

PRIOR LEARNING

- GCSE theory knowledge
- GCSE NEA
- Practical skills
- Design techniques
- Presentation & layout techniques

FUTURE LEARNING

- Year 13 NEA
- A level exams x 2

DESIGN & TECHNOLOGY: YEAR 12 PRODUCT DESIGN

DESIGN

- Christmas designs & developments
- Star-pack- national competition- design developments



TECHNICAL KNOWLEDGE

- Technical principles- Materials, processes, commercial design
- Designing & Making Principles- designers, design movements, design process,



MAKE

- Skills workshops- woods, metals, plastics etc
- Christmas make
- Star-pack- developments and making final prototype
- Trial NEA- development models and final prototype



EVALUATE

- Analyse & evaluate existing products
- Final evaluation- Star-pack
- Trial NEA- throughout eg design reviews, development reviews, final evaluation



EVIDENCE:



- ☐ Diary of making for skills workshops
- ☐ Design and make evidence
- ☐ Product Investigation evidence
- ☐ Star-pack evidence
- ☐ Trial NEA
- ☐ Theory notes
- ☐ Theory questions
- ☐ Theory assessments
- ☐ Mock assessment

CROSS CURRICULAR

- Areas
- Volumes
- Ratios
- Percentages
- Accurate measuring
- Trigonometry
- Material properties
- Fairtrade
- History of design, electronics etc

TOOLS, EQUIPMENT & PROCESSES

- | | |
|---|---|
| ☐ Hand tools | ☐ Biscuit cutter |
| ☐ Band saw | ☐ Die cutter |
| ☐ Router- table and handheld | ☐ Craft knife |
| ☐ Brazing | |
| ☐ Laser cutter | |
| ☐ 3D printer | |
| ☐ 2Ddesign | |
| ☐ Solidworks | |

CAREER LINKS, INDEPENDENT STUDY IDEAS

- Use Youtube tutorials for Solidworks
- Engineering
- Product design

PRIOR LEARNING

- GCSE theory knowledge
- GCSE NEA
- Practical skills

FUTURE LEARNING

- Design & make project
- Star-pack competition
- Trial NEA
- Theory assessments
- Yr12 final assessment

DESIGN & TECHNOLOGY: YEAR 12 PRACTICAL SKILLS

MAKE

- Wood joints- finger, dowel, housing, lap, biscuit
- Lamination
- Living hinge
- Wood turning
- Metal techniques- Pewter casting, rivets, centre lathe etc
- Plastic techniques- strip heat, finger joint, resin casting, 3D printing, vacuum forming
- Concrete casting

TECHNICAL KNOWLEDGE

- Wood processing techniques
- Metal processing techniques
- Plastic processing techniques
- Paper & board processing techniques
- Composite processing

EVALUATE

- Evaluate processes used

EVIDENCE:



- ☐ Wood techniques
- ☐ Woods- diary of making
- ☐ Metal techniques
- ☐ Metal- diary of making
- ☐ Plastic techniques
- ☐ Plastics- diary of making
- ☐ Papers & boards techniques
- ☐ Papers & boards diary of making
- ☐ Composite & smart materials-techniques
- ☐ Composite & smart materials- diary of making

CROSS CURRICULAR

- Accurate measuring
- Properties of materials

TOOLS, EQUIPMENT & PROCESSES

- | | |
|---|---|
| ☐ Hand tools | ☐ Biscuit cutter |
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| ☐ Router- table and handheld | ☐ Craft knife |
| ☐ Brazing | |
| ☐ Laser cutter | |
| ☐ 3D printer | |
| ☐ 2Ddesign | |
| ☐ Solidworks | |

CAREER LINKS, INDEPENDENT STUDY IDEAS

- Come and try your own practical skills during independent study eg become an expert at wood joints, using Solidworks etc
- Help out in KS3 lesson, during practical lessons
- Product Design degree courses
- CAD designers



KEY WORD	DEFINITION	KEY WORD	DEFINITION
FINGER JOINT	Traditional joint, used to join materials together on corners. Can be done on wood and plastic. Consists of an odd number of fingers for best results. Large surface area for glue and attractive.	WOOD LATHE/ TURNING	Used to create cylindrical pieces of wood eg bannisters, pepper mills etc. A subtraction process, where the wood spins and tools are used to create curves, grooves etc. Can be a CAM machine for industrial scale.
DOWEL JOINT	Used to joint woods together, can be corners or edges. Uses cylindrical standard components, need to measure accurately to get a good result. Used a lot in flat-pack furniture.	CASTING	A process used for a range of materials, eg pewter, resin, aluminium, concrete etc. A pattern is created of the desired shape and a liquid material is poured in and left to cool.
HOUSING JOINT	A groove is created in one piece of material, that the other slides into. Good for shelves. Can be made using the router.	RIVETS	A joining method for sheet metals, using standard components.
LAP JOINT	A ledge is cut out of one piece, that the other fits onto flush. Good for corners or longer edges. Can be made using the router.	CENTRE LATHE	A subtraction process for metals, where the metal spins and tools are used to create curves, grooves, surface textures etc. Creates cylindrical pieces of metal. Can be a CAM machine for industrial scale.
BISCUIT JOINT	Makes use of oval shaped standard components. Good for corners, edges of joining planks of timber together. Handheld machine creates the oval slot in both pieces, needed to join together.	STRIP HEAT	Used to create bends in sheet plastic. Material is heated both sides to avoid cracking or burning.
LAMINATION	Layers added to material such as wood, to create a stronger more rigid shape. Useful for creating curves and bends in wood.	3D PRINTING	An addition CAM machine. Used to create models or test pieces relatively quickly in one piece. Models are usually made in plastic. Drawings are taken from 3D CAD packages such as Solidworks.
LIVING HINGE	Uses CAD/CAM to create a series of slots, to make material such as MDF or plywood flexible on a corner.	VACUUM FORMING	A process used on sheet plastic to create simple shallow pieces eg biscuit trays. A mould with draft angles is required. Plastic sheet is heated, mould is raised into the soft plastic and then air removed to form the shape.

PRIOR LEARNING

- GCSE investigations-product analysis
- Presentation & layout techniques

FUTURE LEARNING

- Design & make project
- Star-pack competition
- Trial NEA
- Theory assessments
- Yr12 final assessment

DESIGN & TECHNOLOGY: YEAR 12 INVESTIGATIONS

DESIGN

- Consider reasons behind design choices
- Look at design influences



TECHNICAL KNOWLEDGE

- Materials- woods, metals, plastics, papers & boards, composites, smart materials etc
- Processes- woods, metals, plastics, papers & boards, composites, smart materials etc

EVALUATE

- Analyse & evaluate material choices for products
- Analyse & evaluate process choices for products



EVIDENCE:



- ☐ Product investigation-woods
- ☐ Product investigation-metals
- ☐ Product investigation-plastics
- ☐ Product investigation-papers & boards
- ☐ Product investigation-composites
- ☐ Product investigation-smart/ modern materials
- ☐ Exam style analyse questions
- ☐ Exam style comparison questions

CROSS CURRICULAR

- Science of materials
- Design history
- English writing skills eg comparisons

TOOLS, EQUIPMENT & PROCESSES

- Knowledge of tools, equipment and processes used to make a range of products eg
- Wood processes
 - Metal processes
 - Plastic processes
 - Paper & board processes

CAREER LINKS, INDEPENDENT STUDY IDEAS

- Look at products in your spare time and find out how they have been made and what from
- Watch Inside the Factory, to see how products are made and why they have been made from those materials

DESIGN & TECHNOLOGY: YEAR 12 INVESTIGATIONS



KEY WORD	DEFINITION	KEY WORD	DEFINITION
WOODS	Hardwoods- broad-leafed, deciduous trees, slow growing, relatively expensive. Softwoods- coniferous trees, fast growing, relatively low cost. Manufactured boards- man-made composite material, available in larger sizes than natural timbers.	ANALYSE	These exam questions ask you to look at both the positives and negatives of a product/ material/ process. You will need to be specific to the product/ material/ process being referenced.
METALS	Ferrous- contain iron and carbon, usually magnetic and will rust. Non-ferrous- don't contain iron, will not rust. Alloys- mixture of 2 or more metals/ elements.	EVALUATE	These questions ask you to look at advantages and disadvantages of a topic and come to a conclusion.
PLASTICS	Thermoplastics- can be heated and shaped multiple times, recyclable, thermosetting- can't be shaped multiple times. Elastomer- can be deformed at room temperature and return to it's original shape.	COMPARE	These questions ask you to consider 2 different materials/ processes/ products. You need to discuss different aspects mentioned in the question such as materials, components, ergonomics etc. You need to decide if one is better than the other.
PAPERS & BOARDS	Compliant materials that can be scored, folded and cut with basic tools. Good for nets, packaging etc	AESTHETICS CUSTOMER COST ENVIRONMENT ERGONOMICS SIZE/ ANTHROPOMETRICS SAFETY SCALE OF PRODUCTION FUNCTION MATERIALS MAKING METHODS QUALITY	You can use these headings to help you analyse products. You should try to find the exact information, where possible and provide references to where you have got this information from. If you can't find the exact information, you should make an educated guess, using your knowledge. Make sure to provide reasons for the choices that have been made.
COMPOSITES	A material made of 2 or more different materials, which makes a material with enhanced properties.		
SMART MATERIALS	A material whose property can change in response to a physical stimulus eg electricity, light, pressure etc.		
MODERN MATERIALS	A material developed through invention or improved processes.		

PRIOR LEARNING

- GCSE NEA- design techniques
- Presentation & layout techniques
- Practical skills

FUTURE LEARNING

- Star-pack competition
- Trial NEA
- Theory assessments
- Yr12 final assessment

DESIGN & TECHNOLOGY: YEAR 12 DESIGN & MAKE

DESIGN

- Design own Christmas themed items
- Quick sketches- inspirational images etc
- Refined sketches- presentation, layout
- Development- sketches, quick models



MAKE

- Make Christmas themed item/s
- Model ideas



EVALUATE

- Analyse & evaluate final prototype



TECHNICAL KNOWLEDGE

- Use materials & process knowledge
- Communication techniques



EVIDENCE:



- ☐ Initial concepts
- ☐ Refined designs
- ☐ Development- simple models
- ☐ Final design- perspective drawing, parts list
- ☐ Final prototype/s
- ☐ Evaluation of final prototype

CROSS CURRICULAR

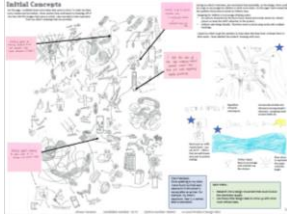
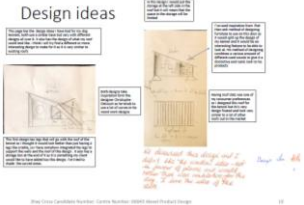
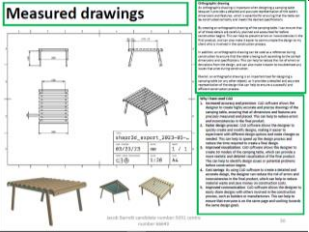
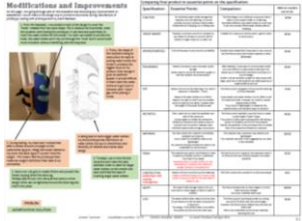
- Accurate measuring
- Properties of materials

TOOLS, EQUIPMENT & PROCESSES

- | | |
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| ☐ 3D printer | |
| ☐ 2Ddesign | |
| ☐ Solidworks | |

CAREER LINKS, INDEPENDENT STUDY IDEAS

- Sketch ideas for your own products, keep a sketchbook of ideas
- Practice drawing skills eg isometric, perspective, orthographic etc.
- Designer for products, furniture etc

KEY WORD	PAGE EXAMPLE	DEFINITION
INITIAL CONCEPTS		Your first thoughts on what to design. These could be thumbnail sketches, using scruffiti/ jack straws, inspirational images etc. These could be parts of the idea, or the whole thing.
REFINED DESIGNS		These are more formal designs, annotated to show how they match the design specification. Client feedback is useful here.
DEVELOPMENT		Further investigation, sketch, model, test and use CAD to help work out how to make your prototype. Make any improvements needed. Document all your decisions.
FINAL DESIGN		An accurate perspective drawing of your final piece/ pieces and a parts list with sizes, costs etc.
FINAL PROTOTYPE		A final version of your intended product, suitable to test out with prospective clients. Making use of appropriate materials, sizes and processes.
EVALUATION		Reviewing and testing your final prototype against success criteria, with potential customers. Looking at what has worked and what could be improved. Suggesting how it could be adapted for commercial production.

PRIOR LEARNING

- GCSE NEA- design techniques
- Presentation & layout techniques
- Practical skills
- GCSE NEA- investigations

FUTURE LEARNING

- Trial NEA
- Theory assessments
- Yr12 final assessment
- A level NEA
- Yr13 Mock assessment
- Final exams x 2

CROSS CURRICULAR

- Marketing & advertising
- Sustainability
- Working out sizes
- Nets

DESIGN & TECHNOLOGY: YEAR 12 STAR-PACK

DESIGN

- Investigations- into the company, materials, processes,
- Initial concepts
- Refined designs
- Developments
- Final design



MAKE

- Model & test out ideas
- Final prototype



EVALUATE

- Analyse & evaluate investigations
- Evaluate design work



TECHNICAL KNOWLEDGE

- Use materials & process knowledge
- Use the design process
- Communication techniques

EVIDENCE:



- ☐ Investigation page
- ☐ Design page
- ☐ Development page
- ☐ Final design information- working drawing,
- ☐ Final prototype
- ☐ Final evaluation

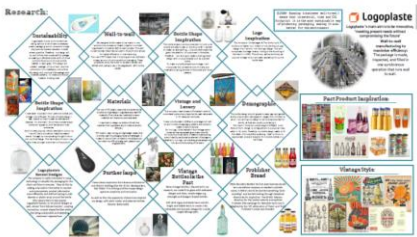
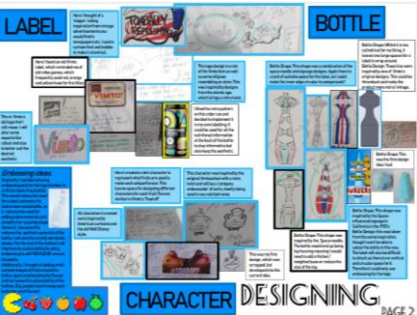
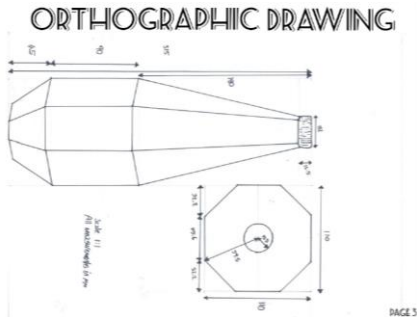
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| ☐ 3D printer | |
| ☐ 2Ddesign | |
| ☐ Solidworks | |

CAREER LINKS, INDEPENDENT STUDY IDEAS

- Packaging designer
- Graphic design
- Ergonomics & anthropometrics
- Sustainability in design
- Take apart existing packaging to see how it is constructed
- Design your own logo for your brand



KEY WORD	EXAMPLE PAGE	DEFINITION
INVESTIGATION PAGE		This page explores the company you are designing for and what materials & constraints they have applied to the brief. Here you organise and pick out the information that has been the most useful to you.
DESIGN PAGE		This page shows the ideas you have thought of from initial concepts, through to developed versions and the final idea. You need show a variety of communication methods and be creative in your approach. Keep in mind any requirements from the company who have set the brief.
DEVELOPMENT PAGE		This is a measured drawing, usually orthographic, showing all the relevant sizes of your final prototype. This can be done by hand or using the computer. Ideally it will be to scale. You need to make use of British Standards when adding dimensions eg block arrowheads, leader lines not touching the drawing etc.
FINAL DESIGN INFORMATION- WORKING DRAWING,		This page shows evidence of your final prototype. It should have different angles and close-ups so all aspects of the design can be seen clearly.
FINAL PROTOTYPE		A final evaluation of your prototype will include the strengths and weaknesses. You should also consider how it might need to be adapted for commercial production.
FINAL EVALUATION		

PRIOR LEARNING

- PROJECT SKILLS IN YEAR 12
- NEA AT GCSE
- PRACTICAL SKILLS IN YEAR 12

FUTURE LEARNING

- UNIVERSITY COURSES EG PRODUCT DESIGN, ENGINEERING ETC
- APPRENTICESHIPS
- CAREERS

DESIGN & TECHNOLOGY: YEAR 12 TRIAL NEA



A01- IDENTIFY & INVESTIGATE DESIGN POSSIBILITIES

- ☐ Introduction
- ☐ Disassembly
- ☐ Client interview
 - ☐ Site visit
 - ☐ Disassembly/ Product analysis
 - ☐ Mood board
 - ☐ Initial sketches



A01- DESIGN BRIEF & SPECIFICATION

- ☐ Design brief
- ☐ Specification
- ☐ Gantt chart



A02- DEVELOPMENT OF DESIGN PROPOSALS

- ☐ More detailed design ideas- detailed, justified annotation (SPECIFICATION)
- ☐ Client feedback- throughout
- ☐ Review of designs
- ☐ Design strategy
- ☐ Developments- modelling
- ☐ Manufacturing specification

A LEVEL NEA



A03- ANALYSE & EVALUATE

- ☐ Investigation summary
- ☐ Design idea review
- ☐ Testing in developments
- ☐ Testing of final prototype
- ☐ Critical analysis of final prototype
- ☐ Spec review of final prototype
- ☐ Modifications/ improvements for the final prototype
- ☐ Commercial consideration of final prototype

A02- DEVELOPING OF DESIGN PROTOTYPES

- ☐ Material and process justification
- ☐ Final prototype
- ☐ Diary of making
- ☐ Modifications to prototype based on client feedback



CROSS CURRICULAR

- SCIENCE OF MATERIALS
- SUSTAINABILITY IN GEOGRAPHY
- COSTS FROM ECONOMICS & BUSINESS

TOOLS, EQUIPMENT & PROCESSES

- HAND TOOLS
- 2D DESIGN
- SOLIDWORKS
- LASER CUTTER
- 3D PRINTER
- POWER TOOLS
- WOOD LATHE

CAREER LINKS, INDEPENDENT STUDY IDEAS

- PRACTISE SOLIDWORKS
- PRACTISE PHOTOSHOP
- PRACTISE PRACTICAL SKILLS
- USE INDEPENDENT STUDY LESSONS TO WORK ON NEA
- ENGINEERING, PRODUCT DESIGN ETC

DESIGN & TECHNOLOGY: A LEVEL TRIAL NEA



NEA PAGE	WHAT TO INCLUDE	NEA PAGE	WHAT TO INCLUDE
INTRODUCTION	Introduce your client and the initial situation. A task analysis exploring all the possibilities linked to your client. Research plan and initial brief.	REVIEW DESIGNS	Check your ideas against your specification. Give them a score, say what you might need to change. Feedback from client.
CLIENT INTERVIEW	Interview with your client, identifying the wants and needs that link with the context.	DESIGN STRATEGY	Identify which design you intend to develop, what you need to work out in order to make your prototype eg materials, processes, finishes etc.
PRODUCT ANALYSIS	Look at existing products on the market, similar to what you intend to design and make. Analyse using ACCESS FM, identify what you could use in your work.	GANTT CHART	Product a Gantt chart to plan how you intend to spend your time. Update to show actual time taken.
SITE VISIT	Visit the proposed site, if appropriate. Photos and sizes that are relevant. Identify what restrictions you might have.	DEVELOPMENTS	Further investigation, sketch, model, test and use CAD to help work out how to make your prototype. Make any improvements needed. Document all your decisions.
INITIAL CONCEPT SKETCHES	Your first thoughts on what to design. Ideally done with your client. These could be thumbnails with client, using scruffiti/ jack straws, inspirational images etc. These could be parts of the idea, not the whole thing.	MANUFACTURE SPECIFICATION	The final design to give a third party enough information to make your prototype. This should include a measured drawing, plan of making, material & process justification, parts list, review using the specification and client feedback.
INVESTIGATION SUMMARY	Sum up what you have found out from your investigations. How is it useful to you? How will it move your project forward?	FINAL PROTOTYPE	Practical evidence of your final prototype. This can be to scale, doesn't have to function or be the correct materials. Make any adjustments as needed, ideally with client feedback.
DESIGN BRIEF	Clearly say what you plan to design and make, linking to your clients wants & needs and how it solves their problem.	DIARY OF MAKING	This documents your making process and should identify health & safety, quality control, materials, equipment & processes used. If you make changes, make this clear.
DESIGN SPECIFICATION	List of success criteria, using ACCESS FM+ headings. These should be justified with reference to your investigations so far.	FINAL EVALUATION	Check your prototype against your design specification, test with the client, get an expert opinion. Suggest areas that could be further improved, based on this feedback. Look at how your design would need to be adapted for commercial manufacture. If time, make improvements.
REFINED DESIGNS	These are more formal designs, annotated to show how they match the design specification. Client feedback is useful here.		