



# Group 4 Extended Essay

Biology HL

# Overview

- An extended essay in biology provides you with the opportunity to apply a range of skills while researching a topic of personal interest in the field of biology.



# Choice of Topic

- It is important to choose a topic that has a **CLEAR BIOLOGICAL EMPHASIS**, and is not more closely related to another subject.
- For a biology extended essay, the topic chosen must allow an approach that distinctly relates to biology. Where a topic can be approached from different viewpoints, the treatment of the material **MUST BE** clearly biological.

# Choice of Topic

- A biology extended essay should incorporate biological theory and emphasize the essential nature of this subject.



# Choice of Topic

- Some topics are unsuitable for investigation because of ethical issues.
- Investigations that are based on experiments likely to inflict pain on, or cause unnecessary stress to, living organisms are not appropriate for submission.

# Choice of Topic

- Some topics may be unsuitable for investigation because of safety issues.
- Experiments in which the student uses toxic or dangerous chemicals, carcinogenic substances, or radioactive materials should be avoided unless adequate safety apparatus and qualified supervision are available.



# Choice of Topic

- Keep your topic title focused.
- “The effect of detergent toxicity on soil bacteria” is much better than, “Detergents in the environment”.
- “The competitive and evolutionary nature of the symbiotic relationship in Paramecium bursaria” is better than, “Symbiosis in animals”.

# Choice of Topic

- The topic chosen for study should be presented in the form of a research question, followed by a statement of intent outlining the research approach to be used in answering the question.



# Treatment of the Topic

- Students should point out early in the essay how the research question was derived and, if appropriate, how it was narrowed down by briefly outlining related aspects that are not being considered in the essay.

# Treatment of the Topic

- Essays in biology may be based on data collected by the student through experimentation, survey, observation, drawings, fieldwork, or some other appropriate biological approach.



# Treatment of the Topic

- Essays that simply restate facts or data taken directly from the sources are of little value and will receive a poor score.

# Treatment of the Topic

- Essays that involve practical work carried out in the laboratory, or fieldwork, should include a clear and concise description of the experimental procedure.
- Students should specify how the research approach and methodology were decided, and show any approaches that were considered and rejected.



# Treatment of the Topic

- Any research carried out for the essay should be performed under the direction of a school supervisor.
- Essays based on research carried out by the student at a research institute or university, under the guidance of an external supervisor, must be accompanied by a covering letter outlining the nature of the supervision and the level of guidance provided.

# Treatment of the Topic

- Generating and presenting data should not be an end in itself; analysis using appropriate scientific techniques is essential.
- The main body of the essay should consist of an argument or evaluation based on the data or information presented.



# Treatment of the Topic

- This is often the longest single section of the essay. It should be well structured and have an obvious logical progression.

# Treatment of the Topic

- This evaluation should show an understanding of the results and an appreciation of their significance in light of the literature that has been consulted.
- Students must be encouraged to undertake a critical evaluation of the work they have done.



# Treatment of the Topic

- Biological limitations should be considered.
- For instance, sometimes problems arise from the standpoint of repeatability and control when using living material, as well as the difficulties of generalizing from research based on a single type of organism or environment.

# Interpreting the Assessment Criteria.

## Criterion A: Research Question

- In a biology extended essay, the research question is best stated in the form of a question.
- The research question should not be understood as a statement of the topic but rather as a precisely formulated question that the research will attempt to answer.



# Interpreting the Assessment Criteria.

## Criterion A: Research Question

- For example, a statement of the topic of an essay might be “Factors that affect bacterial growth in agar plate cultures”; the research question based on this topic could be, “How are the growth rates of three strains of *E. coli* affected by temperature?”.
- The research question can then be used to formulate a hypothesis, or hypotheses which can be tested.

# Interpreting the Assessment Criteria.

## Criterion A: Research Question

- A broad statement of the topic of the essay or a statement of the hypothesis is **NOT SUFFICIENT** on its own to meet the requirement for a research question in a biology extended essay.
- This criterion focuses on the topic, the research question, and the methodology. It assesses the explanation of the focus of the research (this includes the topic and the RQ), how the research will be undertaken, and how the focus is maintained throughout the essay.



# Interpreting the Assessment Criteria.

## Criterion B: Knowledge and Understanding

- This criterion assesses the extent to which the research relates to the subject area/discipline used to explore the RQ, or in the case of the world studies essay, the issue addressed and the two disciplinary perspectives applied, and additionally the way in which this knowledge and understanding is demonstrated through the use of appropriate terminology and concepts.

# Interpreting the Assessment Criteria.

## Criterion B: Knowledge and Understanding

- Students writing in biology need to show a mastery of, and fluency in, the use of appropriate terminology.
- Avoid excessive use of jargon.
- The student must demonstrate an understanding of the terms used by using them appropriately.



# Interpreting the Assessment Criteria.

## Criterion B: Knowledge and Understanding

- A biology EE should be based on specific, relevant, and clearly defined aspects of the biological study of living organisms.
- The information and ideas should be presented in a way that provides evidence that these have been understood and applied correctly.

# Interpreting the Assessment Criteria.

## Criterion B: Knowledge and Understanding

- Material extracted from the sources should be referenced and incorporated into the main body of the essay in a way that demonstrates the student's understanding.



# Interpreting the Assessment Criteria.

## Criterion B: Knowledge and Understanding

- The purpose of the introduction is to set the RQ into context. It is usually appropriate to include the general background biological theory required to understand how the RQ has arisen.
- The essay will be judged on its biological content.

# Interpreting the Assessment Criteria.

## Criterion B: Knowledge and Understanding

- The biology EE should be based on specific, relevant, and clearly defined aspects of the biological study of living organisms.
- The information and ideas should be presented in a way that provides evidence that these have been understood and applied correctly.



# Interpreting the Assessment Criteria.

## Criterion B: Knowledge and Understanding

- Students writing in biology need to show a mastery of, and fluency in, the use of appropriate terminology.
- Avoid the excessive use of jargon.
- The student must demonstrate an understanding of the terms used by using them appropriately.

# Interpreting the Assessment Criteria.

## Criterion C: Critical Thinking

- This criterion assesses the extent to which critical thinking skills have been used to analyze and evaluate the research undertaken.



# Interpreting the Assessment Criteria.

## Criterion C: Critical Thinking

- The stated conclusion must be based on the data, information, and/or evidence presented in the essay.
- The data must be analyzed and presented in such a way that the argument leading to the conclusion is supported and clarified. Tables of raw data will generally not achieve this on their own.

# Interpreting the Assessment Criteria.

## Criterion C: Critical Thinking

- The data must be analyzed, processed and presented in a way that relates clearly and directly to the central argument of the essay.



# Interpreting the Assessment Criteria.

## Criterion C: Critical Thinking

- Because of the nature of the subject, students writing a biology extended essay must make a special effort to maintain a reasoned, logical argument that focuses on the RQ.
- Essays that attempt to deal with a large number of variables are unlikely to be focused and coherent.

# Interpreting the Assessment Criteria.

## Criterion C: Critical Thinking

- The conclusion should relate directly to the research question and should point out the main findings of the research.
- Any unexpected outcomes should also be pointed out here.
- Students should point out any unresolved issues and make suggestions as to how these might be further investigated.



# Interpreting the Assessment Criteria.

## Criterion C: Critical Thinking

- The stated conclusion must be based on the data, information, and/or evidence presented in the essay.
- The data must be analyzed and presented in such a way that the argument leading to the conclusion is supported and clarified. The data must be analyzed, processed, and presented in a way that relates clearly to the central argument of the essay. Tables of raw data will generally not achieve this on their own.

# Interpreting the Assessment Criteria.

## Criterion D: Presentation

- This criterion assesses the extent to which the presentation follows the standard format expected for academic writing and the extent to which this aids in effective communication.



# Interpreting the Assessment Criteria.

## Criterion D: Presentation

- Illustrative material should only be included if it enhances the argument or supplies information that cannot be easily provided in another way.
- Original photographs, photocopies or downloaded images that are not labelled or put into the context of the investigation are unlikely to enhance the essay.

# Interpreting the Assessment Criteria.

## Criterion D: Presentation

- Biological investigations often result in large quantities of raw data. Large tables of raw data are best included in an appendix.



# Interpreting the Assessment Criteria.

## Criterion E: Engagement

- This criterion assesses the student's engagement with their research focused and the research process. It will be applied by the examiner at the end of the assessment of the essay, after considering the student's reflections on their planning and progress form.

# Important Things....

- Chose a topic that really interests you!
- Formulate a good question.
- Be an independent learner.
- **THINGS TAKE TIME!** Get started promptly so as to leave time for setbacks and delays.
- Create deadlines and **STICK TO THEM!**
- Get help from your supervisor as you need it.
- **DO NOT PLAGIARIZE.** Cite your sources.



# Important Dates: