

Lesson #3.4: Scrolling Game



Overview:

In this lesson, students will continue learning about game design. The game they create will include interactions between sprites, score, and levels. The game is similar to Flappy Bird, where the goal is to fly through barriers or walls that scroll across the screen.



Student Agency:

In this lesson, students will continue to learn about video games. They will refer to previous class discussions about game components. While they will all be creating a very similar scrolling game, how they enhance the game is their choice. They can add fun backdrops, choose any object as their player sprite, design obstacles wish, and decide how they will make their game more challenging.



Pathway: Coding/Computational Thinking



Duration: 40-80 minutes. This lesson can be completed in a class period as an introduction, but can also be extended to allow more time for students to create a finished product.



Essential Question: What is a game? How can you use Scratch to create an interactive game?



Objectives:

- Students will be able to apply common design elements of games to a video game they create.
- Students will be able to demonstrate how the example games impacted my thinking when designing their scratch game.
- Students will be able to develop greater fluency with computational concepts (conditionals, operators, data) and practices (experimenting and iterating, testing and debugging, reusing and remixing, abstracting and modularizing) by working on a self-directed game project



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Lesson #3.4: Scrolling Game

 <u>Competencies & Practices</u>	 <u>Student Artifacts/Evidence</u>
Collaboration	Students work in small groups or pairs to give and receive constructive criticism for their games.
Experimenting and Iterating	Students build up their scrolling project through experimentation and iterating.
Abstracting and modularizing	Students will break down the steps of making a video game into various components of game mechanics including setting, players, rules, and objectives.
Testing and debugging	Students will test their projects in progress and debug problems as they arise.
Reusing and remixing	Students will create starter projects to be later remixed into larger, more complex video games.



Teacher Preparation:

Create a class studio where students can share their “Scrolling Game” Scratch projects.

Review the steps of making a scrolling game in the [Video Game Design booklets](#)

Look at the code in this sample project: <https://scratch.mit.edu/projects/369647108/>



Materials for Students:

- [Video Game Design booklets](#)
- [Making a Scrolling Game](#) video tutorial
- Scratch Website: <http://scratch.mit.edu>
- “Scrolling Game” Studio - to be created by the teacher.
- “Starter Games” Studio - to be created by each student



Students Prior Knowledge:

Students should have a basic understanding of game mechanics from the previous



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Lesson #3.4: Scrolling Game

game design lesson. Students should have an understanding of how to use the paint editor to create backdrops and sprites. They should have a familiarity of event, control, motion, and looks blocks. Students should know how to program sequences, events, parallel events, and loops.



Concepts:

Experimenting and Iterating
Abstracting and Modularizing
Testing and Debugging
Reusing and Remixing
Event
Sequence
Parallelism
Loop
Conditionals
Comments



Habits of Mind:

Applying past knowledge to current situations
Creating, imagining, and innovating
Thinking interdependently



Lesson Sequence:

1. Anticipatory Set (15 minutes):

- **Review Game Mechanics:** Review the Google Doc containing game mechanics and attainable goals for the class video game projects. Hold students accountable for these game mechanics as they create their games.
- **Review the game design unit:** Remind students that in this unit, they will create a series of starter game projects that can be revisited and extended later. They already created a Maze game, and a Pong game, now they will create a Scrolling game. Once they have made the three starter games, they will choose one to remix and enhance through Score, Extensions,



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Lesson #3.4: Scrolling Game

and Interactions activities. Additionally, they will create a “backstory” to introduce their character, setting, problem, rules and game objectives. They will rely upon their background in storytelling through Scratch to program their backstory into their video game.

2. Engaging Activities:

- a. **What is a Scrolling Game?:** Ask students if they have ever played a scrolling game (like flappy bird). Have them describe the game. What are the game components? Tell them that they will be learning how to program some of the components of a game through the creation of a scrolling game similar to flappy bird. They will not finish their game at this time, but they will build enough of the game to understand how to program a scrolling sprite with multiple costumes (the walls or pipes), a player sprite that is falling but can “flap” upward (the sprite the user controls to fly through the scrolling sprite), and consequences (What happens when sprite hits the scrolling barrier?).
- b. **Share Resources:** Share the Scratch [Video Game Design booklets](#) with the students and have students go to Chapter 3: Scrolling Game.



Teacher Tip: You may want to Have students skip parts of Section 1 and Section 3. They may design this later if they choose the scrolling game as their final Video Game project.

Share the [Making a Scrolling Game](#) video tutorial with the students.

- c. **Create a Scrolling Game:** Have the students build their scrolling game piece by piece (modularizing - breaking a larger task down into simpler parts). As they program, remind students to add comments to their code, so when they look back on the project, they will know what each line of code or sequence does. “Don’t rely on your memory; it may be awhile before you come back to this game.”
 - i. Create the scrolling sprite with multiple costumes. This will be the barriers that scroll across the stage that the player has to avoid.



Teacher Tip: When students make each costume, be sure they are creating the barriers as a sprite, not a backdrop, or they will not be able to make it move. Be sure the costumes are centered (right and left) on the screen. The objects should not be too wide and should have openings large enough for the player to fly through. Create 4-6 costumes with the opening at the top, middle, or bottom.



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Lesson #3.4: Scrolling Game

- ii. Choose a sprite to be the player (maybe something that flies?)
- iii. Program the barriers to scroll across the screen. Refer to the code and comments in this sample project:
<https://scratch.mit.edu/projects/369647108/>
- iv. Program the player sprite to move. Refer to the code and comments in this sample project:
<https://scratch.mit.edu/projects/369647108/>
- v. Program the game to do something when the player hits the barrier. What should it do? What kind of feedback will you give your player? (switch backdrops to a Game Over screen, stop all, etc...)
- d. **Test and Debug:** Try your game. Does it work? What are the bugs? Think of how you can debug the problems - are there any Habits of Mind you could use?
- e. **Keep Going:** If students are ready, have them add a score component or more levels. They may need to stop here until they have learned how to add score and levels, or they could give it a try.
- f. **Feedback:** Encourage students to get feedback on their games-in-progress. Try the feedback fair activity: half of the students stay in their seats with their projects open while the other half walks around exploring projects, asking questions, and giving feedback, then switch sides.

3. Wrap Up (5-10 minutes):

Reflect: Ask students to respond to the reflection prompts in the notes and credits portion of their project:

- i. What was challenging about designing your game?
- ii. What are you proud of?

Studios: Have students create a “Starter Games” Studio where they can store their starter games from the video game unit. Optionally, have students add their project to a class “Pong Game” studio so other students can view and provide feedback.

 Assessment Questions	Yes	No
Are students able to make sprite with multiple costumes?		
Does the scrolling sprite scroll correctly?		



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Lesson #3.4: Scrolling Game

Does the player sprite move correctly?		
Does something happen when the barrier is touched by the player?		
Do students use comments in their programming to explain what the code does?		

Activities for Relearning:

Allow students to have a partner to work with for feedback and assistance throughout the creation process. Remind students to refer to the Scratch [Video Game Design booklets](#) and [Making a Scrolling Game](#) video tutorial when they get stuck.

Activities for Enrichment:

Challenge students to do more. Challenge students to come up with ways to make their game change difficulty. Add a score component or change the speed and size of the barrier and player. They can also add more objects like rewards to get, or other obstacles to avoid.



Resources for Teachers:

- Scratch [Video Game Design booklets](#)
- [Making a Scrolling Game](#) video tutorial
- [Creative Computing Curriculum Guide](#)
- Sample Scrolling Project: <https://scratch.mit.edu/projects/317583119/>
- The book, *Learn to Program with Scratch: A Visual Introduction to Programming with Games, Art, Science, and Math* by Majed Marji is a great book with even more examples of games students can program.



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