

Wilson Area School District Planned Course Guide

Title of planned course: Grade 7 Computer Science

Subject Area: Computer Science

Grade Level: 7

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. Drawing on prior knowledge of coding in HTML5 and CSS, students will continue to develop programming skills and computing vocabulary using the framework of the Javascript language 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 various types of machines that use the power of computing to operate effectively. They will use Javascript code to program the MicroBit microcontrollers.

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: (5 Days)

- Keyboarding Unit
- Computing Systems
 - Digital Citizenship
 - Hardware & Software
 - Historical Evolution of Computers
 - Problem Solving and Computing

Week 2-5: (15 Days)

- Keyboarding Unit
- Algorithms and Programming Unit 1 (Computing Languages-Javascript)

Week 5-6: (10 Days)

- Keyboarding Unit
- Algorithms and Programming Unit 2 (Physical Computing-Microcontrollers)

Week 7-8: (6 Days)

- Keyboarding Unit
- Future of Computing Unit
 - Artificial Intelligence
 - Quantum Computing

Planned Course Materials

Title of Planned Course: Grade 7 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>
- WAIS Acceptable Use Policy for the Current Academic Year
- 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/>
 - TechnoTurtle
 - [Creative Commons Media](#) Digital Citizenship lessons
 - Code.org Computer Science Discoveries
 - Unit 1 Chapters 1 & 2--Problem Solving and Computing
 - Unit 3a Chapter 1--Interactive Games and Animations
 - Unit 6b Chapter 1--Creating Apps with Devices (micro:bit)
 - Unit 7 - AI and Machine Learning
 - Other resources like Khan Academy and CodeHS for students needing extension or remediation:
 - Khan Academy ([Computer Programming with Khan](#))
 - CodeHS (<https://codehs.com/>)
 - [Code.org](#) Express Course 2025
 - 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
 - V, H, & M Keys

- Period & Comma
- Beginner Review 2
- Personalized Practice
- W, X, & semicolon Keys
- Q, Y, & P Keys
- Z and Enter Keys
- Beginner Wrap-up
- Personalized Practice
- Shift Key and Capitalization
- 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:**
 - Daily Assignments
 - Observation
 - Self-monitoring progress the Typing.com interface
- **Summative**
 - Teacher reports for semester progress from Typing.com

Curriculum Scope & Sequence

Title of planned course: Grade 7 Computer Science

Unit: Review of Computing Systems Unit

- Digital Citizenship
- Hardware & Software
- Historical Evolution of Computers
- Problem Solving and Computing

Time frame: 5 classes

State Standards:

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

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

- Review introductory concepts from Grade 6 computer courses
- 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 Sample 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
 - Processing
 - Storage
 - Output

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 current Academic Year
- Code.org--CS Discoveries (Problem Solving & Computing Unit 1)
- 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: Grade 7 Computer Science

Unit: Algorithms and Programming Unit (Computing Languages-Javascript)

Time frame: 15 classes

State Standards:

- **Algorithms and Programming:** 2-AP-10, 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-16, 2-AP-17, 2-AP-19

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

- Create programmatic images, animations, interactive art, and games in the Interactive Animations and Games unit
- Starting off with simple, primitive shapes and building up to more sophisticated sprite-based games, students become familiar with the programming concepts and the design process computer scientists use daily
- Learn how these simpler constructs can be combined to create more complex programs
- Code an animated design using simple Javascript coding for the final project

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

- Interactive Animations and Games-Chapter 1 (Lesson 1-14)
 - Programming with a Purpose-Lesson 1
 - Unplugged activity to create a prototype of an animation or game design to meet the needs of a user using the problem-solving process. (Partner or Group activity)
 - Identify features of an animation or game design that match the needs of users.
 - Plotting Shapes-Lesson 2
 - Communicate how to draw an image in Game Lab, accounting for shape position, color, and order using locations on a coordinate grid.
 - Drawing in Game Lab-Lesson 3
 - Sequence code correctly to overlay shapes.
 - Shapes and Parameters-Lesson 4
 - Use a coordinate system to place elements on the screen and utilize and explain drawing commands with multiple parameters.
 - Variables-Lesson 5
 - Identify a variable as a way to label and reference a value in a program
 - Use variables in a program to store a piece of information that is used multiple times
 - Random Numbers-Lesson 6
 - Generate and use random numbers in a program.
 - Update a value stored in a variable.
 - Sprites-Lesson 8
 - Create and use a sprite (complex sets of images).
 - Sprites Properties-Lesson 9

- Access and manipulate sprite properties to program more interesting behaviors incorporating dot notation to update sprites properties.
- Text Elements-Lesson 10
 - Place text on the screen using a coordinate plane and use various arguments to control how text is displayed on a screen.
- The Draw Loop-Lesson 12
 - Use the draw loop in combination with the randomNumber() command, shapes, and sprites to make simple animations.
- Sprite Movement-Lesson 13
 - Use the counter pattern to increment or decrement sprite properties to alter sprites and their behavior to achieve specific movements.
- Design an Animated Program-Lesson 14
 - Apply learned programming concepts to create an individualized program using a structured planning process.
 - 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
- Code.org--CS Discoveries Unit 3 (Interactive Animations and Games)
- Unplugged activities and worksheets to support lessons

Assessments:

- Formative:
 - Discussions
 - Observation
 - Self Evaluations
 - Peer Evaluations
 - Google Classroom assignments
 - Code.org activities
- Summative
 - Completed unplugged worksheets
 - Completed lesson sections within Code.org Unit 3
 - Projects

Curriculum Scope & Sequence

Title of planned course: Grade 7 Computer Science

Unit: Physical Computing

Time frame: 10 classes

State Standards:

- **Algorithms and Programming:** CSTA 2-AP-11-13, 2-AP-15, 2-AP-17-19
- **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:

- Develop a framework for explaining the role of physical devices in computing.
- Use App Lab and BBC micro:bit to develop programs that utilize the same hardware inputs and outputs that you see in the smart devices
- Use a “maker mindset” to explain how a prototype can lead to a finished product
- Examine a variety of physical designs and consider what it means to be a physical designer and create resources for other users.
- Create and control buttons, text, images, sounds, and screens in Javascript using either blocks or text that interact with the MicroBit.

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) {...});
- Use if-statements to make decisions when creating apps
- Use the counter pattern to update variables when creating apps
- Use variables to store information when creating apps

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)
Code.org Worksheets related to this unit

Assessments:

- **Formative:**
 - Discussions
 - Observation
 - Self Evaluations
 - Peer Evaluations
 - Google Classroom assignments
- **Summative**
 - Completed unplugged worksheets
 - Showcase a working project on a microcontroller with student designed code

Curriculum Scope & Sequence

Title of planned course: 7th Grade Computer Science

Unit: The Future of Computing

Time frame: 6 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
- Define to a form of artificial intelligence called machine learning
- Explain how the Problem Solving Process can help train a machine/robot to solve problems
- Analyze how humans create “mental” models when learning new concepts and compare how those can be similar to a “machine learning” model

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, GPS, AI, etc.)
- Apply the Problem Solving Process to train a computer to solve a problem.
- Participate in three machine learning activities where a robot - A.I. Bot - is learning how to detect patterns in fish.
- Describe the differences between supervised and unsupervised learning.
- Summarize how Artificial Intelligence may continue to impact society.
- Brainstorm how the possibility of Quantum Computing may also change the future.

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 current Academic Year
- [Code.org](#)--Computer Science Discoveries--Unit 7 - AI and Machine Learning
- 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)