

Electrons/Periodic Table Review Packet

Name _____

Period _____

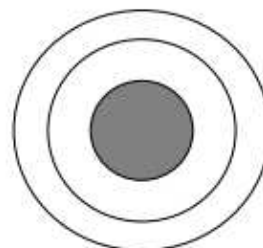
http://www.carolina.com/teacher-resources/Interactive/online-game-cell-structure-cellcraft-biology/tr11062.tr

Atomic Basics

Name _____

Part A: Atomic Structure

1. Draw five protons in the nucleus of the atom. Label them with their charge.
2. Draw six neutrons in the nucleus of the atom.
3. Draw two electrons in the first energy level and label them with their charge.
4. Draw three electrons in the second energy level and label them with their charge.
5. What element is represented by the diagram? _____



Part B: Atomic Calculations

6. Label the information provided in the periodic table.

8	←	_____
O	←	_____
Oxygen	←	_____
15.999	←	_____

7. What does the atomic number represent?

_____ or _____

8. What does the atomic mass represent?

_____ + _____

9. How would you figure the number of protons or electrons in an atom?
10. How would you figure the number of neutrons in an atom?
11. Use your knowledge of atomic calculations to complete the chart.

Element	Atomic Number	Atomic Mass	Protons	Neutrons	Electrons
Li	3	7			
P	15	31			
Cl		35	17		
Ni	28			31	
K		39			19
Ag	47			61	
H		1	1		
Si				14	14
W			74	110	
Ne				10	10

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Part C: Electron Configuration

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12. How many electrons can each level hold? 1st = _____ 2nd = _____ 3rd = _____
13. What term is used for the electrons in the outermost shell or energy level? _____
14. Scientists use two types of diagrams to show the electron configuration for atoms. What are they?
15. Calculate the missing information and then draw the Bohr Diagram and Lewis Structure for each of the following elements

Lithium, Neon, Magnesium, Chlorine, Helium, Silicon

16. Answer the questions below based on the elements in question #15.

- (1) Which elements had a filled outermost shell? _____
- (2) Which element would be most likely to lose electrons in a chemical bond? _____
- (3) Which element would be most likely to gain electrons in a chemical bond? _____
- (4) Which elements are not likely to bond with other elements? _____ Why?

Directions: Answer the questions with the proper information using your notes, book, and the periodic table.

1. Define a family. _____
2. What is a period? _____
3. What is the symbol for the following elements.
 - a. Magnesium _____
 - b. Potassium _____

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c. Iron _____ d. Copper _____

4. What are the names of the following elements.

a. C _____ b. Cl _____

c. Au _____ d. Sr _____

5. What period are the following elements in?

a. He _____ b. Ge _____

c. Rb _____ d. I _____

6. What group are the following elements?

a. Sulfur _____ b. Ca _____

c. Iodine _____ d. Fe _____

7. Give me an atom with the following characteristics.

a. Halogen _____ b. Chalcogen _____

c. Alkali metal _____ d. Boron _____

e. Lanthanide series _____ f. Alkaline Earth metal _____

g. Transition metal _____ h. Noble gas _____

Directions: Use your Periodic table to complete the worksheet.

1. What is the atomic symbol for silver?

2. What is the atomic mass of mercury?

3. Ni is the symbol for what element?

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4. The element that has the atomic number 17 is?
5. List the symbols for two transition metals.
6. Cu, Ag, and Au are all in what group #
7. Name two noble gases
8. Give the symbol for two halogens.
9. What is the symbol for element with atomic number 74?
10. What is the atomic mass of copper?
11. What is the last element in period 4?

For questions 12 - 15, label the following Key box as it should appear on your periodic table

12. _____

13. _____

14. _____

15. _____

→ 6
→ C
→ Carbon
→ 12.01

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Directions: Use a Periodic table to find the information asked for below:

1. What is the atomic number of:

Calcium _____

Iron _____

Gold _____

Uranium _____

2. What is the Atomic mass of:

Calcium _____

Iron _____

Uranium _____

Copper _____

3. How many protons do the following have?

Calcium _____

Gold _____

Copper _____

Iron _____

4. How many electrons do the following have?

Gold _____

Iron _____

Copper _____

Uranium _____

5. Does mercury have more protons and electrons than tin?

6. Is mercury a heavier element than tin?

7. Does potassium have more electrons than neon?

8. Does hydrogen have more electrons than Uranium?

9. Which has more protons, sulfur or iodine?

10. Write the symbols or the names for each of these elements:

Chlorine _____

Zn _____

Copper _____

Helium _____

Potassium _____

Iron _____

Silver _____

P _____

Na _____

Ne _____

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Sn _____

Mercury _____

Period _____

Date Thursday, January 14, 2016

Periodic Trends

ATOMIC RADIUS

1. What trend in atomic radius do you see as you go down a group/family on the periodic table?
2. What causes this trend?
3. What trend in atomic radius do you see as you go across a period/row on the periodic table?
4. What causes this trend?
5. Circle the atom in each pair that has the largest atomic radius.
 - a) Al B
 - b) S O
 - c) Br Cl
 - d) Na Al
 - e) O F
 - f) Mg Ca

6. Put the following elements in order from smallest to largest atomic radius **and** explain why:

C, O, Sn, Sr.

ELECTRONEGATIVITY

7. Define electronegativity
8. How does the ionic radius of a nonmetal compare with its atomic radius?
9. What trend in electronegativity do you see as you go down a group/family on the periodic table?
10. What causes this trend?
11. What trend in electronegativity do you see as you go across a period/row on the periodic table?
12. What causes this trend?
13. Circle the atom in each pair that has the greater electronegativity.
 - a) Ca Ga
 - b) Li O
 - c) Cl S
 - d) Br As
 - e) Ba Sr
 - f) O S

GENERAL QUESTIONS

14. Which group tends to form +1 ions? _____

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15. Which group tends to form +2 ions? _____

16. Which group tends to form -1 ions? _____

17. Which group tends not to form ions or react? _____

18. Based on the concept of periodic trends, answer the following questions for these atoms: **Li, Be, Mg, Na**.

Be able to defend your answers.

a. Which element has the lowest electronegativity? _____

b. Which element has the least metallic character? _____

c. Which element is the largest atom? _____

19. Based on the concept of periodic trends, answer the following questions for these atoms: **P, S, Cl, F**. Be

prepared to defend your answers.

d. Which element has the highest electronegativity? _____

e. Which element has the least metallic character? _____

f. Which element has the largest ion? _____

20. Based on the concept of periodic trends, answer the following questions for these atoms: **Au, Zn, S, Si**. Be

able to defend your answers.

a. Which element has the highest electronegativity? _____

b. Which element has the most metallic character? _____

c. Which element has the largest atom? _____

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21. Complete the following chart:

	K	Mg	Ne	N	Cl	Si
Atomic #						
Period						
Group #						
Family name (if any)						
# of valence e⁻						
# protons						
Metal, nonmetal, or metalloid?						
Conducts electricity? (yes/no)						
State at room temperature?						
Ion Formed? (positive, negative, none, varies)						

22. _____ metal

23. _____ chlorine

24. _____ metalloid

25. _____ transition elements

26. _____ group 1

27. _____ noble gases

28. _____ group 2

a. alkaline earth metals

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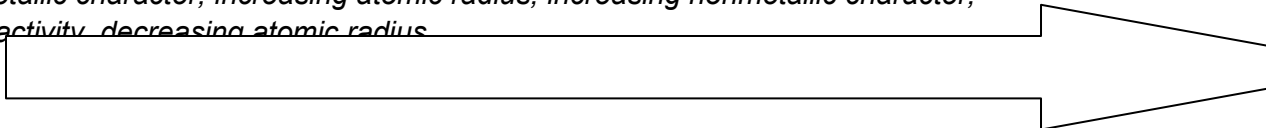
- b. metals with unpredictable properties
- c. a halogen
- d. make good semiconductors
- e. alkali metals
- f. has a full outer energy level (shell)
- g. loses electrons in bonding

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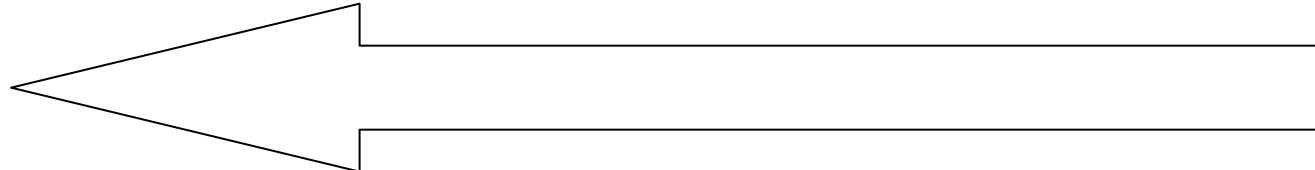
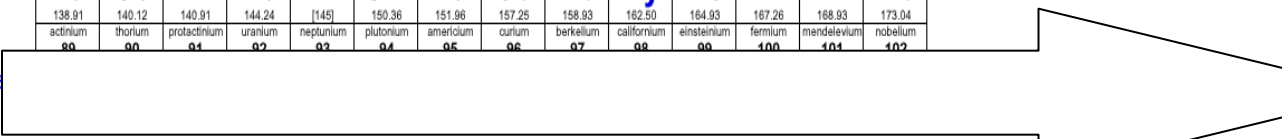
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Instructions Fill in the arrows below with the following terms: *increasing electronegativity, increasing metallic character, increasing atomic radius, increasing nonmetallic character, increasing reactivity, decreasing atomic radius*



beryllium 4 Be 9.0122		Key: element name atomic number symbol atomic weight (mean relative mass)										boron 5 B		carbon 6 C		nitrogen 7 N		oxygen 8 O		fluorine 9 F		helium 18 He									
magnesium 12 Mg 24.305		titanium 22 Ti 47.867		vanadium 23 V 50.942		chromium 24 Cr 51.996		manganese 25 Mn 54.938		nickel 28 Ni 58.693		copper 29 Cu 63.546		zinc 30 Zn 65.38		gallium 31 Ga 69.723		germanium 32 Ge 72.61		arsenic 33 As 74.922		selenium 34 Se 78.96		bromine 35 Br 79.904		krypton 36 Kr 83.80					
calcium 20 Ca 40.078		zirconium 40 Zr 91.224		niobium 41 Nb 92.906		molybdenum 42 Mo 95.94		technetium 43 Tc [98]		ruthenium 44 Ru 101.07		rhodium 45 Rh 102.91		palladium 46 Pd 106.42		silver 47 Ag 107.87		cadmium 48 Cd 112.41		indium 49 In 114.82		tin 50 Sn 118.71		antimony 51 Sb 121.76		tellurium 52 Te 127.60		iodine 53 I 126.90		xenon 54 Xe 131.29	
strontium 38 Sr 87.62		hafnium 72 Hf 178.49		tantalum 73 Ta 180.95		tungsten 74 W 183.84		rhenium 75 Re 186.21		osmium 76 Os 190.23		iridium 77 Ir 192.22		platinum 78 Pt 195.08		gold 79 Au 196.97		mercury 80 Hg 200.59		thallium 81 Tl 204.38		lead 82 Pb 207.2		bismuth 83 Bi 208.98		polonium 84 Po [209]		astatine 85 At [210]		radon 86 Rn [222]	
barium 56 Ba 137.33		radium 88 Ra [226]		rutherfordium 104 Rf [261]		dubnium 105 Db [262]		seaborgium 106 Sg [266]		bohrium 107 Bh [264]		hassium 108 Hs [269]		meitnerium 109 Mt [268]		ununnium 110 Uun [271]		ununium 111 Uuu [272]		ununbium 112 Uub [277]		ununquadium 114 Uuq [289]									
*lanthanoids La Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb		lanthanum 57 La 138.91		cerium 58 Ce 140.12		praseodymium 59 Pr 140.91		neodymium 60 Nd 144.24		promethium 61 Pm [145]		samarium 62 Sm 150.36		europium 63 Eu 151.96		gadolinium 64 Gd 157.25		terbium 65 Tb 158.93		dysprosium 66 Dy 162.50		holmium 67 Ho 164.93		erbium 68 Er 167.26		thulium 69 Tm 168.93		ytterbium 70 Yb 173.04			
**actinoids		actinium 89 Ac [227]		thorium 90 Th 232.04		protactinium 91 Pa [231]		uranium 92 U 238.03		neptunium 93 Np [237]		plutonium 94 Pu [244]		americium 95 Am [243]		curium 96 Cm [247]		berkelium 97 Bk [247]		californium 98 Cf [251]		einsteinium 99 Ei [252]		fermium 100 Fm [257]		mendelevium 101 Md [258]		nobelium 102 Nb [259]			



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Complete the following:

1. For each of the positive ions listed in column 1, use the periodic table to find in column 2 the total number of electrons that ion contains. The same answer may be used more than once.

_____ 1. Al^{+3}	A. 2
_____ 2. Fe^{+3}	B. 10
_____ 3. Mg^{+2}	C. 21
_____ 4. Sn^{+2}	D. 23
_____ 5. Co^{+2}	E. 24
_____ 6. Co^{+3}	F. 25
_____ 7. Li^{+1}	G. 36
_____ 8. Cr^{+3}	H. 48
_____ 9. Rb^{+1}	I. 76
_____ 10. Pt^{+2}	J. 81

2. For each of the following ions, indicate the total number of protons and electrons in the ion.

Ion	Number of Protons	Number of Electrons
Co^{+2}		
Co^{+3}		
Cl^{-1}		
K^{+1}		
S^{-2}		
Sr^{+2}		
Al^{+3}		
P^{-3}		

3. For each of the following atomic numbers, use the periodic table to write the formula (including the charge) for the simple ion that the element is most likely to form.

- | | |
|-------|-------|
| a. 53 | d. 88 |
| b. 38 | e. 9 |
| c. 55 | f. 13 |
4. Write the chemical symbol for the ion with 12 protons and 10 electrons.
5. Write the chemical symbol for the ion with 74 protons and 68 electrons.

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6. Write the chemical symbol for the ion with 95 protons and 89 electrons.
7. Write the chemical symbol for the ion with 33 protons and 36 electrons.
8. Write the chemical symbol for the ion with 29 protons and 27 electrons.
9. How many protons, neutrons, and electrons are present in the $^{59}_{28}\text{Ni}^{+2}$ ion?
10. How many protons, neutrons, and electrons are present in the $^{91}_{40}\text{Zr}^{+4}$ ion?
11. How many protons, neutrons, and electrons are present in the $^{140}_{58}\text{Ce}^{+3}$ ion?
12. How many protons, neutrons, and electrons are present in the $^{79}_{34}\text{Se}^{-2}$ ion?
13. How many protons, neutrons, and electrons are present in the $^{13}_{6}\text{C}^{-4}$ ion?
14. Write the complete chemical symbol for the ion with 84 protons, 125 neutrons, and 80 electrons.
15. Write the complete chemical symbol for the ion with 27 protons, 32 neutrons, and 25 electrons.
16. Write the complete chemical symbol for the ion with 73 protons, 108 neutrons, and 68 electrons.
17. Write the complete chemical symbol for the ion with 31 protons, 39 neutrons, and 28 electrons.