

DESIGN - 2019-2020

| | Grade / Unit Title | Time Frame | Statement of Inquiry | Key concepts Focus concepts for subject Communication Communities Development Systems | Related Concepts Adaptation, Collaboration, Ergonomics, Evaluation, Form, Function, Innovation, Invention, Markets & trends, Perspective, Resources, Sustainability | Global Context Should "help students explore the relevance of inquiry" Identities & Relationships; Orientation in Space & Time; Personal & Cultural Expression; Scientific and Technical Innovations; Globalization & Sustainability; Fairness & Development; | ATLs LBCS Agreement Hit all 1x a year Document growth through program (skills hierarchy) | Criterion Assessed All strands of all criteria assessed 2x per year | Content ITSE Standards CCSS NGSS Skills |
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| 6 | Introduction to the Design Cycle: Paper Airplanes | 10 weeks | The design cycle is an iterative process to develop innovations to real world problems. | Development | Innovation | Scientific & Technical Innovation - Products, processes, solutions | Organization | A-D | ITSE 3a. Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits. ITSE 4a. Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems. ITSE 4c. Students develop, test and refine prototypes as part of a cyclical design process. |
| 6 | Computer Science | 14 | Systems are designed for specific form and function. - Conceptual Statement Understanding the form and function of computer systems can support creating new solutions. | Systems | Form, Function | Scientific and Technical Innovation - Systems | Critical Thinking Transfer | A-D | ITSE 1d. Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies. ITSE 5a. Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions. ITSE 5c. Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving. ITSE 5d. Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions. ITSE 6d. Students publish or present content that customizes the message and medium for their intended audiences. |
| 6 | Travel Planner | 8 weeks | Collaboration tools can improve communication and help organize our experiences. | Communication | Collaboration | Personal & Cultural Expression | Information Literacy Media Literacy | A-D | ITSE 1c. Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways. ITSE 2c. Students demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property. ITSE 4b. Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks. ITSE 4d. Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems. ITSE 6a. Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication. ITSE 6d. Students publish or present content that customizes the message and medium for their intended audiences. |
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| 7 | Flexible Environment | 14 weeks | Humans develop new or adapt existing environments to improve function. | Development | Adaptation Function | Scientific & Technical Innovation: "how humans adapt environments to their needs" - modernization | Communication | A-D | ITSE 1c. Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways. ITSE 3c. Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions. ITSE 4a. Students know and use a deliberate design process for generating ideas, testing |

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| | | | | | | | | | <p>theories, creating innovative artifacts or solving authentic problems.</p> <p>ITSE 4b. Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.</p> <p>ITSE 4d. Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.</p> <p>ITSE 6a. Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.</p> <p>ITSE 6c. Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.</p> |
| 7 | Chinese Paddleboats | 4 Weeks | Long term economic growth depends on investment in transportation systems. | Global Interaction (Individuals Societies) Development (Design) | Invention, | Scientific & Technical Innovation - <i>industrialization and engineering</i> | Transfer | A-D | <p>ITSE 3d. Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.</p> <p>ITSE 4a. Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.</p> <p>ITSE 4c. Students develop, test and refine prototypes as part of a cyclical design process.</p> <p>ITSE 6b. Students create original works or responsibly repurpose or remix digital resources into new creations.</p> |
| 7 | Sphero | 14 | Communication allows for improved function, innovation of systems, processes and solutions. | Communication | Innovation, Evaluation | Scientific & Technical Innovation - <i>Opportunity, risk, consequences and responsibility</i> | Communication | A-D | <p>ITSE 1d. Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.</p> <p>ITSE 4c. Students develop, test and refine prototypes as part of a cyclical design process.</p> <p>ITSE 5a. Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.</p> <p>ITSE 5c. Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.</p> <p>ITSE 5d. Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.</p> <p>ITSE 7c. Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.</p> |
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| 8 | Code Challenge Old version | 14 | Applying innovation to societal needs is a powerful tool for the development of new technologies. | Development | Function, Form, Innovation | Scientific & Technical Innovation - <i>Digital life, virtual environments and the Information Age</i> | Media Literacy | A-D | <p>ITSE 1c. Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.</p> <p>ITSE 1d. Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.</p> <p>ITSE 3d. Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.</p> <p>ITSE 4a. Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.</p> <p>ITSE 4d. Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.</p> <p>ITSE 5a. Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.</p> <p>ITSE 5c. Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.</p> <p>ITSE 5d. Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.</p> |

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| 8 | Truss Bridges | 10 | Engineers improve structure systems as a result of years of trial, error and reflection. | Systems | Form, Collaboration | Orientation in Time & Place. Need to reflect on this | Collaboration, Transfer | A-D | <p>ITSE 3a. Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.</p> <p>ITSE 3b. Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.</p> <p>ITSE 6a. Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.</p> <p>ITSE 6b. Students create original works or responsibly repurpose or remix digital resources into new creations.</p> <p>ITSE 6c. Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.</p> <p>ITSE 7c. Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.</p> |
| 8 | 3D Product Design | 8 | Fusing personal and cultural expressions with markets and trends allow designers to develop products that customers desire. | Communities | Adaptation, Ergonomics, Perspective | Personal & Cultural Expression - <i>Products, Play</i> | Creativity and Innovation | A-D | <p>ITSE 1c. Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.</p> <p>ITSE 2c. Students demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.</p> <p>ITSE 3d. Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.</p> <p>ITSE 4b. Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.</p> <p>ITSE 4c. Students develop, test and refine prototypes as part of a cyclical design process.</p> <p>ITSE 4d. Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.</p> <p>ITSE 6b. Students create original works or responsibly repurpose or remix digital resources into new creations.</p> <p>ITSE 6d. Students publish or present content that customizes the message and medium for their intended audiences.</p> |