

Pre – A Level Design and Technology Product Design- Research Task

For A Level Product Design students are required to use creativity and imagination to design and make prototypes that solve real and relevant problems; considering their own and others' needs, wants and values.

The tasks below reflect a variety of elements of the NEA coursework which requires students to submit a design portfolio and physical prototype.

You are to research, design and manufacture a product / prototype for ecoSmart. EcoSmart are a company who specialise in the manufacture of sustainable products that aim to improve the quality of life for its clients using recycled materials. ecoSmart have reviewed the market and identified that there is a gap in the gardening sector for such a product. Your product / prototype must promote eco living. Your target audience are parents with young families (aged 1-10) with large gardens which require improvement and are focused on positively impacting on the environment for future generations.

Things to think about:

- Saving water
- Using the sun's energy
- Promoting growth of plants
- Using the wind
- Help people to grow their own vegetables.
- Recycling

You must complete a comprehensive portfolio of evidence for ecoSmart to review before they make a decision on whether they will commission your product. They will critically review your design solution/s, assessing their creativity, functionality, feasibility for main scale production and quality of final manufacture / prototype.

Your portfolio should contain the following pages and be completed in order. Use power point to create the portfolio as it is easy to move and insert images. Please email your portfolio to Mr Atkinson once complete satkinson@stj.kent.sch.uk If you have any questions you can also contact Miss Budd at SBudd722@stj.kent.sch.uk

Research

Title of page	Information required
Existing products	Research 4/6 recycled/reused products already on the market. Some should be for the purpose of outdoor use. You must annotate each product focusing on the following aspects: materials, cost, size, function, etc. You must also summarise each design with your likes and dislikes about each product. See point power slide 1 for AQA example coursework.

Design ideas

Initial design ideas	You must create 4/6 different initial designs. The designs must be creative and functioning designs. Include in-depth sections to show joints, intricate areas in the design and include different angle/view of the product. You must include annotation about each design and its features focusing on joints, adhesives, materials, size, function, how it could be manufactured, environmental impact, safety, etc. Analyse areas you can not see from a drawing eg back view. See point power slide 2 for AQA example coursework.
Third party feedback	Show your initial designs to your family in your house. Collect primary data/information from their feedback in relation to your designs; for example; what one is their favourite (must provide justification), colour, forms/shapes, improvements, which design was the best aesthetically, best functioning. This information should be used to develop one of the initial ideas into a final idea. See point power slide 3 for AQA example coursework.
Final idea	Select one or two of your initial designs and improve and develop a final design using the third-party feedback. You must include annotation about the improvement of the design and why you changed it. Also, annotate features you cannot see from a drawing, for example, materials, size, function, how it could be manufactured, environmental impact, safety, etc. If you have the facilities draw your final design on CAD software.

	Software could be Google sketch up, tinkerCAD, Auto CAD, Prodesktop, there are many others programmes. You will also need to draw a technical drawing for the manufactures, this needs to be in third angle orthographic projection. See point power slide 4 for AQA example coursework. See website for how to draw in orthographic. http://www.technologystudent.com/designpro/orthogrp1.html
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Manufacture

Manufacture of product	Manufacture your product with materials you have at home. This may mean you will have to select different materials to the ones you would have use and please ask a parent before you start cutting up materials. Refine the product as best you can under the circumstances we are currently facing. We do not expect a perfect model or for you to spend any additional money on materials. This is more about how the model links to the portfolio. Take a picture and discuss how you manufactured the product and what you could do better if you have the opportunity to design and manufacture the product again.
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Good websites for support and information :

AQA A Level product design – specification <https://www.aqa.org.uk/subjects/design-and-technology/as-and-a-level/design-and-technology-product-design-7552>

technology student <http://www.technologystudent.com/>

Bitesize <https://www.bbc.co.uk/bitesize/subjects/zvg4d2p>

Instructables <https://www.instructables.com/>

Design-technology <https://design-technology.org/>

Pre-A Level Product Design – Written Task

This A Level will require you to take two exams, below are examples of exam questions from past papers. Try to answer these the best you can, then research the topic and answer the questions again. Please email your answers to Miss Kirby once they are complete EKirby120@stj.kent.sch.uk. If you have any questions you can also contact Miss Budd sbudd@stj.kent.sch.uk

The websites below will support your learning and understand. There is also a book which each product design student is required to have. Please see the link is below. I would not buy this until you have been given your place on the course.

Good websites for support and information :

Book (can be brought from other outlets) <https://www.amazon.co.uk/AQA-AS-Level-Design-Technology/dp/1510414088>

AQA A Level product design – specification/past papers <https://www.aqa.org.uk/subjects/design-and-technology/as-and-a-level/design-and-technology-product-design-7552>

technology student <http://www.technologystudent.com/>

Bitesize <https://www.bbc.co.uk/bitesize/subjects/zvg4d2p>

Instructables <https://www.instructables.com/>

Design-technology <https://design-technology.org/>

Exam Questions

1. Study the picture below which shows an item of flat-pack bedroom furniture made from manufactured boards.



- (a) Name **one** specific manufactured board in the construction of the product above.

[1 mark]

Manufactured board:

(b) Give the specific width and length of a standard full-size sheet of manufactured board in millimetres.

[1 mark]

(c) Describe **one** advantage of your chosen manufactured board in terms of each of the requirements listed below:

[4 marks]

Aesthetics:

User requirements:

2. Explain the meaning of the term 'wastage' in relation to manufacturing.

[2 marks]

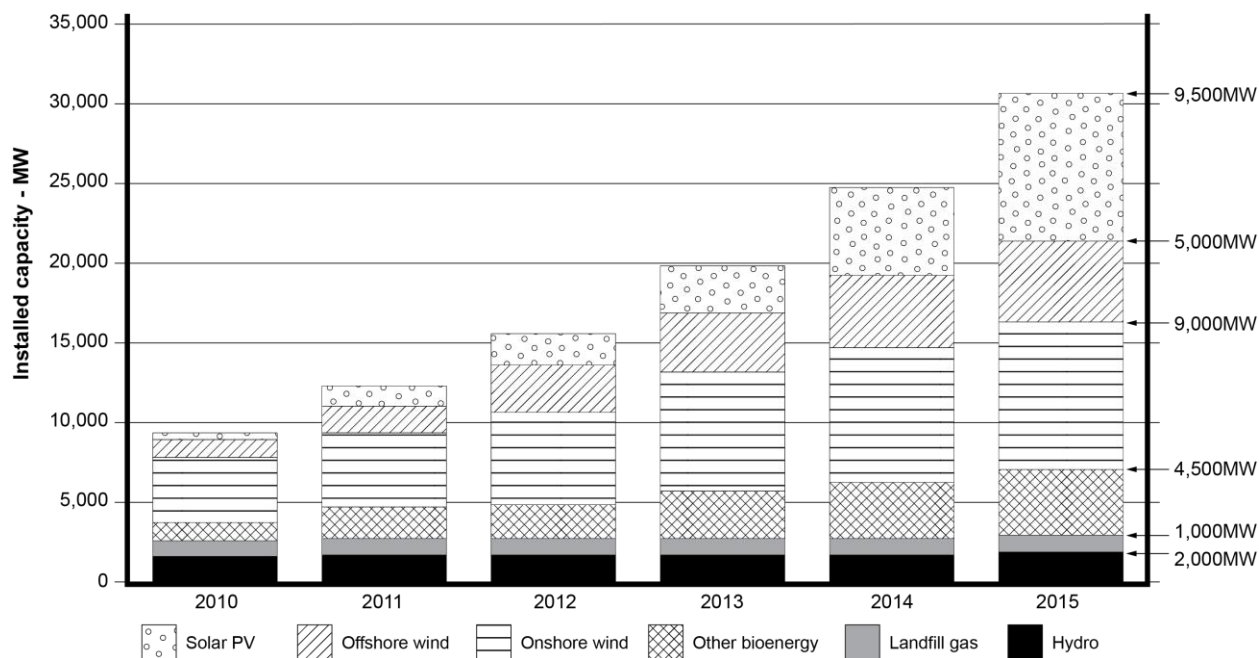
3. Explain the meaning of the term 'thermoset polymer' and give **one** specific example of a thermoset polymer in your answer.

[3 marks]

4. Name **one** biodegradable polymer and state **two** environmental conditions which would enable a biodegradable polymer to degrade faster.

[3 marks]

5. Harnessing renewable energy in the UK is rapidly rising to meet demand. The bar chart below shows the change in renewable energy use in the UK in recent years.



- (a) Calculate the percentage of solar PV used in 2015. Round your answer to the nearest whole number.

[2 marks]

Solar PV

6. This question is about manufacturing processes used for polymers.



- (a) Name the specific process used to manufacture the main body of the bottles pictured above.

[1 mark]

- (b) Name **one** specific thermoplastic used for making the main body of bottles used for cleaning products, such as those pictured above.

[1 mark]

- (c) Explain **two** reasons why thermoplastic polymers are used in the manufacturing of plastic bottles.

[4 marks]

7. The table below gives details of **four** specific papers and boards and a suitable application of use for each.

Specific paper or board	Suitable application of use
Bleed proof paper	Marker rendering of design ideas
Corrugated card	Retail packaging for a TV
Foil backed card	Drinks carton
Mount board	Model making

Describe the **performance characteristics** that make each paper or board suitable for each identified application.

[8 marks]

Bleed proof paper

Corrugated card

Foil backed card

Mount board

8. Study the two types of child's car shown below.

[12 marks]

