Stretford Grammar School

Aspirat primo fortuna labori

GCSE Design Technology

Why Design Technology?

- Design Technology offers a unique opportunity for you to identify and solve real problems by designing and making a range of products.
- Both academic and applied practical ability is required.
- 50% coursework – doesn't make it easy but helps spread out the pressure of exams.
- By studying this course, you will benefit from the many transferable skills which will be highly prized by any FE or workplaces, such as organisational skills, practical dexterity (for those of you thinking about dentistry or medicine) and the capacity for imaginative, innovative thinking, creativity and independence.
- This coursework element allows you to work on a project that is completely your own choice relating to your personal interests.
- The UK is struggling with an annual shortfall of 59,000 engineers – capacity for employment ESPECIALLY for girls within this field is huge.
- Excellent results at GCSE:
  - 2023: 68% grades 9-7
- Logical, creative and practical, it's the only opportunity that school students have to apply what they learn in maths and science – directly preparing them for a future in engineering." – James Dyson

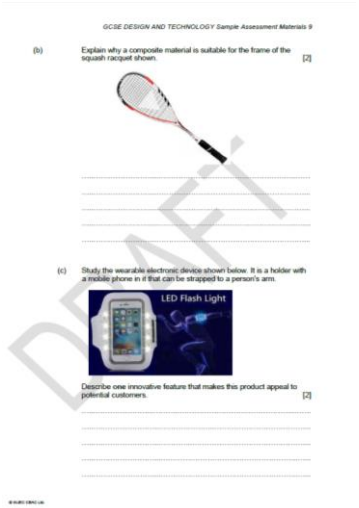
GCSE Design and Technology

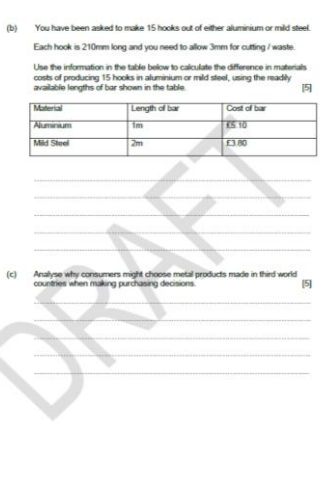
Over the course you will develop technical knowledge and understanding of materials and processes, you will be encouraged to be innovative in the design and development of prototypes and you will be expected to work creatively and independently to solve problems.

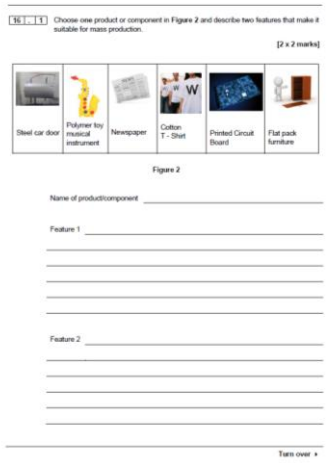
Component 1: Exam

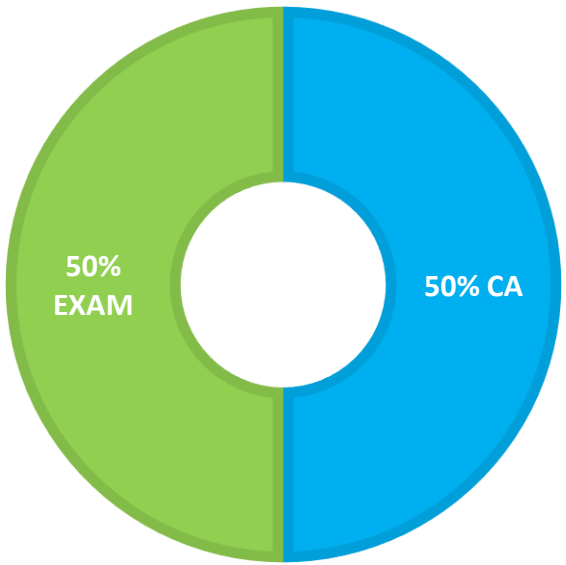
A mix of short answer and extended writing questions assessing your knowledge and understanding.

- 50% of total marks
- 100 marks
- 2 hours









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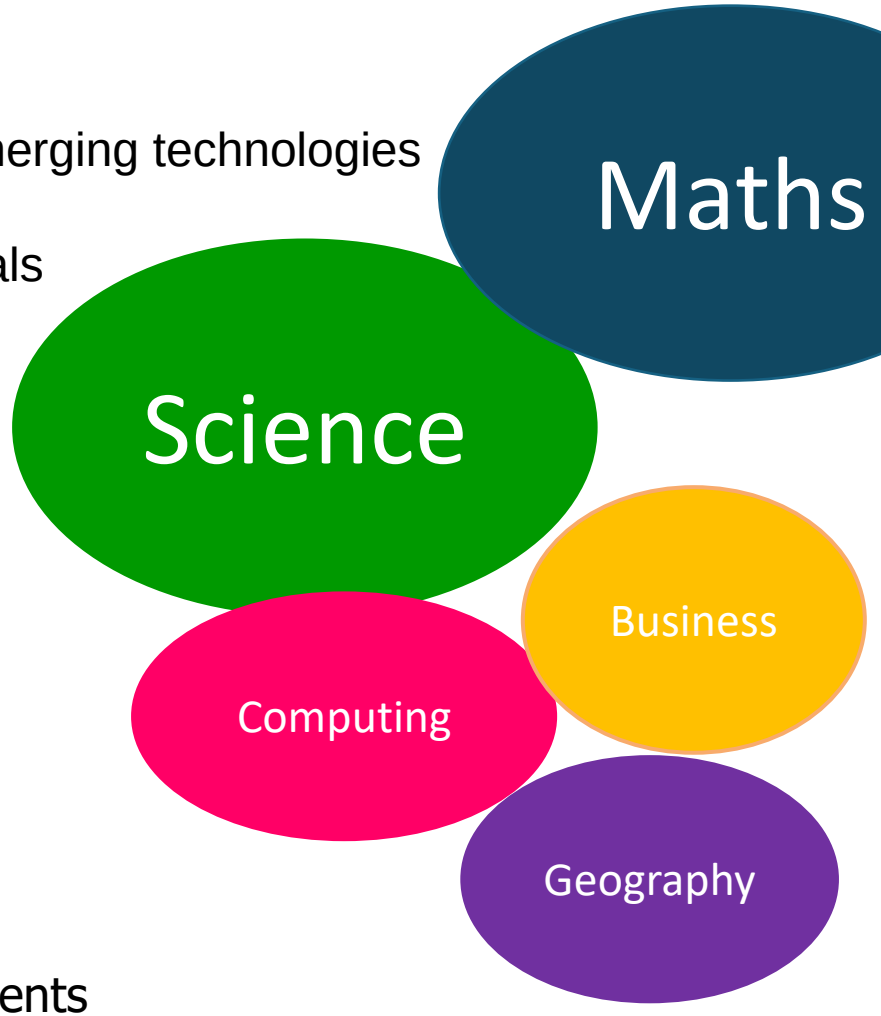
Core Subject Content

Technical Knowledge and Understanding

- Design and Technology in our world - new and emerging technologies
- Energy generation and storage
- Smart materials and developments in new materials
- Systems and programmable components
- Mechanical components devices
- Materials and their working properties.

Designing and Making

- Understanding user needs
- Writing a design brief and specifications
- Developing and communicating design ideas
- Investigating the work of others
- Using design strategies
- Independent problem solving
- Selecting and working with materials and components
- Marking out and measuring
- Using specialist tools and equipment



Links to science

Learners must be able to apply the following scientific knowledge and skills.

Ref	Scientific knowledge and skills requirements	Examples of D&T application	Examples of specification content
1	*Use scientific vocabulary, terminology and definitions*		
a	Quantities, units and symbols.	Appropriate use of scientific terms when developing a design brief and specifications.	NEA (assessment criteria **(b)**) – developing a design brief and specification.
b	SI units (e.g. kg, g, mg; km, m, mm; kJ, J), prefixes and powers of ten for orders of magnitude (e.g. tera, giga, mega, kilo, centi, milli, micro and nano).	Calculation of quantities, measurement of materials and selection of components.	NEA (assessment criteria **(d)**) – manufacturing a prototype.
c	Metals and non-metals and the differences between them, on the basis of their characteristic physical and chemical properties.	Classification of the types and properties of a range of materials.	technical principles – core knowledge and understanding – materials (sections 8 to 12).
2	*Life cycle assessment and recycling*		
a	The basic principles in carrying out a life- cycle assessment of a material or product.	Selection of materials and components based on ethical factors, taking into consideration the ecological and social footprint of materials.	technical principles – in-depth knowledge and understanding (section 2 in all material areas).

Lots of links to science in knowledge content – sits very well with Triple Science as and option.

Ref	Scientific knowledge and skills requirements	Examples of D&T application	Examples of specification content
3	*Using materials*		
a	The conditions which cause corrosion and the process of corrosion and oxidisation.	Understanding of properties of materials and how they need to be protected from corrosion through surface treatments and finishes. Appreciate how oxidisation can be used when dyeing materials.	technical principles – core knowledge and understanding – materials (section 10 ferrous and non-ferrous metals).
b	The composition of some important alloys in relation to their properties and uses.	Selecting appropriate materials.	technical principles – core knowledge and understanding – materials (section 10 ferrous and non-ferrous metals).
c	The physical properties of [materials], how the properties of materials are selected related to their uses.	Knowledge of properties of materials to be applied when designing and making.	NEA (assessment criteria **(d)**) – manufacturing a prototype.
d	The main energy sources available for use on Earth (including fossil fuels, nuclear fuel, bio-fuel, wind, hydro-electricity, the tides and the Sun), the ways in which they are used and the distinction between renewable and non-renewable sources.	Understanding of how to choose appropriate energy sources.	technical principles – core knowledge and understanding – D&T and our world – (section 3 how energy is generated and stored).
e	The action of forces and how levers and gears transmit and transform the effects of forces.	Knowledge of the function of mechanical devices to produce different sorts of movement, changing the magnitude and direction of forces.	technical principles – core knowledge and understanding – mechanical components and devices (section 7 the functions of mechanical devices).

Links to mathematics

Learners must be able to apply the following mathematical skills.

Ref	Mathematical skills requirements	Examples of D&T applications	Examples of specification content
1	*Arithmetic and numerical computation*		
a	Recognise and use expressions in decimal and standard form.	Calculation of quantities of materials, costs and sizes.	NEA (assessment criteria **(c)**) – details of dimensions. 2.1 in-depth, **4.** Stock forms, types and sizes in order to calculate and determine the quantity of materials or components required.
b	Use ratios, fractions and percentages.	Scaling drawings, analysing responses to user questionnaires.	NEA (assessment criteria **(a)**) – analysis of information. 2.1 core, **7.** The functions of mechanical devices, to produce different sorts of movement, changing the magnitude and direction of forces.
c	Calculate surface area and volume.	Determining quantities of materials.	NEA (assessment criteria **(d)**) – manufacturing a prototype. 2.1 in-depth, **4.** Stock forms, types and sizes in order to calculate and determine the quantity of materials or components required.

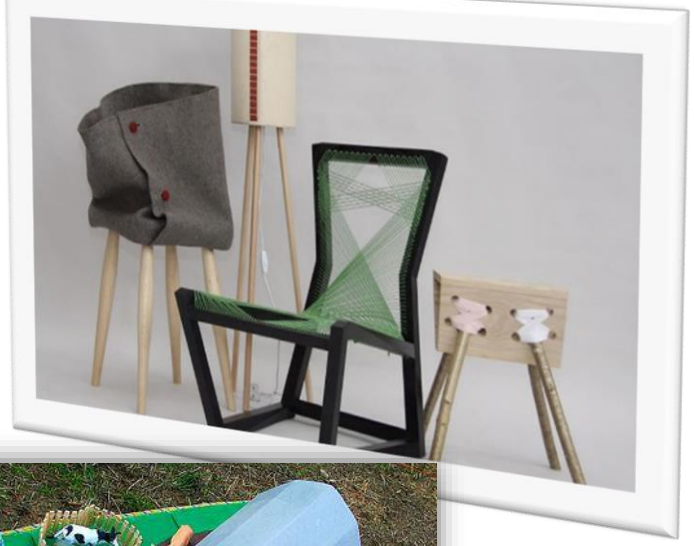
10% of the questions of the exam paper will be contextual Maths questions

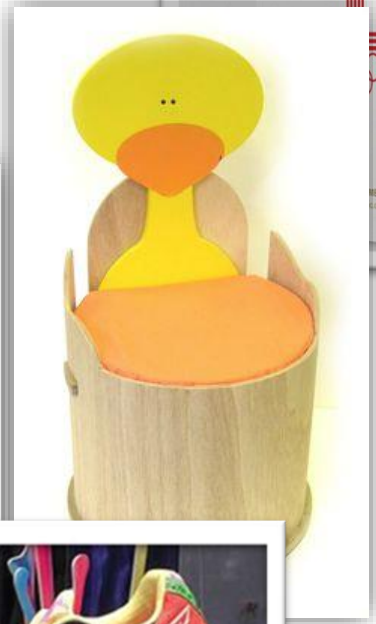
Ref	Mathematical skills requirements	Examples of D&T applications	Examples of specification content
2	*Handling data*		
a	Presentation of data, diagrams, bar charts and histograms.	Construct and interpret frequency tables; present information on design decisions.	NEA (assessment criteria **(c)**) – communicating ideas and proposals to a third party.
3	*Graphs*		
a	Plot, draw and interpret appropriate graphs.	Analysis and presentation of performance data and client survey responses.	NEA (assessment criteria **(a)**) – analysis of information.
b	Translate information between graphical and numeric form.	Extracting information from technical specifications.	NEA (assessment criteria **(a)**) – analysis of information.
4	*Geometry and trigonometry*		
a	Use angular measures in degrees.	Measurement and marking out, creating tessellated patterns.	NEA (assessment criteria **(d)**) – manufacturing a prototype.
b	Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects.	Graphic presentation of design ideas and communicating intentions to others.	NEA (assessment criteria **(c)**) – communicating ideas and proposals to a third party.
c	Calculate areas of triangles and rectangles, surface areas and volumes of cubes.	Determining the quantity of materials required.	NEA (assessment criteria **(d)**) – manufacturing a prototype. 2.1 in-depth, **4.** Stock forms, types and sizes in order to calculate and determine the quantity of materials or components required.

Component 2: Design and Make Project

A sustained design and make task, based on a contextual challenge set by the exam board.

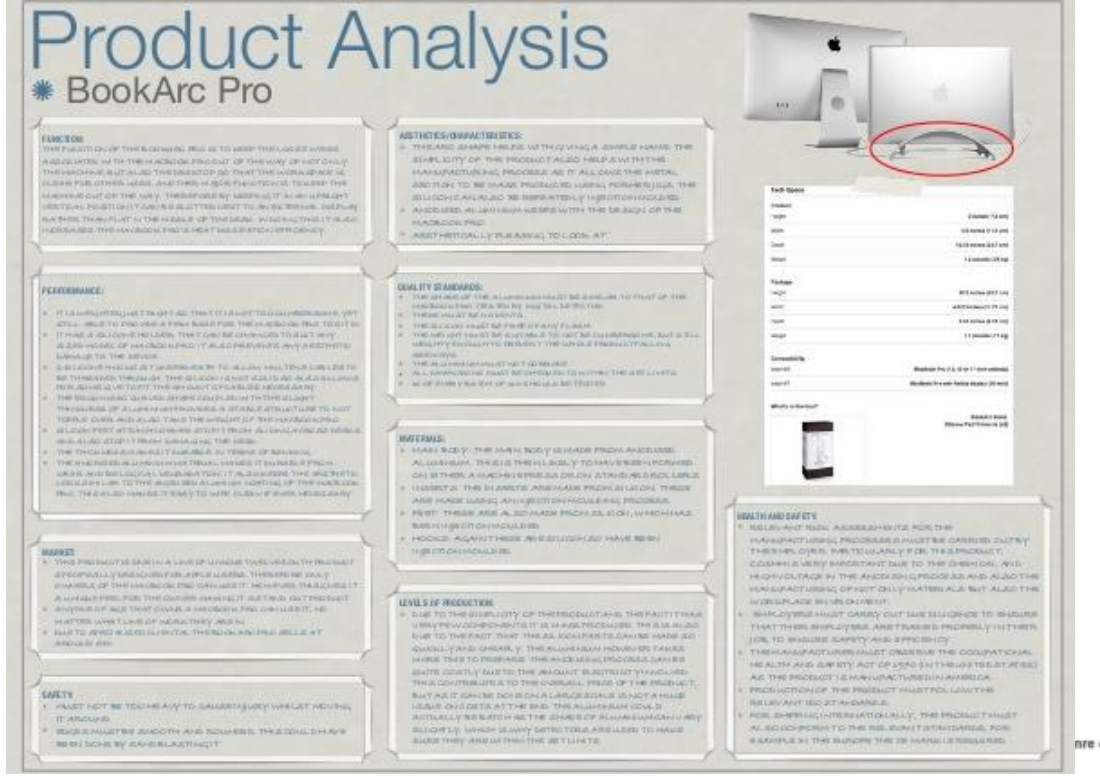
- 50% of total marks
- 100 marks
- Approximately 35 hours

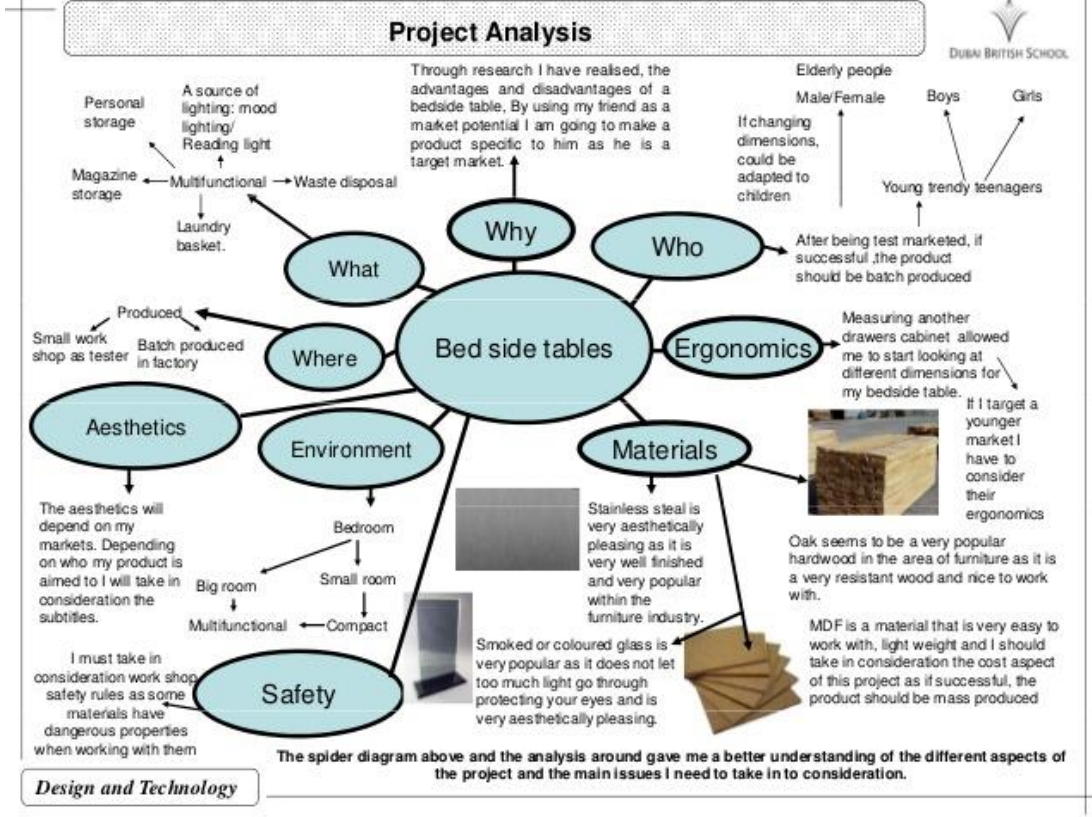


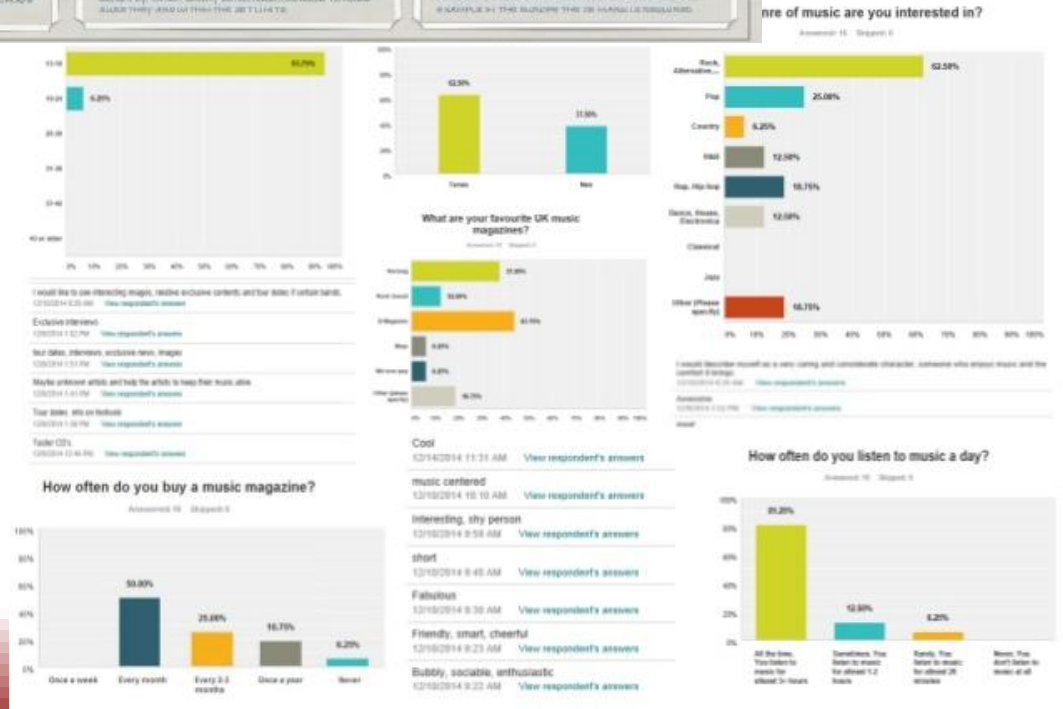


Examples of Project Contexts:

- Promoting a high profile event
- The contemporary home
- Children's learning and development
- The world of travel and tourism
- Sustainability and our future needs
- Improving the daily life of elderly people
- Outdoors pursuits and physical fitness

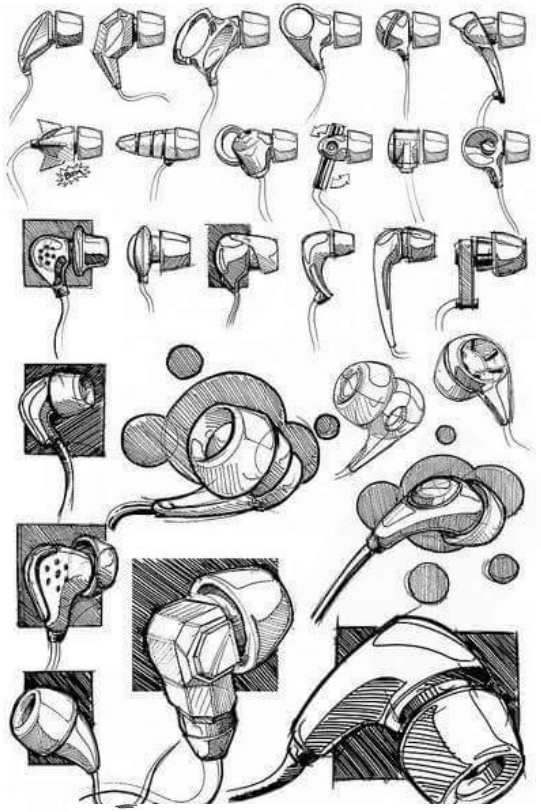


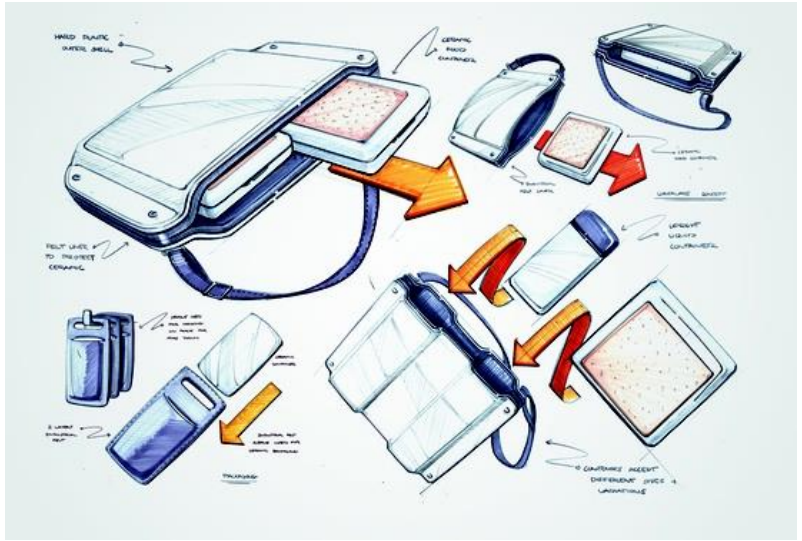


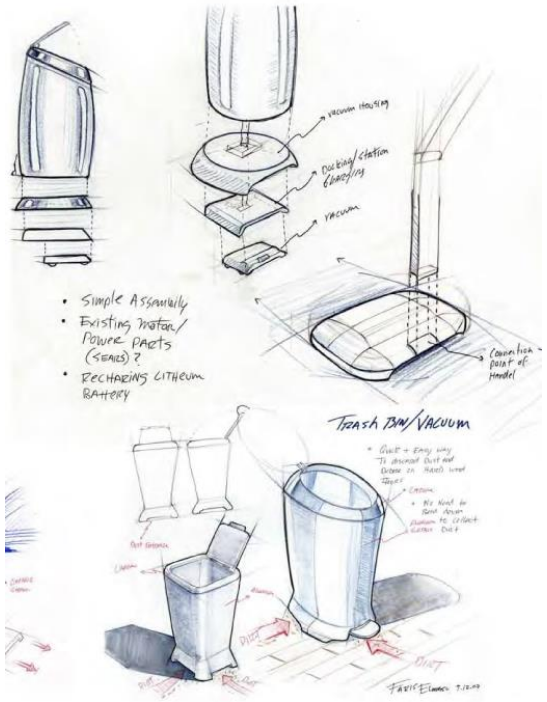


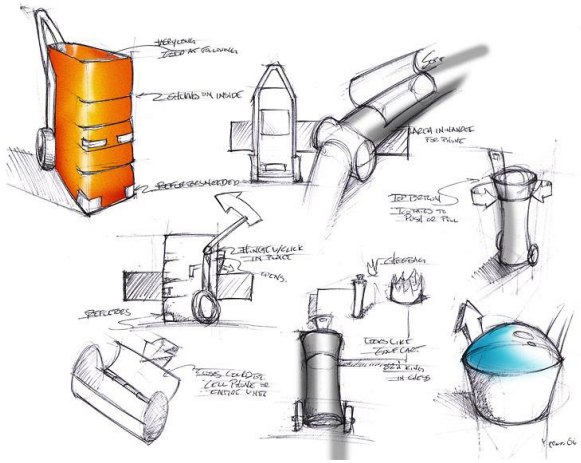
Analysis and Evaluation Skills

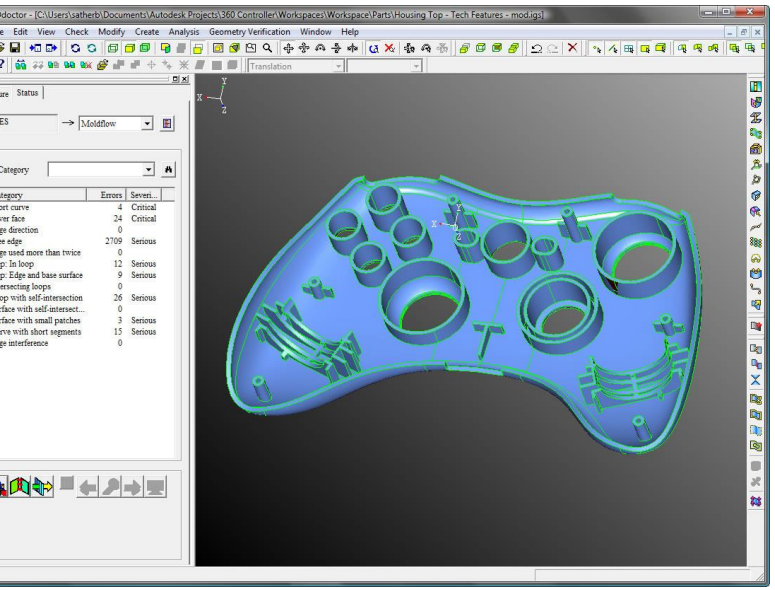
Drawing Skills

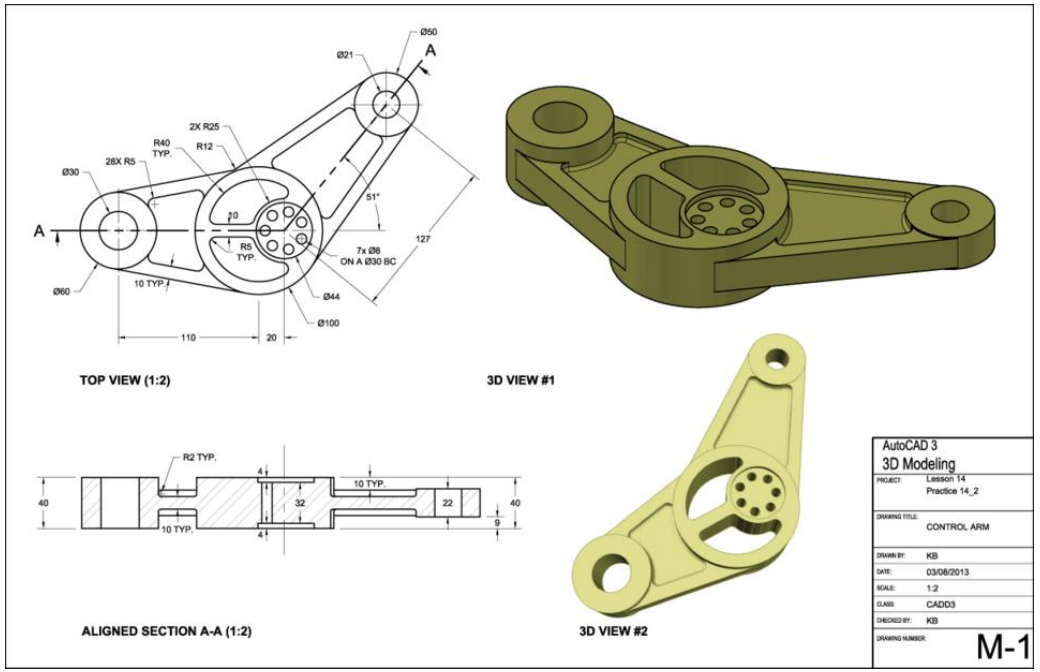


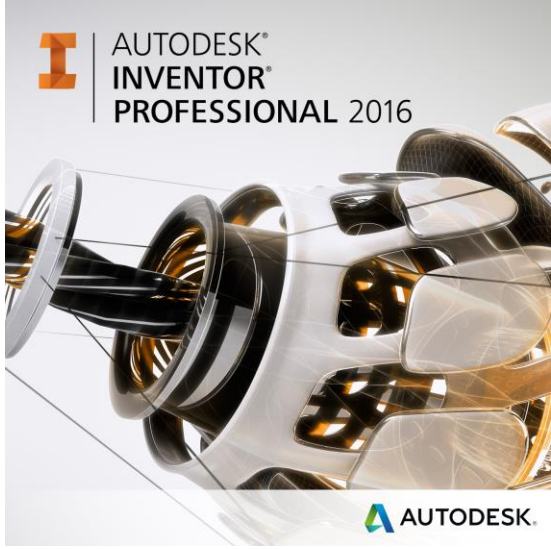


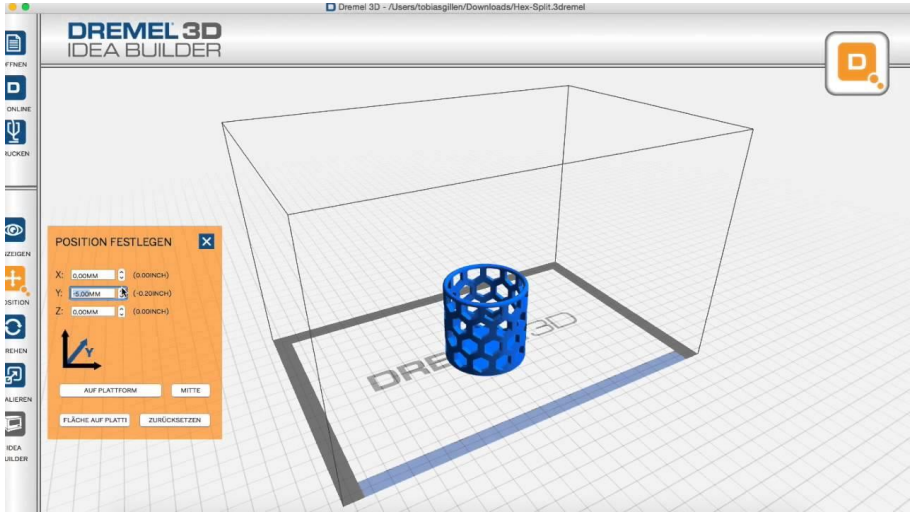


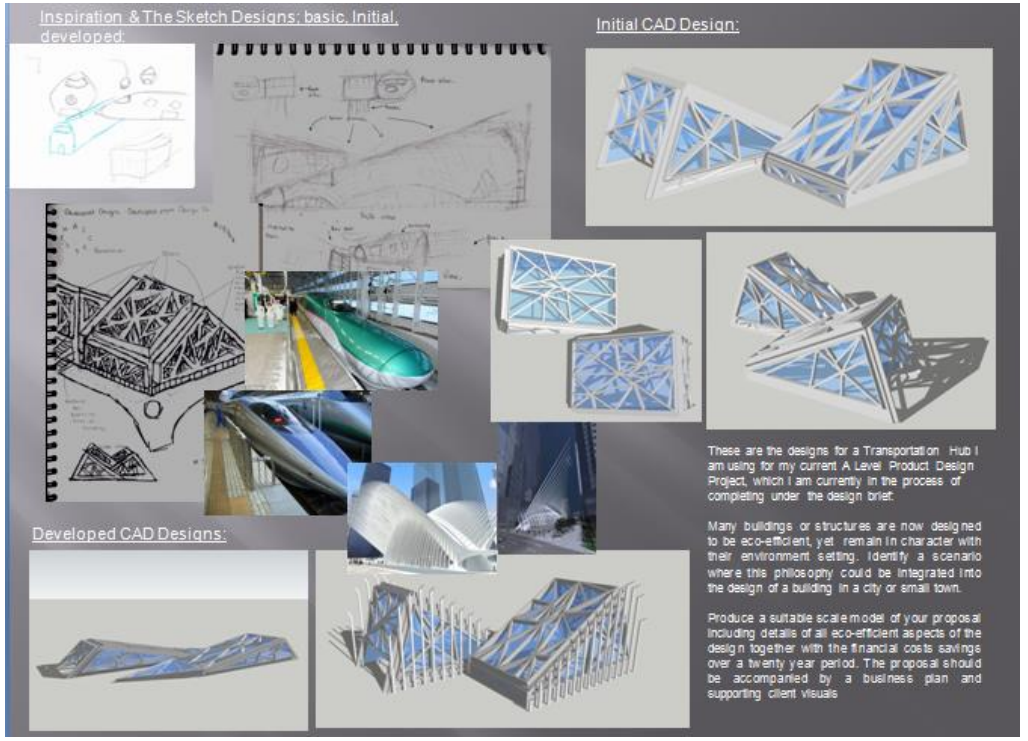





TOP VIEW (1:2)
3D VIEW #1
ALIGNED SECTION A-A (1:2)
3D VIEW #2
AutoCAD 3
3D Modeling
CONTROL ARM
M-1

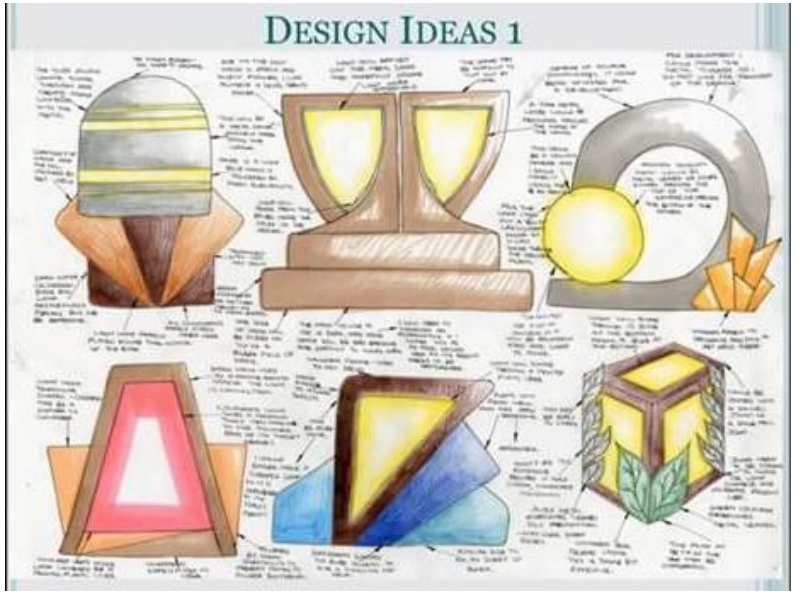

AUTODESK
INVENTOR
PROFESSIONAL 2016
AUTODESK.


DREMEL 3D
IDEA BUILDER
POSITION FESTLEGEN
AUF PLATTFORM
MITTE
FLÄCHE AUF PLATTE
ZURÜCKSETZEN

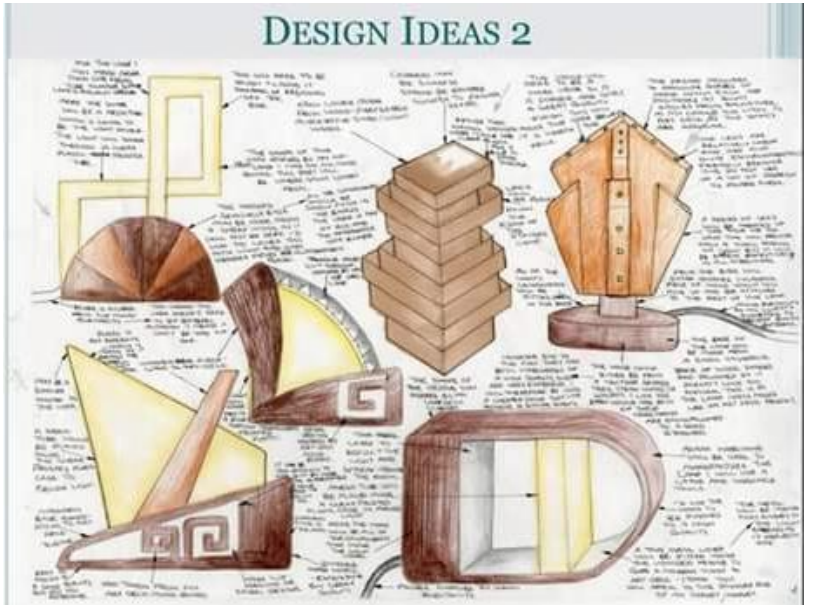

Inspiration & The Sketch Designs: basic, Initial, developed:
Initial CAD Design:
Developed CAD Designs:
These are the designs for a Transportation Hub I am using for my current A Level Product Design Project, which I am currently in the process of completing under the design brief.
Many buildings or structures are now designed to be eco-efficient, yet remain in character with their environment setting. Identify a scenario where this philosophy could be integrated into the design of a building in a city or small town.
Produce a suitable scale model of your proposal including details of all eco-efficient aspects of the design together with the financial costs savings over a twenty year period. The proposal should be accompanied by a business plan and supporting client visuals

CAD Skills

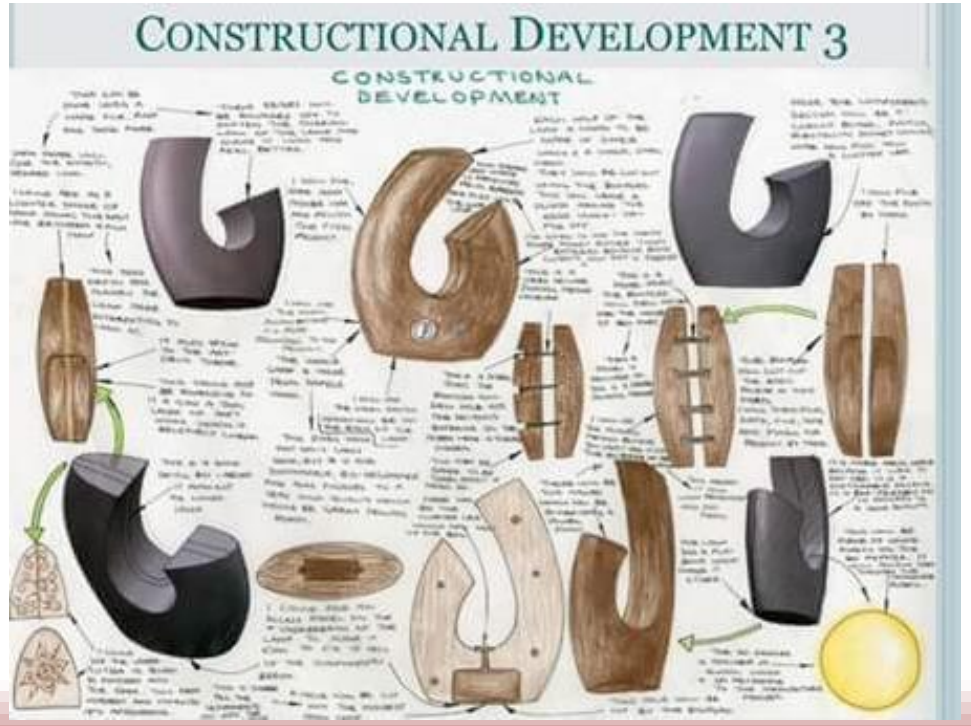
Design Ideas 1



Design Ideas 2



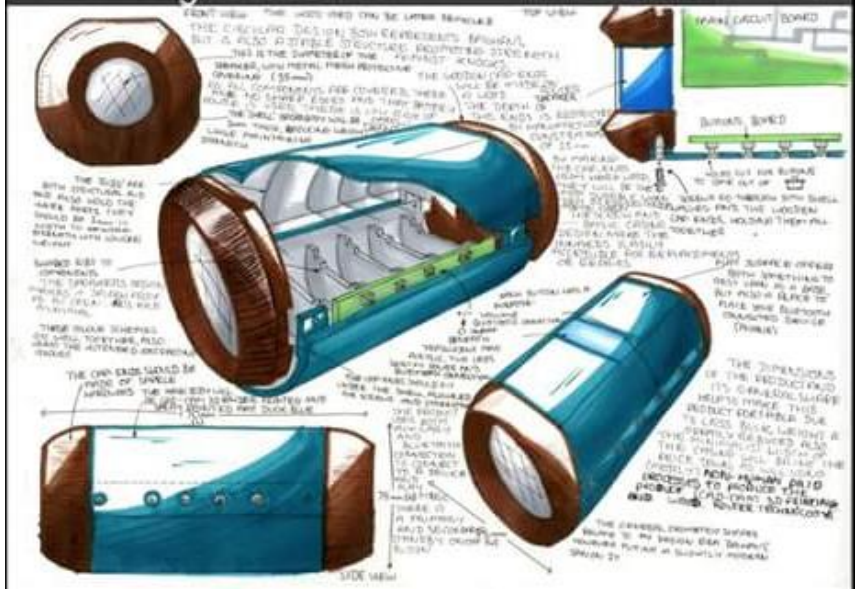
Constructional Development 3



Product Photos

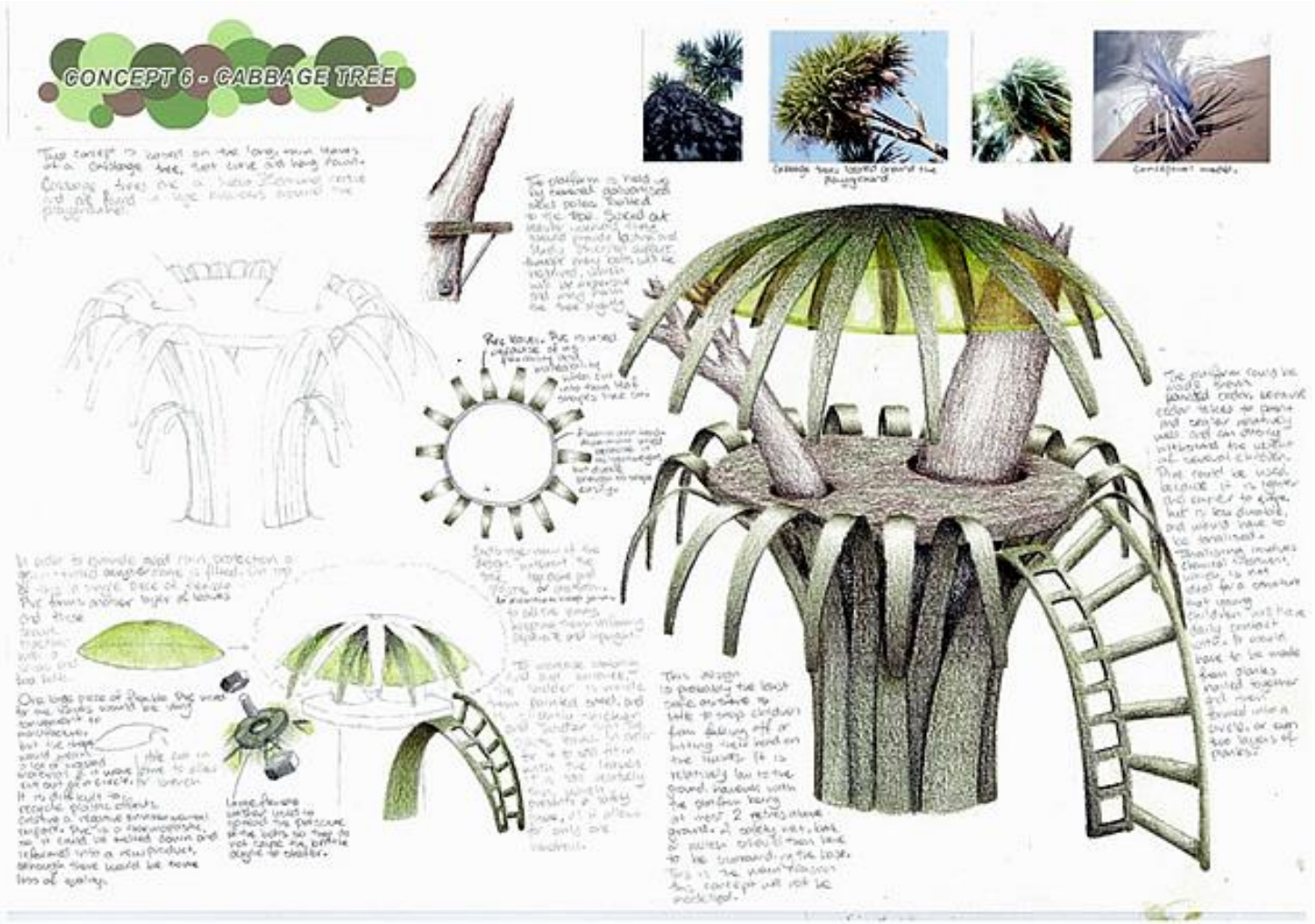
Design Ideas

Final Design



Product Photos

Constructional Development


CONCEPT 6 - CABBAGE TREE

Careers/work this can lead to:

Product Designer
Engineering
Commercial Designer
Teaching Design & Technology
Marketing & Promotion
Advertisement
Product Buyer
Architecture
Building Technician
Mechanical Engineering
Measurement & Control
Fashion Design
Backstage Theatre Work
Armed Services
Technical & Engineering
Careers in Radio & TV
Carpenter & Joiner
Aircraft Engineering
Cabinet & Furniture Making
Agricultural Engineering

Related Further Education Courses:

AS/A2 LEVEL(S):

Art and Design
Product Design
Graphic Design
3D Design
Engineering

OTHER:

Architecture
Advertising
Media
Agricultural Engineering
Construction and the Built Environment
Construction and Engineering
Furniture Crafts
Jewellery Design
Fashion Design
Carpentry and Joinery
Motor vehicle engineering
Interior Design