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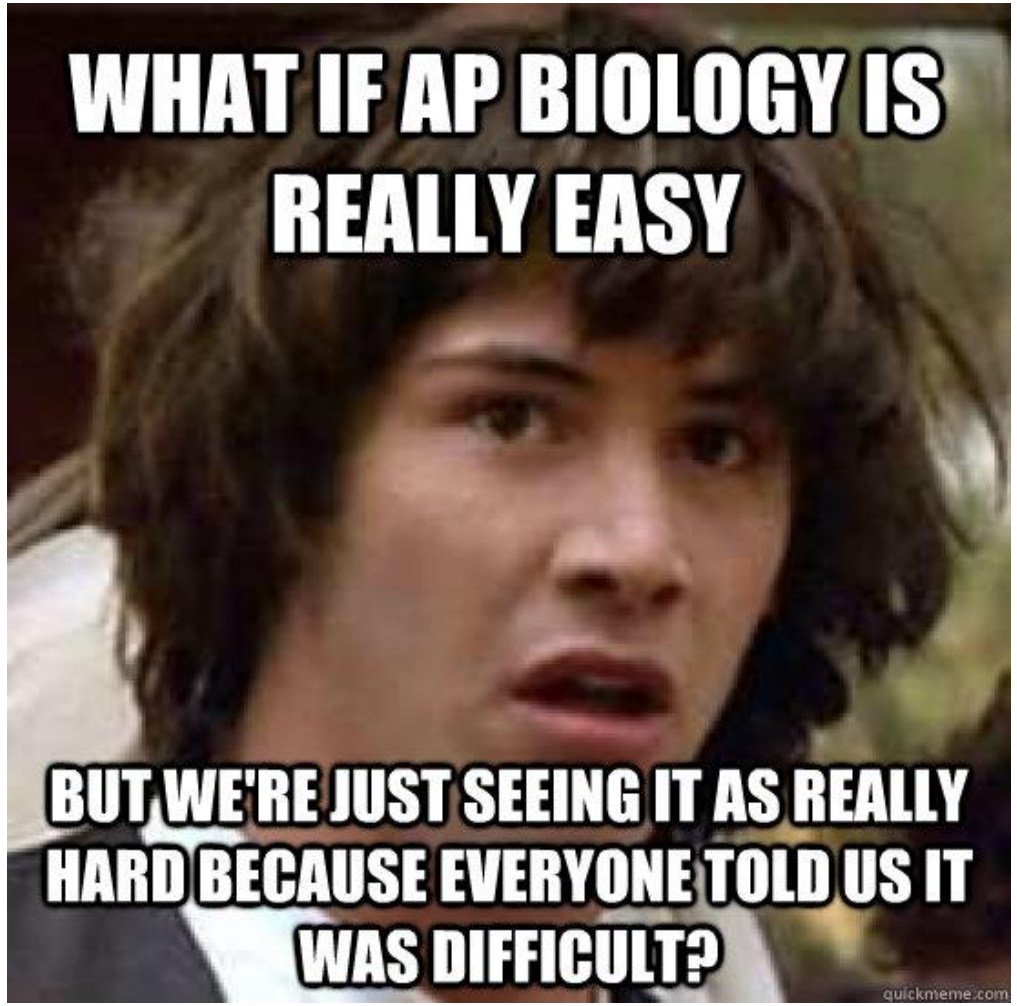


TIPS FOR TAKING THE 2020 AP EXAM

By Kelly Riedell

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, mark it in your question book, and come back to it if you have time.

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

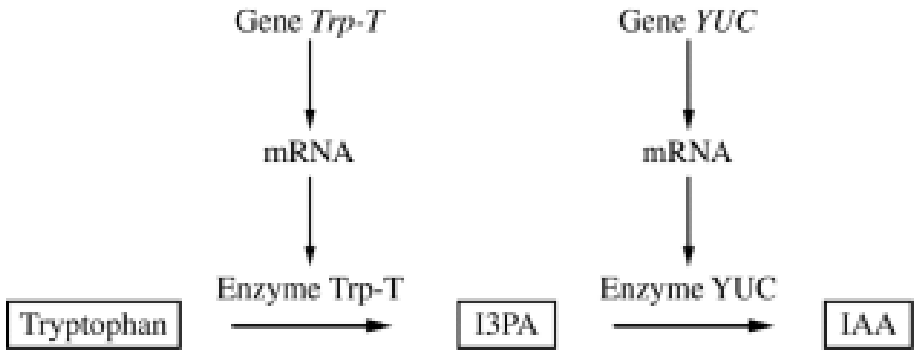


Figure 1. Model of two-step enzymatic plant pathway for synthesis of IAA from tryptophan

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.

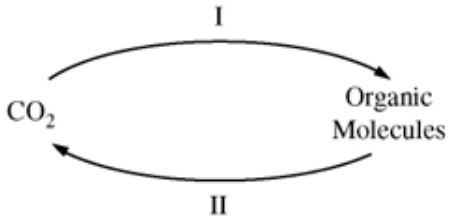
Read through the FRQ questions 1st and circle the POWER WORDS

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

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

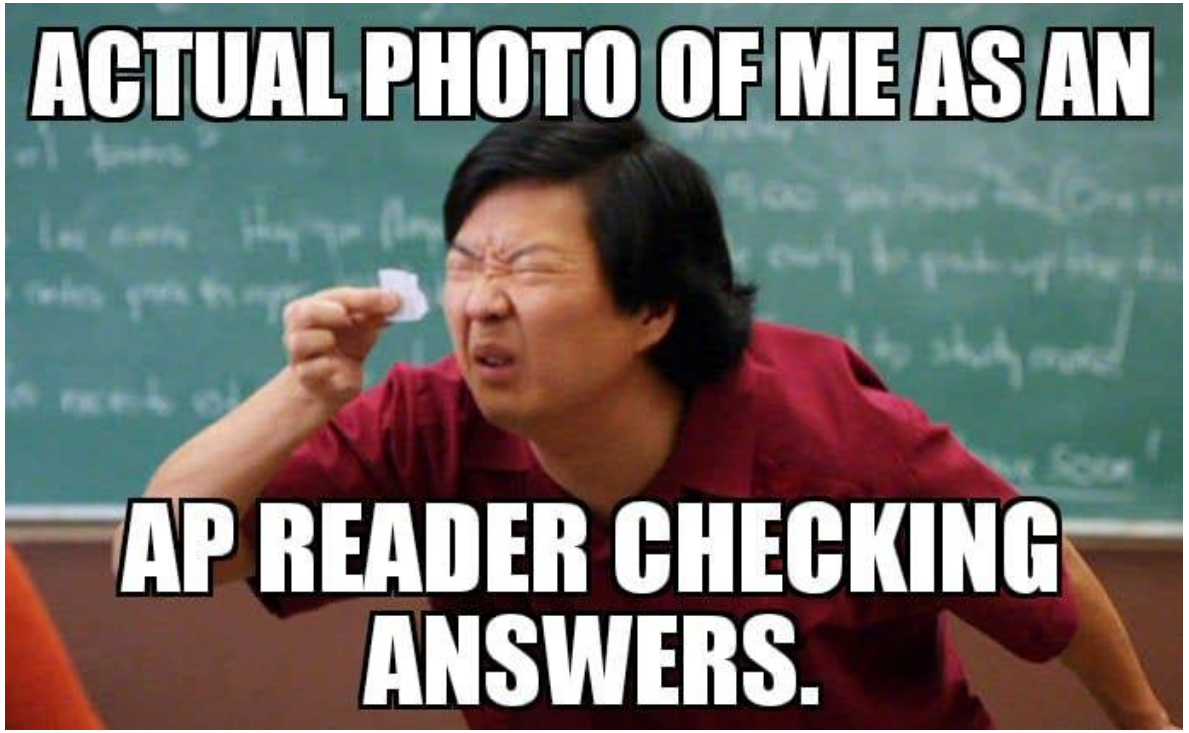
YOU DON'T HAVE TO ANSWER THE FRQs IN ORDER

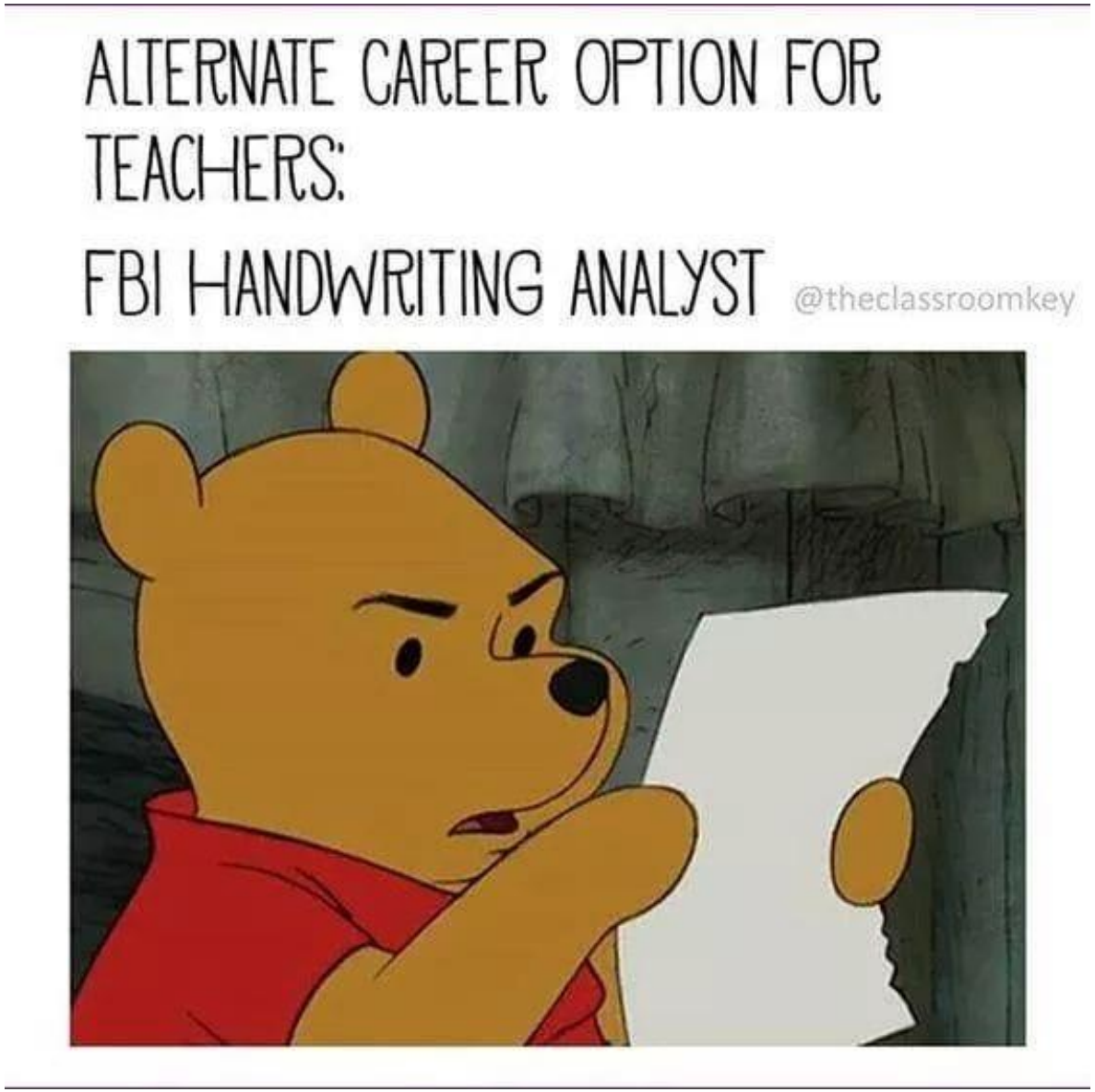
Look back at your notes and number the essays in order of which ones you know the most about.
DO THOSE 1ST

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

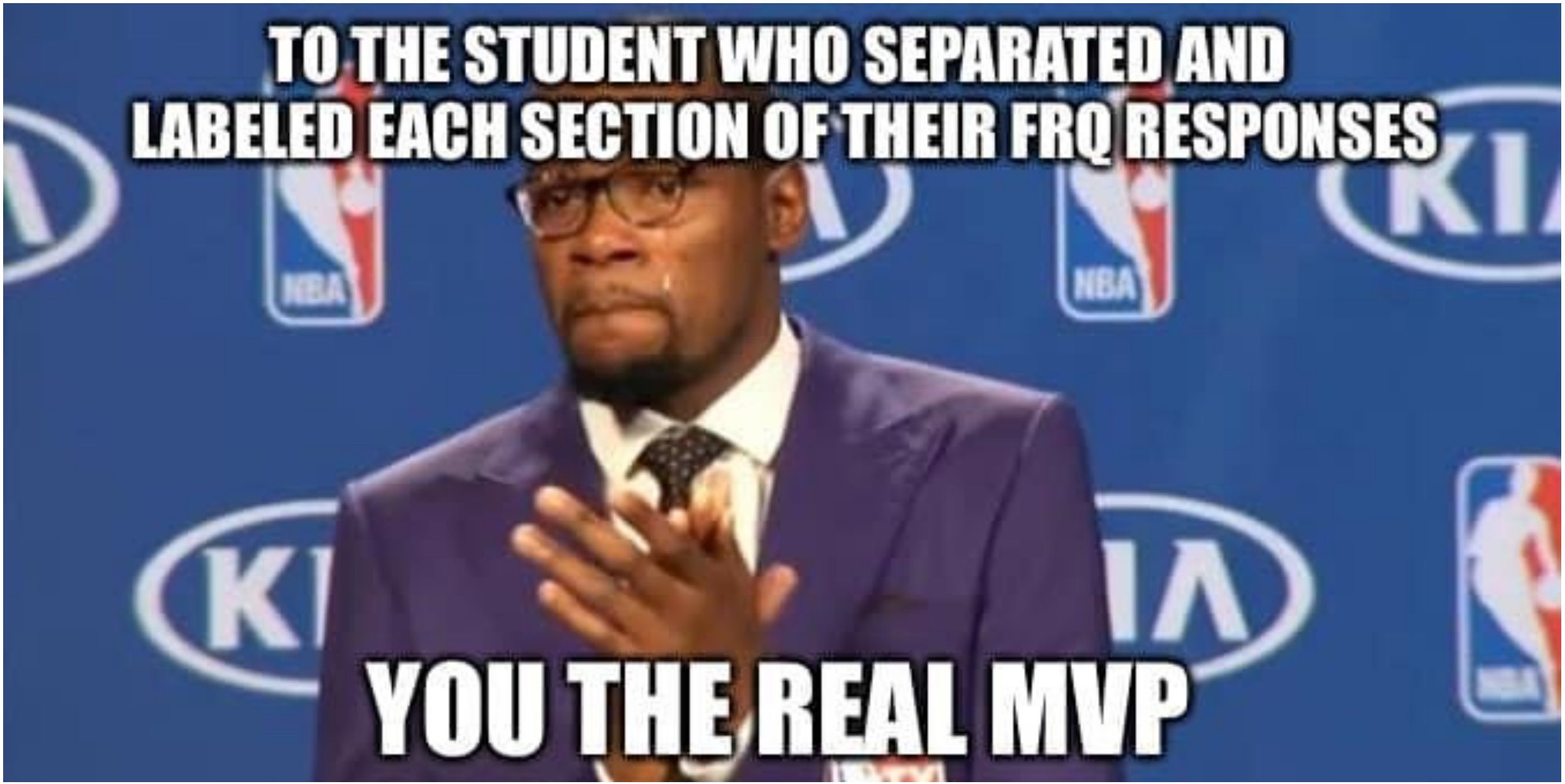
THESE ARE ESSAY QUESTIONS!

~ 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

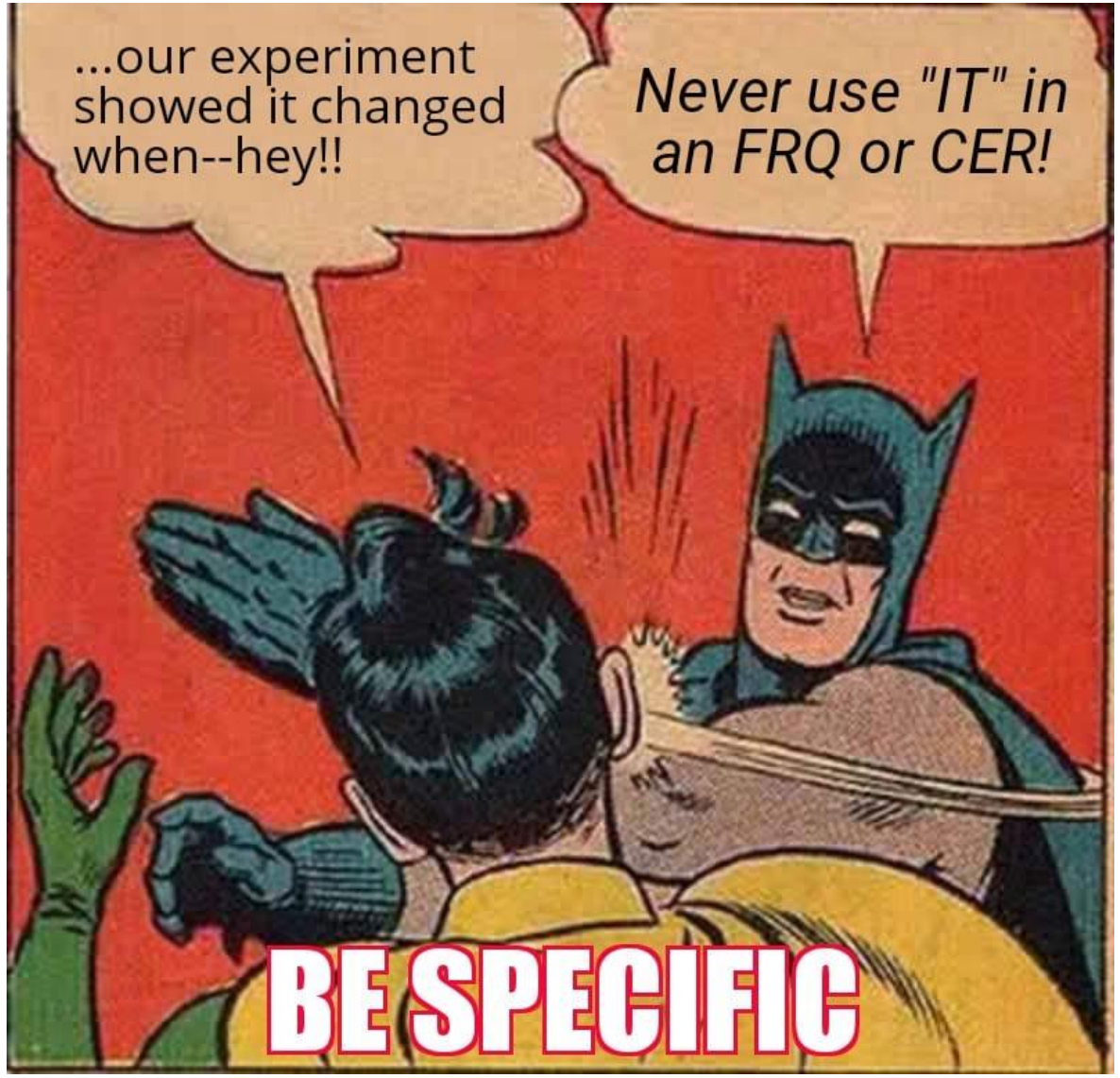
You are trying to show that you understand enough to earn credit for a year of college level biology

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?

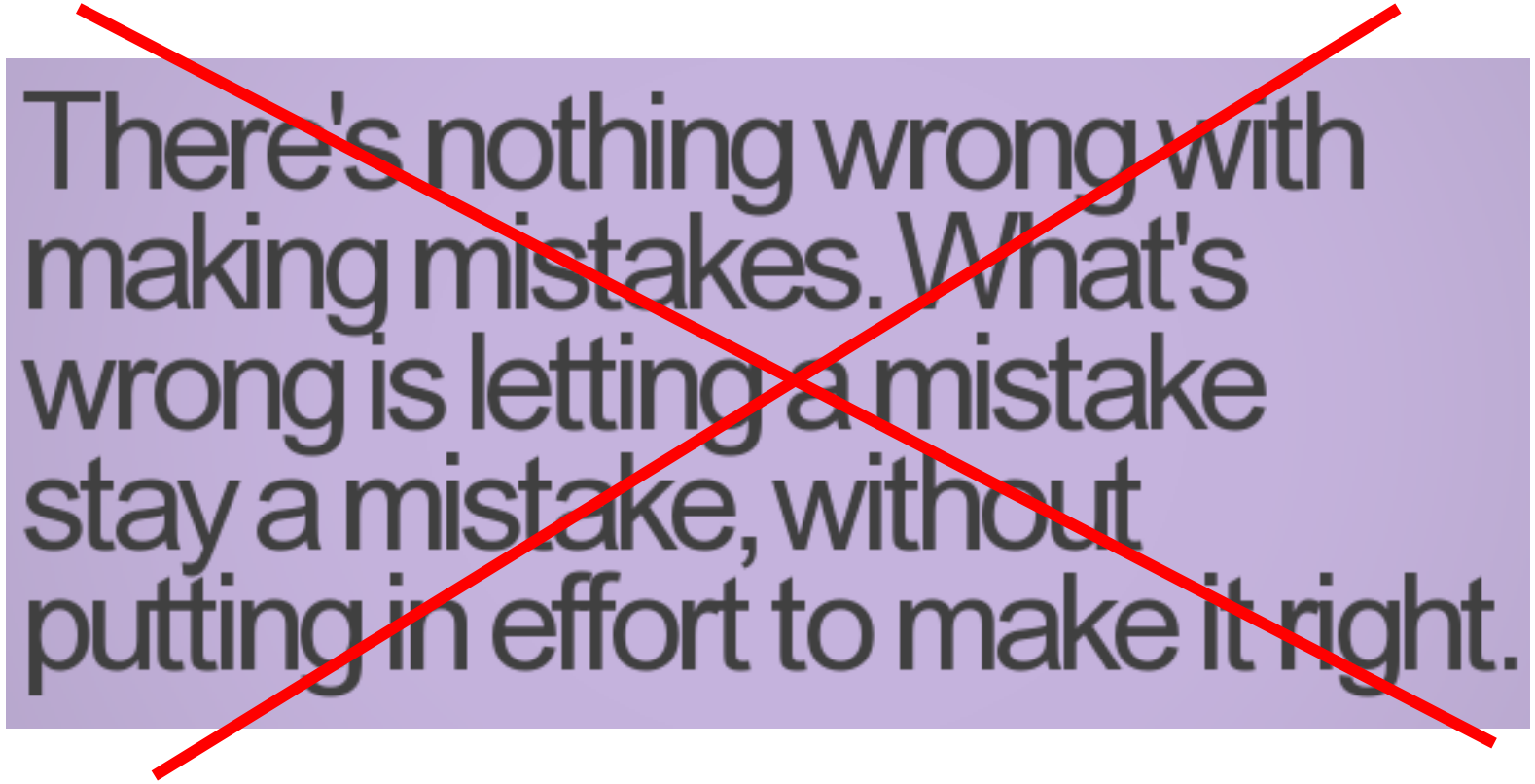


https://www.facebook.com/photo.php?fbid=10213781773914903&set=p.10213781773914903&type=3&theater

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!

JUSTIFY

DISCUSS

IDENTIFY

DESCRIBE

PREDICT

EXPLAIN

PROVIDE REASONING

CALCULATE

PROVIDE EVIDENCE

MAKE A CLAIM

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.

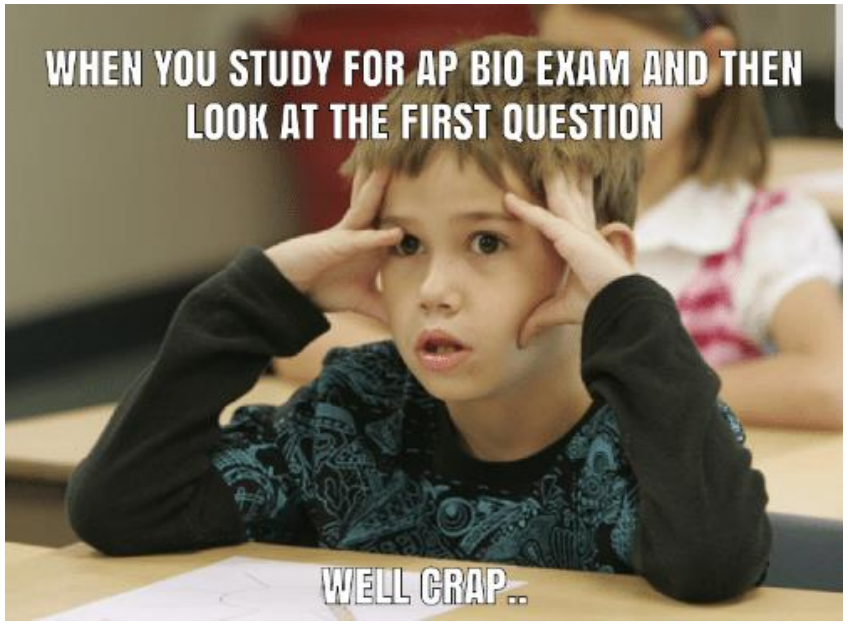
Justify: Provide evidence to support, qualify, or defend a claim, and/or provide reasoning to explain how that evidence supports or qualifies the claim.

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

NOTE: THIS IS NOT A SECURE TEST QUESTION
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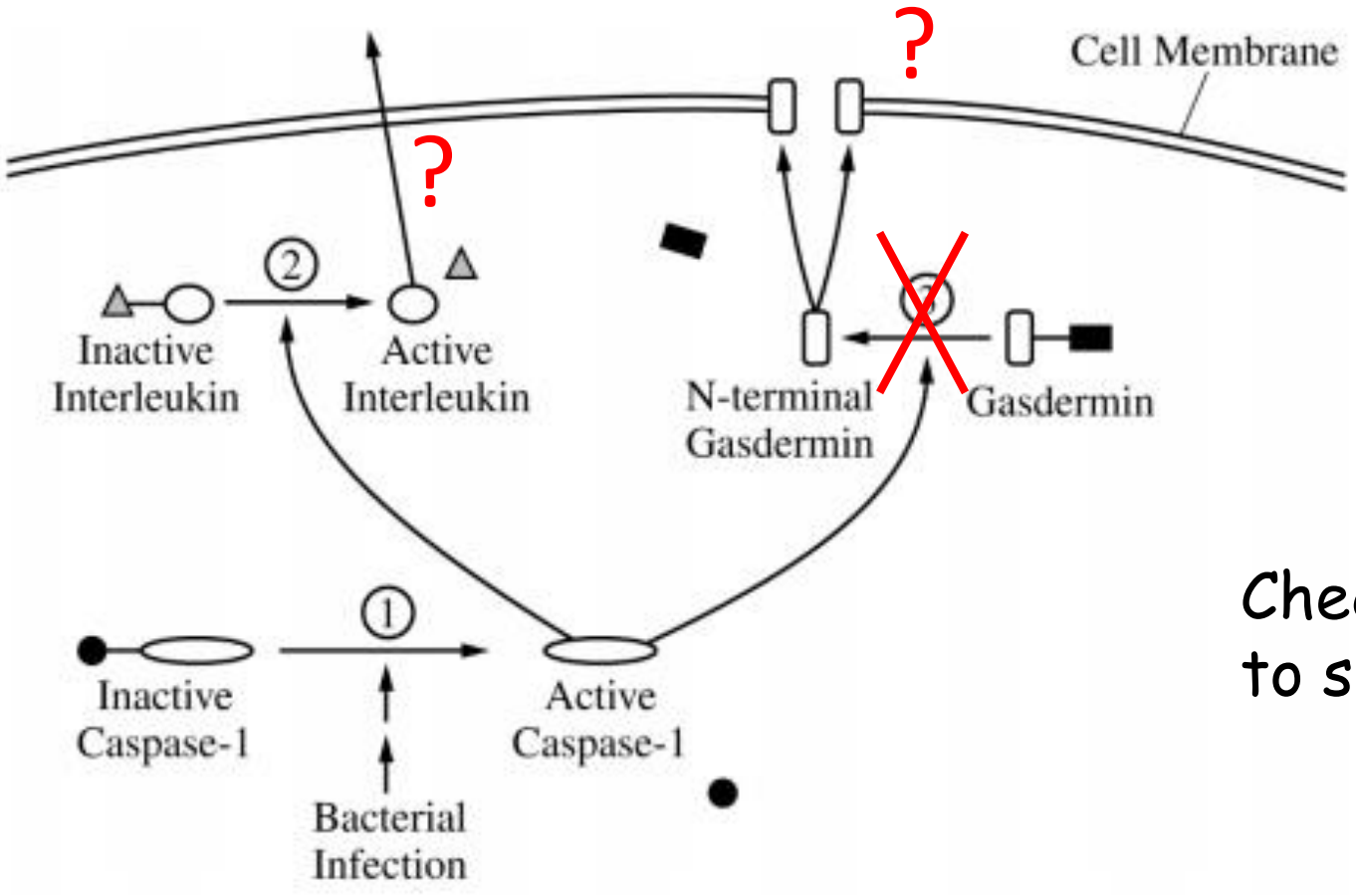
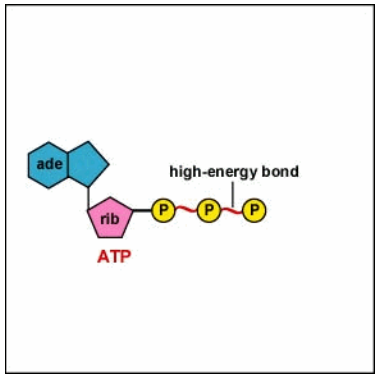
2018 AP® BIOLOGY FREE-RESPONSE QUESTIONS

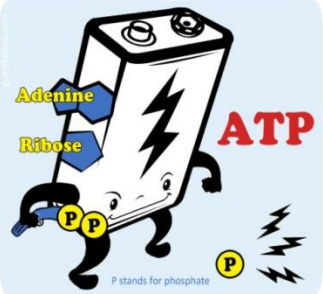


Check SCORING GUIDELINES to see how you did

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.

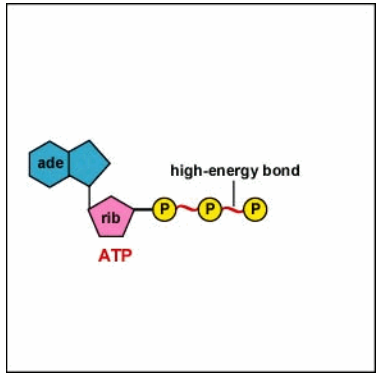
- -transpiration
- - thermoregulation in endotherms
- - plasma membrane structure

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

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



ATP

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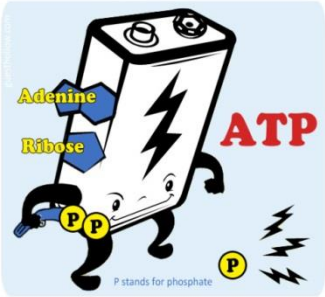


ANSWER THE PROMPT

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 the as 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 . . .

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.

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

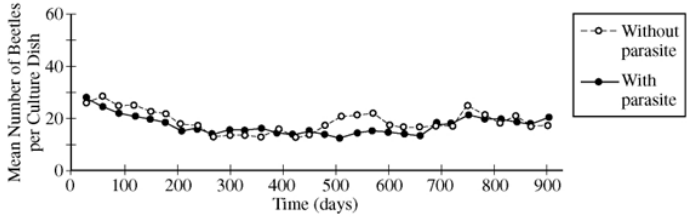
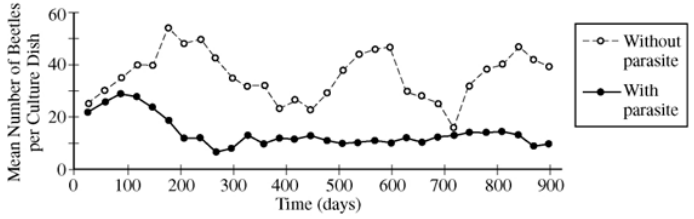
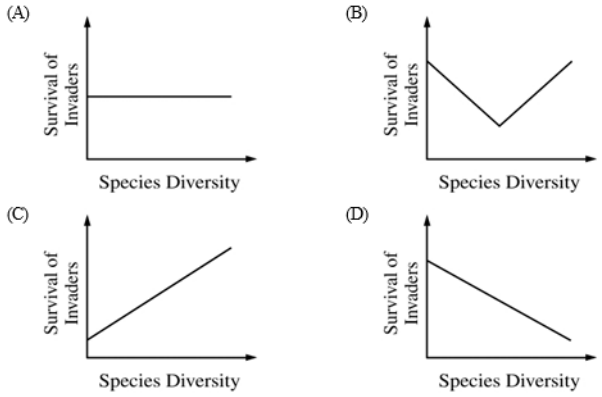


FIGURE II: NUMBER OF *TRIBOLIUM CASTANEUM* OVER TIME

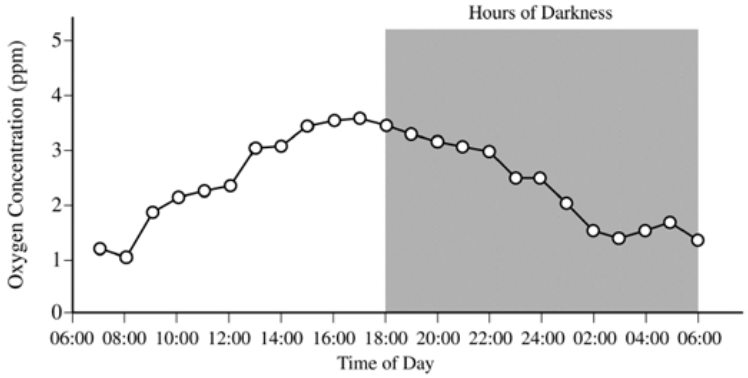


8. A researcher is investigating the relationship between the existing species diversity in a community and the ability of an introduced nonnative species to destabilize the community.

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:

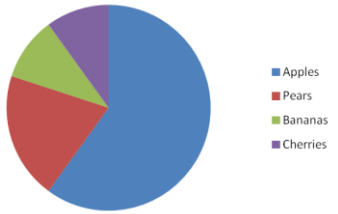
- Interpret data from graphs provided
- Predict what a graph might look like
- Provide explanations for biological phenomena shown in a graph

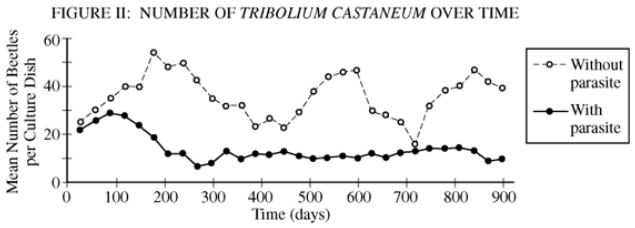
Graphs are from 2013 AP BIO released exam

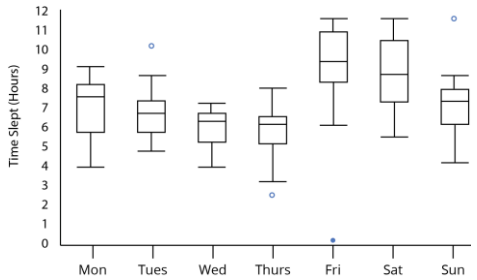
NOTE: THESE are NOT SECURE TEST QUESTIONS

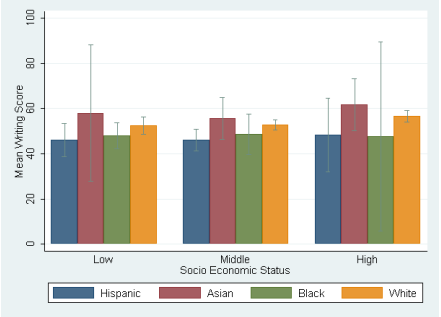
WHAT COULD BE ON THE EXAM?

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

What could be on the exam?

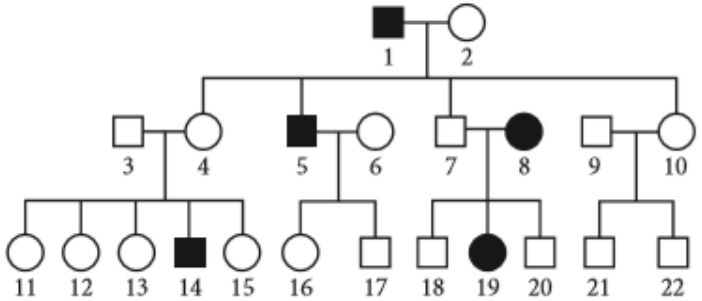
- ***<u>Experimental design</u>***!!! Always identify at least the following:
  - The **question** you are investigating (How does temperature affect the rate of enzyme catalyzed breakdown of hydrogen peroxide?)
  - Your **hypothesis** (My hypothesis is the optimum temperature for enzyme catalyzed breakdown of hydrogen peroxide will be 37 degrees Celsius)
  - **Control** group (Control group will be the enzyme catalyzed reaction at room temperature – 21 degrees Celsius)
  - **Independent** (manipulated) variable (IV will be temperature)
  - **Dependent** (responding) variable (DV will be time of reaction in seconds)
  - ALSO … be able to state the null hypothesis of any experiment (My null hypothesis is that temperature will have no effect on the rate of reaction)

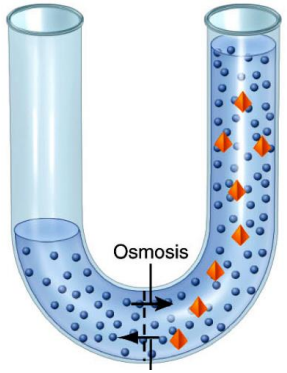
http://classconnection.s3.amazonaws.com/544/flashcards/666544/png/osmosis1315238070090.png

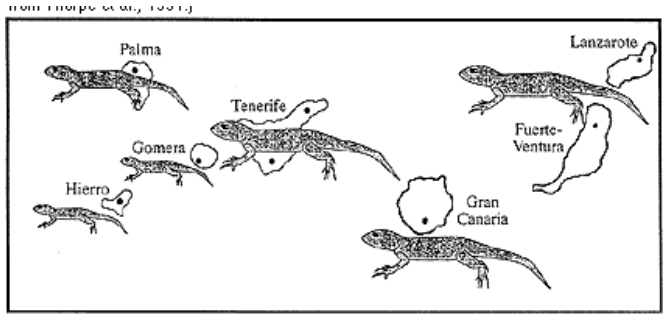
https://ucmp.berkeley.edu/fosrec/Filson.html

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

I DON'T CLAIM ANY INSIDER INSIGHT 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 <u>AND</u> ARE ALSO REPRESENTED IN THE 2019 CED SAMPLE QUESTIONS







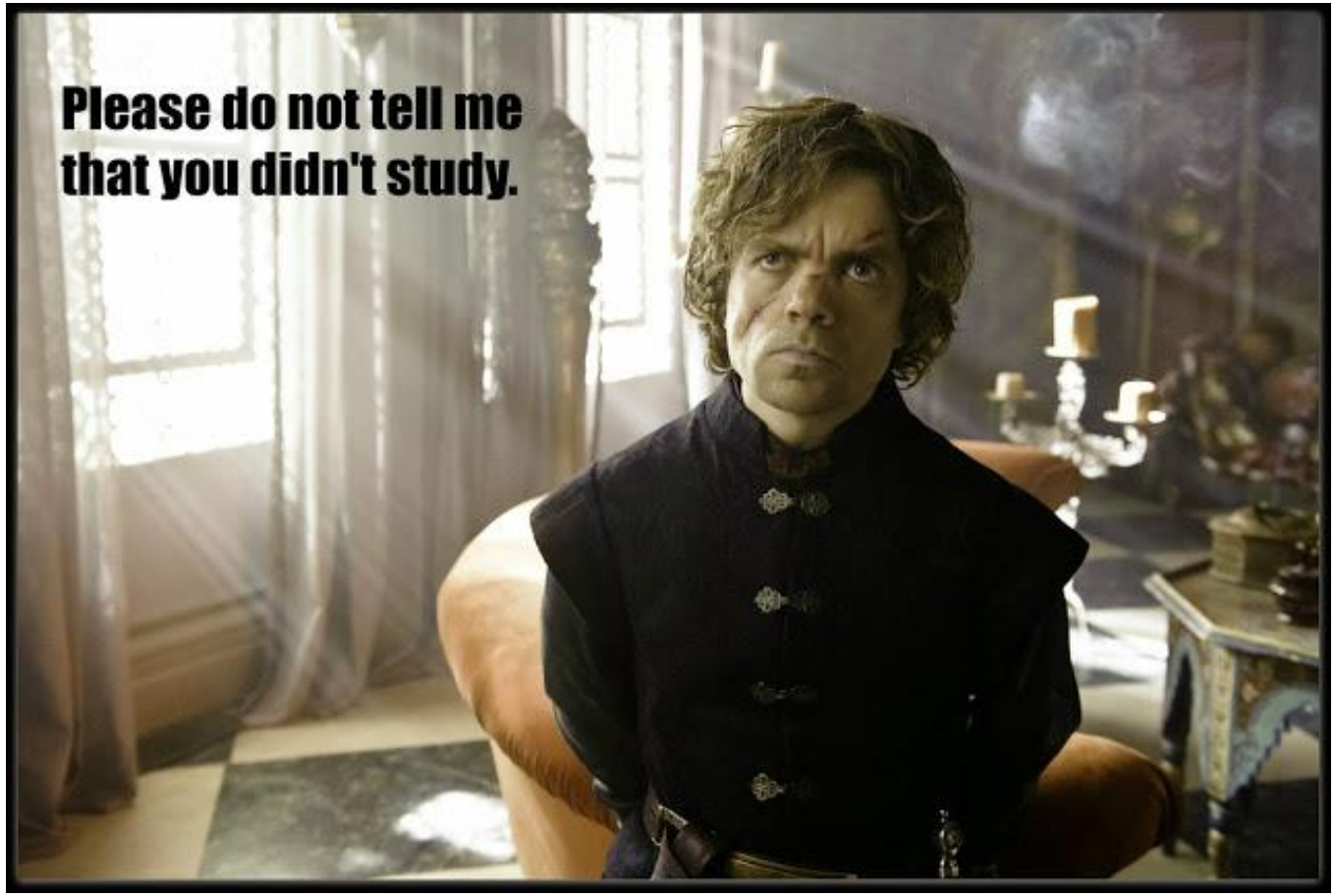
- Draw/Interpret CLADOGRAMS
- Analyze PEDIGREES to predict inheritance patterns
- HYPOTONIC/HYPERTONIC relationships in real world situations
- EVOLUTION, EVOLUTION, EVOLUTION!

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!



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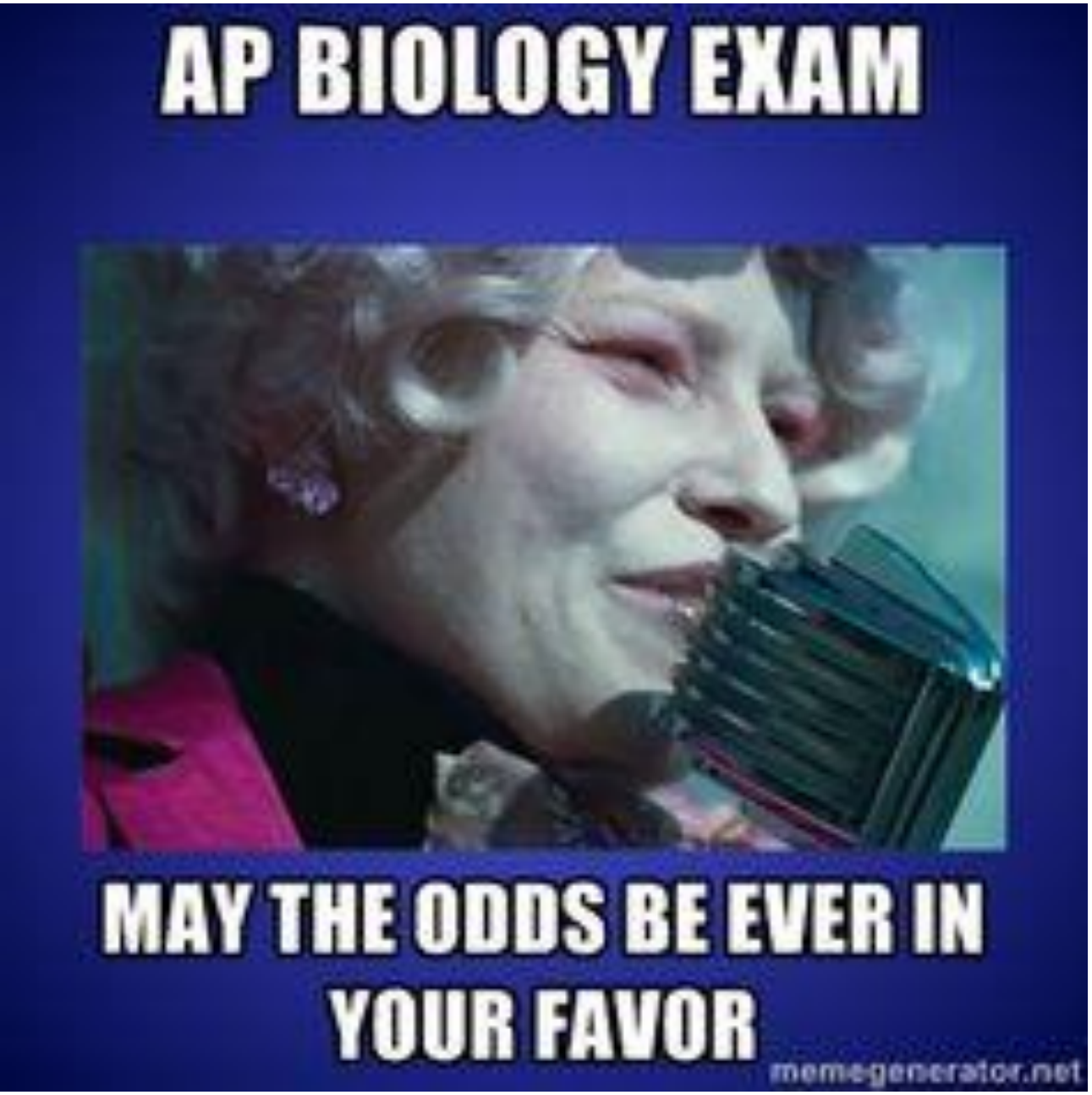

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INSPIRATIONAL VIDEO

* From Bionerdery. This video was made for the previous exam design. The new exam has NO grid in questions and 2 long and 4 short FRQs

EXAM PREP LINKS