

Time Frame: 7 Weeks	Unit Title: Interactive Animations and Games	Course Name: Computer Science Grade 7
Stage 1 - Desired Results		
Established Goals - 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	
	<i>Students will be able to independently use their learning to...</i> creatively solve problems by coding software applications.	
	Meaning	
	UNDERSTANDINGS <i>Students will understand that....</i> - 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.	ESSENTIAL QUESTIONS <i>Students will keep considering</i> - 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	

NH CS Standards <i>AP - Algorithms & Programming</i> • 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,	<i>Students will know...</i> • Bug • Debugging • Program • Parameter • Variable • Property • Sprite • Animation • Frame • Frame rate • Expression • Variable • Boolean • Conditionals • Expression • Boolean expression • If-statement	<i>Students will be skilled at...</i> • 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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implementation, and review of programs. • 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.		• 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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