

Design Technology – GCSE Engineering Design R105

Use the resources below to support you when learning from home. You can use this to help catch up on missed work, to get that extra help you might need, or to show to your family what you have been learning about at school! This supports the understanding of the R105 unit for your Exam and within the other units of R106, R107 & R108 for the mock and final coursework set over the two years.

Task?	What we are learning	Resources
1: LO1: IDENTIFICATION OF DESIGN NEEDS	<p>Right at the start of the project, the client will discuss the problem they want to be solved with the designer. This is referred to as the SITUATION.</p> <p>It sets the scene for the designer and gives them a focus. The situation is then used to write and justify the design brief</p> <p>A DESIGN BRIEF is a description of what the designer will make</p>	<p>Activities:</p> <p><i>TASK: Write your own situation and design brief into your books. You can use a computer to help (in Exercise books)</i></p> <p><i>TASK: Collect some examples of a successful brand identity. Why is this brand successful? What has the designer done well so that customers remember the brand? (on the computer)</i></p> <p>Sam is making a prototype for a speaker designed for the mass market</p> <ol style="list-style-type: none"> Suggest 2 groups of people he could ask for feedback on his prototype Explain why getting feedback on his prototype could be useful (in Exercise books) <p><i>TASK: How have mobile phones changed over the years to suit fashion trends? Collect some images of mobile phones from years ago to present day and discuss the fashion changes (on the computer)</i></p> <p><i>TASK: Titanium and Kevlar are good examples of modern materials. Find out what they are and give some examples of products that they are used in. (in Exercise books)</i></p> <p><i>QUESTION: Why is it important to consult with the client about the budget before designing? (in Exercise books)</i></p> <p>Resources: https://www.youtube.com/watch?v=6l9hjKnJDw0</p>
2: LO1: THE DESIGN CYCLE	<p>The Design Cycle is the process a designer goes through to create a product. Once they reach the evaluate stage, designers can return to identify, to correct any issues they found in the testing and evaluation stages.</p>	<p>Activities:</p> <p><i>TASK: Draw these two diagrams in your book. If you finish before others, test yourself to see if you can remember them</i></p> <p>QUESTIONS:</p> <p><i>Write a description of what the impact would be if the Identify stage of the design cycle was missing. Explain what benefits there are to the stage.</i></p> <p><i>Name 2 methods a designer could use to find out new</i></p>

	<p>Designers will also use The Design Cycle as structure to make sure designs are thoroughly developed and reviewed at each stage, and allows the designers to discuss the design with the client at regular intervals</p>	<p><i>information</i></p> <p>TASK: Can you memorise the 3 stages in the identify phase?</p> <p>QUESTIONS:</p> <p><i>Briefly describe what happens in the Identify stage of the design cycle</i></p> <p><i>What is the difference between a client and a user?</i></p> <p><i>Write a design brief for the design problem below, and then identify what areas of research would need to be carried out before the design stage.</i></p> <p>TASK: Applying one of the ideas from SCAMPER produce another model based on your original idea. Again you must fulfil the specification.</p> <p>QUESTIONS:</p> <ol style="list-style-type: none"> <i>Why is it useful to prototype out of modelling materials rather than the materials that would've been used for the product?</i> <i>Give 2 advantages of CAD modelling over modelling with physical materials</i> <i>Give an example of a product that uses Error Proofing in its design</i> <p>Questions:</p> <ol style="list-style-type: none"> <i>Give 1 activity carried out during the Validate Stage of The Design Cycle</i> <i>Give 2 ways a designer could test a car and why those tests would be useful</i> <i>What are the potential consequences of releasing products that haven't been tested and evaluated?</i> <p>Resources:</p> <p>https://www.youtube.com/watch?v=KpWrHVo972g</p> <p>https://www.youtube.com/watch?v=g0aasZ9_rDo&t=1s</p>
<p>3: LO2: MANUFACTURING CONSIDERATIONS</p>	<p>MANUFACTURING CONSIDERATIONS are a very important business need in a product specification. Manufacturing can be one</p>	<p>Activities:</p> <p>QUESTION: Describe the advantages to a manufacturer of using standard components during the manufacture of a product.</p> <p><i>You should name and describe a product in your answer.</i></p>

	<p>of the main areas of waste creation. If the manufacturing process of a product is fully considered, it should reduce waste and ultimately help to lower costs.</p> <p><i>Manufacturing considerations include:</i></p> <ul style="list-style-type: none"> • Materials Availability / Supply Chain <ul style="list-style-type: none"> • Ease of Manufacture (i.e. standard components, pre-manufactured components, DFMA, design for disassembly, manufacturing processes) • Scale of Production (i.e. prototype, one off, batch, mass production) • Durability/Reliability — how the product stands up to repeated use, and how well it continues to perform the function for which it was designed. <ul style="list-style-type: none"> • Tolerances— how precisely the components or product will match the sizes defined in the engineering drawings 	<p>PAST EXAM QUESTIONS: <i>State 2 reasons why manufacturers should consider the supply chain during the development of a new product (2)</i></p> <p><i>Explain why the availability of a material might have an impact on a new product (3)</i></p> <p>QUESTION: <i>Explain how this watch has been designed to be disassembled Why is it important that the user can take the watch apart?</i></p> <p>TASK: <i>Collect an image of a product that has been designed for disassembly. Describe why it is important that the product can be taken apart</i></p> <p>PAST EXAM QUESTIONS: <i>Discuss how the manufacturing process has affected the design of the building blocks (6)</i></p> <p>TASK: <i>Research the casting process. Collect 2 images of products made by casting and explain the process of how they are made</i></p> <p>QUESTION: <i>What is the benefit of wave soldering over manual soldering in mass production?</i></p> <p>TASK: <i>Collect some examples of wave soldering and explain the process</i></p> <p>TASK: <i>Create a card model of a mobile phone stand. Photograph it and stick it in your book.</i></p> <p>QUESTION: <i>Why is it important to show the client a model before you make the actual product?</i></p> <p>Resources: https://www.youtube.com/watch?v=CHS_9G7KwXE https://www.youtube.com/watch?v=Y-TNpedZzmY</p>
<p>4: LO2: PRODUCT REQUIREMENTS</p>	<p>Product requirements are what a product must do. Common requirements are:</p> <ul style="list-style-type: none"> • Function – what a 	<p>Activities:</p> <ol style="list-style-type: none"> 1. <i>Like the example of the car above, do a mind map of the product requirements of a laptop</i> 2. <i>Compare and contrast these requirements for the laptop, with a desktop computer – what are the similarities?</i>

	<p><i>product's purpose is</i></p> <ul style="list-style-type: none"> • Features – what makes a product unique and sellable • Performance – how well it completes its function • Target Market – how it appeals to its customers • Working Environment – how it is suitable for where it will be used • Constraints – what is must do or must not do • Aesthetics – what it will look like • Ergonomics – how its comfortable and safe to use • Lifecycle – what environmental impact it makes (and how that can be reduced) 	<p><i>The differences?</i></p> <p>3. <i>What would be the changes made, to a personal laptop to make it suitable to be a work/ business laptop? Explain why these changes might be made</i></p> <p>Resources:</p> <p>https://www.youtube.com/watch?v=AgBWfRaa6tw&t=6s https://www.youtube.com/watch?v=orZx_tXvy_Y</p>
<p>5: LO2: REQUIREMENTS OF A DESIGN SPECIFICATION</p>	<p>REQUIREMENTS OF A DESIGN SPECIFICATION: A design specification is a list of things that a product must do.</p> <p>A specification is usually split up into different sections to make it easier to understand. These are called requirement categories</p> <ul style="list-style-type: none"> • User Needs • Product Requirements • Manufacturing 	<p>Activities: <i>PAST EXAM QUESTION: Describe the process a designer would go through to create a specification from an initial design brief (4)</i></p> <p><i>TASK: Collect an image of a product. Stick it in your book and explain how it has been ergonomically designed</i></p> <p><i>PAST EXAM QUESTION: Give 2 ergonomic requirements of a mobile phone (2)</i></p> <p><i>PAST EXAM QUESTION: State 2 ways designers can ensure products are safe to use (2)</i></p> <p><i>Explain why it is important for manufacturers to make sure products are safe before being put on sale (3)</i></p>

	<p>Considerations</p> <ul style="list-style-type: none"> • Production Costs • Regulations & Safeguards <p>These requirements need to be researched and clearly listed before any design work can be carried out.</p>	<p>Resources: https://www.youtube.com/watch?v=QNw_uR1LUnI&t=14s</p>
<p>6: LO2: REGULATIONS AND SAFEGUARDS</p>		<p>Activities: TASK: <i>Using the computer, collect 3 examples of a company logo and slogan that are protected by registered trademarks. Cut them out and stick them in your books</i></p> <p>TASK: <i>There are British Standards for making mostly anything – see if you can find the British Standard for making a perfect cup of tea! Print it out and stick it in your book</i></p> <p>Resources: https://www.youtube.com/watch?v=IXyB1Zj-DFo</p>
<p>7: LO2: PRODUCTION COSTS</p>	<p>PRODUCTION COSTS have to be considered throughout the design and manufacture of a product, so clear reference to this needs to be made in the product specification.</p> <p>RRP (Recommended Retail Price) is important when marketing a product. This needs to be set at a price that; 1. gets the customer interested and 2. provides reassurance surrounding quality.</p> <p>While the RRP is important, this is heavily influenced by manufacturing costs. If a designer is aware in the specification of how much can be spent</p>	<p>Activities: TASK: <i>Use the computer to collect some examples of DIRECT and INDIRECT costs.</i></p> <p><i>Why is it important to consider these before designing and making?</i></p> <p>Resources: https://www.youtube.com/watch?v=QIeJ1RV5t8U https://www.youtube.com/watch?v=F2Uym45TUQE</p>

	on production then the design can be adapted to suit this.	
8: LO3: PRODUCT EVOLUTION	<p>Know about the wider influences on the design of new products</p> <p>Students need to have a understanding of:</p> <p><i>wider influences on new products, market forces, product evolution i.e.</i></p> <ul style="list-style-type: none"> - market pull - technological push - cultural and fashion trends <p>Protecting designs and the links to inspirational / iconic products, i.e.</p> <ul style="list-style-type: none"> - intellectual property 	<p>Activities:</p> <p><i>In your books write down what you think each of these 6 topics mean.</i></p> <ul style="list-style-type: none"> • <i>Technology Push</i> • <i>Market Pull</i> • <i>Culture</i> • <i>Fashion/ Trends</i> • <i>Competition from other companies</i> • <i>Manufacturing Techniques</i> <p>Task:</p> <p><i>If you could design for the future of a company what would you come up with. Use one of these products or choose your own and draw the next design in the Evolution for the product. Make sure you annotate the product explain how it works, what it made from, what makes it the next step in the process etc.</i></p> <p><i>Be prepared to share you designs with each other.</i></p> <p>Resources:</p> <p>https://www.youtube.com/watch?v=Kt_8liBFmdl</p> <p>https://www.youtube.com/watch?v=DENG7Q7VRgo</p> <p>https://www.youtube.com/watch?v=sc-8SJauGYg</p>
8 LO3: NEW AND EMERGING TECHNOLOGIES AND MATERIALS	<p>Traditional materials are those that have been in use for centuries, such as paper, wood, stone and metals. We have also developed modern materials, which can be used alongside them.</p> <p>Concrete, aluminium and steel are all commonly used modern materials, but more recent additions include materials that have changed the way we manufacture and use products.</p>	<p>Activities:</p> <p><i>TASK: What are composite materials?</i></p> <p><i>Create a factfile about carbon fibre. What products made from carbon fibre and what traditional materials were they once made of?</i></p> <p><i>TASK: Produce a factfile on THERMOCHROMIC PIGMENTS</i></p> <p><i>TASK: Produce a factfile on SHAPE MEMORY ALLOYS</i></p> <p><i>TASK: Produce a factfile on POLYMORPH</i></p> <p><i>TASK: Produce a factfile on PHOTOCHROMIC PIGMENTS</i></p> <p>Resources:</p> <p>https://www.youtube.com/watch?v=o81vdCreJtQ</p> <p>https://www.youtube.com/watch?v=qFyaWyv66sc</p>
9 LO3: ENVIRONMENTAL PRESSURES		<p>Activities:</p> <p>QUESTION 1:</p> <p>What are the negative impacts of deforestation?</p> <p>What can a designer do to reduce their impact on deforestation?</p>

		<p>TASK 1: Collect an image of the FSC logo and stick it in your book</p> <p>QUESTION 2: What are some alternative uses of energy that may be good for the environment? What is carbon footprint? How does transporting products effect the environment?</p> <p>TASK: Using the computer, collect some images of products that are sold using Fair Trade</p> <p>Task: Using the computer, collect some examples of designs that are inclusive and explain how they work</p> <p>Resources: https://www.youtube.com/watch?v=ehWIMbhhVkg https://www.youtube.com/watch?v=0DVyZwiXBj8</p>
<p>10 LO3: LIFE CYCLE ANALYSIS (LCA)</p>	<p>Product Lifecycle is what environmental impact a product makes over its life time. Including:</p> <ul style="list-style-type: none"> • Impact of materials • Impact of processes • Product Miles (how far a product has to travel to get from factory to consumer) • Impact while in use • Impact when disposed of (6Rs) • <p>A Lifecycle Analysis is when a designer looks at a product's impact and considers what can be improved to minimise it's impact</p>	<p>Activities: TASK: Use the computer to collect an image of the LIFE CYCLE ANALYSIS diagram as shown here. Find an example of life cycle analysis and fully explain it</p> <p>TASK: Collect an image of the product life cycle graph. Explain what might happen to the sales of Christmas card at each stage of the product life cycle graph</p> <p>Resources: https://www.youtube.com/watch?v=2NgaW8a_22I</p>
<p>11 LO3: LEGISLATIVE DESIGN REQUI</p>	<p>Consumer protection laws and legislation are what rights a consumer has to be protected against</p>	<p>Activities: TASK: Use the computers to find the symbols for:</p> <ul style="list-style-type: none"> • Flammable

<p>REMENTS</p>	<p>defective products, and what companies have to follow to have products sold in different countries. All companies must abide by these laws or face legal consequences.</p> <p>Health and safety considerations are important, not just for consumers using products, but the manufacturers making them as well.</p> <p>Often symbols are used around workshop areas, as well as being on products to ensure people are being safe in an area/ using equipment or a product</p>	<ul style="list-style-type: none"> • <i>Not suitable for children</i> • <i>Recycling symbol (Mobius loop)</i> <p>Resources: https://www.youtube.com/watch?v=IXyB1Zj-DFo</p>
<p>12 LO3: ICONIC PRODUCTS</p>	<p>Iconic Products are designs/products that set a new bench mark for others to follow. The reason for this is to take advantage of the market research that has already been done and the proven customer base that already exists.</p> <ul style="list-style-type: none"> • It is a ground breaking design, in terms of its technology or manufacturing techniques. • It is a design that stands the test of time, remaining popular despite the passing of years. <ul style="list-style-type: none"> • It is often recognised immediately by consumers. • It is often emulated/copied by other designers. 	<p>Activities: <i>TASK: Use the computer to find 3 examples of iconic products. Describe the products and explain why you think they are iconic. Have they inspired further designs?</i></p> <p>Resources: https://www.youtube.com/watch?v=9wHIJXnx0bM https://www.youtube.com/watch?v=QrQx-ipw8zk https://www.youtube.com/watch?v=s95MPtVSngc https://www.youtube.com/watch?v=XhMVWzVXNNk</p>
<p>13. LO3: CULTURAL AND FASHION TRENDS</p>	<p>CHANGES IN FASHION: FASHION changes regularly amongst consumers and designers. The most obvious example of regularly-changing fashion is within the clothing industry, but it affects all consumer products to some</p>	<p>Activities: <i>TASK: Use the computer to collect some images of changes in fashion in products. Stick the pictures in your book and explain the changes</i></p> <p><i>TASK: Use the computer to find an example of market pull and</i></p>

	<p>extent.</p> <p>Consumers want to pick a product that keeps up with fashion and trends. An example of this can be seen in bathroom suites. In the 1980s and 1990s it was popular for bathroom ceramics to be coloured, with gold fixtures. Now, it is virtually impossible to purchase a coloured bathroom suite due to changes in fashion. White ceramics with chrome fittings is now the colour of choice. Some products are aimed at different CULTURES and countries. A product acceptable in one culture may be looked as offensive or less desirable in another.</p> <p>The use of colours and colour schemes are a good example of this.</p> <p>For instance, in China, red is associated with good luck, where elsewhere in the world red is used to represent danger.</p>	<p><i>technology push. Include a picture for each and a description to explain them.</i></p> <p>QUESTIONS:</p> <p><i>Colour can be used to indicate meaning, but this meaning can be understood differently in different cultures. Suggest a suitable colour indicator for ecology, or safe passage such as a fire escape.</i></p> <ol style="list-style-type: none"> <i>1. What emotions or meaning does this colour convey?</i> <i>2. Find out what meaning the colour green has in various societies.</i> <i>3. How might this affect your choice of colour for the packaging of a new environmental product designed for sale internationally?</i> <p>Resources: https://www.youtube.com/watch?v=xlgnWJx9oxc</p>
14. Other useful links	These other links will support your learning in other areas in the course.	<p>Resources:</p> <p>Basic Drawing Techniques Lesson https://www.youtube.com/watch?v=rvc7HZ553Kw</p> <p>Tolerance, Safety, Durability and Sustainability lesson https://www.youtube.com/watch?v=wNSOH-yrX_E</p> <p>OCR Cambridge Nationals Engineering Design - BGLC Exam Success Video https://www.youtube.com/watch?v=K-eULeIEzmU&t=54s</p> <p>The Design Brief https://www.youtube.com/watch?v=C4Bp3ZOskFo&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV</p> <p>What is a Prototype? https://www.youtube.com/watch?v=4XengN51b9o&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=2</p> <p>Design for Disassembly https://www.youtube.com/watch?v=MeN5dUSHQT0&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=6</p> <p>What is rapid prototyping? https://www.youtube.com/watch?v=OhNnKTaciVI&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=7</p> <p>Scales of production- GCSE Revision https://www.youtube.com/watch?v=IAyhCXNMILY&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=8</p> <p>Standard Components https://www.youtube.com/watch?v=0fpB_EG4EaY&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=9</p>

[aQvUOi8P5-mjVOOD7VMmvtYV&index=9](https://www.youtube.com/watch?v=UBSOiHUctrY&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=9)
Coca Cola Supply Chain
<https://www.youtube.com/watch?v=UBSOiHUctrY&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=10>

Intellectual Property Law Explained - What is Trademark?
<https://www.youtube.com/watch?v=2aHfcadJW4&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=11>

6Rs of Sustainability
<https://www.youtube.com/watch?v=luE5Aeqjf1Q&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=12>

Influences On Design: Culture
<https://www.youtube.com/watch?v=HxVN42BIO04&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=13>

Life Cycle Assessment
<https://www.youtube.com/watch?v=KrJUpSiCOoU&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=14>

CE Marking with BSI
<https://www.youtube.com/watch?v=t52cOt6sUo&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=15>

Differentiate your business with BSI Kitemark
<https://www.youtube.com/watch?v=vOeU4MljJ0o&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=16>

A Quick Guide to Smart & Modern Materials
<https://www.youtube.com/watch?v=FgrIDibPmJo&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=17>

Amazing Polymorph Plastic Easy to Mould Thermoplastic
Endless Uses
<https://www.youtube.com/watch?v=lhVuc6RNYaw&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=18>

Sustainability explained through animation
<https://www.youtube.com/watch?v=B5NiTN0chj0&list=PLg9vkUMuVaQvUOi8P5-mjVOOD7VMmvtYV&index=19>