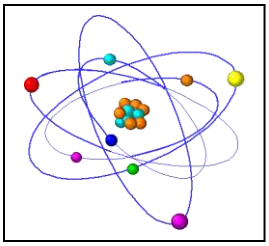


HONORS BIOLOGY
CHAPTER 2 CHEMICAL BASIS OF LIFE

Name_____

Read 2.1 p. 18
Define: matter-

Define: element-

What are the rules for correctly writing a symbol?

Define: compound-

What are the four most abundant elements of life?_____

What are elements that are needed in the human body only in minute amounts?_____

Read 2.2 p. 19
Describe the purposes of the following elements:

Iodine	
Fluorine	
Iron	

Read 2.3 p. 20
Define: atom

Fill in the missing information about subatomic particles:

proton		
	No charge	
		Outside the nucleus

What represents the atomic number?_____
What represents the mass number?_____
How would you find the number of neutrons?_____

How do isotopes of an element differ?_____

What is a radioactive isotope?

Read 2.4 p. 21

KNOW: Living cells cannot distinguish between isotopes of the same element.

Fill in the following chart of commonly use radioisotopes and their uses/dangers:

C^{14} Radioactive carbon	
I^{131} Radioactive iodine	
PIB	
Radon	

Read 2.5 p. 22

It is the **electrons** that are directly involved in the chemical activity of an atom.

Fill in the facts about **electrons (e-)** in the chart below:

Move around the nucleus in energy levels called:	The outermost shell of e- is also called the _____ shell.
The volumes of space in which the electrons will be found are called:	If atoms do not have full valence shells, they will tend to :
Each orbital hold how many e-?	List 2 elements that have filled valence shells:
How many e- in one orbital?_____ How many orbitals are in each e- shell? 1st_____ = _____total e- 2nd_____ = _____total e- 3rd_____ = _____total e-	For 3 elements write how many e- are in their valence shell, and how many e- would be needed to fill the outermost shell? **Na** _____valence e- /need _____ e- **O** _____valence e- /need_____ e- **Mg** _____valence e- /need _____e-

What are **three** possible things electrons can do to form chemical bonds:

Share,_____

Looking at the periodic table on p. 22:

a. How many electrons and electron shells does a **fluorine atom** have?_____

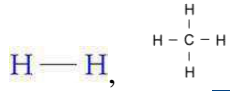
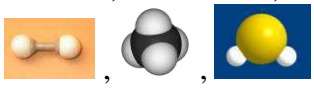
b. How many electrons are in its valence shell?_____

c. How many electrons would fluorine need to add to have a filled valence shell?_____

Read 2.6 pp. 22-23

A. structural formula	**E. molecular formula**	**I. polar covalent**
B. valence	**F. electronegativity**	**J. covalent**
C. double	**G. nonpolar covalent**	
D. space-filling model	**H. molecule**	

MATCHING: Write the letter of the definition that best suits each term.

1._____Strongest kind of chemical bond
2. _____An atom's attraction for shared electrons.
3._____ Two or more atoms held together with a covalent bond form this.
4._____ Bond in which electrons are shared equally between the atoms.
5._____ The way these molecules are written: H_2, CH_4, H_2O
6._____The way these molecules are written: 
7._____The way these molecules are shown: 
8._____Bonding capacity of an atom.
9._____Type of bond consisting of two pairs, or 4 e-, (=)
10.____ Unequal sharing of electrons produce this type of bond.

Read 2.7 p.24

1. Chlorine has how many valence electrons?_____
   Chlorine needs how many e- to have a filled outer shell?_____
   Would chlorine gain or lose an e- to fill that outer shell?_____
   How many protons (+) does a neutral chlorine atom have?_____

2. If chlorine had 17 e- and now has 18 e-, what charge would it have (+) or (-) and number? _____

3. What do we call an atom with a charge (+) or (-)?_____

4. If Na+ and Cl- formed a bond, what kind of bond would it be?_____

5. What is a synonym for an ionic compound?_____ (NOTE: the only salt is not NaCl)

Read 2.8 pp. 24-25

1. Sometimes there are weaker, temporary bonds that form between atoms.
A **hydrogen bond** forms from the partial (+) or (-)? _____ end of the hydrogen atom and the partial (+) or (-) ? _____end of the other atom (mostly O, N, or F).

2. Sketch a water molecule with its hydrogen bonds with other water molecules (the correct number of water molecules) and the partial (+) and (-) ends.

Read 2.9 p. 25

1. An overarching theme in the chemistry of life: the structure of atoms and molecules determines the way they behave. We will learn because of water being polar covalent it has extraordinary properties to sustain life.

2. What does a chemical reaction show?

3. In the following chemical reaction, circle the reactants and put a rectangle around the products:

$$CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$$

Notice that there are the same number of **C** on each side of the arrow, there are the same number of **O** on each side, and there are the same number of **H** on each side. This means the equation is **balanced**.

Read 2.10 -11 p. 26

Match the terms used to describe water:

A. temperature C. cohesion E. surface tension
B. heat D. adhesion F. evaporative cooling

1._____molecules of the same kind stick together (like water to water)
2._____molecules that are not the same stick to each other.
3._____amount of **total energy** associated with the movement of atoms/molecules in matter
4._____how difficult it is to break the surface of a liquid
5._____measures the average speed of molecules in matter
6._____as molecules leave the surface of a liquid they take heat with them

Read 2.12-13 p. 27

Why is water in the solid state less dense than in the liquid state? Sketch.

What advantage is it that water behaves this way to nature?

Define the following:
solution-

solvent-

solute-

aqueous solution-

Sketch how water molecules will arrange themselves to dissolve NaCl:

Read 2.14 p. 28

1. What two ions break off water when it goes into solution?_____

2. Which of these ions are broken off (donated) if the compound is an **acid**?_____
   Which of these ions are broken off (donated) if the compound is a **base**?_____

3. What is the purpose of the **pH scale**?

4. How much more concentration is a pH of 2 than a pH of 4?_____

5. Identify the following: **SA**=strong acid **WA**=weak acid **N**=neutral,
   SB=strong base **WB**=weak base

_____pH 7	_____pH 13	_____High number of H+	_____pH 8
_____pH1	_____pH 6	_____High number of OH-	_____pH 14
		_____Equal H+ / OH-	

6. Define: **buffers**

Read 2.15 and 2.16 p. 29

1. Define: **acid precipitation** (include the 3 main pollutants contributing to its cause, and pH)

2. What was the purpose of the **Clean Air Act**?

3. How will **ocean acidification** alter the oceans?

4. Has water been detected on any other planet? How do you know?