

A TOUR OF THE PERIODIC TABLE

EXPERIMENT 6

Name _____

No formal lab report is required.

Use the Periodic Table and Table S in the Regents Chart and Figure 14.8 in Chapter 14 in the text to answer these questions. Question 9 requires a plot. Include units where appropriate.

- List the chemical symbols for:
 - The alkali metals _____
 - The alkaline earth metals _____
 - The halogens _____
 - The noble gases _____
- What two elements are liquid at room temperature? _____
- Which elements are gases at room temperature? _____
- Which elements are diatomic? _____
- Which group contains all three physical states at STP (normal room conditions)? _____
- Physical properties:
 - The lowest boiling point is _____ for element _____.
 - The lowest freezing point is _____ for element _____.
 - The highest melting point is _____ for element _____.
 - The highest boiling point is _____ for element _____.
 - The element with the highest density is _____, with density _____ g/cm³. By comparison, lead has a density of _____ g/cm³ and water has a density of _____ g/cm³.
- Size of atoms and ions (ion sizes can be found in the text Figure 14.8):
 - The smallest atomic radius is _____ for element _____.
 - The smallest ionic radius is _____ for element _____.
 - The largest atomic radius is _____ for element _____.
 - The largest ionic radius is _____ for element _____.

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8. State the trends (increases or decreases) for the following properties:
- Top to bottom in Group 1: the atomic radius _____.
 - Top to bottom in Group 17: the atomic radius _____.
 - Left to right in Period 3: the atomic radius _____.
 - As a metal changes from an atom to a cation, the size _____.
 - As a nonmetal forms an anion, the size _____.
 - Top to bottom in Group 1, the melting point _____.
 - Top to bottom in Group 17, the melting point _____.
 - Top to bottom in Group 15, the metallic character _____.
9. Plot the first ionization energy for the first 20 elements (I_1 as dependent variable and atomic number as independent variable). Connect the points. Label each point with its symbol. Attach the graph to this report.
10. The five highest electronegativity elements are _____, located in the _____ corner of the Periodic Table; the four lowest electronegativity elements are _____, located in the _____ corner of the Periodic Table.
11. Mendeleev was the first person to organize elements into a table according to their physical and chemical properties. He noticed a gap in his table between silicon and tin, and correctly predicted many of the properties of that yet-to-be-discovered element. Name the element and, using your knowledge of the periodic trends within a Group, predict its properties by averaging the properties of silicon and tin.

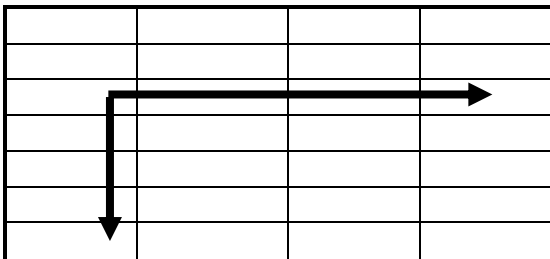
Element Name and Symbol: _____			
	Predicted	Actual	% Error
No. valence electrons			
Atomic mass (amu)			
Electronegativity			
I_1 (kJ/mol)			
MP (K)			
BP (K)			
Density (g/cm ³)			
Atomic radius (pm)			

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12. Periodic Trends

Write the trend (increasing or decreasing) for each property next to the arrow. State the reason for each trend.

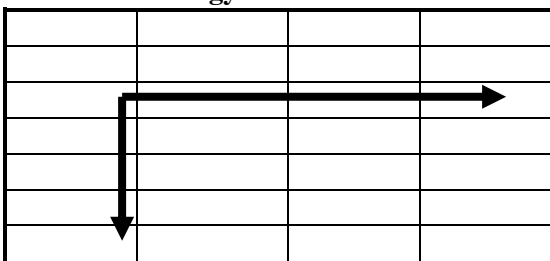
Atomic Size



Reason: Across a Period

Reason: Down a Group

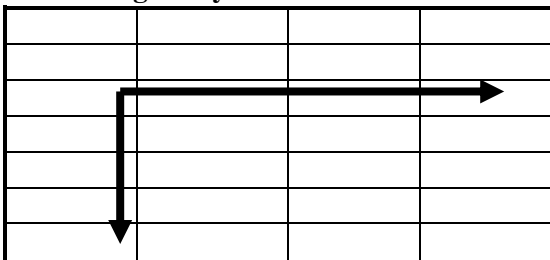
Ionization Energy



Reason: Across a Period

Reason: Down a Group

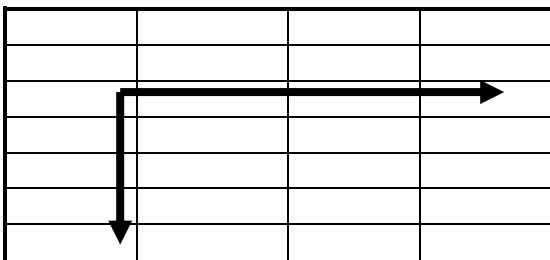
Electronegativity



Reason: Across a Period

Reason: Down a Group

Metallic Character



Reason: Across a Period

Reason: Down a Group