

GCSE DESIGN AND TECHNOLOGY THEORY CHECKLIST

Task

- Read through the checklist and tick to indicate your level of knowledge for each topic.
- Revise each topic (starting with your weaker areas) using your exercise book, revision guide and revision cards. You can also use www.technologystudent.com, where you will find information on all of these topics.

		LITTLE	SOME	GOOD
CORE THEORY				
Impact of new and emerging technologies on:				
Industry	Design and organisation of the workplace, automation and the use of robots, buildings and the place of work			
Enterprise	Crowd funding, virtual marketing and retail, cooperatives, fair trade			
Sustainability	Finite, non finite, disposal of waste			
People	Technology push/market pull, changing job roles			
Culture	Changes in fashion, respecting people of different faiths and beliefs			
Society	Design for the disabled, the elderly and different religious groups			
Environment	Positives - Continuous improvement, efficient working			
	Negatives – Pollution, global warming			
Production techniques and systems	Automation			
	Computer aided design (CAD)			
	Computer aided manufacture (CAM)			
	Flexible manufacturing systems (FMS)			
	Just in time (JIT)			
Informing design decisions	Planned obsolescence, design for maintenance, ethics, environment			
Energy generation and storage (inc. arguments for and against)				
Fossil fuels	Coal, gas, oil			
Nuclear power	Nuclear			
Renewable energy	Wind, solar, tidal, hydro-electrical, biomass			
Environment and Sustainability Issues				
Energy storage systems including batteries	Kinetic pumped storage systems			
	Alkaline and re-chargeable batteries			
Developments in new materials through:				
Modern materials	Graphene, metal foams, titanium etc.			
	Coated metals, liquid crystal display (LCD), nanomaterials etc.			
Smart Materials	Shape memory alloys, thermochromic pigments etc.			
Composite materials	Glass reinforced plastic (GRP), carbonfibre reinforced plastic (CRP)			
Technical textiles	Conductive fabrics, fire resistant fabrics, kevlar, microfibres etc.			
Systems approach to designing				
Inputs	Use of light, temperature and pressure sensors and switches			
Processes	Programming microcontrollers as counters, timers and for decision making			
Outputs	Use of buzzers, speakers and lamps			
Mechanical devices				
Different types of movement	Linear, rotary, reciprocating and oscillating movements			
Changing magnitude and direction of force	Levers, linkages, cams, gears, pulleys			
Materials and their working properties				
Papers	Bleed proof, cartridge, grid, layout, tracing paper			
Boards	Corrugated, duplex, foil lined, foam core, inkjet card, solid white			
Natural timbers	Hardwoods and softwoods			
Manufactured boards	Medium density fibreboard (MDF), plywood, chipboard			
Ferrous metals	Low carbon steel, cast iron, high carbon/tool steel			

Non-ferrous metals	Aluminium, copper, tin, zinc			
Alloys	Brass, stainless steel, high speed steel			
Thermoplastics	Acrylic (PMMA), HIPS, HDPE, PP, PVC, PET			
Thermosetting plastics	Epoxy resin (ER), melamine-formaldehyde (MF), phenol formaldehyde (PF), polyester resin (PR), urea-formaldehyde (UF)			
Natural fibres	Cotton, wool, silk			
Synthetic fibres	Polyester, polyamide (nylon), elastane (lycra)			
Blended/mixed fibres	Cotton/polyester			
Woven	Plain weave			
Non-woven	Bonded fabrics, felted fabrics			
Knitted textiles	Knitted fabrics			
Material properties	Physical properties such as density, fusibility, absorbency, electrical and thermal conductivity. Working properties such as strength, hardness, toughness, malleability, ductility, elasticity			

SPECIALIST THEORY (in relation to one material)

Selection of materials	Functionality, aesthetics, environment, availability, cost, social factors, cultural factors and ethical factors			
Forces and stresses				
Manipulation of materials	Tension, compression, bending, torsion and shear.			
Enhancement of materials	Reinforced, stiffened, made more flexible e.g. lamination, bending, folding, webbing, fabric interfacing			
Ecological and social footprint				
Ecological issues	Deforestation, mining, drilling and farming. Product miles Carbon footprint			
The 6Rs	Reduce, refuse, reuse, repair, recycle, rethink			
Social issues	Safe working conditions, reducing oceanic/atmospheric pollution and reducing the detrimental impact on others.			
Sources and origins				
Primary sources and main processes	Paper and board (cellulose fibres from wood and grasses converted into paper) or Timber based materials (seasoning, conversion and creation of manufactured timbers)			
Using and working with materials				
Properties of materials relevant to commercial products	Papers and boards (flyers/leaflets and card based food packaging) or Timber based materials (traditional timber children's toys and flat pack furniture)			
Modification of properties	Additives to prevent moisture transfer (paper and board) or Seasoning to reduce moisture content (timber based materials)			
Cutting, abrasion and addition	Paper and board (how to cut, crease, score, fold and perforate card) or Timber based materials (how to cut, drill, chisel, sand and plane)			
Stock forms, types and sizes				
Commercially available types and sizes and components	Papers and boards: - sheet, roll, ply - sold by size e.g. A3, thickness, weight and colour - standard components e.g. fasteners, seals and bindings or Timber based materials: - planks, boards and standard mouldings - sold by length, width, thickness and diameter - standard components e.g. woodscrews, hinges and KD fittings			
Scales of production				
Different volumes	Prototype, batch, mass, continuous			
Specialist techniques and processes				
Use of production aids	Measurement/reference points, templates, jigs etc.			
Tools, equipment and processes				
Processes	Wastage: Die cutting, perforation, turning, sawing Addition: lamination, 3d printing, printing Deforming and reforming: vacuum forming, creasing, bending, folding			
Tolerance	Min. and max. measurements			
Commercial processes	Paper and board (off-set lithography and die cutting) or Timber based materials (routing and turning)			

Quality control				
Quality	Paper and boards (registration marks) <u>or</u> Timber based materials (dimensional accuracy using go/no fixture)			
Surface treatments and finishes				
Preparation and application	Paper and boards (printing, embossing and UV varnishing) <u>or</u> Timber based materials (painting, varnishing, tanalising)			