

National School Curriculum  
**INSTRUCTIONAL GUIDE**  
**FOR TVET (PLUMBING)**

**CLASSES IX & X**



Department of Curriculum and Professional Development  
Ministry of Education, Royal Government of Bhutan



“Your parents, relatives, and friends would be very proud of what you have achieved. At your age, to have completed your studies is your personal accomplishment. Your knowledge and capabilities are a great asset for the nation. I congratulate you for your achievements. Finally, your capabilities and predisposition towards hard work will invariably shape the future of Bhutan. You must work with integrity, you must keep learning, keep working hard, and you must have the audacity to dream big.”

*- His Majesty Jigme Khesar Namgyel Wangchuck*

National School Curriculum

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## Foreword

COVID-19 has suddenly caused unforgiving disruptions in 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 teaching and learning in traditional settings.

In the new normal education, human interaction and well-being are a priority. Digital technology that enables communication, collaboration and learning across distance, is 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 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 National School 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 then 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.

Tashi Delek.



**Tashi Namgyel,**  
**Director**

## Introduction

Technical and Vocational Education and Training (TVET) is aimed at providing knowledge and skills for employment. It comprises education, training and skills development related to a wide range of occupational fields, production, services and livelihood. The Department of Curriculum and Professional Development, Ministry of Education envisages 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) 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, 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 the then 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 National School Curriculum Instructional Guide is prepared not only to encourage blended learning but also to facilitate remote learning. The guide would help the schools to implement the curriculum effectively without limiting to contact teaching/learning besides using a variety of pedagogies.



## Purpose of the Instructional Guide

Among the many definitions of 'curriculum' this Instructional Guide underscores the meaning of curriculum as a standard and competency-based sequence of planned learning experiences where learners practise and achieve the proficiency in applying the learning experiences in real life scenarios. These proficiencies, in the curriculum framework, have been stated as "competencies" and 'objectives" for each class. In keeping with the principle, 'less is more' as stated the National School Curriculum, the contents of the curriculum have been reworked, so that learners can be engaged more in activities that can lead to the acquisition of required skills rather than having them 'cover the syllabus'.

This Instructional Guide believes that the classroom teachers, as professional individuals, can make the most authentic and reliable judgment about each learner's learning needs and the learning experiences to be provided to propel the learners in the learning continuum. With these beliefs and principles as the background, the following are the purposes of this document.

- Facilitate learners acquire required skills and competencies.
- Strengthen blended learning, including flipped classroom with multimedia, digital pedagogies and ICT devices and websites as tools to share the responsibility of learning amongst the learners, teachers, the parents and other stakeholders.
- Facilitate the use of Continuous Formative Assessment for learning using diverse appropriate assessment techniques and tools commensurate with individual differences in learning, and gather evidence to guide planning of educational programmes and activities for learners.
- Promote inclusive learning through the blended learning which facilitates learning anywhere, any time with the learner being responsible for the learning.
- Provide suggestive means of acquiring required skills by building interrelationship among, and through, the integration of the four strands of the curriculum.
- Help teachers assume the roles of facilitator, guide, motivator and evaluator.
- Guide teachers, parents and other stakeholders in helping learners achieve their potential.
- Empower teachers to design their own 'course of study' or 'class curriculum' for their students in line with the National School Curriculum Framework.
- Enhance sharing the burden of responsibility and accountability for learning amongst the stakeholders, including the learners themselves.

In this age of advanced communication and information technology, contents are widely available from a number of sources. Therefore, the teachers can select, structure and sequence the contents as required to best suit the learners' need while maintaining coherence and consistency. In other words, while the contents of the curriculum are negotiable, the competencies and objectives are not. While, teachers may have access to

number of materials, it should be kept in mind that the teaching and learning should be focused on achieving the competencies rather than 'covering of the syllabus'. The teaching learning materials should be used as means to create a learning environment that is competency-based where the learners need to master the skills presented to them. While designing lesson plans and teaching learning activities, teachers need to ensure that the materials are relevant and appropriate for the given task.

The assessment should be competency-based wherein the teachers should assess the learners' mastery of the skills stated as competencies and objectives for each class. Teachers should use appropriate assessment tools and techniques depending on the nature of the learning activities. The learners should be clearly informed about the success criteria, the areas of assessment and the tools to be used so that they know exactly what tasks are to be performed or expected of them. In the process of the performance, the teacher should continuously provide feedback and, if necessary, modify instructions. Efforts have to be made to ensure that every learner has mastered the skills.

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## Class IX

### Chapter 1: Practising Occupational Health and Safety (OHS)

#### A. Competency/Competencies:

- ✓ Apply principles of 5S in any task for safety.

#### B. Learning objectives/Topic:

Learning objectives	Topic
1.1.1 Define 5S. 1.1.2 State the purposes of 5S. 1.1.3 Explain the principle of 5S. 1.1.4 Define OHS. 1.1.5 State the importance of OHS. 1.1.6 Explain the rights for employee. 1.1.7 State the main causes of accidents. 1.1.8 State the safety rules. 1.1.9 Ensure appropriate use of PPE. 1.1.10 Ensure to refer OHS manual. 1.1.11 Apply principles of 5S.	<b>1.1 Applying principles of 5S</b>  Overview: The topic is about the ways of organizing and managing the workplace that enable the learners to perform their tasks effectively and efficiently.

#### C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 1.1
- ✓ Provide handouts to learners.
- ✓ Share the web link <https://youtu.be/n9sxq34D9HQ> with the learners which explains the principles of 5S.
- ✓ Make learners perform OPERATION SHEET 1.1
- ✓ Let learners discuss in a group and do a presentation on 5S using PPT, handouts, demonstration, and short video clips to explain 5S.
- ✓ Instruct learners to read INFORMATION SHEET 1.1 through Google Classroom.
- ✓ Share the web link <https://youtu.be/n9sxq34D9HQ> which explains the principles of 5S.
- ✓ 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 1.1 (The learners may arrange available tools and materials at home)
- ✓ Let learners discuss in a group and submit their responses through Google Classroom or any other relevant social media.

**D. Assessment:**

- ✓ Make learners read INFORMATION SHEET 1.1 and perform OPERATION SHEET 1.1 and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner’s knowledge about 5S by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 1.1
- ✓ Let learners do a presentation and assess as per the rubric developed
- ✓ Make learners read INFORMATION SHEET 1.1 and perform OPERATION SHEET 1.1 and ask them to send the short video as evidence through Google Classroom or any other relevant social media platforms. Assess them using a checklist/performance guide.
- ✓ Let learners solve SAMPLE SELF CHECK 1.1 and submit answers through Google Classroom or any other relevant social media.
- ✓ Give additional relevant questions from another resources-Text book/Google/YouTube and Let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.

**E. Resources:**

- ✓ CBLM
- ✓ Handouts
- ✓ <https://youtu.be/n9sxq34D9HQ> (Explanation on principles of 5S)

**A. Competency/Competencies:**

- i. Make appropriate use of PPE.

**B. Learning objectives/Topic:**

Learning objectives	Topic
1.2.1 Define PPE. 1.2.2 State the importance of PPE. 1.2.3 List the categories of PPE. 1.2.4 Use PPE. 1.2.5 <i>Ensure to use appropriate PPE.</i> 1.2.6 <i>Ensure safe disposal of damaged PPE.</i> 1.2.7 <i>Ensure not to use defective and damaged PPE.</i>	<b>1.2 Using PPE</b>  <b>Overview:</b> The topic is about the proper use of various PPE and it helps the learners to maintain safety at workplace.

**C. Learning Experiences:**

- ✓ Make learners read INFORMATION SHEET 1.2
- ✓ Provide handouts to learners.
- ✓ Share the web links <https://youtu.be/r9vp1q1L2ro>, and <https://www.youtube.com/watch?v=DMBrRNV9Hrk> which explain using PPE.
- ✓ Make learners perform OPERATION SHEET 1.2
- ✓ Let learners discuss in a group and do a presentation on PPE using PPT, handouts, demonstration, and short video clips to explain PPE.
- ✓ Instruct learners to read INFORMATION SHEET 1.2 through Google Classroom.
- ✓ Share the web link <https://youtu.be/r9vp1q1L2ro> and <https://www.youtube.com/watch?v=DMBrRNV9Hr> which explains on using PPE
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Instruct learners to perform OPERATION SHEET 1.2 through Google Classroom.
- ✓ Let learners discuss in a group and submit their responses through Google Classroom or any other relevant social media.

**D. Assessment:**

- ✓ Make learners read INFORMATION SHEET 1.2 and perform OPERATION SHEET 1.2 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 1.2
- ✓ Let learners do a presentation and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 1.2 and perform OPERATION SHEET 1.2 and ask them to send the short video as evidence through Google Classroom or any other relevant social media platforms. Assess them using a checklist/performance guide.
- ✓ Let learners solve SAMPLE SELF CHECK 1.2 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.

**E. Resources:**

- ✓ Competency-Based Learning Materials
- ✓ <https://www.youtube.com/watch?v=DMBrRNV9Hr> and <https://youtu.be/r9vp1q1L2ro> (Explanation on PPE)

**A. Competency/Competencies:**

- i. Maintain workplace and personal safety as per job requirements.

**B. Learning objectives/Topic:**

Learning objectives	Topic
<p>1.3.1 Define safety precaution.</p> <p>1.3.2 List the different types of safety</p> <p>1.3.1 Explain workshop and personal safety.</p> <p>1.3.2 State the importance of maintaining a workplace and personal safety.</p> <p>1.3.3 Explain the importance of safety signs and symbols.</p> <p>1.3.4 Explain the Emergency exit.</p> <p>1.3.5 Describe the layout of the workshop.</p> <p>1.3.6 <i>Ensure to follow OHS procedures.</i></p> <p>1.3.7 <i>Ensure to keep the workshop clean.</i></p> <p>1.3.10 <i>Ensure to ring the alarm bell before the accident spreads over.</i></p> <p>1.3.11 <i>Ensure to display safety signs and symbols.</i></p> <p>1.3.12 <i>Ensure to use appropriate PPE in the workplace.</i></p> <p>1.3.13 <i>Ensure to avoid horseplay at the workplace.</i></p> <p>1.3.14 <i>Ensure to avoid smoking and eating inside the workshop.</i></p> <p>1.3.15 <i>Ensure to avoid working under influence of alcohol.</i></p>	<p><b>1.3 Maintaining workplace and personal safety</b></p> <p><b>Overview:</b> The learners can maintain a workplace and personal safety knowing about safety signs and symbols and ways of setting conducive workshop.</p>

**C. Learning Experiences:**

- ✓ Make learners read INFORMATION SHEET 1.3
- ✓ Provide handouts to learners.
- ✓ Share the web links <https://www.youtube.com/watch?v=4bkr5lpKGUM> and <https://www.youtube.com/watch?v=WW0U6o1XNec> which explains the maintaining of the workplace and personal safety.
- ✓ Make learners perform OPERATION SHEET 1.3
- ✓ Let learners discuss in a group and do a presentation on maintaining a workplace and personal safety using PPT, handouts, demonstration, and short video clips to explain maintaining of the workplace and personal safety.
- ✓ Instruct learners to read INFORMATION SHEET 1.3 through Google Classroom.



- ✓ Share the web links <https://www.youtube.com/watch?v=4bkr5lpKGUM> and <https://www.youtube.com/watch?v=WW0U6o1XNec> which explains the maintaining of the workplace and personal safety.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Instruct learners to perform OPERATION SHEET 1.3 through Google Classroom.
- ✓ Let learners discuss in a group and submit their responses through Google Classroom or any other relevant social media.

**D. Assessment:**

- ✓ Make learners read INFORMATION SHEET 1.3 and perform OPERATION SHEET 1.3 and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about maintaining a workplace and personal safety by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 1.3
- ✓ Let learners do a presentation and assess as per the rubric developed.
- ✓ Let learners read INFORMATION SHEET 1.3 and perform OPERATION SHEET 1.3 and ask them to send the short video as evidence through Google Classroom or any other relevant social media platforms. Assess them using a checklist/performance guide.
- ✓ Let learners solve SAMPLE SELF CHECK 1.3 and submit the answer through Google Classroom or any other relevant social media.
- ✓ Give additional relevant questions from another resources-Text book/Google/YouTube and Let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.

**E. Resources:**

- ✓ CBLM
- ✓ <https://www.youtube.com/watch?v=WW0U6o1XNec> and <https://www.youtube.com/watch?v=4bkr5lpKGUM> (Explanation on workplace and personal safety)

**A. Competency/Competencies:**

- ✓ Maintain hand tools and portable power tools for better performance.

**B. Learning objectives/Topic:**

Learning objectives	Topic
<p>1.4.1 Explain tool and equipment safety.</p> <p>1.4.2 State the importance of maintaining tool and equipment safety.</p> <p>1.4.3 List the dos and don'ts for tool and equipment safety.</p> <p>1.4.4 <i>Ensure all the tools are in workable condition</i></p> <p>1.4.5 <i>Ensure to keep tools clean and dry and store them properly after use.</i></p> <p>1.4.6 <i>Ensure to operate the machine when instructed.</i></p> <p>1.4.7 <i>Ensure to refer manual before the operation of tools and equipment.</i></p>	<p><b>1.4 Maintaining tools and equipment safety</b></p> <p><b>Overview:</b> The topic covers information on the ways of maintaining tools and equipment safety thereby increasing the efficiency of tools and equipment.</p>

**C. Learning Experiences:**

- ✓ Make learners read INFORMATION SHEET 1.4
- ✓ Provide handouts to learners.
- ✓ Share the web links <https://www.bramptonguardian.com> or <http://www.ehsdb.com/dos-and-donts--hand-tools-equipments.php> which explains Maintaining tools and equipment safety.
- ✓ Make learners perform OPERATION SHEET 1.4
- ✓ Let learners discuss in a group and do a presentation on Maintaining tools and equipment safety using PPT, handouts, demonstration, and short video clips to explain Maintaining tools and equipment safety.
- ✓ Instruct learners to read INFORMATION SHEET 1.4 through Google Classroom.
- ✓ Share the web links <https://www.bramptonguardian.com> or <http://www.ehsdb.com/dos-and-donts--hand-tools-equipments.php> which explains about the Maintain tools and equipment safety.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Instruct learners to perform OPERATION SHEET 1.4 through Google Classroom. (The learners may arrange available tools and materials at home)
- ✓ Let learners discuss in a group and submit their responses through Google Classroom or any other relevant social media.

**D. Assessment:**

- ✓ 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 maintaining tools and equipment safety by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 1.4
- ✓ Let learners do a presentation on maintaining tools and equipment safety and assess as per the rubric developed.
- ✓ Let learners solve SAMPLE SELF CHECK 1.4 and submit the answer through Google Classroom or any other relevant social media.
- ✓ Give additional relevant questions from another resources-Text book/Google/YouTube and Let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.

**E. Resources:**

- ✓ CBLM
- ✓ <https://www.bramptonguardian.com> or <http://www.ehsdb.com/dos-and-donts--hand-tools-equipments.php> (Explanation on maintaining tool and equipment safety)

**A. Competency/Competencies:**

- i. Use a fire extinguisher as per the standard procedure.

**B. Learning objectives/Topic:**

Learning objectives	Topic
1.5.1 Define fire extinguisher. 1.5.2 Label the parts of the fire extinguisher. 1.5.3 Explain the types of fires. 1.5.4 Explain the types of fire extinguishers. 1.5.5 State the methods of combating/extinguishing fires. <i>1.5.6 Ensure to read the instructions provided on the fire extinguisher.</i> <i>1.5.7 Ensure appropriate use of PPE.</i>	<b>1.5 Using fire extinguisher</b>  <b>Overview:</b> The use of different fire extinguishers are covered and it enables the learners to operate them appropriately.

**C. Learning Experiences:**

- ✓ Make learners read INFORMATION SHEET 1.5
- ✓ Provide handouts to learners.
- ✓ Share the web link <https://www.youtube.com/watch?v=PQV71INDaqY> which explains the usage of fire extinguishers.
- ✓ Make learners perform OPERATION SHEET 1.5
- ✓ Let learners discuss in a group and do a presentation on how to use fire extinguishers using PPT, handouts, demonstration, and short video clips to explain the usage of fire extinguishers.
- ✓ Instruct learners to read INFORMATION SHEET 1.5 through Google Classroom.
- ✓ Share the web link <https://www.youtube.com/watch?v=PQV71INDaqY> which explains about usage of a fire extinguisher.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Instruct learners to perform OPERATION SHEET 1.5 through Google Classroom. (The learners may arrange available tools and materials at home)
- ✓ Let learners discuss in a group and submit their responses through Google Classroom or any other relevant social media.

**D. Assessment:**

- ✓ Make learners read INFORMATION SHEET 1.5 and perform OPERATION SHEET 1.5 and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about how to use fire extinguishers by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 1.5
- ✓ Let learners do a presentation on using of fire extinguisher and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 1.5 and OPERATION SHEET 1.5 and ask them to send the short video as evidence through Google Classroom or any other relevant social media platforms to assess them using a checklist/performance guide.
- ✓ Let learners solve SAMPLE SELF CHECK 1.5 and submit the answer through Google Classroom or any other relevant social media.
- ✓ Give additional relevant questions from another resources-Text book/Google/YouTube and Let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.

**E. Resources:**

- ✓ CBLM
- ✓ <https://www.youtube.com/watch?v=PQV71INDaqY> (Explanation on fire extinguisher)

**A. Competency/Competencies:**

- i. Identify all types of pipes and fittings as per job requirements.

**B. Learning objectives/Topic:**

## Chapter 2 : Carrying out the installation of the internal domestic water system

Learning objectives	Topic
2.1.1 Define pipe. 2.1.2 Explain the types of internal pipes and their uses. 2.1.3 Explain the types of internal fitting and their uses. 2.1.4 State the advantages and disadvantages of different pipes. 2.1.5. Identity pipes and fittings.	<b>2.1 Identifying water pipes and fittings</b>  <b>Overview:</b> The advantages and disadvantages of different pipes and uses of all pipes and fittings are covered and it enables the learners to identify them correctly.

**C. Learning Experiences:**

- ✓ Make learners go through INFORMATION SHEET 2.1.
- ✓ Make learners go through OPERATION SHEET 2.1
- ✓ Let learners discuss in a group and do a presentation on the type of internal pipe and their uses using PPT, handouts, demonstration, and short video clips to explain the usage of fire extinguisher.
- ✓ Arrange site visit.
- ✓ Provide handouts on types of internal pipe and fitting to learners through Google Classroom or any other social media platforms.
- ✓ An instructor may provide the web link <https://youtu.be/XMjnk36Ktfg> that explains the fittings of the pipe.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.

**D. Assessment:**

- ✓ Make learners perform OPERATION SHEET 2.1 and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Make learners solve the SAMPLE SELF CHECK 2.1.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.
- ✓ Make learners solve the SAMPLE SELF CHECK 2.1 that fulfils 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.

**E. Resources:**

- ✓ Competency-Based Learning Materials
- ✓ Handout
- ✓ <https://youtu.be/XMjnk36Ktfg>(Explanation on pipe fittings)

**A. Competency/Competencies:**

- i. Use the right tools for the right job ( Identify right tools and equipment for particular job)

**B. Learning objectives/Topic:**

Learning objectives	Topic
2.2.1 Define tools and equipment. 2.2.2 Explain types of tools and their uses. 2.2.3 Explain types of equipment and their uses. 2.2.4 Identify tools and equipment.	<b>2.2 Identifying tools and equipment</b>  <b>Overview:</b> The types of tools and equipment and their uses are covered and the learners can identify right tools for right job.

**C. Learning Experiences:**

- ✓ Make learners read INFORMATION SHEET 2.2 and go through OPERATION SHEET 2.1
- ✓ Share the web link <https://www.scribd.com/document/306228560/Plumbing-Tools> which explains about tools and equipment.
- ✓ Arrange site visit.
- ✓ Provide handouts to learners through Google Classroom or any other social media platforms.

- ✓ An instructor may provide the web link <https://www.scribd.com/document/306228560/Plumbing-Tools> which explains about tools and equipment.

**D. Assessment:**

- ✓ Make learners should read INFORMATION SHEET 2.2 and perform OPERATION SHEET 2.2 and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Make learners solve the SAMPLE SELF CHECK 2.2 that fulfils objectives and competency.
- ✓ Conduct class test by giving additional questions from CBLM
- ✓ Make learners solve the SAMPLE SELF CHECK 2.2 that fulfils objectives and competency. Send answers through Google Classroom or any other social media platforms.
- ✓ Conduct class test through Kahoot (quiz, true and false, short answer question)

**E. Resources:**

- ✓ Competency-Based Learning Materials
- ✓ Handout
- ✓ <https://www.scribd.com/document/306228560/Plumbing-Tools>(Explanation on tools and equipment)

**A. Competency/Competencies:**

- Carry out estimation and costing for any task using BSR.

**B. Learning objectives/Topic:**

Learning objectives	Topic
2.3.1 Define estimation and costing. 2.3.2 Explain the importance of estimation and costing. 2.3.3 Explain different methods of estimation. 2.3.4 List down the data required for estimation. 2.3.5 Estimate materials	<b>2.3 Estimating materials</b>  <b>Overview:</b> The topic is about the importance of estimating and costing and it enables the learners to carry out estimation and costing.

**C. Learning Experiences:**

- ✓ Make learners go through INFORMATION SHEET 2.3.
- ✓ Make learners go through OPERATION SHEET 2.3
- ✓ Provide PPT on a different method of estimation, the importance of estimation, and costing.
- ✓ Provide handouts with a sample to calculate estimation and costing.

- ✓ Make learners go through INFORMATION SHEET 2.3.
- ✓ Provide handouts with a sample to calculate estimation and costing.
- ✓ Provide PPT on a different method of estimation, the importance of estimation, and costing through Camtasia.
- ✓ Make learners go through OPERATION SHEET 2.3

**D. Assessment**

- ✓ Give a simple drawing and instruct learners to perform OPERATION SHEET 2.3 referring to BSR provided in groups and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Make learners solve SAMPLE SELF CHECK 2.3.
- ✓ Provide additional questions from CBLM and the link provided above.
- ✓ Give a simple drawing and instruct learners to perform OPERATION SHEET 2.3 referring to BSR provided through Google Classroom.
- ✓ Make learners solve SAMPLE SELF CHECK 2.3 and instruct them to send it through Google Classroom.
- ✓ Provide additional questions from CBLM and the link provided above and instruct them to send it through Google Classroom.

**E. Resources:**

- ✓ CBLM
- ✓ PPT

**A. Competency/Competencies:**

- i. Cut pipe as per job requirement.

**B. Learning objectives/Topic:**

Learning objectives	Topic
2.4.1 Ensure appropriate use of PPE. 2.4.2 Define marking tool. 2.4.3 Explain the purpose of marking tools. 2.4.4 Identify types of marking tools. 2.4.5 Define cutting tool. 2.4.6 Explain types of cutting tools and their respective functions. 2.4.7 Explain the importance of body position while cutting the pipe. 2.4.8 Differentiate between pipe cutter and hacksaw	<b>2.4 Cutting pipe</b>  <b>Overview:</b> The learners can cut pipe as required besides knowing the function and types of it.



2.4.9	Set hacksaw blade in the forward direction for proper cutting.	
2.4.10	Label the parts of cutting tools.	
2.4.11	Explain the purposes of applying lubricant.	
2.4.12	List the types of vice and their usage.	
2.4.13	Use hacksaw.	
2.4.14	Use pipe cutter.	
2.4.15	Cut pipe	

**C. Learning Experiences:**

- ✓ Make the learners read INFORMATION SHEET 2.4 and OPERATION SHEET 2.4
- ✓ Share the web link <https://youtu.be/JNqn4iSq9s> and <https://youtu.be/wtuTOR8OPZI> which explain cutting pipe by pipe cutter.
- ✓ Share the web link [https://youtu.be/YkFt\\_53rRxs](https://youtu.be/YkFt_53rRxs) which explains cutting pipe by hacksaw.
- ✓ Demonstrate the pipe cutting through guided practice.
- ✓ Make learners go through INFORMATION SHEET 2.4 and OPERATION SHEET 2.4
- ✓ Provide handouts to learners through Google Classroom or any other social media platforms.
- ✓ Share the web link <https://youtu.be/JNqn4iSq9s> and <https://youtu.be/wtuTOR8OPZI> which explain cutting pipe by pipe cutter.
- ✓ Share the web link [https://youtu.be/YkFt\\_53rRxs](https://youtu.be/YkFt_53rRxs) which explain cutting pipe by hacksaw

**D. Assessment:**

- ✓ Make learners should read and perform INFORMATION SHEET 2.4 and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Make learners solve the SAMPLE SELF CHECK 2.4 that fulfils objectives and competency.
- ✓ Conduct class test by giving additional questions from CBLM
- ✓ Make learners solve the SAMPLE SELF CHECK 2.2 that fulfils objectives and competency. Send answers through Google Classroom or any other social media platforms.
- ✓ Conduct class test through Kahoot ( quiz, true and false, short answer question)

**E. Resources:**

- ✓ Competency-Based Learning Materials
- ✓ Handout
- ✓ <https://youtu.be/wtuTOR8OPZI> (Cutting pipe using pipe cutter)
- ✓ [https://youtu.be/YkFt\\_53rRxs](https://youtu.be/YkFt_53rRxs). (Cutting pipe using a hacksaw)

# ENGINEERING DRAWING

## MODULE: INTERPRETING ENGINEERING DRAWING

### Chapter 1 : Interpreting basic engineering drawing

#### A. Competency/Competencies:

- i. Carry out basic engineering drawing.
- ii. Handle the drawing instrument properly.

#### B. Learning objectives/Topic:

Learning objectives	Topic
1.1.1 Define Engineering Drawing. 1.1.2 State the purposes of engineering drawing. 1.1.3 List the types and uses of drawing instruments. 1.1.4 List the sizes of drawing papers. 1.1.5 Use drawing instruments. 1.1.6 <i>Ensure proper handling of drawing instruments.</i> 1.1.7 <i>Ensure proper disposal of waste.</i>	<b>1.1 Using drawing instruments</b>  <b>Overview:</b> The learners can use appropriate drawing instruments to carry out engineering drawing.

#### C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 1.1.
- ✓ Show the real instruments to the learners which are required for the drawing.
- ✓ Make learners read and perform OPERATION SHEET 1.1 through guided practice.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.1.
- ✓ Share the web link <https://youtu.be/0Q6QwvtjVm8> OR [https://youtu.be/kLe\\_brmh774](https://youtu.be/kLe_brmh774) which explains more about drawing instrument and their uses.
- ✓ Instruct learners to read INFORMATION SHEET 1.1 and OPERATION SHEET 1.1 through Google Classroom.
- ✓ Instruct learners to solve the SAMPLE SELF CHECK 1.1 and send it through Google Classroom.

#### D. Assessment:

- ✓ Assess learners' ability to use drawing instruments using a rubric.
- ✓ Assess learners' response to the SAMPLE SELF CHECK 1.1.
- ✓ Provide feedback.
- ✓ Assess learners' response to the SAMPLE SELF CHECK 1.1.
- ✓ Provide feedback through Google Classroom.

**E. Resources:**

- ✓ CBLM
- ✓ <https://youtu.be/0Q6QwvtjVm8> / [https://youtu.be/kLe\\_brmh774](https://youtu.be/kLe_brmh774) (Drawing instruments and their uses)

**A. Competency/Competencies:**

- i) Layout the drawing sheet as per the required dimension.

**B. Learning objectives/Topic:**

Learning objectives	Topic
1.2.1 Define the layout of a drawing sheet. 1.2.2 Define the title block. 1.2.3 Layout drawing sheet. 1.2.4 <i>Ensure to maintain cleanliness and neatness of drawing.</i> 1.2.5 <i>Ensure proper handling of drawing instruments.</i> 1.2.6 <i>Ensure that the sheet edges are not damaged while handling the drawing.</i>	<b>1.2 Laying out drawing sheet</b>  <b>Overview:</b> The learner can lay out the sheet.

**C. Learning Experiences:**

- ✓ Make the learners read INFORMATION SHEET 1.2.
- ✓ Ask learners to read and perform OPERATION SHEET 1.2 through guided practice.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.2.
- ✓ Instruct the learners to read INFORMATION SHEET 1.2 through Google Classroom.
- ✓ Share the web link <https://youtu.be/FzMPAiW8O-s> which shows the drawing sheet layout.
- ✓ Ask learners to read and perform OPERATION SHEET 1.2 in A4 size paper and submit it through Google Classroom.

**D. Assessment:**

- ✓ Assess learners' ability to draw layout and title block of drawing sheet using the rubric.
- ✓ Assess learners' response to the SAMPLE SELF CHECK 1.2.
- ✓ Provide feedback.
- ✓ Instruct learners to solve the SAMPLE SELF CHECK 1.2 and submit it through Google Classroom. Assess learners' response to the SAMPLE SELF CHECK 1.2.
- ✓ Provide feedback through Google Classroom.

**E. Resources:**

- ✓ CBLM
- ✓ <https://youtu.be/FzMPAiW8O-s> (Drawing layout sheet)

**A. Competency/Competencies: .**

- i. Interpret sign and symbol as required.

**B. Learning objectives/Topic**

Learning objectives	Topic
1.3.1 Define sign and symbol. 1.3.2 Define abbreviation. 1.3.3 Draw engineering signs, symbols, and abbreviations. 1.3.4 Interpret engineering signs, symbols, and abbreviations. <i>1.3.5 Ensure to maintain cleanliness and neatness of drawing.</i> <i>1.3.6 Ensure proper handling of drawing instruments.</i>	<b>1.3 Interpreting engineering signs, symbols, and abbreviations</b>  <b>Overview:</b> The learners can interpret engineering signs, symbols, and abbreviations.

**C. Learning Experiences:**

- ✓ Make learners read INFORMATION SHEET 1.3.
- ✓ Make learners read and perform the OPERATION SHEET 1.3 ensuring the proper handling of drawing instruments.
- ✓ Make learners answer the SAMPLE SELF CHECK 1.3.
- ✓ Instruct learners to read INFORMATION SHEET 1.3 through Google Classroom.
- ✓ Share the web link <https://youtu.be/MfNoq0y1LLY> that shows the convention of materials through Google Classroom.
- ✓ Instruct learners to read OPERATION SHEET 1.3 through Google Classroom.
- ✓ Instruct learners to answer the SAMPLE SELF CHECK 1.3 and submit it through Google Classroom.

**D. Assessment:**

- ✓ Assess learners' ability to draw engineering signs, symbols, and abbreviations using a rubric.
- ✓ Assess learners' response to the SAMPLE SELF CHECK 1.3.
- ✓ Provide feedback.
- ✓ Assess learners' response to the SAMPLE SELF CHECK 1.3.
- ✓ Provide feedback through Google Classroom.

**E. Resources:**

- ✓ CBLM
- ✓ <https://youtu.be/MfNoq0y1LLY> (Convention of materials)

**A. Competency/Competencies:**

- i. Draw different types of lines as per their application.

**B. Learning objectives/Topic:**

Learning objectives	Topic
1.4.1 Define line. 1.4.2 State the types of lines and their application. 1.4.3 Draw different types of lines. 1.4.4 <i>Ensure proper handling of drawing instruments.</i> 1.4.5 <i>Ensure to maintain cleanliness and neatness of drawing.</i>	<b>1.4 Drawing different types of lines</b>  <b>Overview:</b> The learners can know about different types of lines and draw them.

**C. Learning Experiences:**

- ✓ Make learners read the INFORMATION SHEET 1.4.
- ✓ Make learners read and perform OPERATION SHEET 1.4.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.4.
- ✓ Instruct learners to read the INFORMATION SHEET 1.4 through Google Classroom.
- ✓ Share the video links <https://youtu.be/SaOoKpLBfYo> and <https://youtu.be/E6OXZ9OHpVk> that describe the types of line.
- ✓ Instruct students to read and perform OPERATION SHEET 1.4 through Google Classroom.
- ✓ Instruct learners to solve the SAMPLE SELF CHECK 1.4 and submit it through Google Classroom.

**D. Assessment:**

- ✓ Assess learners' ability to draw types of the line using a rubric.
- ✓ Assess learners' response to the SAMPLE SELF CHECK 1.4.
- ✓ Provide feedback.
- ✓ Assess learners' response to the SAMPLE SELF CHECK 1.4.
- ✓ Provide feedback through Google Classroom.

**E. Resources:**

- ✓ CBLM
- ✓ <https://youtu.be/SaOoKpLBfYo> / <https://youtu.be/E6OXZ9OHpVk> (Types of line)

**A. Competency/Competencies:**

- ✓ Draw letters and numbers as per the given scale.

**B. Learning objectives/Topic:**

Learning objectives	Topic
1.5.1 Define lettering and numbering. 1.5.2 Classify the styles of letters. 1.5.3 List the types of letters. 1.5.4 Define freehand lettering. 1.5.5 List the sizes of letters. 1.5.6 State the rules for lettering and numbering. 1.5.7 Draw letters and numbers. 1.5.8 <i>Ensure proper handling of drawing instruments.</i> 1.5.9 <i>Ensure to maintain cleanliness and neatness of drawing.</i>	<b>1.5 Drawing letters and numbers</b>  <b>Overview:</b> The learners will know about different letter styles, types, sizes and can also draw.

**C. Learning Experiences:**

- ✓ Make learners read INFORMATION SHEET 1.5.
- ✓ Make learners draw lettering and numbering reading the procedure OPERATION SHEET 1.5.
- ✓ Make students solve the SAMPLE SELF CHECK 1.5
- ✓ Instruct learners to read INFORMATION SHEET 1.5 through Google Classroom.
- ✓ Share the web link <https://youtu.be/onJlaSAkiEs> on lettering in engineering drawing and share the web link to read an article <http://ednotebook.hostgator.co.in/basics-of-engineering-drawing> on basic of engineering drawing.
- ✓ Instruct learners to read and perform the OPERATION SHEET 1.5 on A4 size paper and submit it through Google Classroom.
- ✓ Instruct learners to solve the SAMPLE SELF CHECK 1.5 and submit it through Google Classroom.

**D. Assessment:**

- ✓ Assess learners' ability to perform OPERATION SHEET 1.5 on drawing letters and numbers using a rubric.
- ✓ Assess learners' response to the SAMPLE SELF CHECK 1.5.
- ✓ Provide feedback.
- ✓ Assess learners' response to the SAMPLE SELF CHECK 1.5.
- ✓ Provide feedback through Google Classroom.

**E. Resources:**

- ✓ CBLM
- ✓ <http://ednotebook.hostgator.co.in/basics-of-engineering-drawing> (Basic of engineering drawing)
- ✓ <https://youtu.be/onJlaSAkiEs> (Lettering and Engineering)

**A. Competency/Competencies:**

- i. Provide dimensions as per standard.

**B. Learning objectives/Topic:**

Learning objectives	Topic
1.6.1 Define dimensioning. 1.6.2 State the types of dimensions. 1.6.3 Explain the system of dimensioning. 1.6.4 State the terminologies of dimensions. 1.6.5 State the rules for dimensioning. 1.6.6 Provide dimensions. 1.6.7 <i>Ensure to maintain cleanliness and neatness of drawing.</i> 1.6.8 <i>Ensure proper handling of drawing instruments.</i>	<b>1.6 Providing dimensions</b>  <u><b>Overview:</b> The learners can carry out the dimensioning knowing about its system and rules.</u>

**C. Learning Experiences:**

- ✓ Make learners read INFORMATION SHEET 1.6.
- ✓ Make learners read and perform OPERATION SHEET 1.6.
- ✓ Make students solve the SAMPLE SELF CHECK 1.6.
- ✓ Conduct a class test covering the LESSONS 1.1 to 1.6.
- ✓ Instruct learners to read INFORMATION SHEET 1.6 of CBLM through Google Classroom.
- ✓ Share the web link <https://youtu.be/XS0lJsmg-gg> to know more about the [dimensioning system in engineering drawing](#).
- ✓ Instruct learners to read and perform OPERATION SHEET 1.6 of CBLM in A4 size paper and submit it through Google Classroom.
- ✓ Conduct a class test through Google Classroom covering the LESSONS 1.1 to 1.6.

**D. Assessment:**

- ✓ Assess learners' ability to perform OPERATION SHEET 1.6 on providing dimension to drawing using a rubric.
- ✓ Assess learners' response to the SAMPLE SELF CHECK 1.6.
- ✓ Assess learners' performance on a class test conducted.
- ✓ Provide feedback

- ✓ Instruct learners to solve the SAMPLE SELF CHECK 1.6 and submit it through Google Classroom.
- ✓ Assess learners' response to the SAMPLE SELF CHECK 1.6.
- ✓ Assess learners' performance on a class test conducted.
- ✓ Provide feedback through Google Classroom.

**E. Resources:**

- ✓ CBLM
- ✓ <https://youtu.be/XS0IJsmy-gg> (Dimensioning system in engineering drawing.)



## Class X

### Chapter 2: Installing pipes and fittings

**A. Competency/Competencies:**

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

**B. Learning objectives/Topic:**

Learning objectives	Topic
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 <i>Ensure safe handling of pipe reamer.</i>	<b>2.5 Reaming pipe</b>  <b>Overview:</b> The topic covers information on the way of reaming pipe, purpose of filing and it enables the learners to ream pipe correctly.

**C. Learning Experiences:**

- ✓ Make learners read INFORMATION SHEET 2.5
- ✓ Provide handouts to learners.
- ✓ Share the web links <https://youtu.be/n6bjzMLS-18> which explain on ream pipe by pipe reamer
- ✓ Share the web link <https://youtu.be/nFkrYSooVlg?list=PL90Fbxldh1AoxKzbsQZyRNEha1da2Zi9J> which explain on ream pipe using the file.
- ✓ Make learners perform OPERATION SHEET 2.5
- ✓ Let 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.
- ✓ Provide handouts to learners through Google Classroom or any other social media platforms.

**D. Assessment:**

- ✓ 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 learners do the presentation and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 2.5
- ✓ Let learners 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:**

- ✓ Competency-Based Learning Materials
- ✓ Handouts
- ✓ <https://youtu.be/n6bJzMLS-18> (Explanation on ream pipe by pipe reamer)
- ✓ <https://youtu.be/nFkrYSooVlg?list=PL90Fbxldh1AoxKzbsQZyRNEha1da2Zi9J> (Explanation on ream pipe by file)

**A. Competency/Competencies:**

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

**B. Learning objectives/Topic:**

Learning objectives	Topic
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.	<b>2.6 Threading pipe manually</b>  <b>Overview:</b> The topic is about types of manual threading tools, difference between adjustable diestock and ratchet die set, causes of defective thread and it enables the learners to thread pipe manually.

**C. Learning Experiences:**

- ✓ Make learners go through INFORMATION SHEET 2.6
- ✓ Let 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.
- ✓ Provide handouts to learners through Google Classroom or any other social media platforms.
- ✓ Let 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:**

- ✓ 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 learners do the presentation and assess as per the rubric developed.
- ✓ Make learners perform OPERATION SHEET 2.6
- ✓ 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:**

- ✓ Competency-Based Learning Materials
- ✓ <https://youtu.be/x2ZVa1KyT9Q> (Explanation on threading)
- ✓ PPT

**A. Competency/Competencies:**

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

**B. Learning objectives/Topic:**

Learning objectives	Topic
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 <i>Ensure appropriate use of PPE.</i> 2.7.8 <i>Ensure proper handling of the universal threading machine.</i> 2.7.9 <i>Ensure proper disposal of waste products.</i> 2.7.10 <i>Ensure to be patient while threading.</i>	<b>2.7 Threading pipe mechanically</b>  <b>Overview:</b> The advantage and disadvantage of electric threading machine, types of electric threading machine and their features are covered and it enables the learners to thread pipe mechanically.

**C. Learning Experiences:**

- ✓ Make students go through INFORMATION SHEET 2.7
- ✓ Demonstration on OPERATION SHEET 2.7
- ✓ Make learner go through 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/mix3CIE5Re0> which explains the threading pipe.

**D. Assessment:**

- ✓ The teacher may develop a rubric to assess 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.
- ✓ 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:**

- ✓ CBLM
- ✓ <https://youtu.be/mix3CIE5Re0> (Explanation on threading pipe)
- ✓ PPT

**A. Competency/Competencies:**

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

**B. Learning objectives/Topic:**

Learning objectives	Topic
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 <i>Ensure appropriate use of PPE.</i> 2.8.12 <i>Ensure economic use of materials.</i> 2.8.13 <i>Ensure proper handling of tools and equipment.</i> 2.8.14 <i>Ensure proper disposal of waste.</i> 2.8.15 <i>Ensure the proper wrapping of jute</i> 2.8.16 <i>Ensure to use of correct jointing compound.</i>	<p><b>2.8 Performing Galvanize Iron (GI) pipe joint</b></p> <p><b>Overview:</b> The topic is about the classification, properties, advantages and disadvantages of GI pipe and fittings, and it enables the learners to perform GI pipe joint correctly.</p>

**C. Learning Experiences:**

- ✓ 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
- ✓ Share the web link <https://youtu.be/Olz1Az1NhWk> which explains joining 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:**

- ✓ As soon as the learners are aware of joining GI pipe, ask them to perform OPERATION SHEET 2.8 and keep on Practising 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.
- ✓ 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 learners submit answers through Google Classroom or any other social media platforms.
- ✓ Assess learner through oral/viva voice
- ✓ Written test through Kahoot.

**E. Resources:**

- ✓ Competency-Based Learning Materials for Classes IX and X, REC
- ✓ <https://youtu.be/Olz1Az1NhWk> (Performing GI pipe joint)
- ✓ Handout

**A. Competency/Competencies:**

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

**B. Learning objectives/Topic:**

Learning objectives	Topic
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.	<b>2.9 Performing Chlorinated polyvinyl chloride (CPVC) pipe joint</b>  <b>Overview:</b> The topic is about the classification, properties, advantages and disadvantages of CPVC pipe and fittings, and it enables the learners to perform CPVC pipe joint correctly.

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|---|--|
| <p>2.9.7 State the importance of trial fitting.</p> <p>2.9.8 Perform CPVC pipe joint.</p> <p>2.9.9 <i>Ensure proper handling of a pipe wrench.</i></p> <p>2.9.10 <i>Ensure economic use of materials.</i></p> <p>2.9.11 <i>Ensure appropriate use of PPE.</i></p> <p>2.9.12 <i>Ensure proper disposal of waste products.</i></p> <p>2.9.13 <i>Ensure to use the correct quantity of glue.</i></p> |  |
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**C. Learning Experiences:**

- ✓ 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 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.
- ✓ Make learner go through INFORMATION SHEET 2.9 through google classroom
- ✓ Share the web link [https://youtu.be/2w\\_Wmv-raBc](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 learners discuss in a group and submit their responses through Google classroom or any other relevant social media.

**D. Assessment:**

- ✓ 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.
- ✓ 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:**

- ✓ CBLM
- ✓ Handouts
- ✓ <https://youtu.be/2w Wmv-raBc> (Joining CPVC)

**A. Competency/Competencies:**

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

**B. Learning objectives/Topic:**

Learning objectives	Topic
2.10.1 Define PP-R pipe. 2.10.2 Explain the advantages and disadvantages of PP-R pipes and fittings. 2.10.3 State the characteristics and properties of PP-R pipe and fittings. 2.10.4 State the application of PP-R pipe. 2.10.5 Explain the importance of maintaining the correct temperature of the PP-R welding machine. 2.10.6 State the standard dimension ratio (SDR) of PP-R pipe. 2.10.7 Explain the condition of PP-R pipe jointing. 2.10.8 Perform PP-R pipe joint 2.10.9 <i>Ensure proper handling of PP-R Bud welding machine.</i> 2.10.10 <i>Ensure economic use of materials.</i> 2.10.11 <i>Ensure to follow OHS.</i> 2.10.12 <i>Ensure appropriate use of PPE.</i>	<p><b>2.10 Performing Poly Propylene - Random (PP-R) pipe joint</b></p> <p><b>Overview:</b> The topic is about the classification, properties, advantages and disadvantages of PP-R pipe and fittings, the importance of maintaining correct temperature of PP-R welding machine and it enables the learners to perform PP-R pipe joint correctly.</p>

**C. Learning Experiences:**

- ✓ Make learners go through INFORMATION SHEET 2.10.
- ✓ Share the web link <https://youtu.be/XwcUWfIU28s> which explains the PP-R pipe joint.
- ✓ Let 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.
- ✓ Make learners read INFORMATION SHEET 2.10 through Google classroom.



- ✓ Share the web link <https://youtu.be/XwcUWfIU28s> for further explanation on joining PP-R and make them write handouts out of it in their notebook.
- ✓ Let 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:**

- ✓ 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.
- ✓ 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 learners submit answers through Google Classroom or any other social media platforms.
- ✓ Assess learner through oral/viva voice.

**E. Resources:**

- ✓ CBLM
- ✓ <https://youtu.be/XwcUWfIU28s> ( Joining PP-R)

**A. Competency/Competencies:**

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

**B. Learning objectives/Topic:**

Learning objectives	Topic
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	<b>2.11 Performing copper pipe joint.</b>  <b>Overview:</b> The topic is about the classification, properties, types, dimension, advantages and disadvantages of copper pipe, and it enables the learners to perform copper pipe joint correctly.

2.11.8	<i>Ensure appropriate use of PPE.</i>	
2.11.9	<i>Ensure economic use of materials.</i>	
2.11.10	<i>Ensure proper disposal of waste products.</i>	

**C. Learning Experiences:**

- ✓ Make learners go through INFORMATION SHEET 2.11 and OPERATION SHEET 2.11
- ✓ Let 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
- ✓ 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:**

- ✓ Assign learners by preparing rubric while performing OPERATION SHEET 2.11
- ✓ Make learners solve SAMPLE SELF CHECK 2.11 in the notebook.
- ✓ Provide additional questions from CBLM.
- ✓ 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:**

- ✓ CBLM
- ✓ PPT
- ✓ Handout

**A. Competency/Competencies:**

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

**B. Learning objectives/Topic:**

Learning objectives	Topic
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 <i>Use a manual heating plate.</i> 2.12.10 <i>Use an Electric butt-welding machine.</i> 2.12.11 <i>Ensure proper handling of Electric Butt-welding machine.</i> 2.12.12 <i>Ensure proper disposal of waste.</i> 2.12.13 <i>Ensure appropriate use of PPE.</i>	<b>2.12 Performing High-Density Polyethylene (HDPE) pipe joint</b>  <b>Overview:</b> The topic is about the classification, advantages and disadvantages of HDPE pipe and important of maintaining correct temperature of heating plate, and it enables the learners to perform HDPE pipe joint correctly.

**C. Learning Experiences:**

- ✓ 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/mwqcqHWMGetY> which explains on butt join.
- ✓ Demonstrate on OPERATION SHEET 2.12 and Let learners perform it through guided practices.
- ✓ 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/mwqcqHWMGetY> which explains on butt join.

**D. Assessment:**

- ✓ 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.
- ✓ 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

**E. Resources:**

- ✓ CBLM for Class X, REC
- ✓ PPT
- ✓ Handout
- ✓ <https://youtu.be/mwcqHWMGetY>

# ENGINEERING DRAWING

## MODULE: INTERPRETING ENGINEERING DRAWING

### Chapter : 2 Draw basic signs, symbols, and dimension

**A. Competency/Competencies:**

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

**B. Learning objectives/Topic:**

Learning objectives	Topic
2.1.2 Define the scale of the drawing. 2.1.3 List types of scale. 2.1.3 <i>Ensure clean and neatness of drawing.</i> 2.1.4 <i>Ensure Proper handling of drawing instruments.</i>	<b>2.1 Converting drawing scale</b>  <b>Overview:</b> The learners will know types of scale and convert scale for drawing.

**C. Learning Experiences:**

- ✓ 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.
- ✓ 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:**

- ✓ 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.
- ✓ 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:**

- ✓ Competency-Based Learning Materials
- ✓ [https://bis.gov.in/other/WC\\_SP\\_46\\_03122014.pdf](https://bis.gov.in/other/WC_SP_46_03122014.pdf) (Explains the engineering drawing scales)

**A. Competency/Competencies:**

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

**B. Learning objectives/Topic:**

Learning objectives	Topic
2.2.1 Define isometric drawing. 2.2.2 State isometric terminologies. 2.2.3 <i>Ensure clean and neatness of drawing.</i> 2.2.4 <i>Ensure Proper handling of drawing instruments.</i>	<b>2.2 Drawing isometric blocks</b>  <b>Overview:</b> The learners will know isometric terminologies and it enables them to draw isometric block correctly.

**C. Learning Experiences:**

- ✓ 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/c6DyglMwos8> 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.
- ✓ 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:**

- ✓ 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.
- ✓ 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:**

- ✓ Competency-Based Learning Materials
- ✓ <https://youtu.be/c6DygJMwos8> (explains the tips of drawing isometric block)

**RESOURCES**

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