

Name _____ Date _____ Period _____

Electron Configurations Lab

Purpose: What are the patterns in electron configuration used to organize of the periodic table?

Hypothesis: None required for this activity

Procedure:

PART I (make your own data sheet)

1. On a **SEPARATE** sheet of paper, list the **ATOMIC NUMBER** and the **SYMBOL** for the first **54** elements on the periodic table in a vertical column.
2. To the right of each element, write the **ELECTRON CONFIGURATION**

PART II

3. On the **ATTACHED DATA SHEET #1**, list in the appropriate **VERTICAL** columns the **SYMBOL** and **ATOMIC NUMBER** of the elements that have the following patterns of electrons in the outermost energy level of the atom:
 - A: the **END** of the configuration is "**s**¹" (ending in 1s¹ or 2s¹ or 3s¹, etc.)
 - B: ends in "**s**²"
 - C: ends in "**p**¹"
 - D: ends in "**p**²"
 - E: ends in "**p**³"
 - F: ends in "**p**⁴"
 - G: ends in "**p**⁵"
 - H: ends in "**p**⁶"

PART III

4. On the **ATTACHED DATA SHEET #2**, list the following in each **ROW**:
 - A: In the first row, list all the elements that end with electrons in the 3d orbitals, but have **NO 4p** electrons.
 - B: In the second row, list all the elements that have end with electrons in the 4d orbitals, but have **NO 5p** electrons.

Data: see data sheets

Conclusion (answer analysis questions, to help with conclusion): conclusion will be a general statement of what was learned, reflecting the purpose.

Analysis Questions:

Answer the following questions:

- 1) How does your Data Sheet 1 compare with the periodic table? Explain any similarities or differences.
- 2) Which element does not appear to be in the correct place in your data sheet compared to the periodic table? Explain why it is in a different place on the periodic table.
- 3) Compare Data Sheet 2 with the periodic table. Explain what part of the periodic table is similar.
- 4) Explain why are there 10 elements in each row of Data Sheet 2?
- 5) Write the electron configurations for the following elements: Cs, La, Pb, Rn. Predict the vertical column or horizontal row where these elements would fit into the charts on data sheet #1 or #2. State a reason for the prediction.
- 6) Look at the highest energy level electrons in your original electron configurations. How many *total valence electrons* do you observe for each element in columns A-H on Data Sheet 2? How does that compare with what you have already learned about valence electrons and the groups on the periodic table?

