

Time Frame: 7 Weeks	Unit Title: Interactive Animations and Games	Course Name: Computer Science Grade 7
Stage 1 - Desired Results		
<p>Established Goals</p> <ul style="list-style-type: none"> Students will create an interactive animation or game that includes basic programming concepts such as control structures, variables, user input, and randomness. Students will work with others to break down programming projects using sprites. Students will view themselves as a computer programmer, and see programming as a fun and creative form of expression. 	Transfer	
	<p><i>Students will be able to independently use their learning to...</i></p> <p>creatively solve problems by coding software applications.</p>	
	Meaning	
	<p>UNDERSTANDINGS <i>Students will understand that....</i></p> <ul style="list-style-type: none"> A program is a collection of instructions that performs a specific task when executed by a computer. Variables will help group/store pieces of information used multiple times. Programming is very personal and allows for self expression in a variety of formats. Iterator patterns, control structures, variables, user input, and randomness are programming constructs that can be used to achieve different goals in a program. 	<p>ESSENTIAL QUESTIONS <i>Students will keep considering</i></p> <ul style="list-style-type: none"> What is a computer program? What are the core features of most programming languages? How does programming enable creativity and individual expression? What practices and strategies will help me as I write programs?
	Acquisition	

<p>NH CS Standards <i>AP - Algorithms & Programming</i></p> <ul style="list-style-type: none"> ● 2-AP-10 - Use flowcharts and/or pseudocode to address complex problems as algorithms. ● 2-AP-11 - Create clearly named variables that represent different data types and perform operations on their values. ● 2-AP-12 - Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. ● 2-AP-13 - Decompose problems and subproblems into parts to facilitate the design, 	<p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● Bug ● Debugging ● Program ● Parameter ● Variable ● Property ● Sprite ● Animation ● Frame ● Frame rate ● Expression ● Variable ● Boolean ● Conditionals ● Expression ● Boolean expression ● If-statement 	<p><i>Students will be skilled at...</i></p> <ul style="list-style-type: none"> ● Reasoning about locations on the Game Lab coordinate grid ● Communicating how to draw an image in Game Lab, accounting for shape position, color, and order ● Using the Game Lab IDE to plot different colored shapes on the screen. ● Sequencing code correctly to overlay shapes. ● Debugging code written by others. ● Using and reasoning about drawing commands with multiple parameters ● Generating and using random numbers in a program ● Identifying a variable as a way to label and reference a value in a program ● Using variables in a program to store a piece of information that is used multiple times ● Reasoning about and fixing common errors encountered when programming with variables ● Assigning a sprite to a variable ● Using dot notation to update a sprite's properties ● Creating a static scene combining sprites, shapes, and text ● Explaining what an animation is and how it creates the illusion of smooth motion ● Explaining how the draw loop allows for the creation of animations in Game Lab ● Using the draw loop in combination with the randomNumber() command, shapes, and sprites to make simple animations
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<p>implementation, and review of programs.</p> <ul style="list-style-type: none">● 2-AP-16 - Incorporate existing code, media, and libraries into original programs, and give attribution.● 2-AP-17 - Systematically test and refine programs using a range of test cases.● 2-AP-19 - Document programs in order to make them easier to follow, test, and debug.		<ul style="list-style-type: none">● Describing the connection between updating a sprite's location properties and sprite movement on the screen.● Reading and following the steps of a short program written in pseudocode that manipulates variable values.● Using the counter pattern to increment or decrement sprite properties● Identifying which sprite properties need to be changed, and in what way, to achieve a specific movement● Organizing objects based on simple and compound boolean statements● Describing the properties of an object using boolean statements● Predicting the output of simple boolean statements● Using conditionals to react to changes in variables and sprite properties● Using conditionals to react to keyboard input● Moving sprites in response to keyboard input● Using an else statement as the fallback case to an if statement● Differentiating between conditions that are true once per interaction, and those that remain true through the duration of an interaction.● Using conditionals to react to keyboard input or changes in variables / properties● Sequencing commands to draw in the proper order● Applying an iterator pattern to variables or properties in a loop
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