Virginia CTE

# Technology Foundations (8403)

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| **Demonstrating Personal Qualities and Abilities** | 1. **Demonstrate creativity and innovation.** 8403.1 |
| | 2. **Demonstrate critical thinking and problem solving.** 8403.2 |
| | 3. **Demonstrate initiative and self-direction.** 8403.3 |
| | 4. **Demonstrate integrity.** 8403.4 |
| | 5. **Demonstrate work ethic.** 8403.5 |
| **Demonstrating Interpersonal Skills** | 6. **Demonstrate conflict-resolution skills.** 8403.6 |
| | 7. **Demonstrate listening and speaking skills.** 8403.7 |
| | 8. **Demonstrate respect for diversity.** 8403.8 |
| | 9. **Demonstrate customer service skills.** 8403.9 |
| | 10. **Collaborate with team members.** 8403.10 |
| **Demonstrating Professional Competencies** | 11. **Demonstrate big-picture thinking.** 8403.11 |
| | 12. **Demonstrate career- and life-management skills.** 8403.12 |
| | 13. **Demonstrate continuous learning and adaptability.** 8403.13 |
| | 14. **Manage time and resources.** 8403.14 |
| | 15. **Demonstrate information-literacy skills.** 8403.15 |
| | 16. **Demonstrate an understanding of information security.** 8403.16 |
| | 17. **Maintain working knowledge of current information-technology (IT) systems.** 8403.17 |
| | 18. **Demonstrate proficiency with technologies, tools, and machines common to a specific occupation.** 8403.18 |
| | 19. **Apply mathematical skills to job-specific tasks.** 8403.19 |

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| | 20. **Demonstrate professionalism.** 8403.20 |
| | 21. **Demonstrate reading and writing skills.** 8403.21 |
| | 22. **Demonstrate workplace safety.** 8403.22 |
| **Examining All Aspects of an Industry** | 23. **Examine aspects of planning within an industry/organization.** 8403.23 |
| | 24. **Examine aspects of management within an industry/organization.** 8403.24 |
| | 25. **Examine aspects of financial responsibility within an industry/organization.** 8403.25 |
| | 26. **Examine technical and production skills required of workers within an industry/organization.** 8403.26 |
| | 27. **Examine principles of technology that underlie an industry/organization.** 8403.27 |
| | 28. **Examine labor issues related to an industry/organization.** 8403.28 |
| | 29. **Examine community issues related to an industry/organization.** 8403.29 |
| | 30. **Examine health, safety, and environmental issues related to an industry/organization.** 8403.30 |
| **Addressing Elements of Student Life** | 31. **Identify the purposes and goals of the student organization.** 8403.31 |
| | 32. **Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult.** 8403.32 |
| | 33. **Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects.** 8403.33 |
| | 34. **Identify Internet safety issues and procedures for complying with acceptable use standards.** 8403.34 |
| **Exploring Work-Based Learning** | 35. **Identify the types of work-based learning (WBL) opportunities.** 8403.35 |
| | 36. **Reflect on lessons learned during the WBL experience.** 8403.36 |
| | 37. **Explore career opportunities related to the WBL experience.** 8403.37 |
| | 38. **Participate in a WBL experience, when appropriate.** 8403.38 |
| **Exploring Technology Foundations** | 39. **Define technology.** 8403.39 |

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| | **40.** Explain the characteristics and scope of technology. 8403.40 |
| | **41.** Identify the core concepts of technology. 8403.41 |
| | **42.** Describe the basic systems model. 8403.42 |
| | **43.** Distinguish between an open- and closed-loop system. 8403.43 |
| | **44.** Explain how systems may have varying outputs. 8403.44 |
| | **45.** List technological resources and their function in a system. 8403.45 |
| | **46.** Explain what process does in a system. 8403.46 |
| | **47.** Identify the seven resources for a particular technological system. 8403.47 |
| | **48.** Describe an engineering design process that is used to design a product. 8403.48 |
| | **49.** Identify common technological processes that convert materials or energy to produce an output or solution. 8403.49 |
| | **50.** Describe the core areas of STEM. 8403.50 |
| | **51.** Use the Pythagorean theorem during a problem-solving activity 8403.51 |
| | **52.** Identify career opportunities in a variety of technological contexts. 8403.52 |
| **Understanding Technological Systems** | **53.** Illustrate the concept of a technological system. 8403.53 |
| | **54.** Distinguish between a system and a subsystem. 8403.54 |
| | **55.** Analyze the effects of technological systems on society and the environment. 8403.55 |
| **Analyzing Consumer Products** | **56.** Define consumer. 8403.56 |
| | **57.** Explain how human factors engineering applies to product design. 8403.57 |
| | **58.** Describe ways consumer products have shaped society and the environment. 8403.58 |
| | **59.** Select a consumer product to analyze. 8403.59 |
| | **60.** Collect product data. 8403.60 |
| | **61.** Reverse engineer a product. 8403.61 |
| | **62.** Analyze how a product works, using mathematical and scientific concepts. 8403.62 |

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| | 63. **Describe an innovation that would improve a product.** 8403.63 |
| | 64. **Draw illustrations of an improved product.** 8403.64 |
| | 65. **Construct models of an improved product.** 8403.65 |
| | 66. **Represent 3D objects on a two-dimensional surface.** 8403.66 |
| | 67. **Create a display or multimedia presentation of an improved product, emphasizing STEM concepts.** 8403.67 |
| | 68. **Present recorded information about a product using multimedia.** 8403.68 |
| **Using Materials as a Technological Resource** | 69. **Classify materials as either natural or synthetic.** 8403.69 |
| | 70. **Classify materials according to the major types.** 8403.70 |
| | 71. **Explain how material resources are processed.** 8403.71 |
| | 72. **Create a detailed diagram for producing a designed product/model/prototype.** 8403.72 |
| | 73. **Use tools, machines, and processes to change materials to produce a designed product.** 8403.73 |
| | 74. **Select the best material for a specific design application.** 8403.74 |
| | 75. **Predict the outcomes of some technological processes.** 8403.75 |
| | 76. **Develop a design using recycled materials.** 8403.76 |
| **Using Energy as a Technological Resource** | 77. **Identify the two types of energy.** 8403.77 |
| | 78. **Analyze forms of energy.** 8403.78 |
| | 79. **Identify the sources of energy used with technological devices.** 8403.79 |
| | 80. **Model the use of energy with mechanical, electrical, fluidic, and thermal systems.** 8403.80 |
| | 81. **Map the path of current and emerging energy supplies from their source to end-users.** 8403.81 |
| | 82. **Compare methods to conserve energy through technological modification.** 8403.82 |
| **Controlling an Electronic System** | 83. **Analyze a problem whose solution uses electronic controls.** 8403.83 |

84. **Describe the different methods for using electronically controlled devices.** 8403.84

85. **Use engineering design to solve an identified problem using an electronically controlled device .** 8403.85

86. **Construct a functional model of an electronically controlled device.** 8403.86

87. **Control a device with a microcontroller.** 8403.87

88. **Present information about an electronically controlled device.** 8403.88

### Designing a Product

89. **Evaluate the needs and wants of people in school, home, community, or world that could be met through technological change.** 8403.89

90. **Write a statement that defines a problem, challenge, need, or opportunity.** 8403.90

91. **Collect information about a technological problem to be solved.** 8403.91

92. **Generate potential solutions to the problem, challenge, need, or opportunity.** 8403.92

93. **Select the best solution for a problem.** 8403.93

94. **Construct a prototype of the best solution.** 8403.94

95. **Evaluate the solution by comparing it with the problem statement, constraints, and criteria.** 8403.95

96. **Present the final product.** 8403.96