

Name \_\_\_\_\_

Date \_\_\_\_\_

### 8<sup>th</sup> Grade Science Second Semester Skill Review

#### Chapter 20: Introduction to Atoms

In each box of the table below, write the name of the scientist(s) associated with the statement. Choose from the following: Democritus, Rutherford, Thomson, Dalton, Bohr, Schrodinger, and Heisenberg.

A. Most of an atom's mass is in the nucleus.	B. There is a small, dense, positively charged nucleus.
C. There are small, negatively charged particles inside an atom.	D. Electrons can jump from a path in one level to a path in another level.
E. Atoms of different elements are different.	F. He conducted the cathode-ray tube experiment.
G. Atoms are small, hard particles.	H. Atoms contain mostly empty space.
I. Atoms are "uncuttable."	J. He conducted experiments in combining elements. <i>OMIT</i>
K. Electrons travel in certain paths, or energy levels.	L. Electron paths cannot be predicted.
M. His theory of atomic structure led to the "plum-pudding" model.	N. His model had electrons surrounding the nucleus at a distance.
O. Atoms of the same element are exactly alike.	P. Electrons are found in electron clouds, not paths.
Q. All substances are made of atoms.	R. Atoms are made of a single material formed into different shapes and sizes.
S. He conducted the gold foil experiment.	T. He wanted to know why elements combine in specific proportions.

1. Draw the Bohr model of sulfur. Be sure to include symbol, at. #, mass #, label nucleus, electron cloud, energy levels, show number of protons, neutrons, electrons in each energy level.

2. Draw a Lewis structure for the following atoms:

N

Br

Ca

Ra

3. Helium is located in group 18 but has only 2 electrons in its outer energy level. How is it different from the other elements in group 18 and how is it alike?

4. Fill in the table below.

Element symbol	Atomic number	Atomic mass /mass number	Protons	Neutrons	electrons	Atom isotope, ion
Bi					83	
Ra <sup>2+</sup>						2+ ion
H				0		
H				1		

5. Explain why an atom of an element is neutral.

6. What would be the charge on a neutral atom that loses 3 electrons?

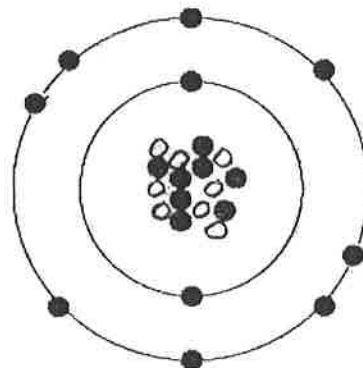
7. What would be the charge on a neutral atom that gains 1 electron?

8. What element is this?

What is its mass number?

What is its atomic number?

Is it an atom or an ion?

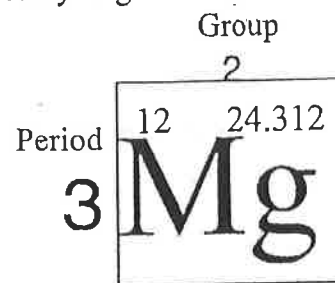


9. Complete the chart shown here

	Symbol	Location	Charge (amount)	Mass
Proton				
Neutron				
electron				

## Chapter 21: The Periodic Table

1. What are the letters and numbers for this element called, and what information can you get from them?

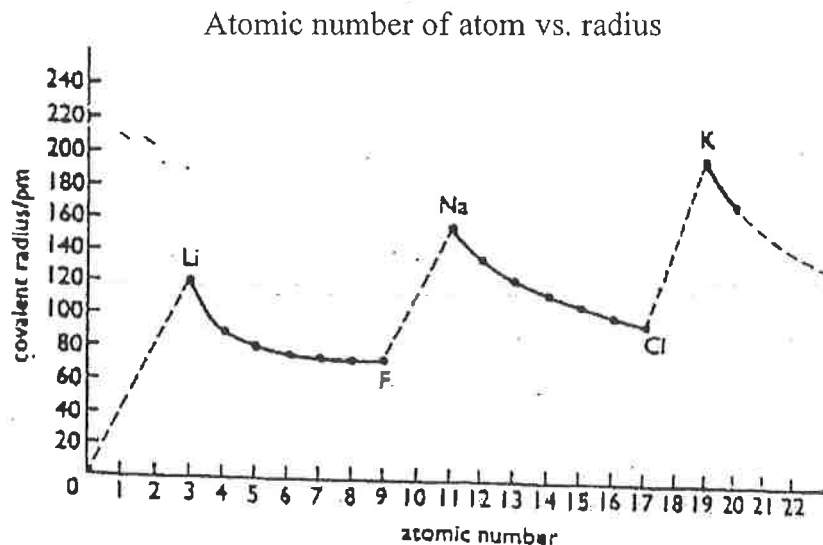


2. What are the properties of metals, nonmetals, metalloids and noble (inert) gases and where are they located on the periodic table.
3. Use the periodic table to tell which element each of the following would be.
- \_\_\_\_\_ This element is in Group 2, Period 3.
  - \_\_\_\_\_ This element is an alkali metal with 3 energy levels.
  - \_\_\_\_\_ This element is the halogen with 5 energy levels
  - \_\_\_\_\_ This element is a metalloid with two energy levels.
  - \_\_\_\_\_ This element is a noble gas with eight electrons in its outer energy level and has 6 energy levels.
  - \_\_\_\_\_ This is an element with properties very similar to oxygen and three energy levels.
  - \_\_\_\_\_ This a metalloid in a family where all the other elements are metals.

4. Use the graph shown here to answer the questions.

a. How does the radius change as you move left to right across the periodic table? Top to bottom?

b. Suggest a reasonable explanation for these observations using the number of valence electrons.



## Chapter 22 – Chemical Bonding

1. Name the following compounds:

a.  $K_2O$

b.  $NH_4OH$

c.  $PCl_3$

d.  $CuSO_4$

e.  $Pb(NO_3)_2$

f.  $KC_2H_3O_2$

g.  $BaBr_2$

h.  $Se_2Br_5$

i.  $FrCl$

1. Write the formula for the following compounds:

a. Calcium iodide

b. Potassium bicarbonate

c. Nitrogen trifluoride

d. Ammonium perchlorate

e. Nickel(II) phosphide

f. Silicon dioxide

g. Magnesium nitrate

h. Iron(III) oxide

i. Iron(II) oxide

3. List the seven diatomic elements

4. What are the two main differences between ionic bonding and covalent bonding?

- |    | covalent bonding |    | ionic bonding |
|----|------------------|----|---------------|
| a. |                  | a. |               |
| b. |                  | b. |               |

5. Write the formula for the following covalent compounds. Then, draw a Bohr Diagram and Lewis Structure to represent each one.

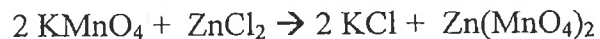
a. Silicon diselenide

b. nitrogen triiodide

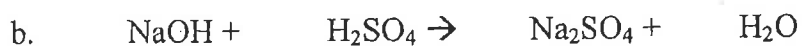
### Chapter 23 – Chemical Reactions

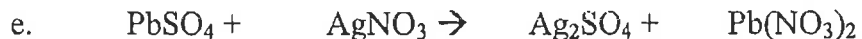
1. What is the law of Conservation of Mass? Who is credited with discovering it? What significance does it have when writing formulas and balancing equations?

2. Identify the reactants and products in the equation shown here. Circle coefficients and put a box around subscripts.

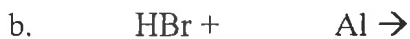


3. Balance the equations. Identify the type of reaction (S, D, SR, DR, N). Some may not fit our rxn types.

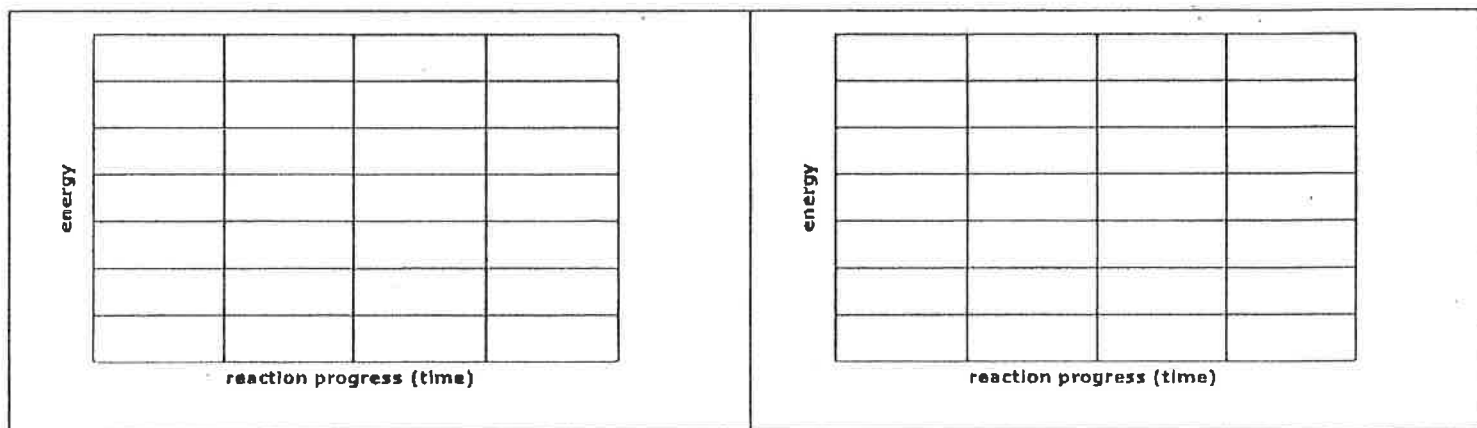




3. Predict the products and balance the equations Identify the type of reaction



4. Draw two graphs of energy versus reaction progress (time) one to show endothermic and the other to show exothermic reactions. Label the  $E_a$ , Transition State, Reactants, Products, Energy Released/Absorbed



5. Write a balanced equation, with correct formulas for the word equation shown here.

iron(III) sulfate + lead(II) nitrate yields iron(III) nitrate + lead(II) sulfate

## Chapter 24 – Chemical Compounds

1. Prepare a Venn Diagram comparing and contrasting the properties of ionic and covalent compounds.

2. Identify each of the following as acid = A, base = B, salt = S or none of these = N
- |                                   |  |                                  |
|-----------------------------------|--|----------------------------------|
| a. _____ $\text{Na}_2\text{CO}_3$ | b. _____ $\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$ | c. _____ $\text{H}_3\text{BO}_3$ |
| d. _____ $\text{HCl}$             | e. _____ $\text{LiOH}$                               | f. _____ $\text{FeCl}_3$         |
| g. _____ $\text{KNO}_3$           | h. _____ $\text{HC}_2\text{H}_3\text{O}_2$           | i. _____ $\text{KOH}$            |
| j. _____ $\text{Ba}(\text{OH})_2$ | k. _____ $\text{NaOH}$                               | l. _____ $\text{H}_3\text{PO}_4$ |
| m. _____ $\text{C}_2\text{H}_8$   | n. _____ $\text{H}_2\text{O}$                        | o. _____ $\text{NaHCO}_3$        |

3. Complete and balance the following neutralization reactions.

- a.  $\text{H}_2\text{CO}_3 + \text{KOH} \rightarrow$
- b.  $\text{Fe}(\text{OH})_3 + \text{H}_2\text{SO}_4 \rightarrow$
- c.  $\text{H}_3\text{PO}_4 + \text{Cu}(\text{OH})_2 \rightarrow$
- d.  $\text{NH}_4\text{OH} + \text{HCl} \rightarrow$
- e.  $\text{Ba}(\text{OH})_2 + \text{HC}_2\text{H}_3\text{O}_2 \rightarrow$

Write the word equation for a neutralization reaction

5. Describe what pH measures, what it means, the range and how to interpret it.

6. Compare the properties of acids and bases.

## Chapter 4 – Heredity

1. Peas can both cross-pollinate and self-pollinate. Why was this a key factor in Mendel's work?

### 2. Matching

_____ dominant trait	A. an organism's appearance
_____ F <sub>1</sub> generation	B. an organism with two of the same alleles for a trait
_____ recessive trait	C. a version of a gene
_____ gene	D. offspring produced after crossing two parents (P)
_____ allele	E. an organism with two different alleles for a trait
_____ F <sub>2</sub> generation	F. trait that reappears in the 2 <sup>nd</sup> generation after crossing 2 true-breeding parents
_____ genotype	G. used to organize all possible offspring combinations
_____ phenotype	H. genetic makeup formed from both inherited alleles together
_____ Punnett square	I. trait seen in the 1 <sup>st</sup> generation after crossing 2 true-breeding parents
_____ homozygous	J. offspring produced after crossing two F <sub>1</sub>
_____ heterozygous	K. instructions for traits passed from parent to offspring

3. A rabbit body cell has 80 chromosomes. How many....

Chromosomes are there in the rabbit's cheek cell? \_\_\_\_\_

Chromosomes are there in the rabbit's sperm cell? \_\_\_\_\_

Chromatids are there in the rabbit's cheek cell at the onset of prophase? \_\_\_\_\_

Chromatids are there in the rabbit's egg cell at the onset of prophase II? \_\_\_\_\_

Duplicated chromosomes are there in the rabbit's egg cell at the end of meiosis? \_\_\_\_\_

Chromosomes are there in the rabbit's eye cell? \_\_\_\_\_

Homologous pairs are there in the rabbit's eye cell? \_\_\_\_\_

Sex chromosomes are there in the rabbit's eye cell? \_\_\_\_\_

Sex chromosomes are there in the rabbit's sperm cell? \_\_\_\_\_

4. Use the word bank to complete the following paragraph. Some terms may be used more than once:

Each human body cell has \_\_\_\_\_ chromosomes. There are \_\_\_\_\_ pairs. Each pair is made up of one \_\_\_\_\_ chromosome and one

\_\_\_\_\_ chromosome. There are \_\_\_\_\_ pairs of regular chromosomes and \_\_\_\_\_ pair of \_\_\_\_\_ chromosomes. These determine if we

are male or female. Males are \_\_\_\_\_ and females are \_\_\_\_\_. When females undergo \_\_\_\_\_ to make sex cells, each of her \_\_\_\_\_ receives half of

her DNA. All of her eggs receive an \_\_\_\_\_ chromosome. When males undergo

\_\_\_\_\_ to make sex cells, each of his \_\_\_\_\_ receives half of his DNA. Some of his sperm

will get the \_\_\_\_\_ chromosome and some will get the \_\_\_\_\_, and therefore it is the \_\_\_\_\_

who determines the sex of the offspring.

X	mitosis
XX	maternal
22	paternal
sex	Eggs
XY	Zygote
1	Fertilization
46	Sperm
Y	Male
23	Meiosis

Egg and sperm unite in the process of \_\_\_\_\_, thus restoring the original number of chromosomes to \_\_\_\_\_. The \_\_\_\_\_, or fertilized egg, then undergoes many rounds of \_\_\_\_\_, which forms the resulting child.





