Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **ALIEN Periodic Table**

You are part of a team of science officers aboard a ship sent to explore the universe outside our solar system. Because of the compactness and efficiency of the ship, the amount of laboratory equipment you can use is limited. You do have the following pieces of equipment: 

* A test kit containing four chemicals marked C1, C2, C3, and C4.
* An instrument which can measure the atomic mass of an element
* An instrument to measure the melting temperature of a solid
* Instruments which can be used to measure the density of a substance

After a long journey, the science team and the rest of the crew land the spacecraft on a large planet. The key facts about this planet are:

* The temperature ranges are about the same as those on the earth.
* There is no atmosphere on the planet
* There are no living organisms on the planet.

Your team searches the planet and brings back rock and mineral samples for analysis. After the studies are completed it is determined that all substances on the planet are made from only 12 different elements. After more laboratory work, your team isolates and purifies 11 of these elements. ALL OF WHICH ARE DIFFERENT FROM THOSE FOUND ON EARTH. Using the materials and instruments in your science kit, you assign each isolated element a name and symbol (each name and symbol are derived from zodiac signs) and also determine mass, melting point, and density. Each of the elements are tested for their reaction with your chemicals C1, C2, C3, and C4. Your team also tries to burn each new element with some oxygen aboard your ship. Some form oxides and some do not. The results of all these tests are shown on the sheet labeled “Eleven Elements”. Use this data to help you complete this activity.

1. Fill in a periodic chart for the twelve elements on this planet. Arrange the elements in a chart: place them into the chart in order of increasing atomic mass (where necessary leave a space). On your periodic chart show the element’s symbol and its atomic mass. Elements with similar properties should be in the same vertical column (the same group).

| **1** | **2** | **3** | **4** |
| --- | --- | --- | --- |
| **5** | **6** | **7** | **8** |
| **9** | **10** | **11** | **12** |

1. Fill in the chart below with the properties of the missing element. Then complete graph below to fill in remianing blanks.

| Name: |  |  | Melting Point |  |
| --- | --- | --- | --- | --- |
| Symbol |  |  | Oxide Formula |  |
| Atomic Number |  |  | Reaction with C1 |  |
| Atomic Mass |  |  | Reaction with C2 |  |
| Density |  |  | Reaction with C3 |  |
| Color |  |  | Reaction with C4 |  |

1. Construct a line graph for density of each element as a function of atomic number.

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1. Plot the melting point as a function of atomic number for each element.

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| **Aquarius - Aq**  Atomic Mass: 9.4 amu  Density: 3.1 g/cm3  Yellow solid  Melting point: 250°C  Oxide formula: Aq2O3  *Reacts with C3 to form a yellow-red solution* | **Aries - Ai**  Atomic Mass: 11.8 amu  Density: 4.0 g/cm3  Black solid  Melting point: 290°C  Oxide formula: none  *No reaction with C1, C2, C3, or C4* | **Cancer - Cn**  Atomic Mass: 32.3 amu  Density: 6.1 g/cm3  Silver solid  Melting point: 400°C  Oxide formula: none  *No reaction with C1, C2, C3, or C4* | **Capricorn - Cp**  Atomic Mass: 3.1 amu  Density: 2.5 g/cm3  White solid  Melting point: 100°C  Oxide formula: Cp2O  *Reacts w/C1 and C2 to form white precipitate* |
| --- | --- | --- | --- |
| **Gemini - Gm**  Atomic Mass: 16.5 amu  Density: 3.5 g/cm3  Turquoise solid  Melting point: 250°C  Oxide formula: GmO  *Reacts w/ C2 and C4 to form colored solution* | **Leo - Le**  Atomic Mass: 29.1 amu  Density: 5.0 g/cm3  Red solid  Melting point: 380°C  Oxide formula: Le2O3  *Reacts with C3 to form yellow-red solution* | **Libra -Lb**  Atomic Mass: 27.2 amu  Density: 4.5 g/cm3  Green solid  Melting point: 320°C  Oxide formula: LbO  *Reacts w/ C2 and C4 to form colored solution* | **Pisces -Pi**  Atomic Mass: 6.2 amu  Density: 2.7 g/cm3  Blue solid  Melting point: 200°C  Oxide formula: PiO  *Reacts w/ C2 and C4 to form colored solution* |
| **Sagittarius - Sa**  Atomic Mass: 25.1 amu  Density: 4.1 g/cm3  Silver solid  Melting point: 250°C  Oxide formula: Sa2O  *Reacts w/C1 and C2 to form white precipitate* | **Scorpio - So**  Atomic Mass: 14.1 amu  Density: 3.0 g/cm3  Gray solid  Melting point: 180°C  Oxide formula: So2O  *Reacts w/C1 and C2 to form white precipitate* | **Taurus - Tu**  Atomic Mass: 20.9 amu  Density: 5.0 g/cm3  Grey solid  Melting point: 300°C  Oxide formula: none  *No reaction with C1, C2, C3, or C4* | ? |