

Name _____ Period _____

LTHS: Chemistry

Unit 4 Review - Periodic Table and Electron Configurations

I can explain how the original periodic table was put together and how it has changed over time

1. Who put together the original periodic table and how did he organize it? What was unique about how he used the periodic table after he was finished?

Mendeleev • arranged by atomic mass.
• left gaps where he believed undiscovered elements would belong
• predicted properties of missing elements

2. Who improved the periodic table and how did he reorganize it?

Moseley • arranged by atomic #

I can differentiate between groups and periods

3. What is a period?
horizontal row

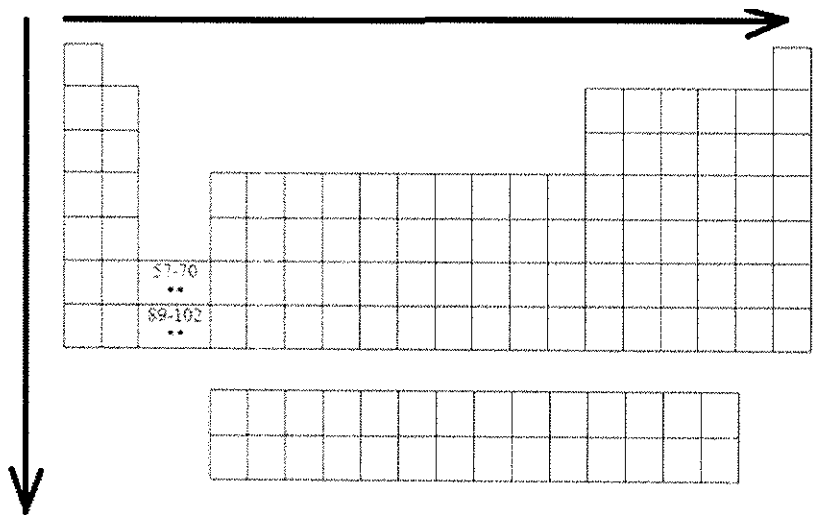
4. What is a group/family? How are elements of the same group similar?
vertical column
elements in the same group have similar properties because of their electron configurations.

I can identify patterns on the periodic table

5. On the periodic table complete the trends by labeling with increases or decreases.

Atomic Radius decreases
Electronegativity increases
Ionization Energy increases

Atomic Radius increases
Electronegativity decreases
Ionization Energy decreases



9. Group 7A elements are known as the halogens. What are the properties of the halogens?
exist in all 3 States

salt former
7 valence electrons

10. Group 8A elements are known as the noble gases. What are the properties of the noble gases?
very stable

don't readily react
full outer shells w/ 8 electron (He=2)

I can locate metals, nonmetals and metalloids on the periodic table

11. What type of elements is the periodic table mostly made of?

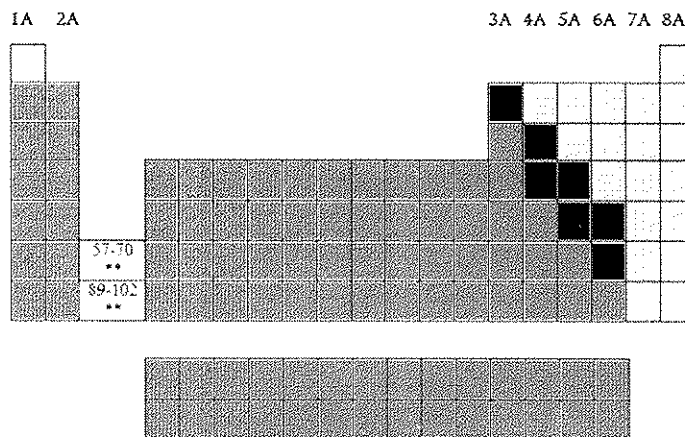
metals

12. How can you tell if an element is a metal, nonmetal, or metalloid based on its position on the periodic table?

metals - left
metalloid - along stair step
non metal - right (and H)

13. Make a key for the periodic table on the right to identify the metals, nonmetals and metalloids.

- non metals
- metals
- metalloids



I can classify metals, nonmetals and metalloids based on their properties

14. List the main properties of metals, nonmetals and metalloids

metals
malleable
ductile
good conductors
lustrous

metalloids
properties of metals and nonmetals
Semi conductors

nonmetals
brittle
not malleable / ductile
do not conduct heat / electricity

15. How is the new quantum model different than the Bohr Model?

Bohr - circular orbits that hold electrons while they orbit nucleus

Quantum - orbitals (regions where electrons are likely to be) different shapes, energies

16. How many sublevels are contained in the 1st energy level? 1 2nd energy level? 2
 3rd energy level? 3 4th energy level? 4

17. What are the four sublevels called?

s, p, d, f

18. How many orbitals does each of the sublevels contain?

s 1 p 3 d 5 f 7

19. How many electrons can each of the sublevels hold?

s 2 p 6 d 10 f 14

I can write the complete electron configuration and the noble gas electron configuration for an element

20. What is the Aufbau Principle?

electrons fill orbitals with lowest energy first then build up.

21. What is Hund's Rule?

electrons spread out in equal energy orbitals before doubling up.

22. What is the Pauli exclusion principle?

electrons that share an orbital must have opposite spins

23. What is the difference between an excited state and ground state configuration?

an excited state configuration doesn't follow the 3 rules of electron configurations. One or more electrons are placed in a higher orbital

24. For the following configurations, determine which are excited states. If they are excited states, write the correct ground state configuration.

a. $1s^2 2s^2 3s^1$ excited $1s^2 2s^2 2p^1$

b. $1s^2 2s^2 2p^6 3s^2 3p^4$ ground

c. $1s^2 2s^2 2p^4 3s^1$ excited $1s^2 2s^2 2p^5$

d. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5 4s^1$ excited $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$

25. Provide the full electron configuration for the following:

a. Phosphide (P^{3-}) $1s^2 2s^2 2p^6 3s^2 3p^6$

b. Calcium $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$

c. Technetium $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^5$

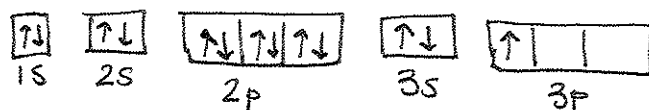
26. Provide the noble gas configuration for the following



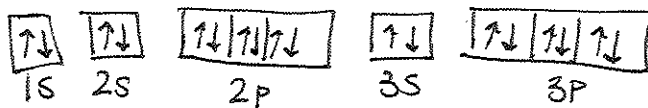
I can draw the orbital dot diagram

27. Provide orbital diagrams for the following:

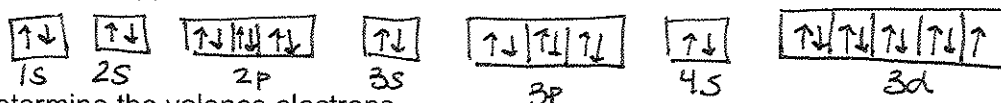
a. Aluminum



b. Argon



c. Copper



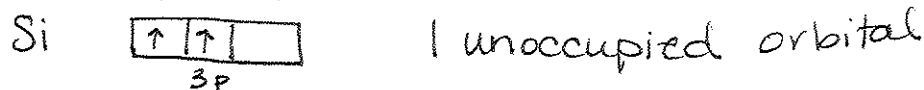
I can determine the valence electrons

I can determine the energy level of an element based on the periodic table

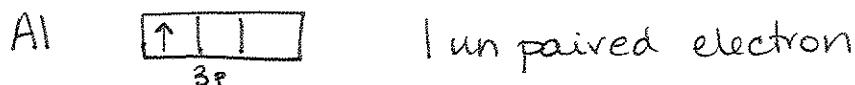
I can identify what block and element is located on the periodic table

Based on the electron configuration or orbital diagrams

28. How many unoccupied orbitals does silicon have?



29. How many unpaired electrons does Aluminum have?



30. How many valence electrons does Selenium have?



31. Which energy level are the valence electrons in for Astatine?

