Connecticut CTE

Technology Education

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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

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

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

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, 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

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
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