

Wilson Area School District Planned Course Guide

Title of planned course: Computer Arts Grade 5

Subject Area: Computer Science and Technology

Grade Level: 5

Course Description: Students in 5th grade will review and continue to expand their knowledge of using computer systems including devices, hardware and software. Students will continue to develop and practice troubleshooting strategies. Students will collect, present and store data and expand on their programming skills.

Fifth grade students will continue to practice their keyboarding skills with a goal of approximately 25 wpm (5 wpm x grade level). In addition, students will continue to learn about and practice their digital citizenship skills, including respecting intellectual property and giving attribution, creating and using strong passwords, and discussing real world cyber-security problems including how to protect themselves.

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 and showcase their work through Google Classroom using various Google applications for worksheets, instructions, and finished projects.

Time/Credit for this Course: 36 days of instruction, practice and/or application of skills. Students in Grade 5 have scheduled computer classes once a week throughout the school year. The actual number of classes will fluctuate based on changes to the academic calendar.

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Wilson Area School District Planned Course Materials

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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 and MicroType
 - Scratch---<http://scratched.gse.harvard.edu>
 - Kodable---<https://www.kodable.com>
 - Common Sense Education ---<https://www.common sense.org/education/>
 - TechnoKids Computer Curriculum---<https://www.technokids.com/>
 - Techno Turtle lessons
 - Techno Internet lessons
 - Various library books related to topics
 - Even More Picture Perfect Science k-5 Lessons and More Picture Perfect Science k-5 Lessons: Provides information on various books to use to link with skills
 - Netsmartz website: <http://www.netsmartz.org/Educators>
 - [Creative Commons Media](#) Digital Citizenship lessons
 - Code.org Computer Science Fundamentals, Curriculum Guide 2020-21 for Course F (Gr. 5) or CSFundamentals Express for Extension Activities
 - References from Computer Hope for student research
 - Khan Academy--<https://www.khanacademy.org/computing>
 - Other extension or demo activities with [Makey Makey](#) or [Ozobots](#)
- Teacher created activities, worksheets, assessments
- Google Applications including Google Classroom

Curriculum Map

August/September:	Keyboarding, Impacts of Computing and Computing Systems
October:	Keyboarding, Networks and the Internet
November:	Keyboarding, Data and Analysis
December:	Keyboarding, Algorithms and Programming
January:	Keyboarding, Algorithms and Programming
February:	Keyboarding, Algorithms and Programming
March:	Keyboarding, Algorithms and Programming
April:	Keyboarding, Algorithms and Programming
May/June:	Keyboard and Impacts of Computing

Curriculum Scope & Sequence

Title of planned course: Computer Arts Grade 5

Unit: Keyboarding

Instructional Objective: Keyboarding - Students will continue building a foundation for correct typing technique by accessing all letter and basic punctuation keys, utilizing all ten fingers.

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

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
- K4 Use a variety of software applications to produce, proofread, and correct errors within documents
- K5 Students will keyboard 20 words per minute with 94% 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)

Essential content/objectives: Students will be able to:

- Know 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
- Demonstrate required speed and of 20 wpm with 94% accuracy
 - Achieve minimum speed wpm speed at 94% accuracy on two-minute timed writings

Curriculum Scope & Sequence

Title of planned course: Computer Arts Grade 5

Unit: Computing Systems

Time frame: 5 classes

State Standards:

- Devices
 - 1B-CS-01 Describe how internal and external parts of computing devices function to form a system.
- Hardware & Software
 - 1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks.
- Troubleshooting
 - 1B-CS-03 Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies.

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

- Describe the connections between computer components and their specific functions
- Compare and contrast how different computing devices accomplish a variety of tasks using specific computer programs
- Model troubleshooting strategies to identify solutions to problems
- Review the district AUP, including shared devices, password and security issues and digital citizenship
- Demonstrate AUP knowledge and model procedures appropriate digital access & behaviors
- Review and practice good online digital citizenship
- Identify and describe the function of internal & external parts of computing devices
- Model how computer hardware & software work together to accomplish tasks
- Diagnose and identify possible solutions for hardware/software problems using simple troubleshooting techniques

Curriculum Scope & Sequence

Title of planned course: Computer Arts Grade 5

Unit: Networks and the Internet

Time frame: 4 classes

State Standards:

- Network Communication & Organization
 - 1B-NI-04 Model how information is broken down into smaller pieces, transmitted as packets through multiple devices over networks and the Internet, and reassembled at the destination
- Cybersecurity
 - 1B-NI-05 Discuss real-world cybersecurity problems and how personal information can be protected

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

- Describe or model the paths that data or information travels within and between computing devices or systems
- Model or evaluate different methods for sending and receiving computer information---both physical and wireless paths
- Describe, analyze and model ways and reasons for protecting personal information and devices from real world cyber security problems
- Analyze and model 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
- Discuss real-world cybersecurity problems. Then draw connections to how and why personal information can and should be protected
- Model methods for protecting personal information when using the Internet
- Describe and evaluate possible situations that require reporting such as inappropriate content is found on the Internet, or if someone suspicious tries to contact them
- Explain the risks of computer and Internet security issues, including computer viruses, spam, and phishing

Curriculum Scope & Sequence

Title of planned course: Computer Arts Grade 5

Unit: Data and Analysis

Time frame: 3-4 classes

State Standards:

- Collection Visualization & Transformation
 - 1B-DA-06 Organize and present collected data visually to highlight relationships and support a claim.
- Inference & Models
 - 1B-DA-07 Use data to highlight or propose cause-and-effect relationships, predict outcomes, or communicate an idea.

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

- Describe, analyze and model the functions of computing devices input, processing, storage, and output
- Understand the importance of grouping and arranging data to make communication with others easier
- Refer to and use data when communicating an idea
- Describe the underlying function of a computer and how that relates to data---Input, Processing, Storage, Output
- Input--Determine ways that computers receives or collects data/information
- Processing--Determine ways that computers process, organize, or calculate data to solve problems
- Output--Determine ways that computers display information
- Explain how data is used to highlight relationships between theories and claims, predict outcomes, or just to communicate ideas
- Practice using computing technology to input, process, and output data for a specific purpose.
For example:
 - Create a table to organize data
 - Sort data on a specific topic making it easier for a user to use

Curriculum Scope & Sequence

Title of planned course: Computer Arts Grade 5

Unit: Algorithms and Programming

Time frame: 20 classes (This is the largest section of the instructional objectives. Students will build on their previous elementary computer science coding experiences.)

State Standards:

- Algorithms
 - 1B-AP-08 Compare and refine multiple algorithms for the same task and determine which is the most appropriate
- Variables
 - 1B-AP-09 Create programs that use variables to store and modify data
- Control
 - 1B-AP-10 Create programs that include sequences, events, loops, and conditionals
- Modularity
 - 1B-AP-11 Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process
 - 1B-AP-12 Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features
- Program Development
 - 1B-AP-16 Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation, and review stages of program development
 - 1B-AP-17 Describe choices made during program development using code comments, presentations, and demonstrations
 - 1B-AP-13 Use an iterative process to plan the development of a program by including others' perspectives and considering user preferences
 - 1B-AP-14 Observe intellectual property rights and give appropriate attribution when creating or remixing programs
 - 1B-AP-15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended
 - 1B-AP-16 Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation, and review stages of program development
 - 1B-AP-17 Describe choices made during program development using code comments, presentations, and demonstrations

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

- Look at different ways to solve the same task and decide which would be the best solution
- Understand variables and how to use them
- Use programs such as Code.org and Kodable to create programs that use sequence, events, loops and conditionals
- Break down events into smaller pieces as well as test and debug programs and outline and discuss program development
- Communicate their choices to others using journaling, storyboarding and projects
- Observe intellectual properties and give attribution to owners
- Define and analyze algorithms using both unplugged and plugged activities to experiment with task sequencing and efficiency

- Define, explain and model/experiment with
 - Variables
 - Sequences
 - Events
 - Loops
 - Conditionals
 - Decomposition

(Practice using applications like Kodable or Code.org lessons in Scratch Programming Language and Techno Turtle lessons in Python Language.)

- Create modifications to portions of an existing program to develop something new or add more advanced features
- Design a new program using an interactive & iterative process with peer evaluation
- Test and debug the project /program
- 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.)

Curriculum Scope & Sequence

Title of planned course: Computer Arts Grade 5

Unit: Impacting of Computing

Time frame: 3 classes

State Standards:

- Culture
 - 1B-IC-18 Discuss computing technologies that have changed the world, and express how those technologies influence, and are influenced by, cultural practices
 - 1B-IC-19 Brainstorm ways to improve the accessibility and usability of technology products for the diverse needs and wants of users
- Social Interactions
 - 1B-IC-20 Seek diverse perspectives for the purpose of improving computational artifacts
- Safety Law & Ethics
 - 1B-IC-21 Use public domain or creative commons media, and refrain from copying or using material created by others without permission

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

- Discuss and model aspects of computing technology history, especially since the introduction of connected computing systems
- Practice appropriate laws and ethics while creating materials and projects while giving attribution for ideas and materials used
- Analyze and discuss how computing technologies have impacted the world and influenced cultural and societal practices. (the Internet, AI, GPS, etc.)
- Brainstorm ways to improve computing technology for diverse users
- Choose a Google application to create and showcase either a significant historical figure, event or technology with care to use only public domain or creative commons media sources for images
- Collaborate and seek feedback from others with the purpose to make improvements to projects

PA Computer Science Standards

Computing Systems

- Devices
 - 1B-CS-01 Describe how internal and external parts of computing devices function to form a system
- Hardware & Software
 - 1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks
- Troubleshooting
 - 1B-CS-03 Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies

Networks and the Internet

- Network Communication & Organization
 - 1B-NI-04 Model how information is broken down into smaller pieces, transmitted as packets through multiple devices over networks and the Internet, and reassembled at the destination
- Cybersecurity
 - 1B-NI-05 Discuss real-world cybersecurity problems and how personal information can be protected

Data and Analysis

- Collection Visualization & Transformation
 - 1B-DA-06 Organize and present collected data visually to highlight relationships and support a claim
- Inference & Models
 - 1B-DA-07 Use data to highlight or propose cause-and-effect relationships, predict outcomes, or communicate an idea

Algorithms and Programming

- Algorithms
 - 1B-AP-08 Compare and refine multiple algorithms for the same task and determine which is the most appropriate
- Variables
 - 1B-AP-09 Create programs that use variables to store and modify data
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 - 1B-AP-10 Create programs that include sequences, events, loops, and conditionals
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Impacts of Computing

- Culture
 - 1B-IC-18 Discuss computing technologies that have changed the world, and express how those technologies influence, and are influenced by, cultural practices.
 - 1B-IC-19 Brainstorm ways to improve the accessibility and usability of technology products for the diverse needs and wants of users
- Social Interactions
 - 1B-IC-20 Seek diverse perspectives for the purpose of improving computational artifacts
- Safety Law & Ethics
 - 1B-IC-21 Use public domain or creative commons media, and refrain from copying or using material created by others without permission

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

5th 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
- K4 Use a variety of software applications to produce, proofread, and correct errors within documents
- K5 Students will keyboard 20 words per minute with 94% 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)