

Design and Applied Technology (DAT) Curriculum and Assessment Guide (Secondary 4 to 6) - Supplementary Notes

Jointly prepared by the Curriculum Development Council and
the Hong Kong Examinations and Assessment Authority
Recommended for use in schools by the Education Bureau, HKSARG
December 2020

(To be implemented at Secondary 4 starting from the 2022/23 school year, leading to the Hong Kong Diploma of Secondary Education (HKDSE) DAT Examination in 2025 and thereafter.)

The curriculum and assessment framework in the DAT Curriculum and Assessment Guide (Secondary 4 - 6) (2015) remains unchanged.

The supplementary notes serve to clarify the coverage of the following four learning topics as specified in “Strand 2 - Technological Principles” and “Module 3 - Design Implementation and Material Processing” of the curriculum for teaching and assessment purposes:

- ✧ **Materials;**
- ✧ **Mechanisms;**
- ✧ **Standard components; and**
- ✧ **Manufacturing/fabrication processes.**

A. The following table shows the coverage of the four learning topics.

Notes:

For items marked within [], students are only required to name and be aware of their application in the design and make processes.

Topics	Items
Materials	<ul style="list-style-type: none"> ● Woods <u>Softwoods</u>: pine, spruce, [cedar] <u>Hardwoods</u>: balsa, beech, birch, oak, san cheong, teak, poplar, [cherry, mahogany, walnut] <u>Manufactured boards</u>: blockboard, particle board, medium-density fibreboard (MDF), plywood ● Metals <u>Ferrous and its alloys</u>: cast iron, carbon steel, mild steel, stainless steel, galvanised steel, [high speed steel, tool steel] <u>Non-ferrous and its alloys</u>: aluminium, brass, bronze, copper, lead, tin, zinc, [duralumin, tungsten carbide] ● Polymers <u>Thermoplastics</u>: acrylonitrile butadiene styrene (ABS), acrylic/polymethyl methacrylate (PMMA), nylon/polyamide (PA), polyethylene terephthalate (PET), polypropylene (PP), polystyrene

	<p>(PS), expanded polystyrene (EPS), extruded polystyrene (XPS), polyvinyl chloride (PVC), [high-density polyethylene (HDPE), low-density polyethylene (LDPE), polycarbonate (PC), Teflon/polytetrafluoroethylene (PTFE), polylactic acid (PLA), polyoxymethylene (POM)]</p> <p><u>Thermosetting plastics</u>: epoxy resin (ER), polyester resin (PR), polyurethane (PU), urea-formaldehyde (UF) resin</p> <p><u>Elastomer</u>: synthetic rubber, silicon rubber</p> <ul style="list-style-type: none"> • Others (include materials for model making, composites and smart materials) ceramics, cardboards, corrugated boards, [kraft, plaster of Paris, shape memory alloys, carbon fibres, glass fibres, thermo-ceramics, nano-materials, materials for making solar panels and liquid crystal display (LCD)]
Mechanisms	cam and follower, rack and pinion, ratchet and pawl, slider crank, linkages, levers, spur gears, bevel gears, worms and worm wheels, belts and pulleys, sprockets and chains, simple gear trains, [compound gear trains, timing belts and pulleys]
Standard component	bolts and nuts, screws, washers, nails, hinges and latches, knock-down fittings, rivets, pop rivets, ball bearings, roller bearings, pins/keys
Manufacturing/fabrication processes	<ul style="list-style-type: none"> • Joining temporary and permanent fixings, assembly and joint using a range of frame and carcass construction, joint with adhesives, solvents and mechanical methods, hard and soft soldering, riveting and screwing, welding • Forming cutting by hand tools, shaping by hand tools, laminating, bending, vacuum forming, injection moulding, blow moulding, rotational moulding, forging, rolling, pressing, 3D printing, sintering, [deep drawing, compression moulding, extrusion, spinning] • Finishing polishing, coating, painting, anodising, varnishing, sanding, plating, veneering • Machining drilling, turning, sawing, milling, routing, etching, laser cutting, [spark erosion, melting, water jet cutting] • Casting [sand casting, die casting] • Heat treatment [annealing, hardening, case hardening, tempering]

B. The positions of the learning topics appeared in the DAT Curriculum and Assessment Guide are marked as follows.

Strand 2 Technological Principles (P.15-16)

Topics <i>Students should learn</i>	Outcomes <i>Students should be able to</i>
Nature of technology <ul style="list-style-type: none"> ● Innovation and technology ● Energy and energy resources ● <u>Materials and standard components</u> 	18. ... 19. ... 20. ... 21. Understand the properties of <u>commonly used materials</u>
Production process <ul style="list-style-type: none"> ● Health and industrial safety ● Tools, equipment and machineries ● Manufacturing systems 	22. ... 23. ... 24. Execute appropriate <u>fabrication processes</u>
Systems and control <ul style="list-style-type: none"> ● Input-Process-Output ● Logic gates ● <u>Mechanical systems</u> ● Physical structure ● Basic electronics 	26. ... 27. ... 28. ... 29. Apply knowledge/concepts of <u>mechanics</u> in design, fabrication and control of systems 30. ... 31. ...

Module 3 Design Implementation and Material Processing (P.25)

Topics <i>Students should learn</i>	Outcomes <i>Students should be able to</i>
Materials, components and systems <ul style="list-style-type: none"> ● Properties and choice of <u>materials</u> ● <u>Materials</u> and structures ● <u>Mechanisms</u> ● New materials 	1. Understand that properties and working characteristics influence the choice of <u>materials and components</u> 2. ... 3. Apply <u>mechanisms</u> for control systems 4. ...
Processing and manufacturing <ul style="list-style-type: none"> ● <u>Manufacturing processes</u> and techniques ● Scale of production ● Quality assurance and quality control 	5. Select, explain and execute appropriate <u>manufacturing processes</u> and techniques 6. ... 7. ...