



Year 11 Design and Technology  
Assessment Unit 3  
**Sustainable  
Living**  
Designing a  
sustainable future

## Assessment notification

Thursday 24 May 2011

Due date: Term 3, Week 10, Thursday 22 September 2011

Unit value: 25%

## Project brief

Develop a **product, system** or **environment** that deals with one or more key issues of sustainability in our daily life.

Key issues may be drawn from areas such as architecture, urban design, transport, energy, water, waste, recycling and their effect on the environment and sustainability of resources. Your task involves the identification of a need for your target market segment, research and development for a solution to your need, the management, documentation and testing of your solution. You must also evaluate the success of your design solution.

The documentation must be presented in a design portfolio and show the solution and, in particular, the design journey to arrive there.

## Design situation

Although many environmental problems have arisen from decisions made in previous generations, every single one of us makes daily choices that affect the quality of the air we breathe, the water we drink, the rise in greenhouse gases, the fertility of soils, the consumption of natural resources and the production of mountains of waste.

Living sustainably—providing a quality future for ourselves and the generations that will succeed us—is not about living in fear or devaluing our lives. Living sustainably is about making smart choices that minimise the environmental and social impact from our lifestyles. Although much is being done to help create a viable future, the message of sustainability must reach the decision makers for tomorrow.

**You** are one of those decision makers.

## Design Process

This project has more constraints than the one you have just completed. You must now work at a more senior level.

As a student, you have the opportunity to play an enormous part in 'designing' a sustainable future. This may be through your lifestyle, career and consumer choices and also through environmentally-sound design and innovation.

### Exercise

Spend a few minutes thinking about some of the choices you have made or done in just one day.

- What did you have for breakfast today?
- How did you get to school?
- What products did you buy?
- Where did you put your waste?
- What is another choice you made?

Now, list all the environmental impacts that may have resulted from these choices in only one day. Keep adding to the list as ideas come to you as you may use this later to help generate possible ideas for this design project.

### Activity

What could you design? How do you identify a need?

- Brainstorm some possible options for your design project. Think about various problems associated with living in an unsustainable future.
- Research some organisations that may be concerned with these areas.
- Identify particular problems that have particular importance for you or our community.
- How could you help make your own school more sustainable?

## Some ideas

Here are some suggestions that may help launch your own ideas.

- How can we reduce dependence on private car travel? What alternatives are there that people will really want to use? Could you develop a car pooling strategy that really works or even redesign the layout of a whole town or city? What are the social, economic and environmental impacts of alternative fuel supplies, such as solar-generated electricity?
- How can the sustainability of regional areas be improved? How can the need for food and products be balanced against the need to maintain a good environment for future generations? Design farming methods that do not cause erosion or depend on chemicals and fertilisers nor destroy native bushland. Or, reduce food miles.
- Is eco-tourism good for the environment? Do resorts in fragile environments really cause low impact? Design a low-impact resort.
- How much energy do we use at home or at school? How can we offset any negative effects. Design a strategy for reducing energy demand in the home or at school. Redesign your home or school. What is a geothermal heat pump?
- How do materials and goods produced in our society affect our health? Is it possible to produce non-toxic materials using today's production methods

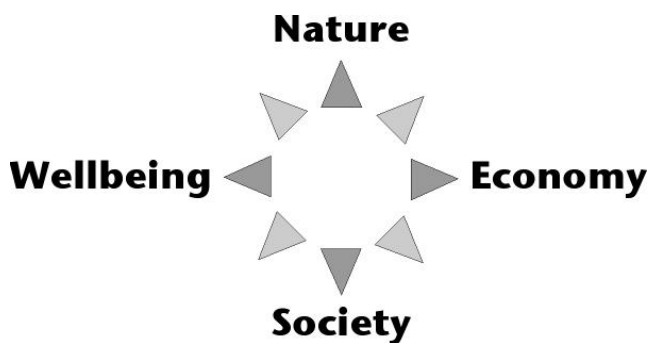
that are within our expectations of standards? Design a new product (clothes, furniture, building, etc) that uses natural or recycled materials. Design a marketing campaign for existing natural textiles. Design a new use for waste products.

- Does a 'think local' attitude make a big difference globally? How can we encourage change in peoples' thinking, wants and aspirations? How much wealth (money) does any individual really need?
- Check the UNSW Sustainable Living web pages for other ideas: <http://www.sustainableliving.com.au/>

## Some systems thinking tools

Sustainable design is easiest when you see the world as the **interconnectedness** of the natural environment, the cultural environment and the built environment. Here are three tools that may help in your thinking:

1. Use a **FOR** and **Do** systems analysis
2. Use the compass of sustainability



3. Use lifestyle thinking: whole **O** rather than lineal **I**

## Outcomes assessed

A student:

- |  |   |
|--|---|
| <p>PI.1 examines design theory and practice, and considers the factors affecting designing and producing in design projects</p> <p>P 2.2 explains the impact of a range of design and technology activities on the individual, society and the environment through the development of projects</p> <p>P4.1 uses design processes in the development and production of design solutions to meet identified needs and opportunities</p> <p>P 4.2 uses resources effectively and safely in the development and production of design solutions</p> | <p>P 4.3 evaluates the processes and outcomes of designing and producing</p> <p>P 5.1 uses a variety of management techniques and tools to develop design projects</p> <p>P5.2 communicates ideas and solutions using a range of techniques</p> <p>P5.3 uses a variety of research methods to inform the development and modification of design ideas</p> <p>P6.2 evaluates and uses computer-based technologies in designing and producing</p> |
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## Some Library resources:

*Solar water heating : a comprehensive guide to solar water and space heating systems /*

Author: Ramlow, Bob

Date: 2006

Classification: 697 RAM

*Green building products : the GreenSpec guide to residential building materials /*

Author: Wilson, Alex T.

Date: 2008

Classification: 691 WIL

*The green house : new directions in sustainable architecture /*

Author: Stang, Alanna

Date: 2010

Classification: 690 STA

*The solar house : passive heating and cooling /*

Author: Chiras, Daniel D.

Date: 2002

Classification: 697 CHI

*Green by design : creating a home for sustainable living /*

Author: Dean, Angela M., 1969-

Date: 2003

Classification: 690 DEA

*Green from the ground up : a builder's guide : sustainable, healthy, and energy-efficient home construction /*

Author: Johnston, David, 1950-

Date: 2008

Classification: 690 JOH

*Modern sustainable residential design : a guide for design professionals /*

Author: Carpenter, William J., 1962-

Date: 2009

Classification: 690 CAR

In addition, there are a number of resources kept in the D&T staff room:

*Green building materials*

*Building green*

*Building a straw bale house*

*Experimental eco-design*

*Massive change*

*Eco design*

*Green plastics*

*Design like you give a damn*

*World changing: a user's guide for the 21<sup>st</sup> century*

*Experimental textiles*

You can also share on-line resources you discover with the class.

Cover photo: The wind farm at Lake George, NSW.

## D&T Preliminary Assessment Task 3 Sustainable Living

Project Proposal and Management (Outcomes P1.1, P2.2, P4.1)				10 marks
	9–10	7–8	4–6	1–3
<b>Identification and exploration of the need</b>	Need is clearly established with documented research using appropriate methods to prove the need. Identifies and justifies appropriate Target Market.	Need is identified and explained, supported with documented research. Identifies and justifies Target Market.	Need is identified and is supported with documented research. Identifies Target Market.	Need is identified
<b>Design brief</b>	Design brief is clearly stated and states the problem or area of need	Design brief is clearly stated and implies a problem or area of need	Design brief is stated and provides some direction to the project	Design brief is stated but is difficult to see how it provides adequate direction to the project
<b>Criteria for evaluating success</b>	Criteria for evaluating success are appropriate, clear and achievable	Criteria for evaluating success are appropriate and clearly stated	Criteria for evaluating success are adequate. Further thought about the need/opportunity may have been necessary.	Criteria for success are listed
<b>Parameters of design</b>	Identifies a number of parameters and justifies	Identifies some parameters and briefly justifies	A few parameters are identified	Lists parameters
<b>Areas of investigation</b>	Areas for investigation are clearly outlined and justified. They focus on the design problems and provide direction for further action. Explanation of sources and places of information is provided	Areas for investigation are identified and provided direction for further action	Areas for investigation are identified	Areas for investigation are listed
<b>Time/Action plan</b>	Time and Action plan is clearly documented and evaluated with application to the PSE	Time and Action plan is clearly documented with application to the PSE	Evidence of Time and Action plan with some application to the PSE	Little or no evidence of Time and Action plan

Project Development and realisation (Outcomes P1.1, P2.2, P4.1, P4.2, P5.1) 20 marks				
	18–20	14–17	10–13	1–9
<b>Identification and justification of resources</b>	Identifies, explains and justifies appropriate resources	Identifies and explains appropriate resources	Identifies appropriate resources	Lists resources
<b>Research</b>	Researches all areas of investigation thoroughly. Validates the appropriateness of research methods used and uses existing data where appropriated. Uses both primary and secondary research methods. Evidence of research being applied to PSE is evident and clearly stated. Clearly relates the outcomes of research to the success of the concept's development and the final design	Researches broadly OR thoroughly. Conclusion s are not always clear OR applied to the PSE. Uses a variety and appropriate range of research sources (eg. electronic, book, magazine, survey, etc). There are good links between the outcomes of research and the PSE	Uses appropriated but limited range of research methods. Evidence that research has influenced the direction of the PSE is implied and not clearly stated	Uses a limited range of research methods. (If all research is from the same source, then maximum of 1 mark.) Makes little connexion between research findings and design process. If links not identifies then maximum of 1 mark
<b>Development, testing and evaluation of ideas</b>	Clear evidence of having tried things out to determine the most appropriate materials, tools, techniques and resources, then recording and drawing conclusions from such trials. Test whole or parts of design solution against the Criteria for Success and/or an Australian Standard. This often involved a prototype, mock-up or simulation. Conclusions are applied in the final PSE. Provides evidence of testing via samples. Conclusions have been applied to the PSE. Design folio indicates how feedback from testing informed progress and required modifications to the design of the PSE. Provides substantial evidence of idea generation in written work and graphic form.	Some documentation suggests that consideration has been given to determine the most appropriate materials, tools, techniques and resources. Some testing of components or process of the design project. This may have involved a prototype, mock-up or simulation. Conclusions are applied to the PSE. Provides good idea generation in written and graphical form	Stated what was to be made and the materials to be used with little research into other appropriate materials, tools, techniques or resources. Briefly mentions testing. (Evidence may be lacking or conclusions not adequately applied to the PSE.) provides some limited evidence of idea generation	Documents little research into materials, tools, techniques and resources. Shows little in the way of testing components or all of the design solution. Some evidence of idea generation is present but ideas have not been completed. Drawings may have been left as rough sketches with little effort to render

<b>Project Development and realisation (Outcomes P1.1, P2.2, P4.1, P4.2, P5.1) 20 marks</b>				
	18–20	14–17	10–13	1–9
<b>Creativity: strategies for creative problem solving to identified problems</b>	The PSE and design folio demonstrate creative problem solving. Problem solving strategies are clearly documented, justified and analysed	The PSE and design folio demonstrate problem solving. Problem solving strategies are documented and justified	The PSE and design folio demonstrate some problem solving. Problem solving strategies briefly mentioned	The PSE and design folio demonstrate little problem solving. Little or no evidence of problem solving strategies
<b>Evidence of appropriate communication</b>	Presents a high quality design folio that suits the PSE and clearly and thoroughly records the design process without unnecessary padding. Makes substantial use of a good variety of communication and presentation methods. The documentation techniques used are appropriate to the PSE and include a range of techniques such as WP, models, photographs, sketches, drawings, renderings, etc	Presents a good design folio that clearly records the design process. Communication is effective and appropriate for the PSE. Makes good use of different communication and presentation methods	The documentation of the design process is either incomplete or is complete but appears rushed. Communication techniques such as drawing and rendering were limited and/or skills in communicating design ideas need more practice	Design folio is either incomplete or poorly organised or non-existent. Communication ability was poor. The communication techniques used were brief
<b>Evidence of production techniques. Demonstrates proficiency in using appropriate range of materials, tools, techniques for the project</b>	Presented a high quality PSE. Demonstrates high-level practical skills. Design folio thoroughly records the processes used to make the PSE. (eg. evidence of production steps through photographs that have been annotated and states problems and how they were overcome.) Documentation of the production process includes details of materials, tools, techniques. Design folio outlines safety considerations appropriate to the PSE and records of production shows evidence of safety having been applied. eg. protective clothing	Presented a good quality PSE. Demonstrates a good level of practical skill. Design folio records the processes used to make the PSE. (eg. evidence of production steps through photographs that have been annotated and some practical problem solving is evident). Documentation of the production process includes some details of materials, tools, techniques. Design folio identifies safety considerations appropriate to the PSE	Presented a satisfactory PSE. Demonstrates practical skills suitable for the PSE. Design folio records the processes used to make the PSE but may not be supported with evidence OR some production steps are not adequately explained. Documentation of the production process alludes to the fact that materials and tools were used. Design folio lists safety considerations that were appropriate to the PSE	Presented a poor quality PSE. Limited documentation of the production processes used to make the PSE. No evidence of safety considerations provided.

<b>Project Evaluation (Outcomes P2.2, P4.1, P4.3)</b>				<b>10 marks</b>
	9–10	7–8	4–6	1–3
<b>Continual evaluation throughout design and production</b>	Clear evidence is given of evaluating processes, decisions and resources throughout the project. A continual evaluation process was an important ingredient for the success of the PSE	Process of continual evaluation is evident most of the time	Limited evidence of continual evaluation	No evidence of continual evaluation
<b>Criteria for evaluation: test and evaluate the appropriateness of the solution for the brief</b>	Analyses the relationship of the PSE to criteria for success. Uses appropriate methods to evaluate the functional and aesthetic aspects of the PSE	Makes links between the PSE and the criteria for success. Explains the functional and aesthetic aspects of the PSE	Limited evidence of the PSE having been compared to the C\$. Identifies the functional and aesthetics aspects of the PSE by highlighting features of the PSE	Limited evidence of considering the criteria for success, functional and aesthetic aspects of the PSE

Comments

Total

/40 marks