SCIENCE PLANNER: WEEK OF 12.2.19

OBJECTIVES FOR THE WEEK:

Biology : Bio.2.1.1 Analyze the flow of energy and cycling of matter (water, carbon, nitrogen and oxygen) through ecosystems relating the significance of each to maintaining the health and sustainability of an ecosystem. Bio.2.1.2 Analyze the survival and reproductive success of organisms in terms of behavioral, structural, and reproductive adaptations. Bio.2.1.3 Explain various ways organisms interact with each other (including predation, competition, parasitism, mutualism) and with their environments resulting in stability within ecosystems. Bio.2.1.4 Explain why ecosystems can be relatively stable over hundreds or thousands of years, even though populations may fluctuate (emphasizing availability of food, availability of shelter, number of predators and disease).

Bio.2.2.1 Infer how human activities (including population growth, pollution, global warming, burning of fossil fuels, habitat destruction and introduction of nonnative species) may impact the environment. Bio.2.2.2 Explain how the use, protection and conservation of natural resources by humans impact the environment from one generation to the next. **EOC review**

Chemistry: Chm.3.2.1 Classify substances using the hydronium and hydroxide ion concentrations. Chm.3.2.2 Summarize the properties of acids and bases. **EOC REVIEW**

DAILY AGENDA – (SUBJECT TO CHANGE) https://evansccca.weebly.com/

DAY	Honors Biology	Honors Chemistry
Mon 12.2	-COLLECT #1-60 -Warm UP https://www.youtube.com/watch?v=ORB866QSGv8&t=.5s -NOTES: Health and disease *HW= #1-80	-Collect objectives #1-4 -Warm up NOTES: Acids and bases *HW= pg 84-87
Tues 12.3	**Lab- OUTBREAK!!** **https://www.youtube.com/watch?v=Kg1gK2E7dAQ** **NOTES- Ecology**	TURN IN EOC review! **Presentations: HW** **LAB! pH** **Notes: Neutralization reactions**

	***HW= Take notes on the 2 videos below and complete #1-90.** https://www.youtube.com/watch?v=GInFylwdYH4&t=1s Interdependence Ecosystem Levels of organization Biotic vs. Abiotic examples Niche https://www.youtube.com/watch?v=izRvPaAWgyw -list 5 things you learned!	
Wed 12.4	**Short quiz** **NOTES- Ecology** bcbca, cacab, acacb https://www.youtube.com/watch?v=v6ubvEJ3KGM ***HW= Quiz corrections, Finish notes, herbivore and omnivore pictures.**	**Short quiz** **Notes- neutralization reactions, net ionic equations, titrations, normality** ***HW= pg 88, 89 & quiz corrections**
Thurs 12.5	**Finish notes!** **LAB- Ecology** ***HW= study for test!**	**BURET practice** **LAB- Titration** https://app.schoology.com/course/2156888379/materials **BURET PRACTICE** ***HW= finish titration lab!!**
Fri 12.6	TEST- health, disease, and ECOLOGY *HW= EOC review #1-120	TEST- acids, bases and salts, *HW=EOC review #9

Global biomes:
https://www.arcgis.com/apps/View/index.html?appid=144b1d74a5964d728b25aeb0542de485

https://scied.ucar.edu/longcontent/shifting-ecosystems

http://maps.tnc.org/migrations-in-motion/#4/19.00/-78.00

CARNIVORE plants: watch at your own risk!
https://www.youtube.com/watch?v=aladpRIVdRI

HOW trees talk to each other.. you will never look at a tree the same way again:
https://www.youtube.com/watch?v=Un2yBgIAxYs

EOC # 9 Name _____

Bonding

A bond forms when an atom tries to become more stable. It wants to satisfy the octet rule – have eight valence electrons.

There are a variety of ways an atom can bond. They are:

1. Metallic – between two metals resulting in a sea of mobile electrons
2. Ionic – between a metal and a nonmetal or polyatomic ion. Results from a transfer of electrons from metal to nonmetal. Form positive and negative ions. (electronegativity difference greater than 1.7)
3. Covalent – between two nonmetals due to the sharing of electrons. There are two types of covalent bonds:
   A. Polar – an uneven sharing – usually two different nonmetals (electronegativity difference of 0.3-1.7) create dipole
   B. Nonpolar – equal sharing of electrons – usually between two

Identify the following as being metallic, ionic, polar covalent, or nonpolar covalent bonds. Do not stress about finding the electronegativities to determine the bonds type.

1. Cu – Cu _____

2. Na – O _____

3. LiCl _____

4. I - I _____

5. C – H _____

6. B – F _____

7. Zn – Zn _____

8. CrF_3 _____

9. O_2 _____

Date _____ Period _____

Lewis Dot Structures

A Lewis dot diagram is used to show how the electrons in a bond are distributed. If the bond is an ionic bond, the Lewis Dot Structures shows the electron transfer and resulting ions. If the bond is covalent the Lewis Dot Structure shows the electron sharing. For covalent bonds the rules are:

1. Draw a skeleton of the structure (identify the center atom

2. Count the total number of valence electrons (Use PT)

3. Distribute electrons so that each atom has eight dots around it.

4. If you run out of dots and every atom is not satisfying the

Complete the Lewis Dot Structures for the following ionic compounds or covalent molecules. For the covalent molecules also predict the shape as linear, bent, trigonal planar, trigonal pyramidal or tetrahedral.

1. NF_3

2. SiI_4

3. CaO

4. $MgBr_2$

5. O_2 6. OF_2

7. F_2 8. BCl_3

EOC # 9 Name _____

Bonding

The bonding that occurs between two atoms has an impact on the overall polarity of a substance. The overall polarity impacts the substance's properties like phase, solubility in water ("like dissolves like"), ability to conduct electricity etc. To determine the overall polarity use these guidelines:

1. If the bonding is metallic its overall polarity is a metal.
2. If the bonding is ionic its overall polarity is an ionic salt.
3. If the bonding is nonpolar it is considered nonpolar overall.
4. If the bonding is polar covalent, then you must look at the symmetry of the molecule (lone pairs around center atom).
    A. If **symmetrical** – no lone pairs - (linear, trigonal planar

Predict the overall polarity of the following substances.

1. NF_3 _____
2. CaO _____
3. $MgBr_2$ _____
4. SiI_4 _____
5. F_2 _____
6. O_2 _____
7. OF_2 _____
8. Cu –Cu _____
9. BCl_3 _____
10. Zn – Zn _____

Date _____ Period _____

Predicting Properties

Once the **overall polarity** is known, then the general properties of a substance can be determined.

1. Ionic Salts – have high melting points, dissolve to dissociate into ions and create a solution that conducts electricity, dissolve in water, and are all solids.
2. Metals – very high melting points, conduct electricity as solids, are all solids (except mercury), do not dissolve in water
3. Nonpolar – lowest melting points, do not dissolve in water, never conduct electricity, frequently gases.
4. Polar – low melting points, dissolve in water, never conduct

Fill in, completely, the following table for each substance.

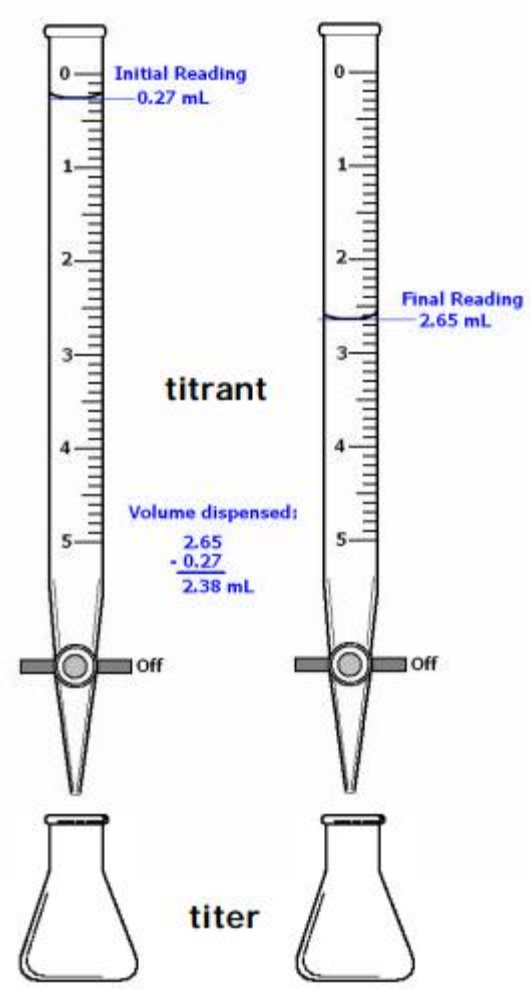
Substance	Melting Point (high/low)	Dissolve in water?	Ability to Conduct Electricity	Phase
CaO				
F_2				
O_2				
OF_2				
Zn- Zn				

SiI_4				
NF_3				
Cu-Cu				
$MgBr_2$				

WARM UP QUESTIONS -

MON	**Describe bacteria and explain how they reproduce. NAME 3 acids and three bases that are common in your home.**
TUES	**DO YOU NEED A SHUTTLE BUS? What is the most common way for illness-causing bacteria to enter a healthy body?** **What is the pH of a 1.3 x 10^{-6} M solution of phosphoric acid?**
WED	**An ocean organism is placed in a fresh water aquarium, why does it die? Draw a picture of it.** **The pOH of a substance is 8.2 , what is the $[H^+]$ concentration?**
THU	**Name the main parts of the Earth's carbon cycle.** https://www.youtube.com/watch?v=dwVsD9CiokY

	0.025 L of 1.5M phosporic acid was used to neutralize 450 mL of Barium Hydroxide. What was the concentration of the Barium hydroxide?
FRI	**Compare commensalism to mutualism.** **Write the ionic and net ionic equation for the rxn of hydrosulfic acid with sodium hydroxide.**



EACH PERSON:

-Full buret pour

-20 drop count verification

-25.5 mL

-38.8 mL

https://arcg.is/010jKa

...and a base is a proton

Example: $HCl + OH^- \rightarrow Cl^- + H_2O$

The HCl acts as an acid, the OH^- as a base. This reaction is reversible in that the H_2O can give back the proton to the Cl^-.

Label the Bronsted-Lowry acids and bases in the following reactions and show the direction of proton transfer.

Example: $H_2O + Cl^- \leftrightarrow OH^- + HCl$

Acid Base Base Acid

1. $H_2O + H_2O \leftrightarrow H_3O^+ + OH^-$ (B A A B)
2. $H_2SO_4 + OH^- \leftrightarrow HSO_4^- + H_2O$ (A B B A)
3. $HSO_4^- + H_2O \leftrightarrow SO_4^{2-} + H_3O^+$ (A B B A)
4. $OH^- + H_3O^+ \leftrightarrow H_2O + H_2O$ (B A A B)
5. $NH_3 + H_2O \leftrightarrow NH_4^+ + OH^-$ (B A A B)

ANSWER KEY

CONJUGATE ACID-BASE PAIRS

Name: _____

Conjugate Pairs

	ACID	BASE	EQUATION
1.	H_2SO_4	HSO_4^-	$H_2SO_4 \rightarrow H^+ + HSO_4^-$
2.	H_3PO_4	$H_2PO_4^-$	$H_3PO_4 \leftrightarrow H^+ + H_2PO_4^-$
3.	HF	F^-	$HF \leftrightarrow H^+ + F^-$
4.	HNO_3	NO_3^-	$HNO_3 \leftrightarrow H^+ + NO_3^-$
5.	$H_2PO_4^-$	HPO_4^{-2}	$H_2PO_4^- \leftrightarrow H^+ + HPO_4^{-2}$
6.	H_2O	OH^-	$H_2O \leftrightarrow H^+ + OH^-$
7.	HSO_4^-	SO_4^{-2}	$HSO_4^- \leftrightarrow H^+ + SO_4^{-2}$
8.	HPO_4^{-2}	PO_4^{-3}	$HPO_4^{-2} \leftrightarrow H^+ + PO_4^{-3}$
9.	NH_4^+	NH_3	$NH_4^+ \leftrightarrow H^+ + NH_3$
10.	H_3O^+	H_2O	$H_3O^+ \leftrightarrow H^+ + H_2O$

Which is a stronger base, HSO_4^- or $H_2PO_4^-$? $H_2PO_4^-$

Which is a weaker base, Cl or NO_3^-? Cl

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pH AND pOH

Name: _____

The pH of a solution indicates how acidic or basic that solution is.

pH range of 0 - 7 acidic
7 neutral
7-14 basic

Since $[H^+][OH^-] = 10^{-14}$ at 25° C, if pH is known, the $[OH^-]$ can be calculated and vice versa.

$pH = -\log[H^+]$ So if $[H^+] = 10^{-4}$ M, pH = 4.

$pOH = -\log[OH^-]$ So if $[OH^-] = 10^{-4}$ M, pOH = 4.

Together, pH + pOH = 14.

Complete the following chart.

	$[H^+]$	pH	$[OH^-]$	pOH	Acidic or Basic
1.	10^{-7} M	7	10^{-7} M	7	Neutral
2.	10^{-10} M	10	10^{-4} M	4	Basic
3.	10^{-2} M	2	10^{-12} M	12	Acidic
4.	10^{-3} M	3	10^{-11} M	11	Acidic
5.	10^{-12} M	12	10^{-2} M	2	Basic
6.	10^{-9} M	9	10^{-5} M	5	Basic
7.	10^{-11} M	11	10^{-3} M	3	Basic
8.	10^{-1} M	1	10^{-13} M	13	Acidic
9.	10^{-6} M	6	10^{-8} M	8	Acidic

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pH AND pOH CONTINUED

Name: _____

Calculate the pH of the solutions below.

1. 0.01 M HCl — pH = 2
2. 0.0010 M NaOH — pH = 11
3. 0.0001 M $Ca(OH)_2$ — pH = 13
4. 0.030 M HBr — pH = 1.5
5. 0.15 M KOH — pH = 13.2
6. 0.1 M $HC_2H_3O_2$ (Assume 5.0% dissociation) — pH = 1.0
7. 3.0 M HF (Assume 10.0% dissociation) — pH = 0.52
8. 0.50 M HNO_3 — pH = 0.30
9. 0.10 M NH_4OH (Assume 5.00% dissociation) — pH = 13.1
10. 0.10 M HNO_2 (Assume 1.0% dissociation) — pH = 1.3

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ACID-BASE TITRATION

Name: _____

To determine the concentration of an acid (or base), we can react it with a base (or acid) of known concentration until it is completely neutralized. This point of exact neutralization, known as the endpoint, is noted by the change in color of the indicator.

We use the following equation:

$N_a V_a = N_b V_b$ where N = normality, V = volume

Solve the problems below.

1. A 20.0 mL sample of HCl was titrated to the endpoint with 15.0 mL of 2.0 M NaOH. What was the normality of the HCl? What was its molarity?

   1.2 N, 1.2 M

2. A 10.0 mL sample of H_2SO_4 was exactly neutralized by 13.6 mL of 1.0 M KOH. What is the molarity of the H_2SO_4? What is the normality?

   0.68 M, 1.4 N

3. How much 1.5 M NaOH is necessary to exactly neutralize 20.0 mL of 2.5 M H_2SO_4?

   100 mL

4. How much of 2.0 M HNO3 is necessary to titrate 25.0 mL of 0.05 M $Ca(OH)_2$ solution to the endpoint?

   5 mL

5. What is the molarity of a NaOH solution if 15.0 mL is exactly neutralized by 7.5 mL of a 0.02 M $HC_2H_3O_2$ solution?

   0.01 M

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ANSWER KEY

HYDROLYSIS OF SALTS

Name _____

Salt solutions may be acidic, basic or neutral, depending on the original acid and base that formed the salt.

Strong Acid + Strong Base → Neutral Salt
Strong Acid + Weak Base → Acidic Salt
Weak Acid + Strong Base → Basic Salt

A weak acid and a weak base will produce any type of solution depending on the relative strengths of the acid and base involved.

Complete the table below for each of the following salts.

Salt	Parent Acid	Parent Base	Type of Solution
1. KCl	HCl	KOH	neutral
2. NH_4NO_3	HNO_3	NH_4OH ($NH_3 + H_2O$)	acidic
3. Na_3PO_4	H_3PO_4	$NaOH$	basic
4. $CaSO_4$	H_2SO_4	$Ca(OH)_2$	neutral
5. $AlBr_3$	HBr	$Al(OH)_3$	acidic
6. CuI_2	HI	$Cu(OH)_2$	acidic
7. MgF_2	HF	$Mg(OH)_2$	basic
8. $NaNO_3$	HNO_3	$NaOH$	neutral
9. $LiC_2H_3O_2$	$HC_2H_3O_2$	$LiOH$	basic
10. $ZnCl_2$	HCl	$Zn(OH)_2$	acidic
11. $SrSO_4$	H_2SO_4	$Sr(OH)_2$	neutral
12. $Ba_3(PO_4)_2$	H_3PO_4	$Ba(OH)_2$	basic

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ACIDS AND BASES CROSSWORD

Name _____

Across

1. Scale of acidity
5. An acid that consists of only two elements
7. Substance that forms hydronium ions in water (Arrhenius)
8. This happens when an acid dissolves in water
10. According to Bronsted-Lowry, an acid is a(n) _____ donor.
12. According to Bronsted-Lowry, a base is a proton _____
13. Can act as either an acid or a base
14. These pairs differ only by a proton.
16. An acid with a small K_a value would be a(n) _____ acid.
17. Reaction of an ion with H_2O to produce H^+ (aq) + OH^- (aq)

Down

2. H_3O^+
3. Formed from the reaction of an acid and a base
4. Procedure to determine the concentration of an acid or base
6. A solution that will resist changes in pH
9. Changes color at the endpoint of a titration
11. The reaction of an acid with a base
15. Substance that produces hydroxide ions in aqueous solution (Arrhenius)
18. When equivalent amounts of H^+ and OH^- have reacted in a titration

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ASSIGNING OXIDATION NUMBERS

Name _____

Assign oxidation numbers to all of the elements in each of the compounds or ions below.

1. HCl $\overset{+1}{H}\overset{-1}{Cl}$	11. H_2SO_3 $\overset{+1}{H_2}\overset{+4}{S}\overset{-2}{O_3}$
2. KNO_3 $\overset{+1}{K}\overset{+5}{N}\overset{-2}{O_3}$	12. H_2SO_4 $\overset{+1}{H_2}\overset{+6}{S}\overset{-2}{O_4}$
3. OH^- $\overset{-2}{O}\overset{+1}{H}^-$	13. BaO_2 $\overset{+2}{Ba}\overset{-1}{O_2}$
4. Mg_3N_2 $\overset{+2}{Mg_3}\overset{-3}{N_2}$	14. $KMnO_4$ $\overset{+1}{K}\overset{+7}{Mn}\overset{-2}{O_4}$
5. $KClO_3$ $\overset{+1}{K}\overset{+5}{Cl}\overset{-2}{O_3}$	15. LiH $\overset{+1}{Li}\overset{-1}{H}$
6. $Al(NO_3)_3$ $\overset{+3}{Al}(\overset{+5}{N}\overset{-2}{O_3})_3$	16. MnO_2 $\overset{+4}{Mn}\overset{-2}{O_2}$
7. S_8 $\overset{0}{S_8}$	17. OF_2 $\overset{+2}{O}\overset{-1}{F_2}$
8. H_2O_2 $\overset{+1}{H_2}\overset{-1}{O_2}$	18. SO_3 $\overset{+6}{S}\overset{-2}{O_3}$
9. PbO_2 $\overset{+4}{Pb}\overset{-2}{O_2}$	19. NH_3 $\overset{-3}{N}\overset{+1}{H_3}$
10. $NaHSO_4$ $\overset{+1}{Na}\overset{+1}{H}\overset{+6}{S}\overset{-2}{O_4}$	20. Na $\overset{0}{Na}$

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REDOX REACTIONS

Name _____

For the equations below, identify the substance oxidized, the substance reduced, the oxidizing agent, the reducing agent, and write the oxidation and reduction half reactions.

Example: $\overset{\text{oxidized}}{Mg} + \overset{\text{reduced}}{N_2} \rightarrow Mg_3N_2$
oxidation half reaction: $Mg \rightarrow Mg^{+2} + 2e^-$
reduction half reaction: $3e^- + N_2 \rightarrow 2N^{-3}$

1. $2H_2 + O_2 \rightarrow 2H_2O$
red.ag ox.ag
ox. hlf: $2H_2 \rightarrow 4H^+ + 4e^-$
red. hlf: $4e^- + O_2 \rightarrow 2O^{-2}$

2. $Fe + Zn^{+2} \rightarrow Fe^{+2} + Zn$
red.ag ox.ag
ox. hlf: $Fe \rightarrow Fe^{+2} + 2e^-$
red. hlf: $2e^- + Zn^{+2} \rightarrow Zn$

3. $2Al + 3Fe^{+2} \rightarrow 2Al^{+3} + 3Fe$
red.ag ox.ag
ox. hlf: $2Al \rightarrow 2Al^{+3} + 6e^-$
red. hlf: $6e^- + 3Fe^{+2} \rightarrow 3Fe$

4. $Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$
red.ag ox.ag
ox. hlf: $Cu \rightarrow Cu^{+2} + 2e^-$
red. hlf: $2e^- + 2Ag^+ \rightarrow 2Ag$

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Name:_____Period_____Date_____

Disease Transmission Lab

How can saliva be transferred?

Procedure:

1. You will receive a small cup with liquid in it **(DO NOT DRINK IT!!!!!!)**
2. Exchange your liquid with the liquid of a partner. To do this, pour your liquid into his/her cup, then gently swirl the liquid for a few seconds. Then have him/her pour half of the liquid back into your cup so you each have an even out the amount of the liquid.
3. Record the name of your partner in the data table under exchange # 1.
4. Repeat steps 2 & 3 with two more partners.
5. Return to your seat and wait to see who is infected with the disease. The teacher will test each liquid, checking for a reaction. Then we will analyze the data and trace the infection back to the original source.

	Exchange #		
	1	**2**	**3**
Name of Partner			

Questions:

1. I was (circle one) infected not infected

2. The original source of the disease in the classroom was: _____.

3. How many people in the class ended up with the disease that started out with just one person? _____

4. Can someone have a disease and still appear healthy? What are the negative effects of this?

pH LAB NAME _____

Unkn #	Color	pH	$[H^+]$	pOH	$[OH^-]$	Possible identity
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						