



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.

Advanced Engineering and Industrial Design - High School

Advanced Engineering and Industrial Design Course Goals:

In this course, students will apply foundational engineering and industrial design concepts learned in the introductory course through creating actual solutions to real world hands-on design challenges. Using the Engineering Design process, students will investigate, research, design, test, develop, evaluate and communicate creative solutions for contemporary problems. Additionally, they will learn how to safely utilize tools and machines in the fabrication lab to transform their designs into actual models and working prototypes that can be tested and evaluated.

Safety		
Strand	Topic	Content Statement
Equipment Safety	Tools and Habits	Develop safe workshop habits using power tools and hand tools.

Advanced Solid 2D/3D Modeling		
Strand	Topic	Content Statement
Information and Communications Technology (OH Tech) The understanding and application of digital learning tools for accessing, creating, evaluating, applying and communicating ideas and information.	3. Use digital learning tools and resources to construct knowledge.	9-12.ICT.3.c Create artifacts using digital learning tools and resources to demonstrate knowledge.
	4. Use digital learning tools and resources to communicate and disseminate information to multiple audiences.	9-12.ICT.4.d Use digital learning tools to represent and model complex systems of information to a target audience.

**Advanced Concept Sketching &
Technical Drawing**

Strand	Topic	Content Statement
<p>Information and Communications Technology (OH Tech) The understanding and application of digital learning tools for accessing, creating, evaluating, applying and communicating ideas and information.</p>	<p>1. Identify and use appropriate digital learning tools and resources to accomplish a defined task.</p>	<p>9-12.ICT.1.a Develop strategies for using digital learning tools and resources to plan, implement and reflect upon a complex task.</p>
<p>Design and 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.</p>	<p>2. Identify a problem and use an engineering design process to solve the problem.</p>	<p>9-12.DT.2.b Implement, document and present a design process as applied to a particular product, process or problem.</p>

Advanced Design: Reverse Engineering

Strand	Topic	Content Statement
Design and 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.	1. Define and describe technology, including its core concepts of systems, resources, requirements, processes, controls, optimization and trade-offs.	9-12.DT.1.a Explore and document how systems theory includes the concepts of system dynamics, systems thinking and computational thinking. 9-12.DT.1.b Discuss how a design process builds on the core concepts of technology, including the relationship between systems.
	2. Identify a problem and use an engineering design process to solve the problem.	9-12.DT.2.b Implement, document and present a design process as applied to a particular product, process or problem.

Project & Portfolio Development

Strand	Topic	Content Statement
Design And 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.	3. Identify a problem and use an engineering design process to solve the problem.	9-12.DT.2.b Implement, document and present a design process as applied to a particular product, process or problem.

Advanced Tooling, Prototyping & Manufacturing

Strand	Topic	Content Statement
<p>Design And 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.</p>	<p>2. Identify a problem and use an engineering design process to solve the problem.</p>	<p>9-12.DT.2.a Evaluate a design solution using conceptual, physical, digital and mathematical models at various intervals of a design process in order to check for proper design and note areas where improvements are needed (e.g., check the design solutions against criteria and constraints).</p> <p>9-12.DT.2.b Implement, document and present a design process as applied to a particular product, process or problem.</p>

Advanced Project Management

Strand	Topic	Content Statement
<p>Information and Communications Technology (OH Tech) The understanding and application of digital learning tools for accessing, creating, evaluating, applying and communicating ideas and information.</p>	<p>1. Identify and use appropriate digital learning tools and resources to accomplish a defined task.</p>	<p>9-12.ICT.1.b Based on project-specific requirements, develop criteria to select digital learning tools and resources to support the concurrent management of multiple projects.</p> <p>9-12.ICT.1.c Analyze and evaluate the ease of use and effectiveness of available features of selected digital learning tools and resources.</p>
	<p>2. Use digital learning tools and resources to locate, evaluate and use information.</p>	<p>9-12.ICT.2.b Independently construct an evaluative process for information sources chosen for a learning task.</p> <p>9-12.ICT.2.c Analyze the complexities and discrepancies found in digital information to make informed decisions.</p>

Advanced Digital Portfolio Development

Strand	Topic	Content Statement
<p>Information and Communications Technology (OH Tech) The understanding and application of digital learning tools for accessing, creating, evaluating, applying and communicating ideas and information.</p>	<p>4. Use digital learning tools and resources to communicate and disseminate information to multiple audiences.</p>	<p>9-12.ICT.4.a Use digital learning tools and resources to identify communication needs considering goals, audience, content, access to tools or devices, timing of communication (e.g., time zones), etc.</p> <p>9-12.ICT.4.b Based on communication needs, develop, implement and evaluate a communication plan to disseminate information to multiple audiences.</p> <p>9-12.ICT.4.c Integrate accessibility principles to effectively communicate to, and meet the needs of, multiple audiences.</p> <p>9-12.ICT.4.d Use digital learning tools to represent and model complex systems of information to a target audience.</p>

Advanced Design

Strand	Topic	Content Statement
<p>Design and 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.</p>	<p>4. Evaluate designs using functional, aesthetic and creative elements.</p>	<p>9-12.DT.4.a Evaluate project/product solutions and communicate observations of the entire design process results.</p> <p>9-12.DT.4.b Interpret data/information related to product testing to determine revisions and modifications to a design's function and aesthetics.</p> <p>9-12.DT.4.c Critically evaluate a design solution at multiple points of a design process. Consider design requirements and adjust processes and outcomes as needed.</p>

Design Portfolio

Strand	Topic	Content Statement
Information and Communications Technology (OH Tech) The understanding and application of digital learning tools for accessing, creating, evaluating, applying and communicating ideas and information.	3. Use digital learning tools and resources to construct knowledge.	9-12.ICT.3.c Create artifacts using digital learning tools and resources to demonstrate knowledge.
Design and 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.	9-12.DT.2.b Implement, document and present a design process as applied to a particular product, process or problem.
	4. Evaluate designs using functional, aesthetic and creative elements.	9-12.DT.4.a Evaluate project/product solutions and communicate observations of the entire design process results.