

<b>Pine Hill Public Schools</b>			
Content Area:		<b>Computer Programming</b>	
Course Title/ Grade Level:		<b>Introduction into Coding</b>	
Unit 1:	<b>The Internet</b>	Length:	<b>4 Weeks</b>
Unit 2:	<b>Digital Information</b>	Length:	<b>2 Weeks</b>
Unit 3:	<b>Intro to Programming</b>	Length:	<b>4 Weeks</b>
Unit 4:	<b>Big Data and Privacy</b>	Length:	<b>3 Weeks</b>
Unit 5:	<b>Building Apps</b>	Length:	<b>7 Weeks</b>
Date Created or Revised:		08/21/2018	
BOE Approval Date:			

<b>Pine Hill Public Schools</b>	
<b>Introduction into Coding Curriculum</b>	
<b>Unit Title: The Internet</b>	<b>Unit #: 1</b>
<b>Course or Grade Level: Introduction into Coding</b>	<b>Length of Time: 15 days</b>
<b>Date Created: August 15, 2018</b>	<b>BOE Approval Date:</b>
<b>Pacing</b>	15 days, 1 day introduction to course, 1-2 days per section, covering all sections in chapters 1 and 2, 1 day performance task assessment
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>● How do computer represent information?</li> <li>● How does information get from one computer to another?</li> <li>● What challenges are involved when developing systems to represent or transmit information?</li> <li>● What problems was the internet designed to solve and how does it solve these problems?</li> <li>● How has the design of the internet allowed it to grow or evolve?</li> <li>● Who or what is “in charge” of the internet?</li> <li>● How should we resolve dilemmas caused by the structure and continuing growth of the internet?</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>● Develop systems for encoding and sending binary messages</li> <li>● Become familiar with binary and hexadecimal number systems</li> <li>● Utilize Internet Simulator</li> <li>● Invent a protocol similar to the real Internet Protocol IP</li> <li>● Identify benefits and concerns of routing traffic across the internet</li> <li>● Invent a protocol to reliably send a message over an unreliable network</li> <li>● Investigate HTTP by looking at HTTP traffic generated within their own browser</li> <li>● Discuss controversial issues around either Net Neutrality or Internet Censorship</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>● Collaboration</li> <li>● Computational Thinking</li> <li>● Iterative Design Process</li> <li>● Concept Invention</li> </ul>
<b>Assessments</b>	<ul style="list-style-type: none"> <li>● Formative: Teacher observation and questioning, group work and activities, student journaling, rubrics for activities</li> <li>● Summative: Quizzes, Performance Task (Research Presentation)</li> </ul>
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>● Purposeful grouping of students</li> <li>● Allow students to access materials online via Code Studio</li> <li>● Sentence starter templates (verbally, or in writing) to help students formulate and express their thoughts</li> <li>● Students given teacher-created discussion notes</li> </ul>
<b>Interdisciplinary Connections</b>	<ul style="list-style-type: none"> <li>● Use literacy skills to convey ideas in writing and speaking</li> <li>● Mathematical reasoning and number system (algorithms)</li> </ul>
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>● Code.org Unit 1 Materials (<a href="https://curriculum.code.org/csp-18/unit1/">https://curriculum.code.org/csp-18/unit1/</a>)</li> <li>● Videos, Rubrics, and Manipulatives</li> </ul>
<b>Common Core State Standards</b>	

<b>Grade or Conceptual Category (HS only): Computer Programming</b>							
<b>Domain: Technology</b>							
<b>Standards (2014 NJ CCCS):</b> 8.1.12.A.3, 8.1.12.E.1, 8.1.12.E.2, 8.1.12.F.1, 8.2.12.B.3 A, 8.2.12.D.6, 8.2.12.E.2, 8.2.12.E.3, 8.2.12.E.2 A							
<b>21<sup>st</sup> Century Themes</b>							
x	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy	x	Civic Literacy		Health Literacy
<b>21<sup>st</sup> Century Skills</b>							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration	x	Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		

<b>Pine Hill Public Schools</b>	
<b>Introduction into Coding Curriculum</b>	
<b>Unit Title: Digital Information</b>	<b>Unit #: 2</b>
<b>Course or Grade Level: Introduction into Coding</b>	<b>Length of Time: 10 days</b>
<b>Date Created: August 15, 2018</b>	<b>BOE Approval Date:</b>
<b>Pacing</b>	10 days, 1-2 days per section, covering all sections in Unit 2, Chapter 1, 2-3 days for research performance assessment
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>● How are images and other complex information represented in a computer?</li> <li>● How can we reduce the size of digital information and what tradeoffs are involved?</li> <li>● Why are there so many different formats for representing the same kind of information?</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>● Identify standard units for measuring the size of digital files</li> <li>● Compress data to send a large amount of information faster</li> <li>● Encode black and white and color images using Pixelation widget</li> <li>● Explain the difference between lossy and lossless compression</li> <li>● Research current or historical file formats and present findings</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>● Collaboration</li> <li>● Computational Thinking</li> <li>● Concept Invention</li> <li>● Research and Presentation</li> </ul>
<b>Assessments</b>	<ul style="list-style-type: none"> <li>● Formative: Teacher observation and questioning, group work and activities, student journaling, rubrics for activities</li> <li>● Summative: Quizzes, Performance Task</li> </ul>
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>● Purposeful grouping of students</li> <li>● Allow students to access materials online via Code Studio</li> <li>● Sentence starter templates (verbally, or in writing) to help students formulate and express their thoughts</li> </ul>

	<ul style="list-style-type: none"> <li>● Outlines and graphic organizer for research report</li> <li>● Students given teacher-created discussion notes and Study Guides</li> </ul>
<b>Interdisciplinary Connections</b>	<ul style="list-style-type: none"> <li>● Use literacy skills to convey ideas in writing and speaking</li> <li>● Units of measurement in science class</li> <li>● Research methods and reliable sources</li> </ul>
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>● Code.org Unit 2 Materials (<a href="https://curriculum.code.org/csp-18/unit2/">https://curriculum.code.org/csp-18/unit2/</a>)</li> <li>● Videos, Rubrics, and Manipulatives</li> </ul>

**Common Core State Standards**

**Grade or Conceptual Category (HS only): Computer Programming**

**Domain: Technology**

**Standards (2014 NJ CCCS):**

8.1.12.A.3, 8.1.12.E.1, 8.1.12.E.2, 8.1.12.F.1, 8.2.12.B.3 A, 8.2.12.D.6, 8.2.12.E.2, 8.2.12.E.3, 8.2.12.E.2 A

**21<sup>st</sup> Century Themes**

x	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy	x	Civic Literacy		Health Literacy
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**21<sup>st</sup> Century Skills**

x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration	x	Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		

**Pine Hill Public Schools**

**Introduction into Coding Curriculum**

**Unit Title: Intro to Programming**

**Unit #: 3**

**Course or Grade Level: Introduction into Coding**

**Length of Time: 20 days**

**Date Created: August 15, 2018**

**BOE Approval Date:**

**Pacing** 20 days, 1-2 days per section, covering all sections in Unit 3, Chapter 1, 2-3 days for research performance assessment

**Essential Questions**

- Why do we need algorithms?
- How is designing an algorithm to solve a problem different from other kinds of problem solving?
- How do you design a solution for a problem so that is programmable?
- What does it mean to be a "creative" programmer?
- How do programmers collaborate?

**Content**

- Develop commands for a "Human Machine Language" and design algorithms for a variety of challenges and problems
- Become familiar with AppLab programming environment
- Define and call functions for repeated use in code

	<ul style="list-style-type: none"> <li>Utilize top-down strategies, use and create functions with parameters, and use a for loop to solve increasingly complex coding problems</li> <li>Read and use API documentation</li> <li>Design and write the code for a digital scene</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>Collaboration</li> <li>Computational Thinking</li> <li>Iterative Design Process</li> <li>Collaborative Problem-Solving</li> </ul>
<b>Assessments</b>	<ul style="list-style-type: none"> <li>Formative: Teacher observation and questioning, group work and activities, student journaling, rubrics for activities</li> <li>Summative: Quizzes, Performance Task</li> </ul>
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>Purposeful grouping of students</li> <li>Allow students to access materials online via Code Studio</li> <li>Sentence starter templates (verbally, or in writing) to help students formulate and express their thoughts</li> <li>Students given teacher-created discussion notes</li> </ul>
<b>Interdisciplinary Connections</b>	<ul style="list-style-type: none"> <li>Use literacy skills to convey ideas in writing and speaking</li> <li>Compare algorithms used in coding to algorithms used in math</li> <li>Digital scene drawings can be presented, discussed, and analyzed in art classroom</li> </ul>
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>Code.org Unit 3 Materials (<a href="https://curriculum.code.org/csp-18/unit3/">https://curriculum.code.org/csp-18/unit3/</a>)</li> <li>Videos, Rubrics, and Manipulatives</li> </ul>

**Common Core State Standards**

**Grade or Conceptual Category (HS only): Computer Programming**

**Domain: Technology**

**Standards (2014 NJ CCCS):**

8.1.12.A.3, 8.1.12.E.1, 8.1.12.E.2, 8.1.12.F.1, 8.2.12.B.3 A, 8.2.12.D.6, 8.2.12.E.2, 8.2.12.E.3, 8.2.12.E.2 A

**21<sup>st</sup> Century Themes**

x	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy	x	Civic Literacy		Health Literacy
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**21<sup>st</sup> Century Skills**

x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration	x	Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		

<b>Unit Title: Big Data and Privacy</b>		<b>Unit #: 4</b>
<b>Course or Grade Level: Introduction into Coding</b>		<b>Length of Time: 15 days</b>
<b>Date Created: August 15, 2018</b>		<b>BOE Approval Date:</b>
<b>Pacing</b>	15 days, 1 days per section, covering all sections in Unit 4, Chapter 1, 2 days for mid-unit and end-of unit performance tasks	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What opportunities do large data sets provide for solving problems and creating knowledge?</li> <li>• How is cybersecurity impacting the ever-increasing number of Internet users?</li> <li>• How does cryptography work?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Define “big data” and identify patterns</li> <li>• Describe the technological innovations enabled by data and the privacy and security concerns that arise from collecting it</li> <li>• Research a topic of personal interest and explain how that innovation produces, uses, or consumes data</li> <li>• Use a widget to attempt cracking some simple encryption methods</li> <li>• Explore the relationship between cryptographic keys and passwords and explain how public key encryption works</li> <li>• Research and report on cyber attacks/cybercrime</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Collaboration</li> <li>• Computational Thinking</li> <li>• Iterative Design Process</li> <li>• Collaborative Problem-Solving</li> </ul>	
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Formative: Teacher observation and questioning, group work and activities, student journaling, rubrics for activities</li> <li>• Summative: Quizzes, Performance Tasks</li> </ul>	
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Purposeful grouping of students</li> <li>• Allow students to access materials online via Code Studio</li> <li>• Sentence starter templates (verbally, or in writing) to help students formulate and express their thoughts</li> <li>• Students given teacher-created discussion notes</li> </ul>	
<b>Interdisciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Use literacy skills to convey ideas in writing and speaking</li> <li>• Research and presentation skills</li> <li>• Discussions on Digital Divide and privacy connect to current-events in social studies classes</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Code.org Unit 4 Materials (<a href="https://curriculum.code.org/csp-18/unit4/">https://curriculum.code.org/csp-18/unit4/</a>)</li> <li>• Videos, Rubrics, and Manipulatives</li> </ul>	
<b>Common Core State Standards</b>		
<b>Grade or Conceptual Category (HS only): Computer Programming</b>		
<b>Domain: Technology</b>		
<b>Standards (2014 NJ CCCS):</b>		
8.1.12.A.3, 8.1.12.E.1, 8.1.12.E.2, 8.1.12.F.1, 8.2.12.B.3 A, 8.2.12.D.6, 8.2.12.E.2, 8.2.12.E.3, 8.2.12.E.2 A		

<u>21<sup>st</sup> Century Themes</u>							
x	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy	x	Civic Literacy		Health Literacy
<u>21<sup>st</sup> Century Skills</u>							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration	x	Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		

<b>Pine Hill Public Schools</b>	
<b>Introduction into Coding Curriculum</b>	
<b>Unit Title: Building Apps</b>	<b>Unit #: 5</b>
<b>Course or Grade Level: Introduction into Coding</b>	<b>Length of Time: 35 days</b>
<b>Date Created: August 15, 2018</b>	<b>BOE Approval Date:</b>
<b>Pacing</b>	35 days, 1 days per section, covering all sections in Unit 5, Chapters 1 and 2, including 5 performance tasks throughout the unit
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>● How do you program apps to respond to user "events"?</li> <li>● How do you write programs to make decisions?</li> <li>● How do programs keep track of information?</li> <li>● How creative is programming?</li> <li>● How do people develop, test, and debug programs?</li> <li>● How do you write programs to store and process large amounts of information?</li> <li>● How are real world phenomena simulated on a computer?</li> <li>● What are "data structures" in a program and when do you need them?</li> <li>● How are algorithms evaluated for "speed"?</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>● Utilize the Design Mode in App Lab to experiment with event-driven programming</li> <li>● Add multiple screens to an app and write code to switch between the screens</li> <li>● Design and create a 4-screen map</li> <li>● Create and assign values to variables and use variables to control memory</li> <li>● Write and use if statements in JavaScript by debugging common problems, solving simple problems, or adding conditional logic into an existing app or game.</li> <li>● Become familiar with the Boolean (logic) operators NOT, AND, and OR as well as the if-else-if construct as tools for creating compound Boolean conditions in if statements.</li> <li>● Use loops to simulate real-world events</li> <li>● Compare the efficiency of different list-processing algorithms</li> <li>● Learn to program with larger and more complex data structures, and apply these skills to self-directed project.</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>● Collaboration</li> <li>● Computational Thinking</li> <li>● Iterative Design Process</li> <li>● Collaborative Problem-Solving</li> <li>● Logical Reasoning</li> </ul>

<b>Assessments</b>	<ul style="list-style-type: none"> <li>● Formative: Teacher observation and questioning, group work and activities, student journaling, rubrics for activities</li> <li>● Summative: Quizzes, Performance Tasks</li> </ul>
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>● Purposeful grouping of students</li> <li>● Allow students to access materials online via Code Studio</li> <li>● Sentence starter templates (verbally, or in writing) to help students formulate and express their thoughts</li> <li>● Students given teacher-created discussion notes</li> </ul>
<b>Interdisciplinary Connections</b>	<ul style="list-style-type: none"> <li>● Use literacy skills to convey ideas in writing and speaking</li> <li>● If/then statements connect to logic and mathematics</li> </ul>
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>● Code.org Unit 5 Materials <a href="https://curriculum.code.org/csp-18/unit5/">https://curriculum.code.org/csp-18/unit5/</a>)</li> <li>● Videos, Rubrics, and Manipulatives</li> </ul>

**Common Core State Standards**

**Grade or Conceptual Category (HS only): Computer Programming**

**Domain: Technology**

**Standards (2014 NJ CCCS):**

8.1.12.A.3, 8.1.12.E.1, 8.1.12.E.2, 8.1.12.F.1, 8.2.12.B.3 A, 8.2.12.D.6, 8.2.12.E.2, 8.2.12.E.3, 8.2.12.E.2 A

**21<sup>st</sup> Century Themes**

x	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy	x	Civic Literacy		Health Literacy
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**21<sup>st</sup> Century Skills**

x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration	x	Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		