Environmental Systems

Assignment for April 13 – April 17, 2020

1. Read the notes provided and remember you have the week to get this done.
2. Take the quiz when you have completed your reading.
3. Please take a picture of your work and send to your teacher.

Please contact your assigned teacher with questions regarding your assignment(s):

Coach Nance	cnance@mpisd.net
Coach Zaldivar	dzaldivar@mpisd.net
Coach Henderson	rskelton@mpisd.net

Name _____ Class _____ Date _____

Assessment

Quiz

Section 2: Biodiversity at Risk

MATCHING

In the space provided, write the letter of the term or phrase that best matches the description.

_____ 1. fire ants in southeastern United States

_____ 2. passenger pigeon

_____ 3. Florida panther

_____ 4. death of the dinosaurs

_____ 5. honeycreepers in Hawaiian Islands

_____ 6. Amazon rain forest

_____ 7. making chemicals or drugs from plants

a. endemic species
b. mass extinction
c. biodiversity hotspot
d. endangered species
e. biotechnology
f. extinct species
g. exotic species

MULTIPLE CHOICE

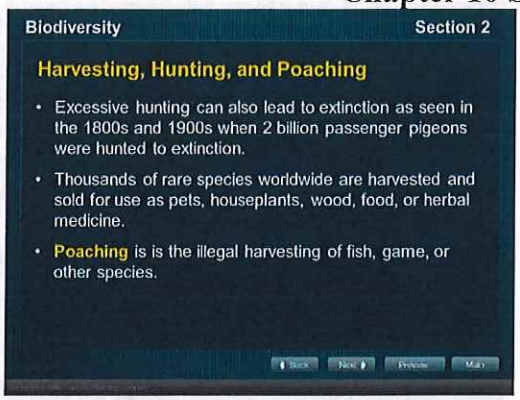
In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

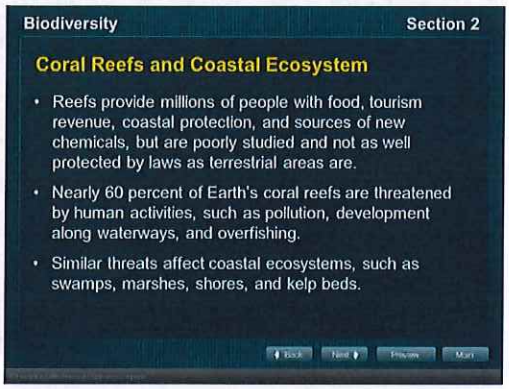
_____ 8. Madagascar is the only home of which primate species?
a. baboons
b. chimpanzees
c. lemurs
d. gibbons

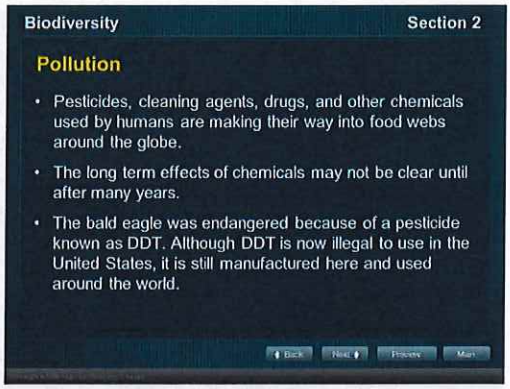
_____ 9. The major human causes of extinction today are
a. poaching and destroying habitats.
b. polluting and introducing nonnative species
c. Both (a) and (b)
d. Neither (a) nor (b)

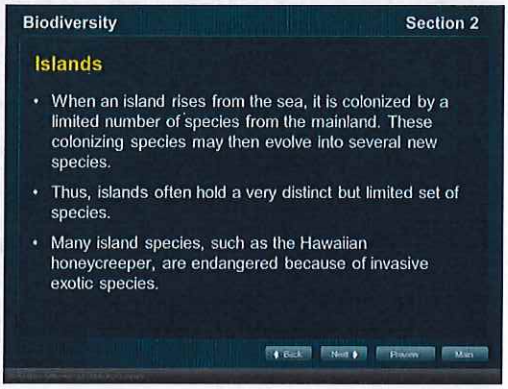
_____ 10. Which of the following areas of the United States are considered biodiversity hotspots?
a. Florida Everglades and the Pacific Northwest
b. Great Lakes and the Grand Canyon
c. California coast
d. Both (a) and (c)

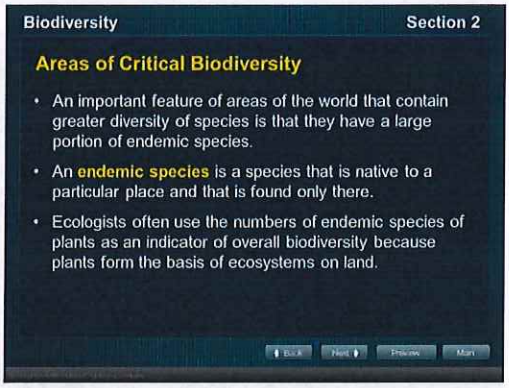
Chapter 10 Section Two Notes

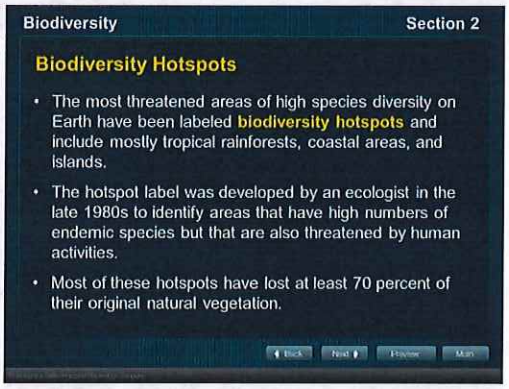


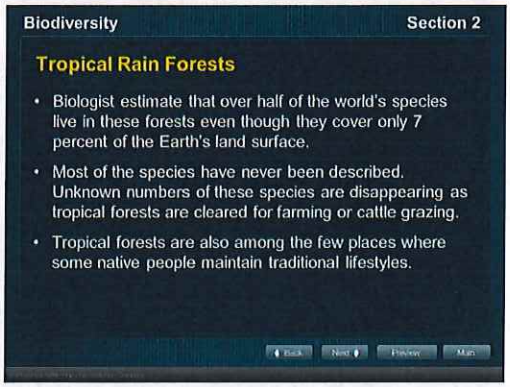


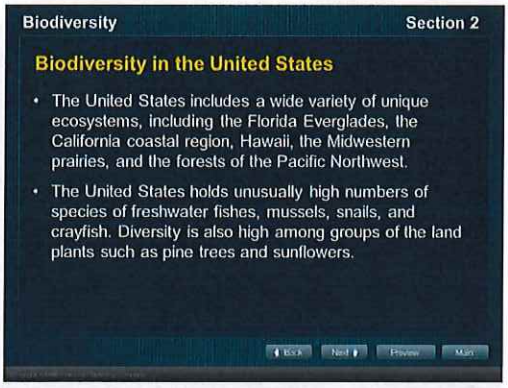












Chapter 10 Section Two Notes

Biodiversity at Risk

- The extinction of many species in a relatively short period of time is called a **mass extinction**.
- Earth has experienced several mass extinctions, each probably caused by a global change in climate.
- It takes millions of years for biodiversity to rebound after a mass extinction.

How Do Humans Cause Extinctions?

- In the past two centuries, human population growth has accelerated and so has the rate of extinctions.
- The numbers of worldwide species known to be threatened, endangered, or recently extinct are listed on the next slide.
- The major causes of extinction today are the destruction of habitats, the introduction of nonnative species, pollution, and the overharvesting of species.

Current Extinctions

- Scientists are warning that we are in the midst of another mass extinction.
- The rate of extinctions is estimated to have increased by a multiple of 50 since 1800, with up to 25 percent of all species on Earth becoming extinct between 1800 and 2100.
- The current mass extinction is different from those of the past because humans are the primary cause of the extinctions.

Habitat Destruction and Fragmentation

- As human populations grow, we use more land to build homes and harvest resources.
- In the process, we destroy and fragment the habitats of other species.
- It is estimated that habitat loss causes almost 75 percent of the extinctions now occurring.

Species Prone to Extinction

- Large populations that adapt easily to many habitats are not likely to become extinct.
- However, small populations in limited areas can easily become extinct.
- Species that are especially at risk of extinction are those that migrate, those that need large or special habitats, and those that are exploited by humans.

Habitat Destruction and Fragmentation

- For example, cougars, including the Florida Panther, require expansive ranges of forest and large amount of prey.
- Today, much of the cougars' habitat has been destroyed or broken up by roads, canals, and fences.
- In 2011, only about 150 Florida panthers made up the only remaining wild cougar population east of the Mississippi River.

Species Prone to Extinction

- An **endangered species** is a species that has been identified to be in danger of extinction throughout all or a significant part of its range, and that is thus under protection by regulations or conservation measures.
- A **threatened species** is a species that has been identified to be likely to become endangered in the foreseeable future.

Invasive Exotic Species

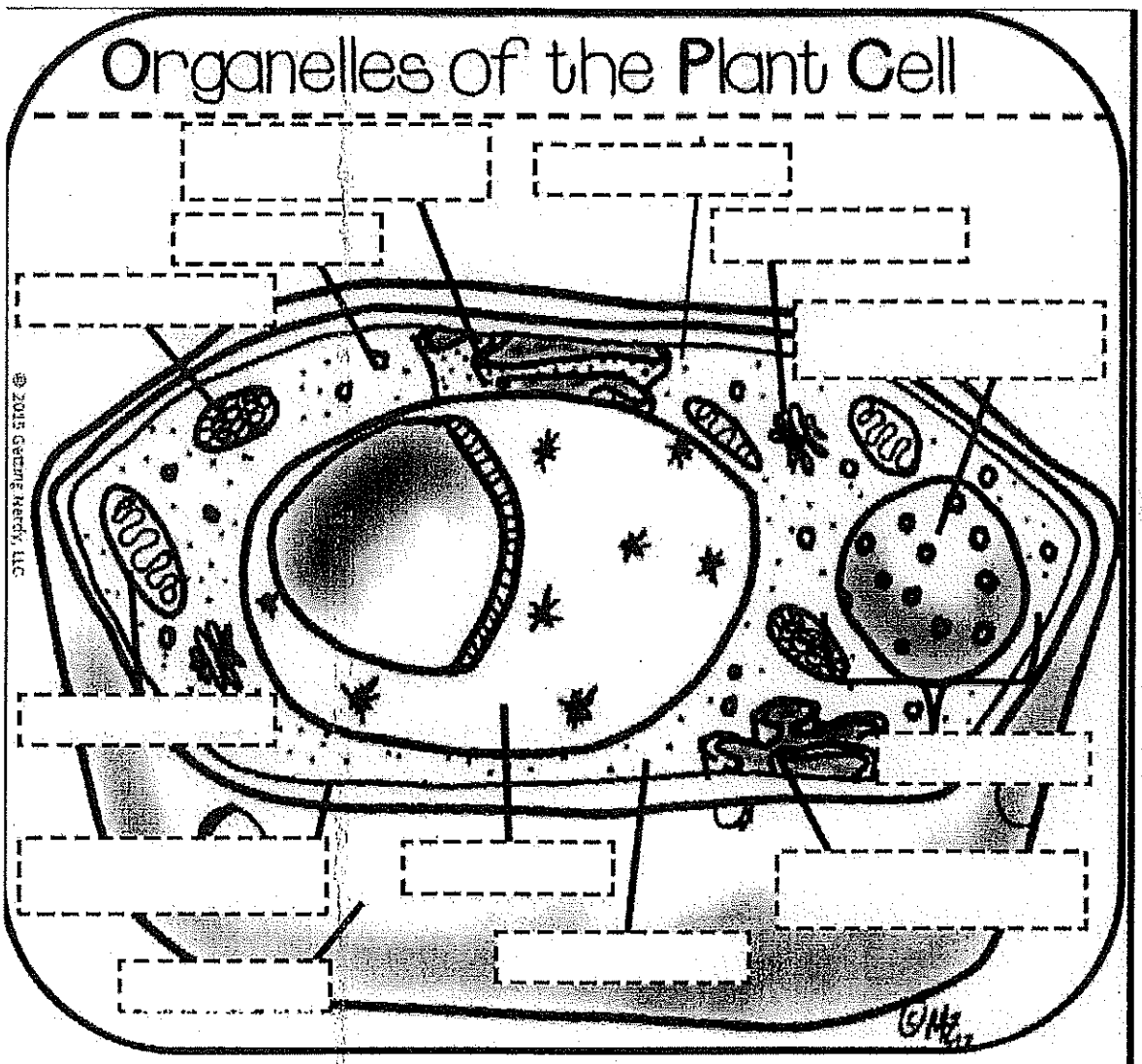
- An **exotic species** is a species that is not native to a particular region.
- Even familiar organisms such as cats and rats are considered to be exotic species when they are brought to regions where they never lived before.
- Exotic species can threaten native species that have no natural defenses against them.

Biology Week of 4/20

Name: _____ Date: _____ Period: _____

- Go to www.cellsalive.com
- Click on "plant cell" on the right.
- Start the animation to label the cell below and write the functions on the previous page.
- Color each cell part you label a different color and color the matching name the same color as the part.
- Cut out the template and glue it on the previous page at the top only.

Organelles of the Plant Cell



Directions: Cut out the cell organelle parts below and glue them onto the INB sheet to the right. Cut out the INB sheet.

Nucleus

Cell Membrane

Cytoplasm

Ribosome

Rough Endoplasmic Reticulum

Lysosome

Smooth Endoplasmic Reticulum

Mitochondria

Chloroplast

Nuclear Membrane

Golgi Bodies

Cell Wall

Vacuole

AP Chemistry: See Schoology for textbook information and links.

Dual credit student need to get their assignment from Blackboard

6. For each of the following pairs, tell which has the higher entropy.
   (a) A sample of solid CO_2 at −78 °C or CO_2 vapor at 0 °C.
   (b) Sugar, as a solid or dissolved in a cup of tea.
   (c) Two beakers, one containing pure water and the other containing pure alcohol, or a single beaker containing a mixture of the water and alcohol.

7. Tell which substance has the higher entropy in each of the following pairs.
   (a) A sample of pure silicon or a piece of silicon containing a trace of some other atoms such as B or P (to be used in a computer chip).
   (b) An ice cube or liquid water, both at 0 °C.
   (c) A sample of pure solid I_2 or iodine vapor, both at room temperature.

Calculations are NOT necessary for questions 6, 7, 8, 9. Questions 11 and 18 will required you use appendix C of the textbook (in Schoology) or do a Google search using "chemistry thermodynamics quantities table".

9. Comparing the formulas or states for each pair of compounds, tell which you would expect to have the higher entropy at the same temperature.
   (a) NaCl(s) or $MgCl_2$(s)
   (b) Cl_2(g) or P_4(g)
   (c) CH_3NH_2(g) or $(CH_3)_2NH$(g)
   (d) Au(s) or Hg(ℓ)

11. Calculate the entropy change, $\Delta S°$, for each of the following changes and comment on the sign of the change:
   (a) $NH_4Cl(s) \longrightarrow NH_4Cl(aq)$
   (b) $S(g) \longrightarrow S(s)$
   (c) $CCl_4(g) \longrightarrow CCl_4(\ell)$

18. Calculate the standard molar entropy change for each of the following reactions at 25 °C.
   (a) $Pb(s) + Cl_2(g) \longrightarrow PbCl_2(s)$
   (b) $C_2H_5OH(\ell) + 3\ O_2(g) \longrightarrow 2\ CO_2(g) + 3\ H_2O(\ell)$
   (c) $4\ Cr(s) + 3\ O_2(g) \longrightarrow 2\ Cr_2O_3(s)$

Chemistry and Pre-AP Chemistry: Solutions Assignment #4 Assigned April 20- Due April 27

The Solution Process

SECTION 13-2

Objectives

- List and explain three factors that affect the rate at which a solid solute dissolves in a liquid solvent.
- Explain solution equilibrium, and distinguish among saturated, unsaturated, and supersaturated solutions.
- Explain the meaning of "like dissolves like" in terms of polar and nonpolar substances.
- List the three interactions that contribute to the heat of solution, and explain what causes dissolution to be exothermic or endothermic.
- Compare the effects of temperature and pressure on solubility.

Factors Affecting the Rate of Dissolution

If you have ever tried to dissolve sugar in iced tea, you know that temperature has something to do with how quickly a solute dissolves. What other factors affect how quickly you can dissolve sugar in iced tea?

Increasing the Surface Area of the Solute

Sugar dissolves as sugar molecules leave the crystal surface and mix with water molecules. The same is true for any solid solute in a liquid solvent: molecules or ions of the solute are attracted by the solvent.

Because the dissolution process occurs at the surface of the solute, it can be speeded up if the surface area of the solute is increased. Crushing sugar that is in cubes or large crystals increases the surface area. In general, the more finely divided a substance is, the greater the surface area per unit mass and the more quickly it dissolves. Figure 13-6 shows a model of solutions that are made from the same solute but have a different amount of surface area exposed to the solvent.

Agitating a Solution

Very close to the surface of a solute, the concentration of dissolved solute is high. Stirring or shaking helps to disperse the solute particles and bring fresh solvent into contact with the solute surface. Thus, the effect of stirring is similar to that of crushing a solid—contact between the solvent and the solute surface is increased.

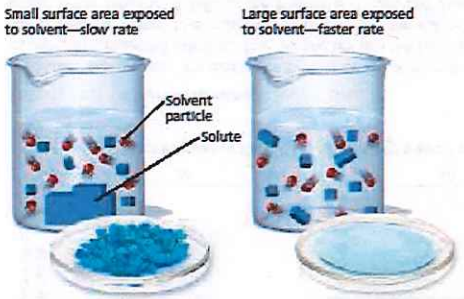


FIGURE 13-6 The rate at which a solid solute dissolves can be increased by increasing the surface area. A powdered solute has a greater surface area exposed to solvent particles and therefore dissolves faster than a solute in large crystals.

Heating a Solvent

You have probably noticed that sugar and many other materials dissolve more quickly in warm water than in cold water. As the temperature of the solvent increases, solvent molecules move faster, and their average kinetic energy increases. Therefore, at higher temperatures, collisions between the solvent molecules and the solute are more frequent and are of higher energy than at lower temperatures. This helps to separate solute molecules from one another and to disperse them among the solvent molecules.

Solubility

If you add spoonful after spoonful of sugar to tea, eventually no more sugar will dissolve. For every combination of solvent with a solid solute at a given temperature, there is a limit to the amount of solute that can be dissolved. The point at which this limit is reached for any solute-solvent combination is difficult to predict precisely and depends on the nature of the solute, the nature of the solvent, and the temperature.

The following model describes why there is a limit. When solid sugar is first dropped into the water, sugar molecules leave the solid surface and move about at random in the solvent. Some of these dissolved molecules may collide with the crystal and remain there (recrystallize). As more of the solid dissolves and the concentration of dissolved molecules increases, these collisions become more frequent. Eventually, molecules are returning to the crystal at the same rate at which they are going into solution, and a dynamic equilibrium is established between dissolution and crystallization, as represented by the model in Figure 13-7.

Solution equilibrium *is the physical state in which the opposing processes of dissolution and crystallization of a solute occur at equal rates.*

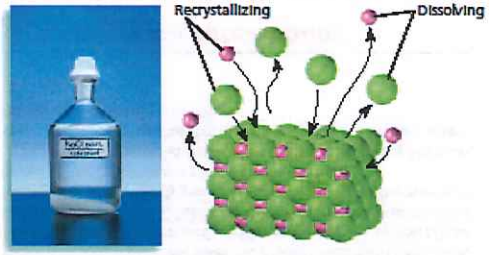


FIGURE 13-7 A saturated solution in a closed system is at equilibrium. The solute is recrystallizing at the same rate that it is dissolving, even though it appears that there is no activity in the system.

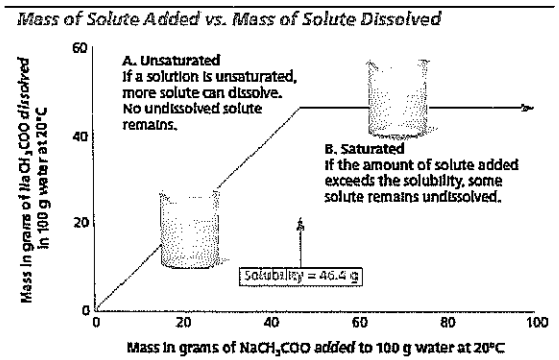


FIGURE 13-8 The graph shows the range of solute masses that will produce an unsaturated solution. Once the saturation point is exceeded, the system will contain undissolved solute.

Saturated vs. Unsaturated Solutions

A solution that contains the maximum amount of dissolved solute is described as a **saturated solution.** How can you tell that the NaCl solution pictured in Figure 13-8 is saturated? If more sodium chloride is added to the solution, it falls to the bottom and does not dissolve because an equilibrium has been established between molecules leaving and entering the solid phase. If more water is added to the saturated solution, then more sodium chloride will dissolve in it. At 20°C, 35.9 g of NaCl is the maximum amount that will dissolve in 100. g of water. *A solution that contains less solute than a saturated solution under the existing conditions is an* **unsaturated solution.**

Supersaturated Solutions

When a saturated solution of a solute whose solubility increases with temperature is cooled, the excess solute usually comes out of solution, leaving the solution saturated at the lower temperature. But sometimes, if the solution is left to cool undisturbed, the excess solute does not separate and a supersaturated solution is produced. *A* **supersaturated solution** *is a solution that contains more dissolved solute than a saturated solution contains under the same conditions.* A supersaturated solution may remain unchanged for a long time if it is not disturbed, but once crystals begin to form, the process continues until equilibrium is reestablished at the lower temperature. An example of a supersaturated solution is one prepared from a saturated solution of sodium thiosulfate, $Na_2S_2O_3$, or sodium acetate, $NaCH_3COO$. Solute is added to hot water until the solution is saturated, and the hot solution is filtered. The filtrate is left to stand undisturbed as it cools. Dropping a small crystal of the solute into the supersaturated solution ("seeding") or disturbing the solution causes a rapid formation of crystals by the excess solute.

Solubility Values

The **solubility** *of a substance is the amount of that substance required to form a saturated solution with a specific amount of solvent at a specified temperature.* The solubility of sugar, for example, is 204 g per 100. g of water at 20.°C. The temperature must be specified because solubility varies with temperature. For gases, the pressure must also be specified. Solubilities must be determined experimentally, and they vary widely, as illustrated in Table 13-4. Solubility values can be found in chemical handbooks and are usually given as grams of solute per 100. g of solvent or per 100. mL of solvent at a given temperature.

The rate at which a solid dissolves is unrelated to solubility. The maximum amount of solute that dissolves and reaches equilibrium is always the same under the same conditions.

Solute-Solvent Interactions

Lithium chloride is highly soluble in water, but gasoline is not. On the other hand, gasoline mixes readily with benzene, C_6H_6, but lithium chloride does not. Why are there such differences in solubility?

"Like dissolves like" is a rough but useful rule for predicting whether one substance will dissolve in another. What makes substances similar depends on the type of bonding, the polarity or nonpolarity of molecules, and the intermolecular forces between the solute and solvent.

TABLE 13-4 Solubility of Solutes as a Function of Temperature (in g solute/100. g H_2O)

	Temperature (°C)					
Substance	0	20	40	60	80	100
$AgNO_3$	122	216	311	440	585	733
$Ba(OH)_2$	1.67	3.89	8.22	20.94	101.4	—
$C_{12}H_{22}O_{11}$	179	204	238	287	362	487
$Ca(OH)_2$	0.189	0.173	0.141	0.121	—	0.07
$Ce_2(SO_4)_3$	20.8	10.1	—	3.87	—	—
KCl	28.0	34.2	40.1	45.8	51.3	56.3
KI	128	144	162	176	192	206
KNO_3	13.9	31.6	61.3	106	167	245
LiCl	69.2	83.5	89.8	98.4	112	128
Li_2CO_3	1.54	1.33	1.17	1.01	0.85	0.72
NaCl	35.7	35.9	36.4	37.1	38.0	39.2
$NaNO_3$						
CO_2 (gas at SP)						
O_2 (gas at SP)						

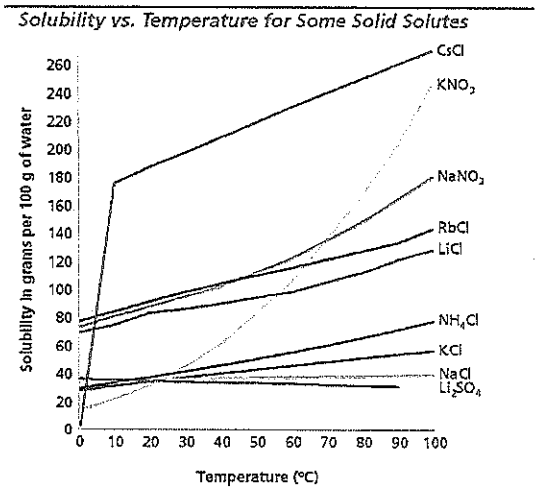


FIGURE 13-15 Solubility curves for various solid solutes generally show increasing solubility with increases in temperature. From the graph, you can see that the solubility of $NaNO_3$ is affected more by temperature than is NaCl.

Answer the following questions:

3. a. What is solution equilibrium?
   b. What factors determine the point at which a given solute-solvent combination reaches equilibrium? (13-2)
4. a. What is a saturated solution?
   b. What visible evidence indicates that a solution is saturated?
   c. What is an unsaturated solution? (13-2)

8. Based on Figure 13-15, determine the solubility of each of the following in grams of solute per 100. g H_2O.
   a. $NaNO_3$ at 10°C
   b. KNO_3 at 60°C
   c. NaCl at 50°C (13-2)
9. Based on Figure 13-15, at what temperature would each of the following solubility levels be observed?
   a. 40 g KCl in 100 g H_2O
   b. 100 g $NaNO_3$ in 100 g H_2O
   c. 50 g KNO_3 in 100 g H_2O (13-2)

INSTRUCTIONS FOR AP BIOLOGY APRIL 20-27, 2020

Virus and Bacteria Worksheet (Lesson Plans, Inc). Instructions are printed on the worksheet.

It is also downloaded into Schoology. The code for Schoology AP Biology is

6FNXS-3NJCZ

If you have questions my email is jyoung@mpisd.net

Topic: Introductory Bacteria and Virus Worksheet

Summary: Students answer introductory questions about bacteria and viruses.

Goals & Objectives: Students will be able to determine the difference between bacteria, viruses and animal/plant cells. Students will be able to remember important facts about viruses and bacteria.

Standards: CA 1c. *Students know* how prokaryotic cells, eukaryotic cells (including those from plants and animals), and viruses differ in complexity and general structure.

Time Length: 30 minutes

Materials:

- Class textbook
- Photocopied worksheets
- Pencils or pens

Procedures:
1. Tell the students which section they are to use in the textbook. Students are then going to read the section and answer the questions on the worksheet.

Accommodations: Students with an IEP can take the handout home if they need extra time or have reduced questions 1-19.

Evaluation:
Each question is worth 1/2 point each. The assignment is worth a total of 20 points.

Name: _____ Row: _____

Date: _____ Period: _____

Introduction to Bacteria and Viruses

1. What is the official name of the smallest and simplest cells? _____
2. What is the modern version of these cells called? _____
3. Bacteria are single-cell or multi-cellular organisms? _____

4-16. Fill in the following table with Yes or No answers.

Questions	Eurkaryote	Prokaryote	Virus
Is made out of a cell or cells?			
Has a nucleus?			
Is considered living?			
Can move on their own?			
Can reproduce or replicate?			
Has DNA?			
Has specialized structures or internal compartments?			
May have a cell wall?			
Has membrane-bound organelles?			
Has ribosomes?			
Has cytoplasm?			
Has chloroplast?			
Has mitochondrion?			

17. How does bacteria reproduce? _____
18. What are the two classification kingdoms for prokaryotes? _____ & _____
19. What does the chromosomes look like in bacteria? _____

20. What do bacteria use to move? _____

21. What do bacteria have surrounding their cell membrane? _____

33-38. Draw and title the three different shapes of bacteria

28. What two things are typical viruses made of? _____ & _____

29. What part of the virus binds the receptor proteins on a cell? _____

30. Viruses are general or highly specific to the cell they can infect? _____

31. What is the main way that viruses replicate? _____

32. What two types of nucleic acids can viruses have? _____ or _____

34-38. Draw and title the three main shapes of viruses

39. What type of virus invades bacteria? _____

40. What is the membrane called that surrounds a capsid? _____

Lisa Trimm: Scientific Research and Design

Purpose:

The purpose of this activity is for students to gather some baseline information, make one variable and test the results, make another variable and test the results, choose a paper plane design that they believe will fly the farthest and test the results, graph the longest and average distances flown for each of paper plane trails.

Objectives:

Make and fly a paper airplane.
Follow directions in making a complex paper plane design.
Organize and graph data collected.
write-up experimental procedures, results, and conclusions.

Resources/Materials:

way to measure distance
paper clips or weight of some sort
paper
scissors

DATA SHEET: Name _____

Date _____

Type of plane _____ (ie. paper clip plane)

Distance flown:

Trial 1 _____

Trial 2 _____

Trial 3 _____

Trial 4 _____

Trial 5 _____

Shortest trial _____

Next _____

Next _____

Next _____

Longest trial _____

Average _____ Median_____

Other information:

Activities and Procedures:

To test your paper airplanes,you will need plenty of space (outdoors might be best). Ask a parent, sibling or someone else to help you with your test trials.

Each student will have five trials to fly his/her plane. The student will record the distance for each trial. After five trials, the student will organize the data from shortest flight to longest flight. Calculate the average and median distance. Data sheets should be emailed, text, or uploaded to google classroom.

Using the same airplane design students will repeat the procedure using a paper clip or small weight on the end of the plane. This will be the one variable tested.

Using the same airplane design students will make flaps at the back of the plane. Flaps are made by cutting four slits on the rear edge of the wings and folding the slotted portion up. The plane is tested as before.

Assign each type of plane a color for graphing. Students will horizontally graph the results of the longest flight and average flight for each type of plane; plain paper, paper clip, and flaps. (Other variations may be tried but are not required; such as 14 inch paper versus 11 inch or various weights of paper could be used from onion skin to construction paper.)

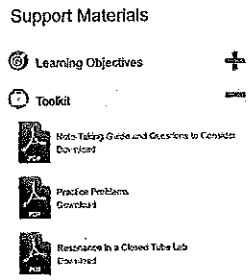
Tying it all Together:

After the graphs are finished, they should be displayed with the data sheets. Review the scientific process. Review what was tested and what was changed for each series of flights. See how the predictions of the longest flying experimental design turned out. Using the graphs check if one design was always the farthest flying. Check the graphs to see if one variable made a difference in distance for the majority of planes and discuss why it did not work for all planes. Students should be able to outline other things which could be tested.

Pre-AP Physics (L. Russell)
Assignment for Weeks April 13 – April 24

These materials are on the Georgia Public Broadcasting website. Watch the internet video about waves using this link https://www.gpb.org/physics-in-motion/unit-6/sound-standing-waves-and-resonance

These files are found on the same web page as the video above. Click on the "+" beside the word Toolkit in order to access them. Complete the Note Taking Guide as you watch the video, complete the Practice Problems, then perform the Resonance in a Closed Tube Lab.

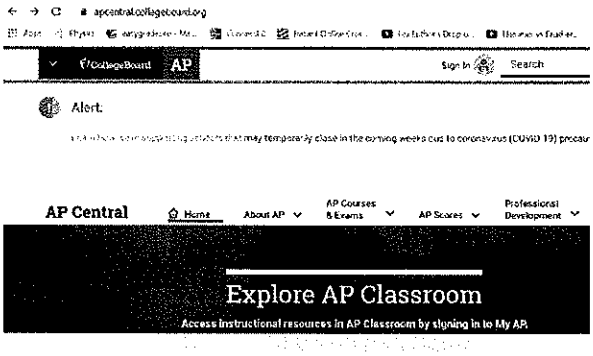


Dual Credit Physics (L. Russell)
Assignment for Week April 13 – April 24

The course is now being administered through Blackboard and Webassign. We will complete assignments over Chapter 21 during the week April 6 – April 10. There will be an exam in Webassign over chapters 19-21 on Tuesday April 14. Assignments for Chapters 22-24 will become available during the April 13-17 week, and we will continue working on these chapters through April 24.

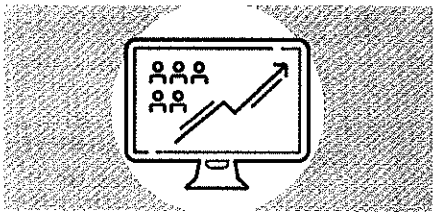
AP Physics C (L. Russell)
Assignment for Week April 13 – April 24

Go to apcentral.collegeboard.org and click on the "Learn how we're supporting schools" tab that you see in the screenshot below. Then click on the "AP Online Course Schedule" tab on the next screen. This gives you access to a list of video lessons that the College Board is providing now for AP students. The AP exam will not cover oscillations or gravitation this year due to the shortened schedule. I posted an old AP exam on Schoology in the folder "AP Review Materials". Here is the access code for our Schoology course if you need it. J4ZN-CXRF-7RFF9 You can take a picture of your answers with your phone and submit using Schoology and I'll check it for you.



Resources for Remote Teaching

To support communities that experience substantial disruption or school closures, we're providing several ways for teachers to help students prepare for exam day.



AP Classroom Resources and Tools

Continue to provide remote instruction with AP Classroom. You can assign Topic Questions and use Personal Progress Checks to evaluate where students may want to focus their reviews for exam prep.

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