periodic table and they are also collectively known as the Crystallogens. The carbon group elements show a transition from nonmetals to metals. This group includes the nonmetal carbon (C), the metalloids silicon (Si) and germanium (Ge), and the metals tin (Sn) and lead (Pb). Flerovium is a man-made element first created in 1999.

The melting and boiling points of Group 14 elements generally decrease with increasing atomic mass. Their melting points range from about 3550°C (carbon) to 231°C (tin). Boiling points range from 4827°C (carbon) to 1740°C (lead). At 11.3 g/cm^3, lead is the most dense element of the group. Amorphous carbon, or soot, is the least dense, at about 2.0 g/cm^3. Amorphous means that the atoms are not arranged in an orderly pattern. Germanium and silicon are semiconductors, which means that they are conductors of heat and electricity under some conditions. Tin and lead are both conductors.

Carbon has several different structural forms including soot, graphite, and diamond. Soot is an amorphous form and diamond is a crystalline form. Silicon, germanium, and one form of tin are similar in structure to the diamond form of carbon. Carbon is an important element because it is an essential part of all living things. It makes up 18.5% of the human body and carbohydrates, proteins, and fats all contain carbon. It forms many molecular compounds and it is the centerpiece of an entire field of study called organic chemistry. Atoms in molecular compounds are held together by covalent bonds. Covalent bonds occur when atoms share their outermost electrons. Carbon is also a part of many industrial materials, including steel.

The computer industry relies on silicon, germanium, and other semiconductors. Silicon is the second most abundant element in the Earth's crust, a major element in sand, clay, and glass. Tin and lead form many metal alloys. Tin is alloyed with copper to make brass. It also prevents corrosion when used as a coating on metals: this property led to the development of the tin can. Lead is used in storage batteries, ammunition, gasoline, paints, and plumbing. Centuries ago, it was even used in cosmetics. We now know that lead is highly toxic.





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THE NITROGEN GROUP
(A.K.A. THE PNICTOGENS)

7
N
Nitrogen

15
P
Phosphorous

33
As
Arsenic

51
Sb
Antimony

83
Bi
Bismuth

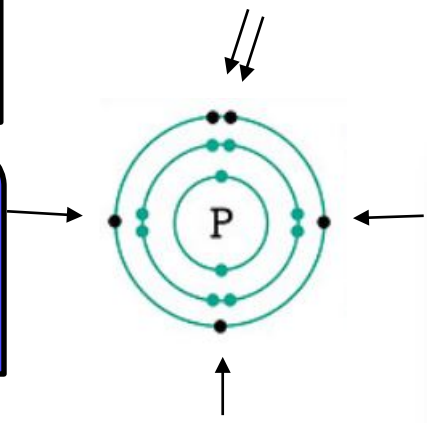
115
Mc
Moscovium

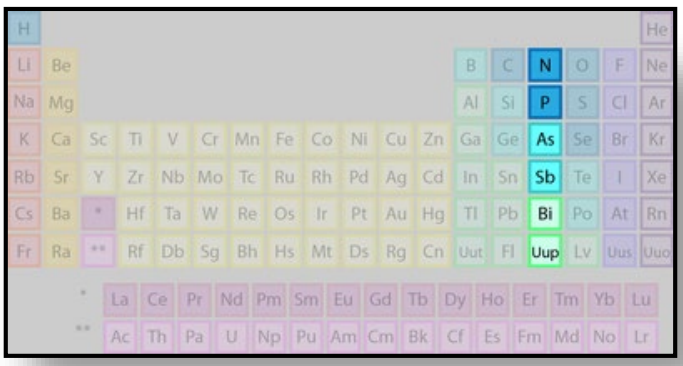
The nitrogen group elements are members of Group 15 on the periodic table and they are sometimes collectively called the Pnictogens. This group includes nitrogen (N), phosphorus (P), arsenic (As), antimony (Sb), and bismuth (Bi). Like the carbon group, the nitrogen group includes nonmetals, metalloids, and a metal. Nitrogen is a gas. Phosphorous and nitrogen are nonmetals. Arsenic and antimony are metalloids. Bismuth is a metal. Nitrogen group elements all have five electrons in their highest occupied energy level.

There is a large range of melting and boiling points within the Group 15 elements, and they generally increase with increasing atomic mass. The melting points range from -210°C (nitrogen) to 817°C (arsenic). Boiling points range from -196°C (nitrogen) to 1750°C (antimony). The Pnictogen densities range from 1.2 g/L (nitrogen) to 9.7 g/cm^3 (bismuth).

By volume, air is more than three-fourths nitrogen gas (N_2). Nitrogen gas is diatomic, which means that in its gaseous form it always exists as two atoms bonded together. All organisms need nitrogen, but most organisms cannot use nitrogen gas. They must get their nitrogen from compounds such as ammonia (NH_3) or nitrates (NO_3^-). The fertilizer industry uses a large amount of nitrogen to make ammonia.

Like nitrogen, phosphorus is essential for living things. It is present in the genetic material of living things. It is also used in plant fertilizers, steels, and water softeners. Pure phosphorous, arsenic, and antimony are toxic. Arsenic has been used in insecticides and has other industrial uses. Arsenic, antimony, and bismuth all have been used in medicine. Antimony and lead alloys are used in batteries and other products. Bismuth is used to make iron malleable. It is also used in alloys that melt at low temperatures. An alloy is a metal made by combining two or more metallic elements.





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THE OXYGEN GROUP
(A.K.A. THE CHALCOGENS)

8
O
Oxygen

16
S
Sulfur

34
Se
Selenium

52
Te
Tellurium

84
Po
Polonium

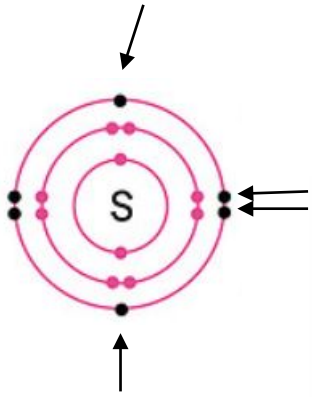
116
Lv
Livermorium

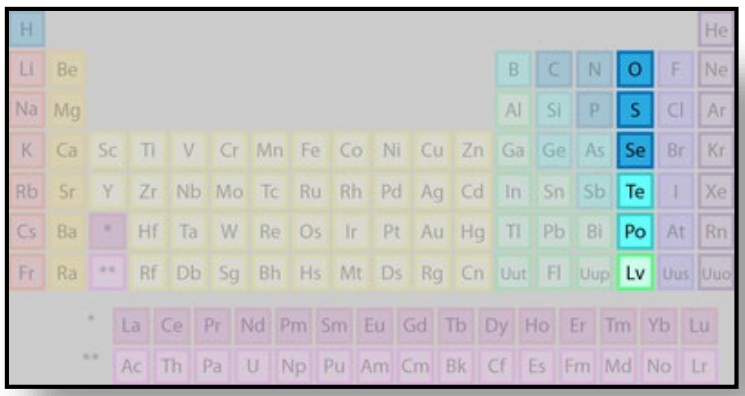
You probably know that oxygen (O) gas in the atmosphere makes life on earth unique in the solar system– and, perhaps, the universe. Life on this planet could not exist without it. The oxygen group elements are members of Group 16 on the periodic table. They are also known as the Chalcogens. In addition to oxygen, they include sulfur (S), selenium (Se), tellurium (Te), and polonium (Po). The oxygen group includes nonmetals and metalloids. Oxygen, sulfur, selenium, and oxygen are non metals. Tellurium and polonium are metalloids. Group 16 elements all have six electrons in their highest occupied energy level.

The melting and boiling points of the Group 16 elements generally increase with increasing atomic mass. The melting point ranges from -219°C (oxygen) to 450°C (tellurium).

Oxygen is the only gaseous Chalcogen. Otherwise, members of this group are soft and they don't conduct heat well. All of these elements generally combine with a large number of metals. In their reactivity with metals, they are second only to the halogens. Most are found both free in nature and combined and most have several allotropic forms. An allotrope is an element that has two or more forms in the same physical state; for example, sulfur's atoms bonded together in the solid state can exist in chains or rings, each of which exhibit different properties.

Oxygen is the most abundant element on earth, it is the third most abundant element in the sun, and it makes up 65% of the human body. Oxygen combines with most other elements.





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THE HALOGENS GROUP

9
F
Fluorine

17
Cl
Chlorine

35
Br
Bromine

53
I
Iodine

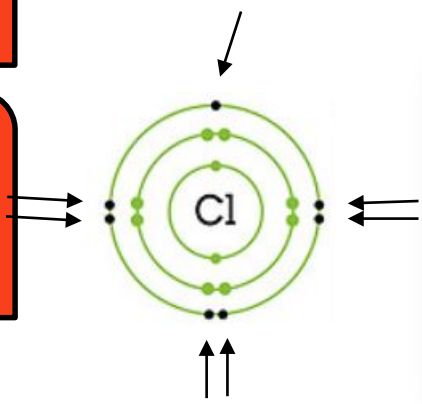
85
At
Astinine

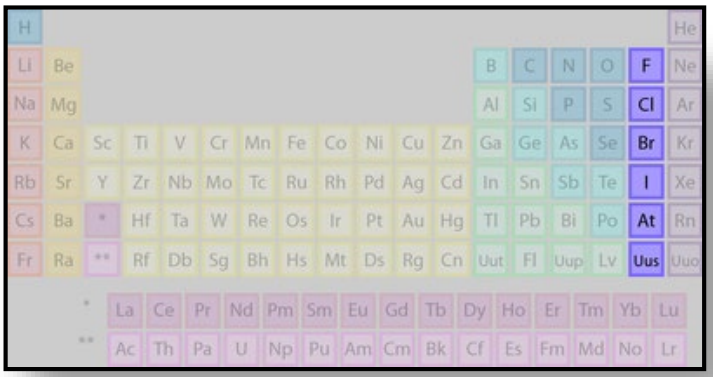
117
Ts
Tennessine

When we think of salt, we usually think of table salt, or sodium chloride (NaCl). Sodium chloride is made of a metal, sodium (Na), and a halogen, chlorine (Cl). Table salt is actually just one of many salts. Whenever a metal is combined with a member of the halogen group, Group 17, a salt is formed. The word *halogen* actually means "salt former". The halogen group includes fluorine (F), chlorine (Cl), bromine (Br), iodine (I), and astatine (At). Group 17 elements all have seven electrons in their highest occupied energy level and in nature, the halogens occur only in combination with other elements because they are so reactive. Of all the elements on the periodic table, fluorine is the most reactive.

Group 17 densities are greater than the density of air. The halogen group is the only group that contains elements in all three states of matter. Iodine and astatine are solids at room temperature, bromine is a liquid at room temperature (the only element other than mercury that is, actually!), and fluorine and chlorine are gases at room temperature. Other than astatine, the halogens all form diatomic compounds as pure elements. A diatomic compound is when two atoms of the same element bond together; for example, Br_2 is two bromine atoms bonded and Cl_2 is two chlorine atoms bonded. Pure halogens are very poisonous.

The halogens form ionic bonds with metals. An ionic bond is when one type of atom gives its outermost electrons to another type of atom and the two become attracted because of the positive and negative charges of the resulting ions, or charged atoms. They form covalent bonds with one another and with nonmetals.





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THE NOBLE GASES GROUP

2
He
Helium

10
Ne
Neon

18
Ar
Argon

36
Kr
Krypton

54
Xe
Xenon

86
Rn
Radon

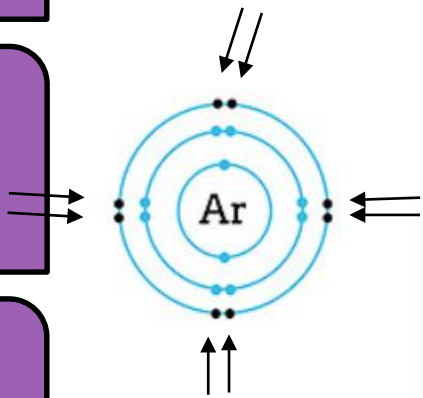
118
Og
Oganesson

The noble gases are members of Group 18 on the periodic table. They include helium (He), neon (Ne), argon (Ar), krypton (Kr), xenon (Xe), and radon (Rn). The noble gases are very unreactive. They are all found free in nature, unbonded to other atoms. This is because they have 8 electrons in their outermost energy level; this is already a *full* shell and atoms are always striving to fill their outermost shell. Noble gases do not usually combine with other elements or with one another, but a few compounds can be formed.

Helium is the second most abundant element in the universe. Only hydrogen is more abundant. The energy of the stars and of the hydrogen bomb comes from the fusion of hydrogen into helium. Lighter than air and safer than hydrogen, helium is also used to fill balloons. Helium is used as a refrigerant commercially and in nuclear reactors. Neon is an even better refrigerant.

Neon, argon, and xenon were discovered by cooling air into a liquid and then separating the liquid into individual elements. Neon's largest use is as a gas for advertising signs. Most of the noble gases are used in advertising signs. Each gas produces a different intense color. Most noble gases are also used in lasers.

The wavelength of the light produced by krypton has been used to define the international standard of the meter. Krypton is used in electron tubes, stroboscopic lights, and bacteria-killing lamps. Radon, the most dense of all gases, is given off when radium decomposes. Radioactive radon is used in cancer treatment.



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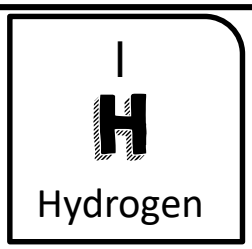
ELEMENT FAMILIES *of the Periodic Table*

The modern periodic table is a very valuable tool. It is useful for displaying what is known about the chemical and physical properties of the elements. Suppose, for example, that we want to know more about an element with the symbol "X". First, element X's location on the periodic table will show whether it is a *metal, nonmetal, metalloid, or a transition metal*. By studying the color or the shading of the box (or by memorizing the sections of the table), you can learn whether the element is a *solid, liquid or gas* at room temperature.

Element X's position on the table will indicate its atomic number. The atomic number, in turn, shows the number of protons and electrons in the neutral atoms of element X. Additionally, the column or *group* in which X is located indicates several characteristics of the unknown element and it gives us information about which other elements will have similar properties to element X. (This is what we are focusing on in this activity). The row or *period* in which element X is located will indicate the number of energy levels in which the electrons are present around its nucleus. From the information in the element's box, you can determine the atomic mass of element X.

The modern periodic table of elements is a very concise method of displaying a lot of information. It shows a great deal about the Earth's elements and their properties. You can think of each main group as a family of elements. Actually, the term *family* is used to describe the groups! Just like in any family, there are characteristics that "run in the family". Today, you will learn more specific details about each of the main families on the periodic table.

Directions: Read the information card about each family of elements. Use it to complete the section for each family in this packet. Follow the directions to color in the family on the blank graphic organizer at the end of this packet, and write the name of each family in the correct arrow. Then, go to the website www.periodictable.com as a resource to fill in the remainder of the notes.



HYDROGEN is a special element that does not fit into any family on the periodic table. It is located above the Alkali Metals, but it is not an Alkali Metal. At any time during this activity or once you have finished finding the information for and completing the other family sections, you should do some of your own research on the element hydrogen and write about it here:

THE ALKALI METALS GROUP

→ Color this family **GREEN** on the blank table

Group #: _____

Draw the example atom and make the *outermost electron(s)* in **bold.**

Family Members
(by symbol and atomic #):

List **5** properties/trends of the members:

1 _____
2 _____
3 _____
4 _____
5 _____

Why are these metals the most chemically reactive metals?

What are several general uses of the Alkali Metals?

Go to www.periodictable.com and hover over each of the Alkali Metals. Write down 2 or 3 interesting facts about them:

THE ALKALINE EARTH METALS GROUP

→ Color this family **LIGHT BLUE** on the blank table

Group #: _____

Draw the example atom and make the *outermost electron(s)* in **bold.**

Family Members
(by symbol and atomic #):

List **5** properties/trends of the members:

1 _____
2 _____
3 _____
4 _____
5 _____

Why does the reactivity increase as you move down the group?

What are several general uses of the Alkaline Earth Metals?

Go to www.periodictable.com and hover over each of the Alkaline Earth Metals. Write down 2 or 3 interesting facts about them:

THE BORON/ALUMINUM GROUP

→ Color this family **YELLOW** on the blank table

Group #: _____

Draw the example atom and make the *outermost electron(s)* in **bold.**

Family Members
(by symbol and atomic #):

List **5** properties/trends of the members:

1 _____
2 _____
3 _____
4 _____
5 _____

What are two *types* of elements included in this group?

What are several general uses of the Icosagens?

Go to www.periodictable.com and hover over each of the Icosagens. Write down 2 or 3 interesting facts about them:

THE CARBON GROUP

→ Color this family **PINK** on the blank table

Group #: _____

Draw the example atom and make the *outermost electron(s)* in **bold.**

Family Members
(by symbol and atomic #):

List **5** uses/existences of the members:

1 _____
2 _____
3 _____
4 _____
5 _____

Why are carbon and silicon especially relevant to us?

What are several properties of the Crystallogens?

Go to www.periodictable.com and hover over each of the Crystallogens. Write down 2 or 3 interesting facts about them:

THE NITROGEN GROUP

→ Color this family **DARK BLUE** on the blank table

Group #: _____

Draw the example atom and make the *outermost electron(s)* in **bold.**

Family Members
(by symbol and atomic #):

List **5** uses/existences of the members:

1 _____
2 _____
3 _____
4 _____
5 _____

What does this group include that is similar to the carbon group?

What are several properties of the Pnictogens?

Go to www.periodictable.com and hover over each of the Pnictogens. Write down 2 or 3 interesting facts about them:

THE OXYGEN GROUP

→ Color this family **LIGHT GREEN** on the blank table

Group #: _____

Draw the example atom and make the *outermost electron(s)* in **bold.**

Family Members
(by symbol and atomic #):

List **5** properties/trends of the members:

1 _____
2 _____
3 _____
4 _____
5 _____

Why is oxygen such an important element?

What is an allotrope?

Go to www.periodictable.com and hover over each of the Chalcogens. Write down 2 or 3 interesting facts about them:

THE HALOGENS GROUP

→ Color this family **RED** on the blank table

Group #: _____

Draw the example atom and make the *outermost electron(s)* in **bold.**

Family Members
(by symbol and atomic #):

List **5** properties/trends of the members:

1 _____
2 _____
3 _____
4 _____
5 _____

What does the word *halogen* mean?

What types of bonds do the Halogens form?

Go to www.periodictable.com and hover over each of the Halogens. Write down 2 or 3 interesting facts about them:

THE NOBLE GASES GROUP

→ Color this family **PURPLE** on the blank table

Group #: _____

Draw the example atom and make the *outermost electron(s)* in **bold.**

Family Members
(by symbol and atomic #):

List **5** uses of the members:

1 _____
2 _____
3 _____
4 _____
5 _____

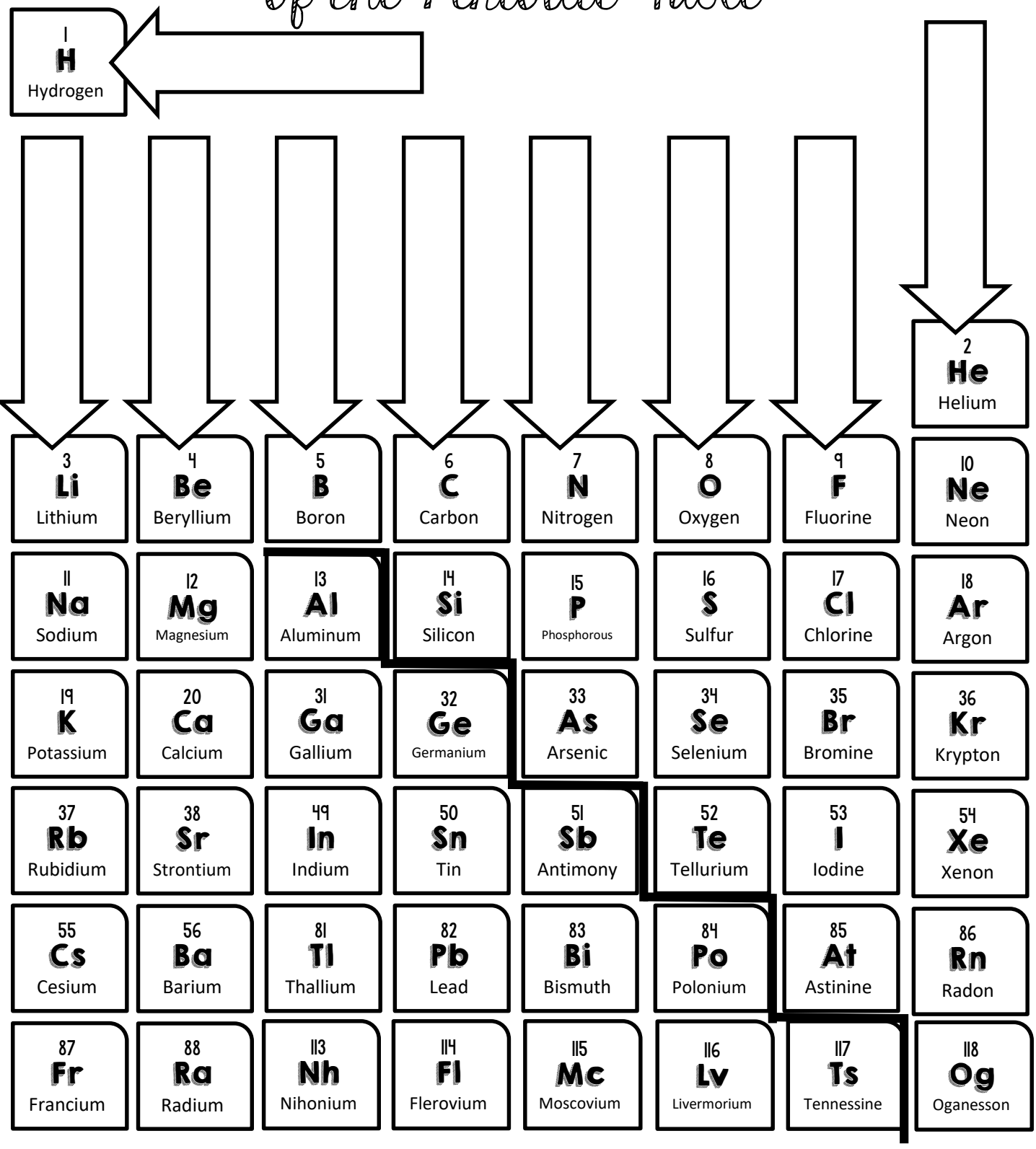
Why are the Nobel Gases so unreactive?

What are some special facts about helium?

Go to www.periodictable.com and hover over each of the Noble Gases. Write down 2 or 3 interesting facts about them:

ELEMENT FAMILIES

of the Periodic Table



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