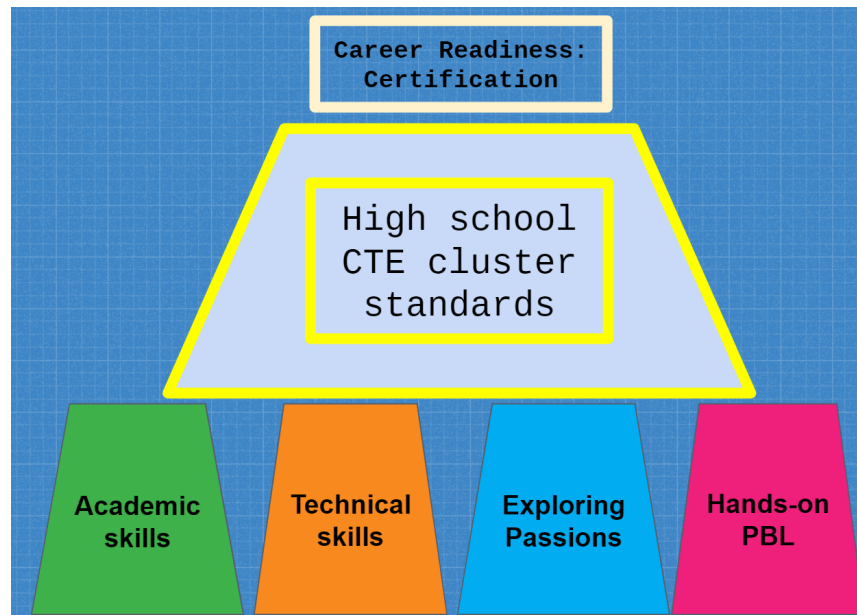


## BlocksCAD Standards Alignment with Select Common Career Technical Core (CCTC) Pathways



**Career Technical Education (CTE)** provides students of all ages with the academic and technical skills, knowledge and training necessary to succeed in future careers and to become lifelong learners. In total, about 12.5 million high school and college students are enrolled in CTE across the nation. CTE prepares these learners for the world of work by introducing them to workplace competencies, and makes academic content accessible to students by providing it in a hands-on context.

**Advance CTE** is the longest-standing national non-profit that represents State CTE Directors and state leaders of Career Technical Education.

**BlocksCAD** provides the hands-on, engaging experience necessary for successful CTE education. It equips students with both academic and technical skills that are aligned directly to CTE standards.

# Alignment to career cluster standards

BlocksCAD supports foundational exploration and skill development of all 16 CTE career clusters ([alignment provided here](#)). This document details specific standards alignment for four of the career pathways. BlocksCAD lessons that address these standards can be found at [www.blockscad3d.com/edu/lessons](http://www.blockscad3d.com/edu/lessons).

1. [Architecture & Construction](#)
2. [Arts, A/V Technology & Communications](#)
3. [Information Technology](#)
4. [Science, Technology, Engineering & Mathematics](#)

# Architecture & Construction

## 2. Use architecture and construction skills to create and manage a project

Standard	In BlocksCAD
AC 2.2: Estimate resources/materials required for a specific project or problem.	Make connections and calculations comparing scaled models to real-world resources.
AC 2.4: Determine alternative solutions for a specific project/problem.	Use problem-solving techniques in BlocksCAD to determine the best route for directing your project. Brainstorm with a group before beginning a model.
AC 2.5: Plan, organize, schedule, and manage a project/job to optimize workflow and outcome.	Optimize workflow through the use of a detailed written plan before and during a building project.

## 6. Read, interpret, and use technical drawings, documents and specifications to plan a project

Standard	In BlocksCAD
AC 6.1: Interpret drawings used in project planning.	BlocksCAD targets visual translation as a means of conveying ideas.
AC 6.3: Use architect's plan, manufacturer's illustrations and other materials to communicate specific data and visualize proposed work.	Modeling through BlocksCAD as a way of thinking of a larger project in a more manageable, productive way.

## Design/Pre-Construction Pathway (AC-DES)

### 2. Use effective communication skills and strategies (listening, speaking, reading, writing, and graphic communications) to work with clients and colleagues.

Standard	In BlocksCAD
AC-DES 2.1: Employ facilitation skills while leading meetings that involve a variety of clients and agencies.	Share and present work to classmates or peers and collaborate in groups to accomplish larger projects.

### 6. Apply the techniques and skills of modern drafting, design, engineering, and construction to projects.

<b>Standard</b>	<b>In BlocksCAD</b>
AC-DES 6.1: Apply basic organizational, spatial, structural, and constructional principles to the design of interior and exterior space to produce an effective design.	Write organized and clear code while also constructing organized, realistic, and structurally sound models.
AC-DES 6.2: Read and produce technical drawings, understanding the significance of each line in a drawing.	Learn to write and interpret block-based code.
AC-DES 6.3: Use communication skills and strategies to work effectively with people (including clients, team members, and others) to identify design/construction requirements.	Collaborate with peers on building projects and follow specific project requirements.

**7. Employ appropriate representational media to communicate concepts and design.**

<b>Standard</b>	<b>In BlocksCAD</b>
AC-DES 7.1: Convey graphic information using multi-dimensional drawings.	Combine BlocksCAD building projects with 2D drafting and sketching. Work in both directions, learning how to communicate a visual idea by multiple different means.
AC-DES 7.2: Build models using referenced drawings and sketches	
AC-DES 7.3: Utilize computer technology when communicating concepts and designs.	

# Arts, A/V Technology & Communications

- Analyze the interdependence of the technical and artistic elements of various careers within the Arts, A/V Technology and Communications Cluster**

<b>Standard</b>	<b>In BlocksCAD</b>
AR 1.1: Summarize the features of the partnership that technology and the arts have in developing presentations and productions.	Understand and analyze the relationship between art and technology through designing unique work in BlocksCAD.

- Evaluate technological advancements and tools that are essential to occupations within the Arts, A/V Technology & Communications Career Cluster.**

<b>Standard</b>	<b>In BlocksCAD</b>
AR 6.1: Research the impact of potential new technological advancements related to this cluster in the future	Explore the potential of 3D modeling technology and the use of 3D printers for creating physical art.

## **Visual Arts Career Pathway (AR-VIS)**

- Describe the history and evolution of the visual arts and its role in and impact on society.**

<b>Standard</b>	<b>In BlocksCAD</b>
AR-VIS 1.2: Analyze the opportunities for communication through the visual arts.	Use BlocksCAD projects as tools for storytelling and visual communication of complex ideas.
AR-VIS 1.3: Evaluate works of art using critical thinking skills.	Have students share their work in traditional critique format, evaluating both technical design skills and project aesthetics.
AR-VIS 1.4: Present written and oral evaluations of visual art works.	
AR-VIS 1.5: Analyze the development of tools and technologies employed in the visual arts.	BlocksCAD is an example of a tool that can be used to enhance visual art production

### 3. Analyze and create two- and three-dimensional art forms using various media.

<b>Standard</b>	<b>In BlocksCAD</b>
AR-VIS 3.3: Analyze multimedia applications of software/hardware for the purposes of visual communications.	Learn to use a specific software platform to create digital art.
AR-VIS 3.4: Analyze art elements and principles of three-dimensional forms of visual art in various media.	Explore public projects and classmates' work to identify art elements and foundational principles of design.
AR-VIS 3.5: Apply art elements and principles to virtual and interactive platforms.	Build BlocksCAD projects that explicitly incorporate specific elements of art and design.

# Information Technology

## Programming & Software Development Career Pathways (IT-PRG)

### 2. Demonstrate the use of industry standard strategies and project planning to meet customer specifications.

Standard	In BlocksCAD
IT-PRG 2.1: Utilize interpersonal skills necessary to work on a software development team.	Work on BlocksCAD projects in teams, dividing work and writing code that is easy to share and interpret by others.
IT-PRG 2.3: Design project plan.	Develop a plan for how best to code each component of a desired model.

### 4. Demonstrate the effective use of software development tools to develop software applications.

Standard	In BlocksCAD
IT-PRG 4.1: Employ tools in developing software applications.	Apply OpenSCAD language tools such as loops, modules, and variables in service of 3D designs.
IT-PRG 4.3: Apply language-specific programming tools/techniques.	

### 6. Program a computer application using the appropriate programming language.

Standard	In BlocksCAD
IT-PRG 6.1: Explain programming language concepts.	Students will learn to organize and label their code and explain how they use tools such as loops, modules and variables to efficiently create their desired 3D outputs.
IT-PRG 6.3: Demonstrate proficiency in developing an application using an appropriate programming language.	

# Science, Technology, Engineering & Mathematics

## 1. Apply engineering skills in a project that requires project management, process control and quality assurance.

Standard	In BlocksCAD
ST 1.1: Apply the skills and abilities in requirements analysis and configuration control while working plans, processes, and projects as assigned.	All projects in BlocksCAD require planning, integration of multiple processes, organization, and reflection.
ST 1.2: Use the skills required in project management to track and assess the progress of a plan, process, or project as assigned.	

## 2. Use technology to acquire, manipulate, analyze and report data.

Standard	In BlocksCAD
2.2: Use modeling, simulation, or visual reproduction to effectively analyze, create, and/or communicate to others regarding plans, projects, problems, issues, or processes.	Each project requires students to translate their own ideas into code and then use their code to create 3D models that communicate specific ideas or goals through design.
ST 2.3: Apply a currently applicable computer programming language to a process, project, plan or issue as assigned.	The block-based interface is transferable to many other programming platforms and the underlying OpenSCAD language is relevant in many fields.

## 4. Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career Cluster and the role of STEM in society and the economy.

Standard	In BlocksCAD
ST 4.1: Describe the relationship between the STEM Career Cluster and society.	Curriculum places students in the role of many different STEM professionals, from architects and engineers to scientists and business owners.
ST 4.2: Describe the effect society and the economy have upon the STEM Career Pathways.	
ST 4.3: Understand STEM knowledge and skills to analyze and suggest solutions to societal problems.	BlocksCAD projects are regularly aligned to addressing specific societal problems and all hinge on successful application of STEM knowledge.



**5. Demonstrate an understanding of the breadth of career opportunities and means to those opportunities in each of the Science, Technology, Engineering & Mathematics Career Pathways.**

Standard	In BlocksCAD
ST 5.1: Research and match career opportunities based upon their fit with personal career goals.	Student agency is central to every BlocksCAD experience. With over 150 lessons to choose from, differentiation based on student interest is easy and even within projects students are able to build based on their own preferences and interests. The diversity of projects introduces students to many possible career pathways.
ST 5.2: Match personal interests and aptitudes to careers when researching opportunities within the pathways.	
ST 5.4: Engage in STEM experiences where an individual can identify personal interests and expectations for career and personal development.	

**Engineering & Technology Career Pathway (ST-ET)**

**1. Use STEM concepts and processes to solve problems involving design and/or production.**

Standard	In BlocksCAD
ST-ET 1.1: Apply the core concepts of technology and recognize the relationships with STEM systems (e.g., systems, resources, criteria and constraints, optimization and trade-off, and controls).	The BlocksCAD interface itself is a clear example of bringing technology into STEM, and the projects in the curriculum further address how to use STEM systems to solve problems.
ST-ET 1.3: Use computer applications to solve problems by creating and using algorithms, and through simulation and modeling techniques.	BlocksCAD requires writing clear and effective code. It includes explicit instances of algorithms through the use of tools like modules and loops.

## 2. Display and communicate STEM information.

Standard	In BlocksCAD
ST-ET 2.2: Read and create basic computer-aided engineering drawings.	Every building project is an example of using a CAD tool to create a 3D model.

## 3. Apply processes and concepts for the use of technological tools in STEM.

Standard	In BlocksCAD
ST-ET 3.1: Use knowledge, techniques, skills and modern tools necessary for engineering practice.	BlocksCAD introduces students to CAD principles and skills essential for modern engineering.
ST-ET 3.2: Describe the elements of good engineering practice (e.g., understanding customer needs, planning requirements analysis, using appropriate engineering tools, prototyping, testing, evaluating and verifying).	Projects all include elements of project planning including sketching, trial-and-error, prototyping, and problem-solving.
ST-ET 4.3: Describe design constraints, criteria, and trade-offs in regard to variety of conditions (e.g., technology, cost, safety, society, environment, time, human resources, manufacturability).	BlocksCAD curriculum regularly addresses design constraints and considerations relating to the cost, feasibility, and impact of models and manufactured products.

## 5. Apply the elements of the design process.

Standard	In BlocksCAD
ST-ET 5.1: Apply the design process using appropriate modeling and prototyping, testing, verification and implementation techniques.	BlocksCAD projects can serve as the modeling/prototyping stage of larger projects, and projects within BlocksCAD can self-contain the complete design process.
ST-ET 5.2: Demonstrate the ability to evaluate a design or product and improve the design using testing, modeling and research.	

## 6. Apply the knowledge learned in STEM to solve problems.

Standard	In BlocksCAD
ST-ET 6.1: Apply the use of algebraic, geometric, and trigonometric relationships, characteristics	BlocksCAD is fundamentally a geometric platform. Every project is a problem of manipulating

and properties to solve problems.	geometric shapes using transformations and numerical reasoning.
ST-ET 6.3: Exhibit the ability to select, apply and convert systems of measurement to solve problems.	Modeling on BlocksCAD's millimeter scale involves careful unit conversion to make projects to desired scale. Several projects address unit conversion specifically.
ST-ET 6.6: Apply and create appropriate models, concepts, and processes for an assigned situation, and apply the results to solving the problem.	Each project presents a situation or problem that can be solved or represented using an appropriate model.

## Science and Math Career Pathway (ST-SM)

### 1. Apply science and mathematics to provide results, answers and algorithms for engineering and technological activities

Standard	In BlocksCAD
ST-SM 1.1: Apply science and mathematics concepts and principles to resolve plans, projects, processes, issues or problems through methods of inquiry.	BlocksCAD projects require creative and iterative application of mathematical methods and scientific thinking. Each project asks students to consider a problem or task and use their STEM skills to model a response or representation.
ST-SM 1.3: Use the skills and abilities in science and mathematics to integrate solutions related to technical or engineering activities using the content and concepts related to the situations.	
ST-SM 1.4: Explain the role of modeling in science and engineering.	

### 4. Apply critical thinking skills to review information, explain statistical analysis, and to translate, interpret and summarize research and statistical data.

Standard	In BlocksCAD
ST-SM 4.1: Demonstrate and use effective critical thinking and reasoning skills by making and testing conjectures, drawing logical conclusions and justifying thinking.	In both their big-picture project planning and in the details of code-writing, students working in BlocksCAD have to think critically to create accurate and sophisticated models.