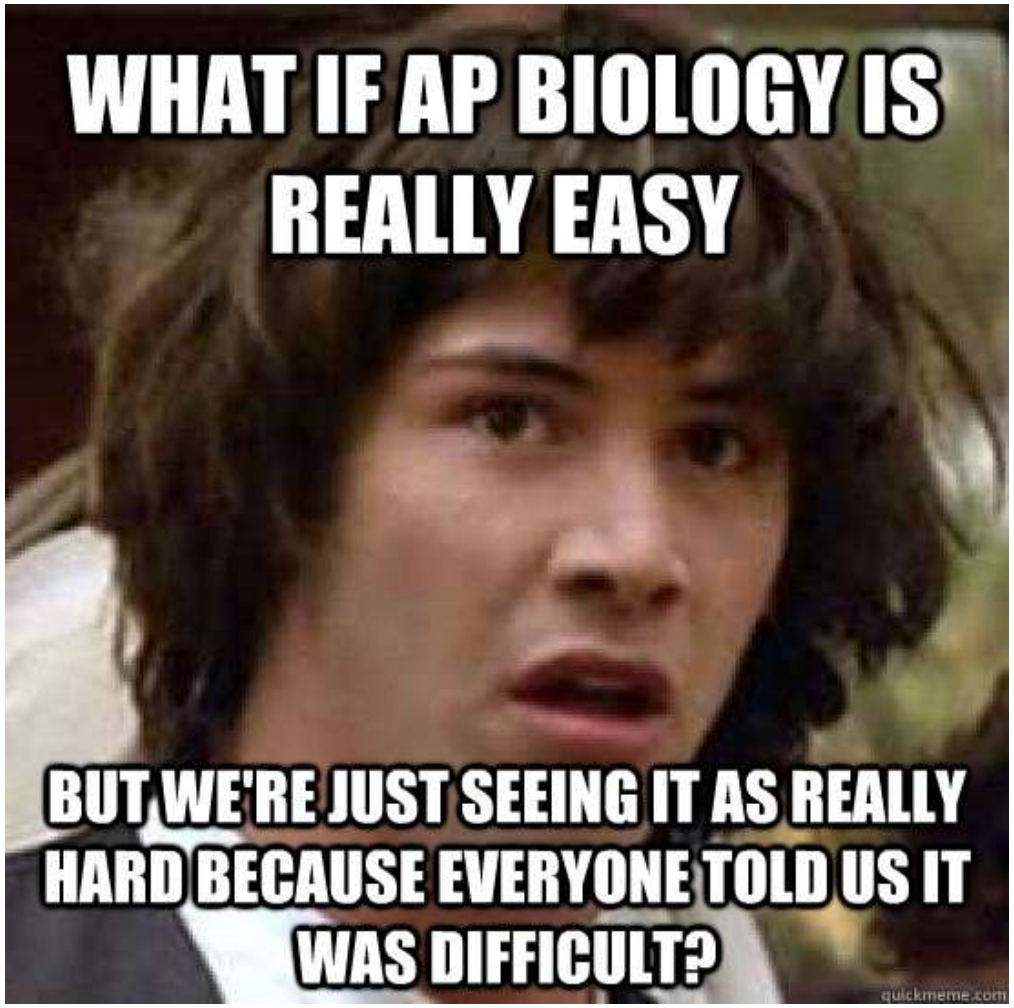
http://i.qkme.me/363u7y.jpg



TIPS FOR TAKING THE 2022 AP EXAM

By Kelly Riedell/Brookings Biology

Includes information about the AP Biology exam from the 2019 Course and Exam Description (CED) and suggestions based on my experiences as an AP BIOLOGY teacher

https://www.allexamgurublog.com/2016/07/introduction-to-sociology-questions-and-answers.html

MULTIPLE CHOICE QUESTIONS

If you don't understand the question, look at the answer choices for clues for what the question is about.

Each question counts the same. Don't get stuck on a question. Make your best guess.

Otherwise you may run out of time and not get to answering some questions that you may know the answers to.

If you absolutely don't have a clue, guess.
Don't leave any blank. There's NO penalty for guessing.

https://secure-media.collegeboard.org/apc/ap19-frq-biology.pdf

NOTE: THIS IS NOT A SECURE TEST QUESTION
It is posted on the College Board website

2019 AP® BIOLOGY FREE-RESPONSE QUESTIONS

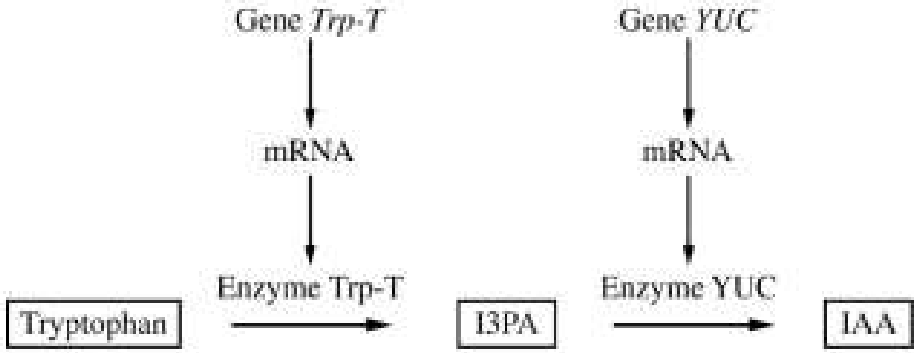


Figure 1. Model of two-step enzymatic plant pathway for synthesis of IAA from tryptophan

1. Auxins are plant hormones that coordinate several aspects of root growth and development. Indole-3-acetic acid (IAA) is an auxin that is usually synthesized from the amino acid tryptophan (Figure 1). Gene *Trp-T* encodes an enzyme that converts tryptophan to indole-3-pyruvic acid (I3PA), which is then converted to IAA by an enzyme encoded by the gene *YUC*.

   (a) **Circle** ONE arrow that represents transcription on the template pathway. **Identify** the molecule that would be absent if enzyme YUC is nonfunctional.

   (b) **Predict** how the deletion of one base pair in the fourth codon of the coding region of gene *Trp-T* would most likely affect the production of IAA. **Justify** your prediction.

   (c) **Explain** one feedback mechanism by which a cell could prevent production of too much IAA without limiting I3PA production.

   (d) Rhizobacteria are a group of bacteria that live in nodules on plant roots. Rhizobacteria can produce IAA and convert atmospheric nitrogen into forms that can be used by plants. Plants release carbon-containing molecules into the nodules. Based on this information, **identify** the most likely ecological relationship between plants and rhizobacteria. **Describe** ONE advantage to the bacteria of producing IAA.

   (e) A researcher removed a plant nodule and identified several "cheater" rhizobacteria that do not produce IAA or fix nitrogen. **Describe** the evolutionary advantage of being a bacterial cheater in a population composed predominantly of noncheater bacteria. Plants can adjust the amount of carbon-containing molecules released into nodules in response to the amount of nitrogen fixed in the nodule. **Predict** the change in the bacterial population that would cause the plant to reduce the amount of carbon-containing molecules provided to the nodule.

If you are taking the in person/paper exam.

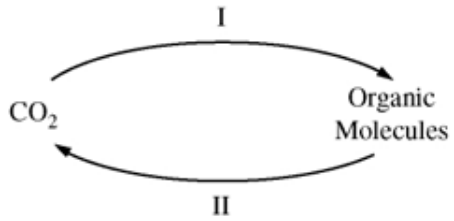
Read through the FRQ questions 1st and circle the POWER WORDS

Each of these is a POINT!

As you write your answers, check back to see if you are hitting these.

https://secure-media.collegeboard.org/digitalServices/pdf/ap/apcentral/ap13_frq_biology.pdf

4. Matter continuously cycles through an ecosystem. A simplified carbon cycle is depicted below.



(a) **Identify** the key metabolic process for step I and the key metabolic process for step II, and briefly **explain** how each process promotes movement of carbon through the cycle. For each process, your explanation should focus on the role of energy in the movement of carbon.

(b) **Identify** an organism that carries out both processes.

PAGE FOR ANSWERING QUESTION 4

If you are taking the in person/paper exam

Read through the questions again. Jot down some notes here

What do you know?
What do you want to be sure and include in your answer?
What will help you answer the ?

BUT REMEMBER Only answers written HERE can earn points!

NOTE: THIS IS NOT A SECURE TEST QUESTION
It is posted on the College Board website

https://media.istockphoto.com/illustrations/brain-freeze-illustration-id166010577

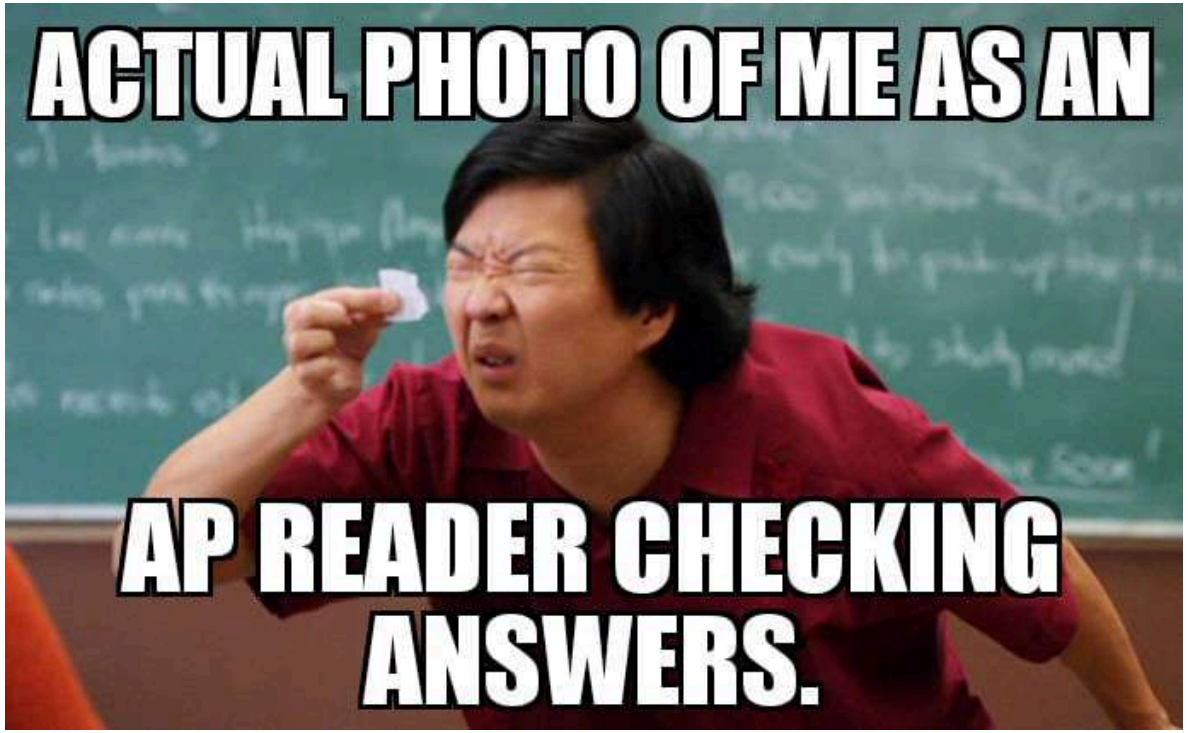
http://www.clipartbest.com/thinking-cartoon-gif

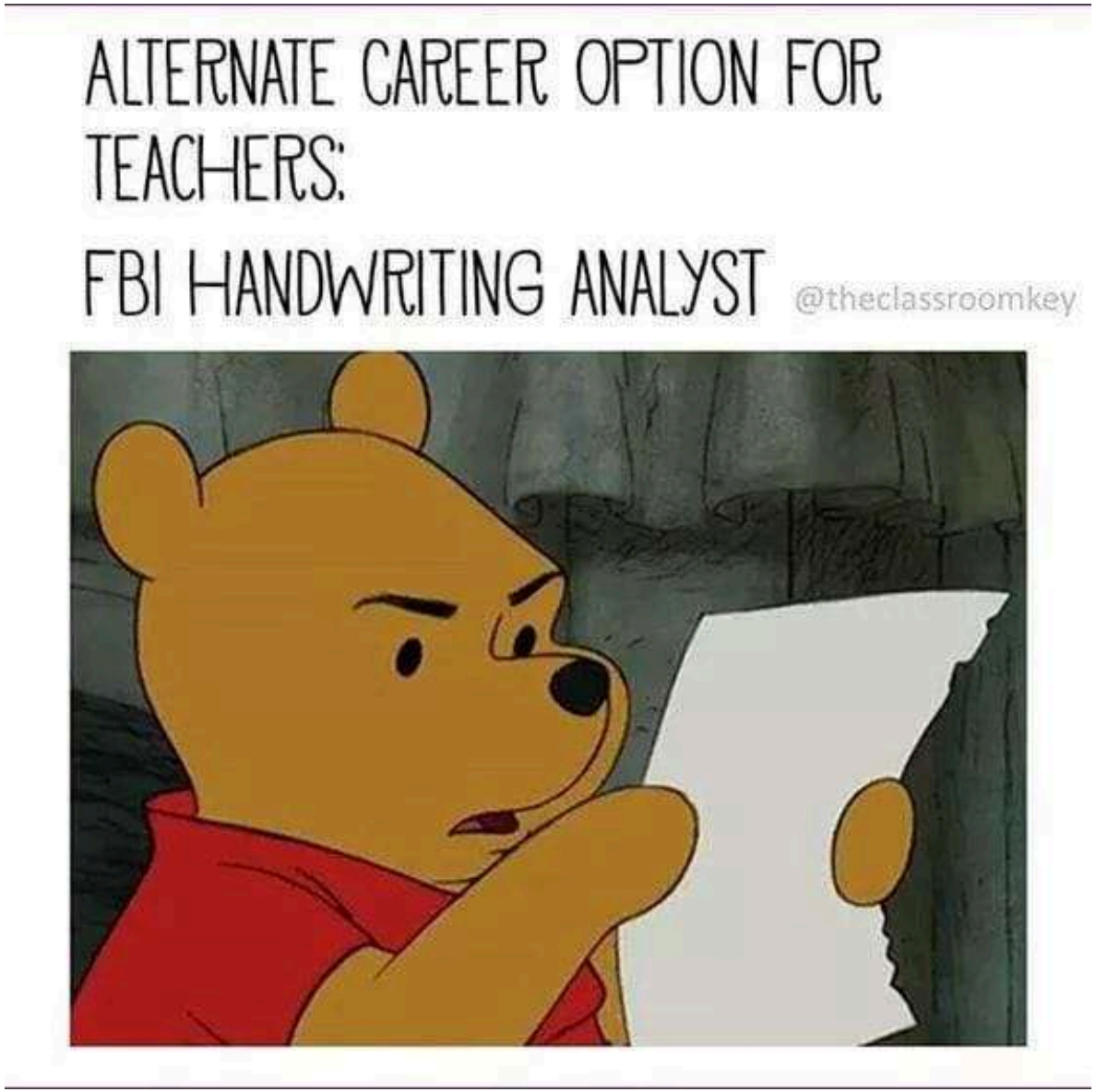
FRQ's

On a big point question even if you can't answer all the parts look to see if there are one or two parts you know something about and answer those.

Describe it, if you can't name it.

WRITE LEGIBLY





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https://www.facebook.com/photo.php?fbid=10216725116578015&set=gm.2308940229372411&type=3&theater&ifg=1

FORGET WHAT YOUR ENGLISH TEACHER TOLD YOU ABOUT WRITING ESSAYS!

GET TO THE GUTS!

- NO introductory/closing paragraphs
- DON'T rewrite the ? stem in your answer !!!

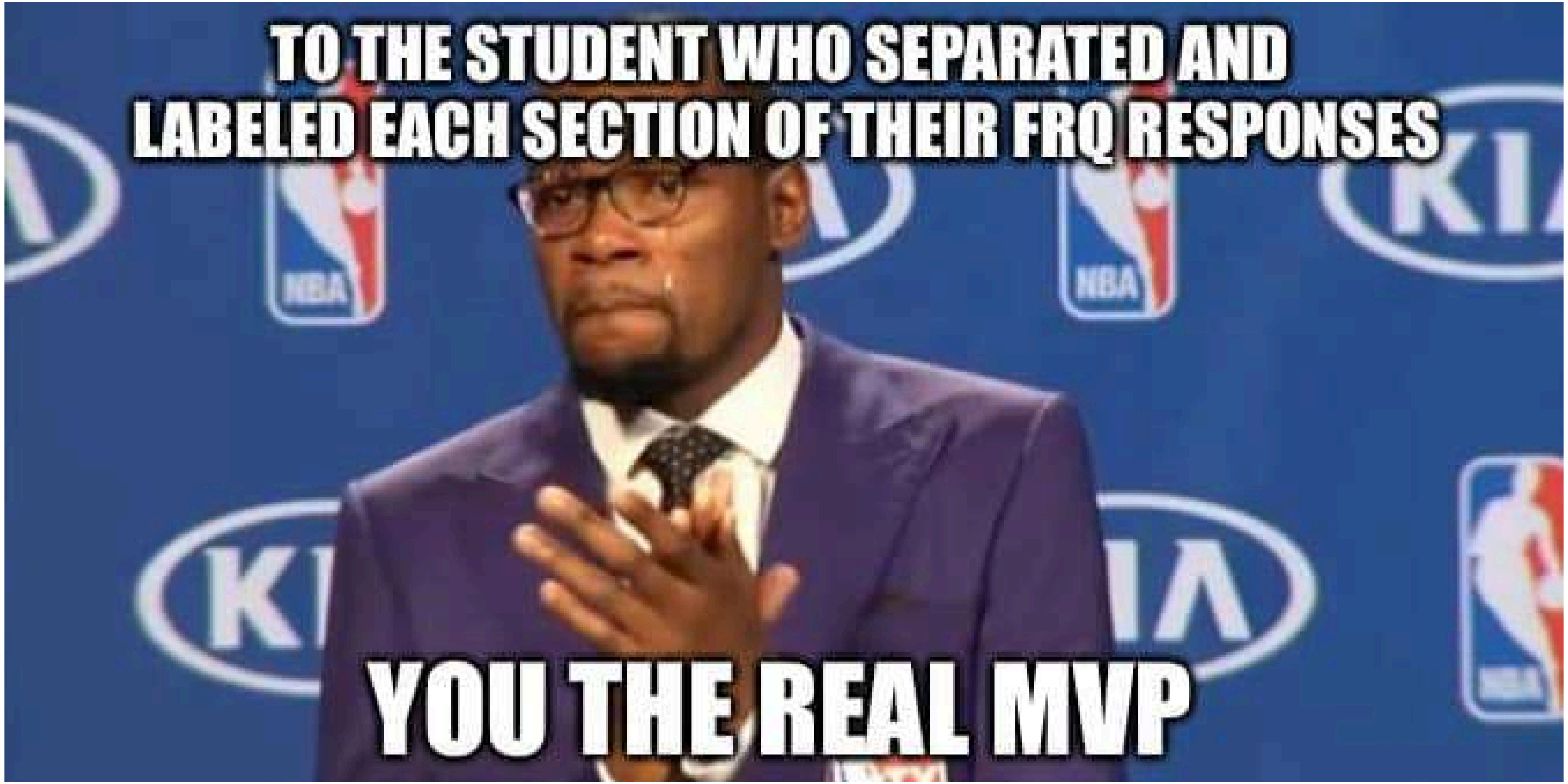
THESE ARE ESSAY QUESTIONS!

~ USE COMPLETE SENTENCES

~ NO BULLETS*

* UNLESS THE POWER WORDS ASK YOU TO
IDENTIFY or LIST

MAKE IT EASY FOR THE READER TO FIND YOUR ANSWERS



https://www.facebook.com/photo.php?fbid=10215152835950449&set=gm.2311330409133393&type=3&theater&ifg=1

MAKE IT EASY FOR THE READER TO FIND YOUR ANSWERS

THAT SAID . . .

If you don't label your sections OR if you write an answer to part A in with your part B answer it still counts. The reader will find it.

Readers will read every word you write.

If you answer correctly, then contradict your answer later you lose that earned point.

If you answer incorrectly then go on to correct your error. You get the point.

NO POINTS FOR JUST REPEATING INFO GIVEN IN THE PROMPT

USE AP LEVEL VOCAB

SHOW WHAT YOU KNOW

You are trying to show that you understand enough to earn credit for a year of college level biology

https://media.makeameme.org/created/what-if-i-6240ud.jpg

WATCH YOUR PRONOUNS

IT CHANGED.

What changed?
How did it change?
How do you know?

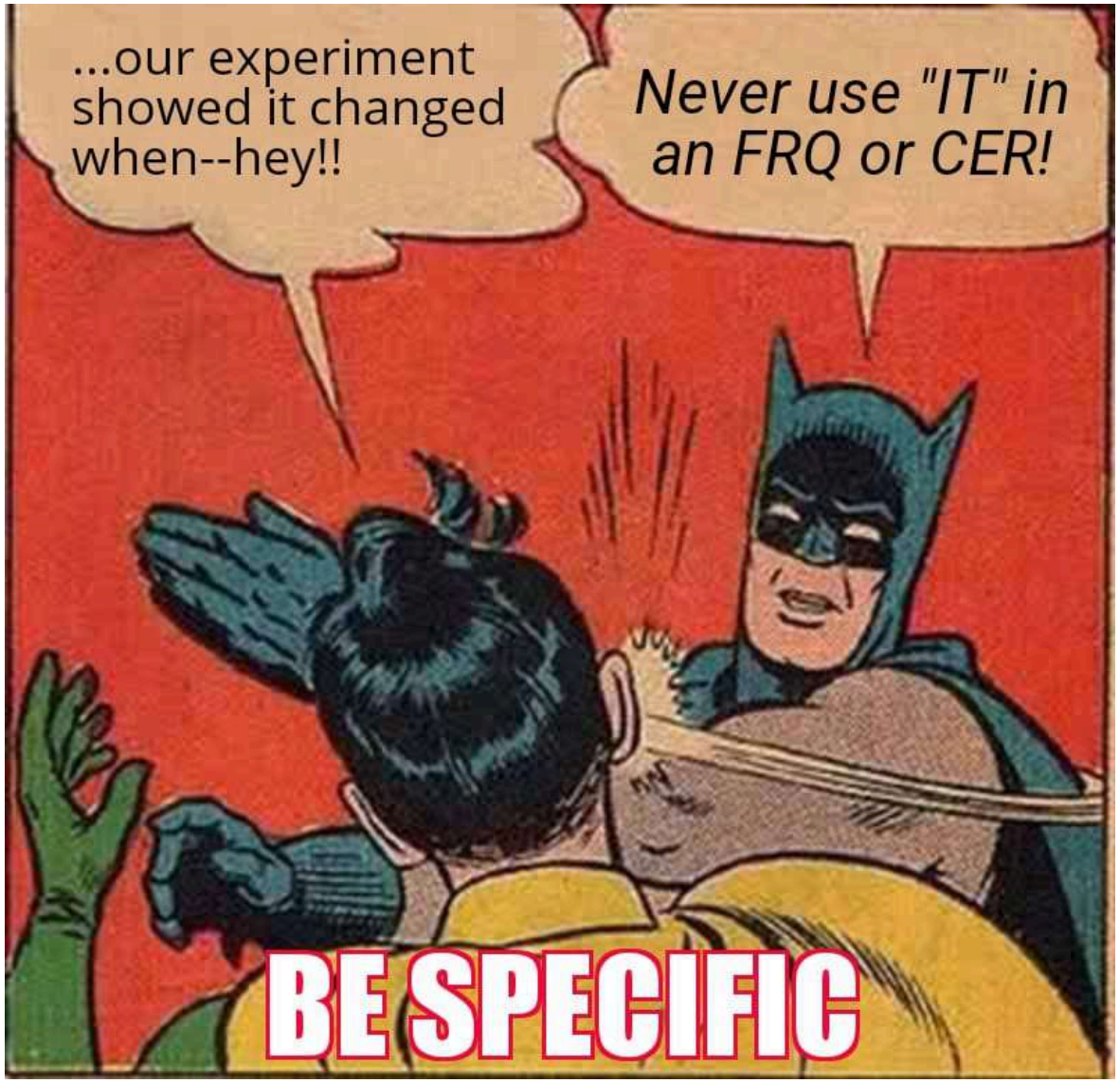
Don't be vague/over dramatic

It will >>>

. . . be harmful to organism

. . . will help organism

. . . Everything will die.



https://www.facebook.com/photo.php?fbid=10213781773914903&set=p.10213781773914903&type=3&theater

ANSWERS SHOULD BE COMPLETE!

Units with Numbers:

When asked to discuss quantitative data, don't forget to include units. Credit is not granted for numbers without units.

Directionality in Trends:

If asked to describe a trend, be sure to address whether the trend is increasing, decreasing or remaining constant.

Making Comparisons:

If asked to compare two groups or explain differences between them, be sure you address BOTH groups, not just one.

Slide from LEE FERGUSON

http://inpathybulletin.com/wp-content/uploads/2014/06/erasing-your-VP-mistakes.jpg

IF YOU MAKE A MISTAKE . . .

Simply draw a line through it.

http://quotespictures.com/wp-content/uploads/2013/07/theres-nothing-wrong-with-making-mistakes-whats-wrong-is-letting-a-mistake-stay-a-mistake-without-putting-if-effort-to-make-it-right.png

KNOW WHAT THEY ARE ASKING FOR

EVERY POWER WORD IS A POINT!

DISCUSS

IDENTIFY

JUSTIFY

DESCRIBE

PREDICT

EXPLAIN

PROVIDE REASONING

CALCULATE

MAKE A CLAIM

PROVIDE EVIDENCE

DRAW/CONSTRUCT

Practice the words

QUIZLET

The following **task verbs** are commonly used in the free-response questions:

Calculate: Perform mathematical steps to arrive at a final answer, including algebraic expressions, properly substituted numbers, and correct labeling of units and significant figures.

Construct/Draw: Create a diagram, graph, representation, or model that illustrates or explains relationships or phenomena. Labels may or may not be required.

Describe: Provide relevant characteristics of a specified topic.

Determine: Decide or conclude after reasoning, observation, or applying mathematical routines (calculations).

Evaluate: Judge or determine the significance or importance of information, or the quality or accuracy of a claim.

Explain: Provide information about how or why a relationship, process, pattern, position, situation, or outcome occurs, using evidence and/or reasoning to support or qualfiy a claim. Explain "how" typically requires analyzing the relationship, process, pattern, position, situation, or outcome; whereas explain "why" typically requires analysis of motivations or reasons for the relationship, process, pattern, position, situation, or outcome.

Identify: Indicate or provide information about a specified topic, without elaboration or explanation.

Justify: Provide evidence to support, qualify, or defend a claim, and/or provide reasoning to explain how that evidence supports or qualifies the claim.

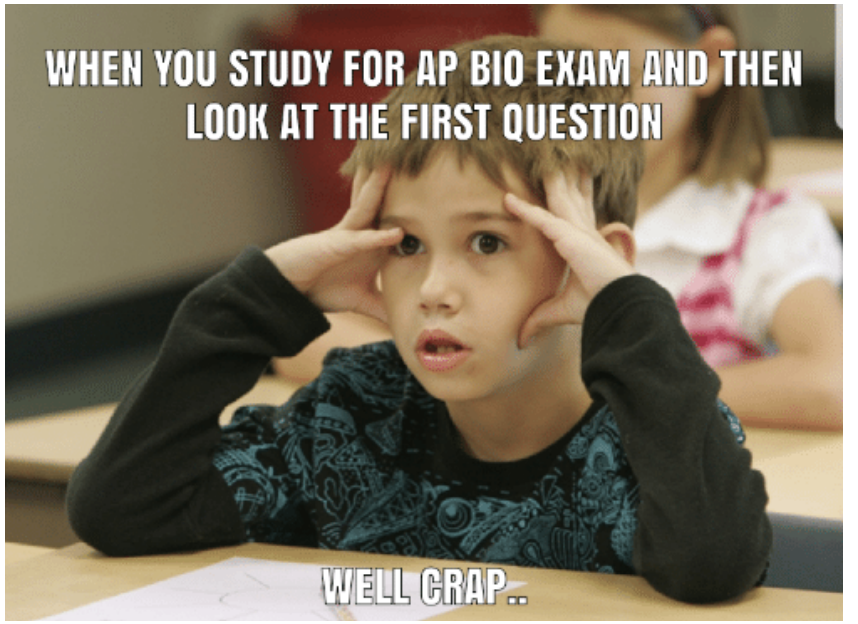
Make a claim: Make an assertion that is based on evidence or knowledge.

Predict/Make a prediction: Predict the causes or effects of a change in, or disruption to, one or more components in a relationship, pattern, process, or

PAGE 199 in new 2019 CED

THERE WILL BE STUFF ON THE EXAM YOU DIDN'T LEARN

At first glance, the questions may look complicated and are about things you never learned BUT . . .



You don't have to know how to cure cancer or understand bee psychology.

Look closer. They ARE really asking about things you learned about like cell structure, ecosystems, hypo/hypertonic situations, gene regulation, cell signaling, transport, symbiotic relationships, genetics, evolutionary processes, homeostasis, metabolism, food chains, water potential . . .

https://me.me/i/when-you-study-for-ap-bio-exam-and-then-look-660f27aef726442fa4b99912b6d9ed8d

https://secure-media.collegeboard.org/ap/pdf/ap-biology-frq-2017.pdf

NOTE: THIS IS NOT A SECURE TEST QUESTION
It is posted on the College Board website

2017 EXAM

Many species of bacteria grow in the mouth of animals and can form biofilms on teeth (plaque). Within plaque, the outer layers contain high levels of oxygen and the layers closest to the tooth contain low levels of oxygen. The surface of the tooth is covered with a hard layer of enamel, which can be dissolved under acidic conditions. When the enamel breaks down the bacteria in plaque can extract nutrients from the tooth and cause cavities.

Certain types of bacteria (e.g., *Streptococcus mutans*) thrive in the innermost anaerobic layers of the plaque and are associated with cavities. Other types of bacteria (*Streptococcus sanquinis*) compete with *S. mutans* but are unable to thrive in acidic conditions.

(a) IDENTIFY the biochemical pathway *S. mutans* uses for metabolizing sugar and DESCRIBE how the pathway contributes to the low pH in the inner layers of plaque.

(b) Normal tooth brushing effectively removes much of the plaque from the flat surfaces but cannot reach the surfaces between teeth. Many commercial toothpastes contain alkaline components which raise the pH of the mouth. PREDICT how the population size of *S. mutans* AND *S. sanguinis* in the bacterial community in the plaque between teeth are likely to change when these toothpastes are used.

Biofilms???
Streptococcus mutans???
Cavities ? ? ?
REALLY ?
WE NEVER STUDIED THIS !

Images from:
https://www.pinterest.com/sum1610/emoji/
https://www.elitedaily.com/social-news/new-ios-update-sassy-emojis/1677642

THERE WILL BE STUFF ON THE EXAM YOU DIDN'T LEARN

LOOK CLOSER AT THE QUESTIONS.
WHAT ARE THEY ASKING ABOUT?

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They are asking about pathways for metabolizing sugar.
I KNOW you learned about fermentation and cellular respiration!

a) How are fermentation/cellular respiration impacted by the presence/absence of oxygen?
Where would each of these be happening?
Which of these could affect the pH and make the inner layer more acidic?

b) is asking how changing an environment might affect populations that live there. If you know something about the characteristics of the populations, you should be able to make a prediction about which population would respond best to the new more alkaline conditions.

THERE WILL BE STUFF ON THE EXAM YOU DIDN'T LEARN

Even if it seems like the question is about something you never learned, the prompt will contain information to help steer you towards what they are looking for and help you answer the question.

LOOK AT THE PROMPT.
WHAT INFORMATION ARE YOU GIVEN TO HELP YOU ANSWER THE QUESTIONS?

2017 EXAM

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Outer layer has HIGH levels of oxygen

Inner layer has LOW levels of oxygen.
S. mutans bacteria thrive here.

S. sanquinis bacteria are unable to thrive in acidic conditions

https://secure-media.collegeboard.org/ap/pdf/ap-biology-frq-2017.pdf

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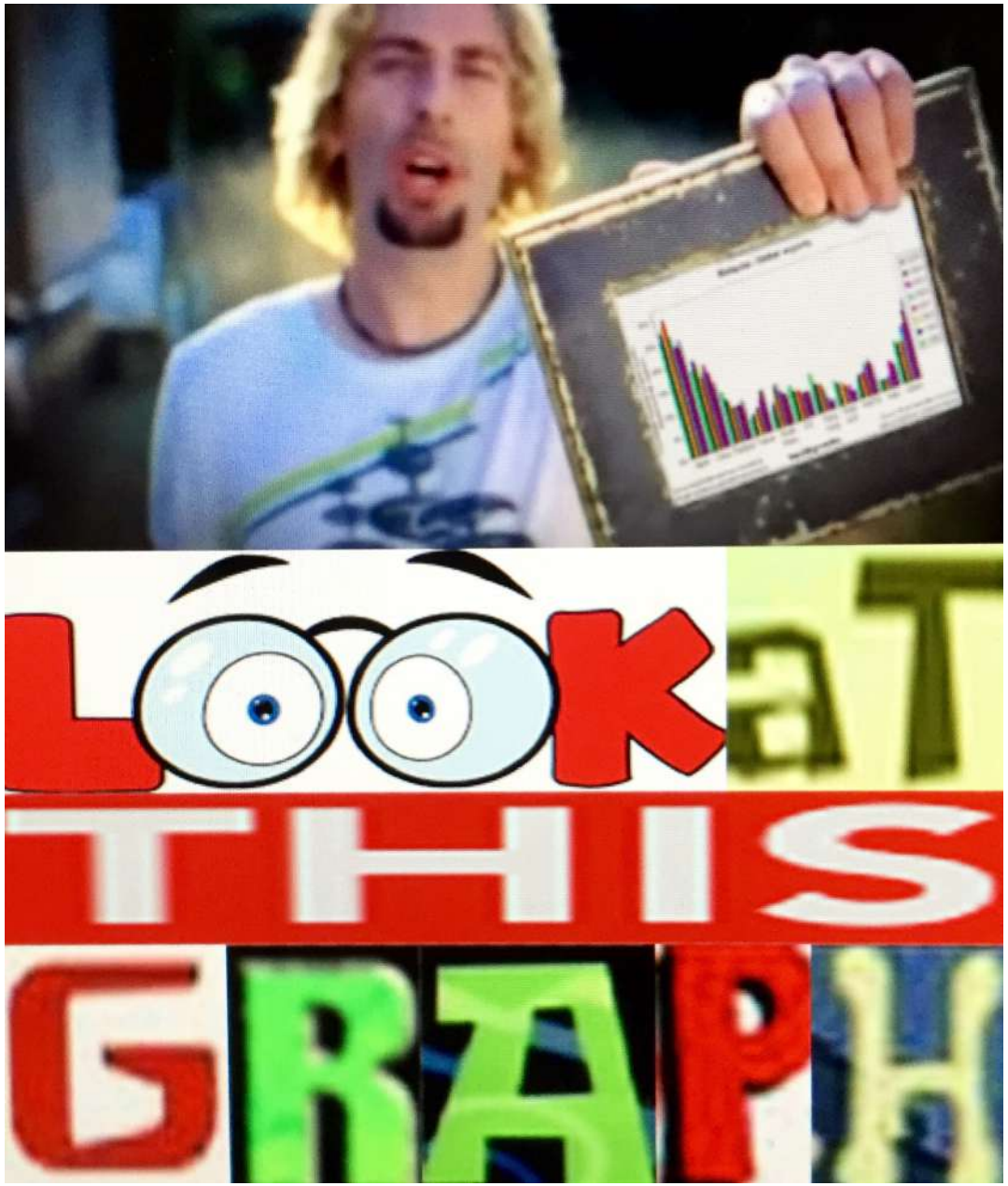
NOW YOU CAN ANSWER THE QUESTIONS !

Check the Scoring Guidelines to see how you did

https://www.mediapost.com/publications/article/322395/emojis-score-with-mobile-users.html

PAY ATTENTION TO GRAPHS/PICTURES



Sometimes just looking at the picture can give you the answer to the question

https://i0.kym-cdn.com/photos/images/original/000/962/553/000.jpg

https://secure-media.collegeboard.org/ap/pdf/ap18-frq-biology.pdf

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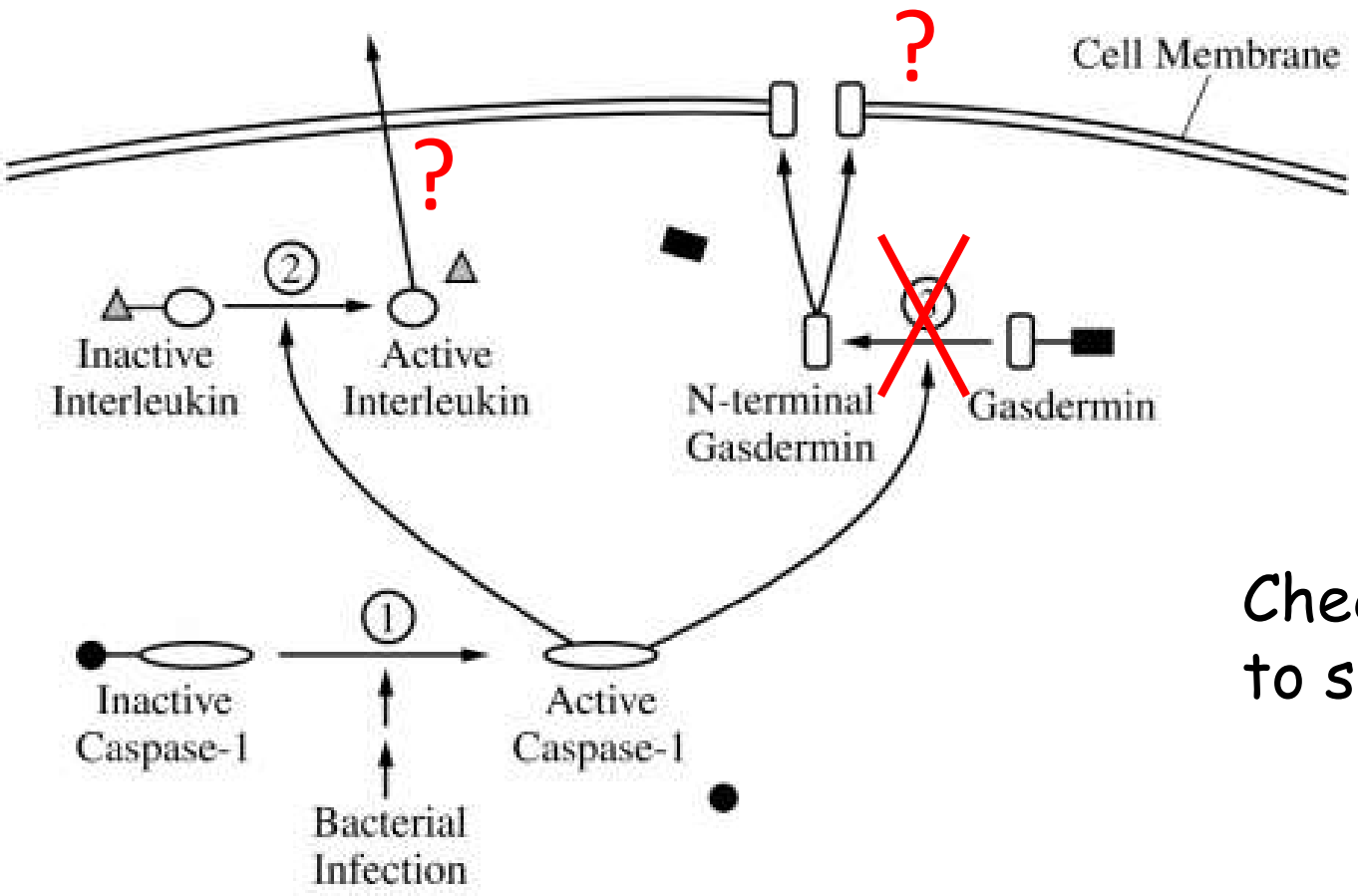
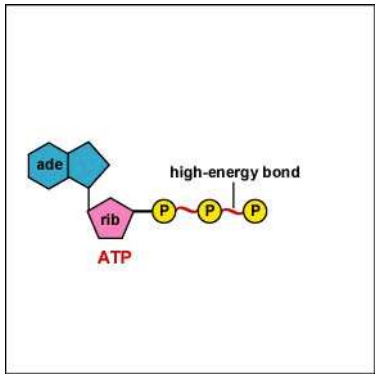
2018 AP® BIOLOGY FREE-RESPONSE QUESTIONS

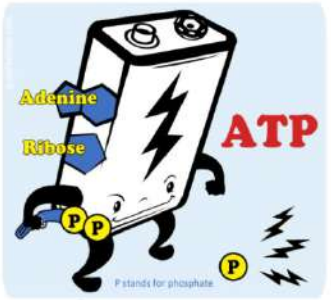


Check SCORING GUIDELINES
to see how you did

DESCRIBE the effect of inhibiting step 3 on the formation of pores
AND the release of interleukin from the cell



ATP



ANSWER THE PROMPT

2003 B #3

DESCRIBE how the properties of water contribute to TWO of the following.

-transpiration
- thermoregulation in endotherms
- plasma membrane structure

If it asks for TWO only the first 2 you write about count for points.

So if you write about 3 or 4 you wasted writing time and if the 2nd one you write about is incorrect, even if your 3rd or 4th answers are correct, you won't get any more points.

Check SCORING GUIDELINES to see how you did

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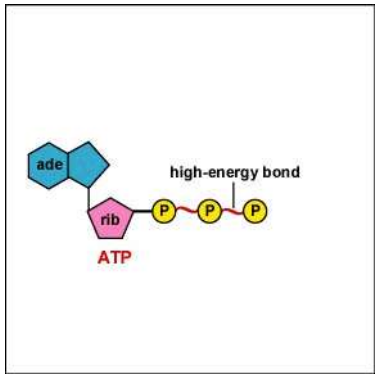

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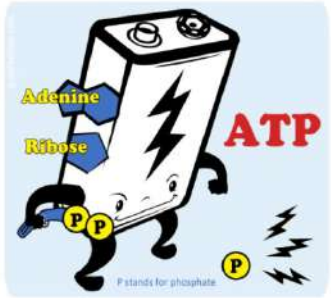


ANSWER THE PROMPT

2001 #4

DISCUSS the following in relation to proteins.

b) The roles of DNA and RNA in protein synthesis

There is plenty you could write about DNA and RNA. . . their structure, what nucleotides they contain, how they are alike or different, role in horizontal gene transfer and viral life cycles, experiments that lead to their discovery, the steps/enzymes involved in DNA replication, DNA as the carrier of genetic code . . . NONE OF THIS GETS YOU ANY POINTS !

NOTICE "in protein synthesis" in the prompt. Before you start writing,
MAKE SURE YOU ARE ANSWERING WHAT THE QUESTION IS ASKING FOR ! Don't just do a "brain dump" about everything you know about DNA and RNA.

Check SCORING GUIDELINES to see how you did

WHAT WILL BE ON THE EXAM?

I DON'T PRETEND TO KNOW BUT . . .

FROM 2019 CED

60 Multiple choice questions (50% of Exam score)
90 minutes
~ Discrete questions
~ Question sets (4-5 ?'s)

Free Response Questions (FRQs) (50% of Exam score)
90 minutes
2 long questions (8-10 points)
~ Interpret and evaluate experimental results
~ Interpret and evaluate experimental results with graphing

4 short answer ?'s (4 points)
assess students' understanding of the following:
~ Scientific investigation
~ Conceptual analysis
~ Analysis of a model or visual representation
~ Data analysis

*Grid in questions have been removed but mathematical calculations will still be assessed in MC and FRQ sections

NOTE: THESE are NOT SECURE TEST QUESTIONS

NO BUBBLE-IN MATH QUESTIONS THIS YEAR BUT THEYR'E NOT GONE. . . WILL BE IN FRQ's or MC SECTIONS

TYPES OF MATH CALCULATION QUESTIONS

2019 Exam

PDC deficiency is caused by mutations in the *PDHA1* gene, which is located on the X chromosome. A male with PDC deficiency and a homozygous female with no family history of PDC deficiency have a male offspring. **Calculate** the probability that the male offspring will have PDC deficiency.

In a certain group of African people, 4 percent are born with sickle cell anemia. What percentage of the group has the selective advantage of being more resistant to malaria than those individuals who are homozygous for normal hemoglobin or for sickle cell anemia?

(A)2%
(B)4%
(C)8%
(D)16%
(E)32%

1986 Exam

In the past the AP Biology content was immense and covered a vast number of topics. Not a lot of guidance was provided about the specifics of what would be on the exam.

However, the new 2019 Course and Exam Description (CED) has narrowed the scope of the exam by eliminating some topics like plants and human anatomy/body systems.

NOTE:

*These can still be used as examples but are no longer covered in depth.

In addition, the new CED has made it easy to know how exactly the 2020 and future tests will be laid out and what the questions will be about.

HOW WILL THE TOPICS BE TESTED?

FROM 2019 CED

The exam assesses content from each of four big ideas for the course:
1. Evolution
2. Energetics
3. Information Storage and Transmission
4. Systems Interactions

The exam also assesses each of the eight units of the course with the following exam weightings on the multiple-choice section of the AP Exam:

Unit	Exam Weighting
1: Chemistry of Life	**8–11%**
2: Cell Structure and Function	**10–13%**
3: Cellular Energetics	**12–16%**
4: Cell Communication and Cell Cycle	**10–15%**
5: Heredity	**8–11%**
6: Gene Expression and Regulation	**12–16%**
7: Natural Selection	**13–20%**
8: Ecology	**10–15%**

HOW WILL THE TOPICS BE TESTED?

FROM 2019 CED

Section I: Multiple-Choice

The first section of the AP Biology Exam includes 60 multiple-choice questions appearing either as individual questions or in sets of typically four to five questions per set. All six AP Biology science practices are assessed in the multiple-choice section with the following exam weightings:

Science Practice	Exam Weighting
1: Concept Explanation	**25–33%**
2: Visual Representations	**16–24%**
3: Questions and Methods	**8–14%**
4: Representing and Describing Data	**8–14%**
5: Statistical Tests and Data Analysis	**8–14%**
6: Argumentation	**20–26%**

WHAT COULD BE ON THE EXAM????

EXPECT to see/interpret graphs in MC questions on the AP Biology Exam

The figures below show the changes in populations of two species of flour beetles, *Tribolium confusum* (Figure I) and *Tribolium castaneum* (Figure II), in cultures without parasites (○) and in cultures infected with a parasite (•). Each data point represents the mean population size from ten culture dishes of equal size and food content.

c

FIGURE I. NUMBER OF *TRIBOLIUM CONFUSUM* OVER TIME

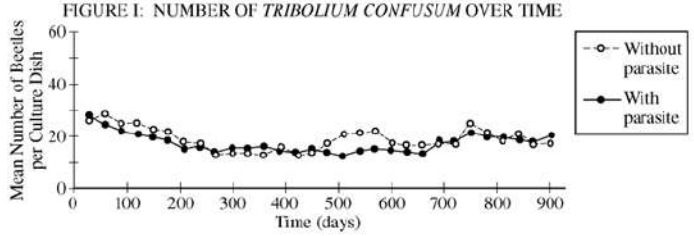
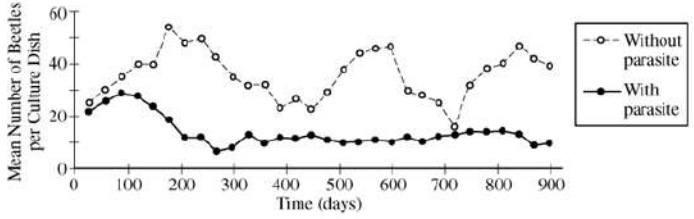
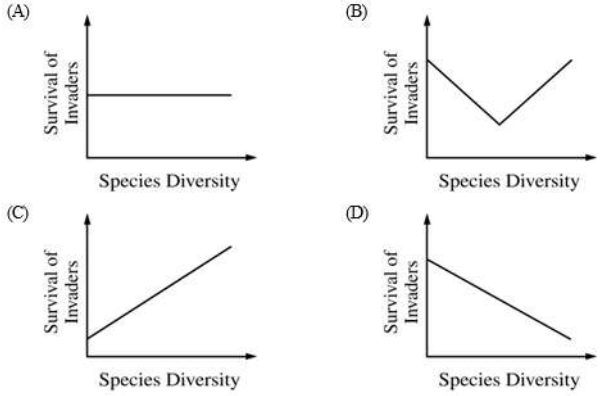


FIGURE II. NUMBER OF *TRIBOLIUM CASTANEUM* OVER TIME

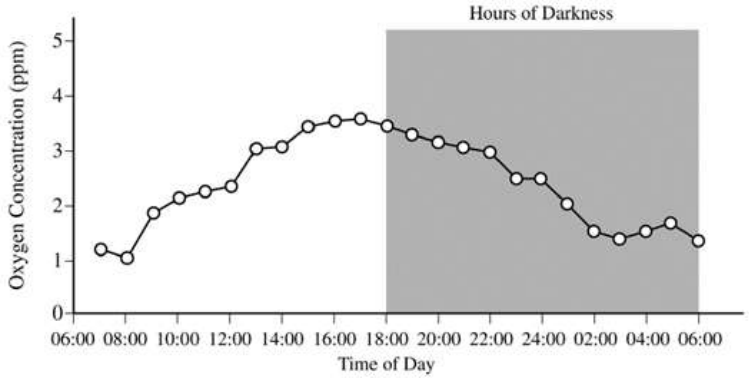


8. A researcher is investigating the relationship between the existing species diversity in a community and the ability of an introduced nonnative species to destabilize the community.

Which of the following graphs is most consistent with the claim that communities with high diversity are more resistant to change than are communities with low diversity?



OXYGEN CONCENTRATION IN THE WATER OF A LAKE



What most likely causes the trends in oxygen concentration shown in the graph above?

(A) The water becomes colder at night and thus holds more oxygen.
(B) Respiration in most organisms increases at night.
(C) More organisms are respiring at night than during the day.
(D) Photosynthesis produces more oxygen than is consumed by respiration during the day.

EXAMPLES OF TYPES OF QUESTIONS FROM PAST MC EXAMS:

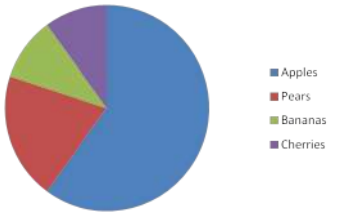
- Interpret data from graphs provided
- Predict what a graph might look like
- Provide explanations for biological phenomena shown in a graph

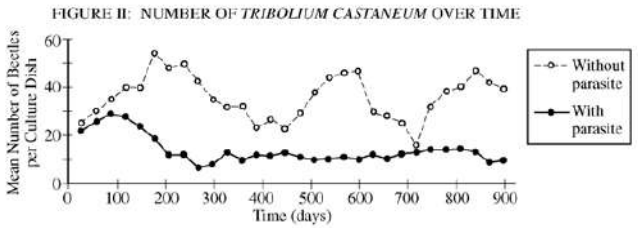
Graphs are from 2013 AP BIO released exam

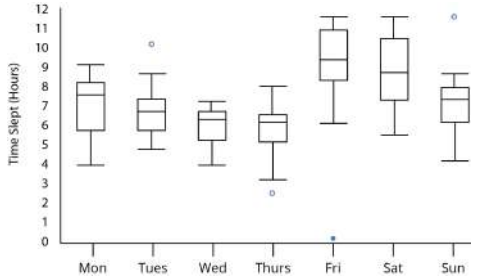
NOTE: THESE are NOT SECURE TEST QUESTIONS

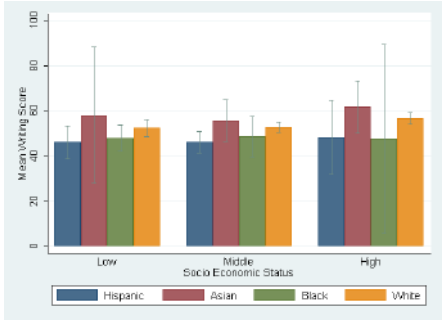
WHAT COULD BE ON THE EXAM?

FROM 2019 CED









SKILLS

4.A Construct a graph, plot, or chart (*X,Y; Log Y; Bar; Histogram; Line, Dual Y; Box and Whisker; Pie*).

a. Orientation

b. Labeling

c. Units

d. Scaling

e. Plotting

f. Type

g. Trend line

EXPECT to interpret/draw graphs in FRQs on the AP Biology Exam

Note: Graph titles have not earned points since the redesign in 2012, but I have always told my students that graphs need a title as a good scientific practice.

Images from:
https://www.schoolsofkingedwardvi.co.uk/wp-content/uploads/2017/07/pie_chart.png
2013 AP Bio Released exam
https://plot.ly/static/img/literacy/boxplot/boxplotfig9.jpg
https://stats.idre.ucla.edu/wp-content/uploads/2016/02/barcap9.png

WHAT COULD BE ON THE EXAM?

You will be provided a copy of the
AP BIOLOGY Equations and Formulas Sheet on the Exam

More math and stats have been added in recent years.
Assume you will see questions on the exam dealing with problems from the Equations and Formulas sheet

- Standard deviation/SEM
- Hardy-Weinberg
- Water/solute potential
- Chi-square
- Population/growth rates
- Simpson's Diversity index

REVIEW THE SCIENCE PRACTICES

FROM 2019 CED

Science Practice 1

Concept Explanation 1

Explain biological concepts, processes, and models presented in written format.

1.A Describe biological concepts and/or processes.

1.B Explain biological concepts and/or processes.

1.C Explain biological concepts, processes, and/or models in applied contexts.

Science Practice 2

Visual Representations 2

Analyze visual representations of biological concepts and processes.

2.A Describe characteristics of a biological concept, process, or model represented visually.

2.B Explain relationships between different characteristics of biological concepts, processes, or models represented visually

a. In theoretical contexts.

b. In applied contexts.

2.C Explain how biological concepts or processes represented visually relate to larger biological principles, concepts, processes, or theories.

2.D Represent relationships within biological models, including

a. Mathematical models.

b. Diagrams.

c. Flow charts.

Science Practice 3

Questions and Methods 3

Determine scientific questions and methods.

3.A Identify or pose a testable question based on an observation, data, or a model.

3.B State the null or alternative hypotheses, or predict the results of an experiment.

3.C Identify experimental procedures that are aligned to the question, including

a. Identifying dependent and independent variables.

b. Identifying appropriate controls.

c. Justifying appropriate controls.

3.D Make observations, or collect data from representations of laboratory setups or results. (Lab only; not assessed)

3.E Propose a new/next investigation based on

a. An evaluation of the evidence from an experiment.

b. An evaluation of the design/methods.

Exam questions are created by linking a science practice to one of the Essential Knowledge statements from the CED

FROM 2019 CED

REVIEW THE SCIENCE PRACTICES

Science Practice 4

Representing and Describing Data 4

Represent and describe data.

4.A Construct a graph, plot, or chart (*X,Y; Log Y; Bar; Histogram; Line, Dual Y; Box and Whisker; Pie*).

a. Orientation

b. Labeling

c. Units

d. Scaling

e. Plotting

f. Type

g. Trend line

4.B Describe data from a table or graph, including

a. Identifying specific data points.

b. Describing trends and/or patterns in the data.

c. Describing relationships between variables.

Science Practice 5

Statistical Tests and Data Analysis 5

Perform statistical tests and mathematical calculations to analyze and interpret data.

5.A Perform mathematical calculations, including

a. Mathematical equations in the curriculum.

b. Means.

c. Rates.

d. Ratios.

e. Percentages.

5.B Use confidence intervals and/or error bars (both determined using standard errors) to determine whether sample means are statistically different.

5.C Perform chi-square hypothesis testing.

5.D Use data to evaluate a hypothesis (or prediction), including

a. Rejecting or failing to reject the null hypothesis.

b. Supporting or refuting the alternative hypothesis.

Science Practice 6

Argumentation 6

Develop and justify scientific arguments using evidence.

6.A Make a scientific claim.

6.B Support a claim with evidence from biological principles, concepts, processes, and/or data.

6.C Provide reasoning to justify a claim by connecting evidence to biological theories.

6.D Explain the relationship between experimental results and larger biological concepts, processes, or theories.

6.E Predict the causes or effects of a change in, or disruption to, one or more components in a biological system based on

a. Biological concepts or processes.

b. A visual representation of a biological concept, process, or model.

c. Data.

Can you do the things listed in the Science Practices?

FROM 2019 CED

Section II: Free-Response

The second section of the AP Biology Exam includes two long questions, and four short-answer questions. Each of the four short-answer questions will focus on a different big idea and a different unit of instruction.

Free-response question 1: Interpreting and Evaluating Experimental Results is an 8 to 10-point question that presents students with an authentic scenario accompanied by data in a table and/or graph. This question assesses student ability to do the following in four question parts:

- Part A (1 to 2 points): Describe and explain biological concepts, processes, or models.
- Part B (3 to 4 points): Identify experimental design procedures.
- Part C (1 to 3 points): Analyze data.
- Part D (2 to 4 points): Make and justify predictions.

Free-response 2: Interpreting and Evaluating Experimental Results with Graphing is an 8 to 10-point question that presents students with an authentic scenario accompanied by data in a table. This question assesses students' ability to do the following in four question parts:

- Part A (1 to 2 points): Describe and explain biological concepts, processes, or models.
- Part B (4 points): Construct a graph, plot or chart and use confidence intervals or error bars.
- Part C (1 to 3 points): Analyze data.
- Part D (1 to 3 points): Make and justify predictions.

Free-response question 3: Scientific Investigation is a 4-point question that presents students with a description of a lab investigation scenario. This question assesses students' ability to do the following in four question parts:

- Part A (1 point): Describe biological concepts or processes.
- Part B (1 point): Identify experimental procedures.
- Part C (1 point): Predict results.
- Part D (1 point): Justify predictions.

Free-response question 4: Conceptual Analysis is a 4-point question that presents students with an authentic scenario describing a biological phenomenon with a disruption. This question assesses students' ability to do the following in four question parts:

- Part A (1 point): Describe biological concepts or processes.
- Part B (1 point): Explain biological concepts or processes.
- Part C (1 point): Predict the causes or effects of a change in a biological system.
- Part D (1 point): Justify predictions.

Free-response question 5: Analyze Model or Visual Representation is a 4-point question that presents students with a description of an authentic scenario accompanied by a visual model or representation. This question assesses students' ability to do the following in four question parts:

- Part A (1 point): Describe characteristics of a biological concept, process, or model represented visually.
- Part B (1 point): Explain relationships between different characteristics of a biological concept or process represented visually.
- Part C (1 point): Represent relationships within a biological model.
- Part D (1 point): Explain how a biological concept or process represented visually relates to a larger biological principle, concept, process, or theory.

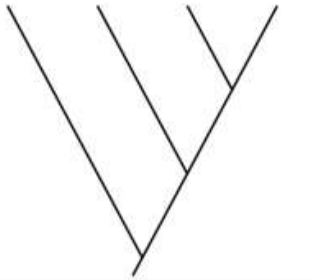
Free-response question 6: Analyze Data is a 4-point question that presents students with data in a graph, table, or other visual representation. This question assesses students' ability to do the following in four question parts:

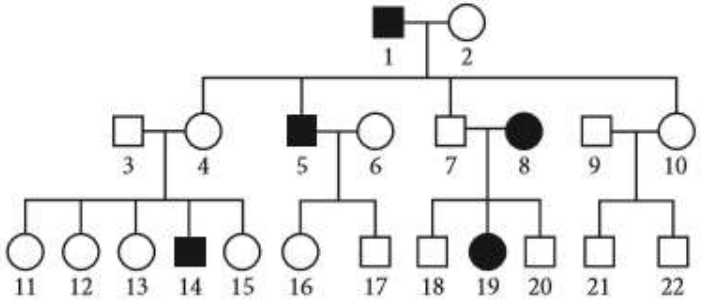
- Part A (1 point): Describe data.
- Part B (1 point): Describe data.
- Part C (1 point): Use data to evaluate a hypothesis or prediction.
- Part D (1 point): Explain how experimental results relate to biological principles, concepts, processes, or theories.

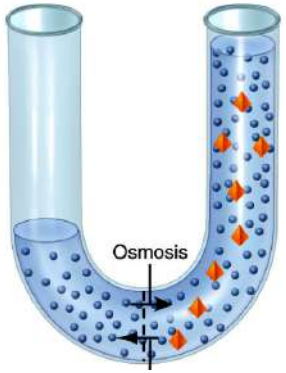
2019 AP BIO CED http://classconnection.s3.amazonaws.com/544/flashcards/666544/png/osmosis1315238070090.png https://ucmp.berkeley.edu/fosrec/Filson.html

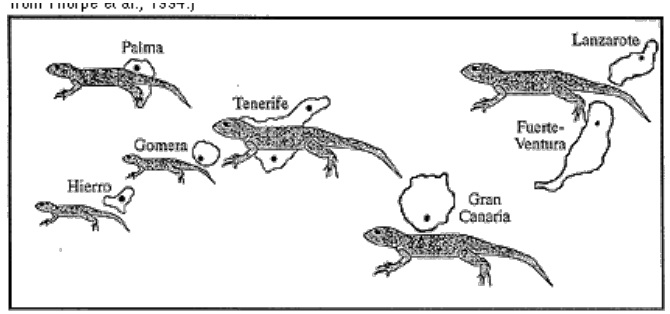
WHAT COULD BE ON THE EXAM??????

I DON'T CLAIM ANY INSIDER INFO BUT JUST BASED ON MY PAST EXPERIENCE AS AN AP BIOLOGY TEACHER, I BELIEVE THE FOLLOWING TOPICS HAVE APPEARED MORE THAN FREQUENTLY ON PAST AP EXAMS AND ARE ALSO REPRESENTED IN THE 2019 CED SAMPLE QUESTIONS









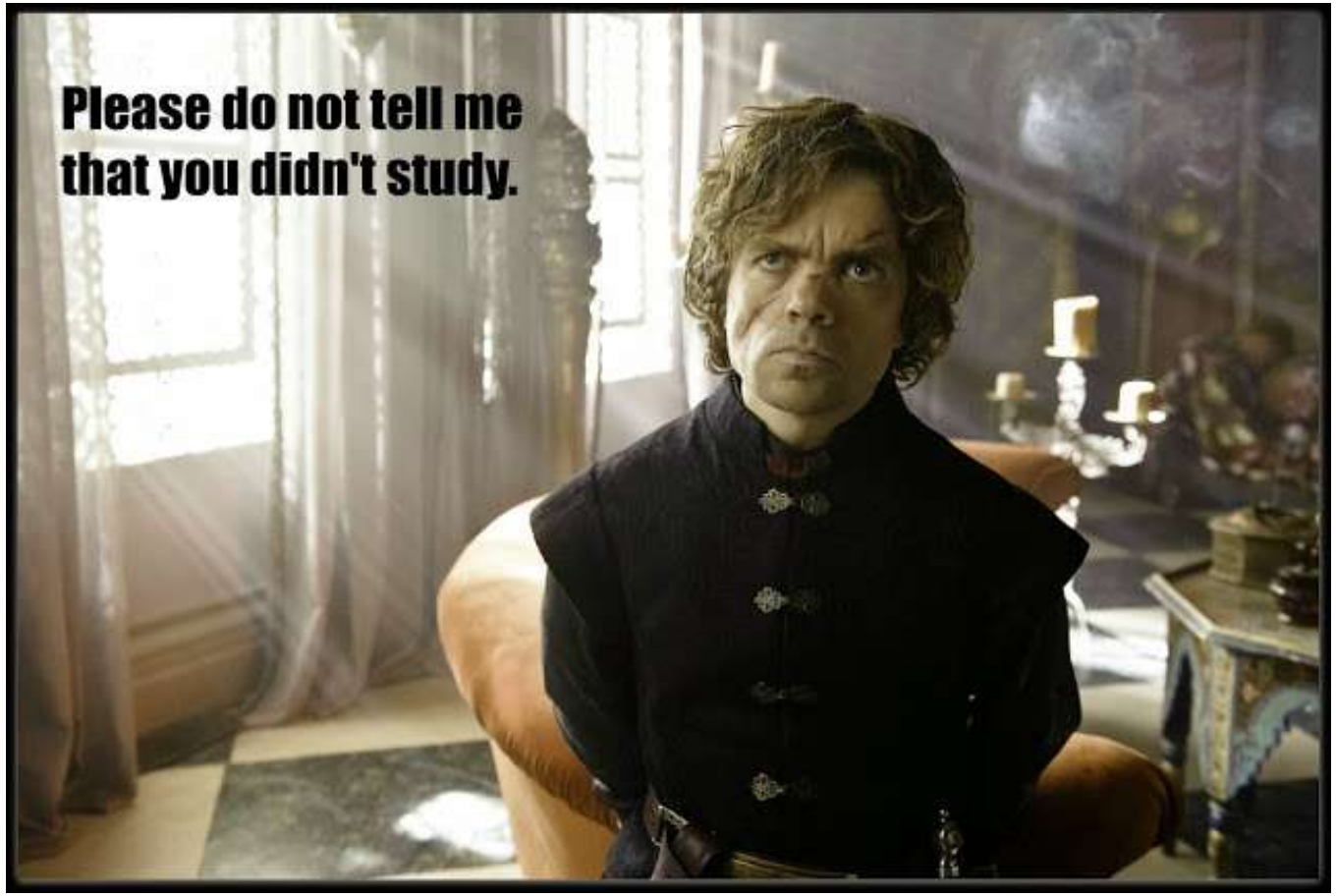
- Draw/Interpret CLADOGRAMS
- Analyze PEDIGREES to predict inheritance patterns
- HYPOTONIC/HYPERTONIC relationships in real world situations
- EVOLUTION, EVOLUTION, EVOLUTION!

NOTE: Images are NOT from SECURE TEST QUESTIONS

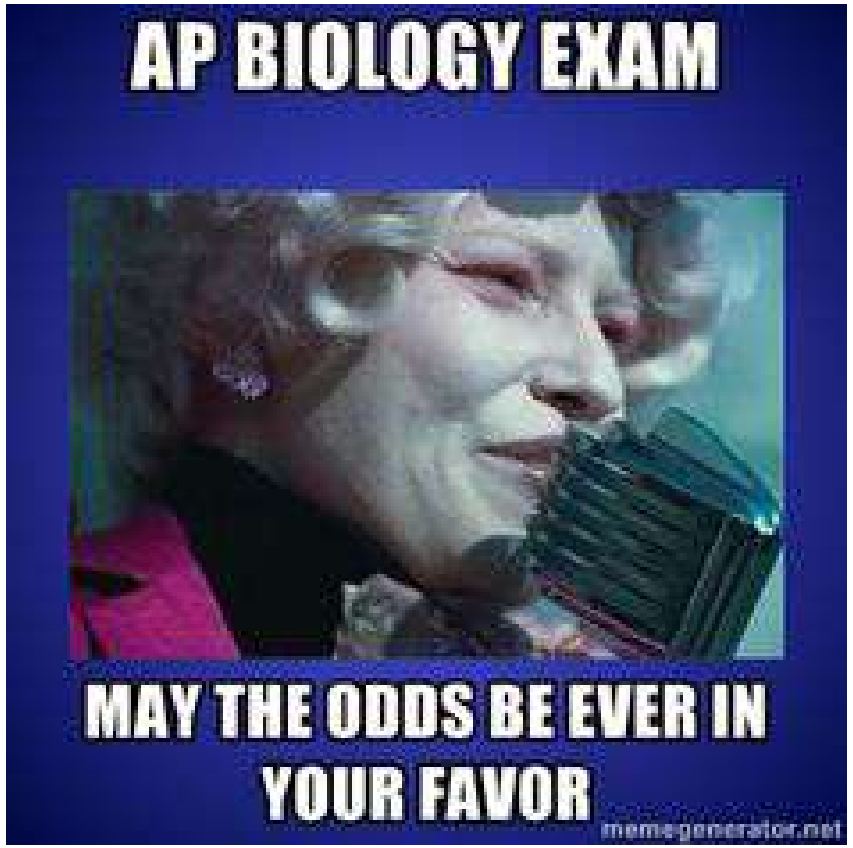
START STUDYING EARLY!

This is not a test where cramming a couple of days before works!

MAKE A STUDY PLAN IF YOU ARE TAKING MULTIPLE AP EXAMS!



https://4.bp.blogspot.com/-c4S-oBYcfyw/VxubmHJk7OI/AAAAAAACGeQ/gHyZ8_XMkM8D_GApOHirX5w6GqUQ_yduwCLcB/s1600/tyrion-meme-final.jpg



FIRE UP ! ! ! !

INSPIRATIONAL VIDEO

* Info at beginning is from old format

EXAM PREP LINKS

GOOD LUCK!

https://i.pinimg.com/736x/f3/7a/0c/f37a0c58955aebc2aabb434d24c98354--broadway-quotes-movie-quotes.jpg