**Honors Chem – 1st Semester Review Scavenger Hunt**

* You will need four combination locks to do this activity. Each combination lock needs to have four digits. The kind you spin individual wheels per digit is best.
* **You will need to change the items underlined and in red in order to customize the scavenger hunt for your own classes.** Changing things in green is optional but encouraged. Please do not use this document as is! Too many students looking for the same lockers will slow everything down and give away answers.
* Please send an all staff email letting teachers know that your students will be doing a scavenger hunt and have been instructed to be quiet and not disturb any classes, and to please let you know if there are any issues. If more than one chem teacher is doing the activity on the same day we should send one email, not individual all staff emails.
* You will need to make a separate Google Doc with the questions for each of the scavenger hunts. Then make a QR code that takes students to that QR code. To set up the game, print two copies of each QR code and lay one code on each lab station. Print one additional copy of each code and hide it in the locker indicated.

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| **Scavenger Hunt #1** | | |
| **Once they answer the questions below it will lead them to a QR Code that you cut out and put in locker 223 which takes them to Scavenger Hunt #2** | | |
| **Building Location** | | |
| 1) | Which of the molecules below will form hydrogen bonds?  **H2O, CO2, NH3, H2S** | **H2O, NH3** |
| 2) | Of the molecules that can hydrogen bond, find the one with **the least number of lone pairs** on the central atom. How many lone pairs does it have? | NH3 has least # of lone pairs **– one lone pair.** |
| 3) | Multiply the number of lone pairs in Q2 by 1000 to find the building number location | **1000** |
| **Locker Number** | | |
| 1) | When **124.08** g of ethane (C2H6) combusts, what mass of water is produced? Round your answer to three significant figures | **223** |
| **Locker Combination** | | |
| 1) | The first two digits of the locker combination will be the number of protons in the following element:   * **A transition metal that makes a +1 ion, and does not need any Roman Numerals it its name.** | **(Ag)**  **47** |
| 2) | The last two digits of the locker combination will be the mass of **0.113** moles of **copper (II) sulfate** | **18** |

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| **Scavenger Hunt #2** | | |
| **Once they answer the questions below it will lead them to a QR Code that you cut out and put in locker 4264 which takes them to Scavenger Hunt #3** | | |
| **Building Location** | | |
| 1) | Number of oxygen atoms in **aluminum phosphate** multiplied by 1000. | **4000** |
| **Locker Number** | | |
| 1) | The first digit of the locker number is:   * The number of electrons in **oxygen’s p-orbital set** | **4** |
| 2) | The second digit of the locker number is:   * The number of electrons in **any full s-orbital** | **2** |
| 3) | The third digit of the locker number is:   * The number of electrons in **the highest occupied p-orbital set of every noble gas** | **6** |
| 4) | The fourth digit of the locker number is:   * The number of electrons **carbon needs to gain or lose in order to have a full valence shell** | **4** |
| **Locker Combination** | | |
| 1) | The locker combination numbers are the coefficients for the balanced equation that is started for you below. You will need to first predict the products, write the formulas, and then balance.   * **Aluminum carbonate + sodium phosphate 🡪** | **Al2(CO3)3 + 2Na3PO4 🡪 2AlPO4 + 3Na2CO3**  **1 2 2 3** |

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| **Scavenger Hunt #3** | | |
| **Once they answer the questions below it will lead them to a QR Code that you cut out and put in locker 3394 which takes them to Scavenger Hunt #4** | | |
| **Building Location** | | |
| 1) | How many grams are in **4.10 x 1025** molecules of CO2, rounded to one significant figure. | **3000** |
| **Locker Number** | | |
| 1) | The first two digits of the locker number will be the number of neutrons in **Copper-62** | **33** |
| 2) | The third digit of the locker number will be the **number of electrons in a neutral fluorine atom**. | **9** |
| 3) | The fourth digit of the locker number will be the number of protons in **beryllium** | **4** |
| **Locker Combination** | | |
| 1) | **Time for a chemistry pun! 😊** The first two digits of the locker combination will be the number of protons in **the “cop” of the periodic table.** | **29** |
| 2) | The last two digits of the locker combination will be **the number of protons in the 3+ ion that has the same electron configuration as Neon.** | **13** |

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| **Scavenger Hunt #4** | | |
| **Once they answer the questions below it will lead them to a QR Code that you cut out and put in locker 2586 which takes them to Scavenger Hunt #5** | | |
| **Building Location** | | |
| 1) | What is the sum of the protons, neutrons and electrons for **Zinc-70** | (30+40+28) = **98** |
| 2) | Multiply your number by **calcium’s atomic number**. Round to one significant figure. | **2000** |
| **Locker Number** | | |
| 1) | **Strontium-86 decays into iron-57, an alpha particle, three beta particles, and an unknown element.** The mass number of the unknown daughter product will be the first two digits of the locker number. | 86Sr38 🡪 57Fe26 + 25Al13 + 4He2 0B-3  **25** |
| 2) | The mass number of **strontium** will be the last two digits of the locker number. | **86** |
| **Locker Combination** | | |
| 1) | **Blood plasma volume for adults is approximately 3.1 Liters. The density of blood is 1.020 g/cm3. Blood is about 65% oxygen by mass. How many molecules of oxygen are in your blood? To find the locker combination take your answer, round to four significant figures and ignore the x10exponent part.** | **3867** |

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| **Scavenger Hunt #5** | | |
| **Once they answer the questions below it will lead them to a QR Code that you cut out and put in an unlocked drawer on the lab station labeled as Oxygen in your classroom, which takes them to Scavenger Hunt #6** | | |
| **QR Code Location** | | |
| 1) | **845 g** of aluminum oxide react. Al2O3 + Cl2 🡪  The room number will be the mass of ionic compound produced.  Round your answer to four significant figures. | **2209** |
| 2) | In the equation above, the products were an ionic compound and a diatomic gas. Go to the lab bench that is labeled with the same element as the diatomic gas that was produced. Look for the QR code in one of the unlocked drawers. | Oxygen lab station |

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| **Scavenger Hunt #6** | | |
| **Once they answer the questions below it will lead them to a QR Code that you cut out and put in an unlocked drawer on the lab station labeled as Nitrogen in your classroom, which takes them to Scavenger Hunt #7** | | |
| **Location** | | |
| 1) | Go to the lab station that is labeled with the element that is able to make a hydrogen bond when it has a lone pair on it, is bonded to multiple hydrogen atoms, and is in a trigonal pyramidal molecular geometry. Look for the QR code in one of the unlocked drawers. | Nitrogen lab station |

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| **Scavenger Hunt #7** | | |
| **Once they answer the questions below it will lead them to a QR Code that you cut out and put on a wall or counter near the entrance to the library, which takes them to Scavenger Hunt #8** | | |
| **Location** | | |
| 1) | 5.47 moles of this element weighs 37.96 g | Li |
| 2) | This diatomic element is actually a liquid at room temperature not a gas! | Br |
| 3) | This element has the same electron configuration as S2- | Ar |
| 4) | The molar mass of this element is the same number as the mass in grams of 7.4 moles of carbon. Now go to the location that your answers spell out! | Y |

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| **Scavenger Hunt #8** | | |
| **Once they answer the questions below it will lead them to a QR Code that you cut out and put on a wall or counter near the attendance secretary counter, which takes them to Scavenger Hunt #1** | | |
| **Building Location** | | |
| 1) | This element has a lower electronegativity than sulfur, and is smaller in radius than the element that has an atomic number of 33. | Se |
| 2) | This element has an electron configuration of [Ar]4s23d4 | Cr |
| 3) | Find the atomic symbol for the metalloid that is next to element 51 on the periodic table. Reverse the letters. | eT |
| 4) | The noble gas that is in period 3 on the periodic table. | Ar |
| 5) | The first element that has a d-orbital and is only a single letter atomic symbol. Now go to the location that your answers spell out! | Y |