

6-12 INDUSTRIAL TECH Standards/Benchmarks/Grade Level Expectations (GLE)

Updated 6/5/2008

Standard 1: Understands and uses basic drafting techniques. (Drafting Fundamentals).

Benchmarks:

1. Use and maintain basic drafting equipment and machines.
2. Use architectural scales and demonstrate scaling techniques.
3. Identify and draw the various line types.
4. Demonstrate correct lettering techniques (freehand or CAD).
5. Reproduce drawings (e.g., blueprints and plots).
6. Prepare drawings/designs using appropriate media.
7. Perform basic geometric constructions.
8. Construct and bisect lines, arcs, and angles.
9. Construct perpendicular and parallel lines.
10. Construct geometric shapes (e.g., pentagon, hexagon, octagon).
1. Construct drawings of tangent lines, arcs, and ellipses.
12. Draw orthographic views and transfer features.
13. Freehand sketch orthographic and pictorial views.
14. Apply basic dimensioning techniques.
15. Construct basic sectional views.
16. Solve mathematical problems related to drafting (e.g., conversion of units).
17. Use drafting references and standards.
18. Identify common manufacturing and construction materials.
19. Construct object intersections and developments.
20. Identify appropriate manufacturing processes.
21. Use precision measuring instruments.
22. Calculate tolerances and fits.
23. Construct and interpret geometric dimensioning and tolerancing symbols.

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24. Read and interpret a variety of drawings.

Standard 2: Use computer and peripheral devices to aid in the documentation for design projects. (Introduction to VersaCAD).

Benchmarks:

1. Demonstrate basic CAD operations.
2. Demonstrate proper care and maintenance of CAD equipment and software.
3. Demonstrate proficiency in creating two-dimensional CAD drawings.
4. Demonstrate proficiency in creating three-dimensional CAD drawings.
5. Demonstrate proficiency in three-dimensional CAD modeling.

Standard 3: Understand and demonstrate the basic concepts of AC Circuits. (Electricity Fundamentals)

Benchmarks:

1. Explain the power formula ($P=EI$) and the variables of power, voltage and current.
2. Demonstrate an understanding of sources of electricity in AC circuits.
3. Demonstrate an understanding of basic motor/generator theory and operation.
4. Demonstrate an understanding of measurement of power in AC circuits.
5. Demonstrate an understanding of the principles of operation of safety grounding systems: (lightning arresters, ground fault interrupters, etc.).

Standard 4: Understand and demonstrate the basic concepts of DC Circuits. (Electronic Fundamentals)

Benchmarks:

1. Explain the concepts of DC current.
2. Demonstrate an understanding of sources of electricity in DC circuits.

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3. Demonstrate an understanding of principles and operation of batteries.
4. Demonstrate an understanding of measurement of resistance of conductors and insulators and the computation of conductance.
5. Demonstrate an understanding of magnetic properties of circuits and devices.
6. Explain the basic circuit components of resistance, capacitance and inductance.
7. Analyze, construct and troubleshoot series, parallel, and series-parallel circuits.
8. Explain Ohms law ($R=E/I$) and the variables of resistance, voltage and current.
9. Analyze, construct and troubleshoot resistance x inductance (RL), resistance x inductance x capacitance (RLC) circuits.
10. Explain the power formula ($P=EI$) and the variables of power, voltage and current.

Standard 5: Understand and apply the principles involved in the mechanical and electrical components of a vehicle. (Car/Home Maintenance)

Benchmarks:

1. Identify, remove and replace worn or damaged belts and hoses.
2. Test and install engine coolant.
3. Check and/or change all fluids and filters per specifications.
4. Remove, replace and adjust ignition components.
5. Check, remove and replace exhaust system components.
6. Test and evaluate automotive batteries using appropriate test equipment.
7. Test and evaluate other electrical circuits and components using a voltmeter, ohmmeter, ammeter, and test light.

Standard 6: Understand and apply the principles involved in the mechanical and electrical components of a vehicle including basic functions of engine care. (Power and Energy)

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Benchmarks:

1. Identify, remove and replace worn or damaged belts and hoses.
2. Test and install engine coolant, caps, and pressure test.
3. Check and/or change all fluids and filters per specifications.
4. Evaluate engine operation using testing equipment.
5. Remove, replace and adjust ignition components.
6. Check, remove and replace exhaust system components.
7. Identify, test, remove and replace fuel system component parts.
8. Test and evaluate automotive batteries using appropriate test equipment.
9. Identify, test and evaluate charging systems and components, remove and replace as required (includes use of appropriate diagnostic equipment).
10. Test and evaluate other electrical circuits and components using a voltmeter, ohmmeter, ammeter and test light.
11. Inspect, remove, replace and adjust clutch assembly and related components.
12. Remove and replace engine.
13. Disassemble, evaluate and reassemble an engine.
14. Identify, test and evaluate starting systems and components, remove and replace as required (includes use of appropriate diagnostic equipment).