

Connecticut CTE

# Technology Education

## Technology Education

### A Automotive Technology TE.AT

- 1 Customer Relations and Shop Procedures: Explain the basic processes and procedures for maintaining a clean, safe, and customer-friendly shop. TE.AT.A
  - a Interpret repair and work orders, including differentiating between parts and labor costs. TE.AT.A.1
  - b Differentiate between flat rate labor and hourly labor. TE.AT.A.2
  - c Explain what is included in an automobile maintenance schedule. TE.AT.A.3
- 2 Shop Safety Procedures: Identify and describe basic shop safety practices, including personal, shop, and hazardous materials. TE.AT.B
  - a Demonstrate knowledge of proper use, storage, and disposal of hazardous materials for an automotive facility according to OSHA regulations. TE.AT.B.4
  - b Demonstrate and explain knowledge of personal safety practices such as eyewear, clothing, footwear, and personal protective equipment (PPE). TE.AT.B.5
  - c Demonstrate and explain knowledge of shop safety procedures when performing tasks, such as raising a vehicle with a floor jack. TE.AT.B.6
  - d Identify basic hand tools and their usage in the automotive industry. TE.AT.B.7
- 3 Engine Repair: Describe the various processes used to perform engine repair. TE.AT.C
  - a Describe basic valve train operation and configuration, such as DOHC, SOHC, OHV, and flathead. TE.AT.C.8
  - b Describe basic engine cylinder configurations such as V, inline, and horizontally opposed. TE.AT.C.9
  - c Identify and describe the function of the basic engine components. TE.AT.C.10
  - d Differentiate between the 4-stroke and 2-stroke operating cycles. TE.AT.C.11
  - e Differentiate between spark ignition and compression ignition engines. TE.AT.C.12
  - f Describe the purpose, operation, and basic components of lubrication systems. TE.AT.C.13
  - g Describe the purpose, operation, and basic components of engine cooling systems. TE.AT.C.14
  - h Describe the purpose, operation, and basic components of exhaust and exhaust emissions systems. TE.AT.C.15
- 4 Electrical/Electronic Systems: Identify and describe the various components of electrical/electronic systems. TE.AT.D
  - a Explain the process for performing battery diagnosis and service. TE.AT.D.16
  - b Describe the purpose, operation, and components of basic starting systems. TE.AT.D.17

- c** Describe the purpose, operation, and components of basic charging systems. [TE.AT.D.18](#)
  - d** Describe the purpose, operation, and components of basic lighting systems. [TE.AT.D.19](#)
  - e** Differentiate between series and parallel circuits. [TE.AT.D.20](#)
  - f** Define volts, amperes, and resistance. [TE.AT.D.21](#)
  - g** Perform simple calculations for volts, amperes, and resistance using Ohm's Law. [TE.AT.D.22](#)
- 5** Engine Performance: Describe the components and functions of the various systems related to engine performance. [TE.AT.E](#)
  - a** Describe the purpose, operation, and basic components of the ignition system. [TE.AT.E.23](#)
  - b** Describe the purpose, operation, and basic components of fuel and air induction systems. [TE.AT.E.24](#)
  - c** Identify the differences between carburetion and fuel injection. [TE.AT.E.25](#)
  - d** Describe the purpose, operation, and basic components of evaporative emission control systems. [TE.AT.E.26](#)
  - e** Explain the use of a computer scanner to read Diagnostic Trouble Codes (DTC). [TE.AT.E.27](#)
- 6** Suspension and Steering: Identify and describe the function of the components of suspension and steering systems. [TE.AT.F](#)
  - a** Describe the purpose, operation, and basic components of the steering system. [TE.AT.F.28](#)
  - b** Describe the purpose, operation, and basic components of the suspension system. [TE.AT.F.29](#)
  - c** Explain caster, camber, and toe-in wheel alignment angles. [TE.AT.F.30](#)
  - d** Identify factors that cause abnormal tire wear. [TE.AT.F.31](#)
- 7** Brakes: Identify and describe the major components of various types of braking systems. [TE.AT.G](#)
  - a** Explain hydraulic systems as they pertain to the service braking systems. [TE.AT.G.32](#)
  - b** Describe the purpose, operation, and basic components of drum brakes. [TE.AT.G.33](#)
  - c** Describe the purpose, operation, and basic components of disc brakes. [TE.AT.G.34](#)
  - d** Describe the purpose, operation, and basic components of parking brake systems. [TE.AT.G.35](#)
  - e** Describe the purpose, operation, and basic components of anti-lock braking systems (ABS) and traction control systems (TCS). [TE.AT.G.36](#)

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## **B Computer Aided Drafting and Design** TE.CADD

- 1 Materials and Processes: Identify and describe the basic elements used in computer aided drafting and design. TE.CADD.A
  - a Describe objects as geometric entities. TE.CADD.A.1
  - b Describe and demonstrate the process of using a mechanical or electronic caliper accurately as required by the design intent. TE.CADD.A.2
  - c Describe and demonstrate the use of graphic communication skills through sketching. TE.CADD.A.3
  - d Send and access information through a network. TE.CADD.A.4
  - e Express a design of an object as a 3D model. TE.CADD.A.5
  - f Export and import images/files in a variety of file formats. TE.CADD.A.6
  - g Evaluate the choice and placement of dimensions, notes, and annotations to clearly communicate design intent. TE.CADD.A.7
  - h Revise a design and update finished drawings appropriately. TE.CADD.A.8
  - i Identify the following basic geometric elements: line, circle, rectangle, sphere, and cube. TE.CADD.A.9
  - j Describe and apply the following basic geometric concepts to building 3D models: tangent and parallel concentric. TE.CADD.A.10
- 2 Identifying Hardware and Operating Systems: Identify and describe the basic hardware and operating systems used in computer aided drafting and design. TE.CADD.B
  - a Identify and describe various types of hardware and software. TE.CADD.B.11
  - b Identify and describe the purpose of operating system components. TE.CADD.B.12
  - c Define and apply computer terminology. TE.CADD.B.13
- 3 Using Hardware and Operating Systems: Describe the process of utilizing various hardware and operating systems. TE.CADD.C
  - a View file names on a storage device. TE.CADD.C.14
  - b Store, copy, move, and retrieve information to/from various drives. TE.CADD.C.15
  - c Rename and backup files. TE.CADD.C.16
- 4 Interpreting and Reading Blueprints: Identify various symbols to interpret and read blueprints. TE.CADD.D
  - a Interpret basic views and dimensions in a working drawing. TE.CADD.D.17
  - b Identify geometric tolerance symbols. TE.CADD.D.18
  - c Interpret drawings, pictures, and symbols. TE.CADD.D.19
- 5 Creating and Manipulating Mechanical Drawing Information: Describe and demonstrate the process for creating various types of views using a well organized

process. **TE.CADD.E**

- a Explain the Cartesian Coordinate System. **TE.CADD.E.20**
  - b Describe the process for setting and editing drawing elements. **TE.CADD.E.21**
  - c Create and edit line types, colors, and layers/levels. **TE.CADD.E.22**
  - d Create and edit basic geometry. **TE.CADD.E.23**
  - e Place and edit text and fonts. **TE.CADD.E.24**
  - f Create orthographic, isometric, section, and auxiliary views. **TE.CADD.E.25**
  - g Place and edit dimensions. **TE.CADD.E.26**
  - h Generate a 2-D multiview drawing. **TE.CADD.E.27**
  - i Generate a pictorial drawing. **TE.CADD.E.28**
  - j Scale and print a hard copy to an output device. **TE.CADD.E.29**
  - k Explain the use and need for scaled drawings. **TE.CADD.E.30**
- 6** Drawing and Designing Assemblies: Create assemblies and views in 3-D format. **TE.CADD.F**
- a Create an assembly in 3-D geometry. **TE.CADD.F.31**
  - b Create an exploded view of a 3-D assembly. **TE.CADD.F.32**
- 7** Using a 3-D Model: Describe and demonstrate the process for converting 2-D drawings to a 3-D format. **TE.CADD.G**
- a Create and edit construction planes through reference geometry. **TE.CADD.G.33**
  - b Create a 2-D drawing from a 3-D model. **TE.CADD.G.34**
  - c Create a 3-D model from a 2-D drawing. **TE.CADD.G.35**

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## **C Engineering Technology** TE.ET

- 1 Career Awareness:** Identify and describe various careers in the engineering field, including educational requirements and ethical expectations. TE.ET.A
  - a** Describe the following engineering fields: mechanical, chemical, civil, and electrical. TE.ET.A.1
  - b** Identify the following job functions and responsibilities: research and development, design, production, supervision, management, testing, and analysis in mechanical, chemical, civil, and electrical engineering. TE.ET.A.2
  - c** Identify the following educational requirements in engineering: associate, bachelor, master, and doctorate degrees. TE.ET.A.3
  - d** Describe ethics related to engineering in the following situations: environmental, sustainable engineering, and corrupt practices. TE.ET.A.4
- 2 Safety:** Describe and apply safe practices in the lab environment. TE.ET.B
  - a** Explain and demonstrate the proper use of personal protective equipment (PPE). TE.ET.B.5
  - b** Describe and demonstrate the proper use of engineering laboratory equipment. TE.ET.B.6
- 3 Teamwork:** Explain the characteristics of an effective engineering design team. TE.ET.C
  - a** Identify the roles and responsibilities of the following engineering design team members: team leader, designers, reporters, testers, and fabricators. TE.ET.C.7
  - b** Identify the following characteristics of an effective design team: team norms, leadership, responsibility, respect, rapport, and time management. TE.ET.C.8
- 4 Materials:** Describe the process for selecting the appropriate materials based on product function. TE.ET.D
  - a** Describe the following mechanical properties of steel, concrete, wood, and plastic: ductility/brittleness, tension, shear, and compression. TE.ET.D.9
  - b** Explain the process used for selecting the correct materials for specific functions. TE.ET.D.10
  - c** Test materials for specific characteristics. TE.ET.D.11
- 5 Production Process:** Describe the various material processes and equipment used in quality control. TE.ET.E
  - a** Explain the following quality controls: geometric dimensioning and tolerances, and go-no go gauge. TE.ET.E.12
  - b** Use the following measurement tools and instruments: rulers, micrometers, and vernier calipers. TE.ET.E.13
  - c** Identify the following elementary statistical process controls: distribution curves, normal curves, and skew curves. TE.ET.E.14
- 6 Software:** Identify and demonstrate the use of various digital resources used in the engineering field. TE.ET.F

- a Identify available digital resources for researching problem solutions. **TE.ET.F.15**
  - b Use word processing software to develop reports. **TE.ET.F.16**
  - c Use presentation software to develop oral presentation of findings. **TE.ET.F.17**
  - d Describe and demonstrate the process for using CAD in a design solution. **TE.ET.F.18**
  - e Use spreadsheet software to develop tables, graphs, charts, and to track data. **TE.ET.F.19**
- 7 Engineering Principles: Identify and describe the various systems that are part of the engineering field, including static, mechanical, electricity, fluid power, and thermal principles. **TE.ET.G****
- a Describe and apply the following statics principles: vectoring to predict resultant forces, equilibrium, trusses, and moment of inertia. **TE.ET.G.20**
  - b Describe and apply the following mechanical systems principles: Law of Conservation of Energy, six simple machines, mechanical advantage, efficiency, work, rate, and friction/resistance. **TE.ET.G.21**
  - c Describe and apply the following electricity principles: Ohm's, Watt's, series, parallel, combination circuits, AC/DC systems, and conductors/insulators. **TE.ET.G.22**
  - d Describe the following components and applications of fluid power principles: reservoir, fluid conductors, valves, pumps, actuators, Pascal's Law, and Bernoulli's Principle. **TE.ET.G.23**
  - e Describe the following principles and applications of thermodynamics: heat flow and transfer, convection, conduction, radiation, temperature scales, and conductors/insulators. **TE.ET.G.24**
- 8 Design Process: Describe and apply the design process to identify and solve a problem. **TE.ET.H****
- a Identify the components of the design process: define the problem, brainstorm, research, develop solutions, prototype, test/evaluate, and communicate results. **TE.ET.H.25**
  - b Identify the elements of a well-written problem statement. **TE.ET.H.26**
  - c Describe the process of brainstorming. **TE.ET.H.27**
  - d Describe the process for researching relevant information. **TE.ET.H.28**
  - e Describe the process of developing a solution. **TE.ET.H.29**
  - f Build a prototype from working drawings using appropriate materials. **TE.ET.H.30**
  - g Test prototype to defined criteria. **TE.ET.H.31**
  - h Use a variety of productivity software to explain the results of the design process, including, spreadsheets, word processing, data analysis, and presentations. **TE.ET.H.32**

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## **D Digital Video Production Systems** TE.DV

- 1** Video Production Skills: Understand video production as a communication tool and the equipment and skills required to properly communicate a message. TE.DV.A
  - a** Describe the various video production processes, when integrated together to create a successful message. TE.DV.A.1
  - b** Describe the differences between a studio production and a field production. TE.DV.A.2
  - c** Identify various career paths in digital/video production. TE.DV.A.3
- 2** Safety: Describe and apply the fundamental principles that relate to both field and studio production. TE.DV.B
  - a** Demonstrate fire safety prevention and extinction, and trip hazards as it relates to lighting and electrical equipment. TE.DV.B.4
  - b** Describe the fundamentals of step ladder safety. TE.DV.B.5
  - c** Identify proper methods of transport and storage for appropriate production and personal equipment. TE.DV.B.6
  - d** Describe and apply fundamentals of cable safety. TE.DV.B.7
- 3** Pre-Production: Describe the process used for concept development and storyboarding as part of the pre-production process while focusing on the importance of communication, deadlines, and legal considerations. TE.DV.C
  - a** Identify a target audience and design an appropriate message for the target market. TE.DV.C.8
  - b** Describe the process used for concept development/treatment. TE.DV.C.9
  - c** Identify and describe the script elements of storyboarding, two column, and screenplay format. TE.DV.C.10
  - d** Define and describe the legal concerns of copyrights, ethics, releases, and royalties. TE.DV.C.11
  - e** Explain the importance of budgets, scheduling, and deadlines in meeting the requirements of a project. TE.DV.C.12
  - f** Evaluate a shooting location in terms of lighting, sound, production equipment needs, and electrical essentials. TE.DV.C.13
- 4** Production: Identify and describe the elements of production to effectively deliver a message. TE.DV.D
  - a** Describe, plan the use of, and apply 3-point lighting, source light, white balance, scrims, and reflectors using the appropriate techniques. TE.DV.D.14
  - b** Describe the various types of sound equipment and techniques used with handheld, lavalier, shot gun, condenser, omni and directional methods. TE.DV.D.15
  - c** Describe the equipment and personnel necessary for producing a studio production. TE.DV.D.16



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## **E Wood Technology** TE.WT

- 1** Safety: Describe and demonstrate the procedures related to workplace and job-site safety, including personal protective equipment, machine safety, and material handling practices. TE.WT.A
  - a** Demonstrate knowledge of proper use, storage, and disposal of hazardous materials following OSHA's proper safety practices for a woodworking facility. TE.WT.A.1
  - b** Demonstrate and explain knowledge of workplace safety procedures. TE.WT.A.2
  - c** Demonstrate and explain knowledge of personal safety practices pertaining to eye wear, footwear, clothing, and personal protective equipment (PPE) used in wood technology. TE.WT.A.3
  - d** Describe safety practices for the following machines: table saw, drill press, stationary sander, router table, and miter saw. TE.WT.A.4
  - e** Demonstrate and explain knowledge of proper use and storage of basic hand tools. TE.WT.A.5
  - f** Demonstrate and explain knowledge of proper use and storage of portable power tools. TE.WT.A.6
  - g** Explain safe proper use, disposal, and storage of chemicals following OSHA standards. TE.WT.A.7
- 2** Machines and Tools: Identify and describe the function of various types of layout hand and power tools in the Wood Technology field. TE.WT.B
  - a** Identify, use, and maintain the following measuring, layout, and marking tools: steel rule, tape measure, combination square, sliding "T" bevel, and compass. TE.WT.B.8
  - b** Identify proper use and function of the following portable power tools: circular saw, drill, jig/saber saw, finishing sanders, and routers. TE.WT.B.9
  - c** Identify proper use and function of the following fastening tools: hammer, phillip head screw driver, and slotted/flat head screw driver. TE.WT.B.10
  - d** Identify proper use and function of the following hand tools: cross cut saw, rip saw, level, coping saw, nail set, hand plane, chisel, and file. TE.WT.B.11
  - e** Identify proper use and function of the table and miter saws. TE.WT.B.12
- 3** Design, Measurement, and Layout: Interpret technical drawings, rough drawings and sketches, and the use fractional measurement. TE.WT.C
  - a** Describe and identify fractional measurements from a basic plan and assembly drawings. TE.WT.C.13
  - b** Describe and prepare rough drawings and sketches. TE.WT.C.14
  - c** Explain and prepare a cut list or bill of material from a basic plan and assembly drawing. TE.WT.C.15
  - d** Measure accurately to a sixteenth of an inch. TE.WT.C.16

- e Identify the difference between both nominal and actual dimensions. [TE.WT.C.17](#)
  - f Estimate material quantities in both board feet and linear feet. [TE.WT.C.18](#)
  - g Consider the natural characteristics of grain, knots, and checks when laying out a board. [TE.WT.C.19](#)
- 4 Materials: Describe characteristics and appropriate applications for softwoods, hardwoods, and plywoods. [TE.WT.D](#)
- a Identify characteristics and applications of the following coniferous softwoods: pine, cedar, and fir. [TE.WT.D.20](#)
  - b Identify characteristics and applications of the following deciduous hardwoods: oak, maple, and poplar. [TE.WT.D.21](#)
  - c Identify characteristics and applications of the following engineered lumber: plywood and medium density fiberboard. [TE.WT.D.22](#)
- 5 Material Processing: Identify and describe the various types of processes associated with the woodworking field and the characteristics of wood as a medium. [TE.WT.E](#)
- a Identify and select the proper cutting process based on grain direction. [TE.WT.E.23](#)
  - b Identify how grain direction affects a material's strength. [TE.WT.E.24](#)
  - c Understanding kerf and its application to cutting and layout operations. [TE.WT.E.25](#)
- 6 Abrasives: Describe the various types of abrasive materials used in wood technology. [TE.WT.F](#)
- a Describe the abrasive grit numbering grading system. [TE.WT.F.26](#)
- 7 Jointery: Identify various types of joints and describe the process for preparation and assembly. [TE.WT.G](#)
- a Identify and assemble the following types of joints: butt, miter, dado, rabbet, and lap. [TE.WT.G.27](#)
  - b Prepare stock for use. [TE.WT.G.28](#)
- 8 Assembly: Identify and describe the purpose of various types of fasteners, adhesives, and clamping devices. [TE.WT.H](#)
- a Identify and describe the purpose and use of the following woodworking fasteners: common nails, round head screws, flat head screws, and oval head screws. [TE.WT.H.29](#)
  - b Identify and describe the purpose of the following clamping devices: bar clamp, cclamp, parallel/hand screw clamp, and spring clamps. [TE.WT.H.30](#)
- 9 Finishing: Describe various types of available finishes and safety precautions used during the application process. [TE.WT.I](#)
- a Identify and apply various wood finishes for interior and exterior, with brush or wipe on, for the following: paint, stain, and clear coat. [TE.WT.I.31](#)