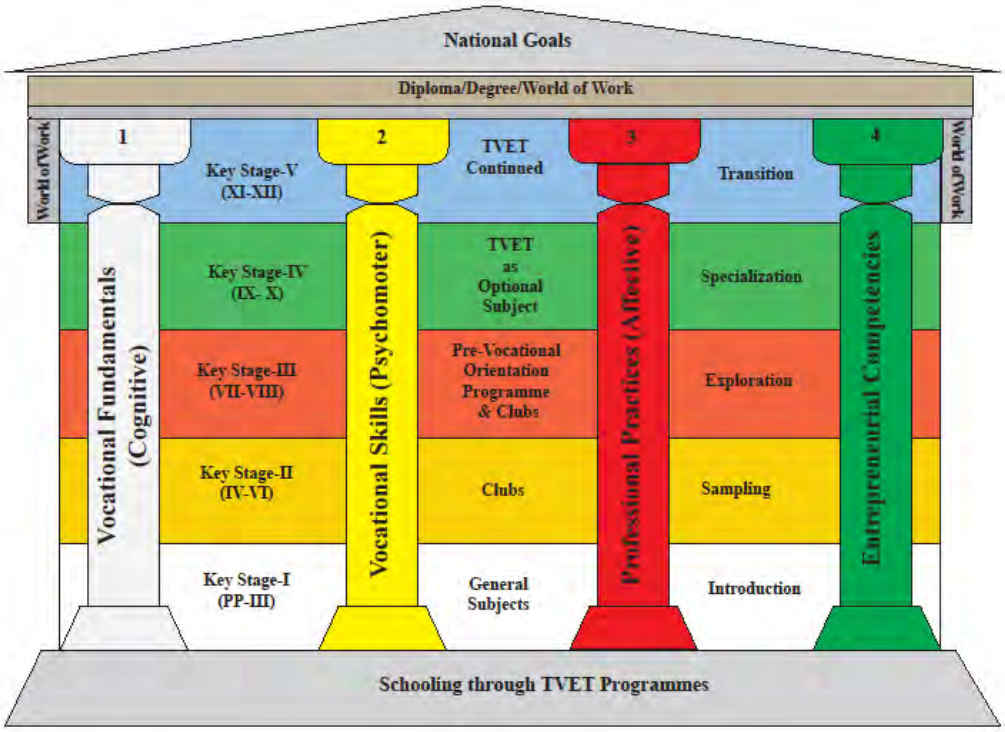
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET)

NEW NORMAL CURRICULUM

INSTRUCTIONAL GUIDE

(ELECTRICAL)

CLASS: IX



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FOREWORD

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

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

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

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

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

Kinga Dakpa,

Director General

INTRODUCTION

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

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

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

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

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

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Chapter 1: Practicing Occupational Health and Safety (OHS)

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1.1.1 Define 5S. 1.1.2 State the purposes of 5S 1.1.3 Explain the principles 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 the principles of 5S	**1.1 Applying principles of 5S**

B. Competencies:

- ✓ Apply the principles of 5S to organize and manage the workplace

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 1.1
  - ✓ Provide handouts to learners.
  - ✓ Provide the web link https://youtu.be/n9sxq34D9HQ can be shared with the learners which explains the principle of 5S.
  - ✓ Make learners perform OPERATION SHEET 1.1
  - ✓ Let the learners discuss in the group and do a presentation on 5S using PPT, handouts, demonstration, and short video clips to explain 5S.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 1.1 through Google Classroom.
  - ✓ Provide the web link https://youtu.be/n9sxq34D9HQ that 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 to perform OPERATION SHEET 1.1 through Google Classroom. (The learners may arrange available tools and materials at home)
  - ✓ Let the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 1.1 and perform OPERATION SHEET 1.1 and assess them using the 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 the learners do a presentation and assess as per the rubric developed.

- **Non-contact:**
  - ✓ 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 the checklist/performance guide.
  - ✓ Let the student solve SAMPLE SELF CHECK 1.1 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books /Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use rubric to assess their answer.

E. Resources (online and offline):

- ✓ Competency Based Learning Materials for Classes IX, REC
- ✓ Handouts
- ✓ 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 *Ensure to use appropriate PPE.* 1.2.5 *Ensure safe disposal of damaged PPE.* 1.2.6 *Ensure not to use defective and damaged PPE.* 1.2.7 Use PPE	**1.2 Using PPE**

B. Competencies:

- ✓ Use PPE to protect from workplace hazards

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 1.2
  - ✓ Provide handouts to learners.
  - ✓ Provide the web links https://youtu.be/r9vp1q1L2ro and https://www.youtube.com/watch?v=DMBrRNV9Hrk with learners that explain about PPE
  - ✓ Make learners perform OPERATION SHEET 1.2
  - ✓ Let the learners discuss in the group and do a presentation on PPE using PPT, handouts, demonstration, and short video clips to explain PPE.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 1.2 through Google Classroom.
  - ✓ Provide the web link https://youtu.be/r9vp1q1L2ro, https://www.youtube.com/watch?v=DMBrRNV9Hr that explain 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 the learners discuss in a group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- ✓ **Contact:**
- ✓ Make learners read INFORMATION SHEET 1.2 and perform OPERATION SHEET 1.2 and assess them using the 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 the learners do a presentation and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 1.2 and ask them to make notes and send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
  - ✓ Let the student 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-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use a rubric to assess their answer.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for class IX.
- ✓ https://www.youtube.com/watch?v=DMBrRNV9Hr and https://youtu.be/r9vp1q1L2ro (explanation on PPE)

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

Learning objectives	Core concepts (Chapters/Topics)
1.3.1 Define safety precaution. 1.3.2 List 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 *Ensure to follow OHS procedures.* 1.3.9 *Ensure to keep the workshop clean.* 1.3.10 *Ensure to ring the alarm bell before the accident spreads over.* 1.3.11 *Ensure to display safety signs and symbols.* 1.3.12 *Ensure to use appropriate PPE in the workplace.* 1.3.13 *Ensure to avoid horseplay at the workplace.* 1.3.14 *Ensure to avoid smoking and eating inside the workshop.* 1.3.15 *Ensure to avoid working under influence of alcohol.* 1.3.16 Maintain workplace safety and personal safety.	**1.3 Maintaining workplace safety and personal safety.**

B. Competencies:

- ✓ Maintain workplace and personal safety to reduce the risk in the workplace

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 1.3
  - ✓ Provide handouts to learners.
  - ✓ Provide the web links https://www.youtube.com/watch?v=4bkr5lpKGUM and https://www.youtube.com/watch?v=WW0U6o1XNec with the learners which explain the maintaining of the workplace and personal safety.
  - ✓ Make learners perform OPERATION SHEET 1.3
  - ✓ Let the learners discuss in the 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.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 1.3 through Google Classroom.
  - ✓ Provide the web links https://www.youtube.com/watch?v=4bkr5lpKGUM and https://www.youtube.com/watch?v=WW0U6o1XNec with learners that explain 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 the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 1.3 and perform OPERATION SHEET 1.3 and assess them using the 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 the learners do a presentation and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 1.3 and ask them to make notes and send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
  - ✓ Let the student solve SAMPLE SELF CHECK 1.3 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use a rubric to assess their answer.

E. Resources (online and offline:

- ✓ CBLM of Classes IX and X, REC
- ✓ https://www.youtube.com/watch?v=WW0U6o1XNec and https://www.youtube.com/watch?v=4bkr5lpKGUM (Video on workplace and personal safety)

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

Learning objectives	Core concepts (Chapters/Topics)
1.4.1 Explain tools and equipment safety. 1.4.2 State the importance of maintaining tools and equipment safety. 1.4.3 List do's and don'ts of tools and equipment. 1.4.4 *Ensure all the tools are in workable condition* 1.4.5 *Ensure to keep tools clean and dry, and store them properly after use.* 1.4.6 *Ensure to operate the machine when instructed.* 1.4.7 *Ensure to refer manual prior to operation of tools and equipment* 1.4.8 Maintain tools and equipment safety	**1.4 Maintaining tools and equipment safety**

B. Competencies:

- ✓ Maintain hand tools and equipment safety to increase the efficiency of tools and equipment

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 1.4
  - ✓ Provide handouts to learners.
  - ✓ Provide the web links https://www.bramptonguardian.com or http://www.ehsdb.com/dos-and-donts--hand-tools-equipments.php with the learners which explain about maintaining tools and equipment safety**.**
  - ✓ Make learners perform OPERATION SHEET 1.4
  - ✓ Let the learners discuss in the 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**.**

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 1.4 through Google Classroom.
  - ✓ Provide the web links https://www.bramptonguardian.com or http://www.ehsdb.com/dos-and-donts--hand-tools-equipments.php that explain 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 the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 1.4 and perform OPERATION SHEET 1.4 and assess them using the 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 the learners do a presentation on maintaining tools and equipment safety and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 1.4 and ask them to make notes and send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
  - ✓ Let the student solve SAMPLE SELF CHECK 1.4 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use a rubric to assess their answer.

E. Resources (online and offline):

- ✓ Competency Based Learning Materials for Classes IX, REC
- ✓ https://www.bramptonguardian.com or http://www.ehsdb.com/dos-and-donts--hand-tools-equipments.php (Video explains on maintaining tool and equipment safety)

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 the fire extinguisher. 1.5.3 Explain the types of fire. 1.5.4 List types of fire extinguishers. 1.5.5 State the method of combating/extinguishing fires. 1.5.6 *Ensure to read the instructions provided on the fire extinguisher.* 1.5.7 *Ensure appropriate use of PPE.* 1.5.8 Use fire extinguisher	**1.5 Using fire extinguisher**

B. Competencies:

- ✓ Use a fire extinguisher to combat the fire

C. Pedagogy/Learning Experiences

- **Contact**
  - ✓ Make learners read INFORMATION SHEET 1.5
  - ✓ Provide handouts to learners.
  - ✓ Provide the web link https://www.youtube.com/watch?v=PQV71INDaqY with the learners which explains the usage of fire extinguishers.
  - ✓ Make learners perform OPERATION SHEET 1.5
  - ✓ Let the learners discuss in the 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.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 1.5 through Google Classroom.
  - ✓ Provide the web link https://www.youtube.com/watch?v=PQV71INDaqY with learners that explains about usage of 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 the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 1.5 and perform OPERATION SHEET 1.5 and assess them using the 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 the learners do a presentation on using of fire extinguisher and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 1.5 and ask them to make notes and send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
  - ✓ Let the student solve SAMPLE SELF CHECK 1.5 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media. Use a rubric to assess their answer.

E. Resources (online and offline):

- ✓ CBLM for Classes IX, REC
- ✓ https://www.youtube.com/watch?v=PQV71INDaqY (Video on how to use fire extinguisher)

Chapter 2: Applying basic electrical theory

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

Learning objectives	Core concepts (chapters/topics)
2.1.1. Define conductor, insulator and semiconductor. 2.1.2. Explain the properties of conductor, insulator and semiconductor. 2.1.3. Differentiate amongst conductors, insulators and semiconductors. 2.1.4. Use a multimeter. 2.1.5. Test conductors, semiconductors and insulators. 2.1.5 *Ensure to select the proper range of multi-meter.* 2.1.6 *Ensure the power supply is disconnected while checking the continuity.* 2.1.7 *Ensure safe handling of multi-meter*	**2.1. Testing conductors, semiconductors and insulator**

B. Competencies:

- ✓ Test to check continuity of conductor, insulator and semiconductor

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 2.1
  - ✓ Provide handouts to learners.
  - ✓ Provide the web link https://www.youtube.com/watch?v=0NBTvJF6ghQ&t=72s with learners that explains the types and characteristics of conductor, semiconductor, insulator.
  - ✓ Make learners perform OPERATION SHEET 2.1
  - ✓ Let the learners discuss in the group and do a presentation on the conductor, semiconductor and insulator using PPT, handouts, demonstration, and short video clips to explain conductor, semiconductor, and insulator.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 2.1 through Google Classroom.
  - ✓ Provide the web link https://www.youtube.com/watch?v=0NBTvJF6ghQ&t=72s that explains the types and characteristics of conductor, semiconductor, and insulator.
  - ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
  - ✓ Instruct learners to perform OPERATION SHEET 2.1 through Google Classroom.
  - ✓ Let the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 2.1 and ask them to make notes and send as evidence through google classroom. Provide necessary feedback.
  - ✓ Assess learner's knowledge about conductor, semiconductor, and insulator by asking questions.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.1
  - ✓ Let the learners do the presentation on conductor, semiconductor, and insulator and assess as per the rubric developed.

- **Non-Contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 2.1 and perform OPERATION SHEET 2.1 and ask them to send the short video as evidence through Google Classroom or any other relevant social media platforms. assess them using the checklist/performance guide.
  - ✓ Let the student solve SAMPLE SELF CHECK 2.1 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use a rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=0NBTvJF6ghQ&t=72s (Explanation on conductor, insulator, and semiconductor)

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

Learning objectives	Core concepts (Chapters/Topics)
2.2.1 List the types of measuring instruments. 2.2.2 State the functions of measuring instruments. 2.2.3 List signs & symbols of measuring instruments. 2.2.4 Explain the errors in the measuring instruments. 2.2.5 Perform instrument reading 2.2.6 *Ensure to select correct range of meters.* 2.2.7 *Ensure safe handling of meters.* 2.2.8 *Ensure use of appropriate PPE*	**2.2: Performing instruments reading**

B. Competencies:

- ✓ Use instruments to note the readings in a circuit

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 2.2
  - ✓ Provide handouts to learners.
  - ✓ Provide the web link https://www.youtube.com/watch?v=gkeJzRrwe5k with the learners which explains the types of measuring instruments.
  - ✓ Make learners perform OPERATION SHEET 2.2
  - ✓ Let the learners discuss in the group and do a presentation on measuring instruments using PPT, handouts, demonstration, and short video clips to explain about measuring instruments.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 2.2 through Google Classroom.
  - ✓ Provide the web link https://www.youtube.com/watch?v=6zAL4Rd_xMc with learners that explains how to take ammeter reading and using the same concept ask learners to find voltmeter reading
  - ✓ Share the web links https://www.youtube.com/watch?v=gkeJzRrwe5k on different types of electrical instrument
  - ✓ Share the web links https://www.youtube.com/watch?v=TdUK6RPdIrA that explains how to use multi-meter
  - ✓ Share the web links https://www.youtube.com/watch?v=rPXD5n3bpWU that explains how to use power factor meter
  - ✓ Let the learners discuss in the group and submit their response through google classroom or any other relevant social media.
  - ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.

- ✓ Based on the information gathered. Let the learner list down the standard procedure to perform instrument reading.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 2.2 and perform OPERATION SHEET 2.2 and assess them using a checklist/performance guide. Provide necessary intervention.
  - ✓ Assess learner's knowledge about measuring instrument by asking questions.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.2
  - ✓ Let the learners do a presentation on measuring instruments and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 2.2 and make notes on measuring instruments and ask them to send them as evidence through Google Classroom or any other relevant social media platforms. Assess them using rubrics.
  - ✓ Let the student solve SAMPLE SELF CHECK 2.2 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.

D. Resources (online and offline):

- ✓ Textbook (CBLM for Class IX)
- ✓ Handout
- ✓ https://www.youtube.com/watch?v=rPXD5n3bpWU (Explanation on power factor meter)
- ✓ https://www.youtube.com/watch?v=TdUK6RPdIrA (Explanation on the use of multimeter)
- ✓ https://www.youtube.com/watch?v=gkeJzRrwe5k (Videos on different types of electrical measuring instruments)
- ✓ https://www.youtube.com/watch?v=6zAL4Rd_xMc (Video on use of Ammeter)

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

Learning objectives	Core concepts (Chapters/Topics)
2.3.1 List the types of magnets. 2.3.2 State the properties of the magnet. 2.3.3 State the properties of magnetic lines of force. 2.3.4 List the factors affecting the strength of the magnet. 2.3.5 Describe the basic concept of magnetism and electromagnetism. 2.3.6 State the application of Fleming's right-hand rule. 2.3.7 State the application of Fleming's left-hand rule. 2.3.8 Verify Faraday's Law of electromagnetic induction. 2.3.9 *Ensure to place the magnet properly on the paper.* 2.3.10 *Ensure the coils are circular.*	**2.3: Verifying Faraday's law of electromagnetic induction**

2.3.11 *Ensure safe handling of materials*	

B. Competencies:

- ✓ Verify Faraday's law of electromagnetic induction when working in electromagnetic circuits.

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ **Make** learners read INFORMATION SHEET 2.3
  - ✓ Provide handouts to learners.
  - ✓ Provide the web link https://www.youtube.com/watch?v=vwIdZjjd8fo can be shared with the learners which explains Faraday's law of electromagnetic induction.
  - ✓ Use ICT (PPT/PDF), handouts, demonstration, and short video clips to explain Faraday's law of electromagnetic induction.
  - ✓ Make learners perform OPERATION SHEET 2.3
  - ✓ Let the learners discuss in the group and do a presentation on Faraday's law of electromagnetic induction using PPT, handouts, demonstration, and short video clips to explain Faraday's law.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 2.3 through Google Classroom.
  - ✓ Provide the web link https://www.youtube.com/watch?v=vwIdZjjd8fo that explains Faraday's law of electromagnetic induction.
  - ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
  - ✓ Instruct learners to perform OPERATION SHEET 2.3 through Google Classroom. (The learners may arrange available tools and materials at home)
  - ✓ Let the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 2.3 and write short notes on Faraday's law of electromagnetic induction and assess learners using rubrics. Provide necessary intervention.
  - ✓ Assess learner's knowledge about Faraday's law of electromagnetic induction by asking questions.
  - ✓ Conduct class test to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.3
  - ✓ Let the learners do a presentation on Faraday's law of electromagnetic induction and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 2.3 and make them write notes and ask them to send as evidence through Google Classroom or any other relevant social media platforms. Assess them using rubrics.

- ✓ Let the student solve SAMPLE SELF CHECK 2.3 and submit answers through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text books/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 (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=SCmZVk3GsQg (Explanation on Faraday law of electromagnetic induction)
- ✓ https://www.youtube.com/watch?v=vwIdZjjd8fo (Videos on different types of magnets)

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

Learning objectives	Core concepts (Chapters/Topics)
2.4.1 Define resistance, voltage, current, power, frequency and energy. 2.4.2 State the unit of electrical quantities. 2.4.3 Measure resistance, voltage, current, power, frequency and energy. 2.4.4 *Ensure correct position of the meter.* 2.4.5 *Ensure to select the proper range of the meter.* 2.4.6 *Ensure safe handling of the meter.* 2.4.7 *Ensure to connect the ammeter in series with the load.* 2.4.8 *Avoid loose connections.*	**2.4: Measuring resistance, voltage, current, power, frequency and energy**

B. Competencies:

- ✓ Measure resistance, voltage, current, power, frequency, and energy when the load is connected to the supply.

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 2.4
  - ✓ Provide handouts to learners.
  - ✓ Use ICT (PPT/PDF), handouts, demonstration and short video clips to explain how to measure resistance, voltage, current, power, frequency and energy.
  - ✓ Make learners perform OPERATION SHEET 2.4
  - ✓ Let the learners discuss in the group and do a presentation on Measuring resistance, voltage, current, power, frequency and energy using PPT, handouts, demonstration and short video clips to explain how to measure resistance, voltage, current, power, frequency and energy.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 2.4 through Google Classroom.

- ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.
- ✓ Use ICT (PPT/PDF), handouts, demonstration and short video clips to explain how to measure resistance, voltage, current, power, frequency and energy.
- ✓ Instruct learners to read OPERATION SHEET 2.4 through Google Classroom.
- ✓ Let the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 2.4 and perform OPERATION SHEET 2.4 and assess them using the checklist/performance guide. Provide necessary intervention.
  - ✓ Assess learner's knowledge about current, voltage, power, and frequency by asking questions.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.4
  - ✓ Let the learners do a presentation on current, voltage, power, and frequency and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 2.4 and ask them to make notes and send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
  - ✓ Let the student solve SAMPLE SELF CHECK 2.4 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/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 (online and offline):

- ✓ Textbook (CBLM of class IX)
- ✓ Handouts

Chapter 3: Verifying Dc circuits

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

Learning objectives	Core concepts (Chapters/Topics)
3.1.1 Define resistor. 3.1.2 List the types of resistors. 3.1.3 Explain the systems of colour coding band of the resistor. 3.1.4 Explain the properties of the resistor. 3.1.5 Determine the value of the resistor using colour code chart. 3.1.6 *Ensure to refer correct band of resistor colour code.*	**3.1: Determining the value of resistor using colour coding chart**

3.1.7 *Ensure to disconnect the resistor from the circuit, if it is installed on the board*	

B. Competencies:

- ✓ Determine the value of any resistor while replacing the resistor in the electronic component

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 3.1
  - ✓ Provide handouts to learners.
  - ✓ Provide the web link https://www.youtube.com/watch?v=AOi6vUOtHHM with the learners which explains the types of resistors.
  - ✓ Provide the web link https://resistorcolorcodecalc.com/#:~:text=Calculating,resistance%20value%20of%20the%20resistor with the learners to show how to calculate the value of resistance.
  - ✓ Make learners perform OPERATION SHEET 3.1
  - ✓ Let the learners discuss in the group and do a presentation on color-coding using PPT, handouts, demonstration, and short video clips to explain how to calculate the value of resistors.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 3.1 through Google Classroom.
  - ✓ Provide the web link https://www.youtube.com/watch?v=AOi6vUOtHHM to share with the learners which explains the types of resistors.
  - ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
  - ✓ Provide the web link https://resistorcolorcodecalc.com/#:~:text=Calculating,resistance%20value%20of%20the%20resistor with learners to calculate the value of resistance.
  - ✓ Share the web link https://www.mnemonic-device.com/physics/electronics/resistor-color-code/ with the learners to remember the color-coding of resistors.
  - ✓ Instruct learners to perform OPERATION SHEET 3.1 through Google Classroom.
  - ✓ Let the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 3.1 and perform OPERATION SHEET 3.1 and assess them using the checklist/performance guide. Provide necessary intervention.
  - ✓ Assess learner's knowledge about color-coding by asking questions.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 3.1

- ✓ Let the learners do the presentation on how to determine the value of resistors and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 3.1 and ask them to make notes and send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
  - ✓ Let the student solve SAMPLE SELF CHECK 3.1 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/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 (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=AOi6vUOtHHM (Explanation on different types of the resistor)
- ✓ https://www.mnemonic-device.com/physics/electronics/resistor-color-code/ (Explanation on color coding)
- ✓ https://resistorcolorcodecalc.com/#:~:text=Calculating,resistance%20value%20of%20the%20resistor (Explanation on how to calculate the value of resistance)

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

Learning objectives	Core concepts (Chapters/Topics)
3.2.1 State Ohm's law. 3.2.2 Explain the relation between voltage, current and resistance. 3.2.3 State the application and limitations of Ohm's law. 3.2.4 Verify Ohm's law. 3.2.5 *Ensure secure connection.* 3.2.6 *Ensure to connect the ammeter in series and voltmeter in parallel.* 3.2.7 *Ensure safe handling of meters.* 3.2.8 *Ensure to verify the circuit connection*	**3.2: Verifying Ohm's law**

B. Competencies:

- ✓ Verify Ohm's law to find a relation among current, voltage and resistance

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 3.2
  - ✓ Provide handouts to learners.

- ✓ Provide the web link https://www.youtube.com/watch?v=wBjT7KZqVuM with the learners which explains the principle of Ohm's law.
- ✓ Make learners perform OPERATION SHEET 3.2
- ✓ Let the learners discuss in the group and do a presentation on Ohm's law using PPT, handouts, demonstration, and short video clips.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 3.2 through Google Classroom.
  - ✓ Provide the web link https://www.youtube.com/watch?v=wBjT7KZqVuM that explains the principle of Ohm's law.
  - ✓ Provide the web link https://www.youtube.com/watch?v=5FSnkZo1vEY with the learners which shows the relationship among resistance, current, and voltage. Ohm's law.
  - ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 3.2 and perform OPERATION SHEET 3.2 and assess them using the checklist/performance guide. Provide necessary intervention.
  - ✓ Assess learner's knowledge about Ohm's law by asking questions.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 3.2
  - ✓ Let the learners do a presentation on Ohm's law and assess as per the rubric developed.
- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 3.2 and ask them to make notes and send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
  - ✓ Let the student solve SAMPLE SELF CHECK 3.2 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answers.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=5FSnkZo1vEY (Explanation of relationship among I, V, R)
- ✓ https://www.youtube.com/watch?v=wBjT7KZqVuM (Explain the Ohm's law.)

Learning objectives	Core concepts (Chapters/Topics)
3.3.1 Define series circuit. 3.3.2 Explain the characteristics of the series circuit. 3.3.3 Calculate the value of resistance and voltage in the series circuit. 3.3.4 Verify characteristics of the series circuit. 3.3.5 *Ensure correct position of the meter.* 3.3.6 *Ensure to select the proper range of the meter.* 3.3.7 *Ensure safe handling of meters.* 3.3.8 *Ensure to verify the circuit connection*	**3.3 Verifying characteristics of series of circuit**

B. Competencies:

- ✓ Verify characteristics of series of the circuit to determine that the total source voltage of the circuit is equal to the sum of individual voltage.

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 3.3
  - ✓ Provide handouts to learners.
  - ✓ Share the web link https://www.youtube.com/watch?v=ZQurBlu35Fo with the learners which explains the connection of the series circuit.
  - ✓ Share the web link https://www.sanfoundry.com/basic-electrical-engineering-questions-answers-series-circuits-parallel-networks/ can be shared with the learners which explain how to calculate the value of the series circuit.
  - ✓ Make learners perform OPERATION SHEET 3.3
  - ✓ Let the learners discuss in the group the series circuit and do a presentation on a series connection using PPT, handouts, demonstration, and short video clips.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 3.3 through Google Classroom.
  - ✓ Share the web link https://www.youtube.com/watch?v=ZQurBlu35Fo can be shared with the learners which explain the connection of the series circuit
  - ✓ Share the web link https://www.sanfoundry.com/basic-electrical-engineering-questions-answers-series-circuits-parallel-networks/ with the learners which explains how to calculate the value of the series circuit.
  - ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
  - ✓ Instruct learners to read OPERATION SHEET 3.3 through Google Classroom.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 3.3 and perform OPERATION SHEET 3.3 and assess them using the checklist/performance guide. Provide necessary intervention.
  - ✓ Assess learner's knowledge about series circuits by asking questions.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 3.3
  - ✓ Let the learners do the presentation on the series circuit and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 3.3 and ask them to make notes and send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
  - ✓ Let the student solve SAMPLE SELF CHECK 3.3 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.
  - ✓ Make learners read INFORMATION SHEET 2.3 and make them write notes and ask them to send as evidence through Google Classroom or any other relevant social media platforms. assess them using rubrics

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ https://www.sanfoundry.com/basic-electrical-engineering-questions-answers-series-circuits-parallel-networks/ (Sample question on the series circuit)
- ✓ https://www.youtube.com/watch?v=ZQurBlu35Fo(Explanation on series)

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

Learning objectives	Core concepts (Chapters/Topics)
3.4.1 Define parallel circuit. 3.4.2 Explain the characteristics of the parallel circuit. 3.4.3 Calculate the value of resistance and current in the parallel circuit. 3.4.4 Verify characteristics of the parallel circuit. 3.4.5 *Ensure the correct position of meters.* 3.4.6 *Ensure to select the proper range of meters.* 3.4.7 *Ensure safe handling of meters.* 3.4.8 *Ensure to verify the circuit connection.*	**3.4: Verifying characteristics of parallel circuit**

B. Competencies:

- ✓ Verify characteristics of the parallel circuit to determine that the total circuit current is equal to the sum of individual current.

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 3.4
  - ✓ Provide handouts to learners.
  - ✓ Provide the web link https://www.youtube.com/watch?v=jNFXtjt5muI with the learners which explains the about the parallel circuit.
  - ✓ Provide the web link https://www.sanfoundry.com/basic-electrical-engineering-questions-answers-series-circuits-parallel-networks/ with the learners which explains the calculation on the parallel circuit.
  - ✓ Make learners perform OPERATION SHEET 3.4
  - ✓ Let the learners discuss in the group and do a presentation on the parallel circuit using PPT, handouts, demonstration, and short video clips.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 3.4 through Google Classroom.
  - ✓ Provide the web link https://www.youtube.com/watch?v=jNFXtjt5muI with the learners which explains the about the parallel circuit.
  - ✓ Provide the web link https://www.sanfoundry.com/basic-electrical-engineering-questions-answers-series-circuits-parallel-networks/ with the learners which explains how to calculate resistance in the parallel circuit.
  - ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
  - ✓ Instruct learners to perform OPERATION SHEET 3.4 through Google Classroom.
  - ✓ Let the learners discuss in the group the parallel circuit and submit their response through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 3.4 and perform OPERATION SHEET 3.4 and assess them using the checklist/performance guide. Provide necessary intervention.
  - ✓ Assess learner's knowledge about parallel circuits by asking questions.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 3.4
  - ✓ Let the learners do the presentation on the parallel circuit and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 3.4 and ask them to make notes and send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
  - ✓ Let the student solve SAMPLE SELF CHECK 3.4 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/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 (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=jNFXtjt5muI (Video on characteristics of the parallel circuit)
- ✓ https://www.sanfoundry.com/basic-electrical-engineering-questions-answers-series-circuits-parallel-networks/ (Sample question on the parallel circuit)

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

Learning objectives	Core concepts (Chapters/Topics)
3.5.1 State the application of a series parallel circuit. 3.5.2 Differentiate between series and parallel circuits. 3.5.3 Verify characteristics of the series-parallel circuit. 3.5.4 *Ensure the correct position of meters.* 3.5.5 *Ensure to select the proper range of meters.* 3.5.6 *Ensure to maintain correct polarity*	**3.5: Verifying characteristics of the series-parallel circuit.**

B. Competencies:

- ✓ Verify characteristics of the series-parallel circuit to determine the total circuit current and voltage drop in the circuit.

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 3.5
  - ✓ Provide handouts to learners.
  - ✓ Provide the web link https://www.youtube.com/watch?v=sbocWMTmPK8 with the learners which explains the difference between series and parallel circuit.
  - ✓ Make learners perform OPERATION SHEET 3.5
  - ✓ Let the learners discuss in the group and do a presentation on the series-parallel circuit using PPT, handouts, demonstration, and short video clips.

- **Non-contact**
  - ✓ Instruct learners to read INFORMATION SHEET 3.5 through Google Classroom.
  - ✓ Provide the web link https://www.youtube.com/watch?v=sbocWMTmPK8 that explains the difference between series and parallel circuits.
  - ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
  - ✓ Let the learners discuss in the group about series- parallel circuit and submit their response through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 3.5 and perform OPERATION SHEET 3.5 and assess them using the checklist/performance guide. Provide necessary intervention.
  - ✓ Assess learner's knowledge about series-parallel circuits by asking questions.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 3.5
  - ✓ Let the learners do the presentation on a series-parallel circuit and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 3.5 and ask them to make notes and send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
  - ✓ Let the student solve SAMPLE SELF CHECK 3.5 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/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 (online and offline):

- ✓ Textbook
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=sbocWMTmPK8 (Differences between series and parallel circuit)

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

Learning objectives	Core concepts (Chapters/Topics)
3.6.1 State Kirchhoff's current and voltage law. 3.6.2 State the application of Kirchhoff's law. 3.6.3 Explain sign-convention in applying Kirchhoff's law 3.6.4 Verify Kirchhoff's law. 3.6.5 *Ensure to select the correct polarity of meters.* 3.6.6 *Ensure the correct position of meters.* 3.6.7 *Ensure to connect the ammeter in series with the load.* 3.6.8 *Ensure to connect the voltmeter in parallel with the load.* 3.6.9 *Ensure safe handling of instruments.* 3.6.10 *Ensure to verify the circuit connection.* 3.6.11 *Ensure that the rise in potential should be considered positive.* 3.6.12 *Ensure that the fall in potential should be considered negative*	**3.6: Verifying Kirchhoff's law**

B. Competencies:

- ✓ Use Kirchhoff's law to analyze and solve complex node

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 3.6
  - ✓ Provide handouts to learners.
  - ✓ Provide the web link https://en.ppt-online.org/245316can be shared with the learners which explains the principle of Kirchhoff's law.
  - ✓ Provide the web link https://www.youtube.com/watch?v=3jZ6xCAMJj8 can be shared with the learners which explain the sign convention of Kirchhoff's law.
  - ✓ Make learners perform OPERATION SHEET 3.6
  - ✓ Let the learners discuss in the group and do a presentation on Kirchhoff's law using PPT, handouts, demonstration, and short video clips.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 3.6 through Google Classroom.
  - ✓ Provide the web link https://en.ppt-online.org/245316 that explains the principle of Kirchhoff's law.
  - ✓ Provide the web link https://www.youtube.com/watch?v=3jZ6xCAMJj8 that explains the sign convention of Kirchhoff's law
  - ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
  - ✓ Let the learners discuss in the group Kirchhoff's law and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 3.6 and perform OPERATION SHEET 3.6 and assess them using the checklist/performance guide. Provide necessary intervention.
  - ✓ Assess learner's knowledge about Kirchhoff's law by asking questions.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 3.6
  - ✓ Let the learners do the presentation on Kirchhoff's law and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 3.6 and ask them to make notes and send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
  - ✓ Let the student solve SAMPLE SELF CHECK 3.6 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/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 (online and offline):

- ✓ Textbook (CBLM)
- ✓ https://en.ppt-online.org/245316 (Explanation on Kirchhoff's law)
- ✓ https://www.youtube.com/watch?v=3jZ6xCAMJj8 (Explanation of sign convention)

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

Learning objectives	Core concepts (Chapters/Topics)
3.7.1 Define cell. 3.7.2 State the types of cells. 3.7.3 Differentiate between primary and secondary cells. 3.7.4 Explain cells connected in series and parallel. 3.7.5 Verify characteristics of cells connected in series and parallel. 3.7.6 Ensure the correct position of the meter. 3.7.7 Ensure to select the proper range of the meter. 3.7.8 Ensure to maintain the polarity of the battery	**3.7 Verifying characteristics of cells connected in series and parallel.**

B. Competencies:

- ✓ Verify characteristics of cells connected in series and parallel to determine characteristics of cell

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 3.7
  - ✓ Provide handouts to learners.
  - ✓ Provide the web link https://www.youtube.com/watch?v=i44tR7C-ae8 with the learners which demonstrates the cell connected in series and parallel.
  - ✓ Make learners perform OPERATION SHEET 3.7
  - ✓ Let the learners discuss in the group and do a presentation on cells connected in series and parallel using PPT, handouts, demonstration, and short video clips.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 3.7 through Google Classroom.
  - ✓ Provide the web link https://www.youtube.com/watch?v=i44tR7C-ae8 that demonstrates the cell connected in series and parallel.
  - ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
  - ✓ Instruct learners to perform OPERATION SHEET 3.7 through Google Classroom. (The learners may arrange available tools and materials at home)
  - ✓ Let the learners discuss in the group about cells connected in series and parallel and submit their response through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 3.7 and perform OPERATION SHEET 3.7 and assess them using the checklist/performance guide. Provide necessary intervention.
  - ✓ Assess learner's knowledge about cells connected in series and parallel by asking questions.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 3.7
  - ✓ Let the learners do the presentation on cells connected in series and parallel and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 3.7 and ask them to make notes and send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
  - ✓ Let the student solve SAMPLE SELF CHECK 3.7 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/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 (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=i44tR7C-ae8 (Demonstration of cell in series and parallel)

Chapter 4: Verifying AC circuits

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

Learning objectives	Core concepts (Chapters/Topics)
1.1.1 Explain the generation of electricity. 1.1.2 Explain characteristics of AC and DC. 1.1.3 List the advantages of AC over DC. 1.1.4 State the application of Cathode Ray Oscilloscope (CRO). 1.1.5 Explain the operation of CRO. 1.1.6 Use CRO. 1.1.7 Verify characteristics of AC and DC. 1.1.8 *Ensure secure connections.* 1.1.9 *Ensure to select AC or DC mode while verifying the characteristics of AC and DC.* 1.1.10 *Ensure safe handling of CRO*	**4.1 Verifying characteristics of AC and DC**

B. Competencies:

- ✓ Determine characteristics of AC and DC in CRO

C. Pedagogy/Learning Experiences

- **Contact**:
  - ✓ Make learners read INFORMATION SHEET 4.1
  - ✓ Provide handouts to learners.
  - ✓ Provide the web link https://www.youtube.com/watch?v=q8HmRLCgDAI with the learners which explains the principle of generation of electricity.
  - ✓ Make learners perform OPERATION SHEET 4.1
  - ✓ Let the learners discuss in the group and do a presentation on verifying AC and DC circuits using PPT, handouts, demonstration, and short video clips.

- **Non-contact:**
  - ✓ Instruct learners to read INFORMATION SHEET 4.1 through Google Classroom.
  - ✓ Provide the web link https://www.youtube.com/watch?v=q8HmRLCgDAI that explains the principle of generation of electricity.
  - ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
  - ✓ Let the learners discuss in the group the generation of electricity and submit their response through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
  - ✓ Make learners read INFORMATION SHEET 4.1 and perform OPERATION SHEET 4.1 and assess them using the checklist/performance guide. Provide necessary intervention.
  - ✓ Assess learner's knowledge about AC, DC, and CRO by asking questions.
  - ✓ Conduct class tests to assess their understanding.
  - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.1
  - ✓ Let the learners do a presentation on verifying AC and DC circuits using CRO and assess as per the rubric developed.

- **Non-contact:**
  - ✓ Make learners read INFORMATION SHEET 4.1 and ask them to send the PPT on the generation of electricity as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
  - ✓ Let the learners solve SAMPLE SELF CHECK 4.1 and submit answers through google classroom or any other relevant social media.
  - ✓ Give additional relevant questions from other resources-Text books/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 (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=q8HmRLCgDA (Explanation on the generation of electricity)

Resources

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