

**BAINBRIDGE-GUILFORD  
CENTRAL SCHOOL DISTRICT**



**TECHNOLOGY PLAN 2023-2028**

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## Executive Summary

The Bainbridge-Guilford Technology Plan was initially developed in alignment with the BG Vision, Mission, Beliefs, the District Plan for Children with Disabilities, as well as research and best practices in the instructional technology field. Currently, the BG Technology Plan has evolved to include professional development, district safety, IT support and curriculum implementation.

Bainbridge-Guilford recognizes and appreciates the students, staff members, parents, community members, and higher education who were engaged in the development of this plan. Members of the Technology Committee worked on defining the focus areas, outcomes, student and staff expectations, and actions steps.

The goal of the Technology Plan is to transform the learning process by seamless technology integration, as we continue to support all learners by providing the necessary resources and guidance while providing a safe physical and digital environment.

The plan is organized in four major focus areas with identified outcomes, expectations for students and staff, and action steps. The four focus areas are:

**Professional Development** – Providing learning opportunities for staff so that they can implement the appropriate technology.

**Technology Infrastructure to Support Safety** – The Technology Committee will partner with the District Incident Management Team to facilitate and support building and cybersecurity.

**IT Support** – Creating an environment in which technology needs are supported.

**Essential Technology Learning Competencies** – Implementing New York State grade level standards for computer science and digital fluency.

## Vision and Mission

The Bainbridge-Guilford School District will continue to be an exemplary 21<sup>st</sup> Century learning community whose students are engaged and empowered by their learning culture. Through opportunity and access to diverse technologies, students will be prepared to excel in an ever-changing world.

The *Vision and Mission* was created in accordance with numerous plans that we have investigated, as well as state regulations. The Technology Committee collaboratively formulated the vision for technology, integrating the *Vision and Mission* of the Bainbridge-Guilford Central School District with the necessities of technology within our district.

The Technology Committee met with the common goal of creating a district-wide technology plan. We have discussed the necessity of a district-wide initiative focused on influence rather than advocacy, which has allowed the committee to create the plan with the good of the entire district in mind when making this plan.

## Technology Plan Committee Members

Team Member	Position	School
Skylar Clark	RTI Teacher	Greenlawn Elementary
Jeff Gerlach	MITS Employee	Bainbridge-Guilford District
Amanda Madugno	2/3 Teacher	Greenlawn Elementary
Melissa Margadona	Special Education Teacher	Guilford Elementary
Greg Milunich	Special Education Teacher	Bainbridge-Guilford Jr.-Sr. High School
Ed Monico	MITS Employee	Bainbridge-Guilford District
Kelly O'Rourke	Kindergarten Teacher	Guilford Elementary
Heather Pratt	Spanish Teacher	Bainbridge-Guilford Jr.-Sr. High School
Nicole Rowley	Science Teacher	Bainbridge-Guilford Jr.-Sr. High School
Tim Ryan	Superintendent	Bainbridge-Guilford District
Greg Winn	A. Principal & Tech Coordinator	Bainbridge-Guilford Jr.-Sr. High School
William Zakrajsek	High School Principal	Bainbridge-Guilford Jr.-Sr. High School

## Focus Area 1: Professional Development

**Outcome:** By June 2028, all staff will have the skills and tools needed to enhance teaching and learning through the use of technology. There will be a focus on continuing staff education in available technology tools within the framework of the LINKS plan.

**Background:** Professional development within the Bainbridge-Guilford Central School District is organized and delivered through the LINKS Team. LINKS is a teacher-led framework through which targeted professional development is created, and provided, by Bainbridge-Guilford staff.

Professional development empowers teachers to continually strengthen their practice to better meet the learning needs of all students. Professional development for technology will be driven by survey feedback from staff and students.

**LINKS Goals include:**

Goal 3: Monitor technology needs and plan implementation.							
A: Organizing and providing professional development for all staff in a path of continued growth.			B: Supporting staff in the use of viable and appropriate curriculum.			C: Evaluating and adjusting instruction via use of formative and summative assessment.	
<b>Strategy</b> K-8 use of i-Ready	<b>Strategy</b> Generation Genius Proficiency K-8	<b>Strategy</b> Promethean Board Implementation K-12	<b>Strategy</b> Make staff technology website available to all staff	<b>Strategy</b> Create Educational Technology Specialists positions	<b>Strategy</b> Provide staff training	<b>Strategy</b> Improve functionality and fluidity of CBT	<b>Strategy</b> Administer i-Ready Diagnostics
<b>Action Step</b> Provide training for K-8 teachers in i-Ready	<b>Action Step</b> Create schedule and opportunity for science for training and exploration.	<b>Action Step</b> Continue providing training and support.	<b>Action Step</b> Complete and publish BG technology website	<b>Action Step</b> Define the role of educational technology specialists and appoint.	<b>Action Step</b> Provide direct training and support to new staff.	<b>Action Step</b> Continue ELA and Math CBT for 3-8 state testing	<b>Action Step</b> Complete Math and ELA Diagnostics three times throughout the school year.
<b>Action Step</b> Streamline i-Ready use by grade level		<b>Action Step</b> Continue to order and install boards.	<b>Action Step</b> Have staff complete technology survey and update website		<b>Action Step</b> Collaborate with technology committee for training and support for all staff.	<b>Action Step</b> Implement science CBT for the 8th grade state science test.	<b>Action Step</b> Analyze data and deliver lessons and intervention based on need.

## Expectations for Students and Adults

### Students:

Adopt and implement new technologies in their learning.

### Adults:

Design and facilitate digital learning experiences and assessments based on best practices. Promote and model digital citizenship and responsibility. Engage in professional growth and leadership.

### Action Steps

- 1) Implement professional development as indicated in the LINKS plan.
- 2) Routinely gather feedback on professional development requests, wants and needs.
- 3) Reflect and modify the next plan.
- 4) Continue to implement computer-based testing (such as iReady and Standardized Testing)

## Focus Area 2: Technology Infrastructure to Support Safety

**Outcome:** Bainbridge-Guilford will commit to technology supporting student safety. Technology needs are driven by the NIST framework, district wide safety plan, laws and regulations, and the SmartBond plan.

**Background:** Infrastructure changes are needed to support safety in the areas of cybersecurity and building security to be in compliance with New York State regulations.

### Part 1: Cybersecurity

We will assess and address insufficiencies according to the NIST framework.

Organizational cybersecurity practices are regularly updated based on the application of risk management processes to changes in business/mission requirements and a changing threat and technology landscape to ensure compliance with all applicable laws and regulations, including FERPA, COPPA, IDEA, Education Law § 2-d, and Part 121 of the Commissioner of Education's Regulations. Education Law § 2-d and Part 121 outline requirements for educational agencies related to the protection of the personally identifiable information (PII). Further, the definition of 'third party contractor' makes it clear that any person or entity that is not an educational agency, that receives student data or teacher or principal data from a school district, BOCES or other educational agency for purposes of providing services, must do so pursuant to a contract or other written agreement. Education Law §2-d includes requirements for such contractors and the contracts with which they are engaged.

### Part 2: Building Security

We will assess and address security needs by building in conjunction with the District Incident Management Team (DIMIT) and the Bainbridge-Guilford Central School District Smart Schools Initiative.

### Action Steps: 2023-2028

- 1) Annual building walkthroughs
- 2) Review of applicable federal and state laws and regulations, for example Alyssa's Law
- 3) Continued review of digital resources and their compliance with Education Law §2-d
- 4) Continued use of filtering software



## Focus Area 3: IT Support

**Outcome:** Bainbridge-Guilford will have staffing and support in place for existing technology to be supported, as well as exploration of new and upgraded technology.

**Background:** Bainbridge-Guilford is a managed technology district through B-T BOCES. In addition, the district is committed to employing Educational Technology Support Specialists (ETSS) in each building.

### Expectations for Students and Adults

#### Students:

Use equipment responsibly and in a way that minimizes the need for repairs and downtime. If the need arises for repairs, students will follow established procedures for their building.

#### Adults:

Provide suggestions and ideas about improving the IT support and installation process. Educate students in the proper use of technology to minimize downtime. Use established procedures to address technology needs.

#### Action Steps: 2023-2028

- 1) When appropriate, submit a ticket or seek out assistance from MITS or the ETSY's.
- 2) Continue exploration of new and updated technology
- 3) Students will follow the digital device agreement expectations

## Focus Area 4: Curriculum

**Outcome:** Students will reach grade level competency of New York State Computer Science and Digital Fluency Learning Standards by June 2028.

**Background:** Student technology learning standards drive the vision and development of the whole technology plan.

These standards allow us to:

- know what instructional technology systems to put in place
- identify equipment needs for purchase and maintenance
- determine professional development needs

### Expectations for Students and Adults

#### Students:

Students will demonstrate competency of the grade level specified technology learning standards.

#### Adults:

Teachers will become proficient with district identified technology tools and facilitate student learning to achieve grade level technology learning standards.

### Action Steps: 2023-2028

Adopt New York State Computer Science and Digital Fluency Learning Standards.

- 1) Approach the LINKS Committee in summer of 2023 to incorporate the new standards into the district LINKS plan. Secure or acquire professional development training during professional development days.
- 2) Assess current technology use throughout the district and present at faculty meetings or PD days, chunking the standards and how we want to tackle them in departments/grade level.
- 3) Reflect on implementation and plan out how to move forward each year. This will be reflected in the LINKS plans.

## NYS Computer Science and Digital Fluency Learning Standards by Grade

[K-1 Computer Science and Digital Fluency Learning Standards](#)

[2-3 Computer Science and Digital Fluency Learning Standards](#)

[4-6 Computer Science and Digital Fluency Learning Standards](#)

[7-8 Computer Science and Digital Fluency Learning Standards](#)

[9-12 Computer Science and Digital Fluency Learning Standards](#)

## NYS Computer Science and Digital Fluency Learning Standards (all grades)

### Impacts of Computing

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
Ethics	This Standard begins in Grade Band 2-3	<p><b>2-3.IC.5</b></p> <p>Identify and discuss how computers are programmed to make decisions without direct human input in daily life.</p>	<p><b>4-6.IC.5</b></p> <p>Explain how computer systems play a role in human decision-making.</p>	<p><b>7-8.IC.5</b></p> <p>Analyze potential sources of bias that could be introduced to complex computer systems and the potential impact of these biases on individuals.</p>	<p><b>9-12.IC.5</b></p> <p>Describe ways that complex computer systems can be designed for inclusivity and to mitigate unintended consequences.</p>
		<p><i>The focus is on describing computing technology that relies on a program, settings, and data to make decisions without direct human involvement.</i></p>	<p><i>The focus is on explaining a range of ways that humans interact with AI to make decisions.</i></p>	<p><i>The focus is on understanding different factors that introduce bias into an AI system and how those biases affect people.</i></p>	<p><i>The focus is on applying an understanding of bias and ethical design in order to make recommendations for designing with inclusivity and social good in mind.</i></p>
Accessibility	<p><b>K-1.IC.6</b></p> <p>With teacher support, identify different ways people interact with computers and computing devices.</p>	<p><b>2-3.IC.6</b></p> <p>Identify and discuss factors that make a computing device or software application easier or more difficult to use.</p>	<p><b>4-6.IC.6</b></p> <p>Identify and explain ways to improve the accessibility and usability of a computing device or software application for the diverse needs and wants of users.</p>	<p><b>7-8.IC.6</b></p> <p>Assess the accessibility of a computing device or software application in terms of user needs.</p>	<p><b>9-12.IC.6</b></p> <p>Create accessible computational artifacts that meet standard compliance requirements or otherwise meet the needs of users with disabilities.</p>
	<p><i>The focus is on the features of computers and other devices, and the things that make them easier to use (i.e. drop-down menus, buttons, areas to type).</i></p>	<p><i>The focus is on identifying choices developers make when designing computing devices and software and considering the pros and cons when making those choices.</i></p>	<p><i>The focus is on identifying the needs and wants of diverse end users and purposefully considering potential perspectives of users with different backgrounds, ability levels, points of view, and abilities.</i></p>	<p><i>The focus is on testing and discussing the usability and accessibility of various technology tools (e.g., apps, games, and devices) with teacher guidance.</i></p>	<p><i>At this level, considering accessibility becomes part of the design process and awareness of professionally accepted accessibility standards.</i></p>

## Impacts of Computing

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
<b>Career Paths</b>	<p><b>K-1.IC.7</b></p> <p>Identify multiple jobs that use computing technologies.</p>	<p><b>2-3.IC.7</b></p> <p>Identify a diverse range of roles and skills in computer science.</p>	<p><b>4-6.IC.7</b></p> <p>Identify a diverse range of role models in computer science.</p>	<p><b>7-8.IC.7</b></p> <p>Explore a range of computer science-related career paths.</p>	<p><b>9-12.IC.7</b></p> <p>Investigate the use of computer science in multiple fields.</p>
	<p><i>The focus is on identifying jobs that utilize computing technology and how technology impacts a range of industries. Doctors, business owners, police officers, auto repair technicians, farmers, architects, and pilots use computing technology in their jobs.</i></p>	<p><i>The focus is not just on jobs in computer science, but also the skills and practices that are important for careers in the field of computer science.</i></p>	<p><i>The emphasis of this standard is the opportunity to personally identify with a range of diverse people in the field of computer science.</i></p>	<p><i>At this level, the focus is on building awareness of the many different computer science-related careers.</i></p>	<p><i>At this level, the focus is on making connections between computer science and the fields of interest of individual students.</i></p>

## Computational Thinking

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
<b>Modeling and Simulation</b>	<p><b>K-1.CT.1</b></p> <p>Identify and describe one or more patterns (found in nature or designed), and examine the patterns to find similarities and make predictions.</p>	<p><b>2-3.CT.1</b></p> <p>Create a model of an object or computational process in order to identify patterns and essential elements of the object or process.</p>	<p><b>4-6.CT.1</b></p> <p>Develop a computational model of a system that shows changes in output when there are changes in inputs.</p>	<p><b>7-8.CT.1</b></p> <p>Compare the results of alternative models or simulations to determine and evaluate how the input data and assumptions change the results.</p>	<p><b>9-12.CT.1</b></p> <p>Create a simple digital model that makes predictions of outcomes.</p>
	<p><i>The emphasis is on identifying patterns and then making predictions based on the pattern.</i></p>	<p><i>The emphasis is on essential components represented in the model to achieve desired results and assist in identifying patterns in the world around us, such as cycles in nature or tessellations.</i></p>	<p><i>The emphasis is on understanding, at a conceptual level, that models or simulations can be created to respond to deliberate changes in inputs.</i></p>	<p><i>The focus is on understanding that models or simulations are limited by the data that they use, rather than understanding specifically how they use that data.</i></p>	<p><i>The focus is on using data to build alternative numerical models that can best represent a data set.</i></p>
<b>Data Analysis and Visualization</b>	<p><b>K-1.CT.2</b></p> <p>Identify different kinds of data that can be collected from everyday life.</p>	<p><b>2-3.CT.2</b></p> <p>Identify and describe data collection tools from everyday life.</p>	<p><b>4-6.CT.2</b></p> <p>Collect digital data related to a real-life question or need.</p>	<p><b>7-8.CT.2</b></p> <p>Collect and use digital data in a computational artifact.</p>	<p><b>9-12.CT.2</b></p> <p>Collect and evaluate data from multiple sources for use in a computational artifact.</p>
	<p><i>The emphasis is on understanding what is data and identifying different types of data, while exploring how data can be collected and sorted.</i></p>	<p><i>The emphasis is on identifying various tools in everyday life that collect, sort and store data, such as surveys, spreadsheets and charts.</i></p>	<p><i>The emphasis is on using digital tools to collect and organize multiple data points.</i></p>	<p><i>The emphasis is on designing and following collection protocols. Data sources include, but are not limited to sensors, surveys, and polls.</i></p>	<p><i>The emphasis is on designing and following collection protocols. Data sources include, but are not limited to sensors, web or database scrapers, and human input.</i></p>

### Computational Thinking

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
<b>Data Analysis and Visualization</b>	<p><b>K-1.CT.3</b></p> <p>Identify ways to visualize data, and collaboratively create a visualization of data.</p>	<p><b>2-3.CT.3</b></p> <p>Present the same data in multiple visual formats in order to tell a story about the data.</p>	<p><b>4-6.CT.3</b></p> <p>Visualize a simple data set in order to highlight relationships and persuade an audience.</p>	<p><b>7-8.CT.3</b></p> <p>Refine and visualize a data set in order to persuade an audience.</p>	<p><b>9-12.CT.3</b></p> <p>Refine and visualize complex data sets to tell different stories with the same data set.</p>
	<p><i>Ways to visualize data include tables, graphs, and charts.</i></p>	<p><i>The emphasis is on using the visual representation to make the data meaningful. Options for presenting data visually include tables, graphs, and charts.</i></p>	<p><i>The emphasis is on identifying and organizing relevant data to emphasize particular parts of the data in support of a claim.</i></p>	<p><i>Refining includes, but is not limited to, identifying relevant subsets of a data set, deleting unneeded data, and sorting and organizing data to highlight trends.</i></p>	<p><i>The emphasis is on refining large data sets to create multiple narratives depending upon the audience. Large data sets require use of a software tool or app to cross-reference, analyze, refine, and visualize subsets of the data.</i></p>
<b>Abstraction and Decomposition</b>	<p><b>K-1.CT.4</b></p> <p>Identify a problem or task and discuss ways to break it into multiple smaller steps.</p>	<p><b>2-3.CT.4</b></p> <p>Identify multiple ways that the same problem could be decomposed into smaller steps.</p>	<p><b>4-6.CT.4</b></p> <p>Decompose a problem into smaller named tasks, some of which can themselves be decomposed into smaller steps.</p>	<p><b>7-8.CT.4</b></p> <p>Write a program using functions or procedures whose names or other documentation convey their purpose within the larger task.</p>	<p><b>9-12.CT.4</b></p> <p>Implement a program using a combination of student-defined and third-party functions to organize the computation.</p>
	<p><i>The focus is on identifying a complex (for the age group) task or problem to break apart into smaller steps. The focus should be on understanding why this process is helpful.</i></p>	<p><i>The focus is on identifying how to break apart a problem into smaller steps, while understanding that there can be multiple valid sequences of steps that solve the same problem.</i></p>	<p><i>The focus is on identifying smaller steps that solve a larger problem, recognizing that some of those steps must be broken down further until each step is manageable.</i></p>	<p><i>The focus is on identifying where there is potential to use a function or procedure to create a reusable computation.</i></p>	<p><i>The focus is on having students think about how to decompose a programming problem into functions and procedures, including working around the constraints imposed by specific functions or features provided in a library.</i></p>

Computational Thinking

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
<b>Abstraction and Decomposition</b>	<p><b>K-1.CT.5</b></p> <p>Recognize that the same task can be described at different levels of detail.</p>	<p><b>2-3.CT.5</b></p> <p>Identify the essential details needed to perform a general task in different settings or situations.</p>	<p><b>4-6.CT.5</b></p> <p>Identify and name a task within a problem that gets performed multiple times while solving that problem, but with slightly different concrete details each time.</p>	<p><b>7-8.CT.5</b></p> <p>Identify multiple similar concrete computations in a program, then create a function to generalize over them using parameters to accommodate their differences</p>	<p><b>9-12.CT.5</b></p> <p>Modify a function or procedure in a program to perform its computation in a different way over the same inputs, while preserving the result of the overall program.</p>
	<p><i>Instructions to perform a task can be given with more or less detail but still achieve the same result.</i></p>	<p><i>Some details are essential to performing a task, while others are not (E.g., some may be so common that they don't need to be stated).</i></p>	<p><i>The focus is on recognizing that the same general steps are often repeated while solving a problem, even though some of the details may differ.</i></p>	<p><i>The focus is on identifying similar expressions or sequences in code and abstracting them into functions that generalize over the similarities.</i></p>	<p><i>The focus is on understanding that the same abstract concept can be performed in different ways in a program, as long as the same inputs yield the same results</i></p>
<b>Algorithms and Programming</b>	<p><b>K-1.CT.6</b></p> <p>Follow an algorithm to complete a task.</p>	<p><b>2-3.CT.6</b></p> <p>Create two or more algorithms for the same task.</p>	<p><b>4-6.CT.6</b></p> <p>Compare two or more algorithms and discuss the advantages and disadvantages of each for a specific task.</p>	<p><b>7-8.CT.6</b></p> <p>Design, compare and refine algorithms for a specific task or within a program.</p>	<p><b>9-12.CT.6</b></p> <p>Demonstrate how at least two classic algorithms work, and analyze the trade-offs related to two or more algorithms for completing the same task.</p>
	<p><i>The task can be a familiar, daily activity or can be designed by the teacher. Algorithms at this stage may be short, though must contain at least three steps, and should focus on sequencing.</i></p>	<p><i>The task can be a familiar activity or more abstract. The focus is on finding more than one way to reach the same goal.</i></p>	<p><i>Tasks can be unplugged or related to a computer program and reflect a task with a specific result that can be checked.</i></p>	<p><i>Algorithms can be represented in a range of formats, including flowcharts, pseudocode, or written steps. Planning the output of a program, such as with a storyboard or wireframe, is not sufficient on its own.</i></p>	<p><i>The focus of this standard is a high-level understanding that algorithms involve trade-offs, especially related to memory use and speed. Students should understand that classic algorithms are solved problems that can be reused.</i></p>



## Computational Thinking

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
<b>Algorithms and Programming</b>	<p><b>K-1.CT.7</b></p> <p>Identify terms that refer to different concrete values over time.</p>	<p><b>2-3.CT.7</b></p> <p>Name/label key pieces of information in a set of instructions, noting whether each name/label refers to a fixed or changing value.</p>	<p><b>4-6.CT.7</b></p> <p>Identify pieces of information that might change as a program or process runs.</p>	<p><b>7-8.CT.7</b></p> <p>Design or remix a program that uses a variable to maintain the current value of a key piece of information.</p>	<p><b>9-12.CT.7</b></p> <p>Design or remix a program that utilizes a data structure to maintain changes to related pieces of data.</p>
	<p><i>The focus is on observing that people use certain terms/labels to refer to a concept (E.g., Today's Date, Today's Weather, Word of the Week, Today's Line Leader) whose specific value can change depending on the day or time.</i></p>	<p><i>The focus is on identifying key pieces of information, labelling them with a descriptive name, and observing which labels refer to different values each time the instructions are given, and which values stay the same.</i></p>	<p><i>The focus is on identifying information that needs to be updated as a computation progresses.</i></p>	<p><i>The focus is on understanding that variables can be used to track the value of a concept in a program as it changes over time.</i></p>	<p><i>The focus is on updating the elements or components within a named instance of a data structure, without changing the value associated with the name itself.</i></p>
	<p><b>K-1.CT.8</b></p> <p>Identify a task consisting of steps that are repeated, and recognize which steps are repeated.</p>	<p><b>2-3.CT.8</b></p> <p>Identify steps within a task that should only be carried out under certain precise conditions.</p>	<p><b>4-6.CT.8</b></p> <p>Develop algorithms or programs that use repetition and conditionals for creative expression or to solve a problem.</p>	<p><b>7-8.CT.8</b></p> <p>Develop or remix a program that effectively combines one or more control structures for creative expression or to solve a problem.</p>	<p><b>9-12.CT.8</b></p> <p>Develop a program that effectively uses control structures in order to create a computer program for practical intent, personal expression, or to address a societal issue.</p>
	<p><i>The focus should be on short tasks where there is repetition and having students identify and describe the repetition.</i></p>	<p><i>The focus should be on recognizing that some steps in a task only get carried out some of the time, and that the conditions can be precisely described.</i></p>	<p><i>The focus is on having students work with each of conditionals and repetition (loops or iteration), but without having to use them in conjunction with one another.</i></p>	<p><i>The focus is on having students combine control structures, such as conditionals and loops, in such a way that they work together to achieve an outcome that could not be achieved using only one of them.</i></p>	<p><i>The focus is on combining different forms of repetition and conditionals, including conditionals with complex Boolean expressions.</i></p>

## Computational Thinking

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
<b>Algorithms and Programming</b>	<p><b>K-1.CT.9</b></p> <p>Identify and fix (debug) errors within a simple algorithm.</p>	<p><b>2-3.CT.9</b></p> <p>Identify and debug errors within an algorithm or program that includes sequencing or repetition.</p>	<p><b>4-6.CT.9</b></p> <p>Explain each step of an algorithm or program that includes repetition and conditionals for the purposes of debugging.</p>	<p><b>7-8.CT.9</b></p> <p>Read and interpret code to predict the outcome of various programs that involve conditionals and repetition for the purposes of debugging.</p>	<p><b>9-12.CT.9</b></p> <p>Systematically test and refine programs using a range of test cases, based on anticipating common errors and user behavior.</p>
	<p><i>The focus should be on identifying small errors within a simple algorithm and fixing the errors collaboratively.</i></p>	<p><i>The focus should be on having students identify error(s) in an algorithm and suggest changes to fix the algorithm.</i></p>	<p><i>Debugging frequently involves stepping or tracing through a program as if you were the computer to reveal errors.</i></p>	<p><i>Programs can be debugged in numerous ways, including tracing and trying varying inputs. Perseverance is important in finding errors.</i></p>	<p><i>The emphasis is on perseverance and the ability to use different test cases on their programs and identify what issues are being tested in each case.</i></p>
	<p><b>K-1.CT.10</b></p> <p>Collaboratively create a plan that outlines the steps needed to complete a task.</p>	<p><b>2-3.CT.10</b></p> <p>Develop and document a plan that outlines specific steps taken to complete a project.</p>	<p><b>4-6.CT.10</b></p> <p>Describe the steps taken and choices made to design and develop a solution using an iterative design process.</p>	<p><b>7-8.CT.10</b></p> <p>Document the iterative design process of developing a computational artifact that incorporates user feedback and preferences.</p>	<p><b>9-12.CT.10</b></p> <p>Collaboratively design and develop a program or computational artifact for a specific audience and create documentation outlining implementation features to inform collaborators and users.</p>
	<p><i>The focus should be on collaboratively identifying a planning process which can be written, drawn, or spoken.</i></p>	<p><i>The focus should be on developing and documenting a plan in writing, using appropriate tools (such as a storyboard or story map).</i></p>	<p><i>An iterative design process involves defining the problem or goal, developing a solution or prototype, testing the solution or prototype, and repeating the process until the problem is solved or desired result is achieved. Describing can include speaking or writing.</i></p>	<p><i>At this level, the emphasis is on using the iterative design process to create a solution or prototype with the end user in mind and to document the steps taken by the student to gather and incorporate information about the user into the computational artifact.</i></p>	<p><i>The focus is on the collaborative aspect of software development, as well as the importance of documenting the development process such that the reasons behind various development decisions can be understood by other software developers.</i></p>



## Networks and Systems Design

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
<b>Hardware and Software</b>	<p><b>K-1.NSD.1</b></p> <p>Identify ways people provide input and get output from computing devices.</p> <p><i>The emphasis is on understanding that humans and computers interact through inputs and outputs and identifying examples in their daily lives.</i></p>	<p><b>2-3.NSD.1</b></p> <p>Describe and demonstrate several ways a computer program can receive data and instructions (input) and can present results (output).</p> <p><i>The focus is on choosing and demonstrating different computing technologies to receive and present results depending on the task.</i></p>	<p><b>4-6.NSD.1</b></p> <p>Propose improvements to the design of a computing technology based on an analysis of user interactions with that technology.</p> <p><i>The emphasis is on thinking about how the user interface could be optimized for the purpose of the computing technology and user interactions.</i></p>	<p><b>7-8.NSD.1</b></p> <p>Design a user interface for a computing technology that considers usability, accessibility, and desirability.</p> <p><i>The emphasis is on designing (but not necessarily creating) a user interface. Designs could include things like written descriptions, drawings, and/or 3D prototypes.</i></p>	<p><b>9-12.NSD.1</b></p> <p>Design a solution to a problem that utilizes embedded systems to automatically gather input from the environment.</p> <p><i>The emphasis is on designing (but not necessarily creating) solutions with embedded systems. Systems can be biological, mechanical, social, or some other type of system. Designs could include written descriptions, drawings, and/or 3D prototypes.</i></p>
	<p><b>K-1.NSD.2</b></p> <p>Identify basic hardware components that are found in computing devices.</p>	<p><b>2-3.NSD.2</b></p> <p>Explain the function of software in computing systems, using descriptive/precise language.</p>	<p><b>4-6.NSD.2</b></p> <p>Model how computer hardware and software work together as a system to accomplish tasks.</p>	<p><b>7-8.NSD.2</b></p> <p>Design a project that combines hardware and software components.</p>	<p><b>9-12.NSD.2</b></p> <p>Explain the levels of interaction existing between the application software, system software, and hardware of a computing system.</p>
	<p><i>Basic hardware components are the parts that students can see, such as monitor/screen, keyboard, mouse, etc.</i></p>	<p><i>The focus is on understanding how software helps to complete computing tasks.</i></p>	<p><i>A model should only include the basic elements of a computer system, including input, output, processor, and storage.</i></p>	<p><i>The focus is on designing (but not necessarily creating) a system that involves collecting and exchanging data including input, output, storage, and processing.</i></p>	<p><i>Knowledge of specific advanced terms of computer architecture and how specific levels work is not required. Rather the progression, in general terms, from voltage to binary signal to logic gates and so on to the level of human interaction, should be explored.</i></p>

## Networks and Systems Design

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
<b>Hardware and Software</b>	<p><b>K-1.NSD.3</b></p> <p>Identify basic hardware and/or software problems.</p> <p><i>The focus is on identifying the source of a common hardware/software problem (such as low battery, speakers not connected) with teacher guidance.</i></p>	<p><b>2-3.NSD.3</b></p> <p>Describe and attempt troubleshooting steps to solve a simple technology problem.</p> <p><i>The focus is on building problem solving techniques for self-help, such as making sure speakers are turned on or headphones are plugged in or making sure that the caps lock key is not on, to narrow down a problem.</i></p>	<p><b>4-6.NSD.3</b></p> <p>Determine potential solutions to solve hardware and software problems using common troubleshooting strategies.</p> <p><i>The focus is on trying multiple strategies to troubleshoot problems, including rebooting the device, checking for power, checking network availability, closing and reopening an application, try using a different browser, and checking settings within an application.</i></p>	<p><b>7-8.NSD.3</b></p> <p>Identify and fix problems with computing devices and their components using a systematic troubleshooting method or guide.</p> <p><i>The focus is on identifying the source of a problem by using a structured process such as a checklist or flowchart to systematically try solutions that may fix the problem.</i></p>	<p><b>9-12.NSD.3</b></p> <p>Develop and communicate multi-step troubleshooting strategies others can use to identify and fix problems with computing devices and their components.</p> <p><i>Some examples of multi-step troubleshooting problems include resolving connectivity problems, adjusting system configurations and settings, ensuring hardware and software compatibility, and transferring data from one device to another.</i></p>
	<b>Networks and the Internet</b>	<p><b>K-1.NSD.4</b></p> <p>Identify how protocols/rules help people share information over long distances.</p> <p><i>The focus is on how information is conveyed from one individual to another and the rules that allow for communication and data sharing, such as envelopes need addresses/emails need email addresses to reach the right person.</i></p>	<p><b>2-3.NSD.4</b></p> <p>Recognize that information can be communicated using different representations that satisfy different rules.</p> <p><i>The focus is on understanding that information is converted in a special way so it can be sent through wires or waves through the air.</i></p>	<p><b>4-6.NSD.4</b></p> <p>Model how data is structured to transmit through a network.</p> <p><i>The focus is on understanding that data is broken down into smaller pieces and labeled to travel through a network and reassembled.</i></p>	<p><b>7-8.NSD.4</b></p> <p>Design a protocol for transmitting data through a multi-point network.</p> <p><i>The focus is on understanding how protocols enable communication and what additional data is necessary for transmission. Knowledge of the details of how specific protocols work is not expected.</i></p>

## Networks and Systems Design

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
<b>Networks and the Internet</b>	<p><b>K-1.NSD.5</b></p> <p>Identify physical devices that can store information.</p> <p><i>The focus is on recognizing that common computing devices can store information, including computers, tablets, phones, and calculators.</i></p>	<p><b>2-3.NSD.5</b></p> <p>Describe and navigate to various locations where digital information can be stored.</p> <p><i>The focus is being able to navigate and save a file to a specific location.</i></p>	<p><b>4-6.NSD.5</b></p> <p>Describe that data can be stored locally or remotely in a network.</p> <p><i>The focus is on describing that data must be stored on a physical device. Access to remotely stored data is restricted by the networks, and to access non-local data a connection to the network is required.</i></p>	<p><b>7-8.NSD.5</b></p> <p>Summarize how remote data is stored and accessed in a network.</p> <p><i>The focus is on explaining where the data associated with different apps, devices, and embedded systems is stored, how the data is synchronized, and how to connect to it.</i></p>	<p><b>9-12.NSD.5</b></p> <p>Describe how emerging technologies are impacting networks and how they are used.</p> <p><i>The focus is on discussing how specific emerging technologies impact networks in terms of scale, access, reliability, and security, and user behavior.</i></p>

## Cybersecurity

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
<b>Risks</b>	<p><b>K-1.CY.1</b></p> <p>Identify reasons for keeping information private.</p> <p><i>The focus should be on discussing the reasons to keep certain information public (information you share with others) or private (information you keep to yourself or only share with your family).</i></p>	<p><b>2-3.CY.1</b></p> <p>Compare reasons why an individual should keep information private or make information public.</p> <p><i>The focus should be on potential effects, both positive and negative, for making information public.</i></p>	<p><b>4-6.CY.1</b></p> <p>Explain why different types of information might need to be protected.</p> <p><i>The emphasis is on discussing different reasons that adversaries may want to obtain, compromise, or leverage different types of information. At this stage, students should be focused on general concepts.</i></p>	<p><b>7-8.CY.1</b></p> <p>Determine the types of personal information and digital resources that an individual may have access to that needs to be protected</p> <p><i>The emphasis is on identifying personal information and devices that an individual may have access to and that adversaries may want to obtain or compromise. At this stage, students should focus on specific data and devices that they have access to.</i></p>	<p><b>9-12.CY.1</b></p> <p>Determine the types of personal and organizational information and digital resources that an individual may have access to that needs to be protected.</p> <p><i>The emphasis is on identifying both personal information and organizational information, and devices and embedded systems, that an individual may have access to and that adversaries may want to compromise, obtain, or leverage.</i></p>
<b>Safeguards</b>	<p><b>K-1.CY.2</b></p> <p>Identify simple ways to help keep accounts secure.</p> <p><i>The emphasis is on having a basic understanding of ways keep accounts secure, such as having a passwords/pass codes.</i></p>	<p><b>2-3.CY.2</b></p> <p>Compare and contrast behaviors that do and do not keep information secure.</p> <p><i>The emphasis is on recognizing and avoiding potentially harmful behaviors, such as sharing private information online or not logging off a public computer.</i></p>	<p><b>4-6.CY.2</b></p> <p>Describe common safeguards for protecting personal information.</p> <p><i>The emphasis is on describing common safeguards such as protecting devices and accounts with strong passwords, keeping software updated, and not sending sensitive information over SMS.</i></p>	<p><b>7-8.CY.2</b></p> <p>Describe physical, digital, and behavioral safeguards that can be employed in different situations.</p> <p><i>The emphasis is on recommending different types of security measures including physical, digital, and behavioral, for a given situation.</i></p>	<p><b>9-12.CY.2</b></p> <p>Describe physical, digital, and behavioral safeguards that can be employed to protect the confidentiality, integrity, and accessibility of information.</p> <p><i>The emphasis is on considering the CIA Triad when recommending safeguards for a specific application or device.</i></p>

## Cybersecurity

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
Safeguards	This Standard begins in Grade Band 2-3	<b>2-3.CY.3</b> Identify why someone might choose to share an account, app access, or devices.	<b>4-6.CY.3</b> Describe trade-offs between allowing information to be public and keeping information private and secure.	<b>7-8.CY.3</b> Describe trade-offs of implementing specific security safeguards.	<b>9-12.CY.3</b> Explain specific trade-offs when selecting and implementing security recommendations.
		<i>The focus is on explaining how user habits and behaviors should be adjusted based on who shares a device and/or application.</i>	<i>The focus is on considering the trade-offs of data sharing in different contexts.</i>	<i>The focus is on thinking about how a specific safeguard impacts the confidentiality, integrity, and access of information. Additionally, there should be a focus on discussing whether strengthening one specific safeguard adversely affects another.</i>	<i>The focus is on making security recommendations and discussing trade-offs between the degree of confidentiality, the need for data integrity, the availability of information for legitimate use, and assurance that the information provided is genuine.</i>
	<b>K-1.CY.4</b> Decode a word or short message using a simple code.	<b>2-3.CY.4</b> Encode and decode a short message or phrase.	<b>4-6.CY.4</b> Model and explain the purpose of simple cryptographic methods.	<b>7-8.CY.4</b> Describe the limitations of cryptographic methods.	<b>9-12.CY.4</b> Evaluate applications of cryptographic methods.
	<i>The focus is on having students look at a string of symbols and giving them a key to substitute letters for the symbols to spell a word.</i>	<i>The focus is on having one student encode a word or message, and a different student, using the same key, decode it. You might encourage students to develop their own coding scheme.</i>	<i>The focus is on using ciphers to encrypt and decrypt messages as a means of safeguarding data.</i>	<i>The focus is on recognizing that cryptography provides a level of security for data, and some types of encryption are weaker than others.</i>	<i>The focus is on analyzing the role that cryptography and data security play in events that have shaped history and impact the future.</i>

## Cybersecurity

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
Response	<b>K-1.CY.5</b> Identify when it is appropriate to open and/or click on links or files.	<b>2-3.CY.5</b> Identify unusual activity of applications and devices that should be reported to a responsible adult.	<b>4-6.CY.5</b> Explain suspicious activity of applications and devices.	<b>7-8.CY.5</b> Describe actions to be taken before and after an application or device reports a security problem or performs unexpectedly.	<b>9-12.CY.5</b> Recommend multiple actions to take prior and in response to various types of digital security breaches.
	<i>The emphasis is on recognizing when it is safe and appropriate for students to open links, with teacher guidance.</i>	<i>The emphasis is on recognizing situations in which students should notify a trusted adult when a device or application does not perform as expected (pop-ups, authentication and/or loading issues).</i>	<i>The emphasis is on describing simple forms of suspicious behavior in common applications and devices, including suspicious data/links, viruses and malware.</i>	<i>The emphasis is on explaining appropriate actions to prevent and address common security issues for common situations.</i>	<i>The emphasis is on analyzing different types of breaches and planning appropriate actions that might be taken to prevent and respond to a security breach.</i>

## Digital Literacy

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
<b>Digital Use</b>	<p><b>K-1.DL.1</b></p> <p>Identify and explore the keys on a keyboard.</p>	<p><b>2-3.DL.1</b></p> <p>Locate and use the main keys on a keyboard to enter text independently.</p>	<p><b>4-6.DL.1</b></p> <p>Type on a keyboard while demonstrating proper keyboarding technique.</p>	<p><b>7-8.DL.1</b></p> <p>Type on a keyboard while demonstrating proper keyboarding technique, with increased speed and accuracy.</p>	<p><b>9-12.DL.1</b></p> <p>Type proficiently on a keyboard.</p>
	<p><i>The focus is on exploring physical and/or touchscreen keyboards, and for students to be able to identify specific keys such as arrow keys, enter, space bar, backspace.</i></p>	<p><i>Students should be introduced to keyboarding and identify in second grade and begin to receive direct instruction in keyboarding in third grade, with a focus on form over speed and accuracy.</i></p>	<p><i>The focus is on direct instruction in keyboarding. Instruction should focus on form over speed and accuracy.</i></p>	<p><i>The emphasis is on continuing to improve keyboarding skills, with a focus on increasing speed as well as accuracy.</i></p>	<p><i>The focus is to demonstrate proficient keyboarding skills by the end of 12th grade.</i></p>
	<p><b>K-1.DL.2</b></p> <p>Communicate and work with others using digital tools.</p>	<p><b>2-3.DL.2</b></p> <p>Communicate and work with others using digital tools to share knowledge and convey ideas.</p>	<p><b>4-6.DL.2</b></p> <p>Select appropriate digital tools to communicate and collaborate while learning with others.</p>	<p><b>7-8.DL.2</b></p> <p>Communicate and collaborate with others using a variety of digital tools to create and revise a collaborative product.</p>	<p><b>9-12.DL.2</b></p> <p>Communicate and work collaboratively with others using digital tools to support individual learning and contribute to the learning of others.</p>
	<p><i>The focus should be on teaching students that people use digital tools to share ideas and work together. Communication and collaboration should be with teacher guidance.</i></p>	<p><i>The focus is on using digital tools to communicate and collaborate in order to expand knowledge and effectively convey ideas.</i></p>	<p><i>Students progress from understanding that people use digital tools to communicate and collaborate to how they use the tools. Communication and collaboration should be purposeful and, when possible and appropriate, with an authentic audience.</i></p>	<p><i>Students connect with others (students, teachers, families, the community, and/or experts) to further their learning for a specific purpose, give and receive feedback, and created a shared product.</i></p>	<p><i>Digital tools and methods should include both social and professional (those predominantly used in college and careers). Collaboration should occur in real time and asynchronously, and there should be opportunities for students to both seek and provide feedback on their thoughts and products.</i></p>

## Digital Literacy

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
Digital Use	<b>K-1.DL.3</b> Conduct a basic search based on a provided keyword.	<b>2-3.DL.3</b> Conduct basic searches based on student-identified keywords.	<b>4-6.DL.3</b> Conduct and refine advanced multi-criteria digital searches to locate content relevant to varied learning goals.	<b>7-8.DL.3</b> Compare types of search tools, choose a search tool for effectiveness and efficiency, and evaluate the quality of search tools based on returned results.	<b>No Standard; Mastery reached by Grade 8</b>
	<i>The teacher will provide the keyword to help students conduct basic searches using appropriate tools.</i>	<i>Students will identify key words with which to perform an internet search using teacher-approved tool(s), to obtain information.</i>	<i>Focus should be on the quality of results a search generates, and how to improve search results based on the task or purpose by defining multiple search criteria and using filters.</i>	<i>Mastery of this standard implies an understanding of how different search tools work, why different search tools provide different results, and how and why some websites rise to the top of a search.</i>	
	<b>K-1.DL.4</b> Use a least one digital tool to create a digital artifact.	<b>2-3.DL.4</b> Use a variety of digital tools and resources to create digital artifacts.	<b>4-6.DL.4</b> Use a variety of digital tools and resources to create and revise digital artifacts.	<b>7-8.DL.4</b> Select and use digital tools to create, revise, and publish digital artifacts.	<b>9-12.DL.4</b> Independently select advanced digital tools and resources to create, revise, and publish complex digital artifacts or collection of artifacts.
	<i>The focus is on students using at least one digital tool to create a digital artifact, with teacher guidance.</i>	<i>Different digital tools are used for different purposes, such as communicating, collaborating, researching, and creating original content.</i>	<i>The focus is on understanding the editing process when creating digital artifacts on multiple platforms.</i>	<i>Teachers should designate a school-approved location for students to publish artifacts for an audience to view. Advanced digital tools may refer to the tool itself (i.e. the tool is more advanced) or to utilization of more advanced features on a tool.</i>	<i>Mastery of this standard implies an ability to choose and use the technology tool or resource best suited for a task or purpose.</i>

## Digital Literacy

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
Digital Use	This Standard begins in Grade Band 4-6.	This Standard begins in Grade Band 4-6.	<b>4-6.DL.5</b> Identify common features of digital technologies.	<b>7-8.DL.5</b> Transfer knowledge of technology in order to explore new technologies.	<b>9-12.DL.5</b> Transfer knowledge of technology in order to use new and emerging technologies on multiple platforms.
			<i>Many digital technologies have similar features and functionalities. The focus is on identifying the similarities between different programs or applications, such as word processing tools on different platforms.</i>	<i>New technologies could include different tools for collaboration, creation, etc. that the student has not used before.</i>	<i>New technologies could include different tools for collaboration, creation, etc. that the student has not used before. Platforms could include devices running different operating systems or could be emerging STEAM technologies. Digitally fluent individuals can move between platforms and can use that knowledge when encountering new technology.</i>
Digital Citizenship	This Standard begins in Grade Band 2-3.	<b>2-3.DL.6</b> Describe ways that information may be shared online.	<b>4-6.DL.6</b> Describe persistence of digital information and explain how actions in online spaces can have consequences.	<b>7-8.DL.6</b> Explain the connection between the persistence of data on the Internet, personal online identity, and personal privacy.	<b>9-12.DL.6</b> Actively manage digital presence and footprint to reflect an understanding of the permanence and potential consequences of actions in online spaces.
		<i>The focus is on how personal information, both public and private, becomes available online and understand ways their information can be shared.</i>	<i>In order for students to be able to effectively manage their digital identities, it should be understood that online information doesn't "go away," and that information posted online can affect their real lives, even years in the future.</i>	<i>A focus should be on learning about privacy settings on social media accounts, exploring the concept of a positive online presence/identity, and identifying behaviors and information that could potentially affect them now and in the future.</i>	<i>Active management implies an understanding of how intentional and unintentional actions can affect a digital presence.</i>

## Digital Literacy

	Grades K-1	Grades 2-3	Grades 4-6	Grades 7-8	Grades 9-12
Digital Citizenship	<b>K-1.DL.7</b> Identify actions that promote good digital citizenship, and those that do not.	<b>2-3.DL.7</b> Understand what it means to be part of a digital community and describe ways to keep it a safe, respectful space.	<b>4-6.DL.7</b> Identify and describe actions in online spaces that could potentially be unsafe or harmful.	<b>7-8.DL.7</b> Describe safe, appropriate, positive, and responsible online behavior and identify strategies to combat negative online behavior.	<b>9-12.DL.7</b> Design and implement strategies that support safety and security of digital information, personal identity, property, and physical and mental health when operating in the digital world.
	<i>Students are able to identify the basic concept of being a "good digital citizen", and know what actions are and are not safe, responsible and ethical when using technologies.</i>	<i>The focus is on describing actions with students and having them discuss whether those actions would be safe, responsible, respectful, and/or ethical using technology and/or online spaces.</i>	<i>The focus is on identifying and describing potentially unsafe behaviors, and actions to take if they are witnessed or experienced, including cyberbullying.</i>	<i>Students are able to strategize ways to keep online spaces safe. Identify types of negative online behaviors including cyberbullying, harassment, trolling/flaming, excluding, outing, dissing, masquerading, and impersonation.</i>	<i>Strategies that support positive mental health in the digital world include both ways to avoid or handle cyberbullying and ways to interact positively and constructively with others in connected spaces.</i>