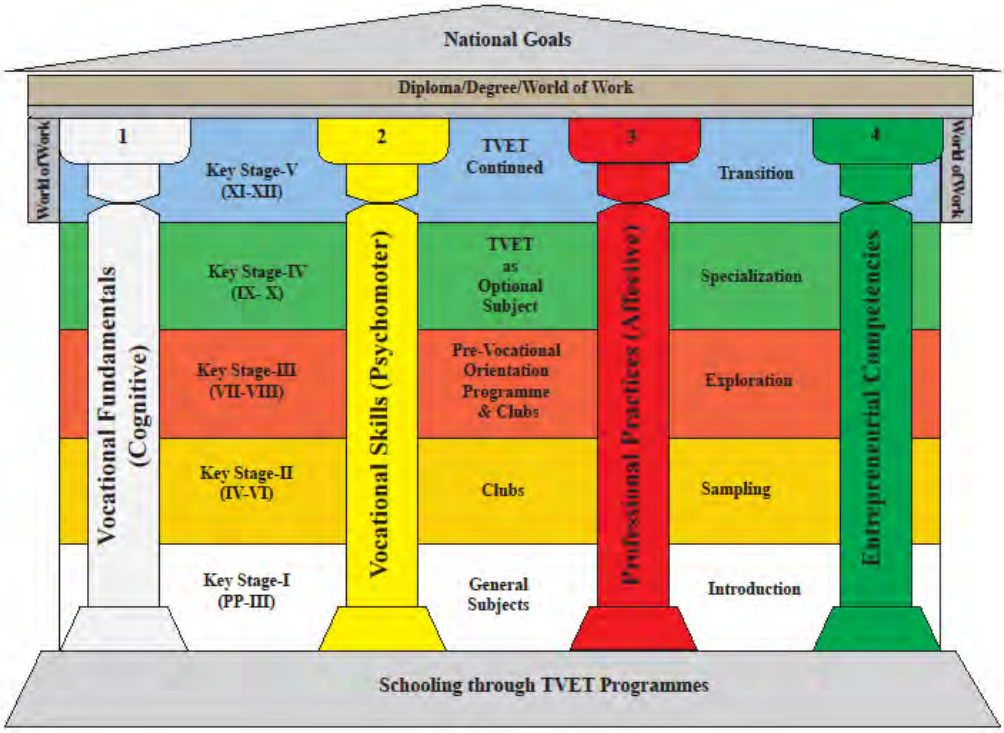
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET)

NEW NORMAL CURRICULUM

INSTRUCTIONAL GUIDE

(PLUMBING)

CLASS: X



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Tel: +975-8-271226
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Advisors
i. Kinga Dakpa, Director General, Royal Education Council, Paro
ii. Wangpo Tenzin, Dean, Curriculum Specialist, REC, Paro

Researchers and writers
i. Dechen Choden, Assistant. Instructor, Chumey MSS, Bumthang.
ii. Kinley Namgyal, Specialist, REC, Paro.

Layout Designer
Tashi Zangpo, REC, Paro

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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 Rinchending) 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.

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Chapter 2: Installing pipes and fittings

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

Learning objectives	Core concepts (Chapters/Topics)
2.5.1 Define pipe reamer. 2.5.2 List the types of pipe reamers. 2.5.3 Label the parts of a reamer. 2.5.4 Explain the importance of checking the thickness of the pipe edge after reaming. 2.5.5 List the different types of files. 2.5.6 Explain the purpose of the file. 2.5.7 Use spiral ratchet reamer. 2.5.8 Ream pipe. 2.5.9 File pipe. *2.5.10 Ensure safe handling of pipe reamer.*	**2.5 Reaming pipe**

B. Competencies:

i) Ream the edge of the pipe as per standard thickness.

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 2.5
  - ✓ Provide handouts to learners.
  - ✓ Share the web links https://youtu.be/n6bJzMLS-18 which explains on ream pipe by pipe reamer
  - ✓ Share the web link https://youtu.be/nFkrYSooVlg?list=PL90FbxIdh1AoxKzbsQZyRNEha1da2Zi9Jwhich explains on ream pipe using the file.
  - ✓ Make learners perform OPERATION SHEET 2.5
  - ✓ Let the learners discuss in a group and do a presentation on types of files using PPT, handouts, demonstration, and short video clips to explain the types of the reamer and its parts.

- **Non-contact:**
  - ✓ Provide handouts to learners through Google Classroom or any other social media platforms.
  - ✓ Share the web links https://youtu.be/n6bJzMLS-18 which explains on ream pipe by pipe reamer
  - ✓ Share the web link https://youtu.be/nFkrYSooVlg?list=PL90FbxIdh1AoxKzbsQZyRNEha1da2Zi9J which explains on ream pipe using file

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 2.5 and perform OPERATION SHEET 2.5 and assess them using a checklist/performance guide. Provide necessary intervention.
  - ✓ Assess learner's knowledge about PPE by asking questions.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.5
  - ✓ Let the learners do the presentation and assess as per the rubric developed.
- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 2.5
  - ✓ Let the student solve SAMPLE SELF CHECK 2.5 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Textbook/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use rubric for assessment.
  - ✓ Asses through oral/viva-voce
  - ✓ Written test through Kahoot.

E. Resources (online and offline):

- Competency-Based Learning Materials, REC
- Handouts
- https://youtu.be/n6bJzMLS-18 (Explanation on ream pipe by pipe reamer)
- https://youtu.be/nFkrYSooVlg?list=PL90FbxIdh1AoxKzbsQZyRNEha1da2Zi9J (Explanation on ream pipe by file)

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

Learning objectives	Core concepts (Chapters/Topics)
2.6.1 Define threading. 2.6.2 Explain the types of manual threading tools. 2.6.3 Label the parts of the diestock. 2.6.4 Differentiate between Indian diestock and ratchet diestock. 2.6.5 Explain the causes of defective thread. 2.6.6 State the purpose of lubricant. 2.6.7 Use Die & stock. 2.6.8 Use Ratchet die stock. 2.6.9 Thread pipe manually.	**2.6 Threading pipe manually**

B. Competencies

i) Thread pipes and perform jointing in any task manually.

C. Pedagogy/Learning Experience

- **Contact**:
  - ✓ Lecture on type of manual threading tools
  - ✓ Make learners go through INFORMATION SHEET 2.6
  - ✓ Let the learners discuss in a group and do a presentation on the difference between Indian diestock and ratchet diestock using PPT, handouts, demonstration, and short video clips to explain types of the reamer and its parts
  - ✓ Make the learners perform SKILL SHEET 2.6
  - ✓ Demonstrate on OPERATION SHEET 2.6.
- **Non-contact:**
  - ✓ Provide handouts to learners through Google Classroom or any other social media platforms.
  - ✓ Let the learners discuss in a group and do a presentation on the difference between Indian diestock and ratchet diestock using PPT, handouts, demonstration, and short video clips
  - ✓ Share the given web link https://youtu.be/x2ZVa1KyT9Q which explains how to thread pipe manually.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 2.6 and perform OPERATION SHEET 2.6 and assess them using a checklist/performance guide. Provide necessary intervention.
  - ✓ Assess learner's knowledge about PPE by asking questions.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.6
  - ✓ Let the learners do the presentation and assess as per the rubric developed.
  - ✓ Make learners perform OPERATION SHEET 2.6

- **Non-contact:**
  - ✓ Make learners solve the SAMPLE SELF CHECK 2.6 that fulfills objectives and competency. Send answers through Google Classroom or any other social media platforms.
  - ✓ Give additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms.
  - ✓ Asses through oral/viva vice
  - ✓ Written test through Kahoot.

E. Resources (online and offline):

- Competency-Based Learning Materials, REC
- https://youtu.be/x2ZVa1KyT9Q (Explanation on threading)
- PPT

A. Learning objectives/Broad theme/Strand/Chapter

Learning objectives	Core concepts (Chapters/Topics)
2.7.1 Define electric threading. 2.7.2 Explain the types of electric threading machine and their features. 2.7.3 State the advantages and disadvantages of electric threading machines. 2.7.4 Label the parts of the threading machine. 2.7.5 Set universal threading machine. 2.7.6 Thread pipe mechanically. 2.7.7 *Ensure appropriate use of PPE.* 2.7.8 *Ensure proper handling of the universal threading machine.* 2.7.9 *Ensure proper disposal of waste products.* *2.7.10 Ensure to be patient while threading.*	**2.7 Threading pipe mechanically**

B. Competencies

i) Thread pipes and perform jointing in any task mechanically.

C. Pedagogy/Learning experience

- **Contact**:
  - ✓ Lecture-based on INFORMATION SHEET 2.7 and make students go through it.
  - ✓ Demonstration on OPERATION SHEET 2.7
- **Non-contact:**
  - ✓ Make learner go through INFORMATION SHEET 2.7 and OPERATION SHEET 2.7
  - ✓ Provide PPT on types of electric threading machine and their features.
  - ✓ Provide PPT on the advantages and disadvantages of electric threading machines.
  - ✓ Share the web link. https://youtu.be/mix3ClE5Re0 which explains the threading pipe.

D. Assessment

- **Contact:**
  - ✓ The teacher may develop a rubric to access learners while performing OPERATION SHEET 2.7.
  - ✓ Make learners solve the SAMPLE SELF CHECK 2.7 that fulfills objectives and competency.
  - ✓ Frame questions from CBLM and other resources-Google/YouTube.

- **Non-contact:**
  - ✓ Make learners solve the SAMPLE SELF CHECK 2.6 that fulfills objectives and competency. Send answers through Google Classroom or any other social media platforms.
  - ✓ Give additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms.
  - ✓ Asses through oral/viva vice
  - ✓ Written test through Kahoot.

E. Resources (online and offline)

- ✓ CBLM of Class X, REC
- ✓ https://youtu.be/mix3ClE5Re0 (Explanation on threading pipe)
- ✓ PPT

A. Learning objectives/Broad theme/Strand/Chapter

Learning objectives	Core concepts (Chapters/Topics)
2.8.1 Define GI pipe. 2.8.2 Explain the classification of GI pipe. 2.8.3 Explain the characteristics and properties of GI pipe and fittings. 2.8.4 Identify the types of jointing compounds and their application. 2.8.5 Explain the purpose of applying a jointing compound. 2.8.6 State the advantages and disadvantages of GI pipe and fittings. 2.8.7 Define Z-Dimensions. 2.8.8 Calculate Z-dimension. 2.8.9 Wrap jute. 2.8.10 Perform Galvanize Iron (GI) pipe joint 2.8.11 *Ensure appropriate use of PPE.* 2.8.12 *Ensure economic use of materials.* 2.8.13 *Ensure proper handling of tools and equipment.* 2.8.14 *Ensure proper disposal of waste.* 2.8.15 *Ensure the proper wrapping of jute* 2.8.16 *Ensure to use of correct jointing compound.*	**2.8 Performing Galvanize Iron (GI) pipe joint**

B. Competencies

i) Join GI pipes while installing outdoor and indoor water pipe networks as per the standard procedure.

C. Pedagogy/Learning experience

- **Contact**:
  - ✓ Lecture on joining GI pipe.
  - ✓ Make learner go through INFORMATION SHEET 2.8 on joining GI pipe.
  - ✓ Make learners go through OPERATION SHEET 2.8
  - ✓ Demonstrate on OPERATION SHEET 2.8
  - ✓ Provide guided practice on OPERATION SHEET 2.8
- **Non-contact:**
  - ✓ Make learner go through INFORMATION SHEET 2.8
  - ✓ Make learners go through OPERATION SHEET 2.8.

- ✓ Share the web link https://youtu.be/OIz1Az1NhWk which explains jointing GI pipe.
- ✓ Provide a handout on the characteristics and properties of GI pipe and fittings, the types of jointing compounds and their application, and the advantages and disadvantages of GI pipe and fittings through google classroom.

D. Assessment

- **Contact:**

✓ As soon as the learners are aware of joining GI pipe, ask them to perform OPERATION SHEET 2.8 and keep on practicing while performing any task.

✓ Make learners solve the SAMPLE SELF CHECK 2.8 given in the CBLM of class X.

✓ Conduct class tests by framing the questions from CBLM and other ICT resources.

✓ Assess the learner's ability through conducting oral tests.

- **Non-contact:**

✓ Ask learners to solve the SAMPLE SELF CHECK 2.8 and send the answers through Google Classroom or any other social media platforms.

✓ Frame questions using different sources and let the learners submit answers through Google Classroom or any other social media platforms.

✓ Assess learner through oral/viva voice

✓ Written test through Kahoot.

E. Resources (online and offline)

- Competency-Based Learning Materials for Classes IX and X, REC
- https://youtu.be/OIz1Az1NhWk (Performing GI pipe joint)
- Handout

A. Learning objectives/Broad theme/Strand/Chapter

Learning objectives	Core concepts (Chapters/Topics)
2.9.1 Define CPVC pipe. 2.9.2 Explain the characteristics and properties of CPVC pipes and fittings. 2.9.3 List the available sizes of pipe. 2.9.4 State the jointing compound used for CPVC pipes. 2.9.5 State the purpose of using a jointing compound. 2.9.6 List the advantages and disadvantages of CPVC pipe and fittings. 2.9.7 State the importance of trial fitting. 2.9.8 Perform CPVC pipe joint. 2.9.9 *Ensure proper handling of a pipe wrench.* 2.9.10 *Ensure economic use of materials.* 2.9.11 *Ensure appropriate use of PPE.* 2.9.12 *Ensure proper disposal of waste products.* 2.9.13 *Ensure to use the correct quantity of glue.*	**2.9 Performing Chlorinated polyvinyl chloride (CPVC) pipe joint**

B. Competencies

i) Join different sizes of CPVC pipes and fittings as required.

C. Pedagogy/Learning experience

- **Contact**:
  - ✓ Make learners go through INFORMATION SHEET 2.9
  - ✓ Provide handout to learners.
  - ✓ Make the learners perform OPERATION SHEET 2.9
  - ✓ Demonstrate on OPERATION SHEET 2.9
  - ✓ Let the learners discuss in a group and do a presentation on the advantages and disadvantages of CPVC pipe and fittings using PPT, handouts, demonstration, and short video clips to explain trial fittings.
- **Non-contact**
  - ✓ Make learner go through INFORMATION SHEET 2.9 through google classroom
  - ✓ Share the web link https://youtu.be/2w_Wmv-raBc which explains jointing CPVC pipe.
  - ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
  - ✓ Instruct learners through google classroom to read OPERATION SHEET 2.9
  - ✓ Let the learners discuss in a group and submit their responses through Google classroom or any other relevant social media.

D. Assessment

- **Contact:**
  - ✓ Make learners read OPERATION SHEET 2.9 and perform OPERATION SHEET 2.9 and assess them using a checklist/performance guide. Provide necessary intervention.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.9.
  - ✓ Let learners do the presentation and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners solve the SAMPLE SELF CHECK 2.9 and send the answers through Google Classroom or any other social media platforms.
  - ✓ Assessing the given Q&A submitted through social
  - ✓ Assess the learner through Oral/viva voice.
  - ✓ Written test through Kahoot.

E. Resources (online and offline)

- CBLM for Classes IX and X, REC
- Handouts
- https://youtu.be/2w_Wmv-raBc (Jointing CPVC)

A. Learning objectives/Broad theme/Strand/Chapter

Learning objectives	Core concepts (Chapters/Topics)
Define PP-R pipe. 2.10.1 Explain the advantages and disadvantages of PP-R pipes and fittings. 2.10.2 State the characteristics and properties of PP-R pipe and fittings. 2.10.3 State the application of PP-R pipe. 2.10.4 Explain the importance of maintaining the correct temperature of the PP-R welding machine. 2.10.5 State the standard dimension ratio (SDR) of PP-R pipe. 2.10.6 Explain the condition of PP-R pipe jointing. 2.10.7 Perform PP-R pipe joint 2.10.8 *Ensure proper handling of PP-R Bud welding machine.* 2.10.9 *Ensure economic use of materials.* 2.10.10 *Ensure to follow OHS.* 2.10.11 *Ensure appropriate use of PPE.*	**2.10 Performing Poly Propylene - Random (PP-R) pipe joint**

B. Competencies

i) Join pipes and fittings that are free from leakage.

C. Pedagogy/Learning experience

- **Contact:**
  - ✓ Lecture-based on INFORMATION SHEET 2.10
  - ✓ Make learners go through INFORMATION SHEET 2.10.
  - ✓ Share the web link https://youtu.be/XwcUWflU28s which explains the PP-R pipe joint.
  - ✓ Let the learners discuss in a group and do a presentation on characteristics and properties of PP-R using PPT, handouts, demonstration, and short video clips to explain the application of PP-R pipe**.**
  - ✓ .Provide guided practices on OPERATION SHEET 2.10
  - ✓ Make learners perform OPERATION SHEET 2.10.
- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 2.10 through Google classroom.
  - ✓ Share the web link https://youtu.be/XwcUWflU28s for further explanation on joining PP-R and make them write handouts out of it in their notebook.
  - ✓ Let the learners discuss in a group and do a presentation on characteristics and properties of PP-R using PPT, handouts, demonstration, and short video clips to explain the application of PP-R pipe**.**

- ✓ Make learners go through OPERATION SHEET 2.10

D. Assessment

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 1.4 and perform OPERATION SHEET 1.4 and assess them using a checklist/performance guide. Provide necessary intervention
  - ✓ Assess learner's knowledge about characteristics and properties of PP-R by asking questions.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.10.
  - ✓ Conduct class tests by framing the questions from CBLM and other ICT resources.
  - ✓ Assess the learner's ability through conducting oral OR written tests.

- **Non-contact:**
  - ✓ Make learners solve the SAMPLE SELF CHECK 2.8. Send the answers through Google Classroom or any other social media platforms.
  - ✓ Frame questions using different sources and let the learners submit answers through Google Classroom or any other social media platforms.
  - ✓ Assess learner through oral/viva voice.

E. Resources (online and offline)

- CBLM for Classes IX and X, REC
- https://youtu.be/XwcUWflU28s (Joining PP-R)

A. Learning objectives/Broad theme/Strand/Chapter

Learning objectives	Core concepts (Chapters/Topics)
2.11.1 Define copper pipe. 2.11.2 State the types of copper pipes. 2.11.3 State the dimension of copper pipe. 2.11.4 Explain the advantages and disadvantages of copper pipe. 2.11.5 Explain the types of copper pipe jointing methods. 2.11.6 State the application of copper pipe. 2.11.7 Perform copper pipe jointing 2.11.8 *Ensure appropriate use of PPE.* 2.11.9 *Ensure economic use of materials.* **2.11.10***Ensure proper disposal of waste products.*	**2.11 Performing copper pipe joint.**

B. Competencies

i) Carryout a copper pipe joint that is even and free of cracks.

C. Pedagogy/Learning experience

- **Contact:**
  - ✓ Make learners go through INFORMATION SHEET 2.11 and OPERATION SHEET 2.11
  - ✓ Let the learners discuss in a group and do a presentation on the advantage and disadvantages of copper pipe using PPT, handouts, demonstration, and short video clips to explain the advantages and disadvantages of copper pipe.
  - ✓ Demonstrate on OPERATION SHEET 2.11
  - ✓ Provide guided practices on OPERATION SHEET 2.11
- **Non-contact:**
  - ✓ Instruct learners to go through INFORMATION SHEET 2.11 and OPERATION SHEET 2.11.
  - ✓ Provide handouts on types of copper pipe and dimensions of copper pipe to learners through Google Classroom or any other social media platforms.

D. Assessment

- **Contact:**
  - ✓ Assign learners by preparing rubric while performing OPERATION SHEET 2.11
  - ✓ Make learners solve SAMPLE SELF CHECK 2.11in the notebook.
  - ✓ Provide additional questions from CBLM.
- **Non-contact:**
  - ✓ Instruct learners to solve SAMPLE SELF CHECK 2.11 in the notebook and send it through Google Classroom.
  - ✓ Provide additional questions from CBLM through Google Classroom.
  - ✓ Conduct a test (quiz, true or false, puzzle or short answer type questions) through Kahoot

E. Resources (online and offline)

- CBLM for Classes IX and X, REC
- PPT
- Handout

A. Learning objectives/Broad theme/Strand/Chapter

Learning objectives	Core concepts (Chapters/Topics)
2.12.1 Define HDPE pipe. 2.12.2 State the advantages and disadvantages of HDPE pipe. 2.12.3 Explain the characteristic of HDPE pipe. 2.12.4 Explain the types of HDPE pipe joining methods. 2.12.5 Explain the importance of maintaining the correct temperature. 2.12.6 Explain the dimension and maximum operating pressure of the HDPE pipe. 2.12.7 State the application of HDPE pipe. 2.12.8 Perform HDPE pipe joint. 2.12.9 *Use a manual heating plate*. *2.12.10Use an Electric butt-welding machine.* *2.12.11Ensure proper handling of Electric Butt-welding machine.* 2.12.12*Ensure proper disposal of waste.* **2.12.13***Ensure appropriate use of PPE.*	**2.12 Performing High-Density Polyethylene (HDPE) pipe joint**

B. **Competencies**

i) Join HDPE pipe as per the standard procedure that is free of leakage.

C. **Pedagogy/Learning experience**

- **Contact:**
  - ✓ Make learners go through INFORMATION SHEET 2.12 and OPERATION SHEET 2.12
  - ✓ Provide PPT on types of HDPE pipe joining methods and application of HDPE pipe.
  - ✓ Share the web link https://youtu.be/mwcqHWMGetY which explains on butt join.
  - ✓ Demonstrate on OPERATION SHEET 2.12 and let learners perform it through guided practices.
- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 2.12.
  - ✓ Make learners go through OPERATION SHEET 2.12
  - ✓ Provide PPT on types of HDPE pipe joining methods and application of HDPE pipe.
  - ✓ Share the web link https://youtu.be/mwcqHWMGetY which explains on butt join.

Assessment

- **Contact:**
  - ✓ Assign learners by preparing rubric while performing OPERATION SHEET 2.12
  - ✓ Make learners solve SAMPLE SELF CHECK 2.12 in the notebook.
  - ✓ Provide additional questions from CBLM.
- **Non-contact:**
  - ✓ Instruct learners to solve SAMPLE SELF CHECK 2.12 in the notebook and send it through Google Classroom.
  - ✓ Provide additional questions from CBLM through Google Classroom.
  - ✓ Conduct a test (quiz, true or false, puzzle or short answer type questions) through Kahoot

D. Resources (online and offline)

- CBLM for Class X, REC
- PPT
- Handout
- https://youtu.be/mwcqHWMGetY (Explanation on butt joint)

ENGINEERING DRAWING

MODULE: INTERPRETING ENGINEERING DRAWING

Chapter: 2 Draw basic signs, symbols, and dimension

A. Learning objectives/Broad theme/Strand/Chapter

Learning objectives	Core concepts (Chapters/Topics)
2.1.2 Define the scale of the drawing. 2.1.3 List types of scale. *2.1.3 Ensure clean and neatness of drawing.* 2.1.4 *Ensure Proper handling of drawing instruments.*	**2.1 Convert drawing scale**

B. Competencies

i. Convert the drawing scales as per the drawing ratios.

C. Pedagogy/Learning experience

- **Contact:**
  - ✓ The teacher may carry out the instructional practices on engineering drawing scales based on the following order of scientific inquiry;
  - ✓ The learners read INFORMATION SHEET 2.1.
  - ✓ The learner performs OPERATION SHEET 2.1.
  - ✓ Based on the information gathered, the learner forms in a group and will be provided with a drawing of different sizes.
  - ✓ The learner explains the selection of the scale and the conversion based on the original drawing given.
- **Non-contact**
  - ✓ Share the web link https://bis.gov.in/other/WC_SP_46_03122014.pdf which explains the engineering drawing scale.
  - ✓ The learners read INFORMATION SHEET 2.1.
  - ✓ The learner performs OPERATION SHEET 2.1.
  - ✓ Based on the information gathered, the learner forms in a group (Zoom, Meet, Skype, etc.) and will be provided with a drawing of different sizes.
  - ✓ The learner explains the selection of the scale and the conversion based on the original drawing given.

D. Assessment

- **Contact**
  - ✓ The learner performs OPERATION SHEET 2.1 and assess their performances.
  - ✓ Assess the answers to the question of SAMPLE SELF CHECK 2.1
  - ✓ Assess the learner's ability to gather information from the drawing given and discussed in the group using a rubric. Provide necessary feedback and intervention based on the rating from the rubric.

- **Non-contact**
  - ✓ Assess the answers of SAMPLE SELF CHECK 2.1 uploaded in Google Classroom or any other social media.
  - ✓ Assess the learner's ability to gather information from the drawing given and discussed in the group using a rubric. Provide necessary feedback and intervention based on the rating from the rubric.

E. Resources(online and offline)

- Competency-Based Learning Materials for Classes IX and X, REC
- https://bis.gov.in/other/WC_SP_46_03122014.pdf (Explanation on the engineering drawing scales)

A. L earning objectives/Broad theme/Strand/Chapter:

Learning objectives	Core concepts(Chapters/Topics)
2.2.1 Define isometric drawing. 2.2.2 State isometric terminologies. 2.2.3 *Ensure clean and neatness of drawing.* 2.2.4 *Ensure Proper handling of drawing instruments.*	**2.2 Draw Isometric blocks**

B. Competencies

i. Draw isometric block as per the given dimensions in standard procedure.

C. Pedagogy/learning experience

- **Contact:**
  - ✓ The teacher may carry out the instructional practices on drawing isometric based on the following order;
  - ✓ The learners read INFORMATION SHEET 2.2.
  - ✓ Share the web link https://youtu.be/c6DygJMwos8 which gives tips on drawing isometric block.
  - ✓ The learner performs OPERATION SHEET 2.2.
  - ✓ The learner searches for information on how to draw an isometric block from relevant sources (books, online materials, videos).
  - ✓ The learner prepares a presentation using the information obtained from relevant sources.
  - ✓ The learner makes the presentation to the whole class.
- **Non-contact:**
  - ✓ The teacher may carry out the instructional practices on drawing isometric based on the following order;
  - ✓ The learners read INFORMATION SHEET 2.2.
  - ✓ Share the web link https://youtu.be/c6DygJMwos8 which gives tips on drawing isometric block.
  - ✓ The learner performs OPERATION SHEET 2.2
  - ✓ The learner searches for information on how to draw an isometric block from relevant sources (books, online materials, videos).
  - ✓ The learner prepares a presentation using the information obtained from relevant sources.
  - ✓ The learner makes the presentation to the whole class (Meet, Zoom, Skype, etc).

D. Assessment

- **Contact**
  - ✓ The learner performs OPERATION SHEET 2.2 and assess their performances.
  - ✓ Assess the answers of SAMPLE SELF CHECK 2.2
  - ✓ Assess the learner's conceptual understanding of drawing isometric blocks through the presentation using a rubric. Provide necessary feedback and intervention based on the rating from the rubric.
- **Non-contact**
  - ✓ Assess the answers of SAMPLE SELF CHECK 2.2 uploaded in Google Classroom or any other social media.
  - ✓ The learner performs OPERATION SHEET 2.2 and assess their performances.
  - ✓ Assess the presentation prepared and uploaded by the learner in the Google Classroom to assess the learner's conceptual understanding of drawing isometric block. Provide necessary intervention based on the assessment of the presentation.

E. Resources(online and offline)

- Competency-Based Learning Materials for Classes IX and X, REC
- https://youtu.be/c6DygJMwos8 (Explanation on the tips of drawing isometric block)

RESOURCES

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