

**Course/Subject: Fundamentals of Coding** **Grade Level: 2**

**Textbook(s) / Instructional Materials Used:** Online resource through code.org

**Month(s): August - October** **Marking Period 1**

**Unit Name**

<u>Big Idea</u>	<u>CSTA K-12 Computer Science Standards</u>	<u>Essential Questions &amp; Lesson Essential Question</u>	<u>Concepts/Objectives</u>	<u>Vocabulary</u>	<u>Competencies</u>
Sequencing Loops Events Digital Citizenship Binary	<p>1A-AP-08 - Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.</p> <p>1A-AP-09 - Model the way programs store and manipulate data by using numbers or other symbols to represent information.</p> <p>1A-AP-11 - Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.</p> <p><b><u>ISTE Standards</u></b> <b>Computational Thinker</b></p> <p>Students develop and employ strategies for</p>	<p>What does it mean to become frustrated?</p> <p>How do I persevere through a problem and keep working when I become frustrated?</p> <p>What strategies can I use when coding to find and fix bugs?</p> <p>How can I translate movements into a series of commands to create a program?</p> <p>What is an algorithm?</p>	<p>Persistence Frustration Debugging Programming Algorithms Sequencing Bug</p> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>Identify the feeling of frustration when felt or described.</li> <li>List strategies for overcoming frustration during a difficult task.</li> <li>Model persistence while working on a difficult task.</li> </ul>	<p>Frustrated Persistence Algorithm Bug Debugging Sequencing</p>	<p>Debugging Programming Algorithms Sequencing</p>

	<p>understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions. Students:</p> <ol style="list-style-type: none"> <li>a. formulate problem definitions suited for technology- assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.</li> <li>b. 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.</li> <li>c. break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.</li> <li>d. understand how automation works and use algorithmic thinking to develop a sequence of steps to</li> </ol>		<ul style="list-style-type: none"> <li>• Translate movements into a series of commands.</li> <li>• Identify and locate bugs in a program.</li> <li>• Predict where a program will fail.</li> <li>• Modify an existing program to solve errors.</li> <li>• Reflect on the debugging process in an age-appropriate way.</li> <li>• Decompose large activities into a series of smaller events.</li> <li>• Organize sequential events into their logical order.</li> </ul>		
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	create and test automated solutions.				
<b>Month(s): November - January</b>			<b>Marking Period 2</b>		
<b>Unit Name</b>					
<b><u>Big Idea</u></b>	<b><u>CSTA K-12 Computer Science Standards</u></b>	<b><u>Essential Questions &amp; Lesson Essential Question</u></b>	<b><u>Concepts/Objectives</u></b>	<b><u>Vocabulary</u></b>	<b><u>Competencies</u></b>
Sequencing Loops Events Digital Citizenship Binary	<p>1A-AP-09 - Model the way programs store and manipulate data by using numbers or other symbols to represent information.</p> <p>1A-AP-10 - Develop programs with sequences and simple loops, to express ideas or address a problem.</p> <p>1A-AP-11 - Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.</p> <p>1A-AP-14 - Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.</p> <p><b><u>ISTE Standards</u></b> <b>Computational Thinker</b></p>	<p>How do you represent an algorithm as a computer program?</p> <p>What problem solving and critical thinking skills can I use when coding to find and fix bugs?</p> <p>How can I create a program using to complete images using sequential steps?</p> <p>What purpose do loops serve when writing a large set of code that repeats?</p>	<p>Program Programming Sequencing Loops</p> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Order movement commands as sequential steps in a program.</li> <li>• Represent an algorithm as a computer program.</li> <li>• Develop problem solving and critical thinking skills by reviewing debugging practices.</li> <li>• Create a program to complete an image using sequential steps.</li> </ul>	<p>Algorithm Program Programmin g Sequencing Loop Repeat</p>	<p>Programming Sequencing Loops</p>

	<p>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:</p> <ol style="list-style-type: none"> <li>a. formulate problem definitions suited for technology- assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.</li> <li>b. 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.</li> <li>c. break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.</li> <li>d. understand how automation works and use algorithmic</li> </ol>		<ul style="list-style-type: none"> <li>• Break complex shapes into simple parts.</li> <li>• Repeat actions initiated by the instructor.</li> <li>• Translate a picture program into a real-world dance.</li> <li>• Convert a series of multiple actions into a single loop.</li> <li>• Identify the benefits of using a loop structure instead of manual repetition.</li> <li>• Break down a long sequence of instructions into the largest repeated sequence.</li> <li>• Employ a combination of sequential and looped commands to reach the end of a maze.</li> </ul>		
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	thinking to develop a sequence of steps to create and test automated solutions.				
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<b>Month(s): January - March</b>	<b>Marking Period 3</b>
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<b>Unit Name</b>
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<u>Big Idea</u>	<u>CSTA K-12 Computer Science Standards</u>	<u>Essential Questions &amp; Lesson Essential Question</u>	<u>Concepts/Objectives</u>	<u>Vocabulary</u>	<u>Competencies</u>
Sequencing Loops Events Digital Citizenship Binary	<p>1A-AP-09 - Model the way programs store and manipulate data by using numbers or other symbols to represent information.</p> <p>1A-AP-10 - Develop programs with sequences and simple loops, to express ideas or address a problem.</p> <p>1A-AP-11 - Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.</p> <p>1A-AP-14 - Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.</p> <p><b><u>ISTE Standards</u></b> <b>Computational Thinker</b></p>	<p>What purpose do loops serve when writing a large set of code that repeats?</p> <p>When can a loop be used to simplify a repetitive action?</p> <p>What role does an event play when coding a program?</p> <p>How can I use an event to help create an interactive program?</p>	<p>Loop Loops Events</p> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>Identify the benefits of using a loop structure instead of manual repetition.</li> <li>Differentiate between commands that need to be repeated in loops and commands that should be used on their own.</li> <li>Write a program for a given task which loops a single command.</li> <li>Identify when a loop can be used to simplify a repetitive</li> </ul>	<p>Loop Repeat Event</p>	<p>Loops Events</p>

	<p>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:</p> <ol style="list-style-type: none"><li>a. formulate problem definitions suited for technology- assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.</li><li>b. 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.</li><li>c. break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.</li><li>d. understand how automation works and</li></ol>		<p>actions.</p> <ul style="list-style-type: none"><li>• Employ a combination of sequential and looped commands to move and perform actions.</li><li>• Repeat commands given by an instructor.</li><li>• Recognize movements of the teacher as signals to initiate commands.</li><li>• Practice differentiating pre-defined actions and event-driven ones.</li><li>• Match blocks with the appropriate event handler.</li><li>• Create a game using event handlers.</li><li>• Share a creative artifact with other students.</li></ul>		
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	use algorithmic thinking to develop a sequence of steps to create and test automated solutions.				
<b>Month(s): March - June</b>			<b>Marking Period 4</b>		
<b>Unit Name</b>					
<b><u>Big Idea</u></b>	<b><u>CSTA K-12 Computer Science Standards</u></b>	<b><u>Essential Questions &amp; Lesson Essential Question</u></b>	<b><u>Concepts/Objectives</u></b>	<b><u>Vocabulary</u></b>	<b><u>Competencies</u></b>
Sequencing Loops Events Digital Citizenship Binary	<p>1A-IC-17 - Work respectfully and responsibly with others online.</p> <p>1A-AP-09 - Model the way programs store and manipulate data by using numbers or other symbols to represent information.</p> <p>1A-AP-11 - Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.</p> <p>1B-AP-10 - Create programs that include sequences, events, loops, and conditionals.</p> <p><b><u>ISTE Standards</u></b> <b>Computational Thinker</b></p>	<p>What can you do when someone is mean to you online?</p> <p>How can I use an event to help create an interactive program?</p> <p>What are the circumstances when certain parts of a program should run and when they shouldn't?</p> <p>What criteria needs to be met to make something a conditional?</p> <p>What role does binary play in the role of storage of a computer?</p>	<p>Digital Citizenship Event Conditional Binary</p> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>Analyze online behaviors that could be considered cyberbullying.</li> <li>Explain how to deal with a cyberbullying situation.</li> <li>Recognize the importance of engaging a trusted adult if the student experienced cyberbullying.</li> </ul>	<p>Cyberbullying Online Event Condition Conditionals Binary</p>	<p>Events Conditionals Binary</p>

	<p>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:</p> <ol style="list-style-type: none"> <li>a. formulate problem definitions suited for technology- assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.</li> <li>b. 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.</li> <li>c. break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.</li> <li>d. understand how automation works and use algorithmic</li> </ol>		<ul style="list-style-type: none"> <li>• Create an animated, interactive game using sequence and event-handlers.</li> <li>• Identify actions that correlate to input events.</li> <li>• Define circumstances when certain parts of a program should run and when they shouldn't.</li> <li>• Determine whether a conditional is met based on criteria.</li> <li>• Encode letters into binary.</li> <li>• Decode binary back to letters.</li> <li>• Relate the idea of storing letters on paper to the idea of storing information in a computer.</li> </ul>		
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	<p>thinking to develop a sequence of steps to create and test automated solutions.</p> <p><b>Digital Citizen</b> Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical. Students:</p> <ul style="list-style-type: none"><li>a. cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.</li><li>b. engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.</li><li>c. demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.</li></ul>				
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	d. manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.				
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