Principles of Engineering and Technology Scope and Sequence (Block): units designed for in class or remote learning		
Quarter 1 (five weeks) In class due to CAD available only on classroom computers		
Unit 1: Standards 9	Unit 2: Standard 10	Unit 3: Standard 11
Fundamental sketching and drawing 1 week	Isometric Drawing 1 week	CAD Software 3 weeks

Overarching Questions:

Questions to explore

Can students define and describe the differences between freehand sketching, manual drafting, and CAD?
Can students create an orthographic drawing with labels, notes, and dimensioning?
Can students create simple isometric drawings with lines, labels, and dimensioning?
Are students able to use CAD software to accurately create simple two and three dimensional drawings?

Framework for 21st Century Learning	TN STANDARDS FOR: Principles of Engineering and Technology
Primary Cluster: STEM **Grade Level:** 9th grade **Program of Study Concentrator:** This course satisfies one out of two required courses that must be taken from a single program of study to meet the Perkins V concentrator definition requirements. **Available Industry Certification:** ● none **Teacher Resource:** https://www.tn.gov/education/career-and-technical-education/career-clusters/cte-cluster-stem.html (Scroll to the area that says Resources and select your Program of Study)	Learning Progression – what activities, milestones, or units must be covered in this quarter in order for students to build their knowledge base? Unit 1: ● Students will define and describe the differences between freehand sketching, manual drafting, and CAD ● Students will create orthographic drawings with labels, notes, and dimensions. Unit 2: ● Students will create isometric drawings with lines, labels, and dimensions. Unit 3: ● Students will create simple two and three dimensional drawings using labels, annotations, dimensions, and line types correctly.

Principles of Engineering and Technology Scope and Sequence (Block): units designed for in class or remote learning				
Quarter 1	**Quarter 2 (4 weeks) can be remote**			
Standards 9-11	Unit 4 Standards 1 & 2	Unit 5: Standard 3	Unit 6 : Standards 4&5	Unit 7: Standard 6
Fundamental sketching, isometric drawing and CAD 5 weeks	Safety in the classroom 1 week	Introduction to Engineering STEM and influences on Engineering 1 week	Introduction to Engineering Engineering History 1 week	Engineering Design Process 1 week

Overarching Questions:

Questions to explore

- Can students interpret safety rules by the NSTA pertaining to OSHA guidelines & electrical safety?
- Can students explain why certain rules apply?
- Can students identify and explain the use of safety equipment in the classroom?
- Can students define each term in STEM and develop a written argument why science, mathematics, and technology are different than engineering and how each influences engineering?
- Are students able to work in teams to produce a timeline of important engineering events in history?
- CanStudents will explain what is involved at each step of the engineering design process.

Framework for 21st Century Learning	TN STANDARDS FOR: Principles of Engineering and Technology
Primary Cluster: STEM **Program of Study Concentrator:** This course satisfies one out of two required courses that must be taken from a single program of study to meet the Perkins V concentrator definition requirements. **Available Industry Certification:** ● **Teacher Resource:** https://www.tn.gov/education/career-and-technical-education/career-clusters/cte-cluster-stem.html	Learning Progression – what activities, milestones, or units must be covered in this quarter in order for students to build their knowledge base? Unit 4: ● Can students interpret safety rules by the NSTA pertaining to OSHA guidelines & electrical safety? ● Can students explain why certain rules apply? ● Can students identify and explain the use of safety equipment in the classroom? Unit 5: ● Can students define each term in STEM and develop a written argument why science, mathematics, and technology are different than engineering and how each influences engineering? Unit 6: ● Are students able to work in teams to produce a timeline of important engineering events in history? Unit 7: ● Students will explain what is involved at each step of the engineering design process.

Principles of Engineering and Technology Scope and Sequence (block) units designed for in class or remote learning				
Quarter 1	Quarter 2		**Quarter 3 (4 weeks) can be remote**	
Standards 9-11	standards ! & 2	standards3-6	Unit 8: Standard 7	Unit 9: Standard 8
Fundamental sketching, isometric drawing and CAD 5 weeks	Safety 1 week	introduction to Engineering, Engineering Design Process 3 weeks	Engineering Design Process: Evaluate engineering design and create report 2 weeks	Engineering Design Process: Create Simple Designs 2 weeks

Overarching Questions:
Questions to explore ● Are students able to work in teams to evaluate an existing design and produce a report documenting constraints faced by the design team ● Can students complete a simple design and apply the engineering design process to produce a model?

Framework for 21st Century Learning	TN STANDARDS FOR: Principles of Engineering and Technology
Primary Cluster: STEM **Grade Level:** **Program of Study Concentrator:** This course satisfies one out of two required courses that must be taken from a single program of study to meet the Perkins V concentrator definition requirements.	Learning Progression – what activities, milestones, or units must be covered in this quarter in order for students to build their knowledge base? Unit 8: ● Students will evaluate an existing engineering design using the engineering design process ● Working in teams, students will create and deliver a presentation presenting the constraints of the design team, criteria for measuring the design, and work through each step of the design process that was used. Unit 9: ● Students will complete a simple design activity applying the engineering design process to produce a model that meets all criteria. ● Students will present the model to the class and critique the designs of others.

Principles of Engineering and Technology Scope and Sequence (Block) Units Designed for in Class but can be adapted to Remote						
Quarter 1	Quarter 2		Quarter 3		**Quarter 4**	
Standards 9-11	standards ! & 2	standards 3-6	Unit 10: Standard 7	Unit 11: Standard 8	Unit 12: Standard 12	Unit 13: Standard 13
Fundamental sketching, isometric drawing and CAD 5 weeks	Safety 1 week	introduction to Engineering, Engineering Design Process 3 weeks	Engineering Design Process: Evaluate engineering design and create report 2 weeks	Engineering Design Process: Create Simple Designs 2 weeks	Measurement 1 week	Class Project 4 weeks
Overarching Topics:						
Questions to explore ● Can students use measurement tools used in engineering? ● Can students think through the design process for an existing large-scale engineering design? ● Can students identify a real world problem and follow the engineering design process to solve the problem?						
Framework for 21st Century Learning	TN STANDARDS FOR: Principles of Engineering and Technology					
Primary Cluster: STEM **Grade Level:** **Program of Study Concentrator:** This course satisfies one out of two required courses that must be taken from a single program of study to meet the Perkins V concentrator definition requirements.	Learning Progression – what activities, milestones, or units must be covered in this quarter in order for students to build their knowledge base? Unit 10: ● In teams, students will evaluate an existing large-scale engineering design and produce a report on the chosen design, assuming the role of the engineering design team that produced the design. Unit 11: ● Students will complete a simple design activity and apply the engineering design process to produce a model that an engineer would trust.					

Available Industry Certification:	Unit 12: ● Students will use physical measurement devices typically employed in engineering to collect and build a dataset. Unit 13: ● Students will identify a problem in the school or community ● Students will follow the design process to solve the problem ● Students will collaborate to develop a technical report ● students will present the class project to members of the school administration and community leaders.	