Course: Coding in Science | Module: Exploring Collisions

Lesson 2.1: Creating Circles

https://codehs.com/course/13420/lesson/2.1

Description	Students will use JavaScript to create a screen with two different colored circles placed in different locations on the canvas.
Objective	Students will be able to: • create and add simple graphics to the screen in order to begin programming a collision simulation.
Activities	2.1.1 Video: Creating Circles 2.1.2 Quiz: Creating Circles 2.1.3 Example: Drawing a Circle 2.1.4 Exercise: Adding a Second Circle
Prior Knowledge	• Experience solving algebraic equations • Knowledge of elastic and inelastic collisions will be helpful • Knowledge of physics conservation laws will be helpful
Planning Notes	• These first few lessons are short. Plan completing a couple at a time, or extending them with a deeper dive into the programming.
Standards Addressed	
Teaching and Learning Strategies	**Lesson Opener:** • Use discussion questions below to explore what students think about simulations and coding. [5-8 mins] **Activities:** • Watch the video as a class or independently and have student complete the check for understanding quiz. [5-7 mins] • Explore the first example together as a class or in pairs. [10 mins] ○ Have students try changing parts of the code and write down their observations. Students will use these circle objects throughout the module, so it's worth spending time exploring this code.

- Ask the students to increase the size of the circle, move it to the bottom of the screen, and change the color to blue.
- Complete the *Adding a Second Circle* exercise. [5 mins]

Lesson Closer:

- Use the discussion questions below talk about variables and review what the code is doing in the example and exercise. [10 mins]

Discussion Questions	**Beginning of Class:**
	
	 • What are simulations, and why are they used?
	     ○ *Simulations model real-life interactions or events. They have a variety of uses, here are a couple: they allow the user to see something that would otherwise be difficult to see; they allow the user to manipulate the situation to see what happens*
	 • Is it ok for simulations to simplify an interaction? For example, removing things like friction, air resistance, sound, etc?
	     ○ *Yep! Simplifying the environment by removing friction etc allows the user to focus on an interaction in an ideal setting first, adding back the complexities later if desired.*
	 • What is coding? What experience do you have with it?
	     ○ *Answers may vary. Coding is a way to communicate instructions to a computer.*
	
	 End of Class:
	
	 • Define a variable in your own words. What is an example?
	     ○ *A variable stores values to be used later in an equation or code. In physics, v is a variable that stores velocity values that we can use in a formula.*
	 • What are the lines `var objectOne;` and `objectOne = new Circle(50);` doing? Why are they important for this program?
	     ○ *They are creating a new graphics circle and a variable to store that circle. We use the name of the variable, "objectOne", to reference the circle object. This is important because we can now use the variable `objectOne` whenever we want to use the circle we created.*
	 • What are the lines `objectOne.setPosition(200, 250);` and `objectOne.setColor(Color.red);` doing?
	     ○ *They are changing the properties of the circle we created, specifically the location and color.*

Resources/Handouts	

Vocabulary

Term	Definition

Modification: Advanced	Modification: Special Education	Modification: English Language Learners
Have students spend more time manipulating the code and making observations. What causes errors and why? What changes properties of the circles?	Getting the syntax right can be frustrating for students. There is nothing wrong copying and pasting example code and changing it vs. creating from scratch.	Create list of unknown words to define. Have students work in pairs.