

**2004 HSC Notes from
the Marking Centre
Design and Technology**

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Published by Board of Studies NSW
GPO Box 5300
Sydney 2001
Australia

Tel: (02) 9367 8111

Fax: (02) 9367 8484

Internet: <http://www.boardofstudies.nsw.edu.au>

ISBN 1 7414 7164 8

2004445

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2004 HSC NOTES FROM THE MARKING CENTRE

DESIGN AND TECHNOLOGY

Introduction

This document has been produced for the teachers and candidates of the Stage 6 course in Design and Technology. It provides comments with regard to responses to the 2004 Higher School Certificate Examination, indicating the quality of candidate responses and highlighting the relative strengths and weaknesses of the candidature in each section and each question.

It is essential for this document to be read in conjunction with the relevant syllabus, the 2004 Higher School Certificate Examination, the Marking Guidelines and other support documents that have been developed by the Board of Studies to assist in the teaching and learning of Design and Technology.

General Comments

In 2004, approximately 4,640 candidates attempted the Design and Technology examination.

Teachers and candidates should be aware that examiners may ask questions that address the syllabus outcomes in a manner that requires candidates to respond by integrating their knowledge, understanding and skills developed through studying the course. This reflects the fact that the knowledge, understanding and skills developed through the study of discrete sections should accumulate to a more comprehensive understanding than may be described in each section separately.

Major Design Project

General Comments

Candidates have demonstrated a clearer understanding of the Major Design Project and the marking guidelines, and an increased understanding of the ways outcomes may be achieved.

Candidates have become more aware of the processes of design development, from needs analysis to final evaluation and including the processes of production.

Projects presented in 2004 represented a broad range of technologies and showcased the wide range of skills and abilities of the candidates.

There was again a concern with the extent of outsourcing of projects. Some outsourcing done was completely unnecessary. Outsourcing led in some cases to the lowering of quality in the skills achieved by the candidates. It is necessary to point out that Design and Technology is a 'hands on' course involving the use of technologies. Those candidates who tend to outsource the bulk of their project are not demonstrating syllabus outcomes in this regard.

Candidates are reminded that offensive language and images are not acceptable in a major design project, irrespective of any warnings which may be included as part of the folio. Candidates should consider appropriate means of conveying information.

Many of the best projects were innovative and demonstrated ongoing resolution of design problems in order to achieve design solutions. Candidates also demonstrated extensive and relevant testing to assist them with the final solution. Some candidates struggled to complete relevant tests and research. Candidates need to avoid irrelevant testing.

More appropriate methods of communication are being used, including charts, graphs, photography and other technologies, to express the ideas or development to the visiting HSC markers. Typically, the most successful Major Design Projects show development by models,

scale models, hypothetical tests of concepts and design ideas in addition to a strong and applied evaluation of the overall project. Better projects provided succinct summaries of their research, and demonstrated application of the results of that research. They provided succinct, less detailed portfolios but provided real evidence of how they developed solutions to identify needs in appendices. This enabled markers to more easily assess that they had demonstrated the subject outcomes.

Candidates were better able to consider the practices of design and development in industrial/commercial settings, and emulate these where appropriate in their own designing.

Candidates should be encouraged to use real evidence of development in model or prototyping form, photographic or brief video evidence where appropriate, and to summarise conclusions and place the source material within an appendix.

Component – Project Proposal and Project Management

This component was completed satisfactorily. However, responses in the lower mark ranges tended to discuss or simply state what it was that they wanted to make rather than providing a thorough investigation of a problem, situation, want or need. Successful responses indicated that they had embarked on research early and spent time clearly identifying and exploring the need to be addressed with their project.

Many candidates still confuse innovation with invention and are overwhelmed by the thought that they have to invent something new. This is not the intention of the Design and Technology course.

Assessment Criteria

- Identification and exploration of the need
Better responses demonstrated the application of critical analysis skills to the investigation of the need and drew conclusions regarding their criteria for evaluation. The flow from need identification to the development of evaluative criteria provided candidates with focus and direction for the product, system or environment's development. Poorer responses tended to simply state what they proposed to make without identifying a genuine need and subsequently exploring opportunities for other solutions.

- Areas of investigation

Better responses included a detailed analysis of the range of logical and relevant areas that they could possibly research, and the methodologies to be used, to inform the development of the PSE, rather than listing some broad areas which may be considered in future research.

- Criteria to evaluate success

The better responses considered the project proposal and the needs that the product, system or environment should meet, in many cases creating an assessment tool for use in the final evaluation of the success or otherwise of the PSE. Better responses linked this work to an analysis of the functional and aesthetic aspects of design. Responses in the lower mark ranges tended to list the criteria without any analysis.

- Action, time and finance plans and their application

Better responses used the action plan as an ongoing tool for assessment of progress and found it a management tool to help them achieve success. They frequently referred to it along the process and evaluated it regularly giving a self-evaluation of progress.

Some timelines that were presented clearly did not give specific details relevant to the project. Candidates need to add headings and stages which are relevant to their project in order to make it a well-formulated and useful management tool. The time they designate to each set task MUST be appropriate. It is not appropriate to use a generic template that will fit any project. Candidates need to develop their own timeline, specific to their project and themselves. It was often evident that many candidates completed the generic template AFTER the completion of the project, thereby presenting a very obvious false representation.

Better responses had clear project management strategies applied, with quality action plans in place from the commencement of the project, and evaluated throughout its development.

Finance plans had improved immensely. Many candidates listed their source of income with a well-justified reason for the amount of money they allocated to their project. Many provided receipts to demonstrate all expenses. Better responses demonstrated a genuine effort to develop a budget based on available financial resources and likely costs and expenses. Poorer responses were simply a collection of receipts after the event. It was clearly a list of expenditure with no real evidence of financial planning or management. Little ongoing evaluation was evident with these projects. Hence, few justified financial decisions were made throughout.

Aspects of development and realisation, investigation and experimentation, prototype development, production, implementation and evaluation should be built into the process of planning. Candidates should be advised that it is appropriate to develop a plan of action, provide this and then evaluate this document during the project development to show new directions that may arise. It is also appropriate to deviate from this plan and document variations that may occur. It is essential, however, that the original documentation, written at the commencement of the project, remains as evidence of its early development.

- Selection and use of ideas and resources

Better projects identified resources that may be available to be used for the project and its development, then evaluated these resources and selected from the range. This selection of resources is part of project management, and was appropriately documented at this point. Many candidates used a table to succinctly communicate in this section. Better responses used this action as a link to the identification and justification of resources utilised in the major design project.

Candidates were better able to demonstrate their understanding and application of design processes when they communicated the development of their design project in its natural order, rather than artificially structuring it to fit a series of headings.

The ongoing process of resource identification, evaluation, selection, justification and use should continue throughout the project, and does not need to be broken into sections.

Component – Project Development and Realisation

In this section, the development and realisation of the Major Design Project, the folio and product, system or environment, should be clearly evidenced, and explained. Application of the conclusions of research should be evident in the development. This is best shown by models, scale and not-to-scale, made of a range of materials and, where appropriate, photographic evidence or similar. Long-winded discussion within a portfolio is neither appropriate nor encouraged. The development and the results should be clear in the final PSE. Better projects often presented a 3D folio, where design development was evident by the samples of modeled solutions shown. The use of appendices of the source data is appropriate.

Better responses demonstrated an ability to critically assess existing designs and research relevant areas, which ultimately impact on the success of their final project. They were able to distinguish between relevant and irrelevant research. They analysed their findings and conducted relevant tests and experiments, which ultimately impacted positively on their end result.

Poorer projects demonstrated little design development. The final design was shown immediately without any research and investigation into existing designs. They often included irrelevant testing, which unfortunately rarely had an impact on the final project. Many did not distinguish tools, materials and techniques. Tools were described but very few actually tested. Some candidates listed tests and experiments without evidence of ever carrying them out.

Assessment Criteria

- Evidence of creativity – ideas generation, degree of difference and exploration of existing ideas

This aspect was well understood by candidates. Many demonstrated a thorough understanding of a definition of innovation versus invention, recognising that a degree of difference in the ideas, technology use and/or final product, system or environment was an acceptable indicator of these outcomes.

- Consideration of design factors relevant to the Major Design Project
Though the design factors are explicitly listed in the syllabus, many candidates could not relate these factors directly to their project. Candidates tended to list these factors and write a description of them rather than relate them to the PSE they were developing. Better responses showed that they considered these factors by actually considering them rather than listing them in isolation.

- Documentation of research, experimentation and testing of design ideas, materials, tools and techniques.

The ad hoc testing of ‘design solutions’ was again of concern in the overall development of the design project. Some candidates continued to test and experiment unnecessarily, resulting in some of their work being irrelevant. Testing became superficial and many candidates could not see its relevance in the development of the whole project. The best responses referred to the use of appropriate testing and created a broad range of model solutions to inform the design development.

Some candidates also demonstrated clear evidence of relevant testing being carried out and predominantly set them out in the form of Scientific Method eg Aim, Method, Results and Conclusion. The better responses drew their conclusions explicitly, which ultimately impacted positively on their PSE, with the evidence of the impact being annotated in the PSE.

Research that can be extracted from external and well respected sources that can be referenced in projects should not simply be duplicated by candidates. Data that cannot be obtained any other way should be the focus of experimentation and testing. Many candidates heavily relied upon downloads from the internet, without summarising and relating to their PSE.

- Application of conclusions

Those candidates who carried out relevant developmental processes did very well in providing evidence of their application of the conclusions drawn to their product, system or environment.

- Identification and justification of ideas and resources

The justification of the selection of the ideas and resources used remains a concept that is not well understood. Better responses identified the resources used in the major design project and justified their application and value, while weaker responses just listed the resources used. This should be linked to the criteria to evaluate success from the project proposal.

- Evidence of the testing of design solutions and application of conclusions

Many responses showed no evidence of a process of model, digital 3D modeling or mock-up development. Processes of development such as this enable candidates to demonstrate both the testing of solutions to design challenges that they meet as they progress, and the testing of whole concepts.

- Use of communication and presentation techniques

A broad range of technologies was used in the presentation of all aspects of product, systems and environment development. From the written word to multimedia presentations, excellent use of the Internet for research and person-to-person communication, candidates showed a growth in the range of techniques they could apply appropriately.

- Evidence and application of practical skills to produce a quality project

Successful projects demonstrated production of work at the highest technical level. This was evident in many products, systems and environments, and in a growing range of technologies. Many of the better responses tended to communicate their construction phase through the use of photographs, which outlined them completing various phases. Explicit instructions followed these photographs along with ongoing evaluations. This enabled the markers to identify that the candidates were clearly solving ongoing problems and making relevant decisions.

Better responses showed little use of outsourcing and the outsourcing they had used was well justified. The majority of their product, system or environment was completed by them, demonstrating that they developed many new skills and managed their time management in an effective way. Some candidates had enrolled themselves into a range of courses outside of school hours, to enable them to further develop new skills, to prevent unnecessary outsourcing.

- Consideration of the practices in industrial/commercial settings as they relate to the Major Design Project

Better responses clearly demonstrated an understanding that the ‘practices’ referred to by the guidelines are the practices of both designing and producing. They discussed the whole process

from needs identification through to production and compared their own practice with that of practising designers and producers.

Poorer responses generally named an industrial or commercial setting, and then failed to compare and contrast these processes with their own. By evaluating the design, management and production techniques in these settings, the candidate is able to demonstrate a sound knowledge of the industrial and commercial practices along with their own.

Component – Project Evaluation

Ongoing evaluation was again much stronger throughout folios. Many projects demonstrated ongoing problem-solving and decision-making processes by drawing conclusions back to how it would impact on their final product, system or environment. Many of these candidates referred back to their criteria to evaluate success as a guide to this development.

Candidates generally need to be more thorough in relating their evaluation, both ongoing and final, to their project proposal work.

Final evaluation in relation to functional and aesthetic criteria was generally strong. Many responses did not include a photo of the final PSE in its environment; for example, showing the successful operation of it or perhaps modelling it. It is important for candidates to include this as it demonstrates to the marker that the project was successful in its end-use. It also demonstrates that there is a significant link between the final PSE and the Project Proposal that was initially set by the candidate. A good evaluation is only possible if the designed solution is put into practice.

The final evaluation of the PSE's impact on society and the environment continues to provide challenges for candidates. Teachers may like to strengthen the understanding of life cycle assessment/analysis used with candidates and the selection of materials, tools and processes on environmental criteria, in addition to those already used. Social impact of PSE is a major syllabus component, as detailed in outcome H4.3. Candidates should have acquired knowledge of the social impact of design from the preliminary course, ie personal values, cultural beliefs, sustainability, safety and health, community needs, individual needs, and equity, and be able to apply this in their major design project.

Evaluation of impact on society remains an overall, weaker area. Candidates often do not link back to current trends in design. They do not discuss the uses of their product, system or environment, or where it is going. Candidates are advised to consider this throughout the development of the project and refer to social impact of the whole project as well as the PSE, which is the end-point and reason for the project.

There was a stronger use of professional evaluations, but many responses failed to link such evaluations to how their project impacted on society as a whole. Many tended to include these evaluations without realising their significance or reflecting upon it.

In relation to evaluating environmental considerations, candidates consistently discuss recycling issues without a detailed analysis. They struggle to clearly state what impact their design has on the environment in terms of resource usage. It is essential that candidates realise that they need to analyse the 'internal' environment as well. For example, 'does the product suit the existing décor in my lounge room?' 'Is my garment suitable for the formal occasion?'

Assessment Criteria

- Recording and application of evaluation procedures throughout the design project
As with other parts of the marking guidelines, many candidates used this as a heading for a section of their portfolio. This is unnecessary. A more appropriate response is to record evaluative comments and procedures as they occur. Better projects used incidental pages or notes throughout the folio or attached to their models of design development to emphasize their efforts at evaluation. The presentation of developing models and prototypes communicates clearly to markers that ongoing evaluation has occurred.

- Analysis and evaluation of functional and aesthetic aspects of design
Better projects commenced this analysis in the early stages of development. They analysed functional and aesthetic criteria while developing their criteria to evaluate success. They then drew upon this in a final evaluation of their solution using functional and aesthetic criteria.
- Final evaluation with respect to the project proposal and the project's impact on society and the environment
Societal impact still proves to be an area of evaluation that is difficult for many candidates. Some work in the case study about societal impacts of designs, and design and production, may assist candidates in this area. Environmental issues are better addressed, but rarely extend to life cycle assessments of materials or of environmental impact of processes used. Successful projects related their criteria to evaluate success directly to their final evaluation.
- Relationship of the final product, system or environment to the project proposal
This aspect was well done by most, with many providing a brief personal reflection relating back to the criteria to evaluate success.

Written Examination

Section I – Multiple Choice

Question Number	Correct Response
1	D
2	B
3	B
4	D
5	A
6	D
7	D
8	C
9	C
10	B

Section II

General Comments

This section was mandatory for all candidates and allowed them to demonstrate their knowledge and understanding of research methods, communication and the processes used by designers.

Question 11

- (a) Most candidates were able to competently outline an appropriate research method, including surveys, observations, experimenting and testing of materials, tools and techniques, literature reviews, internet research, and interviews, showing the link to their MDPs. The impact was then clearly articulated. Some candidates gave detailed descriptions of their research method but merely said the results ‘influenced my design’ or ‘made my design more innovative’ without identifying the actual impact.
- (b) Candidates generally had a good understanding of the audience for the various communication techniques exemplified in this question, particularly showing an understanding of a project such as the art gallery. Some candidates, although they were able to identify architects and designers as the audiences for some communication techniques, did not understand clearly what role they had in the design process and used these two audiences repeatedly throughout the question. Weaker responses did not demonstrate an understanding that the communication techniques had specific target audiences, and gave general non-descriptive answers in the hope that a relationship might be there.
- (c) (i) Candidates gave a range of responses to explain why communication techniques varied throughout the design development of the art gallery. Many candidates could explain reasons why the nature of the techniques varied according to audience knowledge and requirements, but only the better responses linked this to the actual design development by using examples. The better responses demonstrated a knowledge of the differences in communication techniques appropriate to stages of the design development process.
- (ii) The better responses in this section clearly had knowledge of the work of designers and/or design teams and were able to explain some of the processes they used. They had an understanding of the processes that would be used by designers in a complex project such as the art gallery. These responses gave examples of communication techniques, and clearly articulated the consequent response activities. Most candidates answered this in either prose or dot-point form. Some took a sub-heading approach, which allowed them to clearly indicate the communication and response to research.

Many candidates referred to team meetings or communication methods, such as flow charts or emails or personal conversations, and how these are used to respond, but with less depth of knowledge of how these fit into the overall process of a large design project such as the art gallery.

Weaker responses described a response to research by saying that the design teams meet to share their individual results with no specifics of how they communicated these.

- (d) Better responses demonstrated sound knowledge and understanding of the process of designing, and were able to describe the communication processes they used from initial ideas to concept stage and provided a strong justification which linked to the specific nature of their MDP. The better responses also explained how the nature of these processes were either similar to or different from the process used by designers in commercial settings. Examples used of design practice demonstrated a clear understanding. Some candidates in this group set out their response by identifying a communication technique, then describing how and why they used it followed by how and why the commercial designer might have used it, drawing on examples they had studied and/or visited. In this way, they referred to a number of different techniques and demonstrated a high level of knowledge and understanding of design practice in both the classroom and a commercial setting.

Other candidates, although well able to justify the communication processes they used in their MDP, only made vague references to design in a commercial setting – eg ‘designers use better technology’ or ‘they have a larger group to survey’ or ‘have more money to spend and more people in the design team’. Candidates in this range showed that they appropriately used communication processes by describing sketches they made in their MDP and how they used these as communication tools, and the results they achieved, but had not related this to commercial practice.

Some candidates were able to articulate a design process, and outlined communication practices used from initial ideas to finished product, showing less understanding of a design concept. These candidates may have described sketching, CAD or modelling as they used it for their MDP, and then related this to communication in commercial design, but did not draw out why these processes were appropriate ones to use.

Poorer responses were an outline of limited communication processes used in the MDP, and in some cases did not link these to the MDP. These responses typically showed that sketches may have been used to communicate initial ideas and more formal drawings used to communicate dimensional details, but with no reference to commercial practice.

Section III

General Comments

In this section candidates were required to select ONE of either Question 12, 13 or 14.

Question 12

This question was attempted by a relatively small proportion of the candidature, possibly because candidates mistakenly believed that they needed a sound knowledge of nanotechnology. Knowledge of emerging technologies and their compulsory case study would have adequately prepared the candidate.

- (a) Most candidates used the examples of nanotechnology provided in the stimulus material to demonstrate how applications of nanotechnology impact on society.

Some candidates used their own examples of nanotechnology to demonstrate impact on society.

- (b) Better responses to this part of the question demonstrated a high level of understanding of factors affecting the successful development of an innovation. They made a link between the statement provided and the question by identifying how the factors impact on the quality of life using clear and relevant examples.

A small number of candidates had difficulty differentiating between the factors influencing the development of successful innovation and the factors influencing design.

- (c) Candidates attempted this part of the question using two different styles. One approach was to provide a specific example of an innovation and address the ethical and legal implications relating to that innovation. Other candidates structured their responses around the implications of ethical and legal issues providing a variety of examples of innovations to support their analysis.

Better responses to this part of the question showed a high level of understanding of both ethical and legal implications of new and emerging technologies. They were able to articulate the ethical and legal implications using quality examples, and clearly identified the issues and impacts associated with legal and ethical implications.

Some candidates demonstrated knowledge of ethical and legal factors but were unable to link these to emerging technologies. These responses described the factors but had difficulty identifying and critically analysing ethical and legal implications of emerging technologies.

A small number of candidates outlined new and emerging technologies without addressing the specific issues outlined in the question.

Question 13

The majority of candidates utilised the stimulus material provided to respond to the question. Better responses demonstrated a greater depth of knowledge and understanding by drawing upon other examples of design studied throughout the course.

- (a) The majority of candidates were able to identify factors that affect design. Better responses described the factors and their implications in ensuring ‘design quality’. Weaker responses did not explain clearly how these factors linked directly to quality.

There was a good understanding of meeting the client’s need, design criteria and the design brief, as factors in a quality design. However, supporting statements often did not give a clear explanation of the link between these.

Some candidates did not clarify the impact of the examples provided upon the environment. Weaker responses only used direct quotations from the stimulus material and restated the information supplied.

- (b) Candidates took note of the words ‘safety and environment’. Most responses related to these although there was a tendency to concentrate more on one than the other, with one example from the stimulus material utilised.

Weaker responses misinterpreted the question and did not link safety and environmental issues to the selection of resources. Only a few candidates were able to take the environmental and safety issues further by linking the selection of resources to design quality.

- (c) Better responses gave a broad range of reasons for the degree of success of designs, and provided a structured and articulate response. In some instances this involved an in-depth discussion of one design, although generally a few familiar design examples of ‘success and failure’ were used.

Candidates that only used one example to answer the question generally did not fully analyse. In some cases, the poor choice of an example limited the extent of the response. Most candidates described the attributes of a product, which made it successful.

The better responses elaborated about more diverse factors such as ‘appropriate timing on to the market’.

Question 14

This was the most popular question responded to in Section III. Many candidates utilised the stimulus material supplied, with better responses expanding upon these examples, thus demonstrating a broader content knowledge.

- (a) The majority of candidates made good use of the stimulus material to assist in answering the question. A small percentage used alternatives, and others made use of their innovation case study.

Better responses made use of stimulus material and/or other examples and then made a further in-depth connection relating to an environmental impact. Clarification was provided by the use of examples.

Weaker responses included naming two products and then rewriting the wording from the stimulus material into the response, without applying it to the full extent of the question.

- (b) Again the stimulus material was used to advantage. Many candidates were able to give examples of social solutions for change in order for environmental solutions to happen. There was recognition that there was a need for cultural and social changes to take place.

Better responses included the benefits brought to the public that come from the implementation of environmental solutions and how these would be promoted with advertising, incentives and through legislation. These were then balanced with negatives such as public apathy, past habits, perception of inferior performance, and extra cost often associated with environmental solutions.

Average responses provided a combination of examples of environmental solutions, social change in general and some examples of cultural change.

Poorer responses provided answers that briefly mentioned the need to change with a brief link to an environmental solution or addressed a number of reasons for change, but did not link this to a solution.

- (c) Responses ranged from being well planned and articulate, demonstrating a depth of knowledge of the ethical and environmental issues that designers are faced with, through to responses that merely repeated elements of the stimulus material without relating it to the designer.

Better responses successfully approached the question in a variety of ways. Some responded to the question through the issues that arose throughout the various stages of the design process. This allowed for many avenues to demonstrate the skills involved in a 'critical analysis' as examples were easily linked to each stage and were able to focus on elements of 'living greener'. Others generated their responses through the use of a life cycle analysis of a number of 'green designs'. This allowed for a range of ethical and environmental issues to be raised and the ability to clearly link them to the work of designers. Quality responses also included a discussion on both long and short term issues.

Average responses focused on the products given in the stimulus material and were able to demonstrate some knowledge of the associated ethical and/or environmental issues involved in the design and development of these products. These issues were often generic issues that could relate to most products not just those that are determined to be 'green' design. Some of the candidates were only able to list ethical and environmental issues associated with 'green' design but did not structure their answer around a 'critical analysis'.

The weaker responses demonstrated a minimal level of knowledge associated with the relevant issues. These candidates had difficulty in describing any ethical or environmental issues associated with the concept of 'green' design. They were generally able to give examples of 'green' design but had difficulty relating them to the main aspects of the question, providing a response that lacked the necessary depth.

Design and Technology

2004 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
Section I			
1	1	Appropriateness of the design solution	H1.1
2	1	Factors affecting design	H1.1
3	1	Project management	H5.1
4	1	Ethical considerations for designers	H2.2
5	1	Needs analysis	H4.1
6	1	Success of innovation	H3.1
7	1	Project evaluation	H4.3
8	1	Technological change	H2.1
9	1	Protection of intellectual property	H2.2
10	1	Economic issues	H2.1
Section II			
11 (a)	2	Research methods	H5.2
11 (b)	2	Communication	H5.2
11 (c) (i)	3	Communication	H5.2
11 (c) (ii)	3	Communication	H1.2
11 (d)	5	Processes used by designers	H1.2, H5.2
Section III			
12 (a)	3	Emerging technologies and their impact on society	H6.2
12 (b)	4	Factors influencing innovation	H3.1
12 (c)	8	Ethical and legal implications of new and emerging technologies	H6.2
13 (a)	3	Design factors	H1.1
13 (b)	4	Safety and environmental issues selecting resources	H4.2
13 (c)	8	Success and failure in design	H1.1
14 (a)	3	Environmental considerations	H2.2
14 (b)	4	Social and culture change	H2.1
14 (c)	8	Ethical and environmental issues	H2.2

2004 HSC Design and Technology Marking Guidelines

Section II

Question 11 (a)

Outcomes assessed: H5.2

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none">• A clear outline of a research method and description of how results impacted on developmental decisions related to the MDP, with clear articulation of the impact	2
<ul style="list-style-type: none">• Outline of research method, showing some link between results and decisions	1

Question 11 (b)*Outcomes assessed: H5.2***MARKING GUIDELINES**

Criteria	Marks
• Four different audiences identified correctly	2
• Two or more different audiences identified correctly	1

NOTE: although six audiences may be identified, only four different audiences are required to gain full marks.

Question 11 (c) (i)*Outcomes assessed: H5.2***MARKING GUIDELINES**

Criteria	Marks
• Provides a number of reasons why communication techniques vary, clearly indicating a knowledge of the development process and a range of communication techniques used in the development of the art gallery	3
• Provides at least two reasons for variation with limited knowledge of process of development of the art gallery	2
• Reasons for using one technique, but no clarification of variations throughout the process of development of the art gallery	1

NOTE: A list of communication techniques (eg as in (b)) without providing reasons for use – will attract no marks.

Question 11 (c) (ii)*Outcomes assessed: H1.2***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">Explains by describing how design teams communicate the results of research and drawing out and relating implications, with either an example to strengthen the response and/or other indication of depth of knowledge	3
<ul style="list-style-type: none">Describes how design teams communicate the results of research, and describe some response activity, less depth of knowledge	2
<ul style="list-style-type: none">Describes response to research or describe the communication of results of research	1

NOTE: Answers must be appropriate to a project such as the art gallery.

Question 11 (d)*Outcomes assessed: H1.2, H5.2***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Identifies communication processes used, that reflect knowledge of developmental process from ideas to concept stage in MDP• Provides sound reason for the selection and use of these processes, clearly linking to the nature of the design project and next stage of the process• Explains how and/or why these processes are similar/different to designers in commercial setting	4–5
<ul style="list-style-type: none">• Justifies own communication processes in MDP, with clear knowledge of the process from ideas to concepts and relevance OR <ul style="list-style-type: none">• Explains the similarities/differences between communication techniques of own MDP and commercial designers	3
<ul style="list-style-type: none">• Outlines relevant communication processes used in both MDP and commercial practice OR <ul style="list-style-type: none">• Describes communication processes showing developmental process from ideas to concept, in own MDP	2
<ul style="list-style-type: none">• Outlines relevant communication processes used in the MDP OR <ul style="list-style-type: none">• Outlines communication processes in a commercial setting	1

Section III

Question 12 (a)

Outcomes assessed: H6.2

MARKING GUIDELINES

Criteria	Marks
• Describes the impact of two identified applications of nanotechnology	3
• Outlines impact of two identified applications of nanotechnology OR • Describes impact of one identified application and identifies impact of another	2
• Outlines impact of one application	1

Question 12 (b)*Outcomes assessed: H3.1***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">Identifies TWO factors in the developmental process of turning the emerging technology into successful innovationExplains the how and when the factors influence, with clear, relevant examples to show the links (what, how, when, why) and relate to quality of life	4
<ul style="list-style-type: none">Identifies and describes TWO different factors and how and when they influence the process, with examples (what, how, when, why)	3
<ul style="list-style-type: none">Outlines TWO factors, with examples which illustrate knowledge of impact (what, how, when, why) <p>OR</p> <ul style="list-style-type: none">Explanation of ONE factor, with example	2
<ul style="list-style-type: none">Outlines TWO factors, with vague or no examples (what)	1

Question 12 (c)*Outcomes assessed: H6.2***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Identifies and explains in detail, at least one of each of the ethical and legal implications of new and emerging technologies using relevant examples to show depth of knowledge and understanding• Clarifies relationship between issues and impact on new and emerging technologies	6–8
<ul style="list-style-type: none">• Discusses at least two of the ethical and/or legal implications of new and emerging technologies, showing some link by use of example(s) and demonstrates knowledge and understanding of implications	4–5
<ul style="list-style-type: none">• Describes at least one implication of either ethical or legal implications of new and emerging technologies	2–3
<ul style="list-style-type: none">• Outlines/identifies one aspect of either	1

Question 13 (a)*Outcomes assessed: H1.1***MARKING GUIDELINES**

Criteria	Marks
• Identifies appropriate design factors and clarifies the link between consideration of design factor and design quality of the example used	3
• Identifies design factors with links to better design or outlines factors which lead to better design, using example	2
• Outlines a design factor, uses appropriate example, unclear link to quality	1

Question 13 (b)*Outcomes assessed: H4.2***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">Identifies safety and environmental issues and relates the issues and the influence they have in selecting resources with a clear link to affecting the quality of design examples	4
<ul style="list-style-type: none">Identifies safety and environmental issues and relates these generally to the influence on selection of resources	3
<ul style="list-style-type: none">Relates cause and effect of an issue on resource selection	2
<ul style="list-style-type: none">Identifies an issue and a resource <p>OR</p> <ul style="list-style-type: none">Identifies some safety and environmental issues without relating the effect of those on resource selection	1

Question 13 (c)*Outcomes assessed: H1.1***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Demonstrates a depth of understanding and knowledge of success and failure in design by providing a structured and articulate response drawing upon a range of appropriate examples in support of their argument	6–8
<ul style="list-style-type: none">• Demonstrates an understanding and knowledge of success and failure in design by drawing upon examples• These examples are less supportive of the argument	4–5
<ul style="list-style-type: none">• Demonstrates some knowledge and understanding of success and failure in design with limited examples	2–3
<ul style="list-style-type: none">• Shows some evidence of knowledge of success and/or failure in design	1

Question 14 (a)*Outcomes assessed: H2.2***MARKING GUIDELINES**

Criteria	Marks
• Identifies two products in response to an environmental issue and clarifies their impact on the environment, with clear knowledge of environmental issue and impacts (depth of clarification)	3
• Identifies two products and clarifies their impact on the environment	2
• Outlines the impact of one product on the environment	1

Question 14 (b)*Outcomes assessed: H2.1***MARKING GUIDELINES**

Criteria	Marks
• Identifies issues relating to successful implementation of environmental solutions, giving points for and/or against using examples of social and cultural change	4
• Describes examples of social and cultural change relating to environmental solutions	2–3
• Describes a social and/or cultural change with a vague link to an environmental solution	1

Question 14 (c)*Outcomes assessed: H2.2***MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none">• Demonstrates a depth of knowledge by identifying and explaining, in detail, a range of ethical AND environmental issues, by quality articulation and an appropriate range of examples of either the work of designers generally or specific responses to 'green' design	6–8
<ul style="list-style-type: none">• Demonstrates a depth of knowledge and understanding of ethical OR environmental issues with less knowledge and understanding of the other, (eg strong in ethical less depth of knowledge and understanding in environmental or vice versa). Answer should make use of an appropriate range of examples of either the work of designers generally or specific responses to 'green' design issues	4–5
<ul style="list-style-type: none">• Demonstrates a basic knowledge and understanding of ethical and/or environmental issues, using examples	2–3
<ul style="list-style-type: none">• Demonstrates a minimal knowledge of either ethical and/or environmental issues	1