

Plan of Work Design and Technology

Grade 9

For examination in 2025



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Introduction

Prescribed textbook:

- Technology Studies Grade 9 by MIE

Recommended prior knowledge

Learners beginning this course are expected to have knowledge of the following topics:

	Topic
1	Design Fundamentals
2	Pictorial Projection
3	Safety in the DT Workshop
4	Material Technology
5	Geometrical Construction
6	Orthographic Projection
7	The Design Process

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Websites and videos

This plan of work includes website links providing direct access to internet resources. Modern College is not responsible for the accuracy or content of information contained in these sites. The inclusion of a link to an external website should not be understood to be an endorsement of that website or the site's owners (or their products/services).

The website pages referenced in this plan of work were selected when the plan of work was produced. Other aspects of the sites were not checked and only the particular resources are recommended.



FIRST TERM [10/01/2025 – 11/04/2025]

Topic: 1 Green Design

Learning Objectives	Worked Examples	Classwork & Homework	Extra Work	Resources
<p>Students should be able to:</p> <ul style="list-style-type: none"> a) State the causes and effect of pollution b) Explain the importance of Green Design. c) Describe life cycle analysis of products. 	<p>[MIE Textbook]:</p> <p>Page 3-4 Table 1</p> <p>-</p> <p>Page 5 Figure 1.3</p>	<p>[MIE Textbook]:</p> <p>Page 4 activity 1</p>	<p>Worksheets will be provided.</p>	<ul style="list-style-type: none"> • Why Green Design matters? https://www.youtube.com/watch?v=aCBAWPHOnLw • Life-cycle Analysis (LCA) https://www.youtube.com/watch?v=6RNnzfUHWY8
<ul style="list-style-type: none"> d) Describe strategies for adopting Green Design practices. e) Explain the importance of recycling, reusing and reducing materials in design. f) Sketch and explain eco-green labels 	<p>[MIE Textbook]:</p> <p>Page 5-9, 15-17</p> <p>Page 11-14</p> <p>Page 19 Table 1.2</p>	<p>[MIE Textbook]:</p> <p>Page 10 Activity 2, Page 18-19 Activity 6</p> <p>Page 13 Activity 3, page 15 Activity 4</p>	<p>Worksheets will be provided.</p>	<ul style="list-style-type: none"> • Reduce, Reuse and Recycle, to enjoy a better life https://www.youtube.com/watch?v=OasbYWF4_S8

Topic: 2 Pictorial Projection (Oblique Projection)

Learning Objectives	Worked Examples	Classwork & Homework	Extra Work	Resources
<p>Students should be able to:</p> <ul style="list-style-type: none"> a) Identify basic line types. b) Apply basic rendering techniques: tone shading. c) Apply basic rendering techniques: thick and thin lines. 	<p>[MIE Textbook]:</p> <p>Page 27 Table 2.2</p> <p>Page 31- 32 Figure 2.3-Figure 2.4</p> <p>Page 34-35 Figure 2.7- Figure 2.9</p>	<p>[MIE Textbook]:</p> <p>Page 28 Activity 2, 3</p> <p>Page 33-34 Activity 4</p> <p>Page 35-36 Activity 5</p>	<p>Worksheets will be provided.</p>	<ul style="list-style-type: none"> • Hand Rendering Basics <p>https://www.youtube.com/watch?v=9wFzEVO3Vcw</p>
<ul style="list-style-type: none"> d) Draw cuboids in oblique projection. e) Draw shaped blocks in oblique projection 	<p>[MIE Textbook]:</p> <p>Page 37-39 Figure 2.10 – Figure 2.15</p> <p>Page 40-43 Figure 2.16 – Figure 2.22</p>	<p>[MIE Textbook]:</p> <p>Page 39-40 Activity 6</p> <p>Page 44 Activity 6</p>	<p>Additional questions will be given.</p>	<ul style="list-style-type: none"> • Oblique Projection Basics <p>https://www.youtube.com/watch?v=jyGlt6ZsIKo</p>

Topic: 3 Pneumatic and Hydraulic

Learning Objectives	Worked Examples	Classwork & Homework	Extra Work	Resources
<i>Students should be able to:</i> a) Explain the working principles of pneumatic systems. b) State the common application of pneumatic systems.	[MIE Textbook]: Page 111 Activity 1 Page 112	[MIE Textbook]: Page 112 Activity 2	Worksheets will be provided.	<ul style="list-style-type: none">How pneumatic systems works https://www.youtube.com/watch?v=IBARBZNLxQI
 c) Explain the working principles of hydraulic systems. d) State the common application of hydraulic systems.	[MIE Textbook]: Page 113 Page 113-114	 Page 114 Activity 3	Worksheets will be provided.	<ul style="list-style-type: none">How hydraulic systems works https://www.youtube.com/watch?v=M4rJO6QzDWA

Topic: 4 The Design Process – Part 1

Learning Objectives	Worked Examples	Classwork & Homework	Extra Work	Resources
<i>Students should be able to:</i>	[MIE Textbook]:	[MIE Textbook]:	Worksheets will be provided.	<ul style="list-style-type: none"> The Design Process for Students - Design and Technology https://www.youtube.com/watch?v=W-eqjMc1Efs How to solve problems like a designer https://www.youtube.com/watch?v=wOrmr5kT-48
a) Describe the stages of the design process	Page 115 Figure 7.1	-		
b) Identify and describe a possible problem	Page 116 Figure 7.2- Figure 7.3	Page 117 Activity 1 and activity 2		
c) Conduct a research mind map	Page 118 Figure 7.4	Page 118 Activity 3		
d) Analyse existing products	Page 119-120 Figure 7.5	Page 120 Activity 4		
e) List the specification of the design solution.	Page 120	Page 121 Activity 5		

First Term Assessment

Component	Time Allocation	Type	Maximum Mark
Design and Technology	1 hour 15 minutes	Lower order to higher order questions	50

The paper will consist of about 8 - 10 lower to higher order questions. Additional equipment needed for this paper will be A3 size paper, drawing board and technical drawing instruments. Omission of essential working will result in loss of marks.

Candidates should answer **all** questions.

Candidates are expected to cover the PROPOSED syllabus. The paper may contain questions on any part of the syllabus and questions will not necessarily be restricted to a single topic.

SECOND TERM [28/04/2025 – 18/07/2025]

Topic: 4 The Design Process – Part 2

Learning Objectives	Worked Examples	Classwork & Homework	Extra Work	Resources
<i>Students should be able to:</i> a) Sketch a range of ideas as possible solutions.	[MIE Textbook]: Page 121-124 Figure 7.6 – Figure 7.9	Page 123 Activity 6 Page 124 Activity 7 Page 124 Activity 8	Worksheets will be provided.	<ul style="list-style-type: none"> Product Design sketching https://www.youtube.com/watch?v=FLrCO4K2Wkw Illustration of action plan https://www.shutterstock.com/search/carpenter%2Bsketch?section=1&ref_context=keyword Realising the product http://www.technologystudent.com/despro_3/cardmod1.html Evaluating the final product http://www.technologystudent.com/designpro/eval1.htm
b) Develop the selected idea	Page 125-130 Figure 7.10 – Figure 7.15	Page 125-130 Activity 9 – Activity 13		
c) Design a flowchart for the production plan – consist of cutting list, illustrations, basic techniques, tools and safety precautions.	Page 131 – 134	Page 131-134 Activity 14 – Activity 16		
d) Realisation of artefact.	Page 135 – page 146	Page 146 Activity 17		
e) Testing and evaluation of artefact.	Page 147 – 149 Figure 7.18 – Figure 7.20	Page 149 Activity 18 – Activity 19		

Topic: 5 Material Technology

Learning Objectives	Worked Examples	Classwork & Homework	Extra Work	Resources
<p><i>Students should be able to:</i></p> <p>a) Differentiate between hardwood and softwood</p> <p>b) Describe the properties and applications of common softwoods and hardwoods.</p> <p>c) List and describe common manufactured boards and their applications.</p>	<p>[MIE Textbook]:</p> <p>Page 58- 59 Table 3.1</p> <p>Page 59-61 – Table 3.2- Table 3.3</p> <p>Page 62 – 64</p>	<p>[MIE Textbook]:</p> <p>Page 61-62 Activity 1</p> <p>Page 65 Activity 2</p>	<p>Worksheets will be provided.</p>	<ul style="list-style-type: none"> Difference between hardwood and softwood. <p>https://www.youtube.com/watch?v=tlbHHgKk_GY</p> <ul style="list-style-type: none"> Manufactured board <p>https://www.youtube.com/watch?v=dD5fsS5LjyQ</p>
<p>d) Differentiate between ferrous and non-ferrous metals</p> <p>e) Describe the properties and applications of common ferrous and non- ferrous metals.</p>	<p>[MIE Textbook]:</p> <p>Page 65</p> <p>Page 66 – 67 Table 3.5 – Table 3.6</p>	<p>Page 68 Activity 3</p>	<p>Worksheets will be provided.</p>	<ul style="list-style-type: none"> Difference between ferrous and non- ferrous metal. <p>https://www.youtube.com/watch?v=JIX_vFh5IIA</p>

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<p>f) Differentiate between thermoplastics and thermosetting plastics.</p> <p>g) Describe the properties and application of common thermoplastic and thermosetting plastics.</p>	<p>[MIE Textbook]: Page 69</p> <p>Page 69 - 72</p>	<p>[MIE Textbook]:</p> <p>Page 72 - 73 Activity 4</p>	<p>Worksheets will be provided.</p>	<ul style="list-style-type: none"> Difference between thermoplastics and thermosets <p>https://www.youtube.com/watch?v=gkVaRK_A2At8</p>
<p>h) Select appropriate tools in the designing and realisation of artefacts: Measuring and marking out tools, holding tools, cutting tools, driving tools</p>	<p>[MIE Textbook]: Page 73 – 83 Table 3.8 – Table 3.12</p>	<p>[MIE Textbook]: Page 76 Activity 5 Page 79 Activity 6 Page 82 Activity 7 Page 84 Activity 8</p>	<p>Worksheets will be provided.</p>	<ul style="list-style-type: none"> Properties and applications of smart materials. <p>https://www.youtube.com/watch?v=5s6-1uREV4A</p>

Topic: 6 Pictorial Projection (Isometric Projection)

Learning Objectives	Worked Examples	Classwork & Homework	Extra Work	Resources
<p><i>Students should be able to:</i></p> <p>a) Draw cuboids in isometric projection.</p> <p>b) Draw shaped blocks in isometric projection.</p>	<p>[MIE Textbook]:</p> <p>Page 46- 47 Figure 2.24 – Figure 2.28</p> <p>Page 49- 50 Figure 2.29 – Figure 2.34</p>	<p>[MIE Textbook]:</p> <p>Page 48 Activity 8</p> <p>Page 51 Activity 9</p>	<p>Additional questions will be given.</p>	<ul style="list-style-type: none">Isometric Projection Basics https://www.youtube.com/watch?v=jyGlt6ZsIKo

Topic: 7 Mechanisms

Learning Objectives	Worked Examples	Classwork & Homework	Extra Work	Resources
<i>Students should be able to:</i> a) State the functions of mechanism.	[MIE Textbook]: Page 107 - 108	[MIE Textbook]: Page 110 Activity 1	Worksheets will be provided.	<ul style="list-style-type: none">The principle of simple mechanism. https://www.youtube.com/watch?v=HISn0esufk
b) Identify the different mechanism used in machines.	[MIE Textbook]: Page 109 Figure 5.3		Worksheets will be provided.	<ul style="list-style-type: none">Simple mechanism https://www.youtube.com/watch?v=Dhgn8-34YHM

Second Term Assessment

Component	Time Allocation	Type	Maximum Mark
Design and Technology	1 hour 15 minutes	Lower order to higher order questions	50

The paper will consist of about 8 - 10 lower to higher order questions. Additional equipment needed for this paper will be A3 size paper, drawing board and technical drawing instruments. Omission of essential working will result in loss of marks.

Candidates should answer **all** questions.

Candidates are expected to cover the PROPOSED syllabus. The paper may contain questions on any part of the syllabus and questions will not necessarily be restricted to a single topic.

THIRD TERM [11/08/2025 – 31/10/2025]

Topic: 8 Orthographic Projection

Learning Objectives	Worked Examples	Classwork & Homework	Extra Work	Resources
<i>Students should be able to:</i> a) Draw objects in orthographic projection on plain paper.	[MIE Textbook]: Page 86 - 90 Figure 4.1 - Figure 4.10 Page 92 Figure 4.14	[MIE Textbook]: Page 91 Activity 1 Page 96 activity 2	Additional questions will be given.	<ul style="list-style-type: none">How to draw objects in orthographic projection https://www.youtube.com/watch?v=1sjaelzuGAK
b) Insert dimensions on the different orthographic views.	[MIE Textbook]: Page 94-95 Figure 4.18	[MIE Textbook]: Page 98-105 Exercises	Additional questions will be given.	<ul style="list-style-type: none">How to insert dimensions in orthographic projection https://www.youtube.com/watch?v=kf01kQthhVs

Third Term Assessment – National Certificate of Education (NCE)

Component	Time Allocation	Type	Maximum Mark
Design and Technology	1 hour 15 minutes	Lower order to higher order questions	50

The paper will consist of about 8 - 10 lower to higher order questions. Additional equipment needed for this paper will be A3 size paper, drawing board and technical drawing instruments. Omission of essential working will result in loss of marks.

Candidates should answer **all** questions.

Candidates are expected to cover the PROPOSED syllabus. The paper may contain questions on any part of the syllabus and questions will not necessarily be restricted to a single topic.

