

Design technology

These subject guidelines should be read in conjunction with the “Introduction”, “Outline” and “Details—all essays” sections of this guide.

Overview

An extended essay in design technology provides students with an opportunity to undertake in-depth research into the processes involved in the design and development of products or systems, and to make an assessment of their impact on individuals and society at large.

The outcome of the research should be a coherent and structured piece of writing that effectively addresses a particular issue or research question and arrives at a particular, and preferably personal, conclusion.

Absolute reliance on textbooks and the Internet is discouraged and no extended essay in design technology should be based exclusively on such sources.

Choice of topic

The chosen topic must be clearly concerned with issues relating directly to the subject. Where the topic may be approached from different viewpoints, the treatment must be approached from a design technology perspective. Students are expected to be familiar with the design cycle, as clarified in the current *Design technology guide*.

Students are encouraged to select a topic that is appropriate to their interests and abilities, and the resources available. They should avoid topics of a purely historical nature that merely document the development of a product or technology.

Essays may focus on systems design rather than a specific product, for example:

- investigating the labelling of chemicals in transit, from the point of view of provision for dealing with accidents
- investigating and implementing a system for reducing food wastage in a school/college canteen
- evaluating the feasibility of a combined heat and power scheme for a local community.

When choosing a topic for a design technology essay, students should start by exploring appropriate design contexts. For example, it may be worth considering:

- artifacts that do not work properly or seem wasteful of resources
- the needs of particular user groups such as the elderly, infirm or disabled
- new technologies and how they might influence or combine with existing technologies.

It is essential that the topic chosen is appropriate for a design technology extended essay and not merely a review of a technological product or technological development.

The following examples of titles for design technology extended essays are intended as guidance only. Moreover, it may help if the student further defines the topic chosen for study in the form of a research question, followed by a statement of intent that indicates which broad process is going to be used in answering the question. In this way, the approach to the topic chosen may be even further clarified. Some examples of this could be as follows.

Topic	Ergonomic design of telephones for the physically impaired
Research question	How have ergonomic factors been considered in the design of a new telephone for physically impaired people?
Approach	An essay that considers how ergonomics can be used to improve the design of a new telephone.
Topic	Bicycle design
Research question	Has the introduction of new materials improved the performance of modern racing bicycles?
Approach	An essay that examines the use of new materials in the design of bicycles and their components.
Topic	Automated textile production
Research question	Does an automated textile process provide better-quality products than a mechanized process?
Approach	An investigation into a specific automated textile production process.

Treatment of the topic

An extended essay in design technology may be based on literature, surveys or experiments. However, since design technology is an experimental science, many students will wish to base their essay on practical/experimental work, although this is not compulsory. Practical activity may take the form of:

- experiments to test materials or evaluate performance
- modelling situations and products to assess effectiveness
- prototyping design solutions
- full realization and trialling of a design solution.

Because of the visual nature of design technology, it is anticipated that many essays will be significantly enhanced by the addition of relevant graphical material.

In order to promote personal involvement in the extended essay, the use of primary sources that are locally available should be encouraged wherever possible. Data should be collected from different sources using a variety of appropriate methods, and then analysed using appropriate scientific and technological techniques, otherwise it will be of little value. Data should only be included in the essay when directly relevant to the chosen topic. It is important that the topic and research question reflect a firm emphasis on design technology, and that they do not become directed towards another subject area.

The topic should be treated at an appropriate level of study: not so specific or personalized that it has no wider social, political or organizational aspects, nor so broad that there is little potential for taking or stimulating action in the problem area.

Students should identify the key issues that emerge from the investigation and assess their significance in relation to the original proposition or question. Above all, the essay must be based on an issue that can be explored, and from which conclusions can be drawn and recommendations made.

Interpreting the assessment criteria

Criterion A: research question

The research question can often be best defined in the form of a question. It may, however, also be presented as a statement or proposition for discussion. It must be specific, sharply focused and appropriate to design technology. This means that it must relate to the nature of the subject and not be restricted to a descriptive account of a technological or design topic. An appropriate research question allows the essay to address comprehensively the **design cycle**. Whichever way it is formulated, it should be identified clearly as the research question and set out prominently in the introduction.

Criterion B: introduction

The introduction should explain succinctly the significance of the topic and why it is worthy of investigation, and include relevant background details. The introduction should not be seen as an excuse for padding out an essay with research details and should only include relevant information related to the research question. For example, in an essay entitled “How has the impact of composite materials affected the design of bicycle wheels?”, it would not be necessary for the student to include a historical account of the development of the bicycle throughout the 20th century. However, if a particular design provided the impetus for new ideas then including that design would be relevant.

Criterion C: investigation

The sources of data and information need to be clearly identified. Because of the practical nature of the subject, most successful essays will involve some form of practical activity. The sources of data may include making, then trialling an artifact, and experiments, modelling, surveys, interviews or monitoring. The essay should provide sufficient detail to allow an independent person to repeat the exercise. Students are expected to show an awareness of the limitations or uncertainties inherent in the techniques and equipment used.

Criterion D: knowledge and understanding of the topic studied

This criterion relates to knowledge and understanding of the topic chosen, together with its context. Students are expected to understand clearly the scientific and technological concepts used in the extended essay.

Criterion E: reasoned argument

Students should be aware of the need to present their essays as a logical development of an argument. Personal views should not simply be stated but need to be supported by reasoned argument. This argument often results from practical activity and testing. Straightforward descriptive or narrative accounts that lack analysis do not usually advance an argument and should be avoided.

Criterion F: application of analytical and evaluative skills appropriate to the subject

This criterion relates to the questioning and diagnostic treatment of data and information. The most successful design technology extended essays will include a complete assessment of the design cycle, resulting in a comprehensive evaluation of the final artifact or system.

Criterion G: use of language appropriate to the subject

Students are expected to make effective use of technological and scientific terminology and, where appropriate, scientific notation.

Criterion H: conclusion

“Consistent” is the key word here: the conclusion should develop out of the argument and not introduce new or extraneous matter. It should not repeat the material of the introduction; rather, it should present a new synthesis in light of the discussion.

Criterion I: formal presentation

This criterion relates to the extent to which the essay conforms to academic standards about the way in which research papers should be presented. The presentation of essays that omit a bibliography or that do not give references for quotations is deemed unacceptable (level 0). Essays that omit one of the required elements—title page, table of contents, page numbers—are deemed no better than satisfactory (maximum level 2), while essays that omit two of them are deemed poor at best (maximum level 1).

An extended essay in design technology lends itself to many forms of graphic presentation. Most essays are enhanced by the use of charts, tables, technical drawings, sketches and photographs. The graphical nature of many topics makes these essential. Where possible, these should appear in the body of the essay, as close as possible to the relevant text. Hand-drawn diagrams are acceptable. Raw data obtained through experimentation, testing or surveys may be included within an appendix. Any material that is not original must be acknowledged.

Criterion J: abstract

The abstract is judged on the clarity with which it presents an overview of the research and the essay, not on the quality of the research question itself, nor on the quality of the argument or the conclusions.

Criterion K: holistic judgment

The most successful essays contain original thoughts and ideas, demonstrating creativity and innovation, normally resulting from practical activity. Outstanding essays demonstrate the student’s ability to overcome and solve problems, and consider and evaluate a variety of alternative solutions.