**S9 Chemistry Topic 4 and 5 Notes**

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| **Elements and the Periodic Table (Topic 4 p. 116)** |

**Elements are** the **blocks** on the Periodic Table. They are pure substances that cannot be decomposed (broken down) into simpler substances. Ex. carbon (C), oxygen (O), calcium (Ca) – any “block” on the periodic table.

**ELEMENT SEARCH – USING YOUR PERIODIC TABLE, FIND AND NAME:**

• 3 elements named after a country or other geographic place:

• 3 elements named after things in outer space:

• 3 elements named after famous people:

• 1 element important to Superman: Is its state solid, liquid or gas (circle   
 one)?

• 3 elements you know are metals:   
 3 that are metalloids:   
 3 that are non-metals:

• 3 elements you know are gases:

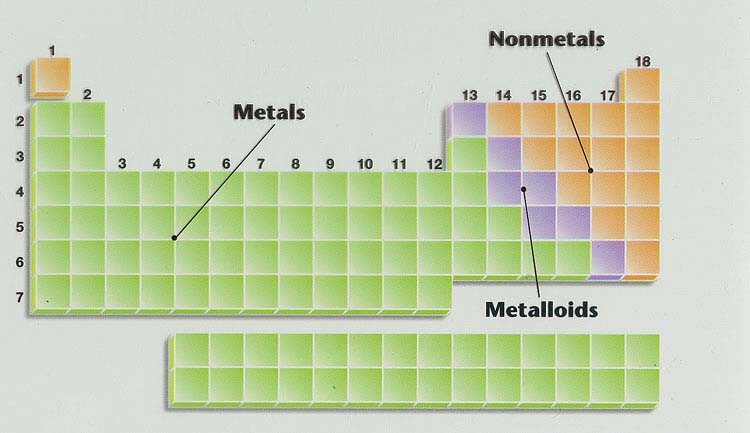
• 3 elements you know are solids:

• 2 elements you know are liquids:

**Do Find Out Activity pg. 117 # 1-5 “Symbols for Elements.” You can use your Periodic   
 Table and/or Appendix C pg. 442** to answer the questions.

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| **Metals, nonmetals and metalloids** |

***The Periodic Table of Elements*** *is an amazingly powerful scientific tool.* ***It helps us classify elements*** *in a variety of ways*



**Color code the Metals, Non-Metals and the Metalloids on your Periodic Table. Pg. 440 will help you. How will you remember what your colors mean?**

**The 4 properties** **we use to compare** metals, nonmetals and metalloids are:   
 • State at room temperature • Appearance • Conductivity • Malleability and Ductility

Using what you know or can find out about the elements that are metals, non-metals and   
 metalloids, complete the following table:

**PROPERTIES OF** **METALS, NON-METALS AND METALLOIDS**

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|  | **State at room temperature (solid, liquid, or gas)** | **Appearance** | **Conductivity of heat and electricity (good or poor)** | **Malleability (or brittle) Ductility (Yes/No)** |
| **Metals**  **3 examples:** |  |  |  |  |
| **Non-Metals**  **3 examples:** |  |  |  |  |
| **Metalloids**  **3 examples:** |  |  |  |  |

If you get stuck, check pg. 118.

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| **Groups (families) and Periods** |

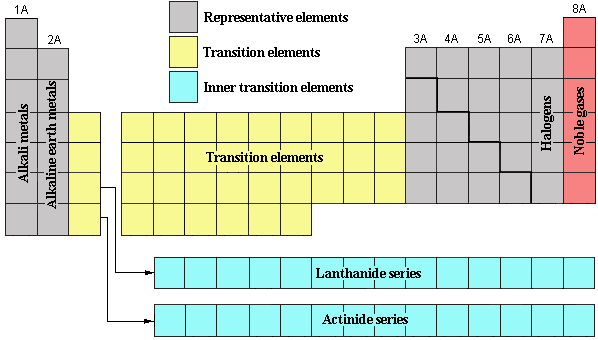
**Groups (families)** = **columns** on the Periodic   
 Table

**Periods = rows** on the Periodic Table.Elements   
 are arranged in periods by increasing **atomic   
 number.**

**LEARNING CHECK!**  
 • Which element is in Group 1, Period 4:

• Aluminum is in Group \_\_\_\_\_. Period \_\_\_\_\_.

**• The periodic table has \_\_\_\_\_ groups and** \_\_\_\_\_\_   
 periods.



**Find and label the following 4 important Groups (Families) on your Periodic Table.**

**Group 1 = Alkali metals**. These are **extremely reactive** because they have one valence electron. They need to lose one valence electron to become stable like the nearest noble gas.

**Group 2 = Alkaline Earth Metals**. They too are **reactive**, but not as much as the alkali metals. They need to lose their 2 valence electrons to become stable like the nearest noble gas.

**Group 17 = Halogens.** They **react vigorously** because they need to gain 1 electron to become more stable like the nearest noble gas.

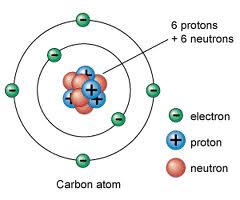
**Group 18 = Noble (inert) gases**. These compounds have **8 valence electrons**. This is called the stable octet. They do not react because they are already stable.

**Assignment: 1st pg. of Practice Booklet: “Groups of Elements” and “Element Symbols”**

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| **Elements are Atoms (Topic 5 p. 126)** |

**Read and highlight your Atomic Theory Notes.**

**We now know that atoms are made of 3 subatomic particles**:   
 • **protons** (positively charged, weight 1 unit)   
 • **neutrons** (no charge, weight 1 unit)   
 • **electrons** (negatively charged, weight is negligible).

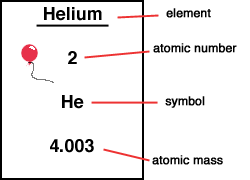
[](http://www.google.ca/imgres?q=atom&num=10&hl=en&gbv=2&biw=1173&bih=553&tbm=isch&tbnid=vuxUSksqlRA1nM:&imgrefurl=http://www.universetoday.com/56469/atom-diagram/&docid=pLFhEw4LPin0gM&w=300&h=250&ei=VAWVTrn-E7PaiQLWnICXBQ&zoom=1&iact=hc&vpx=352&vpy=255&dur=729&hovh=200&hovw=240&tx=114&ty=96&sqi=2&page=1&tbnh=109&tbnw=134&start=0&ndsp=21&ved=1t:429,r:9,s:0)

**Protons and neutrons are in the nucleus**. The **electrons** **spin around outside the nucleus** in different energy levels in an electron cloud. **Atoms are mostly empty space**.

**Each element has its own square on the periodic table.** Printed on this square is a great deal of information about the element

• **name of the element   
• atomic number** **= number of protons in an element.   
   
 The atomic number also = the # of electrons in an   
 element. (We know this because atomic elements   
 have no charge)**

• **element symbol**   
• **atomic mass (number of protons + neutrons in an   
 element).**   
**• State of the element at room temperature**: the balloon   
 tells us that helium is a gas at room temperature

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| **LEARNING CHECK: You can calculate the number of protons and neutrons in an atom**  **atomic mass = # of protons (atomic #) + # of neutrons   atomic mass = p + n**  **How many neutrons does carbon have? Show your work.**  **What is the name of the element with atomic number 9? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   How many protons does it have? \_\_\_\_   How many electrons? How many neutrons \_\_\_\_\_? (show your work).** |

**Assignment:**  **Practice sheet: “Elements and the Periodic Table”**