

CORE content revision and homework checklist and timetable for mock examinations

Revision topic: Design and technology and our world

http://www.technologystudent.com/despro_fish/NEW_GCSE3.html

http://resource.download.wjec.co.uk.s3.amazonaws.com/vtc/2016-17/16-17_1-4/website/index.html

	Topic	Homework Week commencing	Mock examination date Week commencing
1.	The impact of new and emerging technologies.	5 th November 2018	10 th and 17 th December 2018
	<i>Market pull</i>		
	<i>Technology push</i>		
	<i>Consumer choice- consumers wishing to own the latest technologies/products</i>		Followed by
	<i>Product life cycle</i>	Followed by	11 th and 25 th February 2019
	<i>Global production</i>		
	<i>Legislation to which products are subjected</i>		
	<i>Consumer rights and protection</i>	7 th January 2019	
	<i>Moral and ethical factors when manufacturing and selling products</i>		
	<i>Sustainability; meeting today's needs without compromising future generations</i>	Followed by	
	<i>Advantages and disadvantages of CAD</i>		
	<i>Advantages and disadvantages of CAM</i>	4 th March 2019	
	<i>CAM equipment; CNC embroidery, vinyl cutting, CNC routing, laser cutting and 3D printing.</i>		
2.	How the critical evaluation of new and emerging technologies informs design decisions.		
	<i>Sustainable and environmental issues when designing and making</i>		
	<i>Social, cultural, economic and environmental responsibilities when designing and making</i>		
	<i>The Six R's of sustainability</i>		
	<i>Life cycle analysis (the impact of a product on the environment)</i>		
	<i>Fair Trade</i>		
	<i>Ecological footprint and carbon footprint</i>		
3.	How energy is generated and stored.		
	Types of renewable and non-renewable energy source. Including; wind, solar, geothermal, hydroelectric, wood/biomass, wave, coal, gas, nuclear and oil		
	Issues surrounding the use of fossil fuels; coal, oil and gas		
	Advantages and disadvantages of renewable energy sources		
	The use of solar panels and wind turbines in manufacturing sites		
	Renewable energy sources for products; wind up and photovoltaic		
	Energy: motor vehicles (petrol, diesel, electricity) household products (battery, solar, mains electricity)		

Revision topic: Smart materials, composites and technical textiles

http://resource.download.wjec.co.uk.s3.amazonaws.com/vtc/2016-17/16-17_1-4/website/index.html

http://www.technologystudent.com/despro_3/revcards_smart1.html

http://www.technologystudent.com/despro_fish/revise20.html

	Topic	Homework Week commencing	Mock examination date Week commencing
1.	Developments in modern and smart materials.	12 th November 2018	10 th and 17 th December 2018
	<i>Electroluminescent film or wire (LCD)</i>		
	<i>Quantum Tunnelling Composite (QTC)</i>		
	<i>Shape memory alloys (SMA)</i>	Followed by	Followed by
	<i>Polymorph</i>		
	<i>Smart Fibres and fabrics that respond to the environment or stimuli:</i>	14 th January 2019	11 th and 25 th February 2019
	<ul style="list-style-type: none"> - Photochromic - Thermo chromic - Microencapsulation - biometrics 	Followed by	
	<i>Carbon fibre, Kevlar and GRP</i>	11 th March 2019	
	<i>Interactive Textiles that function as electronic devices and sensors:</i>		
	<ul style="list-style-type: none"> - circuits integrated into fabrics (e.g. heart rate monitor) - wearable electronics (e.g. mobile phones, music player, GPS, tracking systems and electronics integrated into fabrics itself) 		
	<i>Micro-fibres in clothing manufacturing</i>		
	<i>Phase changing materials, breathable materials, proactive heat and moisture management</i>		
	<i>Sun protective clothing</i>		
	<i>Nomex</i>		
	<i>Geotextiles for landscaping</i>		
	<i>Rhovyl as an antibacterial fibre</i>		

Revision topic: Mechanical components and devices

http://resource.download.wjec.co.uk.s3.amazonaws.com/vtc/2016-17/16-17_1-4/website/index.html

<http://www.technologystudent.com/cams/camdex.htm>

	Topic	Homework Week commencing	Mock examination date Week commencing
1.	The functions of mechanical devices	19 th November 2018	10 th and 17 th December 2018
	<i>Principles of a mechanical device to transform input motion and force into a desired output motion and force</i>		
	<i>Analyse everyday mechanical devices and how they function</i>	Followed by	Followed by
	<i>Consider mechanical systems in terms of input, process, output</i>	21 st January 2019	11 th and 25 th February 2019
	<i>Mechanical systems which;</i> <ul style="list-style-type: none"> - Increase or decrease speed of movement/rotation - Change magnitude/direction of force/movement/rotation 	Followed by	
	<i>Simple calculations involving mechanical systems</i>	18 th March 2019	
	<i>Analyse the function of mechanical products that have;</i> <ul style="list-style-type: none"> - Pulley system, e.g. curtain rails, sewing machine - Gear systems, e.g. whisk, hand rail - Levers and linkages, e.g. scissors - Rack and pinion, e.g. chair lift - Cams, e.g. automata toys 		

Revision topic: Electronic systems and programmable components

http://resource.download.wjec.co.uk.s3.amazonaws.com/vtc/2016-17/16-17_1-4/website/index.html

<http://www.technologystudent.com/elec1/elecex.htm>

	Topic	Homework Week commencing	Mock examination date Week commencing
1.	How electronic systems provide functionality to products and processes	19 th November 2018	10 th and 17 th December 2018
	<i>Circuit diagrams, block diagrams and flow charts</i>		
	<i>Systems; input- process- output</i>	Followed by	Followed by
	<i>Principles of a control system;</i>	21 st January 2019	11 th and 25 th February 2019
	- <i>input data from a sensor: light dependent resistor (LDR) and thermistor</i>	Followed by	
	- <i>processing by control devices: semi-conductor, IC, microprocessor or computer</i>		
	- <i>Output: buzzer, light emitting diode (LED)</i>	18 th March 2019	
	<i>The importance of feedback within the system</i>		
	<i>The method of providing feedback in different systems</i>		
	<i>Control devices that include counting, switching and timing</i>		
	<i>Analogue and digital sensors as input components</i>		
2.	The use of programmable components		
	<i>Sub routines or macros in control systems</i>		
	<i>Programmable microcontrollers can be used to control a range of systems</i>		
	<i>Programmable microcontrollers can interface with other devices</i>		
	<i>Programmable microcontrollers can be reprogrammed repeatedly</i>		
	<i>The benefits and limitations of programmable microcontrollers</i>		
	<i>Programmable interface controllers (PIC) and how they can be used to control products or systems</i>		

Revision topic: Materials

http://resource.download.wjec.co.uk.s3.amazonaws.com/vtc/2016-17/16-17_1-4/website/index.html

http://www.technologystudent.com/pdf15/POSTER_PAPERANDBOARDS1.pdf

	Topic	Homework Week commencing	Mock examination date Week commencing
1.	Papers and boards	26 th November 2018	10 th and 17 th December 2018
	<i>The categorisation and properties of paper, cards, boards and composite materials. E.g. strength, folding ability, surface finish and absorbency</i>	Followed by	Followed by
	<i>Papers, cards and boards can be laminated to improve strength, finish and appearance</i>	28 th January 2019	11 th and 25 th February 2019
	<i>Standard ISO sizes of paper</i>		
	<i>The use of grammage i.e. grams per square metre (gsm) to measure weight of paper</i>	Followed by	
	<i>The use of microns to measure thickness of card</i>	25 th March 2019	
	<i>The use of recycled materials to manufacture papers and boards</i>		
	<i>The aesthetic and functional properties of common papers, cards and boards. E.g. layout paper, tracing paper, copier paper, recycled paper, corrugated board, cartridge paper, mounting board and folding boxboard</i>		

http://resource.download.wjec.co.uk.s3.amazonaws.com/vtc/2016-17/16-17_1-4/website/index.html

<http://www.technologystudent.com/joints/joindex.htm>

	Topic	Homework Week commencing	Mock examination date Week commencing
2.	Natural and manufactured timber	26 th November 2018	10 th and 17 th December 2018
	<i>The categorisation and properties of hardwoods and softwoods</i>	Followed by	Followed by
	<i>Properties to be considered: strength, grain structure, surface finish and absorbency</i>	28 th January 2019	11 th and 25 th February 2019
	<i>Natural timbers is harvested from deciduous (hardwoods) and coniferous (softwood) trees</i>	Followed by	
	<i>Natural timbers is available in the following forms: plank, board, strip, square and dowel</i>	25 th March 2019	
	<i>Natural timbres can be identified by weight, colour, grain, texture, durability and ease of working</i>		
	<i>Different finishes are used on natural timbers to protect and give aesthetic appeal</i>		
	<i>Categorisation and properties of manufactured timbers</i>		
	<i>Manufactured timbres are made from natural timbers and are made from particles/ fibres or laminates</i>		
	<i>Manufactured timbres are available in standard sizes and forms: plywood, MDF, chipboard, hardwood and veneered boards</i>		
	<i>Finishes are used on manufactured timbers to protect and improve aesthetics</i>		

Materials

http://resource.download.wjec.co.uk.s3.amazonaws.com/vtc/2016-17/16-17_1-4/website/index.html

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	Topic	Homework Week commencing	Mock examination date Week commencing
3.	Ferrous and non-ferrous metals	26 th November 2018	10 th and 17 th December 2018
	<i>Categorisation and working properties of ferrous metals, non-ferrous metals and alloys</i>	Followed by	Followed by
	<i>Properties of metals: hardness, elasticity, conductivity, toughness, utility, tensile strength and malleability</i>	28 th January 2019	11 th and 25 th February 2019
	<i>Metals are sold as sheet, bar, rod, tube and angle</i>	Followed by	
	<i>Ferrous metals: cast iron, mild steel, medium carbon steel and high carbon steel</i>	25 th March 2019	
	<i>Ferrous metals may require a protective finish and this is sometimes used to improve aesthetic appeal</i>		
	<i>Non-ferrous metals: aluminium, copper, brass, bronze</i>		
	<i>Alloys of metal are a base metal mixed with other metals or non-metals to change their properties or appearance</i>		
	<i>Non-ferrous metals may require a protective finish which can sometimes improve aesthetic appeal</i>		

http://resource.download.wjec.co.uk.s3.amazonaws.com/vtc/2016-17/16-17_1-4/website/index.html

<http://www.technologystudent.com/joints/joindex.htm>

	Topic	Homework Week commencing	Mock examination date Week commencing
4.	Thermoforming and thermosetting polymers	26 th November 2018	10 th and 17 th December 2018
	<i>Categorisation and physical properties of polymers</i>	Followed by	Followed by
	<i>Polymers can be made from both natural and synthetic resources</i>	28 th January 2019	11 th and 25 th February 2019
	<i>Polymers are sold as sheet, film, bar, rod and tube</i>	Followed by	
	<i>The differences between a thermoforming (thermoplastic) and thermosetting material</i>	25 th March 2019	
	<i>Properties of polymers: weight, hardness, elasticity, conductivity/insulation, toughness and strength</i>		
	<i>The properties of thermoplastics: polythene, polystyrene, polypropylene and PVC</i>		
	<i>The properties of the thermosetting plastics: UF (urea formaldehyde), MF (melamine formaldehyde), PR (polyester resin) and ER (epoxy resin)</i>		

http://resource.download.wjec.co.uk.s3.amazonaws.com/vtc/2016-17/16-17_1-4/website/index.html

	Topic	Homework Week commencing	Mock examination date Week commencing

5.	Natural, synthetic, blended and mixed fibres, and woven, non-woven and knitted textiles.	26 th November 2018	10 th and 17 th December 2018
	<i>The categorisation and working properties of fibres and textiles.</i>	Followed by	Followed by
	<i>The raw materials of textiles are classified according to their source.</i>	28 th January 2019	11 th and 25 th February 2019
	<i>Natural polymers: Animal polymers: wool/fleece – mohair, cashmere, angora, alpaca, camel (hair). Insect polymers: silk. Plant polymers: cotton, linen hemp, jute, rayon, viscose.</i>	Followed by	
	<i>Manufactured polymers: Synthetic: polyester, polypropylene, nylon, acrylic, elastane, lycra, aramid fibres. Microfibres – Tactel, Tencel (Lyocell).</i>	25 th March 2019	
	<i>The properties of textiles fibres: strength, elasticity, absorbency, durability, insulation, flammability, water-repellence, anti-static and resistance to acid, bleach and sunlight.</i>		
	<i>Blending and mixing fibres improves the properties and uses of yarns and materials.</i>		

INDEPTH content

Revision topic: Natural and Manufactured Timber (Mr. Nines group only)

<http://www.technologystudent.com/joints/joindex.htm>

Topic	Homework Week commencing	Mock examination date Week commencing
The physical and working properties of hardwoods, softwoods and man-made boards: toughness, flexibility, grain structure, strength, absorbency, surface finish, colour and hardness.	3 rd December 2018	10 th and 17 th December 2018
Natural solid timber - strengths and weaknesses	Followed by	Followed by
Defects: shrinkage, splits, shakes, knots, fungal attack.	4 th February 2019	11 th and 25 th February 2019
Hardwoods: beech, oak, mahogany, balsa and jelutong.	Followed by	
Softwoods: scots pine, western red cedar and parana pine.		
Strengths, weaknesses of the following manufactured boards: <ul style="list-style-type: none"> plywood, MDF - medium density fibreboard, Chipboard hardboard. 	1 st and 8 th April 2019	
The impact on the environment of deforestation.		
Ecological and social footprint.		
Changing society's view on waste, encourage recycling.		
Living in a greener world.		
Life-cycle analysis of a material or product.		
Aesthetic properties of natural and manufactured timbers.		
Functional properties of natural and manufactured timbers.		
Responsibilities of designers and manufacturers who design using timber with respect to: <ul style="list-style-type: none"> the environment; working conditions in third world countries, low labour costs and poverty; exploitation of employees; 		

<ul style="list-style-type: none"> recyclability and waste. 		
Biodiversity and deforestation.		
Estimating the true costs of a prototype or product.		
Comparison costs of hardwoods, softwoods and manufactured board.		
The behaviour of natural and manufactured timber under forces or under stress.		
The stiffness and a strength of natural timber will depend upon the wood, the cross sectional area and the depth of the section.		
Reinforcement of natural timber by laminating.		
The strength of plywood will depend upon the number of layers and the wood grain being at right angles. The strength of a timber product will depend upon how the product is jointed or what fixing method is used.		
Natural timber is available in different sectional forms, various standard sizes and can have a different finish (sawn or planed).		
Manufactured boards are commonly available in sheet form and in standard sizes and various thicknesses.		
Calculate the costs involved in the design of products: fixtures, fittings, finishes required and the material cost.		
Advantages and disadvantages of producing single, one off products.		
The advantages and disadvantages of producing products in limited quantities (batch production).		
The need to produce a number of identical products. <ul style="list-style-type: none"> Jigs and devices to control repeat activities. The advantages and disadvantages of high volume, continuous production. Issues related to high volume production. The importance of CAM in modern high volume production. 		
Tools and equipment to mark out, hold, cut, shape, drill and form laminates of natural timbers and manufactured boards.		
The pillar drill to drill holes to various diameters.		
Jigs and formers to ensure accuracy as part of the process of drilling, bending, cutting wood materials.		
Material joining can be permanent or temporary.		
The principles of producing wood products using the following processes: jointing, veneering, laminating and steam bending.		
Classification of wood joints as frame or box construction. <ul style="list-style-type: none"> Frame: mitre, dowel, mortise and tenon, halving and bridle joint. Box/carcass: butt, lap, housing, dovetail and comb joint. 		
Adhesives: PVA (wood to wood), contact adhesive and epoxy resin (wood to other materials).		
Temporary: screw (countersunk and round head) and knock down fittings.		
The use of Laser cutters with wood		
CAM machines <ul style="list-style-type: none"> CNC router CNC lathe 		
Surface treatments of natural timber and manufactured boards to prolong life of a product: <ul style="list-style-type: none"> sealants and primers. 		
Finishes for aesthetic or functional reasons: <ul style="list-style-type: none"> varnish 		

<ul style="list-style-type: none"> • wood stains • oils • polishes • preservative paints. 		
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Revision topic: Natural and Synthetic Fibres and Fabrics (Miss. Williams group only)

http://resource.download.wjec.co.uk.s3.amazonaws.com/vtc/2016-17/16-17_1-4/website/index.html

	Topic	Homework Week commencing	Mock examination date Week commencing
1.	Characteristics of fabrics and fibres	3 rd December 2018	10 th and 17 th December 2018
	<i>Construction method. Advantages and disadvantages.</i>		
	<i>Weaving: Plain, Twill, Satin, herringbone, pile</i>	Followed by	
	<i>Knitting: Weft knit and Warp knit</i>		Followed by
	<i>Bonding: Adhesives, heating thermoplastic fibres, stitching a web of fibres</i>	4 th February 2019	11 th and 25 th February 2019
	<i>Laminating</i>	Followed by	
	<i>Felting</i>		
	<i>Natural polymers: (properties of)</i> <ul style="list-style-type: none"> - Animal polymers: wool/fleece- mohair, cashmere, angora, alpaca, camel (hair) - Insect polymers: silk - Plant polymers: cotton, linen hemp, jute, rayon, viscose 	1 st and 8 th April 2019	
	<i>Manufactured polymers: (properties of)</i> <ul style="list-style-type: none"> - Synthetic: polyester, polypropylene, nylon, acrylic, elastane, lycra, aramid fibres - Microfibers: Tactel, Tencel (lyocell) 		
	<i>The properties of textiles fibres: strength, elasticity, absorbency, durability, insulation, flammability, water-repellence, anti-static and resistance to acid, bleach and sunlight</i>		
	<i>Blending and mixing fibres improves the properties and uses of yarns and materials:</i> <i>Blends:</i> <ul style="list-style-type: none"> - Polyester and Cotton - Silk and Viscose - Hemp and Cotton or Silk <i>Mixture:</i> <ul style="list-style-type: none"> - Cotton and Wool - Lycra with Wool, Cotton or Nylon 		
	<i>Staple and continuous filaments: textured yarns, novelty yarns (chenille) and these determine weight, flexibility, handle and end use</i>		
	<i>Bonding breathable waterproof membrane to outer fabrics:</i> <ul style="list-style-type: none"> - Gore Tex - Permatex 		
	<i>Bonding foam to knitted or woven fabrics</i>		
	<i>Bonding plastic to loosely woven cotton to simulate leather</i>		
	<i>Quilting- polyester wadding between outer and lining material</i>		
2.	Material choice		
	<i>Finishing methods of enhancing appearance:</i>		

	<ul style="list-style-type: none"> - Colouring - Surface decoration - Embossing - Glazing - Moire effect - Stiffening - Increasing luster (calendaring, mercerising) - Brushing - Satin resistance (Scotchguard, Teflon) 		
	<p>To enhance fabric life:</p> <ul style="list-style-type: none"> - Flame retardant - Moth proofing 		
	<p>To improve function:</p> <ul style="list-style-type: none"> - Shower proofing using PVC or PVA or wax - Crease resistance using resin - Waterproofing using silicones - Shrink resistance using chlorine treatment - Anti-static finish - Coating with PVC - Neoprene - Silicone rubber - Polyurethane - Use of barrier membranes laminated to an outer or inner shell to make them breathable yet waterproof - Windproof (close weave construction) 		
	<p>Responsibilities of designers and manufacturers:</p> <ul style="list-style-type: none"> - The environment - Fairtrade (working conditions, low labour costs, poverty, exploitation) - Recyclability and waste - biodiversity 		
3.	Fabric strength		
	<p>Fabrics and components behave differently when subjected to force or stress:</p> <ul style="list-style-type: none"> - loaded rucksack, tents, geotextiles, active sportswear, work wear ,normal daily wear 		
	Textiles can be strengthened by laminating, bonding and quilting		
	Strength of fabric depends on joining or fixing methods used		
4.	Fabric sizes		
	Textiles materials come in standard widths 90cm, 115cm, 150cm, 200cm, 240cm		
	Lay plan to help cost and quantity of fabric needed		
	Calculate cost and quantities for components		
5.	Scales of production		
	<p>Scales of production:</p> <ul style="list-style-type: none"> - custom made or one off - batch production - mass production - line production - progressive bundle system - cell production - JIT 		

6.	Technical processes		
	<i>Use of correct materials, tools and equipment for practical tasks. E.g. Tailors chalk</i>		
	<i>Use of zipper foot and embroidery foot</i>		
	<i>Methods to neaten raw edges: overlocking, binding, zig zag stitch, lining, rolled hem</i>		
	<i>CAD/ CAM for cutting templates</i>		
	<i>Pattern language and lay plans</i>		
	<i>Visual checks for pattern drop/ match</i>		
	<i>Seam tolerances and the importance</i>		
	<i>Cutting on bias, notches, hot notch marking in industry, grain lines, balance marks, tuck/pleat lines, darts, position of pockets, buttons/ holes, centre front/ back</i>		
	<i>Methods of transferring important marks onto material prior to product manufacture</i>		
	<i>Cutting tools in industry and their uses:</i> <ul style="list-style-type: none"> - <i>Straight knives, round or band knives, automated die cutters, computer controlled cutting machines, laser cutters, band saw</i> 		
	<i>Equipment used for lay planning and material quantities (several layers)</i>		
7.	Decorative techniques		
	<i>Dyeing: piece, dip, random, tie and dye, batik</i>		
	<i>Printing: silk screen, roller, discharge, block, burn out, stencilling, marbling, air brushing</i>		
	<i>Painting: felt tip, dimensional, fabric paint, silk paints</i>		
	<i>Transfers: image- marker, ink jet transfer (CAM)</i>		
	<i>Embroidery: hand embroidery, machine embroidery (CAM)</i>		
	<i>Applique, beadwork</i>		