

# Chemistry Chapter 5 Worksheet

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Name: \_\_\_\_\_

Provide a short and specific definition in YOUR OWN WORDS. Do not use the definition from the book

Additional Notes:

Periodic Law \_\_\_\_\_

\_\_\_\_\_

Periodic Table \_\_\_\_\_

\_\_\_\_\_

Lanthanide \_\_\_\_\_

\_\_\_\_\_

Actinide \_\_\_\_\_

\_\_\_\_\_

Alkali metals \_\_\_\_\_

\_\_\_\_\_

Alkaline-earth metals \_\_\_\_\_

\_\_\_\_\_

Transition elements \_\_\_\_\_

\_\_\_\_\_

Main-group elements \_\_\_\_\_

\_\_\_\_\_

Halogens \_\_\_\_\_

\_\_\_\_\_

Atomic radius \_\_\_\_\_

\_\_\_\_\_

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Ion \_\_\_\_\_

\_\_\_\_\_

Ionization NRG \_\_\_\_\_

\_\_\_\_\_

Electron affinity \_\_\_\_\_

\_\_\_\_\_

Cation \_\_\_\_\_

\_\_\_\_\_

Anion \_\_\_\_\_

\_\_\_\_\_

Valence electron \_\_\_\_\_

\_\_\_\_\_

Electronegativity \_\_\_\_\_

\_\_\_\_\_

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## Section 5.1

1. What 4 categories did Lavoisier compile the known elements, at that time, into?

a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

d. \_\_\_\_\_

2. Mendeleev organized his periodic table according to \_\_\_\_\_.

3. Why did Mendeleev place elements into columns? (i.e. why was one element placed below/above another element?)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Who rearranged Mendeleev's periodic table and how did he arrange it?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. Where are the inner transition metals located on the period table, what 2 series are the inner transition metals split into, and what are the ranges for each of these splits?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6. How did the discovery of the Noble Gases impact Mendeleev's periodic table?

\_\_\_\_\_

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7. What is the most distinctive property of the noble gases?

\_\_\_\_\_

8. In the current periodic table there are a few instances when the atomic mass of the following element is less than the element it follows (example: I and Te). Find at least 2 other instances where this phenomenon occurs.

a. \_\_\_\_\_

b. \_\_\_\_\_

9. A particular isotope contains 35 protons, 35 electrons, and 44 neutrons.

a. What is the atomic number for this isotope? \_\_\_\_\_

b. What is the name and symbol of this isotope? \_\_\_\_\_

c. Identify 2 other element that are in the same group \_\_\_\_\_

d. Identify the period \_\_\_\_\_

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MrG

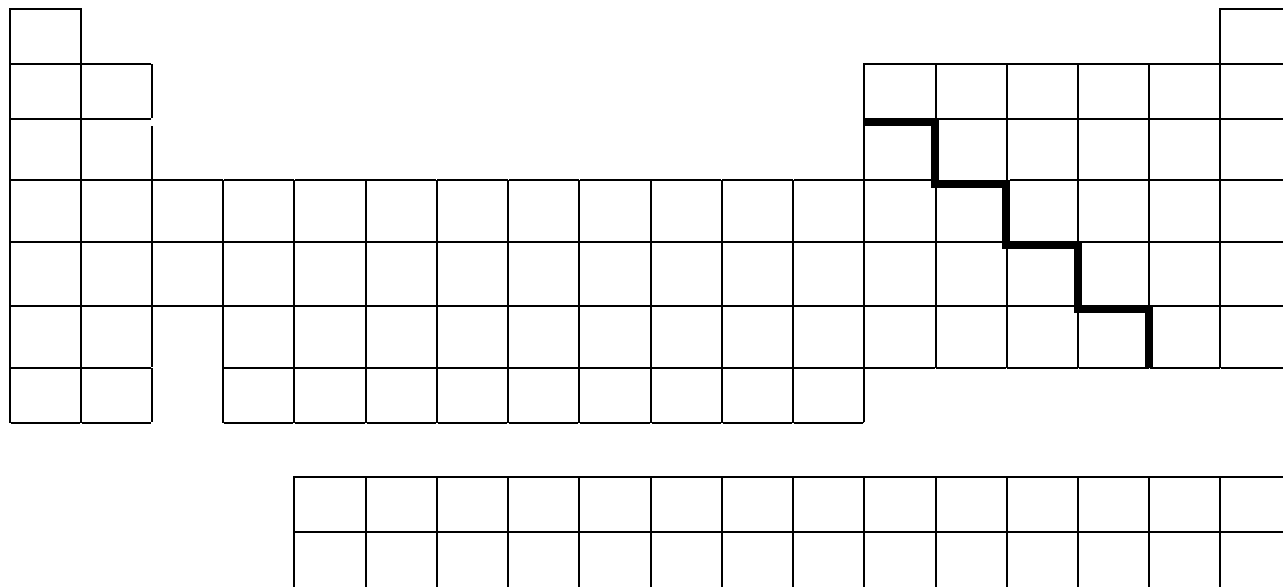
Mr. Gunkelman

## Section 5.2

10. What atomic property determines the length of a period in the periodic tables?

\_\_\_\_\_

11. Identify and name the 4 blocks on the periodic table.



12. Which group on the periodic table has a partially filled *s*-orbital?

\_\_\_\_\_

13. Write the noble gas electron configuration for Li, Na, and K.

Be \_\_\_\_\_

Mg \_\_\_\_\_

Ca \_\_\_\_\_

a. What do you notice? \_\_\_\_\_

b. What would you expect the noble gas electron configuration for Rb to look like?

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14. What is the electron dot diagram?

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15. Draw the electron dot diagram for the following elements.

Be      Ca      N      Al      Na

16. How can the noble gas electron configuration help you create the electron dot diagram for an atom?

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17. Identify the group on the periodic table that has a full  $p$ -orbital.

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18. Determine the period of an element using the following information.

- a.  $1s^2 2s^2 2p^3$  \_\_\_\_\_
- b.  $1s^2 2s^2 2p^6 3s^2$  \_\_\_\_\_
- c.  $1s^2 2s^2 2p^6 3s^2 3p^4$  \_\_\_\_\_
- d.  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^7$  \_\_\_\_\_

19. Identify the periodic table group number (or range of numbers) for each of the following element groups.

- a. Alkali metals \_\_\_\_\_
- b. Halogens \_\_\_\_\_
- c. Transition metals \_\_\_\_\_
- d. Main group metals \_\_\_\_\_
- e. Alkaline earth metals \_\_\_\_\_

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20. Which block on the periodic table contains the inner transition metals? \_\_\_\_\_
21. Name 3 distinctive properties for the alkali metals.
- \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
22. True or False: All elements in group 1 are alkali metals. \_\_\_\_\_
23. Name 3 distinctive properties for the alkaline earth metals.
- \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
24. True or False: All elements in group 2 are alkaline earth metals. \_\_\_\_\_
25. True or False: Some of the transition metals can be found “free” in nature. \_\_\_\_\_
26. Name 2 distinctive properties for the halogen group.
- \_\_\_\_\_
  - \_\_\_\_\_
27. Identify the element and write the noble gas electron configuration for the following.
- Group 3, Period 3 \_\_\_\_\_
  - Group 4, Period 2 \_\_\_\_\_
  - The only liquid metal \_\_\_\_\_
28. Give the symbol, period, and block for the following elements.
- Sulfur \_\_\_\_\_
  - Manganese \_\_\_\_\_
  - Tin \_\_\_\_\_





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## Section 5.3

### Atomic Radius

30. The atomic radius for metals is defined as \_\_\_\_\_  
\_\_\_\_\_

31. Generally, the atomic radius \_\_\_\_\_ as you move across the periodic table.

a. This is caused by \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

32. Generally, the atomic radius \_\_\_\_\_ as you move down the periodic table.

a. This is caused by \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

33. Circle the atom with the LARGER atomic radius

Ca vs. Be

B vs. O

Li vs. Se

34. What is a valence electron?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

35. How does the periodic table group number relate to the number of valence electrons an atom contains?

\_\_\_\_\_

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## Ionization NRG

36. Ionization NRG is defined as \_\_\_\_\_

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37. Generally, the ionization NRG \_\_\_\_\_ as you move across the periodic table.

a. This is caused by \_\_\_\_\_

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38. Generally, the ionization NRG \_\_\_\_\_ as you move down the periodic table.

a. This is caused by \_\_\_\_\_

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39. Explain why the 2<sup>nd</sup> ionization NRG is always higher than the 1<sup>st</sup> ionization NRG.

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40. Circle the atom with the LARGER ionization NRG

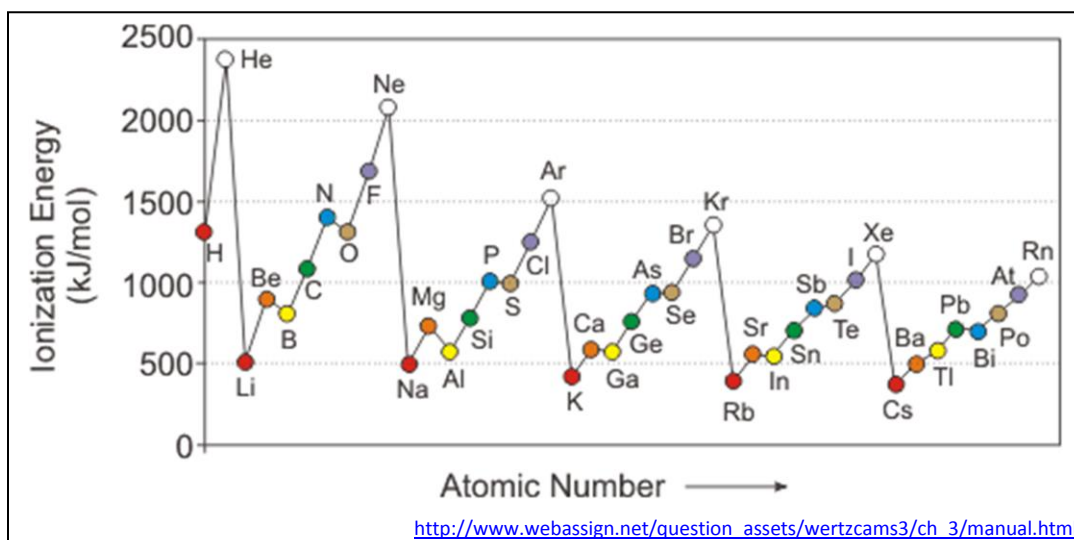
Ca vs. Be

B vs. O

Li vs. Se

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41. Using the ionization NRG vs. atomic number graph below, explain why the graph “dips” at Boron and Oxygen.




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## Electron Affinity

42. Electron affinity is defined as \_\_\_\_\_

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43. Generally, the electron affinity \_\_\_\_\_ as you move across the periodic table.

a. This is caused by \_\_\_\_\_

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44. Generally, the electron affinity \_\_\_\_\_ as you move down the periodic table.

a. This is caused by \_\_\_\_\_

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45. Circle the atom with the LARGER electron affinity

Ca vs. Be

B vs. O

Li vs. Se

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## Ionic Radius

46. State the 2 explanations for why the radius of an atom decreases when it becomes a cation.

a. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

b. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

47. State the 2 explanations for why the radius of an atom increases when it becomes a anion.

a. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

b. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

48. Generally, the ionic radius \_\_\_\_\_ as you move across the periodic table.

49. Generally, the ionic radius \_\_\_\_\_ as you move down the periodic table.

50. Explain why the ionic radius “jumps” when you move from Carbon to Nitrogen.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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## Electronegativity

51. Electronegativity is defined as \_\_\_\_\_

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52. Generally, the electronegativity \_\_\_\_\_ as you move across the periodic table.

a. This is caused by \_\_\_\_\_

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53. Generally, the electronegativity \_\_\_\_\_ as you move down the periodic table.

a. This is caused by \_\_\_\_\_

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54. Circle the atom with the LARGER electron affinity

Ca vs. Be

B vs. O

Li vs. Se

55. Explain how electronegativity is different than the other periodic table properties.

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56. Write the electron configuration for the following.

a. Na \_\_\_\_\_

b.  $O^{2-}$  \_\_\_\_\_

c. P \_\_\_\_\_

d.  $P^{3-}$  \_\_\_\_\_

e. Ne \_\_\_\_\_

57. Compare the radius of a neutral atom to the radius of the positively charge ion.

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58. Compare the radius of a neutral atom to the radius of the negatively charge ion.

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59. Would it be more difficult to remove an electron from a neutral lithium atom or a neutral fluorine atom? Explain.

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All Trends

60. Draw arrows indicating the direction each of the following periodic table trends INCREASE.

Electron Affinity   
 Ionization NRG   
 Ionic Radius   
 Atomic Radius   
 Electronegativity 