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Edexcel D&T Specification

Exam unit **100 marks (worth 50%)**

NEA unit **100 marks (worth 50%)**

GCSE Design & Technology (Fashion & Textiles) - Self Tracking Sheet (RAG)

CORE KNOWLEDGE				
You should...	Covered	Red	Amber	Green
<p><u>Core knowledge:</u></p> <p><u>The impact of new and emerging technologies</u></p> <p>To apply a breadth of technical knowledge and understanding of the characteristics, advantages and disadvantages of the following in relation to new and emerging technologies.</p> <p>1.1.1 Industry: a unemployment b workforce skill set c demographic movement d science and technology parks.</p> <p>1.1.2 Enterprise: a privately-owned business b cloud funding c government funding for new business start-ups d not-for-profit organisations.</p> <p>1.1.3 Sustainability: a transportation costs b pollution c demand on natural resources d waste generated.</p> <p>1.1.4 People: a workforce b consumers c children d people with disabilities e wage levels f highly-skilled workforce g apprenticeships.</p> <p>1.1.5 Culture: a population movement within the EU b social segregation/clustering within ethnic minorities.</p> <p>1.1.6 Society: a changes in working hours and shift patterns b Internet of Things (IoT) c remote working d use of video conference meetings.</p>				

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<p>1.1.7 Environment: a pollution b waste disposal c materials separation d transportation of goods around the world e packaging of goods.</p> <p>1.1.8 Production techniques and systems: a standardised design and components b just-in-time (JIT) c lean manufacturing d batch e continuous f one off g mass.</p>				
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You should....	Covered			
<p><u>Core knowledge required</u></p> <p>How the critical evaluation of new and emerging technologies informs design decisions; considering contemporary and potential Future scenarios from different perspectives, such as ethics and the environment</p> <p>To recognise the importance of the evaluative process and respective criteria when considering the impact of new and emerging technologies to a range of scenarios.</p> <p>1.2.1 How to critically evaluate new and emerging technologies that inform design decisions: a budget constraints b timescale c who the product is for d the materials used e manufacturing capabilities.</p> <p>1.2.2 How critical evaluations can be used to inform design decisions, including the consideration of contemporary and potential future scenarios: a natural disasters b medical advances c travel d global warming e communication.</p> <p>1.2.3 Ethical perspectives when evaluating new and emerging technologies: a where it was made b who was it made by c who will it benefit d fair trade products.</p> <p>1.2.4 Environmental perspectives when evaluating new and emerging technologies: a use of materials b carbon footprint c energy usage and consumption during manufacture and</p>				

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transportation d life cycle analysis (LCA).		
<p><u>Core knowledge required</u></p> <p>How energy is generated and stored in order to choose and use appropriate sources to make products and power systems</p> <p>The processes, applications, characteristics, advantages and disadvantages of the following, in order to be able to discriminate between them and to select appropriately.</p> <p>1.3.1 Sources, generation and storage of energy: a fossil fuels – oil, gas, coal b biofuels – biodiesel and biomass c tidal d wind e solar f hydroelectric.</p> <p>1.3.2 Powering systems: a batteries and cells b solar cells c mains electricity d wind power.</p> <p>1.3.3 Factors to consider when choosing appropriate energy sources to make products and power systems: a portability of the power source b environmental impact c power output d circuit/system connections e cost.</p>		

You should...	Covered	Red	Amber	Green
<p><u>Core knowledge required</u></p> <p>Developments in modern and smart materials, composite materials and technical textiles</p> <p>To apply technical knowledge and understanding of the characteristics, applications, advantages and disadvantages of the following.</p> <p>1.4.1 Modern and smart materials: a shape-memory alloys (SMAs) b nanomaterials c reactive glass d piezoelectric materials</p>				

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e temperature-responsive polymers
f conductive inks.

1.4.2 Composites:
a concrete
b plywood
c fibre/carbon/glass
d reinforced polymers
e robotic materials.

1.4.3 Technical textiles:
a agro-textiles
b construction textiles
c geo-textiles
d domestic textiles
e environmentally friendly textiles
f protective textiles
g sports textiles.

Core knowledge required

The functions of mechanical devices used to produce different sorts of movements, including the changing of magnitude and the direction of forces

The performance, principles, applications and the influence on the design of products of the following.

1.5.1 Types of movement:
a linear
b reciprocation
c rotary
d oscillation.

1.5.2 Classification of levers:
a class 1, 2 and 3
b calculations related to mechanical advantage (MA), velocity ratio (VR), load, effort and efficiency.

1.5.3 Linkages:
a bell crank
b reverse motion linkages.

1.5.4 Cams:
a pear shaped
b eccentric (circular)
c drop (snail).

1.5.5 Followers:
a roller
b knife
c flat followers.

1.5.6 Pulleys and belts:
a V-belt
b velocity ratio (VR)
c input and output speeds.

1.5.7 Cranks and sliders.

1.5.8 Gear types:
a simple and compound gear train
b idler gear
c revolutions per minute (RPM) calculations
d bevel gears
e rack and pinion.

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You should...	Covered	Red	Amber	Green
<p><u>Core knowledge</u></p> <p>How electronic systems provide functionality to products and processes, including sensors and control devices to respond to a variety of inputs, and devices to produce a range of outputs</p> <p>Recognise and apply knowledge and understanding of the working characteristics, applications, advantages and disadvantages of the following.</p> <p>1.6.1 Sensors, including: a the role of sensors in electronic systems b light-dependent resistors (LDRs) c thermistor.</p> <p>1.6.2 Control devices and components, including: a the role of switches in electronic systems b transistors c resistors.</p> <p>1.6.3 Outputs, including: a the role of outputs in electronic systems b buzzers c light-emitting diodes (LEDs).</p>				

You should...	Covered	Red	Amber	Green
<p><u>Core knowledge</u></p> <p>The use of programmable components to embed functionality into products in order to enhance and customise their operation</p> <p>The performance and functionality of using programmable components.</p> <p>1.7.1 How to make use of flowcharts.</p> <p>1.7.2 How to switch outputs on/off in relation to inputs and decisions.</p> <p>1.7.3 How to process and respond to analogue inputs.</p>				

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1.7.4 How to use simple routines to control outputs with delays, loops and counts.				
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<p align="center">You should...</p> <p><u>Core knowledge</u></p> <p>1.8 The categorisation of the types, properties and structure of ferrous and non-ferrous metals</p> <p>To apply knowledge and understanding of working properties, characteristics, applications, advantages and disadvantages of the following types of materials, in order to be able to discriminate between them and select appropriately.</p> <p>1.8.1 Ferrous metals, including: a mild steel b stainless steel c cast iron.</p> <p>1.8.2 Non-ferrous metals, including: a aluminium b copper c brass.</p> <p>1.8.3 Properties, including: a ductility b malleability c hardness.</p>				

	Covered	Red	Amber	Green
<p align="center">You should...</p> <p><u>Core knowledge</u></p> <p>1.9 The categorisation of the types, properties and structure of papers and boards</p> <p>To apply knowledge and understanding of working properties, characteristics, applications, advantages and disadvantages of the following types of materials, in order to be able to discriminate between them and select appropriately.</p> <p>1.9.1 Paper, including: a copier paper</p>				

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<p>b cartridge paper c tracing paper.</p> <p>1.9.2 Board, including: a folding boxboard b corrugated board c solid white board.</p> <p>1.9.3 Properties, including: a flexibility b printability c biodegradability.</p>				
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You should...	Covered	Red	Amber	Green
<p><u>Core knowledge</u></p> <p>1.10 The categorisation of the types, properties and structure of Thermoforming and thermosetting polymers</p> <p>To apply knowledge and understanding of working properties, characteristics, applications, advantages and disadvantages of the following types of materials, in order to be able to discriminate between them and select appropriately.</p> <p>1.10.1 Thermoforming polymers, including: a acrylic b high impact polystyrene (HIPS) c biodegradable polymers – Biopol®.</p> <p>1.10.2 Thermosetting polymers, including: a polyester resin b urea formaldehyde.</p> <p>1.10.3 Properties, including: a insulator of heat b insulator of electricity c toughness.</p>				

You should...	Covered	Red	Amber	Green
<p><u>Core knowledge</u></p> <p>1.11 The categorisation of the types, properties and structure of natural, synthetic, blended and mixed fibres, and woven, non-woven and knitted textiles</p> <p>To apply knowledge and understanding of working properties, characteristics, applications, advantages and disadvantages of the following types of materials, in order to be able to discriminate between them and select appropriately.</p> <p>1.11.1 Natural, including: a animal – wool b vegetable – cotton.</p>				

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<p>1.11.2 Synthetic, including: a polyester b acrylic.</p> <p>1.11.3 Woven, including: a plain – calico b twill – denim.</p> <p>1.11.4 Non-woven, including: a felted wool fabric b bonded fibres/webs.</p> <p>1.11.5 Knitted, including: a weft-knitted fabrics b warp-knitted fabrics.</p> <p>1.11.6 Properties, including: a elasticity b resilience c durability.</p>				
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You should...	Covered	Red	Amber	Green
<p><u>Core knowledge</u></p> <p>1.12 The categorisation of the types, properties and structure of natural and manufactured timbers</p> <p>To apply knowledge and understanding of working properties, characteristics, applications, advantages and disadvantages of the following types of materials, in order to be able to discriminate between them and select appropriately.</p> <p>1.12.1 Natural timbers – hardwoods, including: a oak b mahogany c beech d balsa.</p> <p>1.12.2 Natural timbers – softwoods, including: a pine b cedar.</p> <p>1.12.3 Manufactured timbers, including: a plywood b medium density fibreboard (MDF).</p> <p>1.12.4 Properties, including: a hardness b toughness c durability.</p>				

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<p><u>Core knowledge</u></p> <p>1.13 All design and technological practice takes place within contexts which inform outcomes</p> <p>Performance characteristics of a wide range of materials, components and manufacturing processes, in order to be able to discriminate between them and select appropriately.</p> <p>1.13.1 A wide range of materials, components and manufacturing processes for a range of contexts, to inform outcomes, including:</p> <p>a the properties of materials and or components b the advantages and disadvantages of materials and components and manufacturing processes c justification of the choice of materials and components and manufacturing processes.</p>				
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You should...	Covered	Red	Amber	Green
<p><u>Core knowledge</u></p> <p>1.14 Investigate environmental, social and economic challenges when identifying opportunities and constraints that influence the processes of designing and making</p> <p>Implications for designers and manufacturers of the following when developing designs and manufacturing products.</p> <p>1.14.1 Respect for different social, ethnic and economic groups who have different needs and values when identifying new design opportunities.</p> <p>1.14.2 An appreciation of the environmental, social and economic issues relating to the design and manufacture of products, including, fair trade, carbon offsetting, product disassembly and disposal.</p> <p>1.14.3 The main factors relating to 'Green Designs'.</p> <p>1.14.4 The main factors relating to recycling and reusing materials or products.</p> <p>1.14.5 Human capability.</p> <p>1.14.6 Cost of materials.</p> <p>1.14.7 Manufacturing capability.</p> <p>1.14.8 Environmental impact – life cycle analysis (LCA).</p>				

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<p><u>Core knowledge</u></p> <p>1.15 Investigate and analyse the work of past and present professionals and companies in order to inform design</p>				

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<p>Strategies, techniques and approaches employed when investigating and analysing the work of others.</p> <p>1.15.1 Analysing a product to the following specification criteria: a form b function c client and user requirements d performance requirements e materials and components/systems f scale of production and cost g sustainability h aesthetics i marketability j consideration of innovation.</p> <p>1.15.2 The work of past and present designers and companies: a Alessi b Apple c Heatherwick Studio d Joe Casely-Hayford e Pixar f Raymond Loewy g Tesla h Zaha Hadid.</p>				
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You should...	Covered	Red	Amber	Green
<p><u>Core knowledge</u></p> <p>1.16 Use different design strategies to generate initial ideas and avoid design fixation</p> <p>Strategies, techniques and approaches employed when generating design ideas.</p> <p>1.16.1 Use of different design strategies, including: a collaboration b user-centred design c systems thinking.</p>				

You should...	Covered	Red	Amber	Green
<p><u>Core knowledge</u></p> <p>1.17 Develop, communicate, record and justify design ideas, applying suitable techniques</p> <p>Techniques employed when communicating and recording design ideas.</p> <p>1.17.1 Develop and use a range of communication techniques and media to present the design ideas, including:</p>				

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<p>a freehand sketching (2D and/or 3D) b annotated sketches c cut and paste techniques d digital photography/media e 3D models f isometric and oblique projection g perspective drawing h orthographic and exploded views i assembly drawings j system and schematic diagrams k computer-aided design (CAD) and other specialist computer drawing programs.</p> <p>1.17.2 Record and justify design ideas clearly and effectively using written techniques.</p>				
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You should...	Covered	Red	Amber	Green
<p><u>Fashion and Textiles knowledge</u></p> <p>6.1 Design contexts 6.1.1 When designing or modifying a product, students should be able to apply their knowledge and understanding of textiles, components and manufacturing processes.</p>				

You should...	Covered	Red	Amber	Green
<p><u>Fashion and Textiles knowledge</u></p> <p>6.2 The sources, origins, physical and working properties of natural, synthetic, woven and non-woven, knitted, blended and mixed-fibre textiles and their social and ecological footprint</p> <p>To apply knowledge and understanding of the advantages, disadvantages and applications of the following materials, in order to be able to discriminate between them and select appropriately.</p> <p>6.2.1 Natural: a animal i. wool (in topic 1) ii. silk b vegetable i. cotton (in topic 1) ii. linen.</p> <p>6.2.2 Synthetic: a polyester (in topic 1) b acrylic (in topic 1) c regenerated cellulosic – viscose, acetate, Tencel® d polyamide e elastane f nylon.</p>				

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6.2.3 Woven:

- a plain – calico (in topic 1)
- b twill – denim (in topic 1)
- c satin – jacquard
- d pile – velvet.

6.2.4 Non-woven:

- a felted wool fabric (in topic 1)
- b bonded fibres/webs (in topic 1) .

6.2.5 Knitted:

- a weft-knitted fabrics (in topic 1)
- b warp-knitted fabrics (in topic 1).

6.2.5 Sources and origins – where natural, synthetic, woven and non-woven, knitted, blended and mixed-fibre textiles are resourced/manufactured and their geographical origin:

- a China, India, United states of America, Pakistan – cotton
- b China, India, Uzbekistan – silk
- c Russia, Canada, Ukraine, Europe (France and Belgium) – (flax) linen
- d Australia, New Zealand, China, USA, United Kingdom – wool
- e Alpine Forests – cellulose and wood pulp – cotton linters, pine, spruce, or hemlock trees – soft wood – acetate
- f European Forest – oak and birch – hard wood – Lyocell™
- g Russia, UAE, Saudi Arabia – crude oil – polyester, nylon, acrylic.

6.2.6 The physical characteristics of each natural, synthetic, woven and non-woven, knitted, blended and mixed-fibre textile:

- a allergenic
- b texture
- c density.

6.2.7 Working properties – the way in which each material behaves or responds to external sources:

- a elasticity (in topic 1)
- b resilience (in topic 1)
- c durability (in topic 1)
- d tensile strength
- e breathability and absorbency
- f electrical conductivity
- g heat conductivity.

6.2.8 Social footprint:

- a trend forecasting
- b impact of material production on communities and wildlife
- c impact of farming and material production on communities and wildlife
- d recycling/disposal – ethical responsibility
- e reduction of chemical finishes – surface and aftercare treatments
- f reduction of packaging materials – reduction in litter/waste/energy use
- g brand identity – consumerism, changing the packaging of products over time.

6.2.9 Ecological footprint:

- a sustainability
- b processing
- c transportation
- d wastage
- e pollution

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f deforestation g oil exploration and extraction h wildlife loss.				
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You should...	Covered	Red	Amber	Green
<p><u>Fashion and Textiles knowledge</u></p> <p>6.3 The way in which the selection of natural, synthetic, blended and mixed-fibre textiles is influenced by</p> <p>The influence of the following factors when selecting materials for a specific application.</p> <p>6.3.1 Aesthetic factors: a form b colour c texture d lustre, sheen, shine.</p> <p>6.3.2 Environmental factors: a sustainability b pollution c upcycling.</p> <p>6.3.3 Availability factors: a use of stock materials b use of specialist materials.</p> <p>6.3.4 Cost factors: a quality of material b manufacturing processes necessary c treatments: fire proofing, stain resist, water proofing d transportation – costs of moving materials around the world from country of origin.</p> <p>6.3.5 Social factors: a use for different social groups b trends/fashion c popularity.</p> <p>6.3.6 Cultural and ethical factors: a avoiding offence b suitability for intended market c use of colour and language d the consumer society e the effects of mass production f built-in product obsolescence.</p>				

You should...	Covered	Red	Amber	Green

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<p><u>Fashion and Textiles knowledge</u></p> <p>6.4 The impact of forces and stresses on natural, synthetic, woven and non-woven, knitted, blended and mixed-fibre textiles and how they can be reinforced and stiffened</p> <p>An awareness of the influence of forces and stresses that act on materials and the methods that can be employed to resist them.</p> <p>6.4.1 Forces and stresses: a compression b tension c shear d natural forces within the fibre as it grows – shape e flexibility.</p> <p>6.4.2 Reinforcement/stiffening techniques: a ribs and boning b suitable fabrication/assembly/construction processes c lamination d embedding composite materials e stay stitching.</p>				
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You should...	Covered	Red	Amber	Green
<p><u>Fashion and Textiles knowledge</u></p> <p>6.5 Typical stock forms, types and sizes used in order to calculate and determine the required quantity of natural, synthetic, woven and non-woven, knitted, blended and mixed-fibre</p> <p>To apply knowledge and understanding of the advantages, disadvantages and applications of the following forms/sizes of materials, in order to be able to discriminate between them and select appropriately.</p> <p>6.5.1 Stock forms/types: a rolls b blocks c denier d weights – single, double e laminates.</p> <p>6.5.2 Sizes: a standard width – 90 cm, 137 cm, 154 cm b yarn weight c area d diameter.</p>				

You should...	Covered	Red	Amber	Green
<p><u>Fashion and Textiles knowledge</u></p> <p>6.6 Alternative processes that can be used to manufacture typical products of natural, synthetic, woven and non-woven, knitted, blended and mixed-fibre textiles to different scales of production</p>				

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<p>Application, advantages and disadvantages, of the following processes, scales of production and techniques when manufacturing products, in order to be able to discriminate between them and select appropriately for use.</p> <p>6.6.1 Processes that can be used to cut and shape materials: a shears b stamp c laser cut d heating element – soldering iron e extrusion.</p> <p>6.6.2 Scales of production: a one off b batch c mass production d continuous.</p> <p>6.6.3 Techniques for quantity production – methods that are employed when making products in quantity: a marking-out methods (use of reference points, lines and surfaces) b templates c patterns d sub-assembly e computer-aided manufacturing (CAM) f quality control g working within tolerance h efficient cutting to minimise waste.</p>				
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You should...	Covered	Red	Amber	Green
<p><u>Fashion and Textiles knowledge</u></p> <p>6.7 Specialist techniques, tools, equipment and processes that can be used on natural, synthetic, woven and non-woven, knitted, blended and mixed-fibre textiles to shape, fabricate, construct and assemble a high-quality prototype</p> <p>Application, advantages and disadvantages, of the following specialist techniques when manufacturing products, in order to be able to discriminate between them and select appropriately for use.</p> <p>6.7.1 Tools and equipment: a hand tools b machinery c digital design and manufacture.</p> <p>6.7.2 Shaping: a adding and reducing fullness – pleat, gather, dart, tucks, shirring, ease, godet, under stitching b moulding – steam, heat, adhesive c adding structure – interfacing, boning.</p>				

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<p>6.7.3 Fabricating/constructing/assembling: a draping b seams – plain, felled, French, double stitching, topstitching c finishing raw edges – zig zagged, bound, rolled, turned under and sewn, blind hemming, invisible stitching d fusing – sealed seams, taping, bonding e component linkage f overlocking – 2, 3 or 4 thread – raw edges and joining g pressing, moulding h wastage i addition.</p>				
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You should...	Covered	Red	Amber	Green
<p><u>Fashion and Textiles knowledge</u></p> <p>6.8 Appropriate surface treatments and finishes that can be applied to natural, synthetic, woven and non-woven, knitted, blended and mixed fibre textiles for functional and aesthetic purposes</p> <p>finishing techniques and methods of preservation, in order to be able to discriminate between them and select appropriately for use.</p> <p>6.8.1 Surface finishes and treatments: a fabric painting (including silk) b batik c laminating d couching e embroidery f appliqué g printing h resist dyeing i patchwork j quilting k chemical – bleaching, easy-care, mercerising, carbonising, laminating, coating, fire proofing, stain resist, shrink resist water proofing, antistatic l physical – calendering, raising, heat-setting, desizing, singeing, emerising, milling, fulling, walking m biological – biostoning, biopolishing n smart – thermochromic, photochromic, solvation chromism, electrochromic, anti-bacterial, micro encapsulation.</p>				