**03.03 Periodic Trends: Assignment Details**

For this assignment, you will be creating two graphs to show the trends of atomic radius across the periods and down a group on the periodic table. Then you will use your graph and what you have learned in the lesson to answer questions.

**Part I: Atomic Radius Trend Going
Across the Periodic Table**

(Graph: 10 points total)

For elements in period 2, use the data below to create a **XY scatter plot (line graph)** of atomic radius a function of atomic number. You may use the graphing software of your choice. Contact your instructor if you need help with this part of the assignment.

Be sure to follow the tips below to make sure your graph is complete.

* Include an appropriate title for your graph. (1 point)
* Atomic number should be on the *x*-axis. (1 point)
* Atomic Radius should be on the y-axis. (1 point)
* Be sure that each axis has a scale that is evenly spaced and appropriate for the range of data. (3 points)
* Plan the scale of the graph so that the graph fills the whole page. (2 points)
* Label each axis appropriately, with the name and units of measurement. (2 points)

**Atomic Radius data for period 2**

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| **Element** | **Atomic Number** | **Atomic Radius (pm)** |
| Lithium | 3 | 152 |
| Beryllium | 4 | 113 |
| Boron | 5 | 88 |
| Carbon | 6 | 77 |
| Nitrogen | 7 | 70 |
| Oxygen | 8 | 66 |
| Fluorine | 9 | 64 |
| Neon | 10 | 58 |

**Part II: Atomic Radius Trend Going
Down a Group**

(Graph: 10 points total)

Now we are going to look at the trend for atomic radius going down (top to bottom) group 14 on the periodic table. Use the data below to create a **XY scatter plot (line graph)** of atomic radius as a function of period number.

Be sure to follow the tips below to make sure your graph is complete.

* Include an appropriate title for your graph. (1 point)
* Period number should be on the *x*-axis. (1 point)
* Atomic Radius should be on the y-axis. (1 point)
* Be sure that each axis has a scale that is evenly spaced and appropriate for the range of data. (3 points)
* Plan the scale of the graph so that the graph fills the whole page. (2 points)
* Label each axis (name and units of measurement). (2 points)

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| --- | --- | --- |
| **Element** | **Period Number on the periodic table** | **Atomic Radius (pm)** |
| Carbon | 2 | 77 |
| Silicon | 3 | 117 |
| Germanium | 4 | 122 |
| Lead | 6 | 175 |

**Part III: Analysis and Conclusion**

(10 points total)

After completing both graphs, answer the questions below in complete sentences. Both the question and your answer should be included in the document (along with the two graphs) that you submit to your instructor.

* 1. Refer to the graph that you created in Part I of this assignment. Describe the general trend or patterns that you observed in the atomic radius as you go across the periodic table. (2 points)
	2. In Part II of this assignment, you graphed the atomic radius of some elements from group 14 on the periodic table. What is the general trend for atomic radius going down that group? (2 points)
	3. What element in Period 5 of the periodic table is a member of Group 14? (1 point)
	4. The word interpolate means to use a given line graph to find unknown points between the plotted points of the graph. Use your line graph from Part II to interpolate, or estimate, atomic radius of Tin (Sn). (1 point)
	5. Tin's actual atomic radius is 140 pm. Use the math equation below to determine the percent error of your estimated value. (2 points)

Percent error =  × 100

This equation means that you subtract to find the difference between the actual value (given in this problem) and the experimental value (estimated from the graph). The numerator is in an absolute value sign, so the difference should always be positive. Take that difference and divide by the actual value (given in this problem) of tinâ€™s atomic radius. Take your answer and multiply by 100 to make it a percentage, and that is your percent error. Percent error is a common calculation in science. Your grade will not be determined by the amount of error, but just that you used the calculation correctly.

* 1. The atomic radius you estimated from your graph is most likely not exactly the same as the true atomic radius of tin. There is a small percent error. What do you think caused this error? (2 points)

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