

Wilson Area School District Planned Course Guide

Title of planned course: 7th Grade Computer Science

Subject Area: Computer Science

Grade Level: 7th

Course Description: This course is designed to expand on 6th Grade computing knowledge including networking, security, and troubleshooting taking into consideration the many types of computing devices and interconnected systems. Students will continue to develop programming skills and computing vocabulary using a framework of the languages of the Internet and the World Wide Web, specifically HTML5 and CSS with extended opportunities to learn more about JavaScript. While continuing to think creatively about solutions to real-world computer problems, students will be able to connect their understanding of physical computing systems to other types of machines that use the power of computing. They will be challenged to use their knowledge of the Internet and the WWW to develop a future vision of the Fourth Industrial Revolution and The Internet of Things.

Seventh grade students will continue to practice their keyboarding skills with the goal of perfecting technique and memorizing primary keys. Touch typing is an example of cognitive automaticity, the ability to do things without conscious attention or awareness. It enables students to use higher level thinking for critical academic pursuit. Although speed and accuracy of text will be secondary, there will be a goal range of 20-30 wpm with at least 90 percent accuracy and achievement beyond their previous year's experience.

All students will be exposed to computing practices that include:

- Fostering an inclusive computing culture
- Collaborating around computing
- Recognizing and defining computational thinking
- Developing and using abstractions
- Creating computational artifacts
- Testing and refining a computational artifact
- Communicating about computing

Lessons will be presented in either Chromebook or Windows Desktop format depending on which device is most appropriate for the instruction and objectives. Students will access the assignments through Google Classroom and showcase their work using connected applications, worksheets, and finished projects.

Time/Credit for this Course: 36 days of instruction, practice and/or application of skills. Students in Grade 7 have scheduled computer classes for a block of 36 consecutive days during the academic year. The actual number of classes will fluctuate based on changes to the academic calendar.

Curriculum Writing Committee: Susan Austin

Curriculum Map

Students will demonstrate and develop skills and knowledge of computer science and related technologies throughout this 36-day course as part of their Computer Science instruction.

Week 1: (7 days)

- Keyboarding Unit
- Introduction to Computers & Problem Solving Unit
- Digital Citizenship/Historical & Current Events
- Hardware & Software--Problem Solving & Computing
- Analyzing and Visualizing Data

Week 2: (4 Days)

- Keyboarding Unit
- Networks and the Internet Unit (History of the Internet & the World Wide Web)

Week 3-5: (15 days)

- Keyboarding Unit
- Algorithms and Programming Unit (Computing Languages-HTML5, CSS, Javascript)

Week 6: (8 Days)

- Keyboarding Unit
- Physical Computing Unit (Introduction to the Micro:bit)

Week 7: (2 days)

- Keyboarding Unit
- Future of Computing Lesson

Planned Course Materials

Title of planned course: 7th Grade Computer Science

Subject Area: Computer Science

Grade Level: 7th

Teacher and Student Resources:

- In January 2018 the Pennsylvania State Board of Education endorsed the Computer Science Teachers Association (CTSA) K-12 standards <https://www.csteachers.org/Page/standards>
- Original PA State Academic Standards for Business, Computer and Information Technology http://static.pdesas.org/content/documents/BCIT_standards.pdf
- Various Computer Application and Coding Development program resources
- Typing Programs--Typing.com
- Common Sense Education---<https://www.commonsense.org/education/>
- TechnoKids Computer Curriculum---<https://www.technokids.com/>
 - Techno HTML5/CSS lessons
 - Techno Internet lessons
- [Creative Commons Media](#) Digital Citizenship lessons
- Code.org Computer Science Discoveries Unit 2 - Web Development 23-24
- Code.org Computer Science Discoveries Unit 4B - Creating Apps with Devices 23-24
- Other resources like Khan Academy and CodeHS for students needing extension or remediation:
 - Khan Academy ([Computer Programming with Khan](#))
 - CodeHS (<https://codehs.com/>)
- Sites & references for physical computing and coding including the Micro:bit, Scratch, & Makey Makey.
- References from Computer Hope for student research and vocabulary.
- EdPuzzle Computer Lessons
- Teacher created activities, worksheets, assessments
- Google Applications including Google Classroom

Curriculum Scope & Sequence

Title of planned course: 7th Grade Computer Science

Unit: Keyboarding

Time frame: 5-10 minutes of each class (36 classes)

7th Grade Keyboarding Standards:

- K1 Use correct posture when keyboarding and demonstrate mastery of proper keyboarding technique..
- K2 Use language skills including capitalization, punctuation, spelling, word division, and the use of numbers and symbols as grade-level appropriate.
- K3 Use a variety of software applications Google Slides, Docs, Sheets to produce, proofread, and correct errors within documents.
- K4 Students will keyboard 27 words per minute with 95% accuracy by the end of the seventh grade course.
- K5 Use one space after all punctuation marks.
- K6 Keyboard from copy (documents, textbooks, or other printed sources of information).

Essential content/objectives: Students will continue building a foundation for correct typing technique by accessing all letters and basic punctuation keys, utilizing all ten fingers. (Seventh grade students will be encouraged to reach a speed of 25 wpm with 97% accuracy. Proper keyboarding technique and memorization of key locations will be valued over speed and accuracy.)

Students will be able to use correct keyboarding technique:

- Demonstrate correct use space bar, return, enter, shift, tab, Esc and Control keys.
- Demonstrate correct use of right and left hands
- Practice alphabetic keys by touch
- Demonstrate mastery of the home row keys
- Demonstrate correct fingering of basic punctuation keys
- Demonstrate proper spacing after punctuation
- Demonstrate use of the enter key, and the shift key to capitalize and access additional symbols
- Practice accessing the number keys
- Show correct body and finger positions
- Compose at the keyboard as well as proofread and correct errors within a document

Core Activities: Students will complete/participate in the following:

- Access specific grade level lessons in Typing.com
- Practice progressive skill based lessons in Typing.com
 - Identify the Home Row and Correct Finger Placement.
 - J, F, & Space Keys
 - U, R, & K Keys
 - D, E, & I Keys
 - C, G, & N Keys
 - Beginner Review 1
 - Personalized Practice customized to review individual problem keys
 - T, S, & L Keys
 - O, B, & A Keys

- o V, H, & M Keys
- o Period & Comma
- o Beginner Review 2
- o Personalized Practice
- o W, X, & semicolon Keys
- o Q, Y, & P Keys
- o Z and Enter Keys
- o Beginner Wrap-up
- o Personalized Practice
- o Shift Key and Capitalization
- o Basic & Intermediate Punctuation (Quotation Marks, Colons, Slashes, Question Marks)

Instructional Methods:

- Direct instruction
- Modeling correct keyboarding techniques
- Independent practice
- Individual student assistance (hand-over-hand)

Materials & Resources:

- Computer and other peripherals
- Google applications
- Typing.com Grade 7 sequence
- Keyboard Covers
- Supplemental worksheets

Assessments:

- **Formative:**
 - o Daily Assignments
 - o Observation
 - o Self-monitoring progress the Typing.com interface
- **Summative**
 - o Teacher reports for semester progress from Typing.com

Curriculum Scope & Sequence

Title of planned course: 7th Grade Computer Science

Unit: Introduction to Computers & Problem Solving

- Digital Citizenship/Historical & Current Events
- Hardware & Software--Problem Solving & Computing
- Analyzing and Visualizing Data

Time frame: 7 classes

State Standards:

- Algorithms and Programming: CSTA 1B-AP-08, 1B-AP-011, 1B-AP-016, 2-AP-10, 2-AP-17
- Networks & the Internet: CSTA 1B-NI-05
- Impacts of Computing: CSTA 1B-IC-18 2-IC-20, 2-IC-23
- Computing Systems: CSTA 1B-CS-01, 1B-CS-02
- Data & Analysis: CSTA 1B-DA-06, 1B-DA-07

Essential content/objectives: At the end of the unit, students will be able to:

- Identify the connections between human and computer interactions and brainstorm ideas for improvement.
- Given a variety of factors, make decisions about computer hardware and software to accomplish specific tasks or goals.
- Identify the interconnected components of computing systems (hardware, software, connections) that work together for effective systems.
- Begin to consider more complex issues for troubleshooting problems.
- Identify and explain how computers use, display and share data. (Since this is the first unit, within the context of initial instruction, students will also review the district AUP, including shared devices, password and security issues and digital citizenship.)

Core Activities: Students will complete/participate in the following:

- Demonstrate AUP knowledge and model procedures appropriate digital access & behaviors
- Review and practice good online digital citizenship
- Describe various design standards related to computing devices and applications including accessibility, ergonomics, and learnability.
- Diagnose and identify possible solutions for hardware/software problems using an understanding of the interconnections between components of functional computer systems. (Examples of troubleshooting strategies include following a troubleshooting flow diagram, making changes to software to see if hardware will work, checking connections and settings, and swapping in working components.)
- Describe the Problem Solving Process and Practice it during an unplugged group or partner activity. (Code.org CS Discoveries Unit1--Chapter 1 Activities from Lessons 1-3. For example Power Tower Activity.)
- Define a Computer and Describe the Function using activities from Code.org CS Discoveries Unit 1 --Chapter 2: Lessons 4-7.
 - What is a Computer? (Google Slide Activity)
 - Analyze & Describe Functions:
 - Input & Output
 - Processing
 - Storage

- Describe various ways that computers use and represent data to solve problems and create more effective ways of visualizing data. (Code.org CS Discoveries Unit 2/Chapter 1 activities from Lessons 1-7.)
- Give examples of how the same data can be represented in different ways. (Colors can be represented using binary, RGB, or HexCode. Higher level and text based coding might allow for actual words to code color---but the visual display is the same.)

Instructional Methods:

- Direct instruction
- Model tasks
- Discussion
- Independent practice using online applications and related activity sheets
- Scaffolding and group work
- Review

Materials & Resources:

- Computing Device and attached peripherals
- Google applications
- WAIS Acceptable Use Policy for the 2023-24 Academic Year
- Code.org--CS Discoveries (Problem Solving & Computing Unit 1 and Data & Society Unit 2--Updated for '23-'24)
- Common Sense Media Activities
- EdPuzzle
- Unplugged activities

Assessments:

- Formative:
 - Discussions
 - Observation
 - Self Evaluations
 - Peer Evaluations
 - Google Classroom assignments
- Summative
 - Completed unplugged worksheets
 - Completed online forms/guided questions
 - Projects

Curriculum Scope & Sequence

Title of planned course: 7th Grade Computer Science

Unit: The Internet & the World Wide Web

Time frame: 4 classes

State Standards:

- Impacts of Computing: CSTA 2-IC-20, 2-IC-21, 2-IC-22, 2-IC-23
- Networks and the Internet: CSTA 2-NI-04, 2-NI-05, 2-NI-06

Essential content/objectives: At end of the unit, students will be able to:

- Recall/review the paths that data or information travels inside a computer and between computing devices or systems and the Internet
- Develop a general understanding of the Internet and HTML and basic terminology
- Develop a framework of the key events in Internet and WWW /Browser history and functions of each system
- Explore and begin the basic code for creating web pages: HTML 5 and CSS

Core Activities: Students will complete/participate in the following:

- Analyze and describe how information/data travels throughout the computer and between computing devices
- Analyze and explain how data is broken into smaller pieces, transmitted, and reassembled as packets between devices, over networks, and over the Internet
- Be able to relate Computer Networking needs of humans over time and connect how that has progressed over time
- Define and explain the concept of protocols and how they are related to networking
- Gain some background of why and how networking protocols work to ensure that clients can communicate and share information across computer networks in a secure manner
- Identify some key networking protocols that are used for most of the communication across the Internet. (for example--HTTP, HTTPS, FTP, DNS, SMTP, POP, and IMAP)
- Analyze and describe how all this is related to the Internet and the WWW
- Use Internet and WWW terms correctly to distinguish between their relationship
- Analyze how coding was needed to create the WWW and then how the need for information sharing has driven progress in coding web pages using more advanced web design coding languages

Instructional Methods:

- Direct instruction
- Model tasks
- Discussion
- Independent practice using online applications and related activity sheets
- Scaffolding and group work
- Review

Materials & Resources:

- Computing Device and attached peripherals
- Google applications
- WAIS Acceptable Use Policy for the 2023-24 Academic Year

- Code.org--CS Discoveries (Problem Solving & Computing Unit 1 and Data & Society Unit 2--Updated for '23-'24)
- Common Sense Media Activities
- EdPuzzle
- Unplugged activities

Assessments:

- Formative:
 - Discussions
 - Observation
 - Self Evaluations
 - Peer Evaluations
 - Google Classroom assignments
- Summative
 - Completed unplugged worksheets
 - Completed online forms/guided questions
 - Projects

Curriculum Scope & Sequence

Title of planned course: 7th Grade Computer Science

Unit: HTML5 & CSS Coding Unit

Time frame: 15 classes

State Standards: Algorithms and Programming: CSTA 2-AP-10, 2-AP-13, 2-AP-14, 2-AP-15, 2-AP-16, 2-AP-17, 2-AP-18, 2-AP-19

Essential content/objectives: At end of the unit, students will be able to:

- Create and share content on their own web pages as they begin to explore their creativity with Web Development
- Think about the role of the web and how it can be used as a medium for creative expression
- Develop their pages and begin to see themselves as programmers, they are encouraged to think critically about the impact of sharing information online and how to be more critical consumers of content
- Introduced to problem solving as it relates to programming while they learn valuable skills such as debugging, using resources, and teamwork
- Create a personal website they can publish and share

Core Activities: Students will complete/participate in the following:

- Create modifications to code portions of existing Web Pages to develop something new or add newly introduced or advanced features.
- To kick off a unit devoted to group problem solving and developing websites for other users, students begin by investigating the design of different websites. Students look at a variety of websites and attempt to match each design with a potential user. Pick one page and analyze it based on design and content.
- Analyze the structure of a web page using sample HTML page in Web Lab and discuss with their classmates how HTML tags help solve this problem.
- Use a series of activities to begin developing HTML and CSS coding skills. Activities will challenge students to add structure to pages and debug existing pages.
- Participate in a collaborative process for several lesson activities using iteration with feedback (iterative process is the practice of building, refining, and improving a project, product, or initiative).
- Incorporate curated resources into a project with respect to attribution and permissions and viewership.
- Plan their own web page with respect to the importance of viewers needs, design and layout properties, content both text and visual.
- Create the web page using HTML5 and CSS code correctly with a minimum standard of:
 - 1 Primary Heading
 - 3 subheadings
 - 3 Paragraphs
 - 3 Horizontal Rules
 - 3 Line Breaks
 - 3 Images with attribution
 - 3 Different Font Families
 - 3 Different Styles of Text using CSS
 - Background Color and Text Color

- Alignment of both Images and text
- Use self-evaluation and project presentation or description with completed project/program. (For example: Outline key features of program development and explain their choices made using a storyboard, journaling, or summative presentation.)
- Peer Evaluation for student Projects

Instructional Methods:

- Direct instruction
- Model tasks
- Discussion
- Independent practice using online applications and related activity sheets
- Scaffolding and group work
- Review

Materials & Resources:

- Computing Device and attached peripherals
- Google applications
- WAIS Acceptable Use Policy for the 2023-24 Academic Year
- Code.org--CS Discoveries (Problem Solving & Computing Unit 1 and Data & Society Unit 2--Updated for '23-'24)
- Common Sense Media Activities
- EdPuzzle
- Unplugged activities

Assessments:

- Formative:
 - Discussions
 - Observation
 - Self Evaluations
 - Peer Evaluations
 - Google Classroom assignments
- Summative
 - Completed unplugged worksheets
 - Completed online forms/guided questions
 - Projects

Curriculum Scope & Sequence

Title of planned course: 7th Grade Computer Science

Unit: Physical Computing

Time frame: 8 classes

State Standards:

- Algorithms and Programming: CSTA 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-15, 2-AP-17, 2-AP-18, 2-AP-19
- Computing Systems: CSTA 2-CS-01, 2-CS-02, 2-CS-03

Essential content/objectives: At end of the unit, students will be able to:

- Use the App Lab programming environment as a powerful tool for building and sharing apps
- Use the lessons to create and control buttons, text, images, sounds, and screens in JavaScript using either blocks or text that interact with the MicroBit
- Create resources for other users by looking at a variety of physical designs and consider what it means to be a physical designer

Core Activities: Students will complete/participate in the following:

- Build and share their own apps in App Lab using features like buttons, text, images, sound, and screens.
- Create a prototype of a physical design to meet the needs of a user using the problem-solving process
- Identify features of a physical design that match the needs of users
- Recall the steps of the problem-solving process
- Connect and troubleshoot external micro:bit devices
- Control the micro:bit's LED display with code: turn individual LEDs on and off, scroll words and numbers
- Change text on the screen using code--`setText(id, text)`
- Respond to user input using event handlers
- Set the properties of UI elements using code--`setProperty(id, property, value)`
- Use a board event handler to control buttons on the micro:bit--`onBoardEvent(component, event, function(event) {...});`

Instructional Methods:

- Direct instruction
- Model tasks
- Discussion
- Independent practice using online applications and related activity sheets
- Scaffolding and group work
- Review

Materials & Resources:

- Computing Device and attached peripherals
- MicroBit and connecting wires
- Google applications
- Code.org--CS Discoveries Unit 6B - (Option B) Creating Apps with Devices (micro:bit) Updated for 2023-24.

- Code.org Worksheets related to this unit

Assessments:

- Formative:
 - Discussions
 - Observation
 - Self Evaluations
 - Peer Evaluations
 - Google Classroom assignments
- Summative
 - Completed unplugged worksheets
 - Completed Code.org corresponding Unit activities

Curriculum Scope & Sequence

Title of planned course: 7th Grade Computer Science

Unit: The Future of Computing

Time frame: 2 classes

State Standards: Impacts of Computing: CSTA 2-IC-20, 2-IC-21

Essential content/objectives: At end of the lesson, students will be able to:

- Analyze how computing technology has impacted our world including lifestyles, resources, and careers
- Compare and contrast how various computing technologies are both positive and negative
- Consider recent local, state, national, and global events and correlate those with digital technologies including privacy, communication, and automation

Core Activities: Students will complete/participate in the following:

- Analyze and discuss how computing technologies have impacted the world and influenced cultural and societal practices. (the Internet, AI, GPS, etc.)
- Define and model at least one of these concepts with respect to computing technologies:
 - Crowdsourcing
 - Artificial Intelligence
 - Social Engineering
 - Phishing & Spoofing & Hacking
 - Facial Recognition
 - Accessibility
 - Sustainability
- Using a Goggle application of choice, showcase through collaboration and an understanding of a recent/current event impact and make a clear connection to the future of computing technology impacts. The work should focus on a reasonable prediction of the future and must be presented with respect to intellectual property permission and appropriate attribution.
- Collaborate and seek feedback from others with the purpose to make improvements to projects.

Instructional Methods:

- Direct instruction
- Model tasks
- Discussion
- Independent practice using online applications and related activity sheets
- Scaffolding and group work
- Review

Materials & Resources:

- Computing Device and attached peripherals
- Google applications
- WAIS Acceptable Use Policy for the 2023-24 Academic Year
- Common Sense Media Activities
- EdPuzzle

- Unplugged activities

Assessments:

- Formative:
 - Discussions
 - Observation
 - Self Evaluations
 - Peer Evaluations
 - Google Classroom assignments
- Summative
 - Completed unplugged worksheets
 - Completed online forms/guided questions

PA Computer Science Standards

Computing Systems

- Devices: 2-CS-01 Recommend improvements to the design of computing devices, based on an analysis of how users interact with the devices
- Hardware & Software: 2-CS-02 Design projects that combine hardware and software components to collect and exchange data
- Troubleshooting: 2-CS-03 Systematically identify and fix problems with computing devices and their components

Networks and the Internet

- Network Communication & Organization: 2-NI-04 Model the role of protocols in transmitting data across networks and the Internet
- Cybersecurity: 2-NI-05 Explain how physical and digital security measures protect electronic information.

Data and Analysis

- Storage: 2-DA-07 Represent data using multiple encoding schemes
- Collection Visualization & Transformation: 2-DA-08 Collect data using computational tools and transform the data to make it more useful and reliable
- Inference & Models: 2-DA-09 Refine computational models based on the data they have generated.

Algorithms and Programming

- Algorithms: 2-AP-10 Use flowcharts and/or pseudocode to address complex problems as algorithms
- Variables: 2-AP-11 Create clearly named variables that represent different data types and perform operations on their values
- Control: 2-AP-12 Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals
- Modularity:
 - 2-AP-13 Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs
 - 2-AP-14 Create procedures with parameters to organize code and make it easier to reuse
- Program Development:
 - 2-AP-15 Seek and incorporate feedback from team members and users to refine a solution that meets user needs
 - 2-AP-16 Incorporate existing code, media, and libraries into original programs, and give attribution
 - 2-AP-17 Systematically test and refine programs using a range of test cases
 - 2-AP-18 Distribute tasks and maintain a project timeline when collaboratively developing computational artifacts
 - 2-AP-19 Document programs in order to make them easier to follow, test, and debug.

Impacts of Computing

- Culture:
-

- 2-IC-20 Compare tradeoffs associated with computing technologies that affect people's everyday activities and career options
- 2-IC-21 Discuss issues of bias and accessibility in the design of existing technologies.Culture:
- Social Interactions: 2-IC-22 Collaborate with many contributors through strategies such as crowdsourcing or surveys when creating a computational artifact
- Safety Law & Ethics: 2-IC-23 Describe tradeoffs between allowing information to be public and keeping information private and secure

Other Related PA State Standards/Anchors:

- 15.3.8.M. Demonstrate proper etiquette when networking either face-to-face or online
- 15.3.8.S. Apply appropriate electronic communication based on message requirements.
- 15.3.8.T. Discuss the rules of digital citizenship
- 15.3.12.W. Use electronic communication with peers and/or educators to produce a work product
- 15.4.8.B. Interpret and apply appropriate social, legal, ethical, and safe behaviors of digital citizenship
- 15.4.8.C. Compare and contrast peripheral devices of computing systems for specific needs.
- 15.4.8.D. Create projects using emerging input technologies
- 15.4.8.G. Create an advanced digital project using appropriate software/application for an authentic task
- 15.4.8.H. Explain the differences between a scripting language and a coding language
- 15.4.8.I. Solve a problem with an algorithm
- 15.4.8.J. Explain the basic differences between encoding and decoding
- 15.4.8.K. Create a multimedia project using student created digital media
- 15.6.8.L. Evaluate the accuracy and bias of online sources of information; appropriately cite online resources
- 15.4.8.D. Create projects using emerging input technologies
- 15.4.8.B. Interpret and apply appropriate social, legal, ethical, and safe behaviors of digital citizenship
- 15.4.8.A. Analyze the influence of emerging technologies on daily life

7th Grade Keyboarding Standards:

- K1 Use correct posture when keyboarding and demonstrate proper keyboarding technique for each letter of the alphabet
- K2 Keyboard word lists and sentences using correct posture and proper keyboarding technique
- K3 Use language skills including capitalization, punctuation, spelling, word division, and the use of numbers and symbols as grade-level appropriate
- K6 Use a variety of software applications to produce, proofread, and correct errors within documents
- K5 Students will keyboard 27 words per minute with 95% accuracy by the end of the fifth grade
- K6 Use one space after all punctuation marks
- K7 Keyboard from copy (documents, textbooks, or other printed sources of information)