



Mequon-Thiensville School District

Computer Science Scope & Sequence

Description of Subject Area	Computer Science is an academic discipline that encompasses the study of computers and algorithmic processes, including their principles, their hardware and software designs, their applications, networks, and their impact on society. Students will have the opportunity to experience many of the aspects of computer science from beginning coding to multimedia production to game design to cybersecurity.	
Grade Levels	6-12	
Courses	Middle School Computer Science - 6th Grade Wheel Computer Science - 7th Grade Computer Science - 8th Grade	High School Advanced Programming (H) AP Computer Science Principles AP Computer Science A Contemporary Computing Cybersecurity 1 Introduction to Game Design Introduction to Programming Multimedia 1 Multimedia 2 Multimedia 3 (H)



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Computer Science Scope & Sequence

Course Name: Advanced Programming (H)	Department: Computer Science
Grade Level: 9-12	Duration: 1 trimester

Course Overview: Students in this course will utilize the object-oriented capabilities of the Java programming language to explore the science of computing. Program efficiency is a major area of emphasis in Advanced Programming. Topics include one and two-dimensional arrays, searching, sorting, stacks, queues, strings, lists, and file handling. Advanced Programming is a dual-enrollment course, so students who meet qualification requirements may take this course for college credit. Software used in the class is free and can be downloaded to a Mac or PC at home.

Topics/Units:	Time Frame:
1. Variables & I/O	1 week
2. Repetition & Loops	1 week
3. Controls & Decisions	1 week
4. Methods & Parameters	2 weeks
5. Searching	1 week
6. Sorting	2 weeks
7. Object Oriented Programming	2 weeks
8. Data Structures	2 weeks
9. Algorithm Design & Efficiency	Ongoing
10. String Manipulation	3 days
11. File Handling	Ongoing



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Computer Science Scope & Sequence

Course Name: AP Computer Science Principles	Department: Computer Science
Grade Level: 9-12	Duration: 2 Trimester

Course Overview: Computer Science Principles is an introductory Advanced Placement course designed to broaden participation in computer science. The course is designed to be broadly appealing and accessible; as such, students with diverse interests, especially those typically underrepresented in the field of computer science, are encouraged to enroll. The course equips students with essential computing tools and provides multidisciplinary opportunities. AP CS Principles covers many topics including foundational concepts of computer science, core computing topics, societal impacts of computer science, the Internet, Big Data and Privacy, and Programming and Algorithms. The course focuses on students as creators who use computer tools to change themselves and society. Computer Science Principles is a course designed to prepare students who are new to computer science for the AP CS Principles exam and performance task.

Topics/Units:	Time Frame:
1. Digital Information	14 days
2. The Internet	9 days
3. Introduction to App Design	11 days
4. Variables, Conditionals, and Functions	15 days
5. Lists, Loops, and Traversals	18 days
6. Algorithms	6 days
7. Parameters, Return, and Libraries	11 days
8. Create PT Prep	18 days
9. Data	9 days
10. Cybersecurity and Global Impacts	14 days



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Computer Science Scope & Sequence

Course Name: AP Computer Science A	Department: Computer Science
Grade Level: 9-12	Duration: 2 trimester

Course Overview: AP Computer Science A introduces students to computer science through programming. Fundamental topics in this course include the design of solutions to problems, the use of data structures to organize large sets of data, the development and implementation of algorithms to process data and discover new information, the analysis of potential solutions, and the ethical and social implications of computing systems. The course emphasizes object-oriented programming and design using the Java programming language.

Topics/Units:	Time Frame:
1. Primitive Types	7 days
2. Using Objects	12 days
3. Boolean expressions & if statements	10 days
4. Iteration	13 days
5. Writing Classes	12 days
6. Arrays	6 days
7. Array List	10 days
8. 2D Arrays	10 days
9. Inheritance	12 days
10. Recursion	10 days



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Computer Science Scope & Sequence

Course Name: Contemporary Computing	Department: Computer Science
Grade Level: 9-12	Duration: 1 trimester

Course Overview: This course provides students with opportunities to acquire essential technology skills for success in high school, post-secondary education and careers. In this course students often work collaboratively to learn to use technology effectively and efficiently, both as consumers as well as producers of information. Students acquire or hone practical skills in spreadsheets, browser embedded apps, website development, programming, photo editing, creating and delivering presentations, as well as basic video creation and editing. In addition, students complete a unit in teen branding: exploring and assessing the state of their personal digital brand. The course is predominantly a cloud based course so students are able to work anywhere they have an Internet connected device.

Topics/Units:	Time Frame:
1. Course Introduction	2 days
2. System Overview	5 days
3. Word Processing	7 days
4. Spreadsheets	7 days
5. Information Literacy	5 days
6. Database Management	7 days
7. Introduction to Programming	8 days
8. Multimedia	10 days
9. Emerging Technologies and Productivity Tools	3 days
10. Digital Citizenship	1 day
11. Presentation and Publication	Ongoing
12. Website Development	4 days



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Computer Science Scope & Sequence

Course Name: Cybersecurity I	Department: Computer Science
Grade Level: 9-12	Duration: 1 trimester

Course Overview: This course lays a foundation for understanding cyber law and policy, Linux, networking technology basics, risk assessment, cryptography, and a variety of cybersecurity tools - all the essential knowledge and skills needed to begin a future in the cybersecurity workforce. Not only does this course introduce the breadth of cybersecurity concepts and skills, but it also prepares students to verify their technical know-how through the CompTIA Security+ certification.

Topics/Units:	Time Frame:
1. Linux Basics	2 weeks
2. Security Basics	3 weeks
3. Actors and Vulnerabilities	2 weeks
4. Malware and Attacks	4 weeks



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Computer Science Scope & Sequence

Course Name: Introduction to Game Design	Department: Computer Science
Grade Level: 9-12	Duration: 1 trimester

Course Overview: This course will introduce students to the basics of computer programming in a fun and engaging way. Students will gain experience in a variety of basic computational thinking and programming concepts through a project-based learning environment. Using visual block based programming, students will plan, design, create and test basic interactive games that incorporate storytelling, graphics and audio.

Topics/Units:	Time Frame:
1. Intro to Game Design 2. History of Game Design 3. Basic Game Design Tools 4. Types of Games and Play 5. Player experience 6. Table Top Games 7. Design, Elements, Game Play, Modifications, 8. Creation, Evaluation of Collaboration and Teamwork 9. Storyboarding 10. Create 2D Games 11. Events 12. Movement 13. Repeat Blocks 14. Sensing 15. If-then statements (control flow) 16. Boolean Blocks (conditions) 17. Create a winning & losing condition 18. Variables 19. Randomness 20. Sprite Avoidance 21. Sprite Spawning 22. Using keypress events 23. Keeping Score 24. Ethical Considerations 25. Security in Game Design 26. Careers in Game Design 27. Simple Animations and Movement	



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Computer Science Scope & Sequence

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| <ul style="list-style-type: none">28. Workspace29. Libraries30. Panels31. Assets32. Timeline construction & management33. Importing graphics and conversion steps34. Rotation and Scaling35. Keyframe animation36. Shape & Motion Tweening37. Animation Scripting HTML 5, Javascript38. Controlling MovieClips with Code39. Static and Dynamic Text field40. Defining, calling Functions41. Interactivity with code42. Event Listeners43. Using mouse events for interactive programs44. Looping45. Conditionals46. Commenting code47. Variables48. Control Structures and flow | |
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Computer Science Scope & Sequence

Course Name: Introduction to Programming	Department: Computer Science
Grade Level: 9-12	Duration: 1 trimester

Course Overview: This course provides students with an introductory programming experience. Students learn the basic constructs of a programming language (variables, input, output, conditionals, strings, loops, file handling and lists/arrays). Students design, compose and debug programs covering a wide variety of application areas. Software used in the class is free and can be downloaded to a Mac or PC at home.

Topics/Units:	Time Frame:
1. Input & Output	1 week
2. Variables & Assignment Statements	1 week
3. Decision Structures	2 weeks
4. Loops	2 weeks
5. Data Structures: Arrays/Lists	2 weeks
6. Strings	1 week
7. Modular Programming	Ongoing
8. Algorithm Development	Ongoing



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Computer Science Scope & Sequence

Course Name: Multimedia 1	Department: Computer Science
Grade Level: 9-12	Duration: 1 trimester

Course Overview: This hands-on, project-oriented course provides students with experience in creating and presenting media-rich projects. Students create several smaller projects throughout the trimester. On an ongoing basis, students produce a website showcasing their current multimedia expertise. This portfolio website is suitable for presentation to a college, potential employer, scholarship committee, financial aid counselor, individual or group. As a culminating experience, students select a topic of interest and create a Personal Interest Project, using the knowledge and skills they acquired throughout the trimester.

Topics/Units:	Time Frame:
1. Introduction of Self	3 days
2. Multimedia Introduction	5 days
3. Copyright, Digital Media Rights	Ongoing
4. Audio Files	Ongoing
5. Graphic Files	Ongoing
6. Animation	Ongoing
7. Video Files	Ongoing
8. Productivity and Maintenance	Ongoing
9. Storage and Backup	Ongoing
10. Presentations	Ongoing
11. Technology & Software Research	Ongoing
12. Social Networking Applications	Ongoing
13. Digital Advertising	1 week
14. Digital Portfolio	Ongoing
15. Cumulative Project	15 days



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Computer Science Scope & Sequence

Course Name: Multimedia 2	Department: Computer Science
Grade Level: 9-12	Duration: 1 trimester

Course Overview: This course builds on the skills learned and utilized in Multimedia 1 and includes a greater emphasis on teamwork. The projects are more in-depth and use more advanced industry standard software than the earlier course. Visual programming is also added, enabling students to code their own interactive stories, games, and animations. Students continue to upgrade the portfolio website from Multimedia 1.

Topics/Units:	Time Frame:
1. Peer Introductions	5 days
2. Age-Progression Animation	5 days
3. Layered Videos	3 days
4. Designing 3D and 2D Models with Open Source Software	6 days
5. Digital Broadcasting	5 days
6. Open Source Animation & Programming	5 days
7. Professional Image Editing	5 days
8. Rich Interactive Applications	6 days
9. Non-Linear Video Production	5 days
10. Presentations	Ongoing
11. Technology and Software Research	Ongoing
12. Digital Portfolio	Ongoing
13. Cumulative Project	15 days



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Computer Science Scope & Sequence

Course Name: Multimedia 3 (H)	Department: Computer Science
Grade Level: 10-12	Duration:

Course Overview: This course prepares students to work in the electronic production field by giving them practical real-job experience in a non-threatening environment. Fundamentals of teamwork, organization, time management and creative applications of technology are emphasized. Students select a personal area of emphasis and create a detailed project proposal to define the knowledge and skills they will gain in that specific area of Multimedia. Students form a simulated Multimedia Service Company to design and complete projects for specific clients within the district and/or community. The company is organized into departments that reflect the students' prior choices of expertise. Student leaders head up each department and coordinate department efforts to meet client expectations and deadlines. As a culminating experience, students create a professional-level demo reel, highlighting their client experience and technological strengths, which is added to their comprehensive portfolio website. This trimester course is repeatable for credit.

Topics/Units:	Time Frame:
1. Technology and Software Research	Ongoing
2. The Learning Community	Ongoing
3. Presentations	Ongoing
4. Digital Portfolio	Ongoing
5. Peer Introductions and Team Building	5 days
6. Review, Update, and Evaluation of Current Expertise Level	15 days
7. Independent Learning	20 days
8. Cumulative Life-Real Team Project	20 days



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Computer Science Scope & Sequence

Course Name: Computer Science	Department: Computer Science
Grade Level: 6	Duration: 6 weeks

Course Overview: This course is an introductory computer science course that empowers students to create authentic artifacts and engage with computer science as a medium for creativity, communication, problem solving, and fun. Students will also explore the meaning of digital citizenship and online safety.

Topics/Units:	Time Frame:
1. Module 1: Computer Skills and Google Applications	1 week
2. Module 2: Digital Citizenship	1 week
3. Module 3: Hardware & Software	1 week
4. Module 4: Scratch (Coding)	1.5 weeks
5. Module 5: HTML Websites	1.5 weeks



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Computer Science Scope & Sequence

Course Name: Computer Science	Department: Computer Science
Grade Level: 7	Duration: 1.5 Trimesters

Course Overview: This course is an introductory computer science course that empowers students to create authentic artifacts and engage with computer science as a medium for creativity, communication, problem solving, and fun. Seventh grade uses the code.org platform as we look at the first three units of Computer Science Discoveries.

Topics/Units:	Time Frame:
1. Problem Solving and Computing	4 weeks
2. Web Development	6 weeks
3. Interactive Animations and Games	8 weeks



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Computer Science Scope & Sequence

Course Name: Computer Science	Department: Computer Science
Grade Level: 8	Duration: 3 Trimesters

Course Overview: This course is an introductory computer science course that empowers students to create authentic artifacts and engage with computer science as a medium for creativity, communication, problem solving, and fun. The first semester of 8th grade finishes the Computer Science Discoveries program from code.org. The second semester of 8th grade introduces TEALS a Microsoft program that uses SNAP! to introduce the creation of algorithms in coding.

Topics/Units:	Time Frame:
First Semester	
1. The Design Process	6 weeks
2. Data and Society	5 weeks
3. Physical Computing	6 weeks
Second Semester	
4. Beginnings	1 week
5. SNAP Basics	1.5 weeks
6. Loop-de-Loop	3 weeks
7. Variables and Customizations	2.5 weeks
8. Lists	2 weeks
9. Cloning	3 weeks
10. Final Project	4 weeks