

Trends of the Periodic Table Notes

1. A salute to _____ who invented the modern Table.
2. There are trends that go “up and down” in _____ on the table.
3. There are other trends that go “left and right” in _____ on the table.

Name these parts of the periodic table

4. Group 1 is called the _____
5. Group 2 is called the _____
6. The center of the table are the _____
7. On the right side of the staircase are the _____
8. Group 17 elements are called the _____
9. Group 18 elements are the _____
10. Seven of the nine atoms that touch the staircase are sort of “in between” metals and nonmetals, they are called the _____.
11. The left over atoms at the bottom (that all fit under Sc and Y in group 3 are called the _____ metals
12. The up and down columns of the Periodic Table are the _____
13. Atoms in the same group share many similarities of chemical properties, because they have similar electron orbitals, which means they bond in similar ways.
14. What does PERIODIC even mean here?
15. The elements of the Periodic Table are arranged in order

16. The Periodic Law states....

17. In group 18, all the gases are called “noble gases” because they _____ with other atoms. The Noble Gases are nearly inert.

18. Our periodic table has _____ groups, labeled across the top of the table

19. The periods of the table go _____.

20. The periods contain many elements that have _____.

21. Period numbers are _____, and they correspond to the number of _____ in the atoms of that period.

22. Fill in this chart.

<i>period</i>	<i>Example element</i>	<i>Electron configuration</i>	<i>Number of electron orbitals</i>
1	H		
2	Be		
3	S		
4	Mn		
5	Xe		
6	Ba		
7	Ra		

23. Fill in this chart that shows the SUBATOMIC particles.

Particle	Location	Charge	Mass	symbol
	Nucleus			
	Nucleus			
	Outside of the nucleus			

This is a cool way to show an element, with the important numbers.
Cobalt has mass of 59 amu, and it's atomic number is 27.



24. Calculate the number of protons, neutrons and electrons for this element now.

25. List ALL of the nonmetals (by symbol, in numeric order)

26. List all of the metalloids by symbol and name

27. How many elements are METALS?

28. There are _____ trends that we examine as _____ trends (patterns going down a group), or

_____ trends (patterns going across the table).

29. These trends are:

30. What is the group trend for atomic mass

31. What is the period trend for atomic mass?

Atom	Mass in amu
Be	
Mg	
Ca	
Sr	

Atom	Na	Mg	Al	Si
Mass in amu				

32. What is the group trend for atomic radius (size)?

33. What is the period trend for atomic radius (size)?

Atom	Mass in amu
Li	
Na	
K	
Cs	

Atom	Li	Be	B	C
Mass in amu				

34. The group trend for atomic radius (size) is increasing. Because...

35. The period trend for atomic radius is decreasing. Because...

36. Define Net Nuclear Charge:

37. Net Nuclear Charges. How many protons in each of these atoms?

Atom	K	Ca	Sc	Ti
Atomic number				
Net Nuclear Charge				

Atom	Atomic Number	Net Nuclear Charge
Be		
Mg		
Ca		
Sr		
Ba		

38. State the Group Trend for Net Nuclear Charge

39. State the Period Trend for Net Nuclear Charge

40. First Ionization Energy is

41. Fill in the chart here, state the trend.

Group 1 atom	1 st ionization energy kJ/mole	Electron configuration
Li		
Na	496	
K		
Rb		

42. Why is the group trend for first ionization energy decreasing?

43. Fill in the chart, then...

Atom	Rb	Sr	Y	Zr
1 st Ionization Energy kJ/mole				

State the period trend for first ionization energy.

44. The reason for this trend is...

45. Metallic Properties include

46. Nonmetallic Properties include

47. If you could rank all of the metals in all properties, and score out who wins the most times, the most metallic element would be _____
48. If you measured all of the non metals on all of the nonmetallic property list, the most nonmetallic element would be _____
49. Of the (yellow) Metalloids, _____ and _____ are both metals.

The other five: _____ are nonmetals.

This is dopey.

50. Which element is the most metallic, strontium, copper or lead? _____
51. Which element is the most nonmetallic, sulfur, bromine, or neon? _____

Cation Sizes and Anion Sizes

We have no charts to look over to determine the actual sizes of any ions, but we can still figure out the trends of cation sizes and of anion sizes by thinking.

What is the size of the ATOMS in picometers?

52. Sodium _____
53. Chlorine _____
54. Determine the group trends for cation size. Then the group trend for anion size as well.

Group 1 cations	Group 1 cation electron configurations
Li^{+1}	
Na^{+1}	
K^{+1}	
Rb^{+1}	

Group 17 anions	Group 17 anion electron configurations
F^{-1}	
Cl^{-1}	
Br^{-1}	
I^{-1}	

55. State the group trend for Cation Size

56. State the group trend for Anion Size

These trends exist because...

57. Fill in this chart

Cations:	Na^{+1}	Mg^{+2}	Al^{+3}
Electron configuration			

58. State the period trend for anion size

59. Fill in this chart

Anions:	N^{-3}	O^{-2}	F^{-1}
Electron configuration			

60. State the period trend for anion size

61. Define Electronegativity (created by Dr. Linus Pauling)

62. Draw... Let's imagine two hydrogen atoms bonding. They both have electronegativity values of 2.2

This is a
NON POLAR
BOND

63. Draw... Let's imagine HCl bonding now.

This is a
POLAR
BOND

64. Draw the diagram

65. The arrow itself is called a...

66. Fill in these two charts

Group 1 Atoms	electronegativity values
Li	
Na	
K	
Rb	

Group 17 Atoms	electronegativity values
F	
Cl	
Br	
I	

67. State the group trend for electronegativity.

68. Fill in this chart

Period 2	Li	Be	B	C	N	O	F	Ne
Electro Negativity Values								

69. State the period trend for electronegativity.

70. What's up with NEON?

71. The reason for the period trend for electronegativity to be increasing is...

72. Exceptions to the trends.

73. What are the atomic masses here? Which way do the masses go (up or down?)

atoms	Mn	Fe	Co	Ni	Cu
amus	54.9380	55.845	58.9332	58.693	64.456
trend					

74. Does this DESTROY the trend?

75. How is the Atomic Radius in this period working? Getting bigger or smaller?

Atoms	Li	Be	B	C	N	O	F	Ne
Radius in pm	130.	99	84	75	71	64	60	62
	start							

The period trend for atomic radius is decreasing. Fluorine...

76. Fill in table. Noble gases have no tendency to make bonds ever, so they don't have electronegativity values either, right? Look them up now.

Symbols	Names	Electronegativity value
2 -		
10 -		
18 -		
36 -		
54 -		
86 -		

77. Whoa!

78. Are there exceptions to Net Nuclear Charge? Think.

79. Predict the actual sizes of these cations & anions

Atom	Electron configuration	Radius	Ion	Electron configuration	Radius
Lithium	2-1	pm	Li^{+1}	2	
Magnesium	2-2-2	pm	Mg^{+2}	2-8	
Scandium	2-8-9-2	pm	Sc^{+3}	2-8-8	
Oxygen	2-6	pm	O^{-2}	2-8	
Phosphorous	2-8-5	pm	P^{-3}	2-8-8	

80. Cations are always...

81. A relative scale is one that...

82. Electronegativity is a relative scale, all atoms being relative _____.
Dr. Pauling determined that fluorine has the greatest tendency to gain electrons in a bonding situation.

83. An arbitrary scale is one that uses numbers that _____.
Dr. Pauling choose 4.0 for his highest value, given only to fluorine. All other values ranged down to zero.

Electronegativity is both...

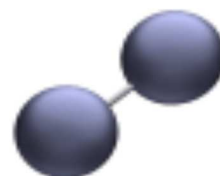
83. Allotropes are....

Examples include

Atomic oxygen



Diatomic oxygen



Ozone

