

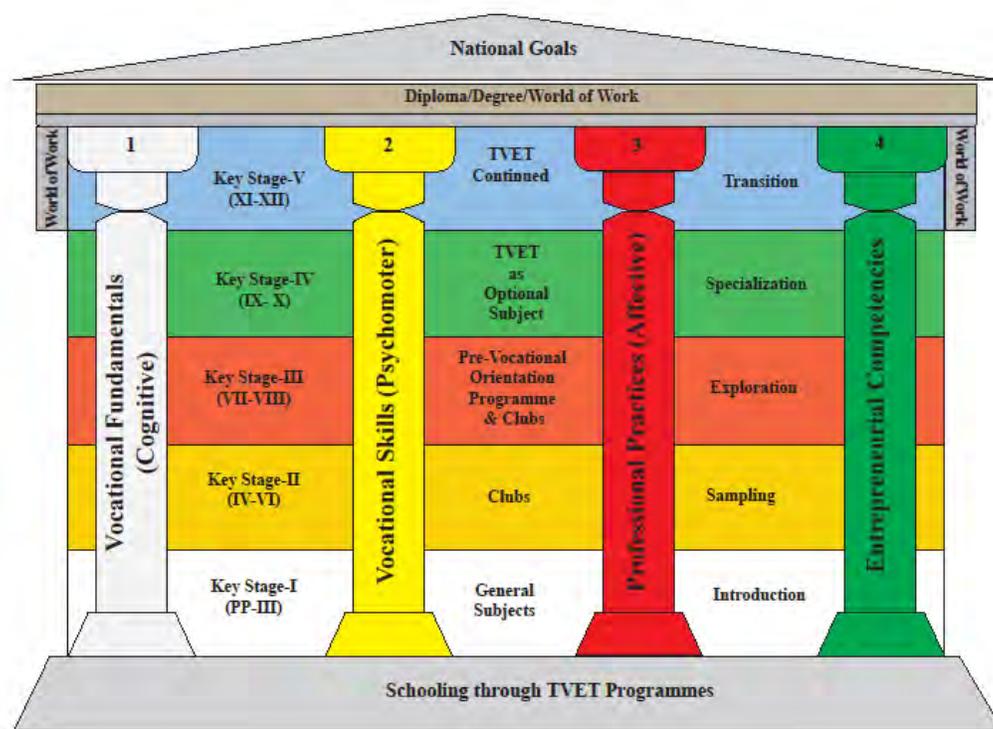
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET)

NEW NORMAL CURRICULUM

INSTRUCTIONAL GUIDE

(AUTOMOBILE)

CLASS: IX



Royal Education Council

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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 Rinchening) in Phuntsholing. Even after that, major curriculum reform was planned by the then Department of Curriculum Research and Development (DCRD) under the Ministry of Education in an attempt to make education relevant to the Bhutanese society through diversification of Secondary Education Curriculum in the schools, which included the introduction of TVET.

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

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

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

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

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MODULE I: SERVICING SUSPENSION SYSTEM

Chapter 1: Practicing Occupational Health and Safety (OHS)

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

Learning objectives	Core concepts (Chapters/Topics)
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 of the employee. 1.1.7 State the main causes of accidents. 1.1.8 State the safety rules. 1.1.9 Apply principles of 5S. <i>Note:</i> ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure to refer OHS manual.</i>	1.1 Applying Principles of 5S

B. Competencies:

- i. Practise OHS procedures in any task for safety.
- ii. Follow the principles of 5S in daily life.

C. Pedagogy/Learning Experiences

- **Contact:**

- ✓ Let the learners read INFORMATION SHEET 1.1.
- ✓ Let them perform OPERATION SHEET 1.1.
- ✓ Let the learners solve the SAMPLE SELF CHECK 1.1.
- ✓ Use PPT, posters(principle of 5S), and handouts.
- ✓ Share the web link <https://youtu.be/n9sxq34D9HQ> with the learners which explains the principles of 5S.

- **Non-contact:**

- ✓ Let the learners read INFORMATION SHEET 1.1.
- ✓ Let them read OPERATION SHEET 1.1
- ✓ Let the learners solve the SAMPLE SELF CHECK 1.1.
- ✓ Provide handouts to learners through Google Classroom or any other social media platforms.
- ✓ Provide the web link <https://youtu.be/n9sxq34D9HQ> that explains the principles of 5S.

D. Assessment:

- **Contact:**

- ✓ Make learners perform OPERATION SHEET 1.1

- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.1 that fulfills objectives and competency.
 - ✓ Give additional questions from CBLM and other resources-Google/YouTube.
 - ✓ Conduct class test.
 - **Non-contact:**
 - ✓ Make learners perform OPERATION SHEET 1.1 and send the short video as evidence through Google Classroom or any other social media platforms.
 - ✓ Ask learners to solve the SAMPLE SELF CHECK 1.1 and 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 (online and offline):**
- ✓ Competency-Based Learning Materials for Classes IX
 - ✓ Handouts and posters (Principle of 5S.).
 - ✓ <https://youtu.be/n9sxq34D9HQ> (Explanation on principles of 5S)

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

Learning objectives	Core concepts (Chapters/Topics)
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. <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure good care of PPE.</i> ✓ <i>Ensure to wear appropriate PPE.</i> ✓ <i>Ensure not to defective and damaged PPE.</i> 	1.2 Using PPE

B. Competencies:

- i. Practice OHS procedures in any task for safety.
- ii. Use appropriate PPE as per the requirement.

C. Learning Experience

- **Contact:**
 - ✓ Read and explain the INFORMATION SHEET 1.2.
 - ✓ Demonstrate and let the learners perform OPERATION SHEET 1.2.
 - ✓ Let the learners solve the SAMPLE SELF CHECK 1.2
 - ✓ Use PPT, handouts, and posters (PPE).
 - ✓ Let learners explore through the given web link.
<https://www.youtube.com/watch?v=DMBrRNV9Hrk> that explains the importance of PPE.
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 1.2.
 - ✓ Let them go through OPERATION SHEET 1.2

- ✓ Let them solve SAMPLE SELF CHECK 1.2
- ✓ Make the learners go through this web link <https://www.youtube.com/watch?v=DMBrRNV9Hrk> that explains the importance of PPE.
- ✓ Provide handouts to learners.

D. Assessment:

- **Contact:**
 - ✓ The learners should use appropriate PPE before the practical works are started.
 - ✓ Assess the learners' ability to identify the different types of PPE and their purposes.
 - ✓ Ask learners to perform OPERATION SHEET 1.2
 - ✓ Ask learners to solve the SAMPLE SELF CHECK 1.2.
 - ✓ Frame questions from CBLM and other resources-Google/YouTube.
- **Non-contact:**
 - ✓ Ask learners to solve the SAMPLE SELF CHECK 1.1 and send answers through Google Classroom or any other social media platforms. Ask learners to perform OPERATION SHEET 1.1 and send the short video as evidence through Google Classroom or any other social media platforms.
 - ✓ Give questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for Classes IX
- ✓ Handouts and posters (PPE).
- ✓ <https://www.youtube.com/watch?v=DMBrRNV9Hrk> (Importance of PPE).

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

Learning objectives	Core concepts (Chapters/Topics)
1.3.1 Define safety precaution. 1.3.2 List the different types of safety 1.3.3 Explain workshop and personal safety. 1.3.4 State the importance of maintaining a workplace and personal safety. 1.3.5 Explain the importance of safety signs and symbols. 1.3.6 Explain the Emergency exit. 1.3.7 Describe the layout of the workshop. 1.3.8 Maintain workplace and personal safety. <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure to follow OHS procedures.</i> ✓ <i>Ensure to keep the workshop clean.</i> ✓ <i>Ensure to ring the alarm bell before the accident spreads over.</i> ✓ <i>Ensure to display safety signs and symbols.</i> ✓ <i>Ensure to use appropriate PPE in the workplace.</i> 	1.3 Maintaining workplace and personal safety

- ✓ *Ensure to avoid horseplay at the workplace.*
- ✓ *Ensure to avoid smoking and eating inside the workshop.*

B. Competencies:

- i. Practice OHS procedures in any task for safety.
- ii. Ensure to follow the principles of 5S.
- iii. Ensure to use appropriate PPE.

C. Pedagogy/Learning Experiences:

- **Contact:**
 - ✓ Let the learners read and explain the INFORMATION SHEET 1.3
 - ✓ Demonstrate and let the student perform OPERATION SHEET 1.3
 - ✓ Let the learners solve SAMPLE SELF CHECK 1.3
 - ✓ USE handouts and PPT.
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 1.3
 - ✓ Let them go through OPERATION SHEET 1.3
 - ✓ Based on the information obtained from the web link or relevant materials, the learner answers the questions on Maintaining workplace and personal safety uploaded in the Google Classroom and SAMPLE SELF CHECK 1.3.
 - ✓ Let the learners follow the link and explore maintaining a workplace and personal safety <https://www.youtube.com/watch?v=4bkr5lpKGUM>

D. Assessment:

- **Contact:**
 - ✓ The teachers may develop a rubric to assess learner's application of appropriate workplace and personal safety while performing the practical-oriented task.
- **Non-contact:**
 - ✓ Assessment of the work submitted through telegram, WeChat, messenger, and google classroom

E. Resources (online and offline):

- ✓ Competency- Based Learning Materials for class IX
- ✓ Handouts.
- ✓ <https://www.youtube.com/watch?v=WW0U6o1XNec> (Explanation on maintaining a workplace and personal safe).

A. Learning objectives/ Broad theme / Strand/Chapter

Learning objectives	Core concepts (Chapters/Topics)
1.4.1 Explain tool and equipment safety.	1.4 Maintaining tools and equipment safety
1.4.1 State the importance of maintaining tool and equipment safety	
1.4.1 List the do's and don'ts for tool and equipment.	
1.4.1 Maintain tools and equipment safety.	

Note:

- ✓ *Ensure all the tools are in workable condition.*
- ✓ *Ensure to keep tools clean and dry, and store them properly after use.*
- ✓ *Ensure to operate the machine when instructed.*
- ✓ *Ensure to refer manual prior to operation of tools and equipment.*

B. Competencies:

- i. Follow the principle of 5S.
- ii. Practice OHS procedures in any task for safety.
- iii. Maintain hand tools and portable power tools for better performance.

C. Pedagogy/Learning experiences:

• **Contact:**

- ✓ Let the learners read and explain the INFORMATION SHEET 1.
- ✓ Explain and let them perform the OPERATION SHEET 1.4.
- ✓ Let the learners solve the SAMPLE SELF CHECK 1.4

• **Non-contact:**

- ✓ Let the learners read the INFORMATION SHEET 1.4
- ✓ Let them go through OPERATION SHEET 1.4
- ✓ Let them solve SAMPLE SELF CHECK 1.4
- ✓ Provide a web link <https://www.bramptonguardian.com/shopping-story/6829220-the-importance-of-using-the-right-tool-for-the-job/> that explains do's and don't's while using tools and equipment.
- ✓ Share the link <http://www.ehsdb.com/dos-and-donts--hand-tools-equipments.php> that explains the importance of using the right tool for the right job.
- ✓ Provide other resources such as video clips, handouts, etc through Google Classroom or any other social media platforms.

D. Assessment:

• **Contact:**

- ✓ As soon as the learners are aware of maintaining tools and equipment safety, ask them to perform OPERATION SHEET 1.4 and keep on practicing while performing any task.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.4
- ✓ Conduct class tests by framing the questions from CBLM and other ICT resources.
- ✓ Assess the learners' ability to explain the importance of maintaining tools and equipment safety, do's and don'ts of handling tools and equipment, by conducting the class test, letting the learners perform the task and rate them using rubrics, etc. Provide necessary feedback and intervention based on an assessment of the model.

• **Non-contact:**

- ✓ Ask learners to perform OPERATION SHEET 1.4 and send the short video clip as evidence through Google Classroom or any other social media platforms.

- ✓ Let learners solve the SAMPLE SELF CHECK 1.4 from CBLM and send the answers through Google Classroom or any other social media platforms.
- ✓ Give questions using different sources and let the learners submit answers through Google Classroom or any other social media platforms.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for Classes IX and X, REC
- ✓ Handouts, video clips, and PowerPoint presentation.
- ✓ <https://www.bramptonguardian.com/shopping-story/6829220-the-importance-of-using-the-right-tool-for-the-job/>(Importance of using the right tool for the right job).
- ✓ <http://www.ehsdb.com/dos-and-donts--hand-tools-equipments.php> (Do's and dont's while using tools and equipment).

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

Learning objectives	Core concepts (Chapters/Topics)
1.5.1 Define fire extinguisher. 1.5.2 Label the parts of 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. 1.5.6 Use fire extinguisher. <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure to read the instructions provided on the fire extinguisher.</i> ✓ <i>Ensure appropriate use PPE.</i> 	1.5 Using Fire Extinguisher

B. Competencies:

- i. Follow the principle of 5S.
- ii. Practise OHS procedures in any task for safety.
- iii. Operate and use different fire extinguishers to combat different classes of fires at any time.

C. Pedagogy/Learning Experiences

- **Contact:**
 - ✓ Read and explain the INFORMATION SHEET 1.5
 - ✓ Demonstrate and let the learners perform OPERATION SHEET 1.5
 - ✓ Let the learners in a group practice followed by individual practice.
 - ✓ Let the learners solve SAMPLE SELF CHECK 1.5.
 - ✓ Let learners explore the methods on how to use a fire extinguisher to combat fire from the link <https://www.youtube.com/watch?v=PQV71INDaqY>
- **Non-contact**
 - ✓ Let the learners read the INFORMATION SHEET 1.5
 - ✓ Let them go through OPERATION SHEET 1.5

- ✓ Let them solve SAMPLE SELF CHECK 1.5
- ✓ Make the students go through this link
<https://www.youtube.com/watch?v=PQV71INDaqY>
- ✓ Let the learner explain how they extinguish the fire in their respective places.

D. Assessment:

- **Contact:**
 - ✓ Assess the learners' ability to perform OPERATION SHEET 1.5 as per the rubrics or practical checklist.
 - ✓ Usage of proper PPE while handling with a fire extinguisher.
- **Non-contact:**
 - ✓ Assessing the given Q&A submitted through any possible social media platforms.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX.
- ✓ Handouts.
- ✓ <https://www.youtube.com/watch?v=PQV71INDaqY> (How to use fire extinguisher)

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

Learning objectives	Core concepts (Chapters/Topics)
1.6.1 State function of a hacksaw. 1.6.2 List parts of hack saw. 1.6.3 State types of hack saw. 1.6.4 Use hacksaw <i>Note:</i> ✓ <i>Ensure appropriate use of PPE.</i>	1.6 Using Hacksaw

B. Competencies:

- i. Practise OHS procedures in any task for safety.
- ii. Use hacksaw safely wherever applicable.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Read the INFORMATION SHEET 1.6 on
 - ✓ Read and Perform OPERATION SHEET 1.6
 - ✓ Let the learners solve the SAMPLE SELF CHECK 1.6
 - ✓ Use PPT, posters(parts of hacksaw), and handouts.
- **Non-contact:**
 - ✓ Provide link <https://www.hunker.com/13402985/types-of-hacksaw-blades> that explains the types of hacksaw blades.
 - ✓ Provide a link <https://www.youtube.com/watch?v=G0NGoPF3Q6A> that explains how to change hacksaw blades and how to use a hacksaw.
 - ✓ Provide handouts and short video clips.

D. Assessment:

- **Contact:**
 - ✓ Provide all the tools and materials and let the learners perform the OPERATION SHEET 1.6.
 - ✓ After completing the practical, assess the end product using rubrics.
 - ✓ Conduct class tests.
- **Non-contact:**
 - ✓ Let them perform OPERATION SHEET 1.6 and send video clips/ images as evidence in google classroom.
 - ✓ Assess the given question and answers submitted through Google Classroom, WeChat, etc.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials of classes IX
- ✓ Use PPT, posters (parts of hacksaw), and handouts.
- ✓ <https://www.hunker.com/13402985/types-of-hacksaw-blades> (Types of hacksaw blades).
- ✓ <https://www.youtube.com/watch?v=G0NGoPF3Q6A> (How to change hacksaw blades and how to use a hacksaw).

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

Learning objectives	Core concepts (Chapters/Topics)
1.7.1 State the function of the file. 1.7.2 List the types of files. 1.7.3 List the parts of the file. 1.7.4 Use file <i>Note:</i> ✓ <i>Ensure appropriate use of PPE.</i>	1.7 Using Filing

B. Competencies:

- i. Follow the principle of 5S.
- ii. Practice OHS procedures in any task for safety.
- iii. Select the tools as per the job requirement.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Read and explain the INFORMATION SHEET 1.7
 - ✓ Read and perform OPERATION SHEET 1.7
 - ✓ Let the learners solve SAMPLE SELF CHECK 1.7
 - ✓ Use PPT, posters (parts of hacksaw), and handouts.

- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 1.7.
 - ✓ Let them go through OPERATION SHEET 1.7
 - ✓ Let the learners solve SAMPLE SELF CHECK 1.7
 - ✓ Provide the web link [https://en.wikipedia.org/wiki/File_\(tool\)](https://en.wikipedia.org/wiki/File_(tool)) to learn more about types of files with function).
 - ✓ Provide the link <https://www.youtube.com/watch?v=BM8gZuLr0CE> to watch a short video clip filing process, types, etc.
 - ✓ Provide handouts and pictures (parts of hacksaw) through google classroom, WeChat, etc.

D. Assessment:

- **Contact:**
 - ✓ Assess the learners’ ability to identify different types of files and use them.
 - ✓ Assess the learner’s product after practical according to the rubrics developed.
 - ✓ Conduct class tests.
- **Non-contact:**
 - ✓ Let the learners go through the links provided and assess the notes submitted through Google Classroom or any other social media platforms.
 - ✓ Upload a question through possible social media platforms from the provided videos, handouts, CBLM, and assess their answers.
 - ✓ Let the learners answer the SAMPLE SELF CHECK 1.7 and submit it through Google Classroom, etc.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX.
- ✓ PPT, posters (parts of hacksaw), and handouts.
- ✓ [https://en.wikipedia.org/wiki/File_\(tool\)](https://en.wikipedia.org/wiki/File_(tool)) (Types of files with function).
- ✓ <https://www.youtube.com/watch?v=BM8gZuLr0CE> (Short video clip on the filing process, types, etc).

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

Learning objectives	Core concepts (Chapters/Topics)
1.8.1 Define drilling machine. 1.8.2 State the function of drilling machine. 1.8.3 List the types of drilling machine. 1.8.4 Use drilling <i>Note:</i> <ul style="list-style-type: none"> ✓ Operate drilling machine. ✓ Use centre punch. ✓ Ensure appropriate use of PPE. ✓ Ensure to use coolant. 	1.8 Using Drilling

B. Competencies:

- i. Practice OHS procedures in any task for safety.
- ii. Identify and operate any types of drilling machine for any task.
- iii. Maintain equipment for effective and efficient performance.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Read and explain the INFORMATION SHEET 1.8 using posters, PPT and CBLM.
 - ✓ Read, demonstrate and let them perform SKILL SHEET 1.8 (a)
 - ✓ Read and let them perform SKILL SHEET 1.8 (b)
 - ✓ Read, demonstrate and let them perform OPERATION SHEET 1.8
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 1.8.
 - ✓ Let them go through the SKILL SHEET 1.8 (a)
 - ✓ Let them go through SKILL SHEET 1.8 (b)
 - ✓ Let them go through OPERATION SHEET 1.8
 - ✓ Provide handouts and short video clips.
 - ✓ Provide link <https://www.youtube.com/watch?v=-HT-OWuP5qgabou%3Ablank> and <https://www.youtube.com/watch?v=V3u8wTjAedU> that explain the parts and operation of radial drilling machine.

D. Assessment:

- **Contact:**
 - ✓ Assess their ability to identify the parts and types of drilling machines.
 - ✓ Assess their performance based on the end product according to the rubrics developed.
- **Non-contact:**
 - ✓ Assess their notes or the task assigned to them based on the links, videos, handouts, etc provided through possible social media platforms.
 - ✓ Let them do the SAMPLE SELF CHECK 1.8 and submit through Google Classroom or any other social media platforms.

E. Resources (online and offline):

- ✓ Competency- Based Learning Materials for class IX
- ✓ PPT, handouts, and posters.
- ✓ <https://www.youtube.com/watch?v=-HT-OWuP5qgabou%3Ablank> & <https://www.youtube.com/watch?v=V3u8wTjAedU> (Parts and operation of radial drilling machine).

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

Learning objectives	Core concepts (Chapters/Topics)
1.3.1 State the function of grinding machine.	1.9 Performing Grinding
1.3.2 Label the parts of grinding machine.	

<p>1.3.3 List the types of grinding machine</p> <p>1.3.4 Perform grinding</p> <p><i>Note:</i></p> <ul style="list-style-type: none"> ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure to keep a safe distance between the hand and grinding machine.</i> ✓ <i>Ensure to use gradual force while grinding.</i> 	
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B. Competencies:

- i. Maintain equipment for effective and efficient performance.
- ii. Identify and operate any type of grinding machine as per the requirement.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Read and explain the INFORMATION SHEET 1.9 with the help of posters and PPT.
 - ✓ Demonstrate and let the learners perform OPERATION SHEET 1.9 using the DEMO++ performance guide.
 - ✓ Let them solve the SAMPLE SELF CHECK 1.9.
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 1.9
 - ✓ Let them go through OPERATION SHEET 1.9
 - ✓ Let them solve the SAMPLE SELF CHECK 1.9
 - ✓ Provide handouts and short video clips(how to perform grinding).
 - ✓ Provide the link https://www.youtube.com/watch?v=gqwuw6kua_g to learn more about bench grinder.

D. Assessment:

- **Contact:**
 - ✓ Assess the learners' ability to identify and operate different types of the grinder.
 - ✓ Discuss the SAMPLE SELF CHECK 1.9 in the classroom.
 - ✓ Conduct the class test for theoretical as well as practical.
 - ✓ Asses the end product of learners after performing the OPERATION SHEET 1.9.
- **Non-contact:**
 - ✓ Assess the answers of SAMPLE SELF CHECK 1.9, notes, and the assignments such as short answer questions, given to the learners through Google Classroom or any other social media platforms.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX
- ✓ Posters, PPT, and short video clips (How to perform grinding).
- ✓ https://www.youtube.com/watch?v=gqwuw6kua_g (Bench grinder).

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

Learning objectives	Core concepts (Chapters/Topics)
1.3.1 Define arc welding 1.3.2 Define arc welding machine. 1.3.3 List the types of welding machines. 1.3.4 List the accessories and their functions. 1.3.5 Define arc length. 1.3.6 Perform Arc welding <i>Note:</i> ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure to set welding current as per the job requirement.</i>	1.10 Performing Arc welding

B. Competencies:

- i. Practice OHS procedures in any task for safety.
- ii. Perform arc welding as per the job requirement.

C. Pedagogy/Learning experiences:

• **Contact:**

- ✓ Read and explain the INFORMATION SHEET 1.10
- ✓ Use PPT, handouts, posters (arc welding set up), and short video clips (how to perform arc welding).
- ✓ Read and demonstrate the JOB SHEET 1.10: On operating of arc welding machine.
- ✓ Demonstrate and let the learners perform OPERATION SHEET 1.10 performing basic arc welding.
- ✓ Let them solve the SAMPLE SELF CHECK 1.10.

• **Non-contact:**

- ✓ Let the learners read the INFORMATION SHEET 1.10.
- ✓ Let them go through OPERATION SHEET 1.10
- ✓ Let them solve the SAMPLE SELF CHECK 1.10.
- ✓ Upload handouts and short video clips.
- ✓ Provide the web link <https://www.youtube.com/watch?v=Si4ivw9PwtU> to learn about the arc welding setup.
- ✓ Provide the link <https://youtu.be/CoHVA7nr82A> to learn about the procedure of arc welding.

D. Assessment:

• **Contact:**

- ✓ Assess the learners' ability to set up the welding machine as per the required standards.
- ✓ Assess the learner's end product after performing the OPERATION SHEET 1.10 as per the rubrics.
- ✓ Conduct the class test.

- **Non-contact:**
 - ✓ Assess the answers of SAMPLE SELF CHECK 1.10 submitted online.
 - ✓ Upload the case study through Google Classroom or any other social media platforms and assess their understanding.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX.
- ✓ PPT, handouts, posters (arc welding set up), and short video clips (how to perform arc welding), and case study.
- ✓ <https://www.youtube.com/watch?v=Si4ivw9PwtU> (Process of arc welding set up).
- ✓ <https://youtu.be/CoHVA7nr82A> (Procedure of arc welding).

Chapter 2: Replacing Faulty Rigid suspension components

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

Learning objectives	Core concepts (Chapters/Topics)
2.1.1 Define suspension system. 2.1.2 State the function of suspension system. 2.1.3 Explain the operation of suspension system. 2.1.4 State the types of suspension system. 2.1.5 List the components of suspension system. 2.1.6 State the functions of shock absorber. 2.1.7 Classify the types of shock absorber. 2.1.8 Illustrate the construction of shock absorber. 2.1.9 Explain the operation of shock absorber. 2.1.10 Replace shock absorber <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure the vehicle is parked safely.</i> ✓ <i>Ensure to place the safety stands on designated area.</i> ✓ <i>Ensure to secure nuts and bolts of shock absorber.</i> ✓ <i>Ensure to handle tools and equipment properly.</i> 	2.1 Replacing shock absorber

B. Competencies:

- Determine the defects and replace the shock absorber with bushes for any type of vehicle.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Read and explain the INFORMATION SHEET 2.1
 - ✓ Read, demonstrate and let the learners perform OPERATION SHEET 2.1
 - ✓ Let them solve the SAMPLE SELF CHECK 2.1

- ✓ Use PPT, handouts, posters, short video clips, Demo++ performance guide, and demonstration.
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 2.1
 - ✓ Let them go through OPERATION SHEET 2.1
 - ✓ Let them solve SAMPLE SELF CHECK 2.1.
 - ✓ Provide the handouts, pictures, and Demo++ performance guide through the google classroom and any other social media platforms.
 - ✓ Provide the link <https://connect2local.com/1/272277/c/329162/the-difference-between-independent---rigid-axle-suspension-systems> that shows the difference between independent and rigid axle suspension system.
 - ✓ Provide the link <https://clubtechnical.com/shock-absorber> that shows the explanation on function, working principle, and types of the shock absorber.

D. Assessment:

- **Contact:**
 - ✓ Conduct the class test to assess their understanding.
 - ✓ Assess the learners’ report on particular practical OPERATION SHEET 2.1 according to the rubrics developed.
 - ✓ Assess the learners’ ability to identify the type of suspension systems, components, and shock absorbers.
 - ✓ Assess the learners’ ability to change the shock absorber and its bushes.
- **Non-contact:**
 - ✓ Assess the answers of SAMPLE SELF CHECK 2.1 through Google Classroom and any other possible social media platforms.
 - ✓ Let the learners write notes based on the learning resources provided to them and assess the notes with the help of rubrics developed.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for classes IX
- ✓ Handouts, short video clips, and DEMO++ performance guide.
- ✓ <https://connect2local.com/1/272277/c/329162/the-difference-between-independent---rigid-axle-suspension-systems> (Difference between independent and rigid axle suspension system).
- ✓ <https://clubtechnical.com/shock-absorber> (Explanation on function, working principle, and types of shock absorber).

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

Learning objectives	Core concepts (Chapters/Topics)
2.2.1 Explain the types of leaf spring.	2.2 Replacing leaf spring assembly
2.2.2 State the functions of leaf spring.	
2.2.3 Explain the operation of leaf spring.	

- 2.2.4 Define and state the function of torque wrench.
- 2.2.5 Explain the types of torque wrench.
- 2.2.6 Explain the torque conversion factor.
- 2.2.7 Replace leaf spring assembly

Note:

- ✓ *Ensure vehicle is parked safely.*
- ✓ *Ensure all tools and equipment are handled properly.*
- ✓ *Ensure that chassis and axle is supported by safety stand.*

B. Competencies:

- i. Determine the defects and replace the leaf spring in any type of vehicle and improve the vehicle's performance as per the standard procedures.

C. Pedagogy/Learning experiences:

- **Contact:**

- ✓ Read and explain the INFORMATION SHEET 2.2 using PPT, posters.
- ✓ Read, demonstrate and let them perform SKILL SHEET 2. 2
- ✓ Demonstrate and let them perform SKILL SHEET 2.2
- ✓ Demonstrate and let the learners perform OPERATION SHEET 2.2 using the DEMO++ performance guide.

- **Non-contact:**

- ✓ Let the learners read the INFORMATION SHEET 2.2.
- ✓ Let them go through OPERATION SHEET 2.2
- ✓ Let them solve SAMPLE SELF CHECK 2.2
- ✓ Provide handouts DEMO++ performance guide.
- ✓ Provide the link <https://www.youtube.com/watch?v=5TjN0FjgCzo> that explains the operation of leaf spring.
- ✓ Provide the web link <https://www.youtube.com/watch?v=AuzF1bGsYkc> that shows the types of torque wrench.
- ✓ Provide the link https://www.youtube.com/watch?v=Nk_KSRCSokc that shows how to use a click adjustable torque wrench.

D. Assessment:

- **Contact:**

- ✓ Conduct the class test.
- ✓ Asses the notes and assignments maintained by the learners as per the rubrics.
- ✓ Let the learners answer the SAMPLE SELF CHECK 2.2

- **Non-contact:**

- ✓ Let them write and submit the notes based on the learning resources.
- ✓ Assess the answers of SAMPLE SELF CHECK 2.2 and the questions given to them through Google Classroom or any other social media platforms.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for classes IX
- ✓ Handouts, and PPT.
- ✓ <https://www.youtube.com/watch?v=5TjN0FjgCzo> (Operation of leaf spring).
- ✓ <https://www.youtube.com/watch?v=AuzF1bGsYkc> (Types of torque wrench).
- ✓ https://www.youtube.com/watch?v=Nk_KSRCSokc (How to use click adjustable torque wrench).

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

Learning objectives	Core concepts (Chapters/Topics)
2.3.1. List the spring defects. 2.3.2. Describe the materials of spring. 2.3.3. Identify the components of leaf spring and its functions. 2.3.4. Disassemble leaf spring assembly <i>Note:</i> ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure proper usage of right tools to pry up the clamp.</i>	2.3 Disassembling leaf spring assembly

B. Competencies:

- i. Determine the defects of leaf spring in any vehicle and disassemble the leaf spring as per the standard procedure.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Explain the INFORMATION SHEET 2.3
 - ✓ Demonstrate and let the learners perform OPERATION SHEET 2.3
 - ✓ Let them solve SAMPLE SELF CHECK 2.3
 - ✓ Use PPT, handout, DEMO++ performance guide, and demonstration.
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 2.3
 - ✓ Let them go through OPERATION SHEET 2.3
 - ✓ Let them solve SAMPLE SELF CHECK 2.3
 - ✓ Give handouts, short video clips, and the DEMO++ performance guide.
 - ✓ Give a link <https://www.truckspring.com/what-causes-leaf-spring-failure.aspx> that explains the causes of leaf spring defects.
 - ✓ Provide a weblink <https://www.youtube.com/watch?v=iXLxWYOjgdg> that shows the procedure to dismantle leaf spring assembly.

D. Assessment:

- **Contact:**
 - ✓ Let the learners do the presentation and asses as per the rubrics developed.

- ✓ Assess the learners' notes, assignments, etc frequently.
- ✓ Assess the ability of learners to determine the defects of leaf spring and disassemble it as per the required standard procedures.
- ✓ Assess their understanding and ability to identify the components with functions.
- **Non-contact:**
 - ✓ Let them solve and submit answers of SAMPLE SELF CHECK 2.3 through Google Classroom or any other social media platforms.
 - ✓ Let the learners write and submit succinct notes through Google Classroom or any other possible social media platforms, based on their understanding after watching the videos, going through the handouts, and CBLM.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX.
- ✓ Handouts, PPT, and short video clips.
- ✓ <https://www.truckspring.com/what-causes-leaf-spring-failure.aspx> (Causes of leaf spring failure).
- ✓ <https://www.youtube.com/watch?v=iXLxWYOjgdg> (Procedure to dismantle leaf spring assembly).

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

Learning objectives	Core concepts (Chapters/Topics)
2.4.1 Explain the importance of spring alignment. 2.4.2 Define pneumatic impact gun. 2.4.3 State the function of pneumatic impact gun. 2.4.4 List the external components of pneumatic gun. 2.4.5 Assemble leaf spring assembly <i>Note:</i> ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure leaf spring assembly is clamped on the vice securely.</i>	2.4 Assembling leaf spring assembly

B. Competencies:

- i. Disassemble and assemble any type of leaf spring as per the standard procedures.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Explain INFORMATION SHEET 2.4
 - ✓ Demonstrate SKILL SHEET 2.4
 - ✓ Demonstrate and let the learners perform OPERATION SHEET 2.4
 - ✓ Use handouts, PPT, DEMO ++ performance guide, and demonstration.
- **Non-contact:**

- ✓ Let the learners read the INFORMATION SHEET 2.4
- ✓ Let the learners go through the SKILL SHEET 2.4
- ✓ Let them go through OPERATION SHEET 2.4
- ✓ Let them solve SAMPLE SELF CHECK 2.4
- ✓ Provide short video clips, handouts, pictures, PPT, DEMO++ performance guide, and case study.
- ✓ Provide a link https://www.youtube.com/watch?v=kQu2ipjom_Q that explains how and when to use a pneumatic impact wrench.

D. Assessment:

• **Contact:**

- ✓ Let the learners solve the SAMPLE SELF CHECK 2.4, notes, etc to assess their understanding.
- ✓ Give questions or let them write a short note as homework after every session.
- ✓ Check the learner note that has been jot down while teaching frequently.
- ✓ Assess their ability to perform OPERATION SHEET 2.4 as per the rubrics developed.
- ✓ Assess the report on OPERATION SHEET 2.4 written in their practical book.

• **Non-contact:**

- ✓ Let the learners solve the SAMPLE SELF CHECK 2.4, notes, etc to assess their understanding through the learning materials provided to them.
- ✓ Share the web link https://www.youtube.com/watch?v=kQu2ipjom_Q which explains how to use a pneumatic impact wrench.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for classes IX
- ✓ Handouts PPT.
- ✓ https://www.youtube.com/watch?v=kQu2ipjom_Q (Explanation on use of pneumatic impact wrench).

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

Learning objectives	Core concepts (Chapters/Topics)
2.5.1 Explain function of spring bush. 2.5.1 State the types of bushes. 2.5.1 Change leaf spring bush <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure proper disposal of used bushes.</i> ✓ <i>Ensure to follow the cross pattern for loosening and tightening U-bolt.</i> 	2.5 Changing leaf spring bush

B. Competencies:

- i. Identify and replace any type of leaf spring bushes in any type of vehicle.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Read and explain the INFORMATION SHEET 2.5
 - ✓ Read, demonstrate and let them perform JOB SHEET 2.5
 - ✓ Demonstrate and let the learners perform OPERATION SHEET 2.5
 - ✓ Let them solve SAMPLE SELF CHECK 2.5
 - ✓ Use handouts, CBLM, pictures, PPT, DEMO++ performance guide, and demonstration.
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 2.5
 - ✓ Let them go through JOB SHEET 2.5
 - ✓ Let them go through OPERATION SHEET 2.5.
 - ✓ Let them solve SAMPLE SELF CHECK 2.5
 - ✓ Provide short video clips, DEMO++ performance guide, and handouts.

D. Assessment:

- **Contact:**
 - ✓ Assess their understanding of the lesson through the notes, class test, and question/answer session.
 - ✓ Assess the learners' ability to perform OPERATION SHEET 2.5 using observation checklist and rubrics as per the standard procedures.
 - ✓ Asses the report written in their practical notebook after performing OPERATION SHEET 2.5.
- **Non-contact:**
 - ✓ Give additional questions to SAMPLE SELF CHECK 2.5, assignments, and assess the answers submitted through Google Classroom using rubrics.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX
- ✓ PPT, handouts, and short video clips.

Chapter 3: Replacing faulty independent suspension component

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

Learning objectives	Core concepts (Chapters/Topics)
3.1.1 Define independent suspension system 3.1.2 State function of strut assembly. 3.1.3 List the types of independent suspension system. 3.1.4 Explain construction of strut assembly. 3.1.5 Explain operation of strut assembly. 3.1.6 Replace strut assembly	3.1 Replacing strut assembly

Note:

- ✓ *Ensure appropriate use of PPE.*
- ✓ *Ensure brake lines are secured.*
- ✓ *Ensure to tightened wheel nut with the specific torque.*

B. Competencies:

- i. Identify the defects and replace any type of independent suspension system and defective strut in any vehicle.

C. Pedagogy/Learning experiences:

• **Contact:**

- ✓ Read the INFORMATION SHEET 3.1
- ✓ Demonstrate and let the learners perform OPERATION SHEET 3.1
- ✓ Let them solve SAMPLE SELF CHECK 3.1
- ✓ Use handouts, CBLM, DEMO++ performance guide, demonstration, and PPT.

• **Non-contact:**

- ✓ Let the learners read the INFORMATION SHEET 3.1
- ✓ Let them go through OPERATION SHEET 3.1
- ✓ Let them solve SAMPLE SELF CHECK 3.1
- ✓ Provide handouts, DEMO++ performance guide, and short video clips.
- ✓ Provide the web link <https://connect2local.com/l/272277/c/329162/the-difference-between-independent--rigid-axle-suspension-systems> that shows the difference between rigid and independent suspension system.
- ✓ The link <https://cartreatments.com/pros-and-cons-of-macpherson-vs-double-wishbone-suspension/> shows the pros and cons of MacPherson strut assembly and double wishbone type.
- ✓ This link <https://www.youtube.com/watch?v=F9m5okh8NVU> shows how the struts and shocks work.

D. Assessment:

• **Contact:**

- ✓ Conduct class tests, presentations, group works, and question/ answer sessions.
- ✓ Give additional questions on SAMPLE SELF CHECK 3.1 and assess their answers.
- ✓ Develop rubrics and assess the learners' practical reports and notes frequently.
- ✓ Assess the learners' ability to identify the type of independent suspension system used and to perform the OPERATION SHEET 3.1.

• **Non-contact:**

- ✓ Let the learners write a note and solve the SAMPLE SELF CHECK 3.1 with additional questions given from the learning materials provided to them and submit through any possible social media platforms.
- ✓ Conduct an online quiz.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX.

- ✓ Handouts, short video clips, and DEMO++ performance guide.
- ✓ <https://connect2local.com/l/272277/c/329162/the-difference-between-independent--rigid-axle-suspension-systems> (Difference between rigid and independent suspension system).
- ✓ <https://cartreatments.com/pros-and-cons-of-macpherson-vs-double-wishbone-suspension/> (Pros and cons of MacPherson strut assembly and double wishbone type).
- ✓ <https://www.youtube.com/watch?v=F9m5okh8NVU> (How struts and shocks work).

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

Learning objectives	Core concepts (Chapters/Topics)
3.2.1 Explain the components of independent suspension system. 3.2.2 State the function of jack. 3.2.3 List types of Jacks. 3.2.4 Locate jacking position. 3.2.5 <i>Use screw jack.</i> 3.2.6 Disassemble strut and coil spring <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure proper gripping of strut assembly in the bench vice.</i> ✓ <i>Ensure the hooks of the spring compressors are place properly.</i> 	3.2 Disassembling strut and coil spring

B. Competencies:

- i. Identify the jacking position in any vehicle.
- ii. Identify the defects and disassemble the strut assembly any time in a sequential array as per the requirement.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Read and explain the INFORMATION SHEET 3.2
 - ✓ Read, demonstrate and let the learners perform SKILL SHEET 3.2
 - ✓ Demonstrate and let them perform OPERATION SHEET 3.2
 - ✓ Use PPT, handouts, DEMO ++ performance guide, group discussion, posters (components of strut assembly), and demonstration.
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 3.2.
 - ✓ Let them go through SKILL SHEET 3.2
 - ✓ Let them go through OPERATION SHEET 3.2.
 - ✓ Let them solve SAMPLE SELF CHECK 3.2.

- ✓ PPT, handouts, DEMO ++ performance guide, pictures(components of strut assembly).

D. Assessment:

- **Contact:**

- ✓ Conduct class tests and develop rubrics to rate every learner’s presentation, notes written in their book, practical reports, etc.
- ✓ Assess the learners’ ability to determine the defects of strut assembly and perform the OPERATION SHEET 3.2.
- ✓ Let them solve the SAMPLE SELF CHECK 3.2 and assess their answers accordingly.

- **Non-contact:**

- ✓ Share different learning materials and let the learners make a brief note and submit it through Google Classroom or any other possible social media platforms.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX.
- ✓ PPT, handouts, DEMO ++ performance guide, group discussion, posters (components of strut assembly), and demonstration.

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

Learning objectives	Core concepts (Chapters/Topics)
3.3.1 State importance of coil spring positioning. 3.3.2 Assemble strut and coil spring <i>Note:</i> <ul style="list-style-type: none"> ✓ Use coil spring compressor. ✓ Ensure to hold the piston rod safety while tightening the lock nut. ✓ Ensure to install the spring in a correct position. ✓ Endure to hock coil spring compressor correctly. ✓ Ensure to tighten each coil spring compressor hook evenly. 	3.3 Assembling strut and coil spring

B. Competencies:

- Disassemble/assemble the strut components and are installed in sequential order in any vehicle as per standard procedures.

C. Pedagogy/Learning experiences:

- **Contact:**

- ✓ Read and explain the INFORMATION SHEET 3.3
- ✓ Demonstrate the SKILL SHEET 3.3
- ✓ Demonstrate and let the learners perform OPERATION SHEET 3.3
- ✓ Use PPT, group discussion, DEMO++ performance guide, demonstration.

- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 3.3
 - ✓ Let them go through OPERATION SHEET 3.3
 - ✓ Let the learners solve the SAMPLE SELF CHECK 3.3 from CBLM.
 - ✓ Share PPT, pictures, DEMO++ performance guide, short video clips which demonstrates the OPERATION SHEET 3.3 as well as SKILL SHEET 3.3.
 - ✓ Provide the link <https://www.youtube.com/watch?v=znhC17YH4YY> that shows how to use a coil spring compressor.

D. Assessment:

- **Contact:**
 - ✓ Conduct class tests, question & answer sessions, and review every session to assess the learners' understanding.
 - ✓ Develop rubrics to assess the assignment and questions given to the learners.
 - ✓ Assess the learners' ability to perform OPERATION SHEET 3.3 as per practical checklist and rubrics.
- **Non-contact:**
 - ✓ Let the learners write a note and solve the SAMPLE SELF CHECK 3.3 with additional questions given from the learning materials provided to them and assess their answers using rubrics.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX.
- ✓ PPT, and DEMO++ performance guide.
- ✓ <https://www.youtube.com/watch?v=znhC17YH4YY> (How to use coil spring compressor).

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

Learning objectives	Core concepts (Chapters/Topics)
3.4.1 State function of coil spring. 3.4.3 List the characteristics of coil spring. 3.4.4 Explain the operation of coil spring. 3.4.5 Replace coil spring <i>Note:</i> <ul style="list-style-type: none"> ✓ Ensure appropriate use of PPE. ✓ Ensure to place the jack and safety stand in correct position. 	3.4 Replacing coil spring

B. Competencies:

- Install the coil spring as per the standard procedures in any vehicle.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Explain the INFORMATION SHEET 3.4 with the help of handouts, CBLM, pictures (coil spring), PPT, and group discussion.
 - ✓ Read, demonstrate and let the learners perform OPERATION SHEET 3.4 by using the DEMO++ performance guide.
 - ✓ Let them solve SAMPLE SELF CHECK 3.4
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 3.4.
 - ✓ Let them go through OPERATION SHEET 3.4
 - ✓ Let them solve SAMPLE SELF CHECK 3.4
 - ✓ Upload PPT, pictures, DEMO++ performance guide, short video clips which demonstrates the OPERATION SHEET 3.4.
 - ✓ Provide the link https://www.testingautos.com/car_care/when-replace-coil-springs.html to learn about when to replace coil spring.

D. Assessment:

- **Contact:**
 - ✓ Check the notes and practical reports frequently after winding up the INFORMATION SHEET 3.4 and OPERATION SHEET 3.4.
 - ✓ Develop and assess the learners' understanding by conducting the class test, group presentation, and quiz among themselves.
- **Non-contact:**
 - ✓ Give and let the learners solve the questions as well as SAMPLE SELF CHECK 3.4 from CBLM and submit through google classroom.
 - ✓ Let them develop notes after receiving every learning material and submit them through Google Classroom.
 - ✓ Give the web link <https://www.tirereview.com/the-role-of-springs-in-suspension-systems/> to understand more about the role of springs in the suspension system.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX.
- ✓ Handouts, PPT slides, and DEMO++ performance guide.
- ✓ https://www.testingautos.com/car_care/when-replace-coil-springs.html (When to replace coil spring).
- ✓ <https://www.tirereview.com/the-role-of-springs-in-suspension-systems/> (Role of springs in suspension system).

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

Learning objectives	Core concepts (Chapters/Topics)
3.5.1 Describe strut bar. 3.5.2 State the function of strut bar. 3.5.3 Replace strut bar <i>Note:</i> <ul style="list-style-type: none">✓ <i>Ensure to wedge wheels.</i>✓ <i>Ensure to give specified torque to strut bar nut.</i>	3.5 Replacing strut bar

B. Competencies:

- i. Replace the strut bar with strut rod bushing of any vehicle without damaging other components as per the standard procedures.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Read and explain INFORMATION SHEET 3.5
 - ✓ Demonstrate and let the learners perform OPERATION SHEET 3.5
 - ✓ Let the learners solve the SAMPLE SELF CHECK 3.5
 - ✓ Use handouts, pictures (strut bar), PPT, quiz, and DEMO++ performance guide.
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 3.5.
 - ✓ Let them go through OPERATION SHEET 3.5
 - ✓ Let them solve SAMPLE SELF CHECK 3.5
 - ✓ Provide handouts, pictures, PPT slides, case study, and DEMO++ performance guide.
 - ✓ Provide the link <https://www.youtube.com/watch?v=Y5hBVmDRpRQ> that shows how to inspect strut rod bushing & <https://www.youtube.com/watch?v=DbzloWkXR5s> the consequences of worn-out strut rod bushing.

D. Assessment:

- **Contact:**
 - ✓ Assess the learners' ability through class tests, notes, assignments, and responses in the classroom.
 - ✓ Let the learners solve the SAMPLE SELF CHECK 3.5 and other questions as well.
 - ✓ Assess the learners' ability to determine the faults and perform the OPERATION SHEET 3.5.
- **Non-contact:**
 - ✓ Let the learners solve SAMPLE SELF CHECK 3.4 from CBLM and submit through google classroom.
 - ✓ Conduct an online quiz.

- ✓ Let them solve the questions on the case study and submit them through Google Classroom.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for classes IX
- ✓ Handouts, case study, DEMO++ performance guide, and short video clips.
- ✓ <https://www.youtube.com/watch?v=Y5hBVmDRpRQ> (Inspection of strut rod bushing).
- ✓ <https://www.youtube.com/watch?v=DbzloWkXR5s> (Consequences of worn-out strut rod bushing).

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

Learning objectives	Core concepts (Chapters/Topics)
3.6.1 State the functions of suspension arm. 3.6.2 Explain the types of suspension arm. 3.6.3 Explain the operation of suspension arm. 3.6.4 Replace suspension arm <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure to wedge the wheels.</i> 	3.6 Replacing suspension arm

B. Competencies:

- Replace the suspension arms without damaging other parts as per the standard procedures.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Read and explain the INFORMATION SHEET 3.6 using PPT, handouts, pictures (types of suspension arm), and short video clips (how suspension arm works).
 - ✓ Demonstrate using DEMO ++ performance guide and let the learners perform OPERATION SHEET 3.6
 - ✓ Let them solve SAMPLE SELF CHECK 3.6
 - ✓ Let the learners solve SAMPLE SELF CHECK 3.6
 - ✓ Visit nearby TTIS and invite guest lecturers frequently.
 - ✓ Let the learners do group presentations, quiz, brainstorming, and demonstration.
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 3.6
 - ✓ Let them go through OPERATION SHEET 3.6
 - ✓ Let them solve SAMPLE SELF CHECK 3.6

- ✓ Upload PPT, handouts, pictures (types of suspension arm) and short video clips (how suspension arm works), and DEMO ++ performance guide through Google Classroom
- ✓ Provide link <https://www.youtube.com/watch?v=sXkMu6PdiCM> that explains the difference between the control arm and the trailing arm.

D. Assessment:

- **Contact:**

- ✓ Develop rubrics to assess the learners’ understanding by conducting class tests, give assignments, questions and let them do the presentations.
- ✓ Assess the learners’ ability to perform OPERATION SHEET 3.6 using a practical checklist and rubrics.
- ✓ And also check their practical reports frequently.

- **Non-contact:**

- ✓ Conduct online quizzes, give assignments such as questions, SAMPLE SELF CHECK 3.6, case study, and let the learners submit through the google classroom or any other social media platforms.
- ✓ Let them develop notes after receiving every learning material and submit them through Google Classroom

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX
- ✓ PPT, handouts, pictures (types of suspension arm) and short video clips (how suspension arm works), and DEMO ++ performance guide through google classroom.
- ✓ <https://www.youtube.com/watch?v=sXkMu6PdiCM> (Difference between the control arm and the trailing arm).

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

Learning objectives	Core concepts (Chapters/Topics)
3.7.1 Define torsion bar. 3.7.2 State the function of torsion bar. 3.7.3 Explain the characteristics of torsion bar. 3.7.4 Explain the operation of torsion bar. 3.7.4 Replace torsion bar <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure to wedge the wheels.</i> ✓ <i>Ensure to place the jack and safety standing correct position.</i> 	3.7 Replacing torsion bar

B. Competencies:

- i. Align the torsion bar and is adjust to the match mark as per the standard practices in any vehicle.

C. Pedagogy/Learning experiences:

• **Contact:**

- ✓ Read and explain the INFORMATION SHEET 3.7 using PPT, pictures, short video clips, providing handouts, and giving group work.
- ✓ Demonstrate and let the learners perform OPERATION SHEET 3.7 with the help of the DEMO++ performance guide and letting them practice in a group and individually several times.
- ✓ Let the learners solve the SAMPLE SELF CHECK 3.7
- ✓ Take learners to nearby TTI (samthang) and let them perform their practical in TTI with the help of TTI instructors.

• **Non-contact:**

- ✓ Let the learners read the INFORMATION SHEET 3.7
- ✓ Let them go through OPERATION SHEET 3.7
- ✓ Let the learners solve SAMPLE SELF CHECK 3.7
- ✓ Provide online content articles, handouts, short video clips, and DEMO++ performance guide.
- ✓ Let the learners explore the link <https://www.youtube.com/watch?v=huWNurDnGB8&t=52s> which explains the working of the torsion bar.
- ✓ Share the link to know the advantages and disadvantages of the torsion bar https://en.wikipedia.org/wiki/Torsion_bar_suspension.
- ✓ Share the link <https://www.roughtrax4x4.com/blog/coil-leaf-torsion-bar-suspension/> with learners to learn the difference between torsion bar, coil spring, and leaf spring.

D. Assessment:

• **Contact:**

- ✓ Assess the answers to the questions of SAMPLE SELF CHECK 3.7.
- ✓ Conduct class test, group presentations, quiz, etc
- ✓ Assess the learners' ability to perform OPERATION SHEET 3.7 based on practical checklist and rubrics.

• **Non-contact:**

- ✓ Conduct online quiz, give assignments such as questions, SAMPLE SELF CHECK 3.7 and case study and let the learners submit through Google Classroom.
- ✓ Let them develop notes after receiving every learning material and submit them through Google Classroom.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX
- ✓ Handouts, short video clips, DEMO++ performance guide, and CBLM.

- ✓ <https://www.youtube.com/watch?v=huWNurDnGB8&t=52s> (Working of torsion bar).
- ✓ https://en.wikipedia.org/wiki/Torsion_bar_suspension (Advantages and disadvantages of torsion bar).
- ✓ <https://www.roughtrax4x4.com/blog/coil-leaf-torsion-bar-suspension/> (Difference between torsion bar, coil spring, and leaf spring).

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

Learning objectives	Core concepts (Chapters/Topics)
3.8.1 Define lateral control rod. 3.8.2 State the function of the lateral control rod. 3.8.3 Explain the operation of the lateral control rod. 3.8.3 Replace lateral control rod <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure to wedge the wheels.</i> ✓ <i>Ensure the jack saddle is placed in the correct position.</i> ✓ <i>Ensure appropriate use of PPE.</i> 	3.8 Replacing lateral control rod

B. Competencies:

- i. Replace the lateral control rod with specific torque as per the standard procedures in any vehicle.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Explain the INFORMATION SHEET 3.8
 - ✓ Demonstrate and let the learners perform OPERATION SHEET 3.8
 - ✓ Let them solve the SAMPLE SELF CHECK 3.8
 - ✓ Use PPT, handouts, DEMO ++ performance guide, group discussion, and demonstration.
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 3.8
 - ✓ Let them go through OPERATION SHEET 3.8
 - ✓ Let them solve SAMPLE SELF CHECK 3.8
 - ✓ Provide PPT slides and handouts.

D. Assessment:

- **Contact:**
 - ✓ Let the learners solve the SAMPLE SELF CHECK 3.8, notes, etc to assess their understanding.

- ✓ Conduct class tests and give questions or let them write a short note as homework after every session.
- ✓ Check the learner note that has been jot down while teaching frequently.
- ✓ Assess their ability to perform OPERATION SHEET 3.8 and the report written in their practical book as per the rubrics developed.
- **Non-contact:**
 - ✓ Let them solve and submit answers of SAMPLE SELF CHECK 2.3 through Google Classroom.or any other social media platforms.
 - ✓ Let the learners write and submit a succinct note through Google Classroom.or any other possible social media platforms, based on their understanding after watching the videos, going through the handouts, and CBLM.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX
- ✓ PPT, handouts, and DEMO ++ performance guide.

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

Learning objectives	Core concepts (Chapters/Topics)
3.9.1 Define stabilizer bar. 3.9.2 State the function of stabilizer bar. 3.9.3 Explain the construction of stabilizer bar. 3.9.3 Explain the construction of stabilizer link bar. 3.9.4 Replace stabilizer bar <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure to park the vehicle safely.</i> ✓ <i>Ensure appropriate use of PPE.</i> 	3.9 Replacing stabilizer bar

B. Competencies:

- i. Replace the stabilizer bar and bushes with specific torque applied as per the standard procedures in any vehicle.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Read and explain the INFORMATION SHEET 3.9 by using PPT, handouts, short video clips.
 - ✓ Demonstrate and let the learners perform OPERATION SHEET 3.9
 - ✓ Let them solve SAMPLE SELF CHECK 3.9
 - ✓ Let the learners do the presentation, group discussion, and brainstorming.

- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 3.9.
 - ✓ Let them go through OPERATION SHEET 3.9
 - ✓ Let them solve SAMPLE SELF CHECK 3.9
 - ✓ Give handouts, short video clips, case studies, and a DEMO++ performance guide.
 - ✓ <https://www.youtube.com/watch?v=nk8WVpRN1kg> share this link to learn more about functions, location, or operations of the stabilizer bar.
 - ✓ Provide web link https://www.youtube.com/watch?v=_liGnV3PTiQ to learn how anti-roll bar works.
 - ✓ Share the link https://www.youtube.com/watch?v=EwmDdMzzDjY&list=TLPQMDUwMzIwMjFeQmEvah_qdg&index=3 that shows the difference between understeer and oversteer.

D. Assessment:

- **Contact:**
 - ✓ Conduct the class test, presentation, group work, and assess using rubrics developed.
 - ✓ Asses the notes and assignments maintained by the learners as per the rubrics developed.
 - ✓ Let the learners answer the SAMPLE SELF CHECK 3.9.
- **Non-contact:**
 - ✓ Conduct online quiz, give assignments such as questions, SAMPLE SELF CHECK 3.9, case study and let the learners submit through the Google Classroom..
 - ✓ Let them develop notes after receiving every learning material and submit them through Google Classroom..

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX
- ✓ Handouts, short video clips, and DEMO++ performance guide.
- ✓ <https://www.youtube.com/watch?v=nk8WVpRN1kg> and https://www.youtube.com/watch?v=_liGnV3PTiQ (Functions, location or operations of stabilizer bar).
- ✓ https://www.youtube.com/watch?v=EwmDdMzzDjY&list=TLPQMDUwMzIwMjFeQmEvah_qdg&index=3 (Difference between understeer and oversteer).

Chapter 4: Diagnosing suspension system failures

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

Learning objectives	Core concepts (Chapters/Topics)
4.1.1 List the methods of inspecting suspension system failure. 4.1.2 Explain types of defects in suspension system. 4.1.3 Explain the inspection check list. 4.1.4 Perform visual inspection of suspension failure <i>Note:</i> ✓ <i>Ensure to use appropriate PPE.</i> ✓ <i>Ensure to park the vehicle safely.</i>	4.1 Performing visual inspection of suspension failure

B. Competencies:

- i. Determine the faulty components in any vehicle as per the standard procedure.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Read and explain the INFORMATION SHEET 4.1 using PPT, CBLM, and pictures.
 - ✓ Let the learners perform OPERATION SHEET 4.1 according to the inspection checklist after the demonstration.
 - ✓ Let them solve SAMPLE SELF CHECK 4.1
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 4.1
 - ✓ Let them go through OPERATION SHEET 4.1
 - ✓ Let them solve SAMPLE SELF CHECK 4.1
 - ✓ Provide handouts to the learners.
 - ✓ Share the web link <https://www.youtube.com/watch?v=8MygUVxCnH0> to guide how to perform a visual inspection.

D. Assessment:

- **Contact:**
 - ✓ Assess the learner's conceptual understanding of methods of inspecting the suspension failure, let learners answer the SAMPLE SELF CHECK 4.1, and given additional questions using rubrics to provide necessary intervention.
 - ✓ Assess the learners' ability to determine the faults of the suspension system perform OPERATION SHEET 4.1 according to the inspection checklist using rubrics and checklist in any vehicle.
- **Non-contact:**
 - ✓ Assess the learner's conceptual understanding by letting the learners answer the SAMPLE SELF CHECK 4.1 and let learners submit through Google Classroom.or any other social media platforms.

- ✓ Let learners perform OPERATION SHEET 4.1 and submit or upload the short video clips as evidence through Google Classroom or any other social media platforms.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX
- ✓ Handouts and PPT slides.
- ✓ <https://www.youtube.com/watch?v=8MygUVxCnH0> (How to perform a visual inspection).

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

Learning objectives	Core concepts (Chapters/Topics)
4.2.1 Explain the methods of bounce test. 4.2.2 Perform bounce test. <i>Note:</i> ✓ <i>Ensure the vehicle is parked on the level ground.</i>	4.2 Performing bounce test

B. Competencies:

- Perform the bounce test as per the standard procedure in any vehicle.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Read and explain the INFORMATION SHEET 4.2
 - ✓ Demonstrate and let the learners perform OPERATION SHEET 4.2
 - ✓ Let them solve SAMPLE SELF CHECK 4.2
 - ✓ Group presentation, pictures (bounce test), PPT, and DEMO++ performance guide.
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 4.2
 - ✓ Let them go through OPERATION SHEET 4.2
 - ✓ Let them solve SAMPLE SELF CHECK 4.2
 - ✓ Provide DEMO++ performance guide and handouts.
 - ✓ Share the link <https://www.youtube.com/watch?v=m8i-zyDEMCE> to let the learners know how to perform bounce tests.

D. Assessment:

- **Contact:**
 - ✓ Conduct the class test to assess their understanding.
 - ✓ Assess the learners' report on particular practical OPERATION SHEET 4.2 according to the rubrics developed.
 - ✓ Assess the learners' ability to identify the type of suspension systems, components, and shock absorbers.
 - ✓ Assess the learners' ability to determine the faults of the shock absorber and change the shock absorber in any vehicle.

- **Non-contact:**
 - ✓ Let them perform OPERATION SHEET 4.2 and send video clips/ images as evidence in g Google Classroom..
 - ✓ Assess the given question and answers submitted through Google Classroom., WeChat, etc.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX
- ✓ DEMO++ performance guide, pictures (bounce test), and handouts.
- ✓ <https://www.youtube.com/watch?v=m8i-zyDEMCE> (How to perform bounce test).

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

Learning objectives	Core concepts (Chapters/Topics)
4.3.1 Explain the symptoms, causes, and remedies of suspension system failure. 4.3.2 Perform test drive. <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure to fasten seat belt while driving.</i> ✓ <i>Ensure to follow traffic signs and road hazards.</i> 	4.3 Performing Test Drive

B. Competencies:

- Suspension failure symptoms are identified through the test drive and recommendation is provided as per the job requirement.

C. Pedagogy/Learning experiences:

- **Contact:**
 - ✓ Explain the INFORMATION SHEET 4.3 using PPT, CBLM, handouts.
 - ✓ Let the learners perform OPERATION SHEET 4.3 after the demonstration.
 - ✓ Let them solve SAMPLE SELF CHECK 4.3
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 4.3
 - ✓ Let them go through OPERATION SHEET 4.3
 - ✓ Let them solve SAMPLE SELF CHECK 4.3
 - ✓ Upload handout and inspection checklist.

D. Assessment:

- **Contact:**
 - ✓ Let the learners solve and upload the SAMPLE SELF CHECK 4.3 with few additional questions
 - ✓ Assess their notes were taken during class hours as well as the home works, class works, etc often.
 - ✓ Assess the learners’ ability to identify the Suspension failure symptoms and remedies.

- ✓ Conduct class tests and question & answer sessions.
 - **Non-contact:**
 - ✓ Let the learners solve and upload the SAMPLE SELF CHECK 4.3 with few additional questions through google classroom.
 - ✓ Give a case study and submit the answer through any possible social media platforms.
- E. Resources (online and offline):**
- ✓ Competency-Based Learning Materials for class IX
 - ✓ Handouts and inspection checklist.

MODULE I: INTERPRETING ENGINEERING DRAWING

Chapter: 1 Draw basic signs, symbols and dimension

A. Learning Objectives/Strand/Broad theme/Chapter/ topics

Learning objectives	Core concepts (Chapters/Topics)
1.1.1 Define engineering drawing. 1.1.2 State the purposes of engineering drawing. 1.1.3 List the types of drawing instruments. 1.1.4 State uses of drawing instruments. 1.1.5 List types and sizes of drawing papers. 1.1.6 Use drawing instruments <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure clean and neatness of drawing.</i> ✓ <i>Ensure proper handling of drawing instruments.</i> 	1.1 Using drawing instruments

B. Competencies:

- i. Carry out basic engineering drawings as per the requirement.
- ii. Ensure proper handling of drawing instruments.

C. Pedagogy/Learning experiences

- **Contact:**
 - ✓ Read and explain the INFORMATION SHEET 1.1.
 - ✓ Read, explain and demonstrate the OPERATION SHEET 1.1
 - ✓ Let them solve SAMPLE SELF CHECK 1.1.
 - ✓ Exhibit the real instruments to the learners which are required for the drawing.
 - ✓ Share the weblink <https://youtu.be/0Q6QwvtjVm8> OR https://youtu.be/kLe_brmh774 with the learners.
- **Non-Contact**
 - ✓ Let the learners read the INFORMATION SHEET 1.1
 - ✓ Let them go through OPERATION SHEET 1.1.
 - ✓ Let them solve SAMPLE SELF CHECK 1.1.
 - ✓ Share the weblink <https://youtu.be/0Q6QwvtjVm8> or https://youtu.be/kLe_brmh774 with the learners.

- ✓ Provide handouts.

D. Assessment

- **Contact:**

- ✓ Assess the learner’s conceptual understanding of different types of drawing instruments and their function, let learners answer the SAMPLE SELF CHECK 1.1, and given additional questions. Based on the assessment, provide necessary intervention.

- **Non-Contact:**

- ✓ Based on the information gathered from the videos and handouts, the learners develop videos that explain the functions of the different drawing instruments.

E. Resources (Online and offline)

- ✓ Competency-Based Learning Materials for Class IX
- ✓ Handout
- ✓ <https://youtu.be/0Q6QwvtjVm8> (Explanation on the types of drawing instrument and their uses)
- ✓ https://youtu.be/kLe_brmh774 (Explanation on the types of drawing instruments and their uses).

A. Learning objectives/Broad theme/Strand/chapter/topics:

Learning Objectives	Core Concepts(Chapters/topic)
1.2.1 Define layout. 1.2.2 List terminology used for layouts. 1.2.3 Define title block. 1.2.4 Explain the purpose of the title block. 1.2.5 Layout drawing sheet <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure clean and neatness of drawing.</i> ✓ <i>Ensure Proper handling of drawing instruments.</i> 	1.2 Laying out drawing sheet

B. Competencies:

- i. Layout the drawing sheet as per the requirement.

C. Pedagogy/Learning Experiences

- **Contact:**

- ✓ Read and explain the INFORMATION SHEET 1.2
- ✓ Demonstrate the layout of the drawing sheet according to OPERATION SHEET 1.2 and let learners do it in a group followed by individual practices.
- ✓ Let the learners solve SAMPLE SELF CHECK 1.2
- ✓ Share the weblink <https://youtu.be/FzMPAiW8O-s> with the learners.

- **Non-contact:**

- ✓ Let the learners read the INFORMATION SHEET 1.2
- ✓ Let them go through OPERATION SHEET 1.2

- ✓ Let them solve SAMPLE SELF CHECK 1.2
- ✓ Provide handouts to learners through Google Classroom or any other social media platforms.
- ✓ Share the weblink <https://youtu.be/FzMPAiW8O-s>.
- ✓ An instructor makes a video of the layout of the drawing sheet and uploads it to google classroom or any other social media platform.

D. Assessment

- **Contact:**
 - ✓ Let learners design the layout of the drawing sheet referring to OPERATION SHEET 1.2.
 - ✓ Assess the learner’s conceptual understanding by letting the learners answer the SAMPLE SELF CHECK 1.2. Based on the assessment, provide necessary intervention.
- **Non-Contact:**
 - ✓ Let learners perform OPERATION SHEET 1.2 and submit or upload the layout sheet through Google Classroom or any other social media platforms.
 - ✓ Assess the learner’s conceptual understanding by letting the learners answer the SAMPLE SELF CHECK 1.2 and let learners submit through google classroom or any other social media platforms.

E. Resources (Online and Offline)

- ✓ Competency-Based Learning Materials for Class IX
- ✓ Handout
- ✓ <https://youtu.be/FzMPAiW8O-s> (Explanation on the layout of drawing sheet).

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

Learning objectives	Core concepts(Chapters/Topic)
1.3.1 Define sign and symbol 1.3.2 Draw civil signs and symbols 1.3.3 Define abbreviation 1.3.4 List the abbreviation used in dimensioning 1.3.5 List the abbreviation used in drawing 1.3.6 List the abbreviation used for the units of length 1.3.7 <i>Interpreting engineering signs, symbols, and abbreviations.</i> <i>Note:</i> ✓ <i>Ensure clean and neatness of drawing</i> ✓ <i>Ensure Proper handling of drawing instruments</i>	1.3 Interpreting Engineering Sign, symbols and abbreviation

B. Competencies

- i. Interpret the signs and symbols as per the requirement..

C. Pedagogy/learning experience

- **Contact:** An instructor may carry out the instructional practice on interpreting Engineering Signs, symbols, and abbreviations through the following order.

- ✓ Make the learners read INFORMATION SHEET 1.3
- ✓ Make the learners go through OPERATION SHEET 1.3
- ✓ Let the learners solve the SAMPLE SELF CHECK 1.3.
- ✓ Share the weblink <https://youtu.be/MfNoq0y1LLY> with the learners.
- ✓ The learner watches the video from the weblink and gathers information on the engineering signs, symbols, and abbreviations.
- **Non-contact**
 - ✓ Make the learners read INFORMATION SHEET 1.3
 - ✓ Make the learners go through OPERATION SHEET 1.3
 - ✓ Let the learners solve the SAMPLE SELF CHECK 1.3.
 - ✓ Share the weblink <https://youtu.be/MfNoq0y1LLY> with the learners or other learning resources (articles, online content, etc.)
 - ✓ The learner watches the video or goes through the learning resource.
 - ✓ Based on the information obtained from the learning resources, the learner develops notes.

D. Assessment

- **Contact**
 - ✓ Make learners perform OPERATION SHEET 1.3
 - ✓ Make learners solve the SAMPLE SELF CHECK 1.3
 - ✓ Give additional questions from CBLM and other resources-Google/YouTube.
- **Non-contact**
 - ✓ Ask learners to solve the SAMPLE SELF CHECK 1.3 from CBLM and 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(online and offline)

- ✓ Competency-Based Learning Material for Class IX
- ✓ <https://youtu.be/MfNoq0y1LLY> (Explanation on the engineering signs and symbols)

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

Learning objectives	Core concepts(Chapters/Topic)
1.4.8 Define line. 1.4.9 State types of line and their applications. 1.4.10 Draw different types of lines <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure clean and neatness of drawing.</i> ✓ <i>Ensure Proper handling of drawing instruments.</i> 	1.4 Drawing different types of lines

B. Competencies :

- i. Draw different types of lines as per the applications.

C. Pedagogy/Learning experiences

- **Contact:**

- ✓ Read and explain the INFORMATION SHEET 1.4
- ✓ Explain and demonstrate the OPERATION SHEET 1.4
- ✓ Let them solve the SAMPLE SELF CHECK 1.4
- ✓ An instructor may ask learners to watch the following videos:
 - <https://youtu.be/SaOoKpLBfYo>
 - <https://youtu.be/E6OXZ9OHpVk>
- ✓ The learner notes the different types of line, their application, and their symbols.
- ✓ Using the information from the videos, the learner develops a drawing containing all the lines.
- **Non-contact:**
 - ✓ Let the learners read the INFORMATION SHEET 1.4
 - ✓ Let them go through OPERATION SHEET 1.4
 - ✓ Let them solve SAMPLE SELF CHECK 1.4
 - ✓ An instructor may ask learners to watch the following videos:
 - <https://youtu.be/SaOoKpLBfYo>
 - <https://youtu.be/E6OXZ9OHpVk>
 - ✓ The learners watch the video.
 - ✓ The learner takes note of the different types of lines and their application. Based on the information, the learner draws the symbols of different types of lines using a drawing instrument.

D. Assessment

- **Contact:**
 - ✓ Assess notes and drawing containing different types of lines using a rubric or a checklist. Provide necessary intervention based on the assessment
- **Non- Contact**
 - ✓ Assess the work uploaded in the Google Classroom to assess learner’s understanding of different types of lines. Provide necessary intervention following the assessment.

E. Resources (Online or offline)

- ✓ Competency-Based Learning Materials for Classes IX
- ✓ <https://youtu.be/SaOoKpLBfYo> (Explanation on the different types of lines)
- ✓ <https://youtu.be/E6OXZ9OHpVk> (Explanation on the application of lines withdrawing)

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

Learning objectives	Core concepts(Chapters/Topics)
1.5.11 Define lettering and numbering. 1.5.12 Classify letters style. 1.5.13 List the types of letters. 1.5.14 Define freehand lettering. 1.5.15 List the size of letters. 1.5.16 State the rules for lettering and numbering. 1.5.17 Draw letters and numbers	1.5 Drawing Letters and numbers

Note:

- ✓ Ensure clean and neatness of drawing.
- ✓ Ensure Proper handling of drawing instruments.

B. Competencies

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

C. Pedagogy/Learning experience

- **Contact:** An instructor may carry out the instructional practice on lettering and numbering through the following order.
 - ✓ Make the learners read INFORMATION SHEET 1.5
 - ✓ Make the learners go through OPERATION SHEET 1.5
 - ✓ Sharee weblink <http://ednotebook.hostgator.co.in/basics-of-engineering-drawing> with the learners.
 - ✓ The learner gathers the information from the web links.
- **Non-contact**
 - ✓ Let the learners read the INFORMATION SHEET 1.5
 - ✓ Let them go through OPERATION SHEET 1.5
 - ✓ Let them solve SAMPLE SELF CHECK 1.5
 - ✓ The following web link can be shared with the learners or other learning resources (articles, online content, etc.) <http://ednotebook.hostgator.co.in/basics-of-engineering-drawing>, <https://youtu.be/onJIaSAkiEs>
 - ✓ The learner watches the video or goes through the learning resource.
 - ✓ Based on the information obtained from the learning resources, the learner develops notes.

D. Assessment

- **Contact**
 - ✓ Make learners perform OPERATION SHEET 1.5
 - ✓ Make learners solve the SAMPLE SELF CHECK 1.5
 - ✓ Give additional questions from CBLM and other resources-Google/YouTube.
 - ✓ Assess learner's ability to transfer conceptual knowledge into developing a model using a checklist/rubric. Provide necessary intervention based on the assessment.
- **Non-contact**
 - ✓ Make learners perform OPERATION SHEET 1.5
 - ✓ Assess the learner's conceptual understanding of lettering and numbering by assessing the answers to questions of SAMPLE SELF CHECK 1.5 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
 - ✓ Provide 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(online and offline)

- ✓ Competency-Based Learning Material for Class IX
- ✓ <http://ednotebook.hostgator.co.in/basics-of-engineering-drawing> (Explanation on the techniques of lettering and numbering)

- ✓ <https://youtu.be/onJJaSAkiEs> (Describe the ways to write letters and numbers).

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

Learning objectives	Core concepts(Chapters/Topic)
1.61.18 Define dimension. 1.61.19 State the types of dimensioning. 1.61.20 Explain the system of dimensioning. 1.61.21 State the terminologies of dimensions. 1.61.22 Provide dimensions <i>Note:</i> <ul style="list-style-type: none"> ✓ <i>Ensure clean and neatness of drawing.</i> ✓ <i>Ensure Proper handling of drawing instruments.</i> 	1.6 Providing dimensions

B. Competencies

- Maintain dimensions as per the standard.

C. Pedagogy/learning experience

- **Contact:** An instructor may carry out the instructional practice on lettering and numbering through the following order.
 - ✓ Make the learners read INFORMATION SHEET 1.6
 - ✓ Make the learners go through OPERATION SHEET 1.6
 - ✓ Let the learners solve SAMPLE SELF CHECK 1.6
 - ✓ The weblink <https://youtu.be/XS0IJsmy-qg> can be shared with the learners.
 - ✓ The learner gather the information from the videos
- **Non-contact**
 - ✓ Make the learners read INFORMATION SHEET 1.6
 - ✓ Make the learners go through OPERATION SHEET 1.6
 - ✓ Let the learners solve SAMPLE SELF CHECK 1.6
 - ✓ Share the weblink <https://youtu.be/XS0IJsmy-qg> with the learners or other learning resources (articles, online content, etc.)
 - ✓ The learner watches the video, explores the information, and develops notes.

D. Assessment

- **Contact**
 - ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- **Non-contact**
 - ✓ Make learners perform OPERATION SHEET 1.6
 - ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 1.6 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
 - ✓ Provide 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(online and online)

- ✓ Competency-Based Learning Material for Class IX
- ✓ <https://youtu.be/XS0lJsmY-qg> (Explanation on the types of dimensioning and systems of dimensioning).

RESOURCES

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