

Standards Correlations

Engineering Explorations I (8450)

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|---|--|--------------------|------------------|
| Demonstrating Personal Qualities and Abilities | | | |
| 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*,</p> | | |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|--|---|--------------------|------------------|
| | 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, 8.6, 8.7, 8.9, 9.1, 9.5, 9.6, 9.8, 10.1, 10.5, 10.6, 10.8, 11.1, | | |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|---|--|--------------------|------------------|
| | 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 History and Social Science: CE.1, CE.4, GOVT.1, USI.1, VUS.1 | | |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|--|---|---------------------------|-------------------------|
| 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 | | |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|---|---|--------------------|------------------|
| 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 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 | | |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|--|---|--------------------|------------------|
| Manage time and resources. | <p>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</p> <p>History and Social Science: CE.1, CE.4, CE.11, GOVT.1, USI.1, USII.1, VUS.1, WG.1, WHI.1, WHII.1</p> <p>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</p> | | |
| Demonstrate information-literacy skills. | <p>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</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> <p>Mathematics: 6.10, 6.11, 7.8, 7.9, 8.11, 8.12, A.8, A.9,</p> | | |

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|--|---|--------------------|------------------|
| | 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 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 | | |

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| | 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 | | |

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|--|---|--------------------|------------------|
| | 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 | | |
| 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 | | |
| Examining All Aspects of an Industry | | | |
| Examine aspects of planning within an industry/organization. | History and Social Science: GOVT.16 | | |

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|--|--|---------------------------|-------------------------|
| 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 | | |
| Addressing Elements of Student Life | | | |

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|---|------------------|--------------------|------------------|
| 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 | | | |
| Identify the types of work-based learning (WBL) opportunities. | | | |
| Reflect on lessons learned during the WBL experience. | | | |

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| Explore career opportunities related to the WBL experience. | | | |
| Participate in a WBL experience, when appropriate. | | | |
| Applying Safety in Engineering Studies | | | |
| Demonstrate knowledge of appropriate personal safety procedures. | Science: CH.1 | 8P. Apply appropriate methods to diagnose, adjust and repair systems to ensure precise, safe and proper functionality. | Technology Bowl |
| Comply with safety rules in laboratory activities. | English: 9.5, 10.5, 11.5 Science: CH.1 | 8N. Use various approaches to communicate processes and procedures for using, maintaining, and assessing technological products and systems. | |
| Examining How Technology Affects Our World | | | |
| Describe the characteristics and scope of technology. | English: 9.5, 10.5, 11.5 History and Social Sciences: WHI.2-7, 9, 11-15 WHII.2-4, 6-12, 14 | 5H. Evaluate a technological innovation that arose from a specific society's unique need or want. 5I. Evaluate a technological innovation that was met with | Technology Bowl Essays on Technology Geospatial Technology Engineering Design |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|--|--|--|------------------|
| | VUS.2, 7-14 Science: PH.1 | societal resistance impacting its development. | |
| Explain the influence of technological systems. | English: 9.5, 10.5, 11.5 History and Social Sciences: WG.2, 4, 14, 16-17 WHI.2-7, 9, 11-15 WHII.2-4, 6-12, 14 VUS.2, 7-14 | 5H. Evaluate a technological innovation that arose from a specific society's unique need or want 5I. Evaluate a technological innovation that was met with societal resistance impacting its development | Technology Bowl |
| Identify historical technological milestones and advancements. | English: 9.5, 10.5, 11.5 History and Social Sciences: WHI.2-7, 9, 11-15 WHII.2-4, 6-12, 14 VUS.2, 7-14 | 6F. Relate how technological development has been evolutionary, often the result of a series of refinements to basic inventions or technological knowledge 6G. Verify that the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools, materials, and processes 6H. Evaluate how technology has been a powerful force in reshaping the social, cultural, | Technology Bowl |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|---|--|--|--|
| | | <p>political, and economic landscapes throughout history</p> <p>6I. Analyze how the Industrial Revolution resulted in the development of mass production, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time.</p> <p>6J. Investigate the widespread changes that have resulted from the Information Age, which has placed emphasis on the processing and exchange of information</p> | |
| Identify the core concepts of technology. | <p>English: 9.5, 10.5, 11.5</p> <p>History and Social Sciences:</p> <p>WG.1, 4</p> <p>WHI.1</p> <p>WHII.1</p> <p>VUS.1</p> | <p>5H. Evaluate a technological innovation that arose from a specific society's unique need or want</p> <p>5I. Evaluate a technological innovation that was met with societal resistance impacting its development</p> | <p>Manufacturing Prototype</p> <p>Biotechnology Design</p> <p>Transportation Modeling</p> <p>Engineering Design</p> <p>Technology Bowl</p> |

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|--|---|--|--|
| | Science: PH.1 | | |
| Examine technological systems. | English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5 | <p>1N. Explain how the world around them guides technological development and engineering design</p> <p>1P. Analyze the rate of technological development and predict future diffusion and adoption of new technologies</p> <p>3I. Evaluate how technology enhances opportunities for new products and services through globalization</p> | Technology Bowl |
| Investigating How Engineering Affects Our World | | | |
| Define <i>engineering</i> . | <p>English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5</p> <p>Science: PH.1</p> | 1O. Assess how similarities and differences among scientific, mathematics, engineering, and technological knowledge and skills contributed to the design of a product or system | <p>Engineering Design</p> <p>Technology Bowl</p> |
| Summarize the history of engineering. | <p>English: 9.5, 10.5, 11.5</p> <p>History and Social Sciences: WG.1, 4</p> | 6F. Relate how technological development has been evolutionary, often the result of a series of refinements to basic | <p>Engineering Design</p> <p>Technology Bowl</p> |

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|------|--------------------------|--|------------------|
| | WHI.1 WHII.1 VUS.1 | <p>inventions or technological knowledge</p> <p>6G. Verify that the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools, materials, and processes</p> <p>6H. Evaluate how technology has been a powerful force in reshaping the social, cultural, political, and economic landscapes throughout history</p> <p>6I. Analyze how the Industrial Revolution resulted in the development of mass production, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time</p> <p>6J. Investigate the widespread changes that have resulted from the Information Age, which has placed emphasis on the processing and exchange of information</p> | |

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|---|--|--|---|
| Identify a diverse selection of worldwide representatives of engineering. | English: 9.5, 10.5, 11.5 | 5H. Evaluate a technological innovation that arose from a specific society's unique need or want 6H. Evaluate how technology has been a powerful force in reshaping the social, cultural, political, and economic landscapes throughout history | Manufacturing Prototype Biotechnology Design Transportation Modeling Engineering Design Technology Bowl |
| Research an engineering achievement. | English: 9.5, 9.8, 10.5, 10.8, 11.5, 11.8 History and Social Sciences: WG.1 WHI.1 WHII.1 VUS.1 Science: PH.1 | 6H. Evaluate how technology has been a powerful force in reshaping the social, cultural, political, and economic landscapes throughout history | STEM Careers (Virginia TSA only) Engineering Design |
| Present information pertaining to an engineering achievement. | English: 9.1, 9.5, 10.1, 10.5, 11.1, 11.5 History and Social Sciences: WG.1 | 6F. Relate how technological development has been evolutionary, often the result of a series of refinements to basic inventions or technological knowledge | Engineering Design |

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| | WHI.1 WHII.1 VUS.1 | | |
| Examining Engineering Practice | | | |
| Describe the principal fields for specialization in engineering. | English: 9.5, 10.5, 11.5 Science: PH.1 | 7W. Determine the best approach by evaluating the purpose of the design 7Z. Apply principles of human-centered design 8N. Use various approaches to communicate processes and procedures for using, maintaining, and assessing technological products and systems | Manufacturing Prototype Biotechnology Design Transportation Modeling Engineering Design Technology Bowl |
| Summarize the habits of mind of successful professional engineers. | English: 9.5, 10.5, 11.5 | 7Z. Apply principles of human-centered design 7AA. Illustrate principles, elements, and factors of design 7BB. Implement the best possible solution to a design 7CC. Apply a broad range of design skills to their design process | STEM Careers (Virginia TSA only) |

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| | | 7DD. Apply a broad range of making skills to their design process | |
| Differentiate between an engineer and a technologist. | English: 9.5, 10.5, 11.5 | 10. Assess how similarities and differences among scientific, mathematics, engineering, and technological knowledge and skills contributed to the design of a product or system | Technology Bowl Essays on Technology |
| Describe continued education possibilities to support careers in engineering and technology. | English: 9.5, 10.5, 11.5 | 3I. Evaluate how technology enhances opportunities for new products and services through globalization 4P. Evaluate ways that technology can impact individuals, society, and the environment | STEM Careers (Virginia TSA only) |
| Explain the importance of communication between engineers and their stakeholders. | English: 9.5, 10.5, 11.5 | 5I. Evaluate a technological innovation that was met with societal resistance impacting its development | Technology Bowl Essays on Technology |
| Explain how ethical behavior of engineers is essential to the betterment of society. | English: 9.5, 10.5, 11.5 | 6H. Evaluate how technology has been a powerful force in reshaping the social, cultural, political, and economic landscapes throughout history. | Technology Bowl Essays on Technology |

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|---|---|---|------------------|
| Practicing Engineering Fundamentals | | | |
| Identify the benefits of case study analysis. | <p>English: 9.5, 10.5, 11.5</p> <p>History and Social Sciences:</p> <p>WG.1</p> <p>WHI.1</p> <p>WHII.1</p> <p>VUS.1</p> | <p>2U. Diagnose a flawed system embedded within a larger technological, social, or environmental system.</p> <p>2Y. Implement quality control as a planned process to ensure that a product, service, or system meets established criteria.</p> <p>4Q. Critique whether existing or proposed technologies use resources sustainably.</p> <p>4S. Develop a solution to a technological problem that has the least negative environmental and social impact.</p> <p>8Q. Synthesize data and analyze trends to make decisions about technological products, systems, or processes</p> | |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|---|--|---|--|
| Investigate an existing case study. | <p>English: 9.5, 9.8, 10.5, 10.8, 11.5, 11.8</p> <p>History and Social Sciences:</p> <p>WG.1</p> <p>WHI.1</p> <p>WHII.1</p> <p>VUS.1</p> | <p>2U. Diagnose a flawed system embedded within a larger technological, social, or environmental system.</p> <p>2Y. Implement quality control as a planned process to ensure that a product, service, or system meets established criteria.</p> <p>4Q. Critique whether existing or proposed technologies use resources sustainably.</p> <p>4S. Develop a solution to a technological problem that has the least negative environmental and social impact.</p> <p>8Q. Synthesize data and analyze trends to make decisions about technological products, systems, or processes</p> | <p>Engineering Design</p> <p>Prepared Presentation</p> |
| Apply measuring skills using instrumentation. | <p>English: 9.5, 10.5, 11.5</p> <p>History and Social Sciences:</p> <p>WG.1</p> | <p>2T. Demonstrate the use of conceptual, graphical, virtual, mathematical, and physical modeling to identify conflicting considerations before the entire</p> | |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|--|--|---|---|
| | WHI.1 WHII.1 VUS.1 Mathematics: A.1, A.4 Science: PH.1 | system is developed and to aid in design decision making 2Y. Implement quality control as a planned process to ensure that a product, service, or system meets established criteria | |
| Demonstrate the use of engineering design graphics. | English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5 History and Social Sciences: WG.1 WHI.1 WHII.1 VUS.1 Mathematics: G.14, MA.7 | 2T. Demonstrate the use of conceptual, graphical, virtual, mathematical, and physical modeling to identify conflicting considerations before the entire system is developed and to aid in design decision making | Engineering Design CAD Engineering Manufacturing Prototype |
| Demonstrate the techniques and benefits of visual communication. | English: 9.6, 10.6, 11.6 History and Social Sciences: WG.1 WHI.1 | 8N. Use various approaches to communicate processes and procedures for using, maintaining, and assessing technological products and systems | Engineering Design CAD Engineering Manufacturing Prototype Transportation Modeling |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|---|---|--|---|
| | WHII.1 VUS.1 | | |
| Explain rapid prototyping to develop models. | English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5 | 2Z. Use management processes in planning, organizing, and controlling work 7DD. Apply a broad range of making skills to their design process | Engineering Design CAD Engineering Manufacturing Prototype Transportation Modeling |
| Demonstrate research techniques/strategies used by engineers. | English: 9.5, 9.6, 10.5, 10.6, 11.5, 11.6 History and Social Sciences: WG.1 WHI.1 WHII.1 VUS.1 | 1Q. Conduct research to inform intentional inventions and innovations that address specific needs and wants 2X. Cite examples of the criteria and constraints of a product or system and how they affect final design | Engineering Design CAD Engineering Manufacturing Prototype |
| Define <i>risk</i> and <i>safety</i> . | English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5 | 8P. Apply appropriate methods to diagnose, adjust and repair systems to ensure precise, safe and proper functionality | |
| Examining the Engineering Design Process | | | |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|---------------------------------------|--|---|--|
| Define an engineering design process. | English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5 Science: PH.1 | 7W. Determine the best approach by evaluating the purpose of the design 7X. Document trade-offs in the technology and engineering design process to produce the optimal design 7Y. Optimize a design by addressing desired qualities within criteria and constraints 7Z. Apply principles of human-centered design 7AA. Illustrate principles, elements, and factors of design | Engineering Design CAD Engineering Manufacturing Prototype |
| Define an engineering design problem. | English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5 | 7W. Determine the best approach by evaluating the purpose of the design 7X. Document trade-offs in the technology and engineering design process to produce the optimal design 7Y. Optimize a design by addressing desired qualities within criteria and constraints | Engineering Design CAD Engineering Manufacturing Prototype |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|---|--------------------------|---|--|
| | | 7Z. Apply principles of human-centered design 7AA. Illustrate principles, elements, and factors of design 8N. Use various approaches to communicate processes and procedures for using, maintaining, and assessing technological products and systems | |
| Identify the specifications/requirements of the design problem. | English: 9.5, 10.5, 11.5 | 7W. Determine the best approach by evaluating the purpose of the design 7X. Document trade-offs in the technology and engineering design process to produce the optimal design 7Y. Optimize a design by addressing desired qualities within criteria and constraints 7Z. Apply principles of human-centered design 7AA. Illustrate principles, elements, and factors of design | Engineering Design CAD Engineering Manufacturing Prototype |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|--|--|--|---|
| Research existing solutions to the design problem. | <p>English: 9.5, 9.8, 10.5, 10.8, 11.5, 11.8</p> <p>History and Social Sciences:</p> <p>WG.1</p> <p>WHI.1</p> <p>WHII.1</p> <p>VUS.1</p> | <p>4T. Evaluate how technologies alter human health and capabilities</p> <p>7W. Determine the best approach by evaluating the purpose of the design</p> <p>7X. Document trade-offs in the technology and engineering design process to produce the optimal design</p> <p>7Y. Optimize a design by addressing desired qualities within criteria and constraints</p> <p>7Z. Apply principles of human-centered design</p> <p>7AA. Illustrate principles, elements, and factors of design</p> | <p>STEM Careers</p> <p>Essays on Technology</p> |
| Generate multiple solutions to the design problem. | <p>English: 9.5, 10.5, 11.5</p> <p>History and Social Sciences:</p> <p>WG.1</p> <p>WHI.1</p> | <p>4T. Evaluate how technologies alter human health and capabilities</p> <p>5J. Design an appropriate technology for use in a different culture</p> | <p>Engineering Design</p> <p>CAD Engineering</p> <p>Manufacturing Prototype</p> |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|---|--|--|--|
| | WHII.1 VUS.1 | 7BB. Implement the best possible solution to a design | |
| Visually communicate the solutions to a design problem. | English: 9.1, 10.1, 11.1 History and Social Sciences: WG.1 WHI.1 WHII.1 VUS.1 | 8N. Use various approaches to communicate processes and procedures for using, maintaining, and assessing technological products and systems | Engineering Design CAD Engineering Manufacturing Prototype |
| Evaluate the criteria and constraints of each potential solution to the design problem. | English: 9.5, 10.5, 11.5 History and Social Sciences: WG.1 WHI.1 WHII.1 VUS.1 | 2X. Cite examples of the criteria and constraints of a product or system and how they affect final design | Geospatial Technology |
| Justify an optimal solution to the design problem. | English: 9.5, 10.5, 11.5 History and Social Sciences: | 4T. Evaluate how technologies alter human health and capabilities | Engineering Design CAD Engineering Manufacturing Prototype |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|--|---|---|--|
| | WG.1 WHI.1 WHII.1 VUS.1 | 5J. Design an appropriate technology for use in a different culture 7BB. Implement the best possible solution to a design | |
| Create a model or prototype for the chosen solution. | English: 9.1, 9.5, 9.6, 9.7, 10.1, 10.5, 10.6, 10.7, 11.1, 11.5, 11.6, 11.7 History and Social Sciences: WG.1 WHI.1 WHII.1 VUS.1 | 7CC. Apply a broad range of design skills to their design process 7DD. Apply a broad range of making skills to their design process | Engineering Design CAD Engineering Manufacturing Prototype Biotechnology Design |
| Create a test plan based on specifications/requirements. | English: 9.1, 10.1, 11.1 History and Social Sciences: WG.1 WHI.1 WHII.1 VUS.1 | 4T. Evaluate how technologies alter human health and capabilities 6H. Evaluate how technology has been a powerful force in reshaping the social, cultural, political, and economic landscapes throughout history | |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|---|--|--|--|
| Test the solution to the design problem. | English: 9.5, 10.5, 11.5 | 4T. Evaluate how technologies alter human health and capabilities 6H. Evaluate how technology has been a powerful force in reshaping the social, cultural, political, and economic landscapes throughout history | |
| Evaluate the test results. | English: 9.5, 10.5, 11.5 History and Social Sciences: WG.1 WHI.1 WHII.1 VUS.1 | 4T. Evaluate how technologies alter human health and capabilities 6H. Evaluate how technology has been a powerful force in reshaping the social, cultural, political, and economic landscapes throughout history | |
| Modify the solution to the design problem, if needed. | English: 9.5, 10.5, 11.5 | 4T. Evaluate how technologies alter human health and capabilities 7W. Determine the best approach by evaluating the purpose of the design 7X. Document trade-offs in the technology and engineering | Engineering Design CAD Engineering Manufacturing Prototype Biotechnology Design |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|--|--|---|---|
| | | <p>design process to produce the optimal design</p> <p>7Y. Optimize a design by addressing desired qualities within criteria and constraints</p> <p>7Z. Apply principles of human-centered design</p> <p>7AA. Illustrate principles, elements, and factors of design</p> | |
| Test the modification/alternate solution, if needed. | English: 9.5, 10.5, 11.5 | <p>4T. Evaluate how technologies alter human health and capabilities</p> <p>6H. Evaluate how technology has been a powerful force in reshaping the social, cultural, political, and economic landscapes throughout history</p> | |
| Document the final project report. | <p>English: 9.5, 10.5, 11.5</p> <p>History and Social Sciences:</p> <p>WG.1</p> <p>WHI.1</p> <p>WHII.1</p> | <p>2T. Demonstrate the use of conceptual, graphical, virtual, mathematical, and physical modeling to identify conflicting considerations before the entire system is developed and to aid in design decision making.</p> <p>8Q. Synthesize data and analyze trends to make</p> | <p>Engineering Design</p> <p>CAD Engineering</p> <p>Manufacturing Prototype</p> <p>Biotechnology Design</p> |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|--|--|---|---|
| | VUS.1 | decisions about technological products, systems, or processes. 8R. Interpret the results of technology assessment to guide policy development | |
| Present the final project report. | English: 9.1, 10.1, 11.1 History and Social Sciences: WG.1 WHI.1 WHII.1 VUS.1 | 4P. Evaluate ways that technology can impact individuals, society, and the environment 4Q. Critique whether existing or proposed technologies use resources sustainably 7X. Document trade-offs in the technology and engineering design process to produce the optimal design | Engineering Design CAD Engineering Manufacturing Prototype |
| Identifying Real-world Problems | | | |
| Research local problems that could benefit from engineering solutions. | English: 9.5, 9.8, 10.5, 10.8, 11.5, 11.8 History and Social Sciences: WG.1 WHI.1 | 6H. Evaluate how technology has been a powerful force in reshaping the social, cultural, political, and economic landscapes throughout history | Engineering Design CAD Engineering Manufacturing Prototype Geospatial Technology |

| Task | SOL Correlations | ITEEA Correlations | TSA Correlations |
|---|--|---|--|
| | WHII.1 VUS.1,14 | 7W. Determine the best approach by evaluating the purpose of the design 7Y. Optimize a design by addressing desired qualities within criteria and constraints | |
| Design an engineering solution to a local problem, using an engineering design process. | English: 9.5, 9.6, 9.7, 10.5, 10.6, 10.7, 11.5, 11.6, 11.7 History and Social Sciences: WG.1 WHI.1 WHII.1 VUS.1 | 6H. Evaluate how technology has been a powerful force in reshaping the social, cultural, political, and economic landscapes throughout history 7W. Determine the best approach by evaluating the purpose of the design 7Y. Optimize a design by addressing desired qualities within criteria and constraints | Engineering Design CAD Engineering Manufacturing Prototype |