

# Standards Correlations

## Mechatronics I (8554)

Task	SOL Correlations
<b>Demonstrating Personal Qualities and Abilities</b>	
Demonstrate creativity and innovation.	<p>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</p> <p>History and Social Science: CE.1, CE.4, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WG.4, WHI.1, WHII.1</p> <p>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*, PS.3*, PS.4*, PS.7*, PS.9*, PS.10*</p> <p>Science: 6.1, BIO.1, CH.1, ES.1, LS.1, PS.1</p>
Demonstrate critical thinking and problem solving.	<p>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</p> <p>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</p> <p>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*</p> <p>Science: 6.1, BIO.1, CH.1, ES.1, LS.1, PS.1</p>
Demonstrate initiative and self-direction.	<p>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, 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</p>

<b>Task</b>	<b>SOL Correlations</b>
	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
<b>Demonstrating Interpersonal Skills</b>	
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 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 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
<b>Demonstrating Professional Competencies</b>	

<b>Task</b>	<b>SOL Correlations</b>
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 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, 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

Task	SOL Correlations
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 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 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 Science: 6.1, BIO.1, CH.1, ES.1, LS.1, PH.1, PS.1
Demonstrate professionalism.	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, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1

<b>Task</b>	<b>SOL Correlations</b>
Demonstrate reading and writing skills.	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 History and Social Science: CE.1, CE.4, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1 Science: 6.1, PH.1, PS.1
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
<b>Examining All Aspects of an Industry</b>	
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
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
<b>Addressing Elements of Student Life</b>	

<b>Task</b>	<b>SOL Correlations</b>
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.	
<b>Exploring Work-based Learning</b>	
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.	
<b>Applying Basic Safety Standards for Mechatronics</b>	
Comply with federal, state, and local safety requirements.	<p>English: 10.5, 11.5</p> <p>Science: CH.1</p> <p>History and Social Sciences: WHII 8; VUS 8; Govt 7, 8, 9</p>
Demonstrate lockout-tagout procedures.	

<b>Task</b>	<b>SOL Correlations</b>
Maintain a safe working environment.	English: 10.5, 11.5  History and Social Sciences: WHII 8; VUS 8; Govt 7, 8, 9
Explain safe working practices around electrical hazards.	English: 10.3, 10.5, 10.6, 10.7, 11.3, 11.5, 11.6, 11.7  History and Social Sciences: WHII 8; VUS 8; Govt 7, 8, 9
Identify emergency first-aid procedures.	English: 10.5, 11.5  WHII 8; VUS 8; Govt 7, 8, 9
Identify the types of fires and the methods used to extinguish them.	English: 10.5, 11.5  Science: CH.1  History and Social Sciences: WHII 8; VUS 8; Govt 7, 8, 9
Demonstrate the use of a fire extinguisher.	History and Social Sciences: WHII 8; VUS 8; Govt 7, 8, 9
Identify personal protective equipment (PPE) requirements.	English: 10.5, 11.5  History and Social Sciences: WHII 8; VUS 8; Govt 7, 8, 9
Inspect hand and power tools to ensure safety and usability.	English: 10.5, 11.5  History and Social Sciences: WHII 8; VUS 8; Govt 7, 8, 9
Demonstrate workplace ergonomics.	History and Social Sciences: WHII 8; VUS 8; Govt 7, 8, 9
Report injuries.	English: 10.5, 10.6, 10.7, 11.5, 11.6, 11.7 History and Social Sciences: WHII 8; VUS 8; Govt 7, 8, 9

<b>Task</b>	<b>SOL Correlations</b>
Earn the construction industry OSHA 10-hour card.	English: 10.5, 11.5 History and Social Sciences: WHII 8; VUS 8; Govt 7, 8, 9
Report personal, environmental, and equipment safety violations to the appropriate authority.	English: 10.5, 10.6, 10.7, 11.5, 11.6, 11.7 History and Social Sciences: WHII 8; VUS 8; Govt 7, 8, 9
Pass the safety exam.	English: 10.5, 11.5 History and Social Sciences: WHII 8; VUS 8; Govt 7, 8, 9
<b>Understanding Manufacturing</b>	
Define <i>manufacturing</i> .	English: 10.3, 10.5, 11.3, 11.5
Identify the five general steps of manufacturing.	English: 10.5, 11.5
Distinguish between primary and secondary processes involved in the manufacture of industrial goods into finished products.	English: 10.5, 11.5
Explain the history of manufacturing.	English: 10.5, 11.5 History and Social Sciences: WHII 8, 14; VUS 8, 14; Govt 7, 8, 9
Explain manufacturing as a technological system that transforms raw materials into products in a central location (e.g., a factory).	English: 10.5, 11.5 History and Social Sciences: WHII 8, 14; VUS 8, 14; Govt 7, 8, 9
Explain the onset of advanced manufacturing.	English: 10.5, 11.5 History and Social Sciences: WHII 8, 14; VUS 8, 14; Govt 7, 8, 9
<b>Understanding Manufacturing Materials</b>	
Distinguish among a wide range of materials used in manufacturing.	English: 10.5, 11.5  Science: CH.6



Task	SOL Correlations
	History and Social Sciences: WHII 8, 14; VUS 8, 14; Govt 7, 8, 9
Research the major material properties: physical, mechanical, chemical, thermal, electrical/magnetic, acoustical, and optical.	English: 10.5, 10.8, 11.5, 11.8 Science: PH.7
<b>Introducing Mechatronics</b>	
Define the term <i>mechatronics</i> .	English: 10.3, 10.5, 11.3, 11.5
Research the field of mechatronics.	English: 10.5, 10.8, 11.5, 11.8
Explore emerging trends in advanced manufacturing.	English: 10.2, 10.5, 11.2, 11.5 History and Social Sciences: WHII 8, 14; VUS 8, 14; Govt 7, 8, 9
Identify the components of a mechatronic system and how they work together.	
Describe the use of robots as mechatronic systems.	English: 10.5, 11.5 History and Social Sciences: WHII 8, 14; VUS 8, 14; Govt 7, 8, 9
<b>Understanding Tools in Mechatronics</b>	
Identify common hand tools.	
Identify electrical measurement devices.	
Demonstrate use of common machine and hand tools.	English: 10.5, 11.5
Demonstrate how to care for machine and hand tools.	
Compare the use of threaded fasteners and non-threaded fasteners.	English: 10.5, 11.5
Explain applications for fasteners.	English: 10.5, 11.5

<b>Task</b>	<b>SOL Correlations</b>
Demonstrate the use of precision measurement tools (United States customary units and metric).	
Differentiate between U.S. customary units and metric measurement systems.	English: 10.5, 11.5  Mathematics: A.1, A.4  Science: CH.1
Use U.S. customary units and metric units.	Science: CH.1
<b>Introducing Mechatronics Documentation</b>	
Define the differences in technique among freehand sketching, manual drafting, and computer-aided drafting (CAD).	English: 10.3, 10.5, 11.3, 11.5
Interpret written specifications for manufacturing devices and systems.	English: 10.5, 11.5  Science: CH.1
<b>Introducing Mechanical Systems</b>	
Identify types of actuators used in mechatronic systems.	
Identify types of sensors used in mechatronic systems.	
Identify mechanical components within a given system or module.	English: 10.5, 11.5
Identify machine elements.	
Read mechanical drawings.	English: 10.5, 11.5
<b>Introducing Electrical Systems</b>	

Task	SOL Correlations
Identify types of motors and/or actuators.	English: 10.5, 11.5  Science: PH.11
Describe the parts of the motor control system.	
Describe the electromagnetic properties of a motor.	Science: PH.11
Describe the connectors.	
Interpret line diagrams for a motor-control station.	
Assemble a motor-control station using normally open (NO) and normally closed (NC) switches.	
Define Ohm's law.	English: 10.3, 10.5, 11.3, 11.5  Mathematics: A.4c, AII.3c PH.11
Compute current, resistance, or voltage using Ohm's law.	English: 10.5, 11.5  Mathematics: A.4c, A.8, AII.3c  PH.11
Define Kirchhoff's current law (KCL) and Kirchhoff's voltage law (KVL).	English: 10.3, 10.5, 11.3, 11.5  Mathematics: A.1, A.4a,c
Compute current, voltage, and resistance in a circuit using Kirchhoff's current law (KCL) and Kirchhoff's voltage law (KVL).	Mathematics: A.1, A.4a,c
Define <i>electric power</i> .	English: 10.3, 10.5, 11.3, 11.5

Task	SOL Correlations
	Mathematics: A.4c, A.8, AII.3c Science: PH.11
Compute electric power.	Mathematics: A.4c, A.8, AII.3c  Science: PH.11
Measure resistance, voltage, and current.	Science: PH.11
Describe the concept of AC.	English: 10.5, 11.5  Science: PH.11
<b>Introducing Programmable Control Systems</b>	
Identify the components of a programmable control system.	
Identify programmable control systems.	English: 10.2, 10.5, 11.2, 11.5