



## West Windsor-Plainsboro Regional School District Information Literacy & Technology Grade 5

Unit 0: Technology Education			
<b>Content Area:</b> Technology Education			
<b>Course &amp; Grade Level:</b> Technology Education - 5 <sup>th</sup> grade			
Summary and Rationale			
The West Windsor-Plainsboro Regional School District recognizes the importance of the study of 21 <sup>st</sup> Century Life and Careers standards. Additionally, it is also believed this learning should not be taught in isolation and cross curricular and career ready practices are embedded in every unit of study. Unit 0 is incorporated into each unit of study of this curricular document.			
Recommended Pacing			
ELA Companion Standards and Career Ready Practices will be integrated throughout all units of study.			
Career Ready Practices			
CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP3. Attend to personal health and financial well-being. CRP4. Communicate clearly and effectively and with reason. CRP5. Consider the environmental, social and economic impacts of decisions. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence.			
Competencies for 21 <sup>st</sup> Century Learners			
✓	Collaborative Team Member	✓	Effective Communicator
✓	Globally Aware, Active, & Responsible Student/Citizen	✓	Information Literate Researcher
✓	Innovative & Practical Problem Solver	✓	Self-Directed Learner

Unit 1: Revisiting the Digital World	
<b>Content Area:</b> Information Literacy & Technology	
<b>Course &amp; Grade Level:</b> Information Literacy & Technology, Grade 5	
Summary and Rationale	
<p>In our technology-rich world, there are basic understandings that all students need to have to be able to navigate their digital lives. Students need to have an understanding of general technology vocabulary so that they may communicate effectively in their digital environment. A large part of their digital world is accessing online information. Though they search for information very quickly using search terms, they are missing the background knowledge on what they are actually accessing, which are URLs. This unit is designed to fill in some of the missing essential general understandings of the contents of their digital lives. Going further, in this unit, students will be asked to think about the ways in which they hold onto their information and files, and how they access them. Students will be refreshed on their knowledge of cloud storage and will appreciate the benefits and uses of this type of storage. There are many digital tools that Google offers that allow students to create, share, and collaborate on documents, presentations, spreadsheets and calendars. Google Drive will allow students to save their digital creations in the cloud so that they may access them in any location. In this unit students will review Google Classroom, documents, spreadsheets, calendars, presentations, and email. Students will learn how to format presentations, as well as add graphics/images, links, video and audio to their work. The students will get to explore the collaborative abilities of Google's digital tools, where they will work on a file or presentation together, at the same time, on their own computers. Google Calendar will allow students to keep track of due dates and school events. Students will learn to share their ideas with their classmates using Screencastify and Flipgrid. At the conclusion of this unit, students will have an ample knowledge of digital tools and be comfortable navigating their digital world using these tools in their school lives, collaboratively with their peers and teachers, as well as, personally in their own lives. Because students are immersed in technology in their daily lives, they need to be able to use a computer in an effective and expedient manner. In this unit, students will get a review of the keyboard, and then will be using a typing program on a weekly basis to improve on their speed and accuracy so that they may move through their digital world with ease.</p>	
Recommended Pacing	
4 days	
New Jersey Student Learning Standards for	
<b>Standard:</b> Standard 8.1 Computer Science	
CPI #	Cumulative Progress Indicator (CPI)
8.1.5.CS.1	Model how computing devices connect to other components to form a system.
8.1.5.CS.2	Model how computer software and hardware work together as a system to accomplish tasks.
8.1.5.CS.3	Identify potential solutions for simple hardware and software problems using common troubleshooting strategies.
<b>Standard:</b> Standard 8.2 Design Thinking	
CPI #	Cumulative Progress Indicator (CPI)
8.2.5.ITH.2	Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have.
New Jersey Student Learning Standards for English Language Arts Companion Standards	
<b>Standard:</b>	
CPI #	Cumulative Progress Indicator (CPI)

CCSS.ELA-Literacy.RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
<b>ISTE Standards for Students</b>	
<b>Empowered Learner</b>	
<b>CPI #</b>	<b>Cumulative Progress Indicator (CPI)</b>
1c	Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.
1d	Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
<b>Creative Communicator</b>	
6a	Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
6b	Students create original works or responsibly repurpose or remix digital resources into new creations.
6d	Students publish or present content that customizes the message and medium for their intended audiences.
<b>Global Collaborator</b>	
7a	Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.
<b>Instructional Focus</b>	
<b>Unit Enduring Understandings</b>	
<ul style="list-style-type: none"> <li>● Digital media are 21st-century tools used for storing and accessing data, as well as communicating locally and globally.</li> <li>● The use of digital tools requires students to have general understandings of the tools and how to use them appropriately.</li> <li>● Technology products and systems impact our life and change over time.</li> <li>● Google Classroom is a place to access resources and submit assignments in an organized method for teachers and students.</li> <li>● Google Drive is a place where we can store our files in cloud storage and share them with others.</li> <li>● Google Drive allows us to create new files such as documents, presentations, spreadsheets and more.</li> <li>● We can use Google Calendar to store important dates and we can share our calendar with others.</li> <li>● We can format documents to fit our design needs by changing or adding different features.</li> </ul>	
<b>Unit Essential Questions</b>	
<ul style="list-style-type: none"> <li>● What are the ways that we use digital technology in our daily lives?</li> <li>● How does digital technology help us in our daily lives?</li> <li>● What are the ways we can save our files and data?</li> <li>● What is the cloud?</li> <li>● What are the benefits of the cloud over previous technology for saving and accessing our data?</li> <li>● What is Google Classroom? <ul style="list-style-type: none"> <li>○ How does a student access class information through Google Classroom?</li> <li>○ How does a student turn in assignments through Google Classroom?</li> <li>○ How does a student view feedback or ask questions through Google Classroom?</li> </ul> </li> <li>● What is Google Drive? <ul style="list-style-type: none"> <li>○ How does it work?</li> <li>○ How do you create a file in drive?</li> </ul> </li> </ul>	

- How do you move a file to a particular folder?
- How do you share a document?
- How do you collaborate on one document with multiple people?
- What is Google Calendar?
  - How do I create a calendar event?
  - How do I set an event to recur on a specific schedule?
  - How do I manage the options in a calendar event?
  - How do I share my calendar with others?
- How do I format documents & presentations?
  - How do I change the font, size, color, and text background color?
  - How do I bold, italicize or underline text?
  - How do I insert a link, image, video, and audio?
  - How do I add bullets?
  - How do I align text?
  - How do I share my files with others so that we may collaborate on it?
- How is the keyboard setup?
- How should hands be placed on the keyboard to gain benefits in typing accuracy and speed?

## Objectives

### Students will know and will be able to:

- Review how digital media are used in our daily lives, in a variety of formats, and for a variety of purposes.
- Review how technology has strengthened our ability to save and access information anywhere we are, as part of a global society.
- Review how the cloud works.
- Enter and edit homework assignments using Google Calendar.
- Join classes in Google Classroom.
- Navigate, open assignments, turn in assignments and access feedback within Google Classroom.
- Place their hands correctly on the keyboard.
- Type with average accuracy and speed.
- Use the mouse to access menus.
- Use keyboard shortcuts.
- Understand basic technology terms.
- Collaboratively complete a task with peers using a digital platform.
- Save and access files in their Google Drive.
- Input & format data, text, and media into files.
- Explain how digital tools help us.
- Engage in online communication with peers and students.
- Evaluate digital resources that can assist us.

## Evidence of Learning

### Assessment

Common Assessment 1: Use of Digital Tools

Name Story Google Slide Presentation

### Competencies for 21<sup>st</sup> Century Learners

✓	Collaborative Team Member	✓	Effective Communicator
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✓	Globally Aware, Active, & Responsible Student/Citizen	✓	Information Literate Researcher
✓	Innovative & Practical Problem Solver	✓	Self-Directed Learner

#### Resources

##### Core Text:

<https://www.youtube.com/watch?v=VVq4kQrRdVA> Using Flipgrid  
[https://www.youtube.com/watch?v=TTNgV0O\\_oTg&t=9s](https://www.youtube.com/watch?v=TTNgV0O_oTg&t=9s) Cloud Computing Frank  
<https://www.youtube.com/watch?v=zUjU7xY-ZvQ> Google Classroom  
<https://www.youtube.com/watch?v=0RFelfHmndA> Typing Training  
<https://www.youtube.com/watch?v=gzAhL2BmcJI> Cloud Computing  
<https://www.youtube.com/watch?v=lfpnclqnXTE> Google Slides  
<http://www.schooltube.com/video/72fea4567c54a813de3c/Basic%20Keyboarding> keyboarding  
<http://www.schooltube.com/video/9a4a7ba9456478ff8d48/How%20to%20Type> How to Type  
<https://www.youtube.com/watch?v=oRxm2CmbSew&t=3s> Screencastify

Unit 2: Digital Citizenship, Cyber Ethics, & Research Literacy	
<b>Content Area:</b> Information Literacy & Technology	
<b>Course &amp; Grade Level:</b> Information Literacy & Technology, Grade 5	
Summary and Rationale	
<p>Digital citizenship is an all-inclusive term that comprises the norms of appropriate, responsible behavior with regard to technology use. Sometimes referred to as cyber ethics, it addresses a fundamental question: How should we behave when we are online? For educators dealing with the growth of educational initiatives involving digital resources, the question may be rephrased: What should be taught to the next generation about the responsible use of technology? In this unit, students will learn how to uphold standards of academic integrity while researching online, how to adopt standards of digital etiquette when engaging in electronic exchanges of information (e.g., emailing, texting, instant messaging, social networking), and how to handle situations in which others do not demonstrate digital etiquette. They will learn how to properly conduct themselves while using digital tools, respecting others and assuming accountability for their own behavior when consuming, interpreting, citing, authoring, posting, and sharing online information. More than ever, information is literally at the fingertips of students through smartphones, iPads, tablet computers, and other digital devices. With the exponential growth of readily available digital content, an academic challenge presents itself: How do we prevent students from perceiving “research” as a perfunctory exercise aimed at locating just enough information to complete an assignment? How do we assist students with navigating the vast landscape of online information, encouraging them to productively delve into the deliberate process of intellectual curiosity and discovery that truly is “research”? In order for students to take advantage of all the web has to offer (breadth and depth of information, engaging multimedia formats, opportunities to become fully self-directed learners), they must understand and apply specific skills in the area of search literacy, habits necessary for deep and original research. In this unit, students will learn and explore methods for efficiently and effectively planning their research, locating appropriate resources, and gathering information that is current, credible, relevant, reliable, and valid. They will create collaborative projects that will help them explore the web and learn more about cyber safety.</p>	
Recommended Pacing	
8 days	
New Jersey Student Learning Standards for	
<b>Standard:</b> Standard 8.1 Computer Science	
CPI #	Cumulative Progress Indicator (CPI)
8.1.5.NI.2	Describe physical and digital security measures for protecting sensitive personal information
8.1.5.DA.1	Organize and display data in order to highlight relationships or support a claim
8.1.5.DA.3	Organize and present collected data visually to highlight relationships or support claims
<b>Standard:</b> Standard 8.2 Design Thinking	
CPI #	Cumulative Progress Indicator (CPI)
8.2.5.ITH.1	Explain how societal needs and wants influence the development and function of a product and a system
8.2.5.ETW.1	Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems
8.2.5.ETW.3	Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved
New Jersey Student Learning Standards for English Language Arts Companion Standards	
<b>Standard:</b> Speaking and Listening Standards (Grade 5)	

<b>CPI #</b>	<b>Cumulative Progress Indicator (CPI)</b>
CCSS.ELA-Literacy.RI.5.1	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text
RI.5.2	Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text
RI.5.3	Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text
RI.5.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area
RI.5.5	Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts
RI.5.6	Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent
RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently
RI.5.8	Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s)
RI.5.9	Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably
RI.5.10	By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4-5 text complexity band independently and proficiently
CCSS.ELA-Literacy.W.5.2a	Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension
W.5.2b	Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic
W.5.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic
W.5.7	Conduct short research projects that build knowledge through investigation of different aspects of a topic
W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research
CCSS.ELA-Literacy.SL.5.1a	Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion
SL.5.1c	Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others
SL.5.2	Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally
<b>ISTE Standards for Students</b>	
<b>Empowered Learner</b>	
<b>CPI #</b>	<b>Cumulative Progress Indicator (CPI)</b>
1c	Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways
<b>Digital Citizen</b>	



2a	Students cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world
2b	Students engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices
2c	Students demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property
2d	Students manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online
<b>Knowledge Constructor</b>	
3a	Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits
3d	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions
<b>Creative Communicator</b>	
6b	Students create original works or responsibly repurpose or remix digital resources into new creations
<b>Global Collaborator</b>	
7a	Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning
7b	Students use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints
<b>Interdisciplinary Standards</b>	
<b>Instructional Focus</b>	
<b>Unit Enduring Understandings</b>	
<ul style="list-style-type: none"> <li>• The use of technology and digital tools requires knowledge and appropriate use of operations and related applications.</li> <li>• Digital tools and environments support the learning process and foster collaboration in solving local or global issues and problems.</li> <li>• Technological advancements create societal concerns regarding the practice of safe, legal, and ethical behaviors.</li> <li>• The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time.</li> <li>• Brainstorming activities enhance creative and innovative thinking in individual and group goal setting and problem solving.</li> <li>• Effective use of digital tools assists in gathering and managing information.</li> <li>• Information accessed through the use of digital tools assists in generating solutions and making decisions.</li> <li>• The ability to recognize a problem and apply critical thinking and problem-solving skills to solve that problem is a lifelong skill that develops over time.</li> <li>• Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.</li> <li>• Effective communication skills convey intended meaning to others and assist in preventing misunderstandings.</li> <li>• Communication with people from different cultural backgrounds is enhanced by the understanding of different cultural perspectives.</li> <li>• Digital media are 21st-century tools used for local and global communication.</li> </ul>	

- There are ethical and unethical uses of communication and media.
- The nature of the 21st-century workplace has shifted, demanding greater individual accountability, productivity, and collaboration.
- Ethical behaviors support human rights and dignity in all aspects of life.
- The identification of key ideas and details is essential in the interpretation of text.
- Collaboration with diverse partners fosters the development of one's own comprehension and development of ideas.
- Research builds knowledge.
- Strong comprehension and collaboration skills benefit search literacy.

### **Unit Essential Questions**

- What does it mean to own intellectual property?
- How is plagiarism a form of dishonesty?
- How can one use, borrow, copy, or build upon another's ideas without violating standards of academic integrity?
- What behaviors constitute cyberbullying?
- How does cyberbullying differ from real-life bullying?
- Are the psychological and emotional outcomes of cyberbullying any worse than those of real-life bullying?
- How is plagiarism a form of dishonesty?
- How can one use, borrow, copy, or build upon another's ideas without violating standards of academic integrity?
- What behaviors constitute cyberbullying?
- How does cyberbullying differ from real-life bullying?
- Are the psychological and emotional outcomes of cyberbullying any worse than those of real-life bullying?
- What is research?
- With so much information now available at our fingertips (via digital devices such as smartphones, iPads, tablet computers, etc.), has research become easier or more difficult?
- What are the pros and cons of having seemingly endless streams of information readily available through digital tools?
- Where do research questions originate?
- How can one craft a search that leads to high-quality, current, credible, relevant, reliable, and valid results?
- How do search engines, such as Google, find information in response to search terms typed in a text box?
- Why is it important to evaluate the source and validity of information found on a website?
- What are the differences between quoting, paraphrasing, and summarizing?
- How does one create a list of citations for an assignment?

### **Objectives**

#### **Students will know and be able to:**

- identify appropriate use of technology
- manage online situations of cyberbullying appropriately and effectively
- grasp the understanding that everything they place online is permanent.
- Demonstrate effective input of text and data using an input device.
- Determine the benefits of a wide range of digital tools by using them to solve problems.
- Engage in online discussions with learners in the United States or from other countries to understand their perspectives on a global problem or issue.

- Explain the need for each individual, as a member of the global community, to practice cyber safety, cyber security, and cyber ethics when using existing and emerging technologies.
- Analyze the need for and use of copyrights.
- Explain the purpose of an acceptable use policy and the consequences of inappropriate use of technology.
- Investigate a problem or issue found in the United States and/or another country from multiple perspectives, evaluate findings, and present possible solutions, using digital tools and online resources for all steps.
- Evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
- Select and apply digital tools to collect, organize, and analyze data that support a scientific finding.
- Recognize a problem and brainstorm ways to solve the problem individually or collaboratively.
- Use data accessed on the Web to inform solutions to problems and the decision-making process.
- Apply critical thinking and problem-solving skills in classroom and family settings.
- Practice collaborative skills in groups, and explain how these skills assist in completing tasks in different settings (at home, in school, and during play).
- Use effective oral and written communication in face-to-face and online interactions and when presenting to an audience.
- Demonstrate an awareness of one's own culture and other cultures during interactions within and outside of the classroom.
- Explain how digital media are used in daily life in a variety of settings.
- Demonstrate effective communication using digital media during classroom activities.
- Distinguish how digital media are used by individuals, groups, and organizations for varying purposes.
- Explain why some uses of media are unethical.
- Explain the meaning of productivity and accountability, and describe situations in which productivity and accountability are important in the home, school, and community.
- Establish and follow performance goals to guide progress in assigned areas of responsibility and accountability during classroom projects and extracurricular activities.
- Explain the importance of understanding and following rules in family, classroom, and community settings.
- Follow agreed-upon rules for online discussions.
- Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
- Review the key ideas expressed and explain their own ideas and understanding in light of the online discussion.
- Paraphrase portions of a text or information presented in diverse media and formats, including visually, quantitatively, and orally.
- Identify the reasons and evidence an author/contributor provides to support particular points.

### **Evidence of Learning**

#### **Assessment**

Common Assessment 1: Vetting and Curation of Resources

Common Assessment 2: Understanding Cyber Ethics

#### **Competencies for 21<sup>st</sup> Century Learners**

✓	Collaborative Team Member	✓	Effective Communicator
✓	Globally Aware, Active, & Responsible Student/Citizen	✓	Information Literate Researcher
✓	Innovative & Practical Problem Solver	✓	Self-Directed Learner

#### Resources

##### Core Text:

[https://beinternetawesome.withgoogle.com/en\\_us/interland](https://beinternetawesome.withgoogle.com/en_us/interland) Interland  
<https://www.brainpop.com/technology/digitalcitizenship/onlinesources/> Online resources  
<http://www.google.com/insidesearch/searcheducation/lessons.html> Google Search Lessons  
<http://www.nettrekker.com/us/> Search Site  
<http://www.ipl.org/> Search Site  
<http://www.sweetsearch.com/> Search Site  
<http://www.schrockguide.net/intellectual-property.html> Kathy Schrock guide to everything  
<http://cyberbullying.us/category/educators/> Cyberbullying Guide  
[https://www.youtube.com/watch?v=OPI7FVon29k&feature=emb\\_logo&disable\\_polymer=true](https://www.youtube.com/watch?v=OPI7FVon29k&feature=emb_logo&disable_polymer=true) Web Evaluation  
<https://www.commonsense.org/education/video/digital-citizenship> Commonsense Digital Citizenship

Unit 3: Coding/Programming	
<b>Content Area:</b> Information Literacy & Technology	
<b>Course &amp; Grade Level:</b> Information Literacy & Technology, Grade 5	
Summary and Rationale	
<p>Computer programming is a distinct academic discipline that also serves to augment the study of other domains. It helps students further develop skills in the areas of logical thinking, problem solving, persistence, collaboration, and communication. In this unit, students will learn the fundamentals of coding, including the uniqueness and exactitude of programming language, the analytical flow of computational thinking, and the employment of computer programs in controlling devices, tools, websites, etc. Students will ask questions, define problems, interpret criteria, identify constraints, generate programming code to solve problems, test programs, compare results, and adjust variables to optimize design solutions. In this unit students will learn to give the ProBots more complex commands and procedures. They will also use a variety of coding languages like Blockly, Java Script, and Python to create functions, variables, and operations through the use of multiple coding applications like Scratch, Code Combat, and Grasshopper. By learning how to code on a large scale, children will transition from their limited roles as technology consumers to much more expansive roles as technology producers.</p>	
Recommended Pacing	
11 days	
New Jersey Student Learning Standards for	
<b>Standard:</b> Standard 8.1 Computer Science	
CPI #	Cumulative Progress Indicator (CPI)
8.1.5.CS.2	Model how computer software and hardware work together as a system to accomplish tasks.
8.1.5.CS.3	Identify potential solutions for simple hardware and software problems using common troubleshooting strategies
8.1.5.IC.1	Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes
8.1.5.IC.2	Identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users
8.1.5.AP.1	Compare and refine multiple algorithms for the same task and determine which is the most appropriate
8.1.5.AP.2	Create programs that use clearly named variables to store and modify data
8.1.5.AP.3	Create programs that include sequences, events, loops, and conditionals
8.1.5.AP.4	Break down problems into smaller, manageable sub-problems to facilitate program development
8.1.5.AP.5	Modify, remix, or incorporate pieces of existing programs into one's own work to add additional features or create a new program
8.1.5.AP.6	Develop programs using an iterative process, implement the program design, and test the program to ensure it works as intended
<b>Standard:</b> Standard 8.2 Design Thinking	
CPI #	Cumulative Progress Indicator (CPI)
8.2.5.ITH.1	Explain how societal needs and wants influence the development and function of a product and a system
ISTE Standards for Students	

<b>Empowered Learner</b>	
<b>CPI #</b>	<b>Cumulative Progress Indicator (CPI)</b>
1b	Students build networks and customize their learning environments in ways that support the learning process
1c	Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways
1d	Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies
<b>Computational Thinker</b>	
5a	Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions
5b	Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making
5c	Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving
5d	Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions
<b>Creative Communicator</b>	
6b	Students create original works or responsibly repurpose or remix digital resources into new creations
6c	Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations
6d	Students publish or present content that customizes the message and medium for their intended audiences
<b>Interdisciplinary Standards</b>	
<b>Instructional Focus</b>	
<b>Unit Enduring Understandings</b>	
<ul style="list-style-type: none"> <li>● Special machines called robots can be programmed to do different things.</li> <li>● Engineers work together using shared norms and practices to accomplish goals.</li> <li>● Procedural Programming is the basic mechanism that computer programs use to execute a program</li> <li>● Selection Statements allow a program to make decisions while the program is executing</li> <li>● Structures allow a program to repeat a set of actions for a constant or variable number of times</li> <li>● System control and robotics is the future of manufacturing in business and industry.</li> <li>● System control technology is used in building control systems at school, work, and home applications.</li> <li>● Computer hardware and software can be used to control a variety of devices to complete specific tasks and to do work.</li> <li>● Coding is used in everyday life to help devices make the world easier.</li> <li>● The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time.</li> <li>● Brainstorming activities enhance creative and innovative thinking in individual and group goal setting and problem solving.</li> <li>● The Engineering Design Process is a method that is used to solve technological challenges to change and improve products for the way we live.</li> </ul>	
<b>Unit Essential Questions</b>	
<ul style="list-style-type: none"> <li>● How can you make your ProBot move in different ways?</li> <li>● Can you make your ProBot complete mathematical functions?</li> </ul>	

- Can you make your ProBot repeat a set of commands?
- Can you make your ProBot follow a path?
- Can you make your ProBot make different letters?
- Can you estimate (or guess) how far apart 2 objects are?
- Can you turn the lights on and off on your ProBot?
- Can you make your ProBot make sound?
- Can you make your ProBot move at certain angles?
- Why do software engineers develop computer programs to control technology systems?
- How has system control technology and robotics systems changed the way we manufacture products?
- How can system control be used in school, work, and home applications?
- Why do engineers and designers strive to improve products used in our daily lives?
- Why do we use the engineering design process to solve design challenges?
- How can the engineering design process benefit us in solving problems in our daily lives?
- What is coding and what can you use coding to create?
- What is Scratch and how can it be used to solve real world problems?

## Objectives

### Students will know and be able to:

- Students will develop vocabulary and communication skills to explain how the technological system works.
- Students will learn how to put a pen inside the *Pro-Bot* and draw some simple lines onto a sheet of paper using it.
- Students will make the pro-bot stop and then restart its journey after a moment.
- Students will move the *Pro-Bot* around a floor mat to different destinations, learning how to enter numerical commands (e.g. forward 3 instead of 3 lots of the forward command).
- Students will learn how to program the *Pro-Bot* to draw rectangular shapes with it (hopefully spotting a repeating pattern in the commands they enter).
- Students will draw shapes and patterns using the repeat command in their programs.
- Students will understand, compare, and describe how the rotation sensors can be programmed to make the robot travel specific distances affects the speed of movement.
- Students will program the Pro-Bot to perform special commands (lights on/off and various sounds).
- Students will create a program to control the robot through a designated course.
- Students will complete an open-ended design challenge using computer software and software programming.
- Students will develop computer programs to control robotic devices to complete a desired outcome.
- Students will test, troubleshoot, and modify computer programs.
- Students will modify computer programs and mechanical systems to complete a design challenge.

## Evidence of Learning

### Assessment

Common Assessment 1: Utilizing Computer Science Skills

Common Assessment 2: Programing Robotic Devices

### Competencies for 21<sup>st</sup> Century Learners

✓	Collaborative Team Member	✓	Effective Communicator
✓	Globally Aware, Active, & Responsible Student/Citizen	✓	Information Literate Researcher
✓	Innovative & Practical Problem Solver	✓	Self-Directed Learner

## Resources

**Core Text:**

<http://movemyrobot.blogspot.com/p/lesson-plan-hour-1-introduce-pro-bot.html> ProBot Lesson Plans

[https://www.tts-international.com/on/demandware.static/-/Sites-TTSGroupE-commerceMaster/default/dwdbe3a621/images/document/3529%20-%20Pro-Bot%20Computing%20Guide\\_a.pdf](https://www.tts-international.com/on/demandware.static/-/Sites-TTSGroupE-commerceMaster/default/dwdbe3a621/images/document/3529%20-%20Pro-Bot%20Computing%20Guide_a.pdf)

ProBot Teacher Guide

<https://learn.grasshopper.app/project/fundamentals> Grasshopper Coding

<https://codecombat.com/> Code Combat

<https://scratch.mit.edu/projects/11283405/> Scratch ProBot Lesson

<https://scratch.mit.edu/projects/23600596/> Scratch Mini Games

<http://www.earlylearninghq.org.uk/themes/vehicles/programmable-robot-racing-track-mat/> (race track mat)



Unit 4: Design Thinking	
<b>Content Area:</b> Information Literacy & Technology	
<b>Course &amp; Grade Level:</b> Information Literacy & Technology, Grade 5	
Summary and Rationale	
<p>Design thinking is a mindset and approach to learning, collaboration, and problem solving. It is a structured method that can be used to create a product, or to develop and implement solutions to a problem. Through the design thinking process, students can learn to focus on the precise criteria and constraints used to create successful solutions. Traditional academic teaching and learning is typically analytical and focused. Design thinking encourages learners to take an inquiry stance, think divergently, and develop reflexivity. The approach affirms empathy, curiosity, constructiveness, and continuous refinement of ideas. Students will collaborate their efforts and use the ideas of design thinking to create new arcade style computer games and green screen videos. Students will also create music compositions and manipulate web applications to create Digital Breakouts. Students will ask questions, define problems, interpret criteria, identify constraints, generate programming code to solve problems, test programs, build structures, compare results, and adjust variables to optimize design solutions.</p>	
Recommended Pacing	
13 days	
New Jersey Student Learning Standards for	
<b>Standard:</b> Standard 8.1 Computer Science	
CPI #	Cumulative Progress Indicator (CPI)
8.1.5.CS.2	Model how computer software and hardware work together as a system to accomplish tasks
8.1.5.CS.3	Identify potential solutions for simple hardware and software problems using common troubleshooting strategies
8.1.5.NI.1	Develop models that successfully transmit and receive information using both wired and wireless methods
8.1.5.NI.2	Describe physical and digital security measures for protecting sensitive personal information
<b>Standard:</b> Standard 8.2 Design Thinking	
CPI #	Cumulative Progress Indicator (CPI)
8.2.5.ED.3	Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task
8.2.5.ITH.2	Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have
8.2.5.ITH.4	Describe a technology/tool that has made the way people live easier or has led to a new business or career
ISTE Standards for Students	
<b>Empowered Learner</b>	
CPI #	Cumulative Progress Indicator (CPI)
1b	Students build networks and customize their learning environments in ways that support the learning process
1c	Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways
1d	Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies

<b>Innovative Designer</b>	
4a	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems
4b	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks
4c	Students develop, test and refine prototypes as part of a cyclical design process
4d	Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems
<b>Creative Communicator</b>	
6a	Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication
6b	Students create original works or responsibly repurpose or remix digital resources into new creations
6c	Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations
6d	Students publish or present content that customizes the message and medium for their intended audiences
<b>Global Collaborator</b>	
7c	Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal
<b>Interdisciplinary Standards</b>	
<b>Instructional Focus</b>	
<b>Unit Enduring Understandings</b>	
<ul style="list-style-type: none"> <li>• The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time.</li> <li>• Brainstorming activities enhance creative and innovative thinking in individual and group goal setting and problem solving.</li> <li>• The Engineering Design Process is a method that is used to solve technological challenges to change and improve products for the way we live.</li> <li>• Communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.</li> </ul>	
<b>Unit Essential Questions</b>	
<ul style="list-style-type: none"> <li>• Why do software engineers develop computer programs to control technology systems?</li> <li>• How has system control technology and robotics systems changed the way we manufacture products?</li> <li>• How can system control be used in school, work, and home applications?</li> <li>• Why do engineers and designers strive to improve products used in our daily lives?</li> <li>• Why do we use the engineering design process to solve design challenges?</li> <li>• How can the engineering design process benefit us in solving problems in our daily lives?</li> <li>• What is coding and what can you use coding to create?</li> <li>• What is Scratch and how can it be used to solve real world problems?</li> <li>• </li> </ul>	
<b>Objectives</b>	
<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>• Observe and engage with users, and immerse in the user experience.</li> <li>• Identify the needs and insights of the users.</li> </ul>	

- Observe the behaviors, feelings, and patterns of the user in the context of their lives and design challenge.
- Engage with users and/or experts through conversations and interviews that incorporate open ended questions to dig deeper for stories, feelings, emotion, and what is important to the user.
- Create and improve prototypes for users to use, interact, and experience.
- Plan and carry out tests in appropriate context and scenario.

### Evidence of Learning

#### Assessment

Common Assessment 1: Understanding the Design Process

Common Assessment 2: Collaborative Web Design

Common Assessment 3: Collaborative Video Design

#### Competencies for 21<sup>st</sup> Century Learners

✓	Collaborative Team Member	✓	Effective Communicator
✓	Globally Aware, Active, & Responsible Student/Citizen	✓	Information Literate Researcher
✓	Innovative & Practical Problem Solver	✓	Self-Directed Learner

### Resources

#### Core Text:

<https://www.youtube.com/watch?v=kfBa2AdjRB4> Design Thinking  
[https://www.youtube.com/watch?v=YB\\_QhFFPpLs](https://www.youtube.com/watch?v=YB_QhFFPpLs) Design Thinking  
<https://www.codeavengers.com/digital-media/300#1.1.1> Game Design  
<https://www.tynker.com/hour-of-code/brick-breaker> Game Design  
<https://www.youtube.com/watch?v=3ZzCfDIB3e4> Green Screening  
[https://www.youtube.com/watch?v=W\\_FfxYJbtHs](https://www.youtube.com/watch?v=W_FfxYJbtHs) Green Screening  
<https://musiclab.chromeexperiments.com/Song-Maker/> Chrome Music Lab  
<https://www.breakoutedu.com/digital2016> Digital Breakouts

Unit 5: Engineering	
<b>Content Area:</b> Information Literacy & Technology	
<b>Course &amp; Grade Level:</b> Information Literacy & Technology, Grade 5	
Summary and Rationale	
<p>Engineers apply their in-depth understanding of scientific and mathematical subjects to design and create devices, structures and systems that improve our lives. While scientists investigate what already exists and discover new knowledge by peering into the unknown, engineers create what has not been—they make things that have never existed before. Engineering teams follow the steps of the engineering design process: understand the need/problem, brainstorm different designs, select the best design, make a plan, create and test a prototype(s), and improve it until a satisfactory solution is achieved. The process is cyclical and may begin at, and return to, any step. In this unit students will learn to use digital graphic and printing equipment to design and fabricate 2-D and 3-D designs. Students will use Google applications to produce vinyl cutter projects, and Tinkercad to construct models with the 3-D printer. This engineering unit will help students apply technical knowledge and skills, while they plan, prepare, and manufacture digital images and print products .</p>	
Recommended Pacing	
4 days	
New Jersey Student Learning Standards for	
<b>Standard:</b> Standard 8.1 Computer Science	
CPI #	Cumulative Progress Indicator (CPI)
8.1.5.CS.1	Model how computing devices connect to other components to form a system
8.1.5.CS.2	Model how computer software and hardware work together as a system to accomplish tasks
8.1.5.CS.3	Identify potential solutions for simple hardware and software problems using common troubleshooting strategies
<b>Standard:</b> Standard 8.2 Design Thinking	
CPI #	Cumulative Progress Indicator (CPI)
8.2.5.ED.3	Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task
8.2.5.ED.4	Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints)
8.2.5.ED.5	Describe how specifications and limitations impact the engineering design process
8.2.5.ITH.1	Explain how societal needs and wants influence the development and function of a product and a system
ISTE Standards for Students	
<b>Empowered Learner</b>	
CPI #	Cumulative Progress Indicator (CPI)
1b	Students build networks and customize their learning environments in ways that support the learning process
1c	Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways
1d	Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies
<b>Digital Citizen</b>	
2a	Students cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world

2b	Students engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices
2c	Students demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property
2d	Students manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online
<b>Innovative Designer</b>	
4a	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems
4c	Students develop, test and refine prototypes as part of a cyclical design process
4d	Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems
<b>Creative Communicator</b>	
6b	Students create original works or responsibly repurpose or remix digital resources into new creations
6c	Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations
6d	Students publish or present content that customizes the message and medium for their intended audiences
<b>Interdisciplinary Standards Science</b>	
<b>Next Generation Science Standards:</b>	
Engineering, Technology, and Applications of Science	
<b>CPI #</b>	<b>Cumulative Progress Indicator (CPI)</b>
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem
3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved
<b>Instructional Focus</b>	
<b>Unit Enduring Understandings</b>	
<ul style="list-style-type: none"> <li>• The Engineering Design Process is a method that is used to solve technological challenges to change and improve products for the way we live.</li> <li>• Knowledge of relevant scientific concepts and research findings is important in engineering.</li> <li>• Because there is always more than one possible solution to a problem, it is useful to compare designs, test them, and discuss their strengths and weaknesses.</li> <li>• Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.</li> </ul>	
<b>Unit Essential Questions</b>	
<ul style="list-style-type: none"> <li>• Why do engineers and designers strive to improve products used in our daily lives?</li> <li>• Why do we use the engineering design process to solve design challenges?</li> <li>• How can the engineering design process benefit us in solving problems in our daily lives?</li> <li>• What is coding and what can you use coding to create?</li> <li>• What is Scratch and how can it be used to solve real world problems?</li> </ul>	
<b>Objectives</b>	
<ul style="list-style-type: none"> <li>• Identify multiple ideas for prototyping based on how well the ideas would likely meet the criteria for success.</li> <li>• Grasp a basic understanding of the design process</li> </ul>	

- Experience the value of success after many failures
- Create and improve prototypes for users to use, interact, and experience.
- Define engineering and identify different engineering disciplines/fields.
- Define design and provide examples.
- Identify the different steps in the design cycle and apply it to an example

### Evidence of Learning

#### Assessment

Common Assessment 1: Understanding the Engineering Process

#### Competencies for 21<sup>st</sup> Century Learners

✓	Collaborative Team Member	✓	Effective Communicator
✓	Globally Aware, Active, & Responsible Student/Citizen	✓	Information Literate Researcher
✓	Innovative & Practical Problem Solver	✓	Self-Directed Learner

### Resources

#### Core Text:

<https://www.tinkercad.com/> TinkerCad

[https://www.youtube.com/watch?v=sh4o9k599pQ&t=420s&disable\\_polymer=true](https://www.youtube.com/watch?v=sh4o9k599pQ&t=420s&disable_polymer=true) TinkerCad

<https://www.youtube.com/watch?v=fkflYv9Td6w> 3-D printer

<https://designer.gravit.io/> 2-D Printing

[https://www.youtube.com/watch?v=w1\\_mBk\\_aoPc&t=368s&disable\\_polymer=true](https://www.youtube.com/watch?v=w1_mBk_aoPc&t=368s&disable_polymer=true) Vinyl Cutter

<https://www.youtube.com/watch?v=Tq8JmxxVhzQ> Gravit Overview

<https://www.youtube.com/watch?v=MWHVchoTlik> Google Drawings Tutorial