

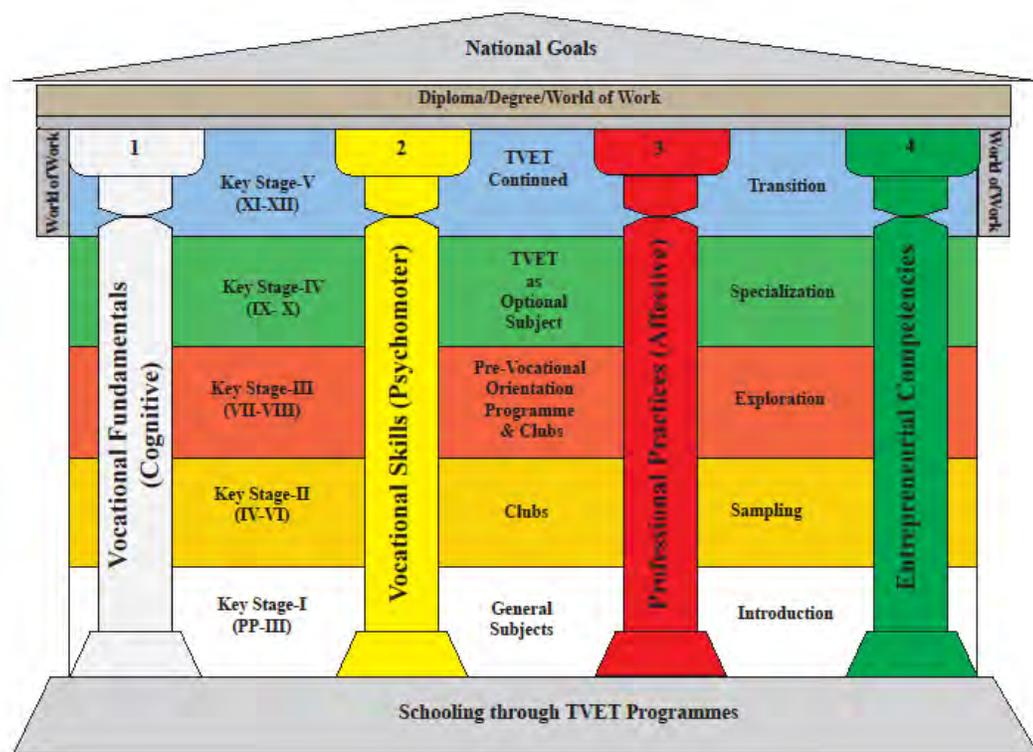
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET)

NEW NORMAL CURRICULUM

INSTRUCTIONAL GUIDE

(MASONRY)

CLASS: X



Royal Education Council

Paro: Bhutan

Published by:
Royal Education Council,
Royal Government of Bhutan
Tel: +975-8-271226
Fax: +975-8-271991
Website: www.curriculum.bt

Provisional edition 2021

Copyright ©2021 Royal Education Council
All rights reserved. No part of this book may be reproduced in any form without permission from the Royal Education Council, Royal Government of Bhutan.

ACKNOWLEDGEMENTS

The REC would like to acknowledge the assistance provided by the Ministry of Education (MoE), Royal Government of Bhutan in the development of Technical and Vocational Education and Training New Normal Curriculum Instructional Guide for classes IX-XII. The REC also extends its sincere gratitude to all the schools and individuals for their invaluable contributions towards the development of this instructional guide.

Advisors

- i. Kinga Dakpa, Director General, Royal Education Council, Paro
- ii. Wangpo Tenzin, Dean, Curriculum Specialist, REC, Paro

Researchers and writers

- i. Sangay Choeda, Assistant Instructor, Chumey MSS, Bumthang
- ii. Kinley Namgyal, Specialist, REC, Paro

Layout Designer

Tashi Zangpo, REC, Paro

ISBN

FOREWORD

COVID-19 has suddenly caused unforgiving disruptions in the public education all over the world, and brought about threats of fragmentation due to disparities in accessibility and connectivity in many systems. In Bhutan too, continuity of education and learning has been severely affected as a result of nationwide school closures and due to restrictions and health protocols. The disruptions have led to challenges in many existing patterns and trends in education resulting in a massive shift away from learning and teaching in traditional settings with physical interactions to the maximum in terms of relevancy and efficiency. This has caused a major problem for children living in poverty worldwide, who often rely on the physical settings of their schools for educational materials, guidance, and, sometimes, the only decent meal of the day.

In the new normal education, human interaction and well-being is a priority. Technology, particularly digital technology that enables communication, collaboration and learning across distance, is a formidable tool – not a panacea but a source of innovation and expanded potentials. As we embrace this exceptional opportunity to transform the world, and as we reimagine the organization of our educational institutions and learning environments, we will need to think about where we want to go.

In the post COVID 19 era, we must prioritize the development of the whole person not just academic knowledge. Inspiration for the change can be drawn from the 1996 Delors report, *Learning the treasure within*, in its specification of four pillars of learning as “learning to know”, “to do”, “to be”, and “to live together”. Therefore, curricula must be increasingly perceived as an integrated and based on themes and problems that allows learners to learn to live in peace with our common humanity and our common planet. This has the potential in the development of a strong base of knowledge about one’s self and about the world and find purpose and be better able to participate in social and political milieu.

The New Normal Curriculum is, not just a mere response to the pandemic, but also a culmination of the curriculum reform work for the last four years by the Royal Education Council. It is an attempt to transform education from the teaching of “what” to learning of “how” and “why” towards empowering learners with the transversal competencies and the 21st century skills, and preparing them to be lifelong learners. We are optimistic that this move orients our education process towards nurturing nationally rooted and globally competent citizens.

Wish all our learners and teachers a life enriching experiential teaching and learning.

Kinga Dakpa,

Director General

INTRODUCTION

Technical and Vocational Education and Training (TVET) is education and training which provides knowledge and skills for employment. It comprises of education, training and skills development related to a wide range of occupational fields, production, services and livelihood. The Royal Education Council and Ministry of Education envisage that the TVET curriculum has a place in the mainstream education system, as it is the case in most of the education systems of the developed world. The formal Technical and Vocational Education and Training (TVET) began in 1965 at Don Bosco Technical School (DBTS), in Kharbandi (presently known as Rinchening) in Phuntsholing. Even after that, major curriculum reform was planned by the then Department of Curriculum Research and Development (DCRD) under the Ministry of Education in an attempt to make education relevant to the Bhutanese society through diversification of Secondary Education Curriculum in the schools, which included the introduction of TVET.

As per ‘National Education Framework’ developed collaboratively by the Royal Education Council (REC) and the Ministry of Education (MoE), it provides a pathway on integrating technical/vocational education in the mainstream school education curriculum and as elective subjects in higher classes (NEF, 2009; page 64).

With the collaborative efforts of the Ministry of Labour and Human Resources and the erstwhile Department of Curriculum Research and Development under Ministry of Education, Vocational Curriculum has been introduced in the schools with assistance from TTIs since 2011. After the first MoU that was signed between MoE and MoLHR in 2011, the second MoU was signed again in 2014, to improve technical/vocational courses. The technical/vocational courses offered by the TTIs/IZCs are adapted and redesigned and are offered in schools aligning to the ‘Bhutan Education Blue Print’ 2014-2024, which recommends upscaling and diversification of TVET in schools through the provision of alternative pathways in schools and the tertiary education systems, owing to the limited access to such courses, despite the growing demand for technical skills in the country.

The resolutions of the National School Curriculum Conference 2016, also strongly emphasised the need to upscale and deepen TVET. Accordingly, the TVET framework is developed from classes PP to XII, schools equipped with necessary resources and instructors trained. Tripartite MoU among REC, MoE and MoLHR was also signed in 2018 to implement the programmes collaboratively.

Although the TVET curriculum is competency based with more emphasis on hands-on experience, further improvements have been made taking care of cognitive and affective domains besides psychomotor. Teaching and learning approaches have also been enriched with the recommendation to use ICT and online resources. Since the pandemic (COVID-19) has resulted in the closure of schools, it has taught us lessons to be prepared for such an untoward situation in the future. Thus, the New Normal Curriculum Instructional Guide is prepared not only to encourage blended learning but also to facilitate remote learning. Thus, the guide would help the schools to implement the curriculum effectively without limiting to contact teaching/learning besides using a variety of pedagogies.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	i
FOREWORD	ii
INTRODUCTION	iii
Chapter 4: Performing brick/blocks masonry work	1
4.5 Laying English bond.....	1
4.6 Laying header and Flemish bond.....	2
4.7 Setting a dumpy level	4
4.8 Preparing stabilized earth block	5
4.9 Laying stabilized earth block wall.....	7
ENGINEERING DRAWING	8
Chapter 2: Interpreting basic engineering drawing.....	8
2.1 Drawing isometric blocks.....	8
RESOURCES	9

MODULE I: PERFORMING BRICK/BLOCK, STONE MASONRY AND PLASTERING

Chapter 4: Performing brick/blocks masonry work

A. Learning objectives/Broad theme/Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.5.1 Define English bond. 4.5.2 State the advantage of English bond. 4.5.3 State the application of English bond. 4.5.4 Lay English bond. 4.5.5 <i>Ensure proper handling of hand tools.</i> 4.5.6 <i>Ensure appropriate use of PPE.</i>	4.5 Laying English bond

B. Competencies

- i) Practice OHS procedures in any task for safety.
- ii) Lay English bond wall as per the requirement.

C. Pedagogy/Learning Experiences

• **Contact:**

- ✓ Make learners read INFORMATION SHEET 4.5.
- ✓ Make learners read and perform OPERATION SHEET 4.5 through guided practice.
- ✓ Make learners solve the SAMPLE SELF CHECK 4.5.

• **Non-contact:**

- ✓ Instruct learners to read INFORMATION SHEET 4.5 through Google Classroom.
- ✓ The weblink <https://www.civillead.com/difference-between-english-bond-and-flemish-bond/> can be shared with the learners to study about English bond wall through Google Classroom.
- ✓ Instruct learners to watch a video from the web link <https://youtu.be/A2ST12dqX8U> on the construction of the English bond wall through Google Classroom.
- ✓ Instruct learners to read OPERATION SHEET 4.5 through Google Classroom.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 4.5 through Google Classroom.

D. Assessment

• **Contact:**

- ✓ Assess learners' ability to construct the English bond wall using a rubric.
- ✓ Assess learners' response to SAMPLE SELF CHECK 4.5.
- ✓ Provide feedback

• **Non-contact:**

- ✓ Assess learners' response to the SAMPLE SELF CHECK 4.5 of CBLM.
- ✓ Provide feedback through Google Classroom.

E. Resources (online and offline)

- CBLM for Classes IX and X, REC
- <https://www.civillead.com/difference-between-english-bond-and-flemish-bond/> (Note on English bond wall)
- <https://youtu.be/A2ST12dqX8U> (Video on English bond wall construction)

A. Learning objectives/Broad theme/Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.6.1 Define the header bond. 4.6.2 State the application of the header bond. 4.6.3 Define a Flemish bond. 4.6.4 State the application of Flemish bond. 4.6.5 Differentiate between English and Flemish bond wall. 4.6.6 Lay header and Flemish bond. 4.6.7 <i>Ensure proper handling of hand tools.</i> 4.6.8 <i>Ensure appropriate use of PPE.</i> 4.6.9 <i>Ensure to maintain cleanliness at the workplace.</i> 4.6.10 <i>Ensure to use materials economically.</i> 4.6.11 <i>Ensure proper storage of surplus materials.</i>	4.6 Laying header and Flemish bond

B. Competencies

- i) Practice OHS procedures at all times for safety.
- ii) Construct header and Flemish bond wall of different designs.

C. Pedagogy/Learning Experience

- **Contact:**
 - ✓ Make the learners read INFORMATION SHEET 4.6.
 - ✓ Make read and perform OPERATION SHEET 4.6 through guided practice.
 - ✓ Ask learners to solve the SAMPLE SELF CHECK 4.6.
- **Non-contact:**
 - ✓ Instruct the learners to read INFORMATION SHEET 4.6 through Google Classroom.
 - ✓ Instruct learners to read about header bond wall in the web link <http://www.civilprojectsonline.com/civil-projects/types-of-bonds-in-brickwork-stretcher-and-header-bond/> through Google Classroom.
 - ✓ Instruct learners to read an article on the web link <https://www.civillead.com/difference-between-english-bond-and-flemish-bond/> for comparison between English and Flemish bond wall through Google Classroom.
 - ✓ Instruct learners to watch a video on constructing a header bond wall by sharing the web link https://youtu.be/c6If_46zMOM through Google Classroom.
 - ✓ Instruct learners to watch a video on constructing a header bond wall by sharing the web link <https://youtu.be/BKKpCmiBtzk> through Google Classroom.
 - ✓ Ask learners to read OPERATION SHEET 4.6 through Google Classroom.
 - ✓ Instruct learners to solve the SAMPLE SELF CHECK 4.6 and submit it through Google Classroom.

D. Assessment:

- **Contact:**
 - ✓ Assess the learners' ability to lay header and Flemish bond wall using a rubric.

- ✓ Assess the learners' response to the SAMPLE SELF CHECK 4.6.
- ✓ Provide feedback.
- **Non-contact:**
 - ✓ Assess the learners' response to the SAMPLE SELF CHECK 4.6.
 - ✓ Provide feedback through Google Classroom.

E. Resources (online and offline):

- CBLM for Classes IX and X, REC
- <http://www.civilprojectsonline.com/civil-projects/types-of-bonds-in-brickwork-stretcher-and-header-bond/> (Header bond wall)
- <https://www.civillead.com/difference-between-english-bond-and-flemish-bond/> (English bond vs Flemish bond)
- https://youtu.be/c6lf_46zMOM (Video on header bond wall)
- <https://youtu.be/BKKpCmiBtzk> (Video on Flemish bond wall)

A. Learning objectives/Broad theme/Strand/Chapter

Learning objectives	Core concepts (Chapters/Topics)
4.7.1 Define the dumpy level. 4.7.1 Label the parts and state their function. 4.7.1 Define levelling staff. 4.7.1 State the precaution while using the dumpy level. 4.7.1 Set a dumpy level. <i>4.7.1 Ensure proper handling of the dumpy level.</i> <i>4.7.1 Ensure to record the reading.</i>	4.7 Setting a dumpy level

B. Competencies

- i) Practise OHS procedures at all times for safety.
- ii) Set a dumpy level as per the requirement.

C. Pedagogy/Learning experience

• Contact:

- ✓ Let learners read INFORMATION SHEET 4.7.
- ✓ Make learners read and perform the OPERATION SHEET 4.7 ensuring the proper handling of dumpy level and recording of the readings.
- ✓ Make learners answer the SAMPLE SELF CHECK 4.7.

• Non-contact:

- ✓ Instruct learners to read INFORMATION SHEET 4.7 through Google Classroom.
- ✓ Instruct the learners to watch a video on a dumpy level by sharing the web link <https://youtu.be/shbhc4NiZbw> through Google Classroom.
- ✓ Instruct learners to watch a video to set up a dumpy level by sharing the web link <https://youtu.be/j8poe2vvD2Q> through Google Classroom.
- ✓ Instruct learners to read OPERATION SHEET 4.7 through Google Classroom.
- ✓ Instruct learners answer the SAMPLE SELF CHECK 4.7 and submit it through Google Classroom.

D. Assessment

• Contact:

- ✓ Assess learners' ability to set up and perform the dumpy level using a rubric.
- ✓ Assess learners' response to the SAMPLE SELF CHECK 4.7.
- ✓ Provide feedback.

• Non-contact:

- ✓ Assess learners' response to the SAMPLE SELF CHECK 4.7.
- ✓ Provide feedback through Google Classroom.

E. Resources (online and offline)

- CBLM of Classes IX and X, REC
- <https://youtu.be/shbhc4NiZbw> (Video on basic introduction to dumpy level)
- <https://youtu.be/j8poe2vvD2Q> (Video on setting up a dumpy level)

A. Learning objectives/Broad theme/Strand/Chapter

Learning objectives	Core concepts (Chapters/Topics)
4.8.1 Define block masonry. 4.8.2 List the types of blocks. 4.8.3 Define stabilized earth block. 4.8.4 List the different sizes of stabilized earth block. 4.8.5 State the advantages and disadvantages of stabilized earth block. 4.8.6 Explain the mix proportion. 4.8.7 Describe different field test for soil. 4.8.8 Prepare stabilized earth block. 4.8.9 <i>Ensure to use the right amount of water.</i> 4.8.10 <i>Ensure to lubricate inside of the mould.</i> 4.8.11 <i>Ensure appropriate use of PPE.</i> 4.8.12 <i>Ensure to remove blocks without damaging</i>	4.8 Preparing stabilized earth block

B. Competencies

- i) Practice OHS procedures at all times for safety.
- ii) Prepare stabilized earth block as required.

C. Pedagogy/Learning experience

• Contact:

- ✓ Make learners read the INFORMATION SHEET 4.8.
- ✓ Read and perform SKILL SHEET 4.8 and OPERATION SHEET 4.8 through demonstration.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 4.8.

• Non-contact:

- ✓ Instruct learners read the INFORMATION SHEET 4.8 through Google Classroom.
- ✓ Instruct learners to read an article about types of concrete block from the web link <https://theconstructor.org/building/types-concrete-blocks-masonry-units/12752/> through Google Classroom.
- ✓ Instruct learners to watch a video by sharing the web link <https://youtu.be/UDmjToX3aBI> that shows how to prepare mud block through Google Classroom.
- ✓ Instruct students to read the SKILL SHEET 4.8 and OPERATION SHEET 4.8 through Google Classroom.
- ✓ Instruct learners to solve the SAMPLE SELF CHECK 4.8 and submit it through Google Classroom.

D. Assessment

• Contact:

- ✓ Assess learners' ability to prepare stabilized earth block using a rubric.

- ✓ Assess learners' response to SAMPLE SELF CHECK 4.8.
- ✓ Provide feedback.
- **Non-contact:**
 - ✓ Assess learners' response to SAMPLE SELF CHECK 4.8.
 - ✓ Provide feedback through Google Classroom.

E. Resources (online and offline)

- CBLM for Classes IX and X, REC
- <https://theconstructor.org/building/types-concrete-blocks-masonry-units/12752/>
(Article on type of the concrete blocks)
- <https://youtu.be/UDmjToX3aBI> (Video on mud block preparation)

A. Learning objectives/Broad theme/Strand/Chapter

Learning objectives	Core concepts (Chapters/Topics)
4.9.1 State the application of earth block. 4.9.2 Explain the grouting. 4.9.3 Explain the use of the reinforcement bar. 4.9.4 Explain the finishing work for the block wall. 4.9.5 Lay stabilized earth block wall. 4.9.6 <i>Ensure to grout the cores every after 1 m.</i> 4.9.7 <i>Ensure appropriate use of PPE.</i>	4.9 Laying stabilized earth block wall

B. Competencies

- i) Practice OHS procedures at all times for safety.
- ii) Lay stabilized earth block wall as required.

C. Pedagogy/Learning experience

• Contact:

- ✓ Make learners read INFORMATION SHEET 4.9.
- ✓ Demonstrate learners how to lay stabilized earth block and make them read and perform OPERATION SHEET 4.9.
- ✓ Make students solve the SAMPLE SELF CHECK 4.9.

• Non-contact

- ✓ Instruct learners read INFORMATION SHEET 4.9 through Google Classroom.
- ✓ Instruct learners to watch a video to laying a stabilized earth block wall by sharing the web link <https://youtu.be/OQBWab9q5Zs> through Google Classroom.
- ✓ Instruct learners to read OPERATION SHEET 4.9.

D. Assessment

• Contact:

- ✓ Assess learners' ability to perform OPERATION SHEET 4.9 on laying a stabilized earth block wall using a rubric.
- ✓ Assess learners' response to SAMPLE SELF CHECK 4.9.
- ✓ Provide feedback.

• Non-contact:

- ✓ Assess learners' response to the SAMPLE SELF CHECK 4.9 and submit it through Google Classroom.
- ✓ Provide feedback through Google Classroom.

E. Resources (online and offline)

- CBLM for Classes IX and X, REC
- <https://youtu.be/OQBWab9q5Zs> (Video on laying stabilized earth block)

ENGINEERING DRAWING

Chapter 2: Interpreting basic engineering drawing

A. Learning objectives/Broad theme/Strand/Chapter

Learning objectives	Core concepts (Chapters/Topics)
2.1.1 Define isometric drawing. 2.1.2 State isometric terminologies. 2.1.3 Draw isometric blocks. 2.1.4 <i>Ensure the handling of set squares.</i>	2.1 Drawing isometric blocks

B. Competencies

- i) Draw isometric blocks to identify different views of the drawing.

C. Pedagogy/Learning experience

- **Contact:**
 - ✓ Make learners read INFORMATION SHEET 2.1.
 - ✓ Make learners read and perform OPERATION SHEET 2.1.
 - ✓ Make students solve the SAMPLE SELF CHECK 2.1.
 - ✓ Conduct a class test to examine the understanding of drawing isometric blocks.
- **Non-contact**
 - ✓ Instruct learners read INFORMATION SHEET 2.1 through Google Classroom.
 - ✓ Instruct learners to watch a video on drawing an isometric view from the web link <https://youtu.be/c6DygJMwos8> through Google Classroom.
 - ✓ Instruct learners to read and perform OPERATION SHEET 2.1 in A4 size paper and submit it through Google Classroom.
 - ✓ Instruct learners to solve the SAMPLE SELF CHECK 2.1 and submit it through Google Classroom.
 - ✓ Conduct a class test to examine the understanding of drawing isometric blocks.

D. Assessment

- **Contact:**
 - ✓ Assess learners' ability to perform OPERATION SHEET 2.1 on providing dimension to drawing using a rubric.
 - ✓ Assess learners' response to the SAMPLE SELF CHECK 2.1.
 - ✓ Assess learners' understanding of drawing isometric blocks.
 - ✓ Provide feedback.
- **Non-contact:**
 - ✓ Assess learners' response to the SAMPLE SELF CHECK 2.1.
 - ✓ Assess learners' understanding of drawing isometric blocks.
 - ✓ Provide feedback through Google Classroom.

E. Resources (online and offline)

- CBLM for Classes IX and X, REC
- <https://youtu.be/c6DygJMwos8> (Video on isometric view)

RESOURCES

- 1) Technical and Vocational Education and Training (TVET) New Normal Curriculum Framework (Classes: PP-XII)
- 2) Competency-Based Learning Materials (Masonry)