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

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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

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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

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

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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

Engineering Technology TE.ET

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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

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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

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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

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

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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, lavaliere, 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

d Describe the equipment and personnel necessary for producing a field production. TE.DV.D.17

5 Cinematic Principles: Describe and apply fundamental camera operations, movement, and composition. TE.DV.E

a Describe white balance, iris, aperture, auto and manual focus, audio settings, and levels in camera operations. TE.DV.E.18

b Describe dolly, truck, pan, and tilt as it relates to camera movements. TE.DV.E.19

c Describe the following methods of stabilization: tripod, monopod, slider, steady cam, fluid head, friction head, and dolly. TE.DV.E.20

d Describe the rule of thirds, head room, lead room/talk space, establishing shot, extreme close up, close up, medium, medium wide, wide, extreme wide, and depth of field as it relates to camera composition/framing. TE.DV.E.21

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6 Post-Production: Identify and describe the elements of post-production to effectively deliver a message. TE.DV.F

a Create graphics and titles appropriate to the project. TE.DV.F.22

b Describe play head, timeline, bin, multiple tracks, trimming, and edit points within nonlinear video editing. TE.DV.F.23

c Describe and apply import, file, and asset management. TE.DV.F.24

d Edit and finalize images and video for rough cut, transitions, color correction, keying, and pacing with nonlinear software. TE.DV.F.25

e Edit audio for voice over, sound levels, music, and sound effects with application software. TE.DV.F.26

7 Media Components and Concepts: Identify and understand the technological literacy of video production. TE.DV.G

a Describe the following digital literacy terminology: aspect ratios, screen resolution, frame rate, file formats, codec, compression, bit rate, and display properties. TE.DV.G.27

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

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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

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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