

Points of emphasis for AP Biology experimental design essays

1. State a hypothesis. This is usually stated as an expectation of results based on the known effects of the independent variable.
2. Design and identify a control group for comparison.
3. Tell how you will hold at least two other experimental variables constant.
4. Indicate how the independent variable will be manipulated (varied) -X axis.
5. Describe how the dependent variable will be measured quantitatively (Y axis).
6. If you are trying to derive a rate, be sure to indicate the time frame of the measurements. If the dependent variable will be measured indirectly, explain how the method works to measure the dependent variable.
7. Verify your results through multiple trials or repetition on the same procedure.
8. Analyze the results statistically (means, etc.).
9. If a rate is derived, indicate how it is calculated (equation, slope of curve, etc.).
10. Explain why you are doing the various procedural steps. This is more important than how many grams of this or milligrams of that you are using.
11. If expressing expected results from your experiment it is a good idea to describe expected results across the range of biological activity (0-100°C, dark to bright light, red to violet light, quiet to loud, etc.)

Tips for Writing AP Biology Exam Essays

DO's

1. The first thing that you should do is carefully read the question. The second thing that you should do is read the question, and the third thing that you should do is read the question. Be sure that you answer the question that is asked and only that question, and that you answer all parts of it. If you are given a choice of parts to answer, choose carefully. Don't answer all parts in that case.
2. Briefly outline the answer to avoid confusion and disorganization. Pay close attention to the verbs used in the directions (such as "describe" "explain", "compare", "give evidence for", "graph", "calculate", etc) and be sure to follow those directions. Thinking ahead helps to avoid scratchouts, astrices, skipping around, and rambling.
3. Write an essay. Outlines and diagrams, no matter how elaborate and accurate, are not essays and will not earn you much, if any, credit by themselves. Exceptions: If you are asked as a part of an essay on a lab to calculate a number, this part does not require an essay, but be sure to show how you got your answer (show the formulas you are using and the values you have inserted into those formulas); or, if you are asked to draw a diagram in the question, do so, but be sure to annotate it carefully and thoroughly.
4. Define and/or explain the terms you use. Say something about each of the important terms that you use. The AP Exam will not ask for a list of buzzwords. Use high-level vocabulary but use it in context.
5. Answer the question parts in the order called for and label them "a" "b", etc., as they are labeled in the question. It is best not to skip around within the question. The four essay questions do not have to be answered in any particular order. The readers will find your answer. Put the number in the box at the top of the page to make it easy to find your answer.
6. Write clearly and neatly. It is foolhardy to antagonize or confuse the reader with lousy penmanship.
7. Go into detail that is on the subject and to the point. Be sure to include the obvious (for example, "light is necessary for photosynthesis.") **Answer the question thoroughly.**

8. If you cannot remember a word exactly, take a shot at it--get as close as you can. Even if you don't remember the name for a concept, describe the concept.
9. Use a ballpoint pen with dark black ink. If it "bleeds" through to the other side of the paper, don't write on the back of that page. That will make it easier for the reader.
10. Remember that no detail is too small to be included as long as it is to the point. Be sure to include the obvious--most points are given for the basics anyway.
11. If you use a diagram, label it (it will get no points otherwise) and place it in the text at the appropriate place--not detached at the end. Be sure to refer to the diagram in your essay.
12. Widen your margins a little. This will make it easier for most folks to read.
13. **Bring a watch** to the exam so that you can pace yourself. You have four essays with about 22 minutes for each answer. The proctor will not give you time cues.
14. Understand that the exam is written to be hard. The national average for the essay section will be under 50% correct, that is less than 5 points out of a possible 10 on each essay. It is very likely that you will not know everything. This is expected, but you will know something about each essay so relax and do the best you can. Write thorough answers.
15. If you are asked to design or describe an experiment, include these things:
 - a. hypothesis and/or predictions
 - b. identify independent variable(s)--what treatments will you apply (X axis)
 - c. identify dependent variable(s)--what will be measured to see if the independent variable had an effect. (Y axis- what data are you collecting)
 - d. Describe how you will measure the independent variable, AND why it will work in this case.
 - e. Identify several variables to be controlled (VERY IMPORTANT).
 - f. Describe the organism/materials/apparatus to be used.
 - g. Describe what you will actually do (how you will apply the treatment).
 - h. Describe how the data will be graphed and analyzed.
 - i. State how you will draw a conclusion (compare your results to hypothesis and predictions).
 - j. Your experimental design needs to be at least theoretically possible and it is very important that your conclusions/predictions be consistent with 1) the principles involved and 2) with the way you set up the experiment. Make sure the experiment is internally consistent.
16. If you are asked to draw a graph, include these things:
 - a. Set up the graph with the independent variable (manipulated variable) along the x-axis and dependent variable (responding variable, data you are collecting) along the y-axis.
 - b. Mark out axes in equal (proportional) increments and label with proper units.
 - c. Plot points and attempt to sketch in the curve (line).
 - d. If more than one curve is plotted, write a label on each curve (this is better than a legend).
 - e. Label each axis with the variable name and include the units in which it is measured (degrees C, min, etc).
 - f. Give your graph an appropriate title (What is it showing? Try: "Y" as a function of "x").

DON'TS

1. Don't waste time on background information or a long introduction unless the question calls for historical development or historical significance. Answer the question.
2. Don't ramble--get to the point, and don't shoot the bull--say what you know and go on to the next question. You can always come back if you remember something.
3. Don't use a pencil, and don't use a pen with an ink color other than black. Don't use a felt-tip pen because ink seeps through the page and makes both sides of the paper hard to read. Don't scratch out excessively. One or two lines through the unwanted word(s) should be

sufficient, and don't write more than a few words in the margin. Finally don't write sloppily. It is easy for a grader to miss an important word when he/she cannot read your handwriting.

4. Don't panic or get angry because you are unfamiliar with the question. You probably have read or heard something about the subject--be calm and think.
5. Don't worry about spelling every word perfectly or using exact grammar. These are not a part of the standards the graders use. It is important for you to know, however, that very poor spelling and grammar will hurt your chances.
6. There is no need to say the same thing twice. While introductory paragraphs may be important in English class, on the AP exam they are a waste of valuable time. This also goes for restating the question. Don't restate it, just answer it.
7. If given a choice of two or more topics to write about, understand that **only the first one(s) you write about will count**. You must make a choice and stick with it. If you decide your first choice was a bad one, then cross out the parts of the answer so the reader knows clearly which part you wish to be considered for credit.
8. Don't leave questions blank. Remember that each point you earn on an essay question is the equivalent of two correct multiple choice questions, and there is no penalty for a wrong guess, bad spelling, or bad grammar. **Make an effort on every question! DON'T QUIT!! Keep working!**