













<i>1: CORE TOPIC</i>			
<i>1.1. CORE: New and Emerging technology</i>			
<i>1.2. CORE: Energy and storage</i>			
<i>1.3. CORE: New Materials</i>			
<i>1.4. CORE: Systems</i>			
<i>1.5 CORE: Mechanical devices</i>			
<i>1.6. CORE: Materials</i>			
<i>1.6. CORE: Material properties</i>			

<i>2: SPECIALIST MATERIAL TOPIC</i>			
<i>2.1 Selection of materials or components</i>			
<i>2.3 Ecological and social footprint</i>			
<i>2.8 Specialist techniques and processes</i>			

<i>3: DESIGNING & MAKING PRINCIPALS TOPIC</i>			
<i>3.2 Environmental, social and economic challenge</i>			
<i>3.5 Communication of design ideas</i>			
<i>3.6 Prototype development</i>			
<i>3.9 Material management</i>			

<i>MATHEMATICS IN D&T</i>			
<i>Arithmetic/DATA/Graphs/ Geometry & Trigonometry</i>			

Section 1: Core

CORE: New and Emerging technology

1.1

INDUSTRY				
Workplace design	Automation	Robotics	Buildings	Tools & equipment
ENTERPRISE				
Crowd funding	Virtual marketing	Co-operative	Fair trade	
SUSTAINABILITY				
Finite	Non-finite		Disposal of Waste	
PEOPLE				
Technology push	Market pull		Changing job roles	
CULTURE				
Fashion & trends			Respecting faiths & beliefs	
SOCIETY				
Design for disabled	Design for Elderly		Design for Religious groups	
ENVIRONMENT				
Continuous improvement	Efficient working	Pollution	Global warming	
PRODUCTION TECHNIQUES & SYSTEMS				
CAD	CAM	FMS	JIT	Lean
INFORMING DESIGN DECISIONS				
Planned obsolescence	Maintenance	Ethics	Environment	

CORE: Energy and storage

1.2

FOSSIL FUELS				
Coal	Gas		Oil	
NUCLEAR POWER				
How is it generated			Arguments for and against	
RENEWABLE				
Wind	Solar	Tidal	Hydro	Biomass
STORAGE				
Kinetic pumped storage			Alkaline & re-chargeable batteries	

Shade in the areas you are comfortable with – you will be left with blank areas to focus on for revision

CORE: New Materials

1.3

MODERN MATERIALS					
Graphene	Metal foams	Titanium	Coated metals	LCD	Nanomaterials
SMART MATERIALS					
SMA	Thermochromic	Photochromic	Polymorph	QTC	Litmus paper
COMPOSITES					
Glass reinforced plastic GRP			Carbon fibre reinforced plastic CRP		
TECHNICAL TEXTILES					
Gore-tex	Kevlar	Conductive	Fire resistant	Micro fibres	

CORE: Systems

1.4

INPUTS					
LDR	Thermistor	Toggle Switch	Push-to-make	Push-to-break	Pressure sensor
PROCESSES					
Digital & analogue signals	Micro-controllers	Flowcharts Open/closed loop	Counters and Timers	Monostable	Astable
OUTPUTS					
Buzzers	Speakers	Bulb	LED	Fan	

CORE: Mechanical devices

1.5

MOVEMENTS			
Linear	Rotary	Oscillating	Reciprocating
LEVERS			
Bell cranks		Push/pull	
LINKAGES			
CAMs & followers	Simple gear trains		Pulleys & belts

CORE: Material properties

1.6

PHYSICAL PROPERTIES				
Absorbency	Density	Fusibility	Electrical/thermal conductivity	
WORKING PROPERTIES				
Strength	Hardness	Toughness	Malleability	Ductility/Elasticity

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<i>Paper and board</i>				
PAPER				
Bleed proof	Cartridge	Grid	Layout	Tracing
BOARDS				
Corrugated	Duplex board	Foil lined	Foam core	Ink jet
<i>Timbers</i>				
HARDWOODS				
Ash	Beech	Mahogany	Oak	Balsa
SOFTWOODS				
Larch		Pine		Spruce
MANUFACTURED BOARDS				
MDF		Plywood		Chipboard
<i>Metals</i>				
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
<i>Polymers</i>				
POLYMERS (THERMOFORMING)				
Acrylic	HIPS	HDPE	Polypropylene	PVC
POLYMERS (THERMOSETTING)				
Epoxy Resin	Melamine Formaldehyde	Phenol Formaldehyde	Polyester Resin	Urea Formaldehyde
<i>Textiles</i>				
NATURAL TEXTILES				
Cotton		Wool		Silk
SYNTHETIC TEXTILES				
Polyester		Nylon		Elastane
TEXTILES CONSTRUCTION				
Blended/mixed	Plain weave	Bonded	Felted	Knitted

Section 2: Specialist area (timber)

Selecting Materials

2.1

Selecting Materials based on...				
Application (use)	Ease of working	Surface finish, texture, colour	Recyclable or reused	Sourcing & purchase
Cost (bulk buying)	Social responsibility	Cultural Influences	Ethical Factors	

Ecological & Social footprint

2.3

Ecological and Social footprint of timbers					
Deforestation	Mileage from Raw source	Manufacture	Distribution	User destination	
Final Disposal		Carbon produced			
The 6 R's					
Reduce	Refuse	Re-use	Repair	Recycle	Rethink
Social Issues during manufacture					
Safe working	Reduce pollution	Reduce negative impact on others			

Enhancing materials				
Lamination	Bending	Webbing	Folding	fabric interfacing

Using and working with Timbers	
Physical properties	Mechanical properties
Properties of Children's toys	Properties of Flat packed furniture

Production aids

2.8

Production aids			
Reference points	Templates	Jigs	Patterns

Tools and Equipment & Processes

2.8

JOINING METHODS (PERMANENT) WOOD							
nails	halving	butt	rebate	housing	mortise and tenon	dowel	polyvinyl acetate (PVA)

MARKING OUT TOOLS			
Steel rule	Measuring tape	Try square	Mitre square
Marking gauge	Mortise gauge	Cutting gauge	

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Wastage (removing unwanted material)

2.8

SAWS				
Coping Saw		Tenon saw		Dovetail saw
PLANES & CHISELS				
Planes	Firmer chisel	Bevel-edge chisel	Mortise chisel	Gouge
ABRASION				
Flat file	Round file	Three square file	Sandpaper	
DRILLS				
Twist drill	Flat bit	Countersink bit	Hole saw	
POWER TOOLS (Handheld)				
Routers	Planers	Jigsaw	Cordless Drill	Sanders

Addition (adding material)

2.8

Addition		
Lamination/shaping	3D Printing	Soldering

Deforming/Reforming

2.8

Deforming/Reforming			
Vacuum forming	Injection Moulding	Blow moulding	Casting

Commercial Processes

2.8

MACHINE TOOLS/COMMERCIAL PROCESSES			
Disc Sander	Band Saw	Pillar Drill	Reciprocating Saw
Circular Saw	Planer/Thicknesser	Routing	Turning (Lathe)

Quality & Tolerances

2.8

Working to Tolerances & accuracy			
Maximum dimensions	Maximum dimensions	Dimensional Accuracy	Check Laser settings

Surface treatments & finishes

2.8

Surface treatments and finishes		
Painting	Varnishing	Tanalisng

Section 3: Designing & Making

Environmental, Social and Economic Challenge

3.2

Social and Environmental footprint		
Deforestation	CO2 levels/Global Warming	Fair trade

Design Strategies & Communication

3.5

COMMUNICATION				
Sketching	Isometric	Perspective	System/Schematic	Annotation
Exploded	Orthographic	Sectional	2D & 3D CAD	Modelling
DESIGN STRATEGIES				
Collaboration	User centred design	Systems approach	Iterative Design	Avoiding design fixation

Tolerances & Material Management

3.9

MATERIAL MANAGEMENT			
Tolerances	Nesting/Tesselation	Quality Control – No go Gauges	
DATA			
Measuring	Marking	Coordinates	Reference points

Mathematics in D&T

ARITHMETIC					
Decimal	Ratios	Fractions	Percentages	Surface area	Volume
DATA					
Diagrams		Bar charts		Histograms	
GRAPHS					
Plot	Draw	Interpret	Translate between graphical and numerical form		
Geometry & Trigonometry					
Use angles & Degrees	Visualise 2D & 3D forms	Areas & sizes of triangles	Areas & sizes of rectangles	Surface areas of cubes	Volume of cubes

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