

Computer Programming Unit 4 - Creating Dynamic Effects / Game Design

Big ideas	• Explore new computing techniques that create dynamic effects • Create a project collaboratively by following a design process		
Enduring understandings	• Understand the concept of variables in computer programming • Understand the logic behind a new technique • Understand a design process and how to make a plan, follow and modify it as needed • Use computational thinking to present a solution to a problem • Understand important elements in game making		
General Description	This unit introduces the concept of variables and how they work in programming. Students will explore Scratch built-in variables and see what kind of tasks they can perform. By examining and remixing example games, students will create variables and use them to get exciting effects. Along the way, this unit will also introduce the techniques of cloning and video sensing. As the final project of the unit (and this topic), students will create an interactive game as a team.		
Final Project Theme, Inspiration, or other Real-World connection	There are so many computer games out there. You've played computer games at least once. With all the skills that are covered in this topic, students can evolve from a game player into a game designer!		
Final Project Prompt	In the final project of this unit, students will work collaboratively to complete a final interactive game following the Design Process Cycle.		
What do potential completed final projects look like	<u>Basic Level:</u>	<u>Intermediate Level:</u>	<u>Advanced Level:</u>
	Content area concepts: • Includes a few ideas about the subject matter and shows some understanding of it	Content area concepts: • Focuses on and understands important concepts related to the subject matter	Content area concepts: • Makes important connections between subject area concepts, shows in-depth understanding of subject matter

	Project Design: • Project uses artwork created by others with some effort to change it • Has some sense of purpose and structure • Includes ways for a user to interact with a problem, may need to be clearer or better fit the program's purpose Programming: • Project shows some understanding of blocks and how they work together • Has some organization and logic • May have a couple bugs Process: • Students tried out the design process • Collaborated at times	Project Design: • Project uses original artwork or reuses imported images creatively • Has a clear purpose, makes sense and has structure • Includes ways for user to interact with problem and clear instructions Programming: • Project shows understanding of blocks and how they work together to meet a goal • Is organized, logical and debugged Process: • Students used the design process • Used project time constructively • Collaborated appropriately	Project Design: • Project artwork and creativity significantly supports the content • Has multiple layers or complex design • User interface fits content well and is complex; instructions are well written and integrated into the design Programming: • Project shows advanced understanding of blocks and procedures • Uses additional programming techniques • Is organized, logical and debugged Process: • Students made significant use of the design process • Used project time constructively, finished early or added elements • Found ways to collaborate beyond class structure
Goals of the Unit	Goal #1 Understand Variables <i>Learning Activities #1~2</i> Students will be able to understand and define the concept of variables and how they are used in computer programming. Students will also use variables for in project to create a score system, timer etc..		

	Goal #2 Add Dynamic Effects <i>Learning Activities #3~4</i>
	Students will learn the process of generating additional objects while a program is running, which is called "Cloning". The students will also master bringing video sources to their project, which will allow them to create more varied interactions with users.
	Goal #3 Create an Interactive Game <i>Learning Activities #5 (Final Project)</i>
	Students will be able to create an interactive game by applying the programming skills that they learned over the course of the classes. Working in teams, students will not only develop their computational skills but also learn how to communicate with each other and collaborate.
General Overview of Learning Activities <i>One row for each activity</i>	1. Intro to Variables - Exercise #1: How many times did the Cat say "Hello"? - Exercise #2: How many apples did the Cat touch?
	2. Remixing Games with Variables - Exercise #1: Create and remix a Basic Pong Game - Exercise #2: Create and remix a Simple Collide Game
	3. Generating Additional Sprites while a Program is running: Cloning - Exercise #1: Getting started with cloning - Exercise #2: Create and remix an Apple Hunting Game
	4. Creating dynamic interaction with users: Video Sensing Exercise #1: Create and remix a Balloon Pop project
	5. Create an Interactive Game (Final Project of the Unit) Unit 4 Final Project: Create an Interactive Game
Provide an exhaustive list of questions students could be able to answer as they learn this concept.	1. What is a variable? 2. What is the difference between a global and local variables? 3. What can you do with variables? 4. How do you create variables in Scratch? 5. Where did you use variables in your project?

	6. What does the “cloning” feature do? 7. What kind of games can you create with the cloning technique? 8. Can you see how the Design Cycle works? 9. As a game designer, what elements might be important to consider when designing engaging & fun games for others? 10. Can you describe the kind of techniques that you used in your game? 11. How might games influence the future of education?
Standards	• CT.L2-10 • CL.L2-03, 04