NAME: **HONORS CHEMISTRY**

SECTION: Periodic Trends Graphing Activity

Model

**Graph 1:**

Using the data listed in Table 1, plot the atomic radius of each element against increasing atomic number. The atomic radii shown here are given in nanometers. (1 nm = 1 x 10-9 m)

Connect each point to the adjacent point with a line segment.

On your graph, draw dashed vertical lines to separate the periods: ie, between elements 2 and 3; between elements 10 and 11; and between elements 18 and 19.

If you wish, you may color code the elements by family.

**Graph 2:**

Using the data listed in Table 2, plot the first ionization energy of each element against increasing atomic number.

Connect each point to the adjacent point with a line segment.

On your graph, draw dashed vertical lines to separate the periods: ie, between elements 2 and 3; between elements 10 and 11; and between elements 18 and 19.

If you wish, you may color code the elements by family.

Table 1

|  |  |  |  |
| --- | --- | --- | --- |
| Element | Atomic Number | Atomic Radius (nm) | First Ionization Energy (kJ/mol) |
| Hydrogen | 1 | 0.037 | 1312 |
| Helium | 2 | 0.05 | 2372 |
| Lithium | 3 | 0.152 | 519 |
| Beryllium | 4 | 0.111 | 900 |
| Boron | 5 | 0.088 | 799 |
| Carbon | 6 | 0.077 | 1088 |
| Nitrogen | 7 | 0.070 | 1406 |
| Oxygen | 8 | 0.066 | 1314 |
| Fluorine | 9 | 0.064 | 1682 |
| Neon | 10 | 0.070 | 2080 |
| Sodium | 11 | 0.186 | 498 |
| Magnesium | 12 | 0.160 | 736 |
| Aluminum | 13 | 0.143 | 577 |
| Silicon | 14 | 0.117 | 787 |
| Phosphorus | 15 | 0.110 | 1063 |
| Sulfur | 16 | 0.104 | 1000 |
| Chlorine | 17 | 0.099 | 1255 |
| Argon | 18 | 0.094 | 1519 |
| Potassium | 19 | 0.231 | 418 |
| calcium | 20 | 0.197 | 590 |

**Key Questions:**

1. What is the pattern for atomic radius as you go from left to right across a period?
2. What is the pattern for atomic radius as you go down a group?
3. What is the pattern for ionization energy as you go from left to right across a period?
4. What is the pattern for ionization energy as you go down a group?