RHINEBECK CENTRAL SCHOOL DISTRICT

Bulkeley Middle School
Innovation in Technology Explorations

Computer Science Curriculum

Addressing the ISTE Student Technology Standards through the Middle School Computer Lab

Contents

Introduction

During the 2015-16 school year, the computer lab at Bulkeley Middle School was updated with new student computers and an advanced presentation system for the teachers. To maximize the potential of this space, the BMS Computer Teachers have been working to update the curriculum for these classes to steer the focus from skills-based teaching to student-centered, project-based learning.

The computer teachers worked with an educational technology consultant to identify the target skills for students and to create a curriculum that would deliver instruction that is in an integrated format. Six sources provided input to the development of a starting point. These include three local sources and three academic sources.

1. A teacher survey identified the basic skills that students need to succeed in their classes. These include presentation skills, searching the internet, and keyboarding proficiency. Teachers indicated that students demonstrate a wide range of skill levels, but most students do not demonstrate mastery of these skills.

2. A student survey revealed an even greater lack of skills. Most reported little experience working with presentations, downloading graphics and other files, saving a file, validating websites, and more.

3. The computer teachers' observation of students in all grades at the beginning of the year confirmed that their keyboarding skills are limited and most do not demonstrate mastery of basic word processing skills. While many students spend time on the computer outside of the classroom, much of that time is spent playing video games, streaming music or videos, and on Facebook. Students demonstrate limited knowledge of the peripheral equipment, such as the scanner or digital camera, or how to move these files to the computer.

4. New York State's Common Core Learning Standards assume requisite technology skills to be used in research, presentation, data analysis and reporting, as well as scientific lab work. The team reviewed the standards that are most broad, such as ELA reading, writing, and presentation, and Mathematics.

5. Several national organizations have developed and refined technology standards to be used in curriculum development. A combination of these were utilized, adding and deleting, to suit Rhinebeck.

6. Rhinebeck teachers developed an Internet Safety Curriculum several years ago. Aspects of this document were included in the digital citizenship section of the document.
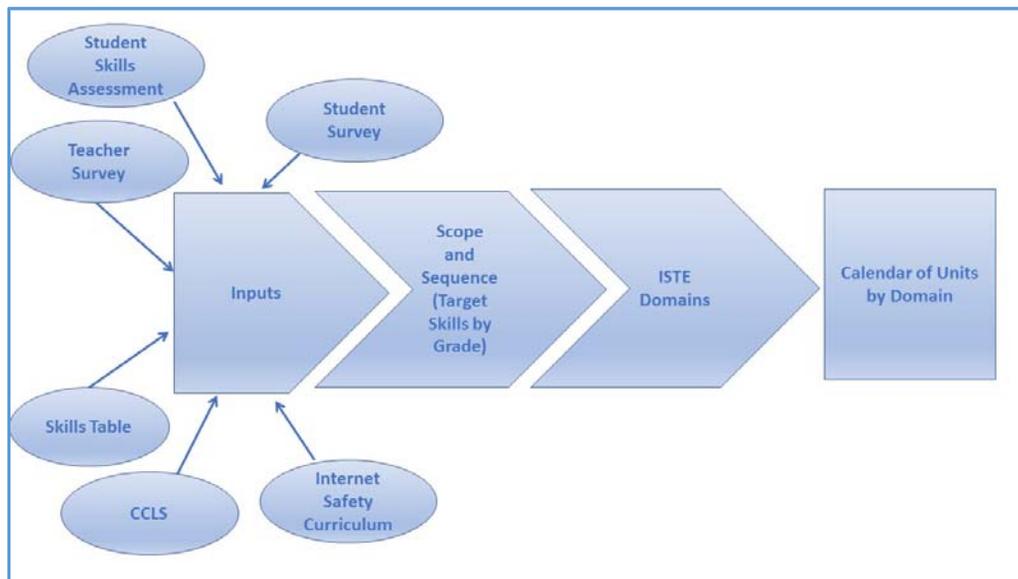
Establishing the Baseline

Based on these assessments, the team agreed that it would be best to start with the basics, assuming nothing, and if students progressed quickly, lessons would be adjusted accordingly. It was hoped that as students focused on these basics during the sixth grade, they would have a higher level entering the seventh and eighth grade, but for the first year or two, the skills addressed would have to be similar. As students demonstrate a higher level of proficiency to grades 7 and 8, the teachers look forward to including greater challenges in their classes.

The team first worked on the skills table, focusing on Grade 6, 7, and 8 with an entering group of students at a low level. The teachers set targets for what grade would introduce, develop, or master a set of skills as a precursor to developing curriculum for that area. The deliverable for this phase was a Scope and Sequence document, which will serve as a work in progress, to be updated regularly as students have a greater skill level entering Grade 6.

After establishing the skills table as a baseline the revised ISTE standards were reviewed and the ISTE domains were utilized to provide a structure for the curriculum. Then, the teachers developed curriculum units to introduce and develop technology skills within the context for a curriculum-related project. A set of "project containers" outlined projects for research, data collection and analysis, and multimedia. These "project containers" are developed for use as templates for projects within the computer classes or in other content areas:

- Research Project: The research project container could be used for a social studies project. Given the topic, students find information using primary sources or online databases (skills include refining an internet search, validating sources, citations, and note-taking). Students then collect all their notes, organize those that are similar, and paraphrase them into paragraphs. The final step is writing an essay on their topic (skills include keyboarding, word processing, and citations). If desired, the teacher might ask students to include a graphic or map to enhance their topic (skills include downloading the graphic, saving it, then sizing it and setting the text to wrap).
- Data Collection Project: The data collection project container could easily be used to collect data about a science project. For example, if a class was studying plants, students could plant seeds and collect daily data about germination, growth, color, leaning, with respect to weather –temperature, sun, etc. Students would set up an Excel spreadsheet to collect this data, then analyze it and create charts to show their results. (skills include use of spreadsheet, ways to sort and filter data, creating and formatting charts, and bringing tables and charts into another document (Word or PowerPoint).
- Multimedia Template: Building on the research project, students can create a multimedia presentation to share their research. The deliverable could be a presentation (PowerPoint, Prezi, or Sway) and could include a number of multimedia options to best convey the message (image, audio, embedded video, animation). If not a presentation, the deliverable could be a comic strip, animation, or video. (skills include design, storyboarding, working with images and objects, editing, narrating, and formatting).

Computer Curriculum Map

This document serves as a guide to developing content-rich curriculum for the computer classes and technology-rich curriculum for the content classes. The goal is to ensure that students master the technology skills that they will need to succeed in higher education or the work force by learning to use technology effectively and responsibly as it applies to their coursework (based on Common Core Learning Standards) to insure that instruction is delivered in an integrated fashion.

While most states do not publish technology standards for students as part of the state learning standards, most (including New York) endorse the ISTE Technology Standards for Students. In addition, the Common Core Learning Standards include technology competencies in context with the Reading, Writing, Presentation, and Mathematics standards at all levels. The 2016 standards can be found at: https://www.iste.org/standards/standards/for-students#startstandards.

The computer teachers worked with the technology consultant to review the ISTE standards and identify a set of skills that are required for "mastery" in each category. Having developed a list, the team reviewed these skills and assigned target grades for each when the skill would be **Introduced**, **Developed**, or **Mastered**. In some cases, where the skill was introduced in the early grades, it is labeled (With **Help**), indicating that students might participate in this, but would not be introduced to it formally or be expected to demonstrate the skill independently. These are listed on the tables on the following pages, and summarized in a set of Student Profiles following the tables.

Note: As students acquire more skills in the lower grades, this Scope and Sequence will evolve to accommodate evolving skill levels. Many of the skills that will initially be introduced at the middle school level, would better be addressed at the elementary school. However, without a formal program at the elementary school, BMS wants to ensure that all students achieve the same level. Having this profile will provide a set of expectations for students entering the middle school, which will evolve into curriculum goals at the elementary school. As this baseline changes, the table should be reviewed and adjusted to reflect these changes.

Having developed the Scope and Sequence and the Student Profiles, the computer teachers have developed curriculum for each grade. The curriculum map is provided later in this document. In addition, three "containers" or "templates" are provided for technology-rich projects to be implemented in the content classes at BMS. These include one for a Research project, one for a Multimedia project, and one for a Data Collection project. The computer teachers will assist with professional development as needed so that teachers have the skills to address these.

Student Technology Standards

1. Empowered Learner – Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals, informed by the learning sciences.

2. Digital Citizen – Students recognize the rights, responsibilities, and opportunities of living, learning, and working in an interconnected digital world, and they act in ways that are safe, legal, and ethical.

3. Knowledge Constructor – Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.

4. Innovative Designer – Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

5. Computational Thinker -- Students identify authentic problems, work with data and employ algorithmic thinking to propose and automate solutions.

6. Creator and Communicator – Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

7. Global Collaborator – Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.

Student Technology Competencies

This section presents skills according to the following categories:

- Empowered Learner
- Digital Citizen
- Knowledge Constructor
- Innovative Designer
- Computational Thinker
- Creator and Communicator
- Global Collaborator

Within these groups, assign the grades in which students will do this with help, will be introduced to the skill, will develop it, and will master it. The following Key will be used to indicate the level at which skills will be done with help, introduced as a skill, developed, and mastered.

Key

	Level
H	With Help
I	Introduce
D	Develop
M	Master

While the focus of this document is on Grades 6-8, placeholders have been inserted in Grades K-5, where a threshold of skill is anticipated before students enter middle school and in Grades 9-12 where students may continue developing skills beyond the middle school grades.

Empowered Learner

1. **Empowered Learner – Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.**
   a. Students articulate personal learning goals, select and manage appropriate technologies to achieve them, and reflect on their successes and areas of improvement in working toward their goals.
   b. Students identify and develop online networks within school policy, and customize their learning environments in ways that support their learning, in collaboration with an educator.
   c. Students actively seek performance feedback from people, including teachers, and from functionalities embedded in digital tools to improve their learning process, and they select technology to demonstrate their learning in a variety of ways.
   d. Students are able to navigate a variety of technologies and transfer their knowledge and skills to learn how to use new technologies.

Empowered Learner	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Levels: H=With Help | I=Introduce | D=Develop | M=Master														
Basic Operations	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Operates technology tools		H	I											
Opens an application and navigates menus		H	H	I	D	M								
Uses developmentally appropriate and accurate terminology		H	H	I	D	M								
Works independently or in pairs on computer		H	I-D	M										
Discusses common uses of technology in daily life and the advantages and disadvantages those uses provide			H	I	D	D	D	M						
Uses keyboards and other common input and output devices efficiently and effectively (includes tab, shift, and caps lock)		H	I	D	M									
Saves and organizes files on flash drives, SD cards, and external hard drives						H	I-D	M						
Applies strategies for identifying and solving routine hardware and software problems					H	I-D	M							
Makes informed decisions in choosing the most appropriate technology tools and resources							H	I	D	D	M			
Creates and follows rules for computer use in classroom, library, lab and on Internet		I	I	D	D	M								
Logs in to network		H	H	I	D	M								
Saves and finds files in personal folder				H	I	D	M							
Saves and finds files on the school network					H	I	D	M						
Saves and finds files in cloud storage					H	I	D	M						
Creates folders to store work and saves work in correct folder					H	I	D	M						

Empowered Learner	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Levels: H=With Help | I=Introduce | D=Develop | M=Master														
Shares files over network and email								I-D	M					
Organizes, manages, and secures technology in classroom			H	I	D	M								
Can be technology mentor (not all students)		I	D	M										
Collaborates online and shares work in electronic portfolio								I-D	M					
Describes hardware and software problems					I	I	D	M						
Productivity skills	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Keyboarding														
Learns keyboard placement			H	I	D	M								
Types 20 words per minute					I	D	D	M						
Types 20 – 45 words per minute								I	D	M				
Types 45-60 words per minute											I	D	D	M
Formats a document				H	I	D	D	M						
Inserts and edits text				H	I	D	D	M						
Changes face, style, size, and color of font						H	I	D	M					
Creates bullet and number lists					I	D	M							
Uses ruler, margins, and tabs					I	D	D	M						
Inserts headers and footers					H	I	D	M						
Inserts section, column, and page breaks								I	D	M				
Creates and formats table								I	D	M				
Uses keyboard shortcuts								I	D	M				
Uses advanced editing features									I	D	M			
Uses spell checker and thesaurus					H	I	M							
Inserts a graphic and wraps text					H	I	D	M						
Transfers and merges files into document								I	D	M				
Composes, edits, and sends messages								I	DM					
Explains the parts of an email address								I	DM					
Creates username and password								I	DM					
Receives and replies to messages								I	DM					
Uses cc and bcc appropriately								I	DM					
Forwards mail with leading message								I	DM					
Creates signature file								I	DM					
Uses cc and bcc appropriately								I	DM					

Empowered Learner	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Levels: H=With Help | I=Introduce | D=Develop | M=Master														
Creates address book and mail groups									I	D	M			
Attaches, receives, and opens attachments									I	DM				
Organizes messages into folders									I	DM				
Sorts messages by date, sender, or subject									I	D	M			
Spreadsheets														
Collects data and creates new spreadsheet					I	D	D	M						
Collects, inputs, analyzes, organizes and displays data graphically					I	D	D	M						
Creates simple formulas and charts									I	DM				
Explains what the data represents					I	D	D	M						
Uses the appropriate chart for activity and data									I	D	M			
Adds and formats appropriate labels and legends									I	D	M			
Collects data to use in complex formulas in charts or graphs									I	DM				
Includes charts or graphs in presentations or publications									I	D	M			
Formats and changes axis scale, chart area, data series or appearance of charts									I	DM				
Formats and prints spreadsheets to use as templates and forms										I	DM			
Uses complex functions and formulas									I	D	M			
Creates a template or form to use for data collection						I	D	M						
Calendaring									I	D	M			
Create an event for a day or span of days									I	D	M			
Check on someone's availability									I	D	M			
Send an invitation to another person									I	D	M			
Add a file to a calendar event									I	D	M			
Track responses to an invitation									I	D	M			
Virtual Learner	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Reviews and evaluates online discussion boards										I	D	D	D	M
Reviews and evaluates both asynchronous and synchronous online tools										I	D	D	D	M
Evaluates and uses online collaborative tools including distance learning and distributed education for lifelong learning opportunities										I	D	D	D	M
Submits assignments to learning management system										I	D	D	D	M
Participates in synchronous activities, such as chat, video chat, or webinar.										I	D	D	D	M
Participates in asynchronous activities, such as discussion board.										I	D	D	D	M

Digital Citizen

2. **Digital Citizen -- Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act in ways that are safe, legal and ethical.**
   a. Students manage their digital identities and reputations within school policy, including demonstrating an understanding of how digital actions are never fully erasable.
   b. Students demonstrate and advocate for positive, safe, legal and ethical habits when using technology and when interacting with others online.
   c. Students demonstrate and advocate for an understanding of intellectual property with both print and digital media—including copyright, permission and fair use—by creating a variety of media products that include appropriate citation and attribution elements.
   d. Students demonstrate an understanding of what personal data is and how to keep it private and secure, including the awareness of terms such as encryption, HTTPS, password, cookies and computer viruses; they also understand the limitations of data management and how data-collection technologies work.

Digital Citizen	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
**Levels: H=With Help	I=Introduce	D=Develop	M=Master**														
Understands and follows rules and procedures for technology use		H	I	D	M									
Demonstrates positive social and ethical behaviors when using technology			H	I	D	M								
Discusses responsible use of technology and information and describes consequences of inappropriate use		H	I	D	M									
Exhibits legal and ethical behaviors when using information and technology, and discusses consequences of misuse								I	D	M				
Understands and follows proper use of copyrighted material and uses netiquette when using email								I	D	M				
Cites resources properly				H	I	D	D	M						
Access and use primary and secondary sources of information for an activity						I	D	M						
Makes informed choices among technology systems, resources, and services								I	D	M				
Takes responsible steps to avoid virus, malware, etc.								I	D	M				
Ethical and Appropriate Use														
Asks for and is granted permission from a staff member before downloading files from the Internet.					H	I	D	M						
Uses the standard rules of spelling, grammar, and punctuation when appropriate.					H	I	D	M						
Demonstrates respects for the rights and privacy of others.					H	I	D	M						
Understands his/her responsibility to post accurate and appropriate information when contributing to websites, including blogs, wikis, and social media sites (including accurate facts, attributing ideas, and not misrepresenting him/herself).					H	I	D	M						

Digital Citizen	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Levels: H=With Help | I=Introduce | D=Develop | M=Master														
Understands the consequences of posting misinformation, inflammatory information, and/or misrepresenting him/herself.					H	I	D	M						
Reads and understands the requirements in setting up and using accounts on social networking and other user-generated applications.							I	D	M					
Ethically uses social networking site.							I	D	M					
Understands the permanent nature of the Internet, and that all postings can be redistributed without the creator's knowledge or consent, without attribution, and can be modified before redistribution.								I	D	M				
Protecting Personal Information:														
Defines and understands the danger of identity theft.								I	D	D	M			
Knows how and why to keep personal information (e.g. address, phone number, passwords) private.								I	D	D	M			
Seeks parent/guardian/teacher approval before sharing personal information online.				H	I	D	D	M						
Understands guidelines for posting or sending pictures.						I	D	D	M					
Understands why a website is requesting personal information and determines whether it would be advisable to provide such information.						I	D	D	M					
Understands the need to create strong passwords.						I	D	D	M					
Responds appropriately if personal information has been compromised		H	H	I	I	D	M							
Understands how to use account and privacy settings to protect personal information (e.g. Facebook).								I	D	D	M			
Knows what information should not be revealed in emails.								I	D	D	M			
Understands the danger of opening emails and email attachments in relation to protecting personal information.								I	D	D	M			
Understands how to safely use video chats.									I	D	D	M		
Knows how to protect personal information when posting multimedia productions online.									I	D	D	M		
Social Media														
Understands the benefits of using social media.								I	D	D	M			
Understands the drawbacks of using social media.								I	D	D	M			
Reads and understands the terms of service or contract for social media sites, and the consequences of using such sites (e.g. age to create account, ownership of postings).								I	D	D	M			
Reflects on information prior to posting, considering personal, academic, and						I	D	D	M					

Digital Citizen	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Levels: H=With Help | I=Introduce | D=Develop | M=Master														
career impact.														
Does appropriate research before sharing online - does not spread misinformation.						I	D	D	M					
Respects others' privacy and rights and does not spread rumors or damaging information.						I	D	D	M					
Understands the pros and cons of "friending" others.						I	D	D	M					
Uses caution when posting pictures or personal information (e.g. thoughts, feelings, plans, location, schedule, ideas) to stay safe online.						I	D	D	M					
Understands posted information and pictures can be distributed or modified without the creator's consent or knowledge.						I	D	D	M					
Is aware of the potential danger of strangers and people met online, and takes precautions to stay safe.						I	D	D	M					
Responds appropriately to upsetting or inappropriate Internet content.						I	D	D	M					
Understands and follows Intellectual property rules when posting to social media sites.						I	D	D	M					
Gets permission before posting or sending pictures of others.						I	D	D	M					
Understands consequences of cyberbullying when using social media.						I	D	D	M					
Uses critical thinking when reading content.						I	D	D	M					
Understands the ownership rights of posted information and photos.						I	D	D	M					
Understands the importance of not revealing information about your location (e.g. where you live, where you are going, and other information about location and movement) on social networking sites and when tagging locations.						I	D	D	M					
Evaluating Resources														
Understands the differences between the free web and reviewed sources such as books and database articles.						I	D	D	M					
Understands the reasons why information on the free web is not always accurate or appropriate for use.						I	D	D	M					
Determines the source (author, sponsor, or organization) of information on a given website and evaluates for credibility and bias.						I	D	D	M					
Determines the parent site of a given web page by using links and the URL.									I	D	M			
Evaluates the domain name of a given website to help determine source and bias.									I	D	M			
Understands website domain extensions.								I	D	M				
Seeks out and determines hidden sponsors of information on the web.								I	D	M				
Identifies and understands the pros and cons of using information from personal								I	D	M				

Digital Citizen	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Levels: H=With Help | I=Introduce | D=Develop | M=Master														
webpages.														
Identifies and evaluates user-generated content when found on the web (e.g. wikis, blogs)								I	D	M				
Understands how various forms of user-generated content are created.								I	D	M				
Understand how to use authentic multimedia located on the web.								I	D	M				
Identifies false, misleading, or biased information.								I	D	M				
Identifies hateful, violent, or otherwise harmful information online.								I	D	M				
Copyright, Plagiarism and Intellectual Property														
Understands intellectual property, and laws governing intellectual property.								I	D	M				
Understands copyright.								I	D	M				
Understands plagiarism.								I	D	M				
Understands techniques to avoid intellectual property theft.								I	D	M				
Understands techniques to avoid plagiarism, including accidental plagiarism.								I	D	M				
Recognizes that copyright law applies to many aspects of life, including downloading music and software, copying DVDs, and posting copyrighted information on websites (e.g. social media sites).								I	D	M				
Understands the consequences of copyright violations and plagiarism.								I	D	M				
Recognizes when facts and ideas need to be cited.								I	D	M				
Properly cites information from websites in a bibliography (age appropriate expectations).								I	D	M				
Properly attributes images and other graphics with a credit line.								I	D	M				
Properly cites images and other graphics in bibliography.								I	D	M				
Uses citation generator (e.g. NoodleTools) to create bibliography.								I	D	M				
Locates necessary citation information when using online databases and web sources.								I	D	M				
Understands work handed in will be reviewed for originality.								I	D	M				
Understands and interprets licensing rules.								I	D	M				
Understands and interprets usage guidelines and permissions.								I	D	M				
Understands Creative Commons licensing, and uses appropriately.								I	D	M				
Understands the concept of fair use and applies fair use guidelines.								I	D	M				
Defines digital rights management (DRM) and understands the implications of DRM.								I	D	M				

Digital Citizen	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Levels: H=With Help | I=Introduce | D=Develop | M=Master														
Inappropriate Messaging – Sexting														
Defines sexting and its scope.								I	D	M				
Understands the laws and legal consequences of sexting.								I	D	M				
Understands the school consequences of sexting.								I	D	M				
Understands the emotional consequences of sexting.								I	D	M				
Understands the permanency of images sent online or via phone, or posted online; and understands these images can be distributed without the creator's consent or knowledge.								I	D	M				
Understands the consequences of forwarding images or other information.								I	D	M				
Identifies adults to whom he/she can turn if he/she becomes aware of a sexting incident.								I	D	M				
Cyberbullying (Potential for outside resources)														
Understands what defines a cyberbully.						I	D	M						
Knows how to tell if he/she is being cyberbullied.						I	D	M						
Understands why some people cyberbully.						I	D	M						
Knows what to do if he/she or someone else is being cyberbullied.						I	D	M						
Understands his/her rights.						I	D	M						
Understands the Internet does not keep a cyberbully anonymous.						I	D	M						
Understands the consequences of online impersonation.						I	D	M						
Knows how to be a good cyber-citizen.						I	D	M						
Understands specific websites' regulations regarding cyberbullying.						I	D	M						
Know how to use "Report Abuse" hotlines.						I	D	M						

Knowledge Constructor

3. **Knowledge Constructor -- Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.**
   a. Students demonstrate and practice the ability to effectively utilize research strategies to locate appropriate digital resources in support of their learning.
   b. Students practice and demonstrate the ability to evaluate resources for accuracy, perspective, credibility and relevance.
   c. Students locate and collect resources from a variety of sources and organize assets into collections for a wide range of projects and purposes.
   d. Students explore real-world issues and problems and actively pursue an understanding of them and solutions for them.

Knowledge Constructor	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Levels: H=With Help | I=Introduce | D=Develop | M=Master														
Search Strategies and Competencies														
Uses sites the teacher points to					I	D	M							
Launches a browser and uses the tool bar					I	D	M							
Navigates by clicking on links on web pages					I	D	M							
Explains the parts of a URL								I	D	M				
Types URLs correctly					I	D	M							
Add bookmarks/favorites					I	D	M							
Returns to site using history, back button, or bookmark/favorite					I	D	D	D	M					
Uses keyword and natural language searches								I	D	M				
Evaluates site and information for validity and accuracy								I	D	M				
Sets home page and configures page setup to print title, URL, and date								I	D	M				
Edits bookmarks/favorites and organizes them into folders								I	D	M				
Downloads files and plug-ins								I	D	M				
Copies and pastes text or images and cites source correctly					H	I	D	M						
Explains difference between search engines, subject directories, and metasearch engines								I	D	M				
Set up an alert for a search string										I	D	M		
Validating Websites														
Evaluates sites for accuracy, relevance, appropriateness, comprehensiveness, and bias of information sources								I	D	M				
Uses information literacy skills to find, use, evaluate, and cite appropriate sources					H	I	D	M						

Innovative Designer

4. **Innovative Designer -- Students use a variety of technologies within a design process to solve problems by creating new, useful or imaginative solutions.**
   a. Students engage in a design process and employ it to generate ideas, create innovative products or solve authentic problems.
   b. Students select and use digital tools to support a design process and expand their understanding to identify constraints and trade-offs and to weigh risks.
   c. Students engage in a design process to develop, test and revise prototypes, embracing the cyclical process of trial and error and understanding problems or setbacks as potential opportunities for improvement.
   d. Students demonstrate an ability to persevere and handle greater ambiguity as they work to solve open-ended problems.

Innovative Designer	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
**Levels: H=With Help	I=Introduce	D=Develop	M=Master**														
Determines target audience, goal, and purpose of presentation					I	D	D	D	M					
Uses advanced drawing and painting programs to create original art									I	D	D	M		
Records and edits sound and QuickTime movies, animations, and VR								H	I	D	M			
Creates original art to include in project									I	D	D	M		
Creates and modifies text objects						I	D	M						
Imports and modifies graphics, backgrounds, clipart, and sound						I	D	D	M					
Applies designs, backgrounds, font styles, and colors for all slides					I	D	D	D	M					
Creates custom animations applies good design principles										I	D	M	M	M
Develop comic strips using animation software									I	D	D	M		

Computational Thinker

5. **Computational Thinker -- Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.**
   a. Students practice defining problems to solve by computing for data analysis, modeling or algorithmic thinking.
   b. Students find or organize data and use technology to analyze and represent it to solve problems and make decisions.
   c. Students break problems into component parts, identify key pieces and use that information to problem solve.
   d. Students demonstrate an understanding of how automation works and use algorithmic thinking to design and automate solutions.

Computational Thinker	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Levels: H=With Help | I=Introduce | D=Develop | M=Master														
Develops algorithms or flowcharts to map the flow of data in a program.								I	D	M				
Define constants and variables to use in a program								I	D	M				
Develop routines or procedures with a programming language											I	D	M	
Contributes images and content to web page someone else is creating											I	D	M	
Creates page with text and/or links and saves as html document											I	D	M	
Creates a web page using a WYSIWG authoring program											I	D	M	
Changes background and colors, imports images, inserts and modifies text											I	D	M	
Storyboards, plans, and creates organized folders for images and website											I	D	M	
Saves page, gives it a title, and makes sure images are in correct folder											I	D	M	
Creates anchors or targets to links on page and links to other pages, email, and sources											I	D	M	
Uses elements of good web design and navigation											I	D	M	
Uses HTML, Java, Javascript, Flash, and/or Shockwave to create special effects on a website											I	D	M	
Uses different plugins, inserts metatags, creates and inserts animated gifs, movies, and sound											I	D	M	
Creates a web portfolio and participates in collaborative Web Project that compiles, synthesizes, produces, and disseminates information, models, and other creative work											I	D	M	
Investigates and applies expert systems, intelligent agents, and simulations in real-world situations											I	D	M	
Databases	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Defines terms such as records and fields										I	D	M		
Enters text and data into appropriate fields										I	D	M		

Computational Thinker	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Levels: H=With Help | I=Introduce | D=Develop | M=Master														
Creates a simple database										I	D	M		
Formats text and numbers in fields										I	D	M		
Sorts, matches, finds and replaces data										I	D	M		
Adds header and footer										I	D	M		
Uses print preview and adjusts margins for printing										I	D	M		
Merges data into another document (i.e., Mail Merge)										I	D	M		
Imports and exports data from other applications												I	D	M
Participates in student project that creates a database that other students can use											I	D	M	
Describes educational uses of databases										I	D	M		

Creator and Communicator

6. **Creative Communicator -- Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.**
   a. Students select appropriate platforms and tools to create, share and communicate their work effectively.
   b. Students create original works or responsibly repurpose other digital resources into new creative works.
   c. Students communicate complex ideas clearly using various digital tools to convey the concepts textually, visually, graphically, etc.
   d. Students publish or present content designed for specific audiences and select platforms that will effectively convey their ideas to those audiences.

Creator and Communicator	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Levels: H=With Help | I=Introduce | D=Develop | M=Master														
Plans and storyboards ideas for presentation (AppleWorks and PowerPoint)								I	D	M				
Develops outline for slide show								I	D	M				
Applies designs, backgrounds, font styles, and colors for all slides								I	D	M				
Imports animations, video, and sound								I	D	M				
Creates custom animations applies good design principles								I	D	M				
Creates linear slide show								I	D	M				
Uses mind-mapping software to brainstorm and plan presentation								I	D	M				
Determines target audience, goal, and purpose of presentation								I	D	M				
Redesigns presentation for proper colors and contrast for room								I	D	M				
Practices timing and provides feedback for peers								I	D	M				
Includes graphs, charts, sound, animation, in non-linear presentation								I	D	M				

Global Collaborator

7. **Global Collaborator -- Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.**
    a. Students use digital tools to interact with others to develop a richer understanding of different perspectives and cultures.
    b. Students use collaborative technologies to connect with others, including peers, experts and community members, to learn about issues and problems or to gain broader perspective.
    c. Students determine their role on a team to meet goals, based on their knowledge of technology and content, as well as personal preference.
    d. Students select collaborative technologies and use them to work with others to investigate and develop solutions related to local and global issues.

Global Collaborator	PK	K	1	2	3	4	5	6	7	8	9	10	11	12
Levels: H=With Help | I=Introduce | D=Develop | M=Master														
Works cooperatively and collaboratively with others when using technology in classroom					I	D	D	M						
Gathers information and communicate with others using telecommunications with support from teachers, family members, or student partners							I	D	D	M				
Use telecommunications and online resources including email and discussion boards to participate in collaborative problem-solving activities								I	D	M				
Uses email and follows netiquette protocol								I	D	M				
Communicates with others online in support of direct and independent learning								I	D	M				
Collaborates with peers, experts, and others using collaborative online tools to investigate curriculum-related problems, issues, and information									I	D	M			
Develops solutions in collaborative online environment for audiences inside and outside the classroom									I	D	M			
Develops essential and subsidiary questions as part of collaborative online projects									I	D	M			
Plans collaborative project with group									I	D	M			
Participates responsibly in several types of online activities including a MOO, videoconference, a chat, and a threaded discussion									I	D	M			
Selects appropriate online tools for research, information analysis, problem-solving, and decision-making in content learning									I	D	M			
Participates in email projects								I	D	M				

Student Profiles

This section provides a high level summary of how the student, at this grade level, is expected to perform in the area of technology for the 2017-18 school year, with some skills moving to lower grades as students demonstrate mastery.

Entering Kindergarten

NYSED defines technology competencies as readiness targets for students entering Kindergarten. The following are extracted from the New York Prekindergarten Foundation for the Common Core (http://www.p12.nysed.gov/ciai/common_core_standards/pdfdocs/nyslsprek.pdf)

1. Describes types of materials and how they're used. Creates simple structures with various materials to determine which do/don't work to achieve the desired purpose.
2. Explores and uses various types of tools appropriately. Demonstrates and describes how they are used.
3. Expresses an understanding of how technology affects them in daily life, and how it can be used to solve problems.
4. Understands the operation of technology systems.
5. Uses the knowledge of technology to increase learning.

Entering Grade 3

1. Knows the rules of technology use.
2. Logs into network with assistance.
3. Understands keyboard placement and is developing typing skills.
4. Types sentences, choosing appropriate font, color, and styles.
5. Begins to access websites under supervision.

Entering Grade 6

1. Uses technology independently and responsibly.
2. Creates and formats documents.
3. Saves, organizes, and manages files.
4. Designs slides with text, backgrounds, and images.
5. Navigates the internet to websites as instructed.
6. Understands acceptable use and responsibility using the internet.

Entering Grade 9

1. Keyboards up to 45 words per minute.
2. Uses advanced formatting tools such as headers/footers, section/page breaks, and columns.
3. Demonstrates legal and ethical behavior using internet resources.
4. Validates websites for accuracy, relevance, and bias.
5. Uses social media responsibly, appropriately, and respectfully.
6. Uses presentations effectively, including backgrounds, links, audio, and animations or video.
7. Developing computational thinking skills, including algorithmic thinking as well as understanding of constructs and objects.
8. Creates multimedia using storyboarding process, selecting media, and creating video, animation, or simulation.
9. Participates in global collaboration projects with students from other regions or other countries.

Project Containers

As an example of seamlessly integrating technology competencies into CCLS content, the following "containers" are offered as templates for teachers who are interested in creating technology-rich units. The project containers focus on research, data collection and representation, and multimedia. The project containers were developed using the previous version of ISTE standards and have not yet been adapted to the recently released version.

- The Research project involves gathering information from research and primary sources, taking notes, citing sources, creating a concept map, and writing about the topic, using technology as a tool to accomplish these tasks. This template be adapted to any content area and skills, while developing both technology competencies and ELA reading and writing skills. For example, if students are researching ancient civilizations, they can research sources as provided by the content area teacher, use Inspiration to create a concept map and outline, then develop this into a research paper, poster, or presentation to report on what they have learned.

- The Multimedia project takes the Research project to a higher level, gathering information and creating a concept map, then sharing this information in the form of a comic strip, animation, or video. This template be adapted to any content area and skills, while developing both technology competencies and ELA presentation skills. For example, if students are researching volcanos, they could follow the same steps as in the research project to gather information, then present it in video format using iMovie or Explain Everything to demonstrate the phases of eruption.

- The Data Collection project can be used to collect quantitative data through experiments, research, or survey, represent this data in spreadsheet format, and create graphs to represent trends in this data. Advanced students may use formulas and filters to analyze this data. This template be adapted to many content areas, while developing both technology competencies and develops Mathematics skills. For example, if students are studying political trends, they might create a survey or use existing survey data, organize it in a spreadsheet, and create graphs to visually represent the results.

The BMS computer teachers are encouraged to use these as a model for other teachers.

SAMPLE Research Project Template

Unit Description

Students follow a step by step process for gathering and organizing information, citing references, and developing an essay. In the process, they develop productivity skills as well as information literacy and digital citizenship.

Use note taking to identify essential elements of a source, sort and categorize this information in a graphic organizer, develop an outline to organize information, synthesize it in clear sentences, then develop these into an essay.

Context

Grade:

Teacher:

Subject:

Alignment to Standards

NYSED Common Core Learning Standards

Content Standards
- This will be completed by the teacher.
-
-
-

Reading and Writing

RL 6.1 Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

RL. 6.4 Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

W 6.1 Write arguments to support claims with clear reasons and relevant evidence.

W 6.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

W 6.7 Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.

W.6.8 Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.

ISTE Technology Standards for Students and Teachers

Targeted ISTE NETS·S:

3. Research and Informational Fluency -- Students apply digital tools to gather, evaluate, and use information.

c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks.

b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media

6. *Technology Operations and Concepts -* Students demonstrate a sound understanding of technology concepts, systems, and operations.

a. Understand and use technology systems

b. Select and use applications effectively and productively

d. Transfer current knowledge to learning of new technologies

ISTE NETS·T:

1. Facilitate and Inspire Student Learning and Creativity

2. Design and Develop Digital Age Learning Experiences and Assessments

b. Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress

4. *Promote and Model Digital Citizenship and Responsibility*

a. Advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources

b. Address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources.

Sample Lesson Sequence

1. Identifying Sources
2. Note-taking
   a. Paraphrasing
   b. Citing Sources
3. Using a Graphical Organizer
4. Outlining
5. Composing an Essay

SAMPLE Multimedia Project Template

Unit Description

Building on the research approach described in the ***Technology-Rich Unit: Research Template,*** students conduct research on an assigned topic, organize it in a graphic organizer, and plan a multimedia presentation in the form of a movie or animation. Students develop a storyboard, search for royalty-free copyrighted images in an image library like Creative Commons, and create the presentation using an assigned tool.

Context

Grade:

Teacher:

Subject:

Alignment to Standards

NYSED Common Core Learning Standards

Content Standards
- This will be completed by the teacher.
-
-
-

Reading and Writing

RI.6.7 Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

W.6.8 Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.

SL.6.2 Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.

SL.6.5 Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information**.**

ISTE Technology Standards for Students and Teachers

Targeted ISTE NETS S:

1. Creativity and innovation -- Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.

    a. Apply existing knowledge to generate new ideas, products, or processes

    b. Create original works as a means of personal or group expression

4. Critical thinking, problem solving, and decision making-- Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

    b. Plan and manage activities to develop a solution or complete a project

    d. Use multiple processes and diverse perspectives to explore alternative solutions

3. Research and Informational Fluency -- Students apply digital tools to gather, evaluate, and use information

---

b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media

c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks.

6. Technology Operations and Concepts - Students demonstrate a sound understanding of technology concepts, systems, and operations.

b. Select and use applications effectively and productively

d. Transfer current knowledge to learning of new technologies

ISTE NETS T:

1. Facilitate and Inspire Student Learning and Creativity - Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.

a. Promote, support, and model creative and innovative thinking and inventiveness

2. Design and Develop Digital Age Learning Experiences and Assessments -- Teachers design, develop, and evaluate authentic learning experiences and assessments incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the Standards.

a. Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity.

b. Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress

4. **Promote and Model Digital Citizenship and Responsibility**

b. Address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources.

Sample Lesson Sequence

Begin with lessons from Research Template for

1. Identifying Sources
2. Note-taking
   a. Paraphrasing
   b. Citing Sources
3. Using a Graphical Organizer
4. Outlining

Continue with:

5. Selecting images (Creative Commons or other Copyright-friendly source)
6. Storyboarding
7. Movie Presentation – Design and setup
8. Movie Creation

SAMPLE Data Collection Project Template

Unit Description

Students follow a step-by-step process to plan a data-collection instrument, conduct the research to populate it, analyze and chart the findings, and graphically present the results in a PowerPoint format. The project could involve a survey, lab assignment, or categorizing data about like entities, such as countries, states, authors, or another topic which would lend itself to multiple fields.

Context

Grade:

Teacher:

Subject:

Alignment to Standards

NYSED Common Core Learning Standards

Content Standards
- This will be completed by the teacher.
-
-
-

Mathematics Standards

Statistics and Probability (6 SP)
Develop understanding of statistical variability.
1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.
2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

Summarize and describe distributions.
5. Summarize numerical data sets in relation to their context, such as by:
   b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
   c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

Equations and Expressions (6 EE)
9. Represent and analyze quantitative relationships between dependent and independent variables.
Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.

ISTE Technology Standards for Students and Teachers

Targeted ISTE NETS S:

3. *Research and Informational Fluency* -- Students apply digital tools to gather, evaluate, and use information
- **a.** Plan strategies to guide inquiry
- **b.** Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media
- **c.** Evaluate and select information sources and digital tools based on the appropriateness to specific tasks
- **d.** Process data and report results

4. *Critical thinking, problem solving, and decision making* -- *Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.*
- **a.** Identify and define authentic problems and significant questions for investigation
- **b.** Plan and manage activities to develop a solution or complete a project
- **c.** Collect and analyze data to identify solutions and/or make informed decisions

6. *Technology Operations and Concepts- Students demonstrate a sound understanding of technology concepts, systems, and operations.*
- **a.** Understand and use technology systems
- **b.** Select and use applications effectively and productively
- **c.** Transfer current knowledge to learning of new technologies

ISTE NETS T:

1. *Facilitate and Inspire Student Learning and Creativity*
- **b.** Engage students in exploring real-world issues and solving authentic problems using digital tools and resources

2. *Design and Develop Digital Age Learning Experiences and Assessments*
- **c.** Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress

4. ***Promote and Model Digital Citizenship and Responsibility***
- **a.** Advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources.
- **b.** Address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources.

Sample Lesson Sequence

1. Select and design a research topic. (This could be a research of traditional information sources, a survey, or a lab report.
2. Create the data collection instrument.
3. Collect data and populate the tool.
4. Review and analyze the data using various sort and filtering strategies.
5. Create a PPT to present results.

Computer Science Curriculum
Grades 6 - 8

Computer Science Curriculum Grades 6 – 8

Students at the Bulkeley Middle School (BMS) take a computer science course in Grades 6, 7, and 8. The Grade 6 curriculum provides an overview to the topics and skills that students need to succeed in their core curriculum classes, then the Grade 7 curriculum develops these more fully. In Grade 8, students achieve mastery and shift to more extensive work in programming skills.

The BMS program is a half-year program offered over the course of a full year. Students attend every other day, totaling a maximum of 90 days of instruction (the equivalent 20 weeks) per year. Of these, approximately two or three weeks are allocated to state testing, field trips, and special projects, such as the circus. The following table shows how the remaining eighteen weeks are estimated to be distributed by topic. Please note that the allocations of time are estimates as unit length may vary according to a number of factors, including but not limited to: scheduling challenges, student diversity of skills, and under-estimation of time allocation for particular units. It is anticipated that units will be adjusted to the needs of the students.

Units	Grade 6 Computer Science I	Grade 7 Computer Science II	Grade 8 Computer Science III
Digital Citizenship (includes Intellectual Property / Internet Safety	6	2	2
Design / Graphics /Photography	0	0	3
Keyboarding	1	1	1
Productivity/Tech Integration (includes graphing and productivity skills)	4	6	3
Coding/Programming	7	9	8
State testing	1	1	1
Field trips/Circus/Assemblies	1	1	2
Total Number of Weeks (20 Week Courses Taught Over 40 weeks)	20	20	20

Grade 6 Curriculum

Curriculum Plan for Computer Science I
Grade: 6th
School: Bulkeley Middle School

In 6th grade students study the following units:

1. **Internet Safety**
2. **Intellectual Property**
3. **Programming**
4. **Graphing**
5. **Keyboarding**

The course meets every other day for the entire year creating a 20-week course. As much as possible, units that can be, are integrated within other subject areas. Some units, such as keyboarding, are interwoven within other units as opposed to occurring in isolation. Similarly, a single ISTE Standard may be reflected in multiple units and unit activities.

Projects will vary in order to be relevant to current events and to enable collaboration with content teachers. Please see the appendix for examples of projects that have been done.

Unit 1: Internet Safety

Description
Students will learn about their responsibilities as a user of the school's technologies and the importance of following the school's regulations and guidelines. There will be discussion and exploration about the nature of students' online presence and how easily personal information can be retrieved by others. Students will learn strategies to keep themselves safe. Students will gain an understanding of the permanence of their online activities and develop an appreciation for the dangers of various online activities including how those activities can cause damage to their personal computer system.
Students will work on activities including a group research project and presentation about internet safety. They will work with the new email accounts and online calendar. Students will complete a group video project highlighting some aspect of what they have learned about internet safety.

Learning Objectives
1. Demonstrate an understanding of the role an online identity plays in the digital world and learn the permanence of their decisions when interacting online.
2. Practice and encourage others in safe, legal and ethical behavior when using technology and interacting online, with guidance from an educator.
3. Demonstrate an understanding of what personal data is, how to keep it private and how it might be shared online.

Key Terms:
- Acceptable Use Policy (AUP)
- Netiquette
- Network
- Friending
- Email Fraud(s)

Unit Outline
1. Review the district AUP and provide real-life examples of what is meant by these guidelines.
2. Explain students' responsibilities as users of the school's technologies and the importance of following the school's regulations and guidelines.
3. Describe the nature of students' online presence and how easily personal information can be retrieved by others.
4. Brainstorm strategies students might use to keep themselves safe.
5. Explain the concept of Digital Footprint, including the permanence of online activities so that students will develop an appreciation for the dangers of various online activities including how those activities can cause damage to their personal computer system.
6. Work on group videos.

Students will do a number of activities in this unit, including a group research project and presentation about internet safety. They will work with their new email accounts and online calendar. Students will create a group video project highlighting some aspect of what they have learned about internet safety.

Note: (In this unit, the Grade 6 computer teacher will consult/work in conjunction with librarian on some aspects of ISTE's Digital Citizen Standard).

Assessment Plan
Students will be graded based on project grading sheets and/or rubrics provided to them. Multiple modalities will be used to make sure all students have an understanding of the task/activity/assignment which they are given. Some opportunities will be provided for students to choose to be assessed individually or as a group. Using Google Drive and Canvas will facilitate the communication of how timely students receive feedback from completed tasks/activities. Additionally, students will be monitored during class time for their attention to that day's task and resulting task completion.

Curriculum Standards
English Language Arts Standards
RI.6.7 – Integrate information presented in different media or formats as well as in words to develop a coherent understanding of a topic or issue.
W.6.1 – Write arguments to support claims with clear reasons and relevant evidence.
W.6.4 – Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
W.6.7 – Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.
SL.6.4 – Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.
SL.6.5 – Include multimedia components and visual displays in presentations to clarify information.
L.6.1 – Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
L.6.2 – Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
L.6.3 – Use knowledge of language and its conventions when writing, speaking, reading, or listening.

Technology Standards
Digital Citizen: Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act in ways that are safe, legal and ethical. *(Consult/work in conjunction with librarian on some aspects of ISTE's Digital Citizen Standard)*

Students:
1. Demonstrate an understanding of the role an online identity plays in the digital world and learn the permanence of their decisions when interacting online.
2. Practice and encourage others in safe, legal and ethical behavior when using technology and interacting online, with guidance from an educator.
3. Demonstrate an understanding of what personal data is, how to keep it private and how it might be shared online.

Creative Communicator: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Students:
1. Recognize and utilize the features and functions of a variety of creation or communication tools.
2. Create digital artifacts to communicate ideas visually and graphically.
3. Learn about audience and consider their expected audience when creating digital artifacts and presentations.

Materials / Resources
1. Computers
2. Internet connectivity/browser
3. Office applications – Word or Google Docs (students make the choice)
4. Projector
5. Speakers
6. Access to digital cameras
7. Headphones
8. Paper & pencils
9. BMS Acceptable Use Policy (AUP)
10. Student accounts for:
    - Google Drive
    - Online bibliography tool (such as Noodle Tools)
    - Email
    - Canvas

Strategies for Differentiation
Based on teacher observation, any number of strategies will be used to assist student learning.

Within many of the units, students are able to take more time or move ahead as their skills dictate. Additionally, students have the opportunities in some units to choose the type of project they would like to create or to choose the material they will use for an assignment.

The teacher will provide additional guidance/assistance as needed based on observing the students in class. For longer projects, checkpoints will be used to aid students in their time management of multi-step assignments.

Unit 2: Intellectual Property

Description
Students learn the definition of intellectual property (IP) and the four types of intellectual property. Students will be provided the opportunity to explore the concept of intellectual property in more detail. Students are exposed to images, video and physical examples of intellectual property to help them gain a full understanding of what IP represents. Students learn about the history of IP as is relates to computers and technology. (The inception of awareness of IP theft/abuse which occurred with the "supposed anonymity" of using the internet.) Students are encouraged to be good cyber citizens and to respect intellectual property laws. Students will gain an understanding of the Fair Use another for discussion and understanding.

Learning Objectives
1. Learn about, demonstrate, and encourage respect for intellectual property with both print and digital media when using and sharing the work of others.

Key Terms:
- Copyright
- Trademark
- Design
- Patent
- Public Domain
- Fair Use
- Plagiarism
- Creative Commons
- Domain Extension(s)
- Digital Rights Management (DRM)
- URL
- Metasearch engines

Unit Outline
1. Review definition of intellectual property and the four types. Students take notes on the computer.
2. Through images, music and video fully explore examples intellectual property.
3. Review the history of IP as is relates to computers and technology and the concept of IP theft/abuse/piracy.
4. Review/discuss major terminology such as Fair Use and Plagiarism.
5. Create a poster about IP or other project proposed by a student. (For example, a student may choose to create a PSA video or a slide show presentation.)

Assessment Plan
Students will be graded based on project grading sheets and/or rubrics provided to them. Multiple modalities will be used to make sure all students understand the task/activity/assignment which they are given. Some opportunities will be provided for students to choose to be assessed individually or as a group. Using Google Drive and Canvas will facilitate the communication of how timely students receive feedback from completed tasks/activities. Additionally, students will be monitored during class time for their attention to that day's task and resulting task completion.

As a Unit Assessment, students will develop a poster or PSA about intellectual property and the need to respect intellectual property rights.

Curriculum Standards
English Language Arts Standards
RI.6.7 – Integrate information presented in different media or formats as well as in words to develop a coherent understanding of a topic or issue.
W.6.4 – Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
W.6.8 – Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.
SL.6.1 – Engage effectively in a range or collaborative discussions with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.
SL.6.5 – Include multimedia components and visual displays in presentations to clarify information.

Technology Standards
Digital Citizen: Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act in ways that are safe, legal and ethical.

Students:
1. Practice and encourage others in safe, legal and ethical behavior when using technology and interacting online, with guidance from an educator.
2. Learn about, demonstrate and encourage respect for intellectual property with both print and digital media when using and sharing the work of others.

Creative Communicator: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Students:
1. Recognize and utilize the features and functions of a variety of creation or communication tools.
2. Create digital artifacts to communicate ideas visually and graphically.
3. Learn about audience and consider their expected audience when creating digital artifacts and presentations.

Materials / Resources
1. Computers
2. Internet connectivity/browser
3. Office applications – Word, PowerPoint
4. Graphic Organizer application such as Inspiration
5. Projector
6. Speakers
7. Access to digital cameras
8. Headphones
9. Paper & pencils
10. Student accounts for:
    - Google Drive
    - Online bibliography tool (such as Noodle Tools)
    - Canvas

Strategies for Differentiation
Based on teacher observation any number of strategies will be used to assist student learning.

Within many of our units, students may take more time or move ahead as their skills dictate. Additionally, students have the opportunities in some units to choose the type of project they would like to create or to choose the material they will use for an assignment.

The teacher will provide additional guidance/assistance as needed based on observing the students in class. For longer projects, checkpoints will be used to aid students in their time management of multi-step assignments.

Unit 3: Programming

Description:
Students will learn the basis of computer programming – logical and specific directions given to accomplish a goal/task. Students will use explore programming tasks through their online Tynker units. Additionally, students will participate in the "Hour of Code" activities. It is planned that students will connect with real programmers either through email or some other communication tool. As students meet with a programming challenge, they will be able to reach out to another resource person, in addition to peers, and the teacher.

Learning Objectives
1. Break down problems into smaller parts, identify key information and propose solutions.
2. Understand and explore basic concepts related to automation, patterns and algorithmic thinking.

Key Terms:
- Logic
- Coordinates
- Loops
- Conditionals
- If … then

Unit Outline
1. Introduce the concept of writing a series of commands/instructions to complete a task.
2. Connect this concept to process of programming.
3. Introduce Tynker and students begin programming activities.
4. Tie in with Hour of Code activities during the month of December.

Assessment Plan
Students will be graded based on completion of programming tasks/units within Tynker. There are also periodic quizzes imbedded within some units. Using Google Drive and Canvas will facilitate the communication of how timely students receive feedback from completed tasks/activities. Additionally, students will be monitored during class time for their attention to that day's task and resulting task completion.

Curriculum Standards
English Language Arts Standards
SL.6.1 – Engage effectively in a range or collaborative discussions with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

Technology Standards
Computational Thinker: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Students:
1. Break down problems into smaller parts, identify key information and propose solutions.
2. Understand and explore basic concepts related to automation, patterns and algorithmic thinking.

Materials / Resources
1. Computers
2. Internet connectivity/browser
3. Projector
4. Speakers
5. Paper & pencils
6. Student accounts for:
   - Tynker
   - Canvas
   - Email

Strategies for Differentiation
Based on teacher observation, any number of strategies will be used to assist student learning. Within many of the units, students are able to take more time or move ahead as their skills dictate. Students' progress on Tynker at their own pace. On occasion, students will be required to complete some work outside of class.

The teacher will provide additional guidance/assistance as needed based on observing the students in class.

Unit 4: Graphing

Description

Students use collected data to create and share a graph *(ideally the data will come from work they are doing in one of their core classes such as math, science or social studies).* They will learn how to create a data template to collect their data. They will learn how to create multiple graph models (bar, pie, etc.) from the data including how to format titling, graph wall, axes labels to create a professional document.

Learning Objectives
1. Students create a data template to collect their data.
2. Students learn to choose the best graph to represent their data
3. Seek from feedback from both people and features embedded in digital tools, and use age-appropriate technology to share learning.

Key Terms:
- Cell
- Row
- Column
- Axis
- Wall

Unit Outline
1. Introduce key spreadsheet terms and give time for students to practice.
2. Students will create a graph based on data provided by the teacher as a model for the process.
3. Students will collect their own data, either through data obtained from another core subject or from data collected through their own survey. (If creating a survey, students will have the option to use a variety of different applications to design their survey such as Google Forms, Survey Monkey or Zoho.)
4. Students will create a final version of their individual graph project.

Assessment Plan

Students will be graded based on project grading sheets and/or rubrics provided to them. Multiple modalities will be used to make sure all students understand the task/activity/assignment which they are given. Opportunities will be provided for students to choose to be assessed individually or as a group. Using Google Drive and Canvas will facilitate the communication of how timely students receive feedback from completed tasks/activities. Additionally, students will be monitored during class time for their attention to that day's task and resulting task completion.

Curriculum Standards
English Language Arts Standards
L.6.2 – Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Technology Standards
Empowered Learner: Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals.

Students:
1. Seek from feedback from both people and features embedded in digital tools, and use age-appropriate technology to share learning.

Innovative Designer: Students use a variety of technologies within a design process to solve problems by creating new, useful or imaginative solutions.

Students:
1. Explore and practice how a design process works to generate ideas, consider solutions, plan to solve a problem, or create innovative products that are shared with others.

Creative Communicator: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Students:
1. Create digital artifacts to communicate ideas visually and graphically.
2. Learn about audience and consider their expected audience when creating digital artifacts and presentations.

Materials / Resources
1. Computers
2. Internet connectivity/browser
3. Office applications – Excel
4. Survey applications – Survey Monkey, Zoho
5. Projector
6. Speakers
7. Paper & pencils
8. Student accounts for:
   - Google Drive
   - Email
   - Canvas

Strategies for Differentiation
Based on teacher observation, any number of strategies will be used to assist student learning.

Within many of the units, students may take more time or move ahead as their skills dictate. Additionally, students have the opportunities in some units to choose the type of project they would like to create or to choose the material they will use for an assignment.

The teacher will provide additional guidance/assistance as needed based on observing the students in class. For longer projects, checkpoints will be used to aid students in their time management of multi-step assignments.

Unit 5: Keyboarding

Description
Students' keyboarding skills will be assessed before starting lessons. The students will set personal goals with the aspiration to type at least 25-30 words per minute by the end of the year. At the beginning of using the program, some work will be done in school (especially to assess proper technique) then, at times, keyboarding assignments are given as homework. When keyboarding in class, students will work for 15-20 minutes. Student progress is shared in an encouraging manner to celebrate their improvement. At times, students will incorporate journaling and poem activities to make keyboarding more meaningful.

Learning Objectives
1. By the end of grade 6, students will type 25-30 words per minute.

Key Terms:
- Home Row
- Speed (Words per minute, WPM)
- Accuracy
- Body Position

Unit Outline
1. Introduce keyboarding program.
2. Use time occasionally during class to practice during school to ensure correct hand placement.
3. Assign keyboarding as homework.
4. Journaling/poem writing as time permits.

Assessment Plan
Students will be graded based on project grading sheets and/or rubrics provided to them. Multiple modalities will be used to make sure all students have an understanding of the task/activity/assignment which they are given. Some opportunities will be provided for students to choose to be assessed individually or as a group. Using Google Drive and Canvas will facilitate the communication of how timely students receive feedback from completed tasks/activities. Additionally, students will be monitored during class time for their attention to that day's task and resulting task completion.

Lessons:
Class time will be allocated throughout the year with some time allocated at the start of the year and the rest of the time at the end of the year when students are re-assessed.

Assessment Plan
Students will be graded on each homework assignment based on a demonstration of improvement in their keyboarding skills – accuracy and speed (word per minute, WPM). The first area for students to improve is their accuracy. They should meet/strive for 90% accuracy or better. The keyboarding program (All the Right Type) is set by the teacher to require students to repeat a lesson if they do not meet 95% threshold on a unit test. Using Google Drive and Canvas will facilitate the communication of how timely students receive feedback from completed tasks/activities. Additionally, students will be monitored during class time for their attention to that day's task and resulting task completion.
As a final assessment, students will be required to complete a keyboarding test. Data from this assessment will be used at the start of the 7th grade.

Curriculum Standards
English Language Arts Standards
W.6.4 – Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
W.6.6 – Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.
W.6.11 – Create and present a text or art work in response to a literary work.
L.6.1 – Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
L.6.2 – Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
L.6.3 – Use knowledge of language and its conventions when writing, speaking, reading, or listening.

Technology Standards
Empowered Learner: Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals.
1. Students develop learning goals in collaboration with an educator, select the technology tools to achieve them, and reflect on and revise the learning process as needed to achieve goals.

Materials / Resources
1. Computers
2. Internet connectivity/browser
3. Document application such as Microsoft Word or Google Docs
4. Projector
5. Speakers
6. Student accounts for:
   - Google Drive
   - Canvas
   - Email
   - All the Right Type

Strategies for Differentiation
Students who demonstrate a lack of progress in improving their accuracy or wpm will received additional instruction/monitoring by the teacher. It may necessitate giving those student(s) more frequent homework assignments. Students who demonstrate consistency in meeting the 6th grade goals (90% or better accuracy, 25-30 wpm) will not be subject to homework with the same frequency.

Sources (for 6th grade curriculum)
ISTE (2017). ISTE standards for students. International Society for Technology in Education (ISTE). Retrieved August 18, 2016, from https://www.iste.org/standards/standards/for-students.
Keating, L. et al. (2016). Bulkeley Middle School: Innovation in Technology Explorations – Curriculum Mapping. Print.
NYSED. (March 26, 2014). Common core learning standards: P-12: University of the State of New York - New York State Education Department, 26 Mar. 2014. Retrieved August 18, 2016 from http://www.p12.nysed.gov/ciai/common_core_standards/.

Grade 7 Curriculum

Curriculum Plan for Computer Science II
Grade: 7th
Subject: Computer Science II
School: Bulkeley Middle School

Bulkeley Middle School In 7th grade students study the following units:

1. **Internet Safety/Digital Citizenship**
2. **Programming & Coding**
3. **Technology Integration/Productivity**
4. **Keyboarding**

The course meets every other day for the entire year creating a 20-week course. As much as possible, units that can be, are integrated within other subject areas. Some units, such as keyboarding are interwoven around other units as opposed to being done in isolation. Similarly, a single ISTE Standard may be reflected in multiple units and unit activities.

Unit	Length
Internet Safety/Digital Citizenship	Two weeks
Programming & Coding	Nine weeks
Technology Integration/Productivity	Six weeks
Keyboarding	One week
State Testing	One week
Field Trips/Assemblies	One week

Unit 1: Internet Safety/Digital Citizenship

Unit Description
Students are reminded of their responsibilities as a user of the school's technologies by reviewing and discussing the Acceptable Use Policy. Students get additional practice in keyboarding as they synthesize the most important aspects of the AUP. We build on the learning and discussions from 6th grade but with the addition of learning about cyberbullying. Students are taught how to treat others respectfully while online and how to advocate for themselves and others when there is an issue of safety. Student learn their options for getting help should they have any concerns. We also discuss scams that can be used by others online to harm a person's personal safety including predators.

Learning Objectives
Demonstrate and advocate for positive, safe, legal and ethical habits when using technology and when interacting with others online.
Demonstrate and advocate for an understanding of intellectual property with both print and digital media - including copyright, permission and fair use - by creating a variety of media products that include appropriate citation and attribution elements.
Demonstrate an understanding of what personal data is and how to keep it private and secure, including the awareness of terms such as encryption, HTTPS, password, cookies and computer viruses; they also understand the limitations of data management and how data-collection technologies work.

Key Terms:
- Acceptable Use Policy (AUP)
- Netiquette
- Cyberbullying
- Video Chat

Unit Outline
1. Review & discussion of Acceptable Use Policy.
2. Through video presentations and discussions learn about cyberbullying, how to be respectable while online, and how to advocate for themselves and others when there is an issue of safety.
3. Do research about online scams.
4. Create a presentation using Google Slides in a class presentation about internet safety.

Lessons:
1. Week One: Student-led review of key components of the Acceptable Use Policy, discuss cyberbullying as it relates to middle school students
2. Week Two: Research an online scam and present to the class.

Assessment Plan
Students will be graded based on project grading sheets and/or rubrics provided to them. Multiple modalities will be used to make sure all students understand the task/activity/assignment which they are given. Opportunities will be provided for students to choose to be assessed individually or as a group. Using Google Drive and Canvas will facilitate the communication of how timely students receive feedback from completed tasks/activities. Additionally, students will be monitored during class time for their attention to that day's task and resulting task completion.

As a final assessment, students create a presentation about strategies to keep themselves safe online.

Curriculum Standards
English Language Arts Standards
RI.7.1 – Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
W.7.7 – Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.
W.7.11 – Create a presentation, art work, or text in response to a literary work with a commentary that identifies connection.
SL.7.1 – Engage effectively in a range or collaborative discussions with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.
SL.7.5 – Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

Technology Standards
Empowered Learner: Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals.

Students:
1. Actively seek performance feedback from people, including teachers, and from functionalities embedded in digital tools to improve their learning process, and they select technology to demonstrate their learning in a variety of ways.
2. Are able to navigate a variety of technologies and transfer their knowledge and skills to learn how to use new technologies.

Digital Citizen: Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act in ways that are safe, legal and ethical. *(Consult/work in conjunction with librarian on some aspects of ISTE's Digital Citizen Standard)*

Students:
1. Manage their digital identities and reputations within school policy, including demonstrating an understanding of how digital actions are never fully erasable.
2. Demonstrate and advocate for positive, safe, legal and ethical habits when using technology and when interacting with others online.
3. Demonstrate and advocate for an understanding of intellectual property with both print and digital media - including copyright, permission and fair use - by creating a variety of media products that include appropriate citation and attribution elements.
4. Demonstrate an understanding of what personal data is and how to keep it private and secure, including the awareness of terms such as encryption, HTTPS, password, cookies and computer viruses; they also understand the limitations of data management and how data-collection technologies work.

Creative Communicator: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.
Students:
1. Select appropriate platforms and tools to create, share and communicate their work effectively.
2. Publish or present content designed for specific audiences and select platforms that will effectively convey their ideas to those audiences.

Materials / Resources
1. Computers
2. Internet connectivity/browser
3. Office applications - Word
4. Projector
5. Speakers
6. Graphic Organizer application such as Inspiration
7. Headphones
8. BMS Acceptable Use Policy (AUP)
9. Student accounts for:
   - Google Drive
   - Online bibliography tool (such as Noodle Tools or EasyBib)
   - Email
   - Canvas

Strategies for Differentiation
Based on teacher observation any number of strategies will be used to assist student learning. Students will be provided with project sheets and rubrics to assist them in understanding the online scam project.
Students have the opportunity to self-select which application they would like to use for the project, as well as whether they would like to work in a small group or individually.
The teacher will provide additional guidance/assistance as needed based on observing the students in class.
Typically, there is the need for frequent check-points so that the teacher can monitor the work completion & students' understanding of the project.

Unit 2: Programming and Coding

Unit Description

The course builds on the experiences students gained in 6th grade. In contrast with the 6th grade work on Tynker, students begin working with actual coding languages instead of coding blocks. Students work with the Logo programming language where there is a great deal of focus on writing programs that will draw various geometrical shapes using mathematical formulae. This is followed by two activities (the Star Challenge and "I Am a Robot".) The Star Challenge requires the students to work either individually or in groups to write a Logo program that will draw a five-pointed star with no lines showing in the middle, which requires students to use a programming language (such as Logo) to complete a real movement task in the classroom environment. Later in the year, students also learn how to code in JavaScript and Python. Time permitting, students will also work with HTML and build a website. During early December students will also formally participate in Code.org's "Hour of Code". As with other units, students are encouraged to collaborate by sharing ideas and assisting each other in completing tasks. Ideally, students will also have access by email to real programmers to ask questions and/or get assistance on a programming task.

Learning Objectives
1. Practice defining problems to solve by computing for data analysis, modeling or algorithmic thinking.
2. Find or organize data and use technology to analyze and represent it to solve problems and make decisions.
3. Break problems into component parts, identify key pieces and use that information to problem solve.
4. Demonstrate an understanding of how automation works and use algorithmic thinking to design and automate solutions.

Key Terms:
- Coordinates
- Conditionals
- Angle
- Degrees
- Boolean
- Debugging
- Modulo
- Recursion
- Lists
- Arrays
- Variable
- Comparator
- Substring
- If…else
- Other coding language specific to the particular language, e.g. Logo: Forward = FD, Clear Screen = CS; JavaScript: var = declare a variable, console.log =prints the message in parenthesis; Python: # = programmer's comment will be written as is, % = returns the remainder of the division of two numbers; HTML: <> = used for opening and closing tags

Unit Outline
1. Students begin working with the Logo language.
2. As needed, introduce new programming terms and mathematical formulae while working with Logo.
3. After completing first ten units on Logo, introduce the "Star Challenge". Students may opt to work in groups or work on their own.
4. Introduce JavaScript. Students work on programming tasks on Codecademy.

5. Introduce Python. Students work on programming tasks on Codecademy.
6. Introduce HTML. Students work on programming tasks on Codecademy.
7. There will be a test/quiz at the end of each experience with the programming languages.
8. Students will participate in "Hour of Code" activities in December within the programming unit currently being studied.

Lessons

	Topics Covered
Week One	Logo: Basic commands; combining commands; picking up the pen and putting it back down; x & y coordinates; drawing arcs, circles, triangles and polygons
Week Two	Logo: Teaching the turtle a set a commands/a procedure, drawing in color; assigning a variable, recursion, creating lists, fill command, getting user input, the 'while' loop
Week Three	Star Challenge
Week Four	I Am a Robot
Week Five	JavaScript: Create comments, prompt dialogs, strings, Booleans, comparison operators, debugging, if/else statements, modulo (%), substrings, variables, functions, 'for' loops, AND/OR/NOT
Week Six	JavaScript: Arrays, create objects, nested conditionals, class, prototype
Week Seven	Python: Python syntax, modulo, variable operations, strings, indexing, date time library, control flow, Boolean operators, comparator, IF/ELSE and ELIF statements, storing a user's input, functions – defining and calling, For In Loop
Week Eight	Python: Create a function to calculate grades and averages, lists, join function, create a grid for 'Battleship' game, FOR/ELSE loops
Week Nine	HTML – Make a website: Opening and closing tags, adding heading, adding paragraph, anchor elements, adding an image, adding video, unordered list, metadata

Assessment Plan

Students will be graded based on the "Star Challenge" project grading rubric provided to them. Tests/quizzes will be used at the end of each programming language unit. Within the other programming lessons there are opportunities for students to create/debug programs such as the activity within Python where students will create a grid for the game 'Battleship'.

Multiple modalities will be used to make sure all students understand the task/activity/assignment which they are given. Some opportunities will be provided for students to choose to be assessed individually or as a group such as when doing work on Logo. The teacher will be able to access real-time data on Codecademy re: students' progress. Also, students will be able to track their progress on their account – both as a whole for all units assigned to them as well as for each individual lesson. Students in the top six for lesson completion will be on display during class and continually updated. Using Google Drive and Canvas will facilitate the communication of how timely students receive feedback from completed tasks/activities. Additionally, students will be monitored during class time for their attention to that day's task and resulting task completion.

Curriculum Standards
English Language Arts Standards
SL.7.1 – Engage effectively in a range or collaborative discussions with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

Mathematics Standards
7.G – Draw construct, and describe geometrical figures and describe the relationship between them.

Technology Standards
Innovative Designer: Students use a variety of technologies within a design process to solve problems by creating new, useful or imaginative solutions.

Students:
1. Engage in a design process and employ it to generate ideas, create innovative products or solve authentic problems.
2. Engage in a design process to develop, test and revise prototypes, embracing the cyclical process of trial and error and understanding problems or setbacks as potential opportunities for improvement.
3. Demonstrate an ability to persevere and handle greater ambiguity as they work to solve open-ended problems.

Computational Thinker: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Students:
1. Practice defining problems to solve by computing for data analysis, modeling or algorithmic thinking.
2. Find or organize data and use technology to analyze and represent it to solve problems and make decisions.
3. Break problems into component parts, identify key pieces and use that information to problem solve.

Materials / Resources
1. Computers
2. Internet connectivity/browser
3. Projector
4. Protractors
5. Paper & pencils
6. Student accounts for:
   - Tynker
   - Google Drive
   - Email
   - Canvas
   - Code Academy

Strategies for Differentiation
Based on teacher observation any number of strategies will be used to assist student learning.
Within many of our units, students are able to take more time or move ahead as their skills dictate. Additionally, students have the opportunities in some units to choose the type of project they would like to create or to choose the material they will use for an assignment.
The teacher will provide additional guidance/assistance as needed based on observing the students in class. For longer projects, checkpoints will be used to aid students in their time management of multi-step assignments.

Unit 3: Technology Integration/Productivity

Description
An integral part of Bulkeley's middle school program has been to have students do integrated projects. "In today's dynamic global economy, centered on the development and exchange of knowledge and information, individuals prosper who are fluent in several disciplines and comfortable moving among them. Creativity, adaptability, critical reasoning, and collaboration are highly valued skills. When it comes to fostering those skills in the classroom, integrated study is an extremely effective approach, helping students develop multifaceted expertise and grasp

the important role interrelationships can play in the real world." In particular, this has been practiced in the seventh grade curriculum since the late 1990's; most especially between ELA, social studies and computer classes. This curriculum plan adds in integration of computer science and foreign language.

Units of Integration with Computer Science:
1. Veterans Day Project – this is a very special project done by middle school students which plays a huge role in the annual BMS Veterans Day Assembly. Among the highlights of the program, especially for the attending veterans or their families, is the individual recognition of each veteran which includes details and images apropos to each veteran. Many attendees look forward to this part of the show each year. Comments made by veterans include "No one else honors the veterans like Bulkeley Middle School does."
2. ELA – The current project requires students to research a garment industry in a foreign country. In Computer Science class, students learn how to analyze the credibility of resources. Research and writing of the text (which will be published in a brochure) is accomplished in ELA class, oftentimes in conjunction with time in the library. In Computer Science class, students use a graphic organizer to plan their brochure layout and learn to use Publisher to create their final product.
3. Social Studies – The students work either individually or in groups (student choice) to research and create a video about an aspect of life during the Civil War (e.g. a particular battle, women's lives during the war, the impact of African-American's during the war, the nature of the medical treatments & resources during the war). Research and filming occur mostly in social studies class (and some time is spent in the library). In computer class, students create their Google folder and learn how to import images and video to this shared site. Additionally, students are provided resources for images and video and have the time in class to gather their resources for the project. Additionally, instruction is provided on properly citing all of their sources. Students who complete gathering resources early, may also opt to do some of their filming during computer class.
4. Foreign Language – Students in either French or Spanish create a children's book based on vocabulary they have been exposed to in foreign language class. The computer teacher and foreign language teachers collaborate on the requirements of the project and the associated grading rubric. Students write their book draft in computer class, which is then checked for accuracy by the foreign language teacher. Students continue to edit, as needed, until their writing is complete and accurate. The book is designed and produced in computer class. The computer teacher confers with the first grade chairperson to match 7th grade students to 1st grade students. Seventh graders and their teachers walk to Chancellor Livingston School to read their books to first graders.

Learning Objectives (as applicable to project as listed above)
1. Demonstrate and practice the ability to effectively utilize research strategies to locate appropriate digital resources in support of their learning.
2. Practice and demonstrate the ability to evaluate resources for accuracy, perspective, credibility and relevance.
3. Locate and collect resources from a variety of sources and organize assets into collections for a wide range of projects and purposes.
4. Explore real-world issues and problems and actively pursue an understanding of them and solutions for them.
5. Are able to navigate a variety of technologies and transfer their knowledge and skills to learn how to use new technologies.
6. Create original works or responsibly repurpose other digital resources into new creative works.
7. Communicate complex ideas clearly using various digital tools to convey the concepts textually, visually, graphically, etc.

Key Terms:
Key terms will be specific to the unit and will be developed in collaboration with the content teacher.

Unit Outline
1. Two units are introduced in the core classroom (ELA and Social Studies) the other two units (Foreign Language and Veterans Day) are introduced in computer class.
2. Veterans Day:
    a. Review design elements in Power Point
    b. Discuss requirements of military features
    c. Discuss formatting of images, background, text, shapes
    d. Students create slides for 2-3 veterans being honored
3. ELA:
    a. Discuss the design elements required in each brochure panel (six-sided brochure) and the optional elements students can choose to do
    b. Using a graphic organizer, formulate a plan for each panel
    c. Gather images and create bibliography entries
    d. Design each panel using the saved images and the text students researched & created in their ELA class
4. Social Studies:
    a. Discuss the resources available for sound and video images and how to download these to Google Drive
    b. Students work to gather their resources and have time to work with their group on shooting their video
5. Foreign Language:
    a. The project is introduced and students have a grading rubric for both their work using the language (graded by their French or Spanish teacher) and for the design of their book (graded by their Computer Science II teacher.
    b. Students use Power Point to create their book.
    c. Printed books are shared with first grade students at CLS. Each 7th grader has 1-2 younger students who he/she reads and translates the book to the first grader(s).

Potential related activities with this unit:
1. Food festival during 7th grade lunch to include French and Spanish foods. (Need to coordinate this with the MS Cafeteria.) This was accomplished in June 2017. Students had the opportunity to sample various Spanish and French foods which the teachers and parents provided. (Among the food items were empanadas, burritos, and crepes.) Some seventh grade parents volunteered to assist the teachers in serving the food to the students. The computer teacher also coordinated the with the food service manager in order for the cafeteria menu to have French/Spanish foods available for hot lunches. (Some of the items included quiche and quesadillas.)
2. Skyping with another Spanish and/or French class
3. Guest speakers to come in to talk with students about their French and/or Spanish heritage, including speaking to the students in that language and presenting photos and/or other cultural items

Assessment Plan
Students will be graded based on project grading sheets and/or rubrics provided to them. Multiple modalities will be used to make sure all students understand the task/activity/assignment which they are given. Opportunities will be provided for students to choose to be assessed individually or as a group. Using Google Drive and Canvas will facilitate the communication of how timely students receive feedback from completed tasks/activities. Additionally, students will be monitored during class time for their attention to that day's task and resulting task completion.

Curriculum Standards
English Language Arts Standards
RI.7.3 – Analyze the interactions between individuals, events, and ideas in a text.
W.7.1 – Write arguments to support claims with clear reasons and relevant evidence.

W.7.4 – Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

W.7.6 – Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.

W.7.8 – Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

SL.7.5 – Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

L.7.1 – Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

L.7.2 – Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

L.7.3 – Use knowledge of language and its conventions when writing, speaking, reading, or listening.

Technology Standards

Empowered Learner: Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals.

Students:
1. Articulate personal learning goals, select and manage appropriate technologies to achieve them, and reflect on their successes and areas of improvement in working towards their goals.
2. Actively seek performance feedback from people, including teachers, and from functionalities embedded in digital tools to improve their learning process, and they select technology to demonstrate their learning in a variety of ways.

Knowledge Constructor: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others. *(Consult/work in conjunction with librarian on some aspects of ISTE's Knowledge Constructor Standard)*

Students:
1. Demonstrate and practice the ability to effectively utilize research strategies to locate appropriate digital resources in support of their learning.
2. Practice and demonstrate the ability to evaluate resources for accuracy, perspective, credibility and relevance.
3. Locate and collect resources from a variety of sources and organize assets into collections for a wide range of projects and purposes.
4. Explore real-world issues and problems and actively pursue an understanding of them and solutions for them.

Creative Communicator: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Students:
1. Select appropriate platforms and tools to create, share and communicate their work effectively.
2. Communicate complex ideas clearly using various digital tools to convey the concepts textually, visually, graphically, etc.

Global Collaborator: Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.

Students:
1. Use digital tools to interact with others to develop a richer understanding of different perspectives and cultures.
2. Use collaborative technologies to connect with others, including peers, experts and community members, to learn about issues and problems or to gain broader perspective.

Technology Skills:
1. Gathers information and communicate with others using telecommunications with support from teachers, family members, or student partners
2. Use telecommunications and online resources including email and discussion boards to participate in collaborative problem-solving activities
3. Uses email and follows netiquette protocol
4. Communicates with others online in support of direct and independent learning
5. Collaborates with peers, experts, and others using collaborative online tools to investigate curriculum-related problems, issues, and information
6. Develops solutions in collaborative online environment for audiences inside and outside the classroom
7. Develops essential and subsidiary questions as part of collaborative online projects
8. Plans collaborative project with group
9. Participates responsibly in several types of online activities including a MOO, videoconference, a chat, and a threaded discussion

Materials / Resources
1. Computers
2. Internet connectivity/browser
3. Office applications – Word, Xcel, PowerPoint, Publisher
4. Projector
5. Speakers
6. Access to digital cameras
7. Graphic Organizer application such as Inspiration
8. Headphones
9. Student accounts for:
   - Google Drive
   - Online bibliography tool (such as Noodle Tools or EasyBib)
   - Email
   - Canvas

Strategies for Differentiation

Based on teacher observation any number of strategies will be used to assist student learning. Within many of our units, students are able to take more time or move ahead as their skills dictate. Additionally, students have the opportunities in some units to choose the type of project they would like to create or to choose the material they will use for an assignment.

The teacher will provide additional guidance/assistance as needed based on observing the students in class. For longer projects, checkpoints will be used to aid students in their time management of multi-step assignments.

Unit 4: Keyboarding

Description

Students' keyboarding skills are assessed before starting lessons at the beginning of the year. Students set personal goals with the aspiration to type at least 30-35 words per minute by the end of 7th grade. We primarily

use "All the Right Type" for lessons. Students will complete some work in school (especially at the beginning to assess proper technique) then, at times, keyboarding assignments are given as homework. Students are encouraged to continually improve their skills via review with the teacher and the program allows students to monitor their progress as well. To provide additional keyboarding experiences in other formats, students will incorporate journaling and poem activities.

Learning Objectives
By the end of grade 7, students will type 30-35 words per minute with at least 90% accuracy.

Key Terms:
- Home Row
- Speed (words per minute, wpm)
- Accuracy
- Body Position

Unit Outline
1. Assessment of WPM & accuracy at the start of the unit. (Reassessed at the end of the unit.)
2. Students work at their own pace to complete lessons.

Assessment Plan
Students will be graded based on their grades on embedded tests within "All the Right Type" (ATRT), their work to improve their WPM & accuracy, the journaling/poetry assignments, as well as completion of assigned ATRT lessons. Additionally, students will be monitored during class time for their attention to that day's task and resulting task completion.

Curriculum Standards
English Language Arts Standards
W.7.2 – Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
W.7.4 – Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
L.7.2 – Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Technology Standards
Empowered Learner: Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals.

Students:
1. Articulate personal learning goals, select and manage appropriate technologies to achieve them, and reflect on their successes and areas of improvement in working towards their goals.

Skills:
1. Productivity Skills -- Keyboarding:
   a. Types 30-35 words per minute

Materials / Resources
1. Computers
2. Internet connectivity/browser
3. Office applications – Word
4. Projector

5. Speakers
6. Student accounts for:
   - Google Drive
   - Email
   - Canvas
   - All the Right Type

Strategies for Differentiation

Based on teacher observation during class and/or the teacher review of the data on All the Right Type, a student may require additional intervention (if struggling) or not be required to do the homework assignment if the student has consistently demonstrated the accuracy and wpm goals on the assessments.

Sources (for 7th grade curricula)

Edutopia. (October 6, 2008). Why should schools embrace integrated studies? It fosters a way of learning that mimics real life. *Edutopia*. George Lucas Educational Foundation. Retrieved Junem21, 2017, from https://www.edutopia.org/integrated-studies-introduction.

ISTE (2017). ISTE standards for students. International Society for Technology in Education (ISTE). Retrieved August 18, 2016, from https://www.iste.org/standards/standards/for-students.

Keating, L. et al. (2016). Bulkeley Middle School: Innovation in Technology Explorations – Curriculum Mapping. Print.

NYSED. (March 26, 2014). Common core learning standards: P-12: University of the State of New York - New York State Education Department, 26 Mar. 2014. Retrieved August 18, 2016 from http://www.p12.nysed.gov/ciai/common_core_standards/.

Grade 8 Curriculum

Curriculum Plan for Computer Science III
Grade: 8th
School: Bulkeley Middle School

In 8th grade students study the following units:

1. **Digital Citizenship (**ISTE Standards addressed: Digital Citizen)
2. **Innovative Designer** (ISTE Standards addressed: Innovative Designer)
3. **Empowered Learner** (ISTE Standards addressed: Empowered Learner)
4. **Computational Thinker** (ISTE Standards addressed: Computational Thinker)
5. **Collaborative JavaScript Project** (ISTE Standards addressed: Global Collaborator)
6. **SurveyMonkey** (ISTE Standard addressed: Knowledge Constructor, Creative Communicator)

The course meets every other day for the entire year creating a 20-week course. As much as possible, units that can be, are integrated within other subject areas. Some units, such as keyboarding are interwoven around other units as opposed to being done in isolation. Similarly, a single ISTE Standard may be reflected in multiple units and unit activities.

Unit 1: Digital Citizenship

Description
Using a variety of activities – such as group- and class-discussion of dramatic fictional videos and current news broadcasts, role-playing, online games, individual written reflections, and persuasive letters -- students will explore the pervasive and powerful role of technology in their lives and will be asked to grapple with and recommend healthy options for navigating the hazards inherent to an interconnected digital world.

As students who are recently old enough to legally utilize popular social media services, many activities will place special emphasis on responsible use of social media platforms to ensure students' (and 3rd parties') physical and psychological health, maintenance of students' good reputations, and preservation of a positive reputation for future employment marketability. Students will also engage in activities that highlight the growing problem of identity theft and learn best practices to reduce the risk of personally identifying data being revealed. Student activities will also provide clear definitions of crimes associated with child pornography, reveal ways in which technology facilitates youth becoming ensnared in digital child pornography crimes, highlight the devastating consequences of conviction for these crimes, and counsel courses of action students should take to avoid these hazards.

Activities will engage students in the practice of discerning the authorship and nature of web-based resources and evaluating their credibility. While exploring and evaluating online resources, students will practice attribution of sources to reinforce respect for federal copyright laws.

Learning Objectives
Students will be able to:
1. identify the rights, responsibilities, and opportunities of living, learning, and working in an interconnected digital world,
2. understand why it is important for them to conduct themselves in ways that are safe, legal, and ethical,
3. communicate that importance to peers and the wider community, and
4. model the protocols and values consistent with good digital citizenry.

Key Terms

The following terms are representative of the content that will be taught in this unit.

- digital identity
- ethics,
- sexting,
- encryption
- HTTPS
- cookies

Unit Outline:

This Unit lasts for 10 days, begins the school year, and includes development of the following skills as detailed in the Scope and Sequence tables earlier in this document:

1. Review logistics of computer lab (computer access; setup)
2. Introduction to Office 365 tools (Outlook and Word)
3. Overview of internet safety
4. Review RCSD AUP
5. Introduce Keyboarding
6. Internet Safety Topic Discussions – Sexting, Bullying

Assessment Plan

Students may be assessed daily based on their class participation, completion of assigned tasks, indications of sincere effort and engagement with the assigned material, and, for certain assignments, in accordance with a rubric distributed to students.

Sample Calendar:

Day 1 Digital Citizenship	Day 2 Digital Citizenship	Day 3 Digital Citizenship	Day 4 Digital Citizenship	Day 5 Digital Citizenship
Day 6 Digital Citizenship	Day 7 Digital Citizenship	Day 8 Digital Citizenship	Day 9 Digital Citizenship	Day 10 Digital Citizenship

Curriculum Standards

English Language Arts Standards

W.8.1.A-E - Write arguments to support claims with clear reasons and relevant evidence.

W.8.8 - Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

SL.8.1 - Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

Technology Standards

Digital Citizenship: Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act in ways that are safe, legal and ethical.

Students:

1. Manage their digital identities and reputations within school policy, including demonstrating an understanding of how digital actions are never fully erasable.

2. Demonstrate and advocate for positive, safe, legal and ethical habits when using technology and when interacting with others online.
3. Demonstrate an understanding of what personal data is and how to keep it private and secure, including awareness of terms such as encryption, HTTPS, password, cookies and computer viruses; they also understand the limitations of data management and how data-collection technologies work.

Materials / Resources
- BMS Acceptable Use Policy (AUP)
- Computers
- Internet connectivity/browser
- NetSmartz
- Email accounts
- MS Word
- Envelopes
- Projector & Speakers

Strategies for Differentiation
Given the nature of this Unit, and based on past experience, there has not been a need for significant differentiation. Some students may need more prompting and guidance from the teacher when responding to questions or additional teacher facilitation during student group discussion and role playing. Groups can be configured to support students who may have social anxiety or be particularly introverted. Additional time beyond the class period may need to be extended to students who process more slowly, have physical limitations, or whose IEP calls for extra time.

Unit 2: Innovative Designer

Description
Students will create a video project, such as a newscast or PSA, which illustrates what they learned in the first Unit (Digital Citizenship) about responsible use of digital resources, ensuring personal safety, protecting sensitive personal data, and recognizing digital forms of child pornography and how they are disseminated. Students will work in groups to design and storyboard their project. They will use digital tools to research actual news as examples of events to depict in their video. Students will assign roles to one another (newscaster, field reporters, subject of news story, etc.) and produce video and graphics for later assembly into their final product. Students will have the freedom to select different digital tools to create the components of their video (e.g. some students may create original artwork, while others may use premade art in the public domain). Students will then assemble the components they've created into a final video product and share it with their class and wider BMS community.

Students will be expected to shoot some video footage outside of class (using their own equipment or items on loan from the school) and it is anticipated that the entire class will have access to the "green screen" located in the High School building.

The project will begin with a refresher in basic graphics applications (e.g. Paint Shop Pro) and then introduce more advanced graphics editing software (e.g. Adobe Photoshop). Following a refresher in iMovie, students will begin their research and storyboarding.

Learning Objectives
Students will be able to:
- use a variety of technologies with a design process to solve problems,
- use digital and physical tools in planning strategies for managing and designing their projects or products,
- use a variety of technologies to create new, useful, and/or imaginative solutions, and

- develop, test, and refine prototypes of innovative design concepts, products or solutions.

Key Terms
The following terms are representative of the content that will be taught in this unit.
- design process
- storyboarding
- green screen
- editing
- video file formats

Unit Outline
This Unit lasts for 14 days and includes development of the following skills as detailed in the Scope and Sequence tables earlier in this document:
1. Overview of Videography (basic terminology, design process, storyboarding, green screen, editing, video file formats)
2. Create and edit graphic images and export files in various formats using basic graphics software (e.g. Paint Shop Pro)
3. Develop Storyboard reflecting target audience, goal, and purpose of presentation
4. Import video and images, edit, and produce video using iMovie

Assessment Plan
At the beginning of the project, a rubric will be provided to each student identifying expectations for the final video project. Students may also be assessed daily for their completion of discrete tasks, sincerity of effort and engagement in the project, and cooperative teamwork.

Sample calendar:

Day 1 Paint Shop Pro	Day 2 Adobe Photoshop	Day 3 Adobe Photoshop	Day 4 Adobe Photoshop	Day 5 iMovie
Day 6 Internet research/ Broad Storyboarding	Day 7 Broad Storyboarding	Day 8 Storyboarding: Scripting	Day 9 Storyboarding: Scripting	Day 10 Storyboarding: Scripting/graphics/ design
Day 11 Green Screen & Graphics/Design	Day 12 Green Screen & Graphics/Design	Day 13 Green Screen & Post-production	Day 14 Green Screen & Post-production	

Curriculum Standards
English Language Arts Standards
RI.8.7 - Evaluate the advantages and disadvantages of using different media (e.g. print or digital text, video, multimedia) to present a particular topic or idea.
W.8.2A-F - Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant context.
W.8.3.A-E - Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.
W.8.6 - Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas efficiently as well as to interact and collaborate with others.
W.8.8 - Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

SL.8.4 - Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.

Technology Standards
Innovative Designer: Students use a variety of technologies within a design process to solve problems by creating new, useful or imaginative solutions.

1. Engage in a design process and employ it to generate ideas, create innovative products or solve authentic problems
2. Select and use digital tools to support a design process and expand their understanding to identify constraints and trade-offs and to weigh risks.
3. Engage in a design process to develop, test and revise prototypes, embracing the cyclical process of trial and error and understanding problems or setbacks as potential opportunities for improvement.
4. Demonstrate an ability to persevere and handle greater ambiguity as they work to solve open-ended problems.

Materials
- Computers (PCs)
- iPads/iMacs
- Internet connectivity/browser
- Storyboard worksheets
- Paint Shop Pro
- iMovie
- Adobe Photoshop CS6
- Student smartphones
- Transfer cables
- Green Screen

Strategies for Differentiation
Students will be working in groups, so no significant differentiation is anticipated. Some students may need more prompting and guidance from the teacher or additional teacher facilitation during student group discussion and utilization of software. Groups can be configured in order to support students who may have social anxiety or be particularly introverted, as well as to ensure that there is a good mix of student competence with software applications. Additional time may need to be extended to students who process more slowly or whose IEPs call for extra time.

Unit 3: Empowerment through Excel

Description
Students will begin this unit with an introduction to MS Excel and its basic components and functions before learning how to use formulas, advanced graphing techniques, and conditional formatting. After several discrete lessons to teach students Excel (including group and individual exercises), students will begin a project that dissects data on a topical subject (e.g. the results of the 2016 U.S. Presidential Election using publicly available polling and election data). Students will design this project themselves, define their own learning goals, and create a class rubric for grading their projects.   While one required component of the project will be the use of Excel, students will be strongly encouraged to explore and incorporate other technologies to achieve their goals (e.g. PowerPoint, Word, iMovie) to create a multimedia presentation that can be shared out and narrated.

Learning Objectives

Students will be able to:
1. leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals,
2. set learning goals, apply strategies to meet them, and use technology tools to reflect on their learning,
3. use their technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways,
4. use advanced functions of MS Excel, utilize Excel in problem solving, and graphically communicate solutions to an audience.

Key Terms

The following terms are representative of the content that will be taught in this unit.
- column
- row
- cell references
- formula bar
- sheet
- conditional formatting

Unit Outline

This Unit lasts for 14 days and includes development of the following skills as detailed in the Scope and Sequence tables earlier in this document:
1. Researching data using public resources
2. Discerning credibility of online resources
3. Downloading data sets
4. Importing data into Excel
5. Evaluating election results and patterns
6. Recognizing diversity of political views in the United States, geographical distinctions, and demographic correlation
7. Microsoft Excel 2013

Assessment Plan

Students may be assessed using the following: their completion of daily tasks, multiple choice quizzes and/or Excel performance quizzes, and, for their unit project, using a rubric constructed by the class.

As a Unit Assessment, students will create a multimedia presentation featuring graphs related to a topic of current events, such as the US presidential election.

Sample calendar

Day 1 Excel Introduction	Day 2 Excel basics & formatting	Day 3 Excel formulas	Day 4 Excel conditional formatting	Day 5 Excel graphing
Day 6 Excel graphing	Day 7 Project Intro, Goal Setting & Rubric Design	Day 8 Political Data Research/Gathering	Day 9 Political Data Research/Gathering	Day 10 Project Assembly
Day 11 Project Assembly	Day 12 Project Assembly	Day 13 Project Completion	Day 14 Project Sharing	

Curriculum Standards
English Language Arts Standards
RI.8.7 - Evaluate the advantages and disadvantages of using different media (e.g. print or digital text, video, multimedia) to present a particular topic or idea.
W.8.1.A-E - Write arguments to support claims with clear reasons and relevant evidence.
W.8.8 - Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
SL.8.3 - Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.

Mathematics Standards
7.SP.1 - Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
8.SP.41 - Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?
S.ID.21 -- Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

Technology Standards
Empowered Learner: Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.

Students:
1. Seek feedback from both people and features embedded in digital tools, and use age-appropriate technology to share learning.

Materials
- Computers (PCs)
- Internet connectivity/browser
- Microsoft Excel
- Printers

Strategies for Differentiation
Based on past experience, no significant differentiation is anticipated to be required, however the teacher will have resources (e.g. polling and election data) available for students. Some students may need more prompting and guidance from the teacher or additional teacher facilitation during their research, manipulation of the data within Excel, and in deciding what kind of output will reveal the meaning discovered from the data. Although intended to be an individual project, students may be grouped in order to support students. Additional time may need to be extended to students who process more slowly or whose IEPs call for extra time.

Unit 4: Computational Thinker

Description
This unit builds on the experiences students gained in 6th and 7th grades by continuing to work with Tynker lessons on more advanced tasks that require knowledge of prior skills gained last year. Students will begin this unit with a review of the basic concepts underlying programming, a review of basic terminology, flowchart some simple games and activities, complete a "robot exercise," and an assessment of what students know and remember from their prior year's computer science instruction. Students will then segue into a programming course (e.g. Tynker, a scratch-based programming courses based on JavaScript); the skills and knowledge that students bring to the classroom will determine the particular courses assigned (e.g. Tynker modules 301 or 302, or some portions therein).

Students will then work with actual coding languages. When students work with Logo there is a great deal of focus on writing programs that will draw various geometrical shapes using mathematical formulae. Later in the year, students also learn how to code in JavaScript and Python. During early December students will also formally participate in Code.org's "Hour of Code". As with other units, students are encouraged to use each other as resources to share ideas and assist each other in completing tasks. Ideally students will also have access to email real programmers to ask questions and/or get assistance on a programming task.

 At the conclusion of the programming module(s), students will create a project that connects with the content of one of their academic courses. Students will have the freedom to choose an academic topic of interest and create a presentation and/or game that meets the project rubric standards. After the project, students will learn a programming language (e.g. JavaScript), using the actual coding language, through Codecademy or equivalent.

Learning Objectives
Students will be able to:
- Practice defining problems to solve by computing for data analysis, modeling or algorithmic thinking.
- Find or organize data and use technology to analyze and represent it to solve problems and make decisions.
- Break problems into component parts, identify key pieces and use that information to problem solve.
- Demonstrate an understanding of how automation works and use algorithmic thinking to design and automate solutions.

Key Terms
The following terms are representative of the content that will be taught in this unit.
- Numbers
- Strings
- Booleans
- Syntax
- Variables
- Conditions
- Loops
- Functions
- Algorithms
- Debug

Unit Outline
This Unit lasts for 33 days and includes development of the following skills as detailed in the Scope and Sequence tables earlier in this document:

1. Review basic concepts of programming
2. Guided practice exercise
3. Introduce concepts to design, write and debug programs that accomplish specific goals
4. Design and develop modular programs that use procedures or functions
5. Write code, debug, and edit using JavaScript
6. As needed, introduce new programming terms and mathematical formulae while working with Logo.
7. After completing first ten units on Logo, introduce the "Star Challenge". Students may opt to work in groups or work on their own.
8. Introduce JavaScript and Python. Students work on programming tasks on Code Academy.
9. Students will participate in "Hour of Code" activities in December.

Assessment Plan
Students may be assessed using the following: their completion of daily tasks, quizzes, a rubric for their unit project, completion of assigned lessons.
As a Unit Assessment, students will students will develop a program that connects with the content of one of their academic courses

Sample Calendar

Day 1 Coding Introduction	Day 2 Coding Flowcharts	Day 3 Coding Robot Exercise	Day 4 Coding ASSESSMENT	Day 5 Programming Tynker
Day 6 Programming Tynker	Day 7 Programming Tynker	Day 8 Programming TYNKER	Day 9 Programming TYNKER	Day 10 Programming TYNKER
Day 11 Programming Tynker	Day 12 Programming Tynker	Day 13 Programming Tynker	Day 14 Programming Tynker	Day 15 Programming Tynker
Day 16 Programming Tynker	Day 17 Programming Tynker	Day 18 Programming Tynker	Day 19 Programming Tynker	Day 20 Tynker Project
Day 21 Tynker Project	Day 22 Tynker Project	Day 23 Tynker Project	Day 24 Tynker Project	Day 25 Codecademy: Javascript
Day 26 Codecademy: JavaScript	Day 27 Codecademy: JavaScript	Day 28 Codecademy: JavaScript	Day 29 Codecademy: JavaScript	Day 30 Codecademy: JavaScript
Day 31 Codecademy: JavaScript	Day 32 Codecademy: JavaScript	Day 33 Codecademy: JavaScript		

Curriculum Standards
Mathematics Standards
MP.1 – Make sense of problems and persevere in solving them.
4.OA.5– Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.
5.G.1– Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates.

6.NS.5– Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

Reading Science/Technical Standards
8.RST.3– Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

Technology Standards
Computational Thinker: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Students:
1. Explore or solve problems by selecting technology for data analysis, modeling and algorithmic thinking, with guidance from an educator.
2. Select effective technology to represent data.
3. Break down problems into smaller parts, identify key information and propose solutions.
4. Understand and explore basic concepts related to automation, patterns and algorithmic thinking.

Materials
- Computers (PCs)
- Internet connectivity/browser
- Projector
- Tynker subscription/accounts
- Code Academy accounts

Strategies for Differentiation
Based on past experience, no significant differentiation is anticipated to be required, however some students may need more prompting and guidance from the teacher or additional teacher facilitation. The teacher will seat students-in-need alongside students who are more proficient in programming and/or coding and "deputize" them to offer aid. The teacher's experience deputizing students in prior years was been very positive in that it creates an environment of student inter-dependence, cooperative problem-solving, and increased student self-reliance and engagement. Although these projects are intended to be performed individually, the teacher may pair students for projects, abbreviate the lessons, and/or extend additional time to those students who require it.

Unit 5: Collaborative JavaScript Project

Learning Objectives
Students will be able to:
1. use digital tools to interact with others to develop a richer understanding of different perspectives,
2. use collaborative technologies to connect with others, including peers, experts and community members to solve problems,
3. determine their role on a team to meet goals, based on their knowledge of technology and content, as well as personal preference.

Description
Students will work in teams of 3 (or 4) and design a program using JavaScript that draws upon what they learned in the prior, Computational Thinker Unit. Students will use JSFiddle (or an equivalent JavaScript editor) to code the program and create an interactive game (e.g. "Choose Your Own Adventure"-experience). Students will be

responsible for designating roles on the project amongst team members (e.g. 1 game designer and 2 programmers). Students will use "pair programming" during coding in class (reviewing one another's code in real-time and sharing responsibility for writing the code).

Key Terms
The following terms are representative of the content that will be taught in this unit.
- collaboration
- game designer
- lead programmer,
- driver

Unit Outline:
This Unit lasts for 5 days and includes development of the following skills as detailed in the Scope and Sequence tables earlier in this document:
1. Review basic concepts of programming
2. Work collaboratively to design and develop modular programs
3. Write code, debug, and edit using JavaScript

Assessment Plan
Students may be assessed using the following: daily observation of individual effort, group collaboration, and a project rubric.
As a Unit Assessment, students will create an interactive game of their own design.

Sample Calendar:

Day 1	Day 2	Day 3	Day 4	Day 5
JSFiddle: Create Your Own Adventure (CYOA)	JSFiddle: CYOA	JSFiddle: CYOA	JSFiddle: CYOA	JSFiddle: CYOA

Technology Standards
Global Collaborator: Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.

Students:
1. Perform a variety of roles within a team using age-appropriate technology to complete a project or solve a problem.

Materials
- Computers (PCs)
- Internet connectivity/browser
- JSFiddle accounts (or equivalent JavaScript editor)

Strategies for Differentiation
Based on past experience, no significant differentiation is anticipated to be required, however some students may need more prompting and guidance from the teacher or additional teacher facilitation. The teacher may pair students for projects, may adjust the rubric, and/or may extend additional time to those students who require it.

Unit 6: Survey Monkey

Learning Objectives
Students will be able to:
1. use digital tools to gather data about a subject that is meaningful to them,
2. evaluate the accuracy, perspective, credibility and relevance of information and data,
3. curate information from a digital survey tool (i.e. Survey Monkey) and create artifacts that demonstrate meaningful connections or conclusions
4. build knowledge by actively exploring real-world issues and problems, develop theories, and pursue answers and solutions,
5. communicate complex ideas clearly and effectively by creating or using a digital object,
6. publish or present content that customizes the message and medium for an intended audience.

Description
Using Survey Monkey (or an equivalent digital survey tool), students will craft a digital survey about a subject that is meaningful to them and use that data to create a digital presentation (e.g. Excel, PowerPoint, Prezi, etc.) that collates the data into an audience-friendly presentation, and includes student findings and conclusions that construct meaning from the data.

Key Terms
The following terms are representative of the content that will be taught in this unit.
- open-ended questions
- closed-ended questions
- quantitative data
- qualitative data
- response rate

Unit Outline:
This Unit lasts for 3 days and includes development of the following skills as detailed in the Scope and Sequence tables earlier in this document:
1. Basic terminology – open-ended questions, closed-ended questions, quantitative data, qualitative data, response rate
2. Use of an online survey (e.g. Survey Monkey), its construction, and dissemination.
3. Crafting succinct questions that elicit useful, closed-ended responses that can be quantified.
4. Critical analysis of gathered data, attention to patterns, drawing reasonable conclusions.
5. Transforming raw data into an audience-friendly presentation

Assessment Plan
Students will be assessed using the following: observation of individual effort and a project rubric.
As a Unit Assessment, students will collect survey data to create a digital presentation featuring their findings.

Sample calendar:

Day 1	Day 2	Day 3
Survey Monkey Creation	Survey Monkey Digest Data	Survey Monkey Present Data

Curriculum Standards
English Language Arts Standards
W.8.4 – Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Technology Standards

Knowledge Constructor: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.

Students:
1. Practice and demonstrate the ability to evaluate resources for accuracy, perspective, credibility and relevance.
2. Explore real-world issues and problems and actively pursue an understanding of them and solutions for them.

Creative Communicator: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Students:
1. Select appropriate platforms and tools to create, share and communicate their work effectively.
2. Create original works or responsibly repurpose other digital resources into new creative works.
3. Communicate complex ideas clearly using various digital tools to convey the concepts textually, visually, graphically, etc.
4. Publish or present content designed for specific audiences and select platforms that will effectively convey their ideas to those audiences.

Materials
- Computers (PCs)
- Internet connectivity/browser
- Survey Monkey accounts (or equivalent)
- PowerPoint
- MS Excel
- Projectors
- Printers

Strategies for Differentiation

Based on past experience, no significant differentiation is anticipated to be required, however some students may need more prompting and guidance from the teacher or additional teacher facilitation.

Appendix of Sample Projects

6th Grade Projects

Unit 1: Internet Safety
- Research Project
- Presentation
- Online calendar
- Video

Unit 2: Intellectual Property
- Poster presentation
- Public service announcement

Unit 3: Programming
- Hour of Code submission
- Tyner tasks

Unit 4: Graphing
- Spreadsheet
- Charts
- Graphs
- SurveyMonkey – Zoho

7th Grade Projects

Unit 3: Technology Integration with the Curriculum

Veterans Day Assembly:
Students create slides to honor veterans at our MS Veterans Day assembly. In particular, the need for accuracy in representing the veterans' information is stressed to the students. Students learn how to format their work to create a professional presentation which is a key aspect of the assembly. Additionally, some veterans will request a copy of their slide.

Technology Integration with ELA:
Students research a topic such as the social awareness of the global garment industry. In creating their six-paneled brochure to present their information, students will use a graphic organizer to plan each brochure panel, search for images, create their bibliography, and design each panel of their brochure.

Technology Integration with Social Studies:
Students will research a subtopic of a unit they study in social studies class such as The Civil War. For example, a group may research a Civil War battle or do research about a particular Civil War historical figure. In preparing their video presentation of this project, students also search for images, video and sound files, learning how to download and insert these into their project.

Technology Integration with Foreign Language:
Students create a children's book in the language they are studying (French or Spanish). Some aspects of the project are graded by their Foreign Language teacher (e.g. language usage) while other aspects are assessed by the computer teacher (e.g. book layout, formatting, picture bibliography). Students create the designs for their book including images & backgrounds. Each student may decide the focus for his/her book based on the vocabulary lists provided by the Foreign Language teachers (e.g. an animal book, a book about families, a book about colors).

Students take a walking field trip to Chancellor Livingston Elementary School to read their book to a younger student(s) translating each page into English after reading it in Spanish or French. This past year students read to first graders.

Other potential related activities:
1. Food festival during 7th grade lunch to include French and Spanish foods. (Need to coordinate this with the MS Cafeteria)
2. Skyping with another Spanish and/or French class
3. Guest speakers to come in to talk with students about their French and/or Spanish heritage, including speaking to the students in that language and presenting photos and/or other cultural items

8th Grade Projects

The following section describes some of the units that have been implemented or are in current plans for implementation in the Grade 8 Computer Science classes.

Unit 1: Digital Citizenship
Letter Writing/Email, File-Management Basic Skills -- Students write persuasive letters to fictional friends who are engaging in unsafe, unwise, or illegal digital activities. Students receive scripts of fictional student behavior and get to choose who to engage with, share out their letters with classmates, then email their letters as attachments to the teacher. This exercise reinforces the lessons of digital citizenship, engages students in (potentially) counter-attitudinal advocacy of safe digital practices, offers an opportunity for instruction in MS Word formatting and tools, file management, practices keyboarding skills, letter formatting, reinforces basic email skills (creation, proper subject line, use of directory to find addresses, attachment of files), and requires student engagement with fictional at-risk youth.

Unit 2: **Innovative Designer**
Adobe Photoshop/"Where's Waldo" – Students begin with introductory instruction in Adobe Photoshop (using video demonstrations and discrete tasks), then take digital photos of themselves and edit those photos for creation of a "Where's Waldo" where they are Waldo. Students select an image off the web that is busy and will serve as good camouflage, edit their self-portrait, and figure out how to edit and blend seamlessly their image into the background. Students then share out their work and get to see who was most effective at hiding their image within the larger image.

Public Service Announcement Videos – Students work in groups of three to create 4-minute videos using iMovie that teach a valuable lesson about digital safety. Students storyboard their video before filming to establish essential dialogue, scene changes, music, graphics, and special effects. Students use the High School's "green screen" room to film scenes that occur in remote locations. Students are expected to work outside school with their partners to film. Students are encouraged to use their photoshop skills to create relevant graphics.

Unit 3: Empowerment through Excel
Examination of Election Results – Students learn basic and intermediate skills in Excel by entering and manipulating data generated by the most recent federal election results. Students practice their data entry, formula writing, sorting, conditional formatting, and graphing (including graph selection, formatting, and design) to discover patterns in election data that would not be apparent to the naked eye.

Survey Creation and Graphing – Students used Survey Monkey to create a survey about some subject they care about (political, sports, social, culture, etc.). They carefully craft their questions, consider the best question format, and distribute the survey for completion to classmates. Once students have at least 20 responses, they take the response data and enter the data into Excel for sorting, conditional formatting, and graphing.

Unit 4: Computational Thinking
Tynker Project – After using the scratch programming service, Tynker, to learn the basics of programming (algorithmic thinking/problem solving, loops, conditions, Booleans, variables, coordinates, physics, etc.), students select a topic they are studying in one of their core academic courses (i.e. social studies, science) and create a project within Tynker's platform. Students are encouraged to create games that are embedded in subject matter (for context) and help illuminate the chosen subject. Whether or not there is a game component, the project and program must at least be educational, self-explanatory, and fun.

For example, in conjunction with a unit on World War II, students designed and scripted a program explaining one aspect of the war. Some projects included a map showing major battles of the war, biographies of significant figures and their role, the role of women (Rosie the Riveter), and highlights of specific battles. These could then be used in the Social Studies classroom as study guides.

Unit 5: Collaborative JavaScript Project
Choose Your Own Adventure – Students work in teams of 3 or 4 to design a program in JavaScript using a JavaScript editor to create an interactive game ("Choose Your Own Adventure"). Choose Your Own Adventure games are those in which a character is presented with choices that alter the storyline and produce a series of different outcomes. They will collaboratively design, code, edit, and debug their work. This project will require use of user inputs, variables, conditions, loops, Booleans, and logging to the console. When finished, they share out their projects for other students to query, experience, and play.