## OBJECTIVES

In this lesson, students will learn how to make a sprite respond to keyboard controls and how to make the sprite's movement wrap around the edges of the stage. They will also create a goal for their "hero" sprite and learn how to reset the position of the sprite.

## LINKS

[Lesson Plan](https://docs.google.com/document/d/1vKM8hp5dYbFLOeWnfBJNq0hia3hHT4lHJXQxPPJpksk/edit)

## VIDEO: INTRODUCTION TO GAMES IN SCRATCH

## ACTIVITY 1: KEYBOARD CONTROL

The first step for making a fun and interactive game in Scratch is to let the user interact with the game. In this case, we'll do so by using keyboard controls. There are two ways of doing this; we'll go over one today and the other on the final day of the Games Section. Watch the video below for a quick explanation and then try to add the four directions of movement to your game.

## VIDEO: MOVING SPRITES WITH KEYBOARD CONTROLS

## ACTIVITY 2: WRAPPING AROUND EDGES

In this Activity, you will learn how to make your sprite move from one edge of the stage to the other when he goes off the side, as if the stage space wrapped around. Watch the video below to understand the concept, then try to make the sprite wrap in the directions not covered in the video.

## VIDEO: WRAPPING AROUND THE LEVEL

## ACTIVITY 3: MAKING A GOAL AND RESPAWNING

In the last activity for today, you will make a goal for your hero/sprite to reach. When the sprite reaches the goal, it should **respawn**; that is, it should reappear at the start point. Watch the video below for help.

## VIDEO: MAKING A GOAL AND RESPAWNING

## VIDEO: GAMES DAY 1 WRAP UP

## VIDEO: CAREER CONNECTION/APPLICATION

## OBJECTIVES / SUMMARY

In this lesson, students will make their games more interesting by keeping score and adding a timer. They will create variables to keep score and learn how to change and reset these variables. They will keep time using Scratch's built-in timer.

## LINKS

[Lesson Plan](https://docs.google.com/document/d/1eEjzQGckjVETFW5FgXIYBJbvC8e8psA-A7ZLgx4kU-0/edit)

## VIDEO: INTRODUCTION TO VARIABLES

[Fill browser](http://www.muddx.com/courses/HMC/MyCS/Middle-years_Computer_Science/courseware/90d398d58ed44b6394d887ca7e00ddca/b6d9958da970495f8a38356fedf0084f/)ACTIVITY 1: USING SCRATCH'S BUILT-IN TIMER

The first variable we can add to our game is a timer. This can be found near the bottom of the "Sensing" tab in the script section.

When setting up your timer, remember to reset the timer every time a new game is started. Follow the video below for more instruction.

## VIDEO: SCRATCH'S BUILT-IN TIMER

## ACTIVITY 2: ADDING A VARIABLE TO KEEP TRACK OF SCORE

Next, we will make a variable to count how many times our hero sprite reaches the goal. This will be our score. For information on what a variable actually is and how to implement it in Scratch, watch the video below!

## VIDEO: ADDING VARIABLES TO YOUR GAMES

## Video: VARIABLES AND TIMER WRAP UP

## OBJECTIVES / SUMMARY

In this lesson, students will add a villain to their game. When the hero touches the villain, the hero will respawn at the starting point.

## LINKS

[Lesson Plan](https://docs.google.com/document/d/1U7qeXBoqVVyfwL5B32nswpWZVXUpgH6SPdzJtK9V_qs/edit)

## ACTIVITY 1: MAKING VILLAINS

Now that we have created our hero and a goal, let's make the game a little more challenging! Think of a villain that wants to destroy your hero, and then watch the video below to learn how to add this villain to your game.

## VIDEO: MAKING VILLAINS IN SCRATCH

## ACTIVITY 2: THE RANDOM BLOCK

Now let's make the game even harder by getting the villain to spawn at a random x-location every time it reapears. We will use the 'pick random \_\_ to \_\_' block located in the Operators section of the Scripts tab for the villain. Then, try to make the villain even less predictable. Make it move in a random x-direction as it is falling. Use the video below for help.

## VIDEO: THE RANDOM BLOCK

## ACTIVITY 3: MAKING THE BAD GUY BAD

Finally we will actually make our villain BAD. To do this, change the game so that when the villain touches the hero, the hero respawns at the starting point. Use the video below for assistance.

## VIDEO: MAKING THE BAD GUY BAD

## VIDEO SOLUTION TO HOW TO MAKE EVIL

Congratulations, you now have a working game! Feel free to add more villians, a time limit, or any other fun things you can imagine. In the next lesson, we will add three different types of powerups.

## OBJECTIVES / SUMMARY

In this lesson students will make their games more exciting by adding powerups for their characters. They will do this by using different costumes, variables, and backgrounds.

## LINKS

[Lesson Plan](http://www.muddx.com/courses/HMC/MyCS/Middle-years_Computer_Science/courseware/90d398d58ed44b6394d887ca7e00ddca/b6d9958da970495f8a38356fedf0084f/www.google.com)

(lesson plan not made yet)

## VIDEO: INTRODUCTION TO SUPERPOWERS

The next step in creating a fun game is adding powerups. First, we will brainstorm some ways the sprite can know that something has changed in its environment and what we can do to alter its motion, appearance, or other characteristics. Try to think of some ways this could be done.

## ACTIVITY 1: SUPERSPEED

I've always wanted to have the power to fly...but since I've made a game with a butterfly, I can already to that. So how about superspeed?

In the video below we will walk you through one way to give your hero superspeed. Try to pause the video and work ahead to show how supersmart you are.

This is only one way to give a sprite superspeed. Try to think of other ways it could be done!

## VIDEO: SUPER SPEED

## ACTIVITY 2: SUPER STRENGTH

How about we give our hero super strength? Who doesn't like to beat the bad guys? This time we can use a costume change to signify an increase in strength.

This video shows how I gave my butterfly super strength.

## VIDEO: SUPER STRENGTH

## ACTIVITY 3: SUPER SMALL

Have you ever gotten an awesome toy stuck behind the refrigerator? I know that I have. It's in those moments that I wish for the power to become small. So how about we give our heros the ability to become small. But for a twist, try to make the item run away from your sprite.

This is was we came up with:

## VIDEO: SUPER SMALL

## ACTIVITY 4: CLONING AND FIRING FIRE BALLS!

Hmmm, our butterfly still seems a little too average for a video game that can be considered world class. Wait, what's going on? Our butterfly is beginning to evolve! Its skin is scalier! Its teeth are teethier! Its body is dragonier! It... it's... a DRAGON! It flies faster, it longs for meat... well done. With his fire breathing abilities, he can turn any foe into toast from a distance. Let's see how this powerful character will turn out.

## VIDEO: CLONING IN SCRATCH

## WRAP UP AND REFLECTION

Now that you all know how to use extra variables, more keyboard controls, costume changes, and cloning, you have the ability to give your sprites any super power that you want! Try to think of another ability you can give your hero and how you would create that in Scratch.

## OBJECTIVES

In this lesson students will learn how to make their characters fall after they jump (gravity). They can practice using gravity by making a helicopter game. They will also begin a Final Project which may take more than one class period to finish.

## LINKS

[Lesson Plan for Gravity](https://docs.google.com/a/g.hmc.edu/document/d/1YUcUONfSA3GKcFtxImxV2kofHkoBvAlmdbzGCLYbIXI/edit)

[Lesson Plan for using Gravity to make a Helicopter Game](https://docs.google.com/document/d/1p0-xs9erRUaY2AlsxFRUhk13lk0503i6cljwTbVQcfA/edit)

[Helicopter Game Worksheet](http://www.cs.hmc.edu/~cs5grad/MyCS/2012_Curriculum/scratch_offline/day_24/worksheet.pdf)

[Final Project](http://www.cs.hmc.edu/~cs5grad/MyCS/2012_Curriculum/scratch_offline/day_31/worksheet.pdf)

## VIDEO: INTRODUCTION TO GRAVITY AND FINAL PROJECT

## ACTIVITY 1: SIMULATING GRAVITY IN SCRATCH

To simulate gravity in Scratch we will introduce a new sensing block and the if/else block. The video below will help show you how to do this.

## VIDEO: SIMULATING GRAVITY IN SCRATCH

## ACTIVITY: HELICOPTER GAME & FINAL PROJECT

Now that we know how to simulate gravity, try to make a helicopter game by using this [Worksheet](http://www.cs.hmc.edu/~cs5grad/MyCS/2012_Curriculum/scratch_offline/day_24/worksheet.pdf).

Once you feel comfortable with gravity and the helicopter game, you can move on to the [Final Game Project](http://www.cs.hmc.edu/~cs5grad/MyCS/2012_Curriculum/scratch_offline/day_31/worksheet.pdf). Try to be as creative as you can and make a game using all the tools we have learned over the past four days. Good Luck!

## VIDEO: HELICOPTER GAME AND FINAL PROJECT

## REFLECTION AND WRAP-UP

Share your awesome new games with your classmates and revel in your new found computer science abilities! Keep exploring the tools available in Scratch and feel free to make more games in free time.

## VIDEO: GAMES IN SCRATCH WRAP UP