Computer Science 7 Curriculum

Board Approved: 05/21/2026

Course Information

Middle School
Quarter-Elective

Course Description:

This course builds on foundational computer science concepts introduced in Computer Science 6 and moves students toward more independent problem solving and design. Students examine how computing technologies influence communication, collaboration, and decision making in everyday life. Through hands-on projects, students evaluate digital tools, design digital artifacts, develop algorithms, and apply programming concepts to solve problems. Students also work with microcontrollers and digital design tools while refining their solutions through testing, feedback, and iteration.

Transfer Goals:

- Evaluate cybersecurity risks and apply responsible decision-making when participating in digital environments.
- Design and refine digital artifacts using collaborative tools to communicate ideas and solve problems for specific audiences.
- Develop and test programs that use algorithms, variables, loops, and conditionals to solve problems and complete tasks.
- Use digital design tools and computing devices, including microcontrollers, to design solutions that meet defined constraints and user needs.

Vertical Articulation:
Computer Science 6:
Provides foundational exposure to computer science concepts including cybersecurity, digital design, and introductory programming. Students develop basic computational thinking skills while working in structured and scaffolded learning environments.
Computer Science 7:
Builds on these foundational skills by having students evaluate digital technologies, design solutions with defined constraints, and develop algorithms to solve problems. Students collaborate to create digital artifacts, apply programming concepts,

	and refine their solutions through testing and feedback. **Computer Science 8:** Students apply these concepts more independently as they integrate hardware and software systems to engineer solutions to more complex problems. Students design, test, and refine systems that use advanced programming structures and physical computing devices.
Curriculum Standards: Missouri K-12 Computer Science Standards **Proficiency Scales:** Computer Science 7 Proficiency Scales	
Curriculum Resource(s): N/A	

Unit 1: Digital Design

Timeframe: 1 week

Unit Description: In this unit, students explore how graphic design communicates ideas and influences how information is interpreted by an audience. Students evaluate how visual elements such as color, layout, typography, and imagery affect the effectiveness of a design. Using digital design tools, students create visual artifacts that communicate a specific message or purpose for a target audience. Through critique, revision, and iterative design, students refine their work while considering how design choices impact clarity, usability, and visual communication.

Enduring Understandings:

- Visual design choices such as color, layout, typography, and imagery influence how information is communicated and interpreted by an audience.
- Digital design tools allow users to create and refine visual artifacts that communicate ideas and messages.
- Designing effective visual communication requires evaluating how well a design meets the needs of its intended audience.
- Feedback and revision are important parts of the design process and help improve the clarity and effectiveness of digital artifacts.

Essential Questions:

- How do design choices such as color, layout, and typography affect how a message is communicated?
- How can digital tools help us create visual designs that communicate ideas clearly?
- How can feedback from others help improve a visual design?
- How can design choices influence how people interpret information?

Unit 1 Standards	
STANDARD CODE	**STUDENTS WILL KNOW, BE ABLE TO, AND UNDERSTAND:**
6-8.CS.D.01	• **I can evaluate the user interface of a digital tool and propose specific design changes to improve the user's experience and efficiency.**
6-8.AP.PD.02	• I can use feedback from others to improve a visual design. • I can revise a design to better communicate a message to an audience.
6-8.IC.C.01	• I can explain how digital design tools help people communicate ideas. • I can describe how design choices influence how people interpret digital information.
6-8.AP.PD.03	• I can give proper credit to images, fonts, or media I use in my digital designs.
6-8.IC.C.02	• I can identify how color choices or font sizes might make a design less accessible for certain user

priority standards indicated in **bold*

Unit 2: Web Design

Timeframe: 2 weeks

Unit Description: In this unit, students design and create a basic website that communicates information to a specific audience. Students evaluate website layouts, navigation, and usability to understand how design choices affect how users interact with digital content. Throughout the design process, students consider ethical issues such as protecting privacy, sharing information responsibly, and giving proper attribution for digital media. Students use feedback and revision to improve their websites while managing project tasks and timelines to complete a functional digital artifact.

Enduring Understandings:

- The effectiveness of a website depends on its layout, organization, and usability for the intended audience.
- Publishing information online requires responsible decision-making about privacy, attribution, and ethical use of digital media.
- Designing a functional website requires planning, testing, and revising digital content.
- Feedback and revision help improve how users experience and interact with digital artifacts.
- Managing tasks and timelines helps creators complete complex digital projects.

Essential Questions:

- How do layout and navigation affect how users interact with a website?
- What should we consider before publishing information on a public website?
- How can websites communicate information effectively to a specific audience?
- How can feedback help improve the design and usability of a website?
- How does responsible use of digital media affect what we publish online?

Unit 2 Standards	
STANDARD CODE	**STUDENTS WILL KNOW, BE ABLE TO, AND UNDERSTAND:**
6-8.CS.D.01	• I can evaluate the user interface of a digital tool and propose specific design changes to improve the user's experience and efficiency.
6-8.IC.SLE.01	• **I can explain the tradeoffs between sharing information online and protecting personal privacy.** • **I can decide what information is appropriate to publish on a public website.**
6-8.AP.PD.02	• I can use feedback from others to improve a website's design and usability.
6-8.AP.PD.05	• I can use a planning tool (such as a storyboard or task list) to manage the development of my website artifact.
6-8.IC.C.01	• I can explain how websites allow people to communicate information to a large audience.
6-8.AP.PD.03	• I can provide proper attribution for images and media used on my website.

priority standards indicated in **bold*

6-8.IC.C.02	• I can design a website that is accessible to diverse users (e.g., clear navigation, high contrast).

Unit 3: Programming Foundations

Timeframe: 3 weeks

Unit Description: In this unit, students develop programming skills by designing and testing programs that interact with physical computing systems. Students apply computational thinking to design algorithms, use variables and control structures, and debug programs that respond to inputs and produce outputs. Through hands-on design challenges, students explore how code can control electronic components and circuits to create interactive systems. Students design and build physical projects that combine hardware and software while refining their programs through testing, troubleshooting, and feedback.

Enduring Understandings:

- Programs use algorithms to organize instructions that allow computers or devices to perform specific tasks.
- Control structures such as loops and conditionals allow programs to respond to different inputs and situations.
- Variables allow programs to store, update, and use information while a program is running.
- Programming often involves testing and debugging in order to identify problems and improve how a system functions.
- Computing systems can combine software and electronic components to create interactive physical systems.

Essential Questions:

- How do algorithms help us organize the steps needed to solve a problem with code?
- How do loops and conditionals allow programs to respond to different inputs or situations?
- How do variables help programs store and use information?
- How does testing and debugging help improve how a program works?
- How can programs interact with electronic components to create physical computing systems?

Unit 3 Standards	
STANDARD CODE	**STUDENTS WILL KNOW, BE ABLE TO, AND UNDERSTAND:**
6-8.AP.A.01	• I can design an algorithm using flowcharts or pseudocode to represent the logic needed to solve a complex problem.
6-8.AP.C.01	• I can use loops to repeat actions in a program. • I can use conditionals to make a program respond to different inputs or situations.
6-8.AP.M.01	• I can decompose a complex physical computing problem into smaller, manageable sub-problems.
6-8.AP.V.01	• I can create variables to store information in a program. • I can use variables to change or update information while a program runs.
6-8.AP.PD.04	• I can test a program to see if it works correctly. • I can debug a program to identify and fix errors.
6-8.CS.HS.01	• **I can design and build a computing system that uses software to control**

priority standards indicated in **bold*

	hardware components (like sensors or motors) to collect and exchange data.
6-8.AP.PD.02	● I can use feedback from peers to refine my program's logic and user experience.

Unit 4: 3D Design

Timeframe: 4 weeks

Unit Description: In this unit, students use 3D modeling software to design solutions to real-world design challenges while working within defined design constraints. Students evaluate how digital design tools allow users to create, modify, and improve three-dimensional models while considering layout, usability, and functionality. Through the design process, students plan, build, and refine a digital model that meets project goals. Students analyze feedback, revise their designs, and manage project tasks and timelines while exploring how digital modeling tools support problem solving and engineering design.

Enduring Understandings:

- Digital design tools allow users to create and modify three-dimensional models to represent ideas and solutions.
- Designing a digital model requires considering space, layout, and functionality.
- The design process involves planning, building, testing, and revising a model to improve the final result.
- Feedback and revision help improve digital designs and make them more effective solutions to a problem.
- Managing project tasks and timelines helps ensure that design projects are completed successfully.

Essential Questions:

- How do digital design tools support the creation and improvement of three-dimensional models?
- How do layout, usability, and design constraints affect the success of a digital design? How does the design process help refine a model to better meet project goals?
- How can analyzing feedback improve the effectiveness of a digital design?
- How does managing tasks and timelines help teams complete design projects successfully?

Unit 4 Standards	
STANDARD CODE	**STUDENTS WILL KNOW, BE ABLE TO, AND UNDERSTAND:**
6-8.AP.M.01	• **I can decompose a complex 3D object into simple geometric shapes to facilitate the design and implementation of a digital model.**
6-8.DA.VT.01	• I can use a 3D modeling tool to represent a real-world object or data set in a visual format that is easy for a user to understand.
6-8.CS.D.01	• I can evaluate how the design of a digital tool affects how users interact with it. • I can explain how digital design tools help users create and modify three-dimensional models.
6-8.AP.PD.02	• I can use feedback from others to improve a digital design.
6-8.AP.PD.05	• I can use a project plan to manage the development of a 3D computational artifact from initial sketch to final model.

priority standards indicated in **bold*