

Standards Correlations

Technology of Robotic Design

8421 (36 weeks) and 8420 (18 weeks)

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Demonstrating Personal Qualities and Abilities			
Demonstrate creativity and innovation.	English: 6.1, 6.3, 6.4, 6.6, 6.7, 6.9, 7.1, 7.3, 7.4, 7.6, 7.7, 7.9, 8.1, 8.3, 8.4, 8.6, 8.7, 8.9, 9.1, 9.5, 9.6, 9.8, 10.1, 10.5, 10.6, 10.8, 11.1, 11.5, 11.6, 11.8, 12.1, 12.5, 12.6, 12.8 History and Social Science: CE.1, CE.4, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WG.4, WHI.1, WHII.1 Mathematics: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.10, 6.11, 6.12, 7.2, 7.3, 7.8, 7.9, 8.2, 8.4, 8.6, 8.7, 8.11, 8.12, 8.17, 8.18, A.9, AFDA.3, AFDA.4, AFDA.5, AFDA.6, AFDA.7, AFDA.8, AII.9, COM.1, COM.3, COM.4, COM.5, COM.8, DM.7, DM.1*, DM.10, DM.2*, DM.3*,		

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
	PS.3*, PS.4*, PS.7*, PS.9*, PS.10* Science: 6.1, BIO.1, CH.1, ES.1, LS.1, PS.1		
Demonstrate critical thinking and problem solving.	English: 6.1, 6.3, 6.4, 6.5, 6.6, 6.7, 6.9, 7.1, 7.3, 7.4, 7.5, 7.6, 7.7, 7.9, 8.1, 8.3, 8.4, 8.5, 8.6, 8.7, 8.9, 9.1, 9.5, 9.6, 9.8, 10.1, 10.5, 10.6, 10.8, 11.1, 11.5, 11.6, 11.8, 12.1, 12.5, 12.6, 12.8 History and Social Science: CE.1, CE.4, CE.11, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WG.4, WHI.1, WHII.1 Mathematics: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.10, 6.11, 7.2, 7.3, 7.8, 7.12, 7.13, 8.2, 8.4, 8.8, 8.9, 8.10, 8.11, A.8, A.9, G.1, G.13, G.14, AFDA.3, AFDA.5, AFDA.8, AII.9, AII.10, AII.11, COM.1, COM.3, COM.4, COM.5, COM.8, DM.4, DM.7, DM.1*, DM.2*, DM.3*, DM.9*, PS.9*, PS.10* Science: 6.1, BIO.1, CH.1, ES.1, LS.1, PS.1		
Demonstrate initiative and self-direction.	English: 6.1, 6.4, 6.6, 6.7, 6.9, 7.1, 7.4, 7.6, 7.7, 7.9, 8.1, 8.4,		

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	8.6, 8.7, 8.9, 9.1, 9.5, 9.6, 9.8, 10.1, 10.5, 10.6, 10.8, 11.1, 11.5, 11.6, 11.8, 12.1, 12.5, 12.6, 12.8 History and Social Science: CE.1, CE.4, CE.11, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1		
Demonstrate integrity.	English: 6.1, 7.1, 8.1, 9.1, 9.5, 10.1, 10.5, 11.1, 11.5, 12.1, 12.5 History and Social Science: CE.1, CE.3, CE.4, GOVT.1, GOVT.16, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1		
Demonstrate work ethic.	English: 6.1, 7.1, 8.1, 9.1, 10.1, 11.1, 12.1 History and Social Science: CE.1, CE.4, CE.14, GOVT.1, GOVT.16, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1 Science: CH.1		
Demonstrating Interpersonal Skills			
Demonstrate conflict-resolution skills.	English: 6.1, 6.2, 6.4, 6.6, 6.7, 6.9, 7.1, 7.2, 7.4, 7.6, 7.7, 7.9, 8.1, 8.2, 8.4, 8.6, 8.7, 8.9, 9.1, 10.1, 11.1, 12.1		

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	History and Social Science: CE.1, CE.4, GOVT.1, USI.1, VUS.1		
Demonstrate listening and speaking skills.	English: 6.1, 6.2, 6.4, 6.6, 7.1, 7.2, 7.4, 7.6, 8.1, 8.2, 8.4, 8.6, 9.1, 10.1, 11.1, 12.1 History and Social Science: CE.1, CE.4, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1		
Demonstrate respect for diversity.	English: 6.1, 7.1, 8.1, 9.1, 10.1, 11.1, 12.1 History and Social Science: CE.1, CE.3, CE.4, GOVT.1, GOVT.16, USI.1, USII.1, USII.9, VUS.1, VUS.13, WG.1, WHI.1, WHII.1		
Demonstrate customer service skills.	English: 6.1, 6.4, 6.7, 7.1, 7.4, 7.7, 8.1, 8.4, 8.7, 9.1, 9.5, 9.6, 10.1, 10.5, 10.6, 11.1, 11.5, 11.6, 12.1, 12.5, 12.6 History and Social Science: CE.1, CE.4, GOVT.1, GOVT.16, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1		
Collaborate with team members	English: 6.1, 7.1, 8.1, 9.1, 10.1, 11.1, 12.1		

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	History and Social Science: CE.1, CE.3, CE.4, GOVT.1, GOVT.16, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1		
Demonstrating Professional Competencies			
Demonstrate big-picture thinking.	English: 6.1, 6.4, 7.1, 7.4, 8.1, 8.4, 9.1, 9.5, 10.1, 10.5, 11.1, 11.5, 12.1, 12.5 History and Social Science: CE.1, CE.4, CE.12, GOVT.1, GOVT.15, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1		
Demonstrate career- and life-management skills.	English: 6.1, 6.7, 7.1, 7.7, 8.1, 8.7, 9.1, 9.6, 10.1, 10.6, 11.1, 11.6, 12.1, 12.6 History and Social Science: CE.1, CE.4, CE.12, CE.14, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1 Mathematics: 8.4		
Demonstrate continuous learning and adaptability.	English: 6.1, 6.4, 6.7, 6.9, 7.1, 7.4, 7.7, 7.9, 8.1, 8.4, 8.7, 8.9, 9.1, 9.5, 9.6, 9.8, 10.1, 10.5, 10.6, 10.8, 11.1, 11.5, 11.6, 11.8, 12.1, 12.5, 12.6, 12.8		

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	History and Social Science: CE.1, CE.3, CE.4, CE.14, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1 Science: BIO.1, CH.1, LS.1, PH.1, PH.4, PS.1		
Manage time and resources.	English: 6.1, 6.2, 6.4, 6.7, 6.9, 7.1, 7.2, 7.4, 7.7, 7.9, 8.1, 8.2, 8.4, 8.7, 8.9, 9.1, 9.5, 9.6, 9.8, 10.1, 10.5, 10.6, 10.8, 11.2, 11.5, 11.6, 11.8, 12.2, 12.5, 12.6, 12.8 History and Social Science: CE.1, CE.4, CE.11, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1 Mathematics: 6.10, 6.11, 6.12, 7.2, 7.3, 7.8, 7.9, 7.10, 7.11, 7.12, 7.13, 8.4, 8.11, 8.12, 8.13, 8.14, 8.17, 8.18, A.4, A.5, A.8, A.9, AFDA.3, AFDA.4, AFDA.5, AFDA.6, AFDA.7, AFDA.8, COM.1, COM.3, COM.5, COM.8		
Demonstrate information-literacy skills.	English: 6.1, 6.2, 6.4, 6.6, 6.7, 6.9, 7.1, 7.2, 7.3, 7.4, 7.6, 7.7, 7.9, 8.1, 8.2, 8.3, 8.4, 8.6, 8.7, 8.9, 9.2, 9.5, 9.6, 9.8, 10.2, 10.5, 10.6, 10.8, 11.2, 11.5,		

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
	11.6, 11.8, 12.2, 12.5, 12.6, 12.8 History and Social Science: CE.1, CE.4, CE.14, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1 Mathematics: 6.10, 6.11, 7.8, 7.9, 8.11, 8.12, A.8, A.9, AFDA.3, AFDA.4, AFDA.6, AFDA.7, AFDA.8, DM.8, PS.1*, PS.2*, PS.3*, PS.4*, PS.7*, PS.8*, PS.9*, PS.10* Science: 6.1, BIO.1, CH.1, ES.1, LS.1, PH.1, PS.1		
Demonstrate an understanding of information security.	English: 6.1, 6.2, 6.3, 6.4, 6.6, 6.7, 6.8, 6.9, 7.1, 7.2, 7.3, 7.4, 7.6, 7.7, 7.8, 7.9, 8.1, 8.2, 8.3, 8.4, 8.6, 8.7, 8.8, 8.9, 9.1, 9.2, 9.5, 9.6, 9.8, 10.1, 10.2, 10.5, 10.6, 10.8, 11.1, 11.2, 11.5, 11.6, 11.8, 12.1, 12.2, 12.5, 12.6, 12.8 History and Social Science: CE.1, CE.4, CE.14, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1 Mathematics: COM.10		
Maintain working knowledge of current information-technology (IT) systems.	English: 6.1, 6.3, 6.4, 6.6, 6.9, 7.1, 7.3, 7.4, 7.6, 7.9, 8.1, 8.3, 8.4, 8.6, 8.9		

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
	History and Social Science: CE.1, CE.4, CE.14, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1 Mathematics: 7.8, COM.1, COM.2, COM.7, COM.9, COM.10, COM.11, COM.16, COM.18, PS.17 Science: BIO.1, CH.1, ES.1, PH.1		
Demonstrate proficiency with technologies, tools, and machines common to a specific occupation.	History and Social Science: CE.1, CE.4, CE.14, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1 Mathematics: 6.10, 6.11, 7.9, 8.4, A.7, A.8, A.9, AFDA.1, AFDA.3, AFDA.5, AII.4, AII.7, AII.9, COM.1, COM.7, COM.10, COM.11, COM.12, COM.16 Science: CH.1, ES.1, LS.1, PH.1, PS.1		
Apply mathematical skills to job-specific tasks.	English: 6.4, 6.6, 6.7, 7.4, 7.6, 7.7, 8.4, 8.6, 8.7, 9.5, 9.6, 10.5, 10.6, 11.5, 11.6, 12.5, 12.6 History and Social Science: CE.1, CE.4, CE.14, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1		

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
	<p>Mathematics: 6.1, 6.2, 6.5, 6.6, 6.12, 6.13, 6.14, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.8, 7.9, 7.11, 7.12, 7.13, 8.4, 8.5, 8.6, 8.8, 8.9, 8.10, 8.11, 8.12, 8.13, 8.14, 8.15, 8.16, 8.17, 8.18, A.1, A.3, A.4, A.5, A.7, A.8, A.9, AFDA.1, AFDA.3, AFDA.5, AFDA.8, AII.3, AII.7, AII.9, AII.10, COM.1, COM.7</p> <p>Science: 6.1, BIO.1, CH.1, ES.1, LS.1, PH.1, PS.1</p>		
Demonstrate professionalism.	<p>English: 6.1, 7.1, 8.1, 9.1, 10.1, 11.1, 12.1</p> <p>History and Social Science: CE.1, CE.4, CE.14, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1</p>		
Demonstrate reading and writing skills.	<p>English: 6.1, 6.6, 6.7, 7.1, 7.6, 7.7, 8.1, 8.6, 8.7, 9.1, 9.5, 9.6, 9.7, 10.1, 10.5, 10.6, 10.7, 11.1, 11.5, 11.6, 11.7, 12.1, 12.5, 12.6, 12.7</p> <p>History and Social Science: CE.1, CE.4, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1</p> <p>Science: 6.1, PH.1, PS.1</p>		

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Demonstrate workplace safety.	English: 6.4, 7.4, 8.4, 9.5, 10.5, 11.5, 12.5 History and Social Science: CE.1, CE.4, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1 Science: CH.1		
Examining All Aspects of an Industry			
Examine aspects of planning within an industry/organization.	History and Social Science: GOVT.16		
Examine aspects of management within an industry/organization.			
Examine aspects of financial responsibility within an industry/organization.			
Examine technical and production skills required of workers within an industry/organization.			
Examine principles of technology that underlie an industry/organization.			
Examine labor issues related to an industry/organization.	History and Social Science: GOVT.16		

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Examine community issues related to an industry/organization.	History and Social Science: GOVT.16		
Examine health, safety, and environmental issues related to an industry/organization.	History and Social Science: GOVT.16		
Addressing Elements of Student Life			
Identify the purposes and goals of the student organization.			
Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult.			
Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects.			
Identify Internet safety issues and procedures for complying with acceptable use standards.			
Exploring Work-Based Learning			

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Identify the types of work-based learning (WBL) opportunities.			
Reflect on lessons learned during the WBL experience.			
Explore career opportunities related to the WBL experience.			
Participate in a WBL experience, when appropriate.			
Exploring Robotics and Automation Systems			
Define <i>robotics</i> , <i>automation</i> , and <i>control systems</i> .	English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5	1. The Characteristics and Scope of Technology 3. The Relationships Among Technologies and the Connections Between Technology and Other Fields 17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) System Control Technology
Investigate careers in robotics, automation, and control systems.	English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5 History and Social Science: VUS.13	17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM)

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
		4. The Cultural, Social, Economic, and Political Effects of Technology 19. Manufacturing Technologies	System Control Technology
Research the history and development of robotics, automation, and control systems.	English: 9.8, 10.8, 11.8 History and Social Science: VUS.1, VUS.13, VUS.14, WG.1, WHII.1, WHII.13, WHII.14	7. The Influence of Technology on History	Animatronics Computer Integrated Manufacturing (CIM) Debating Technological Issues Essays on Technology System Control Technology
Explain the universal systems model (i.e., input, process, output, and feedback).	English: 9.5, 10.5, 11.5	2. The Core Concepts of Technology 3. The Relationships Among Technologies and the Connections Between Technology and Other Fields	Animatronics Computer Integrated Manufacturing (CIM) System Control Technology Video Game Design
Apply direct and indirect measurement systems and coordinate systems.	English: 9.5, 10.5, 11.5 Mathematics: A.1	12. Use and Maintain Technological Products and Systems 13. Assess the Impact of Products and Systems	Animatronics Computer Integrated Manufacturing (CIM)

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
			Computer-Aided Design (CAD), Engineering Engineering Design Flight Endurance Geospatial Technology (Virginia only) Principles of Technology (Virginia only) System Control Technology
Identify open and closed loops in control systems.	English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5	12. Use and Maintain Technological Products and Systems 13. Assess the Impact of Products and Systems	Animatronics Computer Integrated Manufacturing (CIM) System Control Technology
Applying the Basics of Control and Distribution of Energy			
Describe the concepts of voltage, current, and resistance in electricity.	English: 9.5, 10.5, 11.5 Mathematics: A.8 Science: PH.11	12. Use and Maintain Technological Products and Systems	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Describe the difference between alternating and direct current.	English: 9.5, 10.5, 11.5 Mathematics: T.3 Science: PH.11	12. Use and Maintain Technological Products and Systems	Animatronics Computer Integrated Manufacturing (CIM) Engineering Design Principles of Technology (Virginia only) System Control Technology
Identify safety precautions and information for electricity (AC and DC), mechanical, hydraulic, and pneumatic systems.	English: 9.5, 10.5, 11.5		
Explain the primary functions of electronic systems components.	English: 9.5, 10.5, 11.5 Science: PH.11	12. Use and Maintain Technological Products and Systems	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology
Identify the primary concepts and components of mechanical systems.	English: 9.5, 10.5, 11.5 Science: PH.7		

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Explain primary concepts and components of a fluid power system.	English: 9.5, 10.5, 11.5 Science: PH.7		
Describe the differences between and uses of analog and digital electronics for the control of power distribution systems.	English: 9.5, 10.5, 11.5	12. Use and Maintain Technological Products and Systems	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology
Describe the operation of basic logic circuits.	English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5 Mathematics: G.1, COM.8 Science: PH.11	12. Use and Maintain Technological Products and Systems	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology
Measure circuit values with a multimeter.	Science: PH.11	13. Assess the Impact of Products and Systems	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Identify the primary types of data transmission hardware.	English: 9.5, 10.5, 11.5	12. Use and Maintain Technological Products and Systems 17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology
Exploring Microprocessor/Microcontroller (Computer) System Basics			
Describe the function of an operating system.	English: 9.5, 10.5, 11.5	17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology
Describe the essential components of a computing system.	English: 9.5, 10.5, 11.5 Mathematics: COM.16	17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology
Describe the software applications of computer	English: 9.5, 10.5, 11.5	17. Information and Communication Technologies	Animatronics

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
technology within automation systems.			Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology
Describe how computers are used to control automated systems.	English: 9.5, 10.5, 11.5 History and Social Science: VUS.13, VUS.14, WHII.14	17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology
Describe a microcontroller.	English: 9.5, 10.5, 11.5 History and Social Science: VUS.13, VUS.14, WHII.14		
Describe the function of interfacing robotic systems.	English: 9.5, 10.5, 11.5 History and Social Science: VUS.14	17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Describe the function of a microcontroller/logic controller.	English: 9.5, 10.5, 11.5 History and Social Science: VUS.14	17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology
Describe the fundamentals of computer numeric control (CNC).	English: 9.5, 10.5, 11.5	17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology
Identify microcontrollers and their functions within industry tools, including PLC.	English: 9.5, 10.5, 11.5	17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Computer-Aided Design (CAD), Engineering Principles of Technology (Virginia only) System Control Technology

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Develop a computer-controlled model solution to a problem.	English: 9.5, 10.5, 11.5 Mathematics: COM.1, COM.2	9. Engineering Design 10. The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving 17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM) Computer-Aided Design (CAD), Engineering Principles of Technology (Virginia only) System Control Technology
Manipulating and Controlling Data			
Describe the need for data manipulation and control.	English: 9.5, 10.5, 11.5	13. Assess the Impact of Products and Systems 17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM) System Control Technology
Manipulate data.	English: 9.5, 10.5, 11.5 Mathematics: COM.14, COM.16	12. Use and Maintain Technological Products and Systems 13. Assess the Impact of Products and Systems 17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM) Computer-Aided Design (CAD), Engineering System Control Technology Video Game Design

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Ensure the security of data.		12. Use and Maintain Technological Products and Systems 13. Assess the Impact of Products and Systems 17. Information and Communication Technologies	Video Game Design
Exploring Communication and Networking			
Explain types of communication/networking and layers.	English: 9.5, 10.5, 11.5	17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM) Webmaster
Describe various types of ports, channels, and controllers for robotic communications.	English: 9.5, 10.5, 11.5	12. Use and Maintain Technological Products and Systems 17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM) System Control Technology Video Game Design
Define a process control network (PCN).		17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM)

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Plan a PCN for various systems.	English: 9.5, 10.5, 11.5	11. Apply the Design Processes 17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM)
Exploring the Components of Robotics and Automation Systems			
Identify components of safe robotic systems.	English: 9.5, 10.5, 11.5		
Describe types and functions of sensors and the intelligent systems used to analyze and expand on these functionalities.	English: 9.5, 10.5, 11.5	12. Use and Maintain Technological Products and Systems 17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology
Describe the options for power supplies, silicon-controlled rectifiers (SCRs), solenoid valves, actuators, and motors to control movement systems.	English: 9.5, 10.5, 11.5	12. Use and Maintain Technological Products and Systems 17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Engineering Design Principles of Technology (Virginia only) System Control Technology

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Describe types and functions of relays.	English: 9.5, 10.5, 11.5	12. Use and Maintain Technological Products and Systems 17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology
Describe various hardware and software used in the industry.	English: 9.5, 10.5, 11.5	12. Use and Maintain Technological Products and Systems 17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Principles of Technology (Virginia only) System Control Technology
Describe precision measurement equipment and techniques.	English: 9.5, 10.5, 11.5	12. Use and Maintain Technological Products and Systems 13. Assess the Impact of Products and Systems 17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Engineering Design Principles of Technology (Virginia only) System Control Technology

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Describe components or processes that typically require precision measurement.	English: 9.5, 10.5, 11.5	12. Use and Maintain Technological Products and Systems 17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Engineering Design Principles of Technology (Virginia only) System Control Technology
Assembling an Automated System			
Compare open and proprietary hardware components.	English: 9.5, 10.5, 11.5	12. Use and Maintain Technological Products and Systems 17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Engineering Design Principles of Technology (Virginia only) System Control Technology
Simulate functions of all components of a working automated system.		12. Use and Maintain Technological Products and Systems 17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM) Engineering Design

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
		19. Manufacturing Technologies	Principles of Technology (Virginia only) Scientific Visualization (SciVis) System Control Technology Video Game Design
Assemble an automated system.		11. Apply the Design Processes 12. Use and Maintain Technological Products and Systems 13. Assess the Impact of Products and Systems 17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Engineering Design System Control Technology
Reengineer the design of an existing system.	English: 9.5, 10.5, 11.5 Mathematics: COM.17, COM.18	10. The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving	Animatronics Computer Integrated Manufacturing (CIM) Engineering Design System Control Technology

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
		11. Apply the Design Processes 12. Use and Maintain Technological Products and Systems 13. Assess the Impact of Products and Systems 17. Information and Communication Technologies 19. Manufacturing Technologies	
Simulate precision measurements of components in a control system.		11. Apply the Design Processes 12. Use and Maintain Technological Products and Systems 13. Assess the Impact of Products and Systems 17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Engineering Design System Control Technology

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
Simulate control, robotics, and automation systems.		11. Apply the Design Processes 12. Use and Maintain Technological Products and Systems 13. Assess the Impact of Products and Systems 17. Information and Communication Technologies 19. Manufacturing Technologies	Animatronics Computer Integrated Manufacturing (CIM) Engineering Design System Control Technology
Install a machine vision system on an existing design.	English: 9.5, 10.5, 11.5		
Programming an Automated System			
Implement basic programming procedures.	English: 9.5, 9.6, 9.7, 10.5, 10.6, 10.7, 11.5, 11.6, 11.7 Mathematics: COM.1, COM.2, COM.4, COM.8, COM.9, COM.17, COM.18	17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM) Engineering Design System Control Technology
Select the most appropriate programming language/platform for application.	Mathematics: COM.9	17. Information and Communication Technologies	Animatronics

Task	SOL Correlation	ITEEA National Standards	TSA Competitive Events
			Computer Integrated Manufacturing (CIM) Engineering Design System Control Technology
Program an automated system.	Mathematics: COM.1, COM.2, COM.3, COM.4, COM.5, COM.7, COM.8, COM.9, COM.10, COM.11, COM.13, COM.14, COM.17, COM.18	17. Information and Communication Technologies	Animatronics Computer Integrated Manufacturing (CIM) System Control Technology