

Environmental Systems

Assignment for week of April 10th - 14th

1. Please read the paragraph given on the Active Reading worksheet.
2. Once you have completed the reading, answer the questions that follow.
3. Once your work is complete, please take a picture and email to your teacher. If you send an email, please include your first and last name along with your usual class period for that teacher.

Please do not attempt to return any work to the school.

If you have any questions regarding the assignment, please feel free to contact your teacher for this subject. Emails are listed below:

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Active Reading

Section 2: Biodiversity at Risk

Read the passage below and answer the questions that follow.

Like rain forests, coral reefs occupy a small fraction of the marine environment yet contain the majority of the biodiversity there. Reefs provide millions of people with food, tourism revenue, coastal protection, and sources of new chemicals. One study in 1998 estimated the value of these services to be \$375 billion per year. But reefs are poorly studied and not as well protected by laws as terrestrial areas are. Nearly 60 percent of Earth's coral reefs are threatened by human activities, such as development along waterways, over fishing, and pollution. Similar threats affect coastal ecosystems, such as swamps, marshes, shores, and kelp beds. Coastal areas are travel routes for many migrating species as well as links to ecosystems on land.

IDENTIFYING MAIN IDEAS

One reading skill is the ability to identify the main idea of a passage. The main idea is the main focus or key idea. Frequently, a main idea is accompanied by supporting information that offers detailed facts about main ideas.

Read each question and write the answer in the space provided.

1. How much of the marine environment do coral reefs make up?

2. What percentage of coral reefs are threatened by human activity?

3. How much of the marine environment's biodiversity is contained in Earth's coral reefs?

4. How much money are the coral reefs worth, according to one study?

5. Which are better protected by laws, terrestrial areas or coral reef areas?

6. Name four reasons why coral reefs are beneficial to humans.

7. Name four types of coastal ecosystems.

Active Reading *continued*

RECOGNIZING SIMILARITIES AND DIFFERENCES

One reading skill is the ability to recognize similarities and differences between two phrases, ideas, or things. This is sometimes known as comparing and contrasting.

Read each question and write the answer in the space provided.

8. What are the similarities between coral reefs and coastal ecosystems?

9. What three human activities are threatening both coral reefs and coastal ecosystems?

RECOGNIZING CAUSE AND EFFECT

One reading skill is the ability to recognize cause and effect.

Read each question and write the answer in the space provided.

10. Why are coral reefs perhaps in more danger than inland areas?

11. What two purposes do coastal areas serve for wildlife?

12. List three reasons why it is beneficial to humans to protect coral reefs.

Biology.

Attachment 1: Classification of Aliens

Objective: The learner will classify aliens using a dichotomous key and the levels of taxonomy.

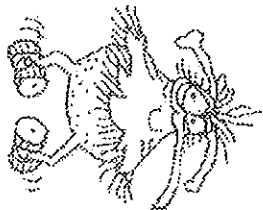
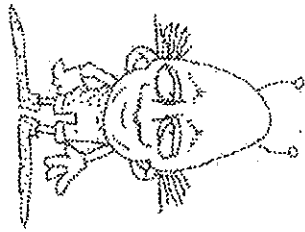
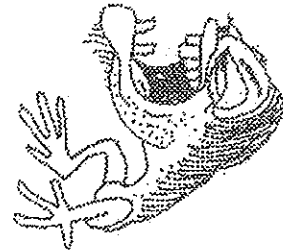
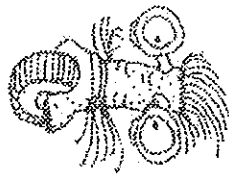
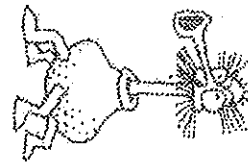
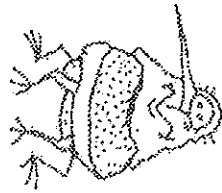
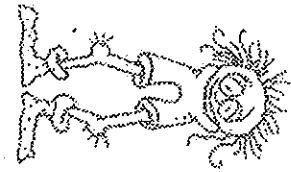
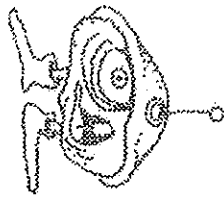
Directions:

1. Use the dichotomous key below to classify the aliens.
2. Look at an alien, read number one on the dichotomous key and answer the question, continuing until the alien has a name. For example: "Does the first alien have feet?" Yes, he does. The statement tells you to go to statement two. Number two asks, "Does he have socks?" Yes, he does. The statement tells you to go to statement three. Number three asks, "Does he have antennae?" No, he does not. His life form is K. Write the letter K in the blank under the first alien.
3. Do this for each alien until all have been classified.

Alien Dichotomous Key

1. A. Does the alien have feet?.....Go to statement 2
B. Does the alien have no feet?.....Go to statement 7
2. A. Does the alien have socks?.....Go to statement 3
B. Does the alien have no socks?.....Go to statement 5
3. A. Does the alien have antennae?.....Go to statement 4
B. Does the alien have no antennae?.....It is alien K
4. A. Does the alien have two eyes?.....It is alien R
B. Does the alien have less than two eyes?.....It is alien M
5. A. Does the alien have toes?.....Go to statement 6
B. Does the alien have no toes?.....It is alien T
6. A. Does the alien have long hair?.....It is alien Z
B. Does the alien have no long hair?.....It is alien N
7. A. Does the alien have eyes on stalks?.....Go to statement 8
B. Does the alien have eyes not on stalks?.....Go to statement 9
8. A. Does the alien have a nose?.....It is alien X
B. Does the alien have no nose?.....It is alien Y
9. A. Does the alien have arms?.....It is alien V
B. Does the alien have no arms?.....It is alien W

Attachment 2: Classifying Aliens



Biology

Classifying Aliens

Using your knowledge of a dichotomous key and the directions on the first page, classify the aliens using their dichotomous key.

AP BIOLOGY

Instructions for AP Biology Assignment for week of April 6th.

Fill out the Kingdom Chart. Research your answers. Number of cells means unicellular or multicellular. Cell type means prokaryote or eukaryote. Mode of nutrition means autotroph or heterotroph. Reproduction means asexual or sexual. Symbiotic relationship means Mutualism, Commensalism, or Parasitism. Can it move? yes or no. Cell wall in it's cells? yes or no.

SIX KINGDOM CHARACTERISTIC CHART

	Eubacteria	Archaeobacteria	Protista	Fungus	Plant	Animal
Cell Type						
Number of cells						
Cell Wall						
Mode of Nutrition						
Reproduction						
Symbiotic Relationship						
Motility						
Give examples						

Name _____
Date _____ Class _____

9. AIR QUALITY SPECIALIST



Air pollution is a problem in many urban areas, harming people and vegetation alike. Many cities experience a haze around highways and factories, while others, such as Los Angeles, are shrouded most days in a thick layer of smog. The problem of air pollution has been widely recognized and documented, and policymakers in many cities have implemented plans aimed at regulating and decreasing the amount of air pollutants produced in their area.

THE CLEAN AIR FORCE

The Clean Air Force (CAF) is an organization that works to improve air quality in and around cities. Ramona Rogers works for the CAF as an air-quality specialist. Her job is to monitor pollution levels and to provide this information, along with other independent research, to the CAF. Ultimately, her findings are reported to the Environmental Protection Agency (EPA), the branch of the federal government that establishes and enforces standards for pollution control.

Rogers has a master's degree in environmental engineering with an emphasis in chemistry, as well as a bachelor's degree in both electronics and management. "My education has allowed me to pursue a rewarding career that I feel truly benefits the community," she says, "and in the long run, the world."

TRACKING AND REDUCING AIR POLLUTION

In her work for the CAF, Rogers focuses on two aspects of air pollution: ground-level ozone and particulate matter. "We pay close attention to these types of pollution, especially the ground-level ozone," she explains, "because they pose the biggest threat to the health of a community."

"My job is to coordinate the field studies that monitor the amounts of ground-level ozone and particulate matter. I report the findings to the CAF, who in turn reports the data to the Metropolitan Planning Organization (MPO). The MPO is charged by the EPA with conformity analysis. This means that the MPO is responsible for monitoring levels of pollution and implementing programs to reduce those levels to the national standards if necessary."

Ground-Level Ozone

"One of the more highly publicized air-pollution problems in recent history has been the depletion of the ozone layer in the upper atmosphere due to the effect of chlorofluorocarbons. The presence of ozone, O₃, is necessary in the upper atmosphere to shield the Earth from the sun's ultraviolet rays. But in the lower atmosphere, particularly at ground level, ozone is a harmful pollutant."

Ozone is a reactive, colorless gas that can cause lung damage if inhaled. "For the most part, children and the elderly are most seriously affected by ozone," explains Rogers. "Children are especially at risk because they breathe more air per pound of body weight than adults do, and because their respiratory systems are still developing. Ground-level ozone is a particularly serious problem during the summer, when most kids are outside playing all the time, and ozone exposure is fairly constant."

"Elderly people with pre-existing pulmonary conditions tend to be affected in large numbers as well. Ozone exposure has a cumulative effect, and can aggravate

REGULATING THE AIR

asthma to a dangerous degree. Repeated exposure to high levels of ozone can even produce permanent structural damage to the lungs."

The Formation of Ozone

Ozone pollution is most serious on hot, sunny days. This is because ozone is produced by a sunlight-induced chemical reaction between nitrogen oxides and hydrocarbons in the atmosphere. According to Rogers, there are many sources of the hydrocarbon reactants, which are often called volatile organic compounds, or VOCs.

"VOCs can come from natural sources like trees and soil, as well as from man-made sources like chemical plants, factories, consumer products such as paints and insecticides, and industrial production. The biggest contributors, however, are the fuel-burning engines of motor vehicles. Cars, trucks, and trains contribute half of all the VOCs and nitrogen oxides in the atmosphere, and these emissions have a huge impact on the production of ground-level ozone."

Ozone Action Days

"One way we are trying to reduce ozone levels is through a program called 'Ozone Action Days.' It's a way for us to educate the public on the dangers of ground-level ozone and how each individual can help to solve the problem. By declaring an Ozone Action Day we're trying to get the general public to curtail emissions activities in order to lower ozone levels at the end of the day. We ask people to try and avoid things like driving, mowing lawns, filling gas tanks, and other things that cause heavy emissions of hydrocarbons and nitrogen oxides. If a large segment of the population cooperates, it makes a big difference."

Several criteria must be met by 2:00 p.m. on the day preceding a proposed Ozone Action Day. For example, the ozone level must be above 70 parts per billion and winds must be less than two miles per hour. Also, there can be no chance of rain or cloud cover according to the National Weather Service. And the temperature must exceed 87 degrees Fahrenheit. If all of these criteria are met, an Ozone Action Day will be declared for the following day.

Particulate Matter

"Particulate matter refers to the mixture of solid particles and liquid droplets that is found in the air. Those particles that are between 10 and 2.5 microns are called coarse particles. Examples of coarse particles are dust, soil, and the products of grinding operations. For the most part, coarse particles can be filtered by the body's defenses. Fine particles, those that are smaller than 2.5 microns, are not easily filtered by the body, and they can easily reach the deepest areas of the lungs. Therefore, they are a matter of great concern. Fine particles come from sources like fuel combustion, power plants, and bus and truck emissions."

"Particulate matter, especially fine particles, have been linked to a number of health problems, including aggravated asthma, chronic bronchitis, shortness of breath, and decreased lung capacity."

"The state conservation commission provides us with information regarding major pollutants, power plants, and other industrial sources," Rogers says. "And these organizations are regulated consistently. The uncertainty in air-pollution regulation is introduced by lawnmowers, chain saws, construction equipment, leaf blowers, and other fuel-burning equipment because they emit unfiltered, unregulated

Chemistry

AIR-QUALITY SPECIALIST continued

exhaust. There are no pollution controls on them. We don't know how many there are or how long or how often they are used. Therefore, we don't know for certain how much they contribute to the problem. The EPA does give us estimates, though, based on the population and many other factors.

"Once we assess the big picture, we determine how many tons per day of hydrocarbons and nitrogen oxides are emitted and try to project how high the emissions will be over the next ten or twenty years. With these calculations, we try to predict what is happening to the lower atmosphere. We try to locate the problem sources and determine where the focus for action should be.

"All this information is compiled into a comprehensive report called an Emissions Inventory that is sent to local and state government agencies for consideration. In the report, we provide emissions information for the area being tested. Based on the information in the report, we also recommend where changes should be made. And because the report is solid documentation of the emissions activities of a very specific region, it is pivotal in establishing legislation."



Do Your Share For Cleaner Air

ACTIVITIES AND QUESTIONS

1 Find out what the EPA's standards are for ground-level ozone and particulate matter. Then find out if the city or state you live in is in compliance with those regulations.

a. If your state is in compliance, what steps are being taken to reduce harmful air pollutants? What further steps could be taken?

9. AIR-QUALITY SPECIALIST continued

b. If your state is not in compliance, what steps could be taken to reduce emissions of hydrocarbons and nitrogen oxides in your area? What steps could be taken to reduce levels of particulate matter?

2 What devices in and around your home emit harmful pollutants?

3 How many machines does your family use that emit unregulated exhaust? Suggest some alternatives to these machines.

AP Chemistry - Trickey
AP/Dual Credit Chemistry Questions: Solubility
Product Equilibria Assignment #2 Assigned 3/6

Remember to use K_{sp} values as needed from your K_a/K_b reference.

#1) Write the dissociation equation and the solubility product constant for the following compounds:

- a) $Mg(OH)_2$
- b) $SrCO_3$
- c) $Ca_3(AsO_4)_2$
- d) $Fe(OH)_3$
- e) $Mn_3(PO_4)_3$

#2) Silver Chloride has a larger K_{sp} than silver carbonate ($K_{sp} = 1.6 \times 10^{-10}$ and 8.1×10^{-12} respectively). Does this mean that $AgCl$ also has a larger molar solubility than Ag_2CO_3 ? Explain.

#3) The solubility of silver bromate, $AgBrO_3$, in water is 0.0072 g/L.

- a) What is the molar solubility of $AgBrO_3$?
- b) What is the molar solubility of the cation in this compound?

#4) If 0.0490g of $AgIO_3$ dissolves per liter of solution, what is the molar solubility of this compound?

#5) The molar solubility of $MnCO_3$ is 4.2×10^{-6} M. What is K_{sp} for this compound?

#6) From the solubility data given, calculate the solubility product for the following compounds:

- a. SrF_2 7.3×10^{-2} g/L
- b. Ag_3PO_4 6.7×10^{-3} g/L

Aqueous Equilibria

Chapter 17 of Chemistry: The Central Science

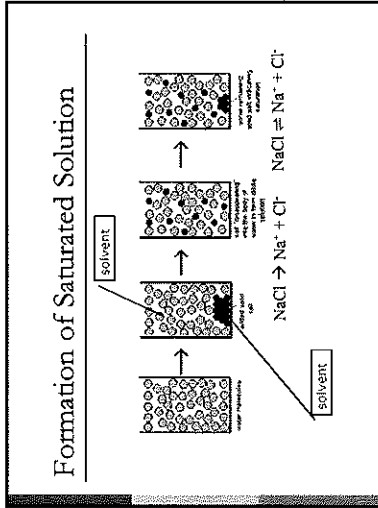
Review of Equilibrium Constants

- K_c equilibrium constant using conc.
- K_p equilibrium constant using pressure.
- K_w equilibrium constant for water.
- K_a equilibrium constant for acid.
- K_b equilibrium constant for base.

The expression for each of these has always been:

$$K = \frac{[\text{products}]^{\text{coefficients}}}{[\text{reactants}]^{\text{coefficients}}}$$

Recall that any solid or liquids is replaced with "1"



Solubility-Product Constant

- When salt solutions are saturated they form an equilibrium through **dissociation** (cation - anion):
 $\text{BaSO}_4(s) \rightleftharpoons \text{Ba}^{2+}(aq) + \text{SO}_4^{2-}(aq)$

The equilibrium constant is called the **solubility product** or **K_{sp}**

The equilibrium expression for this process looks like:

$$K_{sp} = \frac{[\text{Ba}^{2+}][\text{SO}_4^{2-}]}{[\text{BaSO}_4]}$$

Remember to replace solids with "1"

$$K_{sp} = [\text{Ba}^{2+}][\text{SO}_4^{2-}]$$

$$K_{sp} \approx 1.1 \times 10^{-10}$$

Example 1

- Write the solubility product constant (K_{sp}) expression for the following salts:

- $\text{Ba}_3\text{C}_2\text{O}_7(s) \rightleftharpoons 3\text{Ba}^{2+}(aq) + \text{C}_2\text{O}_7^{2-}(aq)$
- $\text{Ca}_3(\text{PO}_4)_2(s) \rightleftharpoons 3\text{Ca}^{2+}(aq) + 2\text{PO}_4^{3-}(aq)$
- $\text{FeCO}_3(s) \rightleftharpoons \text{Fe}^{2+}(aq) + \text{CO}_3^{2-}(aq)$
- $\text{Mn}(\text{OH})_2(s) \rightleftharpoons \text{Mn}^{2+}(aq) + \text{OH}^-(aq)$

Molar Solubility

Molar solubility is the moles of BaSO_4 that *dissolve* per liter a solution or $[\text{BaSO}_4]_{(aq)}$

Since 1 mole of $\text{BaSO}_4(s)$: 1 mole of $\text{Ba}^{2+}(aq)$ the molar solubility of $\text{BaSO}_4 = [\text{Ba}^{2+}]$

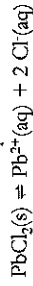
Use the mole ratio to determine molar solubility for ions that do not have 1:1 mole ratio. (see the following example)

Example 2

The molar solubility of PbCl_2 at 25°C is $1.0 \times 10^{-2} \text{ M}$ (mol/L). What is the molar solubility of chloride ions?

The question is asking what is $[\text{Cl}^-]$

#1) Write the dissociation equation.



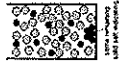
#2) Use mole ratio of Cl to PbCl_2

$$1.0 \times 10^{-2} \text{ M PbCl}_2(aq) \times \frac{2 \text{ Cl}^-}{1 \text{ PbCl}_2} = 2.0 \times 10^{-2} \text{ M Cl}^-$$

Solubility

The solubility is the concentration of a substance in a saturated solution usually in g/L.

To convert from molar solubility to solubility we use the molar mass to convert the units from moles to gram. (see example 3)



Example 3

The molar solubility of PbCl_2 at 25°C is $1.0 \times 10^{-2} \text{ M}$ (mol/L). What is the solubility of PbCl_2 in g/L?

Remember that $M = \frac{\text{mol}}{\text{L}}$

$$[\text{PbCl}_2] = 1.0 \times 10^{-2} \frac{\text{mol}}{\text{L}} \text{PbCl}_2(aq) \times \frac{278.1 \text{ g}}{1 \text{ mol}} = 2.8 \frac{\text{g}}{\text{L}} \text{PbCl}_2$$

What is the solubility of chloride ions?

Determine molar solubility of Cl first...

$$1.0 \times 10^{-2} \text{ M PbCl}_2(aq) \times \frac{2 \text{ Cl}^-}{1 \text{ PbCl}_2} = 2.0 \times 10^{-2} \text{ M Cl}^-$$

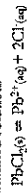
Now convert the molar solubility of Cl to solubility...

$$2.0 \times 10^{-2} \frac{\text{mol}}{\text{L}} \text{Cl}^- \times \frac{35.45 \text{ g}}{1 \text{ mol}} = 2.8 \frac{\text{g}}{\text{L}} \text{PbCl}_2$$

Solubility Product vs Molarity Solubility

Confusion alert! K_{sp} (solubility product) is NOT the same as molar solubility!

For the following saturated solution:



The solubility product expression is:

$$K_{sp} = [\text{Pb}^{2+}][\text{Cl}^-]^2$$

This is the molar solubility of Pb^{2+} and since the mole ratio of Pb^{2+} to Cl^- is 1:2 then $[\text{Pb}^{2+}] = [\text{PbCl}_2]$

So, if the solubility or the molar solubility is known then the solubility product, K_{sp} , can be found using an ICE table. (See Example 4)

Example 4

If the molar solubility of CaF_2 at 25°C is $1.24 \times 10^{-3} \text{ M}$ what is the solubility product, K_{sp} ?

$\text{CaF}_2(s)$	\rightleftharpoons	$\text{Ca}^{2+}(aq)$	$+ 2 \text{ F}^-(aq)$
0		0	0
-x		+x	+2x
1.24 x 10 ⁻³ M		1.24 x 10 ⁻³ M	2.48 x 10 ⁻³ M

$$K_{sp} = [\text{Ca}^{2+}][\text{F}^-]^2$$

$[\text{CaF}_2] = [\text{Ca}^{2+}]$ since there is a 1:1 mole ratio.

So $[\text{Ca}^{2+}] = 1.24 \times 10^{-3} \text{ M}$. This is "x" value.

$[\text{F}^-] = 2(1.24 \times 10^{-3} \text{ M})$

$[\text{F}^-] = 2.48 \times 10^{-3} \text{ M}$

$K_{sp} = [1.24 \times 10^{-3}][2.48 \times 10^{-3}]^2$

$K_{sp} = 7.63 \times 10^{-9}$

Pre-AP Physics (L. Russell)
Assignment for Week April 6 – April 10

These materials are on the Georgia Public Broadcasting website. Watch the internet video about waves using this link: <https://www.gpb.org/physics-fundamentals/episodes/1102>

These files are found on the same web page as the video above. Complete the Note Taking Guide as you watch the video.

 Note Taking Guide I

 Note Taking Guide II

Complete the worksheet Wave Properties and Math.

 Wave Properties and Math

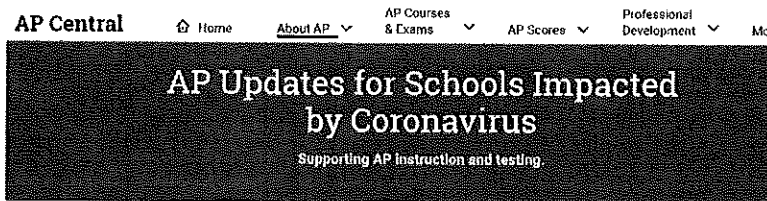
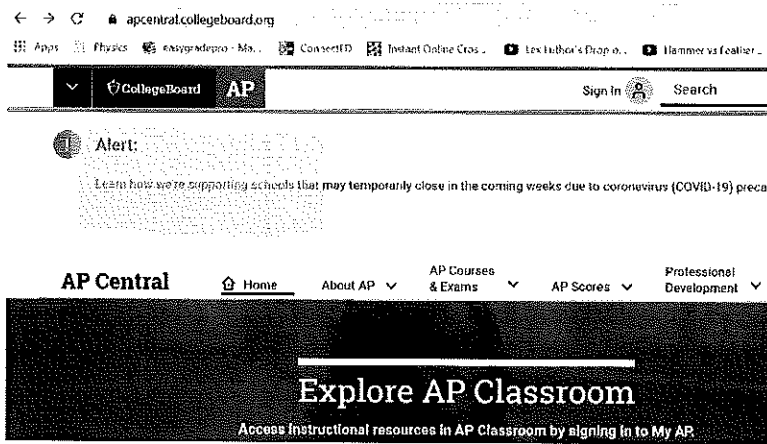
Dual Credit Physics (L. Russell)
Assignment for Week March 30 – April 3

The course is now being administered through Blackboard and Webassign. I'm leaving the instructions for accessing those websites here.

In order to allow you to receive credit for Physics 1402 through the college, we are transitioning the course to online through the NTCC website. The instructions for accessing the materials are on Schoology. Here is the access code for the course on Schoology if you need it. [9CRC-PSDJ-X3WGN](#) I have two assignments for the week listed there. Be sure to set up your Webassign access using the procedures outlined in Schoology in order to complete the homework assignments. Don't use your textbook to complete the assignments since the numerical values in the textbook won't match the numerical values in the problems on Webassign even though they are the same problems.

AP Physics C (L. Russell)
Assignment for Week March 30 – April 3

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 “free remote learning resources” tab on the next screen. The next page will list the different AP courses. Go down and click on AP Physics C Mechanics and it will open 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.



AP Central / About AP / News & Changes / AP Updates for Schools Impacted by Coronavirus

About AP

March 20, 2020

Overview

As schools and communities navigate the unprecedented challenges posed by the coronavirus (COVID-19) outbreak, the health and safety of educators and students are the AP Program's top priorities. Here's how we're supporting schools:

AP at a Glance

Discover the Benefits of AP

Start & Grow AP

- We're providing free remote learning resources.
- We're investing in the development of a new at-home testing option.