

# Grade 5 Unit 1: Game Design via Block Coding

## Unit Focus

Students will learn about the different facets involved in game design. Using Scratch, and its block based language, students will develop, test, and debug a game. Students will have the opportunity to create their own sprites and worlds as part of their iterative design process. In the PBA, students will innovate an existing game in making it more challenging and fun to play.

## Stage 1: Desired Results - Key Understandings

Established Goals	Transfer	
<p><b>Connecticut Goals and Standards</b>  <i>Computer Information Systems: 5</i></p> <ul style="list-style-type: none"> <li>Apply design principles to programming tasks. <i>CIS.6.1.1.2</i></li> <li>Test, debug, and document code. <i>CIS.6.1.1.3</i></li> </ul> <p><b>CSTA: Computer Science Standards (2017- )</b>  <i>CSTA: 3-5</i></p> <ul style="list-style-type: none"> <li>Create programs that use variables to store and modify data. <i>IB-AP-09</i></li> <li>Create programs that include sequences, events, loops, and conditionals. <i>IB-AP-10</i></li> <li>Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process. <i>IB-AP-11</i></li> <li>Use an iterative process to plan the development of a program by including others' perspectives and considering user preferences. <i>IB-AP-13</i></li> <li>Test and debug (identify and fix errors) a program or algorithm to ensure it runs as <i>IB-AP-15</i></li> <li>Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation, and review stages of program development. <i>IB-AP-16</i></li> </ul> <p><b>Student Growth and Development 21st Century Capacities Matrix</b>  <i>Critical Thinking</i></p> <ul style="list-style-type: none"> <li>Synthesizing: Students will be able to thoughtfully</li> </ul>	<b>T1</b> Explore and hone techniques, skills, methods, and processes to create and innovate	
	<b>Meaning</b>	
	<b>Understandings</b>	<b>Essential Questions</b>
	<p><b>U1</b> Complex problems can more easily be solved by breaking them down in smaller components and solving for those.</p> <p><b>U2</b> Game design is a complex art that involves using an increasingly sophisticated programmatic language and capacity to make it better.</p> <p><b>U3</b> Programmers debug and revise their programs to improve the stability of the program and end user experience.</p> <p><b>U4</b> Collaboration with others can improve the end product by incorporating different perspectives in the game design.</p> <p><b>U5</b> When an object (character, window, etc..) is presented on a screen, its position on the screen is represented by a Cartesian coordinate system.</p>	<p><b>Q1</b> How do I break this problem down?</p> <p><b>Q2</b> How do I represent something in the real world on a computer screen?</p> <p><b>Q3</b> How do I trace through the operation of my program/game to find out where the problem is? What is a possible fix? To what extent does that make the program/game run better?</p> <p><b>Q4</b> How do I optimize my game design for maximum fun?</p> <p><b>Q5</b> What do I do when I don't know what to do? How are the resources I'm connecting with growing my capacity?</p>
	<b>Acquisition of Knowledge and Skill</b>	
	<b>Knowledge</b>	<b>Skills</b>
<b>K1</b> Use basic terminology of coding: sprite, algorithm, event, animation, broadcast, variable, sequencing,	<p><b>S1</b> Write basic code using block language</p> <p><b>S2</b> Use and create different sprites</p>	

## Stage 1: Desired Results - Key Understandings

<p>combine information/data/evidence, concepts, texts, and disciplines to draw conclusions, create solutions, and/or verify generalizations for a given purpose. <i>MM.1.3</i></p> <p><i>Creative Thinking</i></p> <ul style="list-style-type: none"> <li>Innovation: Students will be able to take an existing solution or object in order to consider limitations and possible transformations. <i>MM.2.1</i></li> </ul> <p><i>Self-Direction</i></p> <ul style="list-style-type: none"> <li>Perseverance: Students will be able to identify problem(s) and use appropriate strategies to continue toward a desired goal. <i>MM.4.2</i></li> </ul>	<p>conditionals, scripts, parallelism, debug, coordinate, scene, nesting and loops.</p> <p><b>K2</b> Block code is written in a sequential order</p> <p><b>K3</b> Bugs in a program are natural and are part of the iterative design process</p> <p><b>K4</b> Gaining feedback from others is an important step in optimizing your game design</p> <p><b>K5</b> The reiterative process includes: testing, debugging and revising.</p> <p><b>K6</b> Cartesian coordinate system</p>	<p><b>S3</b> Use block loops</p> <p><b>S4</b> Use blocks that contain variables</p> <p><b>S5</b> Use blocks that effect the orientation and placement of a sprite</p> <p><b>S6</b> Use conditional blocks</p> <p><b>S7</b> Represent age-appropriate math in the computer (e.g., variables and equations)</p> <p><b>S8</b> Set limits on given variables</p>
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