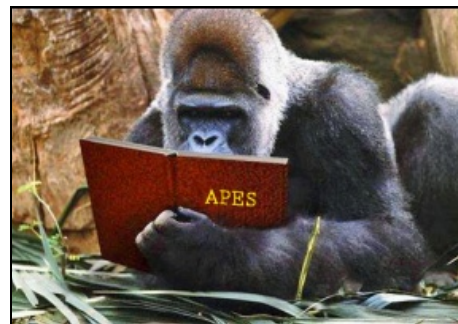# Test Tips for APES

The exam consists of:

Section I: Multiple Choice

80 Questions | 1 Hour 30 Minutes | 60% of Exam Score

- Individual Questions
- Set-based Questions

Questions will include quantitative data (charts, data tables, graphs), qualitative data (models, maps, representations), and text-based sources/reading.

Section II: Free Response

3 Questions | 1 Hour 10 Minutes | 40% of Exam Score

- **Question 1:** Design an investigation presents students with an authentic environmental scenario accompanied by either a model/visual representation or quantitative data.

- **Question 2:** Analyze an environmental problem and propose a solution presents students with an authentic environmental scenario accompanied by either a model/visual representation or quantitative data.

- **Question 3:** Analyze an environmental problem and propose a solution doing calculations presents students with an authentic environmental scenario. (50% of this question is math based!)

General Reminders

- Answer the things you know first.
- No blank answers - guess on everything!
- Always go with your first instinct - don't change your answers unless you happen to find the correct answer somewhere else in the test.
- Read prompts or questions **TWICE!** Give your brain a chance to process.
- You may use a calculator, but there is **NO formula sheet.** You must memorize <u>necessary formulas.</u>

MCQ Reminders

- Eliminate wrong things on the MCQ first and then pick the answer you think is best.
- Again, don't leave these blank! Always **at least guess!**
- Keep an eye on your time!
- Skip and come back to questions if needed.
- Typically 4-8 MCQs are math (Rule of 70 is popular!) - you do not need to show work on MCQs.

FRQ Reminders

1. Always write in **complete sentences**, but *forget* what your English teacher told you about writing essays! We're not doing that here!
   a. NO introductory/closing paragraphs!
   b. DON'T need to restate the question in your answer! No points are removed for it, but it can take some of your precious time.
   c. DON'T be vague in an attempt to trick the grader!

2. Write as <u>legibly</u> as possible! Make it EASY for the graders to give you points! You must use a **pen with navy blue or black ink on FRQs**, so anything you don't want graded must be ~~crossed out.~~
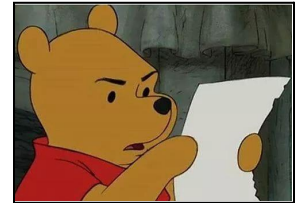
3. Write using the verbage your teacher would use (*Think like a mountain, Write like a scholar!*) - you have to convince the reader that you know this stuff at a COLLEGE level. <u>BE SPECIFIC</u>. If a 4th grader could say it, it is too vague/simple. Use AP Level vocab, NOT SLANG! **Points are given for content, not intent.**

4. DO NOT *just* say something changes/is affected. <u>*BE SPECIFIC*</u>. Indicate What changed, direction of change (**increase/decrease/remained constant)** and tell us why! Also, don't use "**it**" when describing something; tell us what "**it**" is! **AGAIN, BE SPECIFIC**.

5. Any diagrams must be referred to and explained in the narrative of an answer. **Drawing a *stand-alone diagram does not earn points.***

6. Be careful with absolutes; will it *really* kill ALL the animals? Will the ENTIRE ecosystem actually be harmed/destroyed? Be realistic. Avoid "maybes" and "mights" as well, however!

7. Separate your answer to each prompt by **labeling it with the correct letter (a., b., c., etc.)**…**DO NOT write one giant paragraph**, and make sure you write on the lines. Again, make it as EASY as possible for graders to give you points! You can answer out of order — but again, just make sure to <u>label your responses</u>.

8. On the free-response questions, keep in mind that the national average is a 5 out of 10 possible points, so you are not expected to earn *every* point, but do *everything* in your power to earn every point you can by **precisely** writing what you do know.

9. When it comes down to it, remember… **ATP: Answer the prompt, THEN STOP!** Know the <u>task verbs</u> and what they are asking you to do!

   a. Answer what the prompt is asking, and then NO MORE THAN THAT! **Graders will read EVERY word you write unless you cross it out**. If you answer correctly, then *contradict your answer later*, you LOSE that earned point. **Don't word vomit and contradict yourself.**
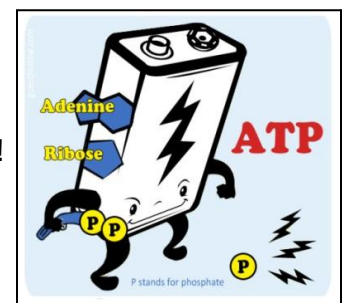
      i. For example, if the FRQ asks for two examples, only the first two examples that you write are graded. HOWEVER, if you put a third response, and it contradicts the first two, <u>you will lose the points for the first two!</u>

FRQ Task Verbs

Term	What it means for FRQ
Define	Give a definition - 1 sentence typically
Identify/Provide	Give a definition or make a statement answering the question. ~1 simple sentence
Describe	Make a statement/definition with additional information and give an example . 1-2 complex sentences.
Explain/Discuss	Tell HOW or WHY something occurs. Make connections. Ex. "A" happens, therefore this leads to "B". This causes "C" to occur, therefore "A" and "C" have this relationship/connection. This is typically 2-3 sentences. Use evidence and/or reasoning. ● Sometimes, it is a process requiring steps in order. ● Use "<u>because</u>" for "why" questions.
Make a Claim	Make an assertion based on evidence or knowledge. If asked to **justify** your claim, make sure you add "Because" or "Which leads to" in your answer to get full points!
Justify	Provide evidence to support, qualify, or defend a claim and/or provide reasoning to explain HOW that evidence supports the claim.
Calculate	A math problem to solve. Show set-up and answer WITH UNITS. (Does not need complete sentences, but you gotta show your work! **No work = no credit!**)
Propose a solution	Provide a realistic proposed solution to a problem based on evidence or prior knowledge.

Common Go-To Phrases in FRQs - If they ask about…

Environmental/ ecological benefits	HAS to be related to the environment, and CAN'T be a benefit to humans Ex: Credit: offshore wind farms allow for less habitat destruction because of reduced drilling for oil. No credit: offshore shore wind farms provide energy for humans.
Ecosystem services (from environmental economics)	Services from ecosystems *for humans.* This provides money or some other benefit to humans. Ex: Forests provide medicines for humans to treat diseases, or timber to build homes, clean water, fisheries, food, etc.
Economic benefits	This has to be related to money/economy. Relate to jobs/tourism and indicate an increase/decrease.
Environmental impact	Default is always habitat destruction that leads to a decrease in biodiversity.

Human health impact	Respiratory illness such as asthma, cancers such as reproductive cancers, etc. *BE SPECIFIC*. Don't just say something like "it makes you sick
How to get people to do things/change behaviors/get involved. For example: make people recycle, use less oil, etc.	<u>Subsidize</u> or give tax credits for things you WANT them to do. <u>Heavily tax</u> things you DON'T WANT them to do. <u>Public education</u> always works - ie, a PSA about the benefits of using no till agriculture. Outright banning things isn't feasible or realistic!
How to fix an acidic environment - such as acid mine drainage or acid rain	Add a base, such as limestone. This doesn't work for ocean acidification, because the ocean is too big for that to be effective.
Always make sure to show the **direction of change**. This increased, this decreased. It is not enough to say it changed, you have to show which direction the change was in.	

Flowery & Vague Phrases to <u>AVOID</u> on the APES FRQs

One strategy to boost your score is to avoid the use of vague and "flowery" terms and phrases. These terms and phrases may *sound* descriptive, but they frequently say little and provide none of the detail needed to earn credit. To avoid them you should try to explain yourself as best as possible using more detail. The following is a listing of these terms and phrases to try to **AVOID**, as they are too **vague**:

1. "bad for the environment / planet"
2. "cause environmental degradation"
3. "cause global warming and pollution"
4. "change" (*Instead of specifying increase or decrease.*)
5. "destroy the environment"
6. "disrupt the environment"
7. "disturb the environment"
8. "ecofriendly"
9. "good for the environment"
10. "greener"
11. "global solution"
12. "global catastrophe"
13. "global cooperation"
14. "harm the environment"
15. "harmful / dangerous chemicals" (*Without specifying.*)
16. "help keep the habitat cleaner"
17. "human footprint"
18. "human impact"
19. "incentivize the system"
20. "kill all the plants/animals/wildlife"
21. "make it illegal" or "the water law" or "the air law" (*Without identifying relevant laws.*)
22. "make it more / less expensive" (*When referring to incentives.*)
23. "mother nature "
24. "overconsumption of natural resources"
25. "pollute the environment"
26. "pollute the water / air / soil" (*Without specifying.*)
27. "restore the environment"
28. "repair the damage"
29. "save the Earth"
30. "save the planet"
31. "stop global warming"
32. "sustainable" (*Without elaboration.*)
33. "toxins", "pollution", "chemicals" & "health effects" (*Without specifying.*)
34. "_____ the habitat" (impact, change, alter)
35. "_____ the ecology" (destroy, restore, maintain, support, harm, compromise, reinvent...)

The following are examples of how to turn weak, vague answers into strong answers that would earn you credit:

Weak:	"Acid deposition hurts forests."
Strong:	"Acid deposition can hurt forests in several ways. One way is by reducing the topsoil's ability to retain vital nutrients such as calcium, magnesium and potassium which are needed by trees."
Weak:	"Runoff from farms can reduce water quality and harm the environment."
Strong:	"Runoff from farms can reduce surface water quality by introducing nutrients such as nitrates and phosphates. These compounds promote algae growth which can reduce water clarity. Further, when the algae die their decomposition by aerobic bacteria can also reduce dissolved oxygen levels."
Weak:	"The pollution from coal power plants causes a lot of environmental degradation."
Strong:	"The air pollution from coal power plants includes nitrogen oxides, sulfur oxides and mercury which have been linked to several environmental problems including acid deposition and mercury contamination of surface water."
Weak:	"Garbage incinerators cause a lot of air pollution."
Strong:	"Garbage incinerators generate a variety of different air pollutants including carbon dioxide (CO_2), dioxin, particulate matter (PM), heavy metals and sulfur oxides."

Now its your turn:

1. Take this weak statement: *"High levels of poverty are bad for the planet."*

And make it stronger: "_____

_____

_____

_____."

2. Take this weak statement: *"Mercury contamination in food can hurt children."*

And make it stronger: "_____

_____

_____

_____."

3. Take this weak statement: *"Automobiles make a lot of air pollution which can disrupt the environment."*

And make it stronger: "_____

_____

_____

_____."

ONE MUST CHAMPION ONESELF AND SAY

Math Reminders

- 4-8 MCQs are typically math, and FRQ #3 will be at least 50% math. Don't let it intimidate you - the best thing you can do to prepare is practice!
- Calculators ARE allowed, but there is NO formula sheet. Memorize the necessary formulas!
- Remember that you MUST show your work on the FRQ math problems for credit. No work shown = no credit!
- NO NAKED NUMBERS! **Always** include your units!
- While you don't need to know specific conversion factors, you DO need to know basic metric conversions as well as things like 7 days/week, 24 hours/per, 60 mins/hour, etc.
- Math Hack - If you don't know how to solve A, but know that you need A to solve B, make up an answer for A (for example 1 or 10), and plug into B.
- The biggest hurdle is often **setting up the problem**. Achieving success with dimensional analysis requires the ability to think about problems in a step-by-step manner and to organize problem setups in a way that will lead to the correct solution. Read through the problem and write down everything you know (what information did they give you?) and what they are asking for. Logically, what is the best way to use the given information to solve the problem?
- Clearly identify your final answer so there is no guessing on the part of the reader.

Multiplication Factor	Prefix	Symbol
$1,000,000,000 = 10^9$	giga	G
$1,000,000 = 10^6$	mega	M
$1,000 = 10^3$	kilo	k
$100 = 10^2$	hecto	h
$1 = 1$		
$0.01 = 10^{-2}$	centi	c
$0.001 = 10^{-3}$	milli	m
$0.000001 = 10^{-6}$	micro	μ
$0.000000001 = 10^{-9}$	nano	n

EXAMPLE:

It takes 2 barrels of fresh water to process and obtain 1 barrel of synthetic oil. If a refinery produces 3×10^7 barrels of synthetic oil per month, how many barrels of fresh water do they use per year?

$$\frac{3 \times 10^7 \text{ barrels of synthetic oil}}{1 \text{ month}} \times \frac{2 \text{ barrels of fresh water}}{1 \text{ barrel of synthetic oil}} \times \frac{12 \text{ months}}{1 \text{ year}}$$

$$= 7.2 \times 10^8 \text{ barrels of fresh water}$$
$$= 720,000,000 \text{ barrels of fresh water}$$

Experimental Design

- **Independent Variable or Manipulated Variable**
  What you are testing. It is what *causes* things to change as you make changes to it. Some people nickname it the I-do variable.

- **Dependent Variable or the Responding Variable**
  The *effect* you are measuring, and it may or may not change. It can be observed during and/or at the end of the experiment. Basically the "results" or "data" of your experiment.

- **The Control or Control Group**
  Group free of any change of the independent variable. It is to make sure that your results were based on the independent variable instead of another factor.

- **Experimental Groups**
  Exposed to the independent variable.

- **Constants/Controlled Variables**
  The things that you keep the same for each test group. They are sometimes called "controlled variables" -- NOT to be confused with the control.

- **Extraneous Variables**
  Unanticipated, unwanted events, which may cause incorrect experimental results and wrong conclusions.

Graphing Acronym to help you remember

DRY MIX is an acronym to help you remember how variables are plotted on a graph.
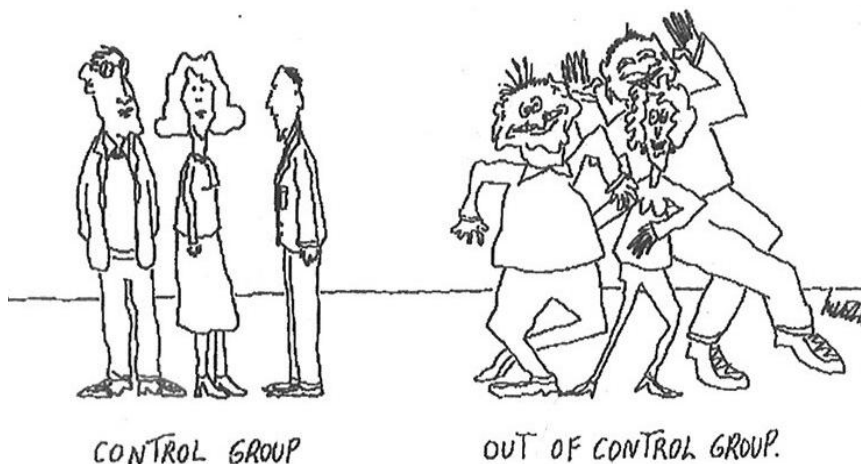
D = dependent variable   **M** = manipulated variable
R = responding variable   **I** = independent variable
Y = graph information on the vertical axis   **X** = graph information on the horizontal axis

CONTROL GROUP   OUT OF CONTROL GROUP.

Good Experiments Have

- A large sample size--the more data you can gather, the better.
  - 20 fish in each pond
  - 5 seeds in each petri dish
- A lot of constants--the things you keep the same in every sample or test group.
- A control or control group--not exposed to the independent variable, but has the same constants.
  - A pond without pesticide added (but has the same number of fish as experimental ponds)
  - A petri dish with pure water, but no salt added (but has the same number of seeds as experimental dishes)
  - A sample not exposed to a pollutant
- Experimental (test) groups that have increasing levels of a substance - for ex:
  - 4 ponds with **increasing** levels of pesticide (one without pesticide)
  - 6 dishes with seeds and **increasing** levels of salt (one without salt)
- Only one independent variable
  - OR, multiple independent variables, but designed in such a way that each variable is tested against a control
- Appropriate graphs
  - Line graph for change over time, concentration, or measurement (length, etc)
  - Bar graph to compare different groups, locations, etc.
  - ScatterPlot for data points that are varied, random, or do not make a pattern
- Small standard error
- Research is done beforehand to develop a good question and hypothesis
- Is repeated or can be repeated by others

Flawed Experiments Have

- A small sample size--not enough data to draw a conclusion
  - Only 2 fish in each pond
  - Only 1 seed in each petri dish
- Too many independent variables--can't isolate which variable caused the change or gave the results
- No control—if the experiment needs one.
- Extraneous variables (outside, unwanted factor) may have influenced the data
- Large standard error

Other Helpful Stuff

- [**APES Topics Checklist + Unit Guides**](#)
- [**APES Unit Vocab List**](#)
- [**Practice Math Review Problem Set**](#)
- [**Legislation Slides**](#)
- [**Smedes 10 Topics You Should Know Video**](#)

After the test:

Know you worked hard all year and this is just ONE test. I know you have learned a lot and I am proud of all the work you have done!

<u>Don't worry about scores</u>; not posted until at least mid-July!

Know that you will live happily and have a productive life no matter what this score is. Again, *I'm proud of you!*

<u>After your exam, feel proud for having done it!</u>