Dublin City Schools
STEAM
Graded Course of Study
2022

DCS STEAM Vision

Dublin City Schools is committed to providing purposeful STEAM learning experiences to students throughout their K-12 journey. These experiences will be in the form of integrated, interdisciplinary experiences as well as focused pathways in the areas of STEAM.

We commit to transforming STEAM into more than the integration of Science, Technology, Engineering, and Mathematics with vision to expand ownership to all disciplines and grade levels. By creating a culture of thinking, curiosity and creativity across content, students will engage in interest based learning that will help them develop the attitudes and skills that will support them in a variety of career and life pathways. These learning experiences will support students as lifelong, adaptable learners who can thrive in a quickly changing world.

We believe in STEAM learning for all students and commit to creating equitable access so that our STEAM classrooms are representative of our school populations and communities.

Instructional Agreements:
- We recognize the importance of early access and exposure to STEAM learning.
- We prioritize learning where students will identify and solve open-ended problems and engage in experiential learning.
- We will engage students through a lens of design thinking and promote opportunities for PBL.
- We will provide students with industry connections and experiences.
- We prioritize educating the whole child, in addition to our content. This includes a commitment to employability skills and emotional intelligence.
- We value students seeing themselves in STEAM fields.

Technology Solutions - Grade 8

Technology Solutions 8 Course Goals:

Students will solve real world problems by exploring a variety of technologies and using a problem-based approach. Students will use design thinking and creatively explore topics including graphic design, coding and other topics of interest/relevance.

Graphic Design		
Strand	**Topic**	**Content Statements**
ISTE 3 Knowledge Constructor Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.	**Creativity and Innovation** Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.	3.a Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits. 3.b Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources. 3.c Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions. 3.d Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.
ISTE 4 Innovative Designer Students use a variety of technologies within a design process to identify and solve problems by creating		4.a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems. 4.b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks. 4.c Students develop, test and refine prototypes as part of a cyclical

new, useful or imaginative solutions.		design process. 4.d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
ISTE 6 Creative Communicator Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.	**Communications and Collaboration** Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.	6.a Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication. 6.b Students create original works or responsibly repurpose or remix digital resources into new creations. 6.c Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations. 6.d Students publish or present content that customizes the message and medium for their intended audiences.
ISTE 7 Global Collaborator Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.	**Critical Thinking, Problem Solving, and Decision Making** Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.	7.a Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning. 7.b Students use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints. 7.c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal. 7.d Students explore local and global issues and use collaborative technologies to work with others to investigate solutions.

Information & Communications Technology (OH Tech) The understanding and application of digital learning tools for accessing, creating, evaluating, applying and communicating ideas and information.	4. Use digital learning tools and resources to communicate and disseminate information to multiple audiences.	6-8.ICT.4.a. Use digital learning tools and resources to identify communication needs considering goals, audience and content. 6-8.ICT.4.b. Select and use a variety of media formats to communicate information to a target audience. 6-8.ICT.4.c. Discuss and identify ways to communicate and disseminate information so that users with varied needs can access information. 6-8.ICT.4.d. Evaluate the effectiveness of a digital tool to communicate information with multiple audiences.
Design & Technology (OH Tech) Addresses the nature of technology to develop and improve products and systems over time to meet human/societal needs and wants through design processes.	2. Identify a problem and use an engineering design process to solve the problem.	6-8.DT.2a Apply a complete design process to solve an identified individual or community problem: research, develop, test, evaluate and present several possible solutions, and redesign to improve the solution. 6-8.DT.2b Describe how invention is a process of turning ideas and imagination into devices and systems. 6-8.DT.2c Explain how innovation is the process of modifying an existing system or system element(s) to improve it. 6-8.DT.2d Consider multiple factors, including criteria and constraints, (e.g., research, cost, time, materials, feedback, safety) to justify decisions when developing products and systems to solve problems. 6-8.DT.2e Identify and explain why effective designs develop from non-linear, flexible application of a design process.
	3. Demonstrate that solutions to complex problems require collaboration, interdisciplinary	6-8.DT.3a Collaborate to solve a problem as an interdisciplinary team modeling different roles and functions.

| | understanding and systems thinking | 6-8.DT.3b Explain ways that invention and innovation within one field can transfer into other fields of technology.

6-8.DT.3c Evaluate the effectiveness of the group's collaboration during the engineering design process and the contribution of the varying roles.

6-8.DT.3d Give examples of how changes in one part of a system can impact other parts of that system.

6-8.DT.3e Deconstruct a system into its component parts and describe how they interrelate. |

Coding		
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3.b Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.

3.c Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.

3.d Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions. |

ISTE 4 Innovative Designer Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.		4.a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems. 4.b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks. 4.c Students develop, test and refine prototypes as part of a cyclical design process. 4.d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
ISTE 6 Creative Communicator Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.	**Communications and Collaboration** Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.	6.a Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication. 6.b Students create original works or responsibly repurpose or remix digital resources into new creations. 6.c Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations. 6.d Students publish or present content that customizes the message and medium for their intended audiences.

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and systems over time to meet human/societal needs and wants through design processes.		6-8.DT.2c Explain how innovation is the process of modifying an existing system or system element(s) to improve it. 6-8.DT.2d Consider multiple factors, including criteria and constraints, (e.g., research, cost, time, materials, feedback, safety) to justify decisions when developing products and systems to solve problems. 6-8.DT.2e Identify and explain why effective designs develop from non-linear, flexible application of a design process.
	3. Demonstrate that solutions to complex problems require collaboration, interdisciplinary understanding and systems thinking	6-8.DT.3a Collaborate to solve a problem as an interdisciplinary team modeling different roles and functions. 6-8.DT.3b Explain ways that invention and innovation within one field can transfer into other fields of technology. 6-8.DT.3c Evaluate the effectiveness of the group's collaboration during the engineering design process and the contribution of the varying roles. 6-8.DT.3d Give examples of how changes in one part of a system can impact other parts of that system. 6-8.DT.3e Deconstruct a system into its component parts and describe how they interrelate.
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Computing Systems (OH Comp Sci)	Troubleshooting	CS.T.8.a Use a systematic process to identify and evaluate the source of a routine computing problem. Select the best solution to solve the computing problem and communicate the solution to others.
Data and Analysis (OH Comp Sci)	Data Collection and Storage	DA.DCS.8.a Interpret digital data collection tools to manage information effectively. DA.DCS.8.b Identify data storage systems to define how data is stored and accessed. DA.DCS.8.c Create a logical file structure to organize data in different storage systems to support individual and collaborative work.
	Visualization and Communication	DA.VC.8.a Evaluate data to construct a model or representation. DA.VC.8.b Create a spreadsheet utilizing formulas, functions and graphs to represent and analyze data.
Algorithmic Thinking and Programming (OH Comp Sci)	Algorithms	ATP.A.8.a Create multiple pseudocode to solve a multi-step process and justify the most efficient solution.
	Variables and Data Representation	ATP.VDR.8.a Analyze test cases and determine the range of valid solutions. ATP.VDR.8.b Use a data structure to represent a collection.
	Control Structures	ATP.CS.8.a Use and apply decisions and loops in a program to solve a problem.
	Modularity	ATP.M.8.a Decompose problems and subproblems into parts to

		facilitate the design, implementation and review of complex programs.
	Program Development	ATP.PD.8.a Write code that utilizes algorithms, variables and control structures to solve problems or as a creative expression. ATP.PD.8.b Systematically test and refine programs using a range of test cases. ATP.PD.8.c Use procedures that utilize parameters to pass values.

Solving Real World Problems Through Design
Students explore topics like Engineering and Video Production to create and solve problems that exist in the world.

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