design and technology
Thomas Alleyne's High School

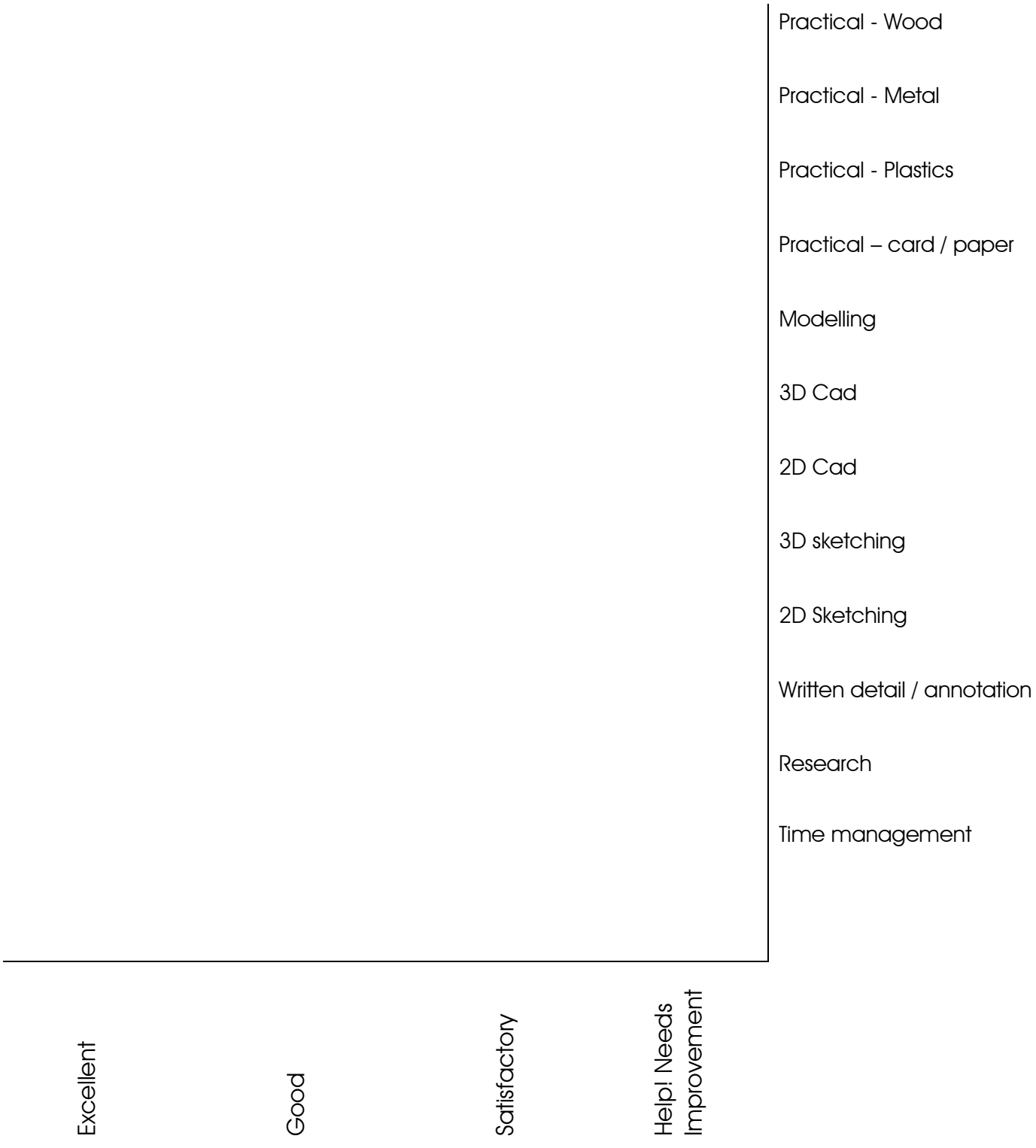
Y12 Lighting Project

Support, Assessment and Feedback.

Name_____
Target Grade_____
Project Title_____

W	Date	Project	Theory
Autumn 1			
1	1) 5th Sept	INSET day Monday 5th. Term Starts + Y12 Induction on Tues 6th. Normal lessons start on Weds 7th **Lighting project** (12 Weeks) **Spec** – based on P.A. & comparisons done in transition lessons	
2	2) 12th	Finish Spec. **Initial Ideas** morph table + Iso sketching & tutorials	**1)** Material Properties
1	3) 19th	**Initial Ideas**. 2D/ 3D component sketches from morph table.	**2) Polymers**: + demo: Vac form, imould, blow
2	4) 26th	**Initial Ideas** 2D/ 3D component sketches from morph table. Plus Annotation and Spec check (morph) **Morph Development** Do Morph table + start sketches / practical	Polymer Processes cont. **3) Wood** + Processes, Router and Lathe demos
1	5) 3rd Oct	**Modelling: Workshop basics:** hot wire, Styrofoam, sanders, pillar drill Wood lathe, Router + wood joints	Finish Wood + demos **4) Metal +** Lathe demo
2	6) 10th	**Modelling:** Workshop basics: hot wire, Styrofoam, sanders, pillar drill Wood Lathe / Metal Lathe	Metal – complete demos
1	7) 17th	**Modelling:** Riveting, Metal Lathe practice **INSET Day Fri 21st**	Flexible: demo /practice
	½ Term	24th Oct- 30th	
Autumn 2			
2	1) 31st	**Development Practical** with support and demos as needed	2D CAD Corel
1	2) 7th Nov	Development Practical with support and demos as needed	2D CAD Corel
2	3) 14th	Development Practical with support and demos as needed	2D CAD Corel+laser
1	4) 21st	Development Practical with support and demos as needed **Y13 Coursework:** Tutorials to pick a project	3D CAD Inventor
2	5) 28th	**Y13 Coursework:** Tutorials to pick a project **Final Idea** Drawings	3D CAD Inventor
1	6) 5thDec	**Coursework:** Moodboards **Final Idea**+CAD+Prod Plan	CAD / CAM +3D Printer
2	7) 12th	**Coursework:** Moodboards **Final Idea**+CAD+Prod Plan	CAD / CAM + 3D Printer
	Christmas	19th Dec – 3rd Jan HO HO HO !!	
Spring 1			
1	1) 2ndJan	**Coursework:** Complete and print Moodboards **Inset Day 3rd+4th Jan.** Students back Thurs 5th	
2	2) 9th	**Coursework:** Situation and Problem	**Lighting Practical**
1	3) 16th	**Coursework:** Situation and Problem, Possible Projects Brainstorm + 3 Briefs	Final Prototype
2	4) 23rd	**Coursework:** Finish intro. Feedback+Next Steps+ Sort Products for Analysis	Final Prototype
1	5) 30th	**Coursework:** Product Analysis	Final Prototype
2	6) 6th Feb	**Coursework:** Product Analysis	Final Prototype
1	7) 13th	**Coursework:** Product Analysis – Feedback & Next Steps	Complete + Evaluation
	½ Term	20th – 26th Feb	
Spring 2			
2	1) 27th	**Coursework:** Comparisons	**5)** Composites
1	2) 6th Mar	**Coursework:** Comparisons	**6)** Smart Materials
2	3) 13th	**Coursework:** Comparisons – Feedback & Next Steps	**7)** Energy
1	4) 20th	**Coursework:** Survey and Interview	**8)** Life Cycles
2	5) 27th	**Coursework:** Survey and Interview – Feedback and Next Steps	Flexible
	Easter	3rd April – 16th April	
Summer 1			
1	1) 17 Apr	**Coursework:** Market Gap & USP **INSET Day** Monday 17th	Morph Ideas Table
2	2) 24th	**Coursework:** Market Gap & USP – Feedback and Next Steps	Concept Sketches
1	3) 1stMay	**Coursework:** Contextual Research	Concept Sketches
2	4) 8th	Bank Holiday Monday 1st May **Coursework:** Contextual – Feedback and Next Steps	Initial Ideas
1	5) 15th	**Coursework:** Anthropometrics	Initial Ideas
2	6) 22nd	**Coursework:** Anthropometrics – Feedback and Next Steps	Initial Ideas
	½ term	29th May - 4th June	
Summer 2			
1	1) 5thJun	**Coursework: COURSEWORK REVIEW OF PROGRESS – COMPLETE RESEARCH SECTION + NEXT STEPS**	
2	2) 12th	**Coursework:** COURSEWORK REVIEW OF PROGRESS – COMPLETE RESEARCH SECTION + NEXT STEPS	
1	3) 19th	**Coursework:** BRIEF AND SPECIFICATION MOCK EXAMS??	
2	4) 26th	**Coursework:** BRIEF AND SPECIFICATION MOCK EXAMS??	
1	5) 3rd July	**Coursework:** BRIEF AND SPECIFICATION MOCK EXAMS??	
2	6) 10th	Initial Ideas + Annotation	
1	7) 17th	Initial Ideas + Annotation	
2	8) 24th	2 days only	

Let's face it, Y10 and 11 was a bit pants. Despite everyone's best efforts we didn't cover everything we would have liked to in Y11. We tried to cover as much theory, design and practical work as we could BUT, sat there now in your lovely new suit / outfit, ready to start Y12 you have all got a fairly big skills gap. So, we have restructured Y12 to focus mainly on theory and practical so that you are ready to complete Y13 with the strongest skillset possible. We will also be starting your Y13 coursework a few months earlier than we usually do to give you time to complete it. Start by filling in this skills graph as honestly as you can. This will help us focus on your weaker skills. Hopefully, when you fill it in at the end of the year, you will have improved.



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Grade Tracker and Next Steps
Target Grade:

Section	Mark	Next Steps Completed
Intro & Research Considerations Product Analysis Comparison		
Specification		
Design Morphological Initial Ideas Table Initial Ideas Sketches Annotations		
Development Morph Development Plan Table Development Sketches Peer comments / annotation Modelling + CAD		
Final Idea Final drawings Basic Production Plan		
Making Quality + Accuracy Use of Tools and Equipment		
Evaluation Spec check User comments		

Desk Lamp / Lighting Project

Design Brief

Ikea want to expand their range of Desk Lamps / Moodlights on sale in their UK stores. The marketing department want to target the 14-25 year-old, unisex student target market. Ikea want to see stylish and innovative designs which will appeal to a wide range of people to maximise sales. You will design, develop and prototype a lamp concept using a standard light fitting and bulb **or** a moodlight using LED's, light gathering acrylic or Electroluminescent wire. The specific focus area of the target market is up to you. There is a free choice on use of materials (we will be covering wood, metal and plastic processes during lessons, plus laser cutting and engraving using paper / board, timber and plastic.)

The Tasks - Some tasks were completed in June during the Y11-12 transition sessions:

Task 1) Considerations. Start with a considerations brainstorm where you list all the issues you need to think about / research before you start designing. Ask yourself a series of questions using the list below as guidance. Use a prioritised CAFE QUE (start with your most important issue – remember the holy trinity – Aesthetics – Function - Ergonomics)

EXTENSION TASK If it helps – create a moodboard of existing lamps. Annotate to explain Aesthetics (common styles, materials, surface finishes, colours and shapes) and Function (light type, switches etc)

Cost
How much will the light cost? How will it offer value for money? What affects the selling cost? (Think about cost to make, cost of materials and profit)

Aesthetics
How will it be designed to look appealing? Think about the type of light source, shape, colour, style, materials, surface finish, proportion, symmetry as they affect the way a product looks.

Function
What will the lamp do? Will it be Functional lighting (reading/studying/hobbies?) or Aesthetic/Mood lighting. How will it do it? Adjustability? Are there different ways of doing it? Which is best? How do similar products which are already available function?

Ergonomics
How can your light be designed to make it more comfortable or easy to use? Think about size, shape/form, grip and texture of the parts that you touch or hold. Good ergonomic design is very important. See below for details on Ergonomics:

- Ergonomics is all about making a product more comfortable and easy to use. A designer does this by making the product fit the human form by shaping it and using grip or texture to make the product easier to use. E.g. look at the design of a toothbrush handle, a chair, a TV remote or the handle on a handbag/rucksack. Think about any adjustable parts or touch points on a lamp.

Quality
How will you design the light to make sure it is good quality? Think about materials, how will it be made and assembled? Also think about quality standards and testing.

User
Who is the light aimed at? This group of people is the user group or target market. How will your product be suitable for this target market? Think about age, gender and price range as they will determine the colour, style and overall aesthetics of the final design.

Environment
Is your product harmful to the environment during use? Think about power source – Battery or mains electricity Are the materials of your product and it's packaging **sustainable**? (Wood, paper and fabrics are, plastic is not. Plastic needs to be recycled as it is from a non sustainable resource (oil) and it does not biodegrade). How easy is it to recycle the materials used?

Research

Task 2) Product Analysis (we want detailed analysis BUT to save time: rough draft, handwritten only! NOT CSWK QUALITY)

- Start with a clear photo of the product and state the name of it and the price.
- Now decide on your priorities from CAFE QUE and 3 new subheadings - **materials, methods of assembly and methods of manufacture**. For each subheaded section you must explain the key + and – features of the design. Use lots of close up photographs to illustrate your writing. Number the photos and refer to them in the text. To highlight the +/- points either colour code them or subhead each set of comments. See helpsheet below to give you some guidance on your analysis.
- To finish add a **conclusion** and list the overall key+ design features that you will retain and the key – features that will need improving on. **WE WILL USE THIS CONCLUSION TO STRUCTURE TASK 3-COMPARISON**

Cost - How much does the product cost? Is it good value for money? Why / why not – explain!! Look at function, aesthetics and materials. What do you get for your money? Is it worth it?
Aesthetics - Does the product look good? Why / why not? Explain! Think about shape, colour, materials, proportion, symmetry, surface finish, style (modern, traditional, contemporary)
Function – What does the product do? How well does it do it? What makes it easy / difficult to use? Are there any components that don't work well? Why – why not? Think about safety issues.
Ergonomics - How is the product designed to make it easier or more comfortable to use? How is it held, gripped or touched by the user. Think about size, shape, form and grip / texture. Is it easy to use? Why / why not?
Quality – How has each component been made and how has the product been assembled? (see me if unsure) Is the product well made and are the materials good quality? How can you tell? Comment on any damage, scratches to the materials or individual components.
User - Who is the product aimed at? Think about age, gender and price range. Is it suitable for this target market? Is the function and appearance suitable for them? Why / why not?
Environment – Complete a life cycle analysis of your product using the following headings:
Design: Is it made of sustainable materials (wood, metal)? If it isn't (plastic) has it been designed to make it more sustainable? Has the designer reduced the amount of plastic used, or is it really chunky?
Making: How has waste material been kept to a minimum? How is your product assembled? Could it be flat packed to reduce packaging? Has it been made from recycled plastic? Has it been packaged? Is the packaging sustainable?
Use: Does your product cause pollution when in use? Does it need batteries or electricity, as these create pollution from power stations used to create the electricity?
Disposal: How easy is it to recycle the product? Is it easy to disassemble in to its separate components? (remember, if it has plastic components, it needs to have the recycling logo on it to identify the type of plastic)

Task 3) Comparison Using the negative design features identified in your product analysis conclusion as a checklist, compare the first lamp's negative points to the other lamps. Make a note of the main features that are BETTER on the comparison lamp. Subhead this work the same way as the Product Analysis. REMEMBER – you are just trying to identify the design features that are BETTER than the original – any features that are worse, (or equally as bad) don't need mentioning.





Task 4) Specification:

- This will be a short, basic Spec as it is only driven by two pieces of research (Product Analysis + Comparison) Obviously, your Y13 major coursework project will have loads more research so your spec will be much more detailed!
- Concentrate on the main negative points from your Product Analysis for Aesthetics, Function and Ergonomics. Subhead each section from CAFÉ QUE to structure your spec.
- Use bullet points and write a justified 3 part statement:
- Each statement must say what the product must do, why it should do it and be justified with reference to your research:
  Part 1: It must / it should……
  Part 2: so that / because / as this allows / due to……..
  Part 3: as seen in my product analysis or Comparison (for Y13 major coursework you can quote survey results / client interview / contextual research / anthropometrics and ergonomics research)

For example:
It should have a sculpted, soft grip handle so that the ergonomics and overall grip are improved when used by left and right handed people. This can be seen in photo 5 of my analysis.

Lighting Project - Research and Specification - Assessment and Feedback

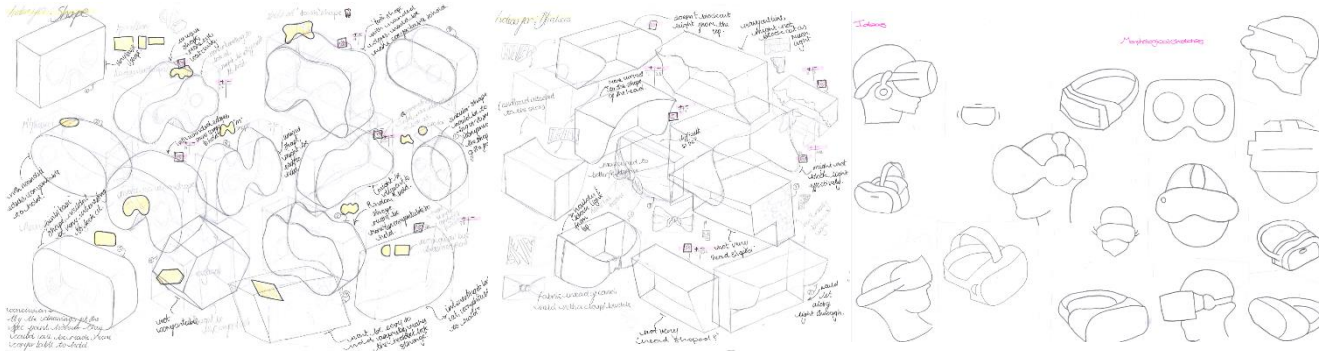
Strengths and Weaknesses	Next Steps + Deadline
Considerations Moodboard Product Analysis Product Comparisons Specification **Now redo your skills graph on P3 so you can track where you have improved / still need to focus on improving.**	

Design Section

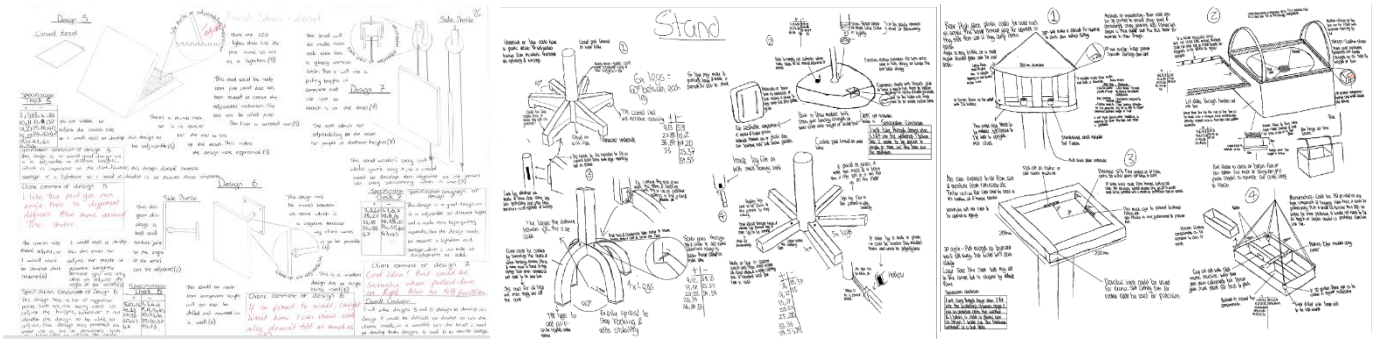
Task 5) **Morphological Analysis**
Start with a morphological analysis table– use your considerations brainstorm to help structure this. Break the project into morph sections. (Base, stem, shade, light source, shape, switch type, materials)
Fill in each column with as many ideas you can think of (use your Product Analysis, comparisons and moodboard (if you did one) to help with this. If all else fails, google it / ask us.

Task 6) Initial ideas
Sketches should be free flowing initial thoughts, not overworked presentation drawings. Your ideas need to be as creative as possible, put your effort into creativity rather than perfect sketches

- Start with at least one page of **CONCEPT SKETCHES,** lots of rough doodles crammed onto a page with no annotation. Look at examples of previous Y13 work to get an idea of how to do this.

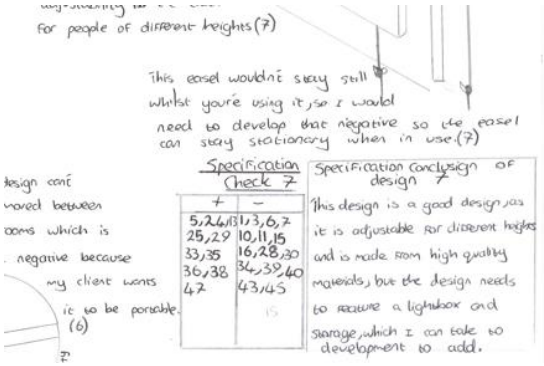


- Now start doing Isometric **INITIAL IDEA** sketches. No more than 6 ideas per page as it will be too cramped once you add annotation. You can sketch sub assemblies or parts of ideas if you want to.



Task 7) Annotation of Initial Ideas
Your annotation should be quick, handwritten and NOT CSWK QUALITY to save time. Just highlight key design points (for Aesthetics, Function and Ergonomics, materials and assembly)

- Add a **spec check** table to each design with a conclusion for each morphological section, not for each design. We will explain how to do this. See below for a Y13 example.



Design Development

You do not need to develop all of your initial ideas, just the **best ideas (or parts of ideas)** from each morphological section that you identified in your spec check conclusion.

You must develop and improve the **shape, aesthetics, ergonomics and function** of your designs. Also look at the **materials, manufacture and assembly** methods for your **one off prototype**.

Task 8) Morphological Development Plan
Start by making a development plan table of the best ideas that you will be developing and work out which bits of the design you will sketch or model. Generally, you will need to sketch the shape and model the ergonomics & function. Once we've finished learning Autocad Inventor you can also do 3D CAD models of aesthetics / shape and function. You can also include Corel development of any images/graphics or lazer cut components.

Task 9) Development Practical + Sketches + CAD
Now use your morph dev table as a development plan to help organise your work over the next weeks / months. Follow your plan and tick things off when you've done them. You will have new ideas as you develop your designs – add these to your development table as you progress.

When you are modelling use chronological photographs to show your model developing. The photos should tell a story; they should show actual development. Remember to contextualise your models by adding your hand / finger / a bulb / LED etc so that you get an idea of scale.

When you are using CAD use screenshots to show the major changes as you **develop and improve** your idea.

For both sets of images above add brief annotation – see below

Task 10) Annotation of development section

All images that you use (sketches, photos of models or CAD) need to be annotated REMEMBER - this should be quick, handwritten annotation, NOT fully typed and coursework quality to save time!

Use the what, how, why, approach:

- Explain **what** you have developed (shape, ergonomics, size etc..), **how** you have developed it and **why** you have developed your product

- For example: 'On this model I have improved the grip and made the handle fit in the user's hand better by increasing the size of the handle and including some ridges on it which are made of rubber' This explains **What** and **How.**

- 'By increasing the size of the handle and including a large grip area the handle will be easier to use for both left and right handed users, a key point in my specification' This explains **WHY** by referring to the specification. You can also refer to peer comments as a reason why…

ALSO ADD PEER COMMENTS ON AESTHETICS / ERGO / FUNCTION – discuss this during practical lessons.

Final Idea

You will be learning (or will have already learned) 2D CAD on Corel 11 and 3D CAD on AutoCAD INVENTOR. Once you have mastered the basics you will be able to produce the following as practice for your major coursework project:

Task 11) Presentation Drawings

- Using CAD you need to show a detailed final idea presentation drawing and / or engineering drawing and / or net layout.
- If your CAD skills aren't up to it yet show final concept model photos, flat nets / assembled nets (graphics).
- Add notes to highlight and explain your key design features.

Lighting Project - Design Section Assessment and Feedback

Strengths and Weaknesses	Next Steps + Deadline
Morphological Ideas Table Sketches Annotation Development Plan Table Modelling Including CAD Annotation of development Final Idea **Now redo your skills graph on P3 so you can track where you have improved / still need to focus on improving.**	

Making Section – Production Planning, Practical Work and Evaluation

Task 12) Production Plan

Before you can make your product you need to work out the sequence of manufacturing on a production plan so that you know what to do each lesson. You will pick up marks for being able to identify health and safety and quality control issues. Use the following table to produce your production plan – this can be word processed or hand written.

Task and Process	Tools / Equipment	Health & safety	Quality Control	Time	Comments
1) Order materials	Pencil, cutting list, ruler	none	Double check all measurements	10 mins	
2) Collect and check materials	Ruler, tri square, copy of cutting list.	Careful of sharp / heavy materials	Check all sizes are accurate. Check for material defects		
3) Mark out, cut out and clean up…					

Guidance on what to put in each column:

Task and Process – use the following order of tasks in this column. For each task explain the manufacturing process that you will use (e.g. routing, lazer cutting, sanding, vacuum forming)
1) Order materials
2) Collect and check materials
3) Mark out, cut out and clean up….(Think about which components need to be made first and insert the name of your first set of components e.g. sides)
4) Repeat step 3 for each set of components that you need to make. (E.g. for a simple box you would make the sides, then the ends, then base, then lid) Keep repeating this step until all your components have been planned. Finally add the last line - **Assemble and finish**

Tools / Equipment
List all the tools and equipment you will need to carry out each process. See us if unsure.
Health & safety
List any health and safety issues and PPE that you will need (goggles, aprons etc)
Quality Control
List any Quality checks that you could do (e.g. check sizes, position of holes, depth of holes, depth of joints, do parts fit together? are components square, etc) Mention any jigs / templates that you can use (pre-bought) or that you can make to improve quality
Time
An estimate of how long the task will take – use a one hour lesson as a unit.
Comments
Leave this blank. During manufacture you can add progress comments and any problems that have happened in this column.

Task 13) Practical Work – Final make

Your mark for this in Y13 will be determined by finishing your product on time and demonstrating high quality skills and accuracy with a wide range of tools, equipment and processes. See copy of the markscheme in Y13 below. This is the top mark level description:

(d) Manufacturing a prototype [AO2] *The candidate has:*	Band
21 – 25 marks • clearly and comprehensively communicated all relevant details of a logical sequence and achievable timeline for the stages of production and testing of the final prototype • selected and worked with appropriate materials and components to successfully complete all aspects of the manufacture of their prototype to a clearly defined schedule • consistently implemented appropriate, sophisticated making skills and processes to produce a very high quality fully-functioning prototype that meets requirements of the design specification and is fit for purpose • demonstrated an excellent, in-depth understanding of the working properties and performance characteristics of the specified materials and, where appropriate, detailed consideration of surface treatments/finishes for functional and aesthetic purposes • selected and safely used specialist tools, appropriate techniques, processes, equipment and machinery with excellent accuracy and precision to enable the prototype to perform as intended and meet the needs, wants and values of the user	A* 22+

Task 14) Evaluation

- Contextual Testing**:** Test your lamp realistically, in the dark in its intended place for use!
- Get plenty of photographs from different angles, including close ups, showing your product being used by yourself and other people from your target market.

- **Testing against Specification**:

  Explain the + and – evaluation points compared to your original specification (cut and paste your spec points and comment on them)

- **Client or User group testing / survey**

  Photos of people from your user group using the product with handwritten + and – comments based on Aesthetics, Function, Ergonomics and Sustainability added in a table.

Lighting Project - Making Section - Assessment and Feedback

Strengths and Weaknesses	Next Steps + Deadline
Production Plan Quality + Accuracy Use of Tools and Equipment Evaluation **Now redo your skills graph on P3 so you can track where you have improved / still need to focus on improving.**	