

YEAR 11 DT GCSE EXAM REVISION

Structure of the exam paper:

- The paper is 2 hours duration
- The exam is 50% of total marks
- There are three sections in the exam:
 - Section A: Core technical principles (20 marks) - consists of multiple choice and short answer questions examining the core technical principles
 - Section B: Specialist technical principles (30 marks) - consists of longer response questions that assess the specialist technical principles
 - Section C: Designing and making principles (50 marks) - consists of questions that assess the designing and making principles.

Revision list Section A (the page numbers are for the blue book) :

Core technical principles	
New and emerging technologies	<ul style="list-style-type: none"> • Industry – Design/organisation of the workplace ie. automation and the use of robotics. Pages 2 & 3 • Enterprise – Crowdfunding, co-operatives, virtual marketing and fair trade. Pages 10 & 11 • Sustainability – Finite resource, non-finite resource, ecological + social footprint of materials, Disposal of waste. Pages 6 to 9, 35, 102 & 103 • People - Technology push and market pull, Culture (fashion), Society and Environment issues with new technologies, designing for disabled/elderly/different religious groups. Pages 6 to 11, 2 & 3, 96 & 97 • Production techniques and systems – CAD/CAM, FMS, CNC, JIT, lean manufacturing. Pages 4 & 5, 8, 3 • Critical evaluation of emerging technologies – planned obsolescence, design for maintenance, ethics, environment and end of life disposal. Pages 6 to 8
Energy generation and storage	<ul style="list-style-type: none"> • Fossil fuels – Coal, natural gas and oil – how is power generated and arguments for and against. Page 12 • Nuclear power – how is power generated and arguments for and against. Page 12 • Renewable energy – wind, solar, tidal, water (hydroelectricity), wave and biomass – how does it work and arguments for and against. Pages 12 & 13 • Energy storage systems – kinetic pump storage systems, mechanical energy storage, electrical energy storage. Page 13
Developments in new materials	<ul style="list-style-type: none"> • Modern materials – Graphene, metal foam, titanium, coated metals, LCD, nanomaterials, Teflon, Corn starch polymers. Page 32 • Smart materials – Thermo-chromic pigments, Shape memory alloys, photochromic pigments. Page 33 • Composites – Concrete, GRP, CRP. Page 33 • Technical textiles – conductive fabrics, fire-resistant fabrics, Kevlar, gore-tex, microfibers. Page 33
Systems approach to designing	<ul style="list-style-type: none"> • Systems approach – Input, process, output. Pages 24 to 27 • Input devices – LDR, thermistor, switches and pressure sensors. Page 25 • Processes – microcontrollers. Pages 26 & 27 • Outputs - Lamps and LEDs, buzzers and speakers. Page 27
Mechanical devices	<ul style="list-style-type: none"> • Types of movement – linear, reciprocating, rotary, oscillating. Page 28 • Changing magnitude and direction – levers, linkages, rotary systems, pulleys and gears. Pages 28 to 31
Materials and their working properties	<ul style="list-style-type: none"> • Paper and boards – properties and uses. Paper – Bleed proof, cartridge paper, grid, layout paper and tracing paper. Boards – corrugated card, duplex board, foil-lined board, foam core board, inkjet card, solid white board. Page 16 • Natural and manufactured timbers – Properties and uses. Page 17 <ul style="list-style-type: none"> - Hardwoods – Ash, beech, mahogany, oak, balsa - Softwoods – Larch, Pine, Spruce - Manufactured boards – MDF, plywood, chipboard. Pages 23, 44 • Metals and alloys – Properties and uses. Page 18 <ul style="list-style-type: none"> - Ferrous metals – Cast iron, Low carbon steel, high carbon steel - Non-ferrous metals – Aluminium, copper, zinc, tin - Alloys – Brass, stainless steel, high speed steel • Polymers – Properties and uses. Page 19 <ul style="list-style-type: none"> - Thermoforming polymers – Acrylic, HIPS, HDPE, PP, PVC, PET - Thermosetting polymers – epoxy resin, MF, PF, polyester resin, UF - Polymer additives • Textiles. Pages 20 to 23 <ul style="list-style-type: none"> - Natural fibres – cotton, wool, silk - Synthetic fibres – Polyester, polyamide (nylon), Elastane - Blended and mixed fibres - Woven fabrics - Non woven fabrics – bonded, felted - Knitted textiles – Weft knit fabrics, warp knit fabrics • Material properties. Pages 14 & 15 <ul style="list-style-type: none"> - Physical properties – Fusibility, electrical conductivity, thermal conductivity, resistance to moisture, absorbency - Mechanical properties – Strength, hardness, density, toughness, malleability, ductility, elasticity

Revision list Section B (the page numbers are for the blue book) focusing on timbers and polymers only:

Specialist Technical Principles: Timbers and Polymers	
Selection of materials or components Pages 34 & 35	<ul style="list-style-type: none"> • Functionality • Aesthetics • Environmental factors • Availability • Cost • Social Factors • Cultural factors • Ethical factors, ie using FSC timber
Forces and stresses Pages 36 & 37	<ul style="list-style-type: none"> • Forces acting on materials and objects – Tension, compression, shear, bending, torsion • Enhancing materials – Timber laminating, GRP,CRP
Ecological and social footprint Pages 6 to 11, 44 to 47	<ul style="list-style-type: none"> • Eco issues in product design/manufacture – mining, drilling, farming, deforestation, the 6 R's • Social issues in product design/manufacture, safe working conditions • Reducing oceanic and atmospheric pollution • Reducing the detrimental impact on others
Sources and origins Pages 44 & 45	<ul style="list-style-type: none"> • Timber – Primary sources, conversion, seasoning • Polymers –Primary sources, fractional distillation, cracking, polymerisation
Using and working with materials Pages 58 & 59, 64 & 65	<p>Timber + polymers</p> <ul style="list-style-type: none"> • How different properties are used in commercial products • How properties influence use and performance • Modification of properties for specific purposes ie. stabilisers to resist UV in polymers • How to shape and form - for timber - cutting, drilling, chisel, sanding, a plane - for polymers – cutting, drilling, casting, deforming, welding
Stock forms, types and sizes Pages 60 to 62	<ul style="list-style-type: none"> • Timber stock forms and timber based components – woodscrews, hinges, knockdown fittings. • Polymer stock forms – sheets, granules, powders, foams, films, PLA filament • Polymer based components – nuts and bolts, hinges
Scales of production Pages 38 & 39	<ul style="list-style-type: none"> • Prototype, batch production, mass production, continuous production
Specialist techniques and processes	<p>Timber + polymers</p> <ul style="list-style-type: none"> • The use of production aids ie. Jigs / templates. Pages 42 & 43 • Tools equipment and processes including injection moulding / vacuum forming / extrusion for polymers, and routing and turning for timbers. Pages 64 to 71 • Tolerances. Page 40 • Commercial processes. Pages 68 to 71 • Application of quality control. Pages 40 & 41
Quality Control Pages 40 & 41	Dimensional accuracy, go/no go for timber, laser cutter settings for polymers.
Surface treatments and finishes	<p>Timber</p> <ul style="list-style-type: none"> • Surface preparation for timber. Page 72 • Finishes for timber – stains, preservatives, varnish, oils and paints. Page 72 <p>Polymers</p> <ul style="list-style-type: none"> • Polishing. Page 73 • Printing. Page 73 • Vinyl decals. Page 73

Revision list Section C (the page numbers are for the blue book) mostly covered in our NEA :

Designing and making principles	
Investigation, primary and secondary data	<ul style="list-style-type: none"> Use primary and secondary data to understand client needs (market research, human factors including ergonomics, focus groups, product analysis, anthropometric data/percentiles). Pages 100 & 101 How to write a design brief, design specification, manufacturing specification. Pages 98 & 99, 112 & 114
Environmental, social and economic challenge	<ul style="list-style-type: none"> Deforestation. Page 47 Global warming. Page 6 Fair trade. Pages 10 & 103
The work of others Pages 94 & 95	<ul style="list-style-type: none"> Past and present designers – revise 2 from the following: Harry Beck, Marcel Breuer, coco Chanel, Norman Foster, Sir Alec Issigonis, Alexander Mcqueen, William Morris, Mary quant, Louis Comfort Tiffany, Raymond Templier, Gerrit Reitveld, Charles Rennie Makintosh, Aldo Rossi, Ettore Sottsass, Phillippe Starck, Vivienne Westwood Past and present design companies – revise 2 from the following: Braun, Dyson, Apple, Alessi
Design Strategies Pages 104 & 105	<ul style="list-style-type: none"> Design strategies – collaboration, user centred design, a systems approach, iterative design, avoiding design fixation, biomimicry, cultural influences
Communication of ideas Pages 108 to 111 Pages 106 & 107	<ul style="list-style-type: none"> Freehand sketching, isometric and perspective Systems and schematic diagrams Annotated drawings Exploded diagrams Working drawings – 3rd angle orthographic, dimensions, scale Modelling
Prototype development Pages 114 & 115	<ul style="list-style-type: none"> Designing and developing – think NEA Evaluation of prototypes – think NEA
Selection of materials and components Pages 34 & 35	<ul style="list-style-type: none"> Functional need, cost, availability
Tolerances Page 40	<ul style="list-style-type: none"> Relevant tolerances in design and manufacture How to calculate max/min size given a tolerance
Materials management Pages 116 & 117	<ul style="list-style-type: none"> Efficient cutting & minimising waste, marking out methods, datum points and coordinates
Specialist tools and equipment Pages 64 to 67 Pages 4 & 5	<ul style="list-style-type: none"> Laser cutters, 3d printers, CNC machines, vacuum bags, hand tools
Specialist techniques and processes	<ul style="list-style-type: none"> Specialist techniques. Pages 64 to 71 Surface treatments. Pages 72 & 73

Revision Resources

- The blue and white books should be used to learn/revise/test your theory knowledge.
- Worksheets/drawing technique work etc. completed in lessons can be used to revise from.
- You will have learnt a huge amount through the process of completing your NEA, including materials and manufacturing processes knowledge.
- Some specimen questions from the AQA follow. Also, use your Year 10 and Year 11 mock as a revision resource.
- BBC bitesize has been updated for this course, and is much improved. Good Q & A to test your knowledge.
- Try the Gojimo app.
- technologystudent.com has a vast bank of knowledge. Use it to further your understanding and compliment the other revision sources listed above.

Please see your DT teacher for additional revision exercises or help with understanding a particular topic.

Draft AQA questions

Specimen paper questions – section A

1 A designer has created a security system for use in a home. The system is intended to alert the home owner to an intruder. What is the input in this system?

- A Alarm sound
- B Automatic message sent to mobile phone
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- C Flashing light
- D Motion sensor

[1 mark]

Specimen paper questions – section A

2 You have marked out and cut a design to a measurement of 100 x 100mm with a tolerance of ± 2 mm. Which one of the following measurements is in tolerance?

- A 97.9 x 100.58mm
- B 98.2 x 102.56mm
- C 99.9 x 101.07mm
- D 102.58 x 96.2mm

[1 mark]

Specimen paper questions – section A

3 Figure 1 shows a stool.



Figure 1

When a person sits on this stool, what is the main force on the stool leg?

- A Compression
- B Shear
- C Tension
- D Torsion

[1 mark]

Specimen paper questions – section A

13

State two reasons why corrugated cardboard is used as packaging for cooked pizzas.

[2 marks]

1. _____

2. _____

Specimen paper questions – section A

14 . 1 Name a non-renewable energy source.

[1 mark]

14 . 2 State two impacts of non-renewable energy sources on the environment.

[2 marks]

1. _____

2. _____

Specimen paper questions – section B

15 . 1 Circle **one** of the stock forms listed. Name **one** of the raw materials it is made from.

[1 mark]

Acrylic rod	Corrugated card	Aluminium sheet	Wool yarn	MDF board
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Raw material _____

15 . 2 Choose **one** of the above stock forms. Describe the process of changing it from raw material to stock form.

[4 marks]

Name of stock form _____

Specimen paper questions – section B

19 Designers sometimes make choices about the materials they use according to their impact on society.
Examples include the use of fair trade cotton, recycled components and biodegradable packaging.

Evaluate how the use of such materials might be seen as the ethical choice.

[10 marks]

Specimen paper questions – section C

20 . 1 Please select **one** of the products below.
This will be used as the basis for your answers in this section of the paper.



Stacking chair



Radio



Dress

State your chosen product _____

Who do you think the intended target market might be for this product and why?

[2 marks]

Specimen paper questions – section C

22 . 1 You have been asked to redesign your chosen product to make it suitable for a child aged between 3 and 5 years old.

The data in the table below shows the preferred colour scheme according to 250 children aged between 3 and 5 years old.

Calculate the missing percentages.

[2 marks]

Rectangular Slip

	Number of children	Percentage of total
Pastel colours	55	22%
Primary colours	105	
Fluorescent colours	50	20%
Subtle colours	30	
Metallic colours	10	4%
Total	250	