Solution Sheets

Game Design

Use the sample code blocks to help club members as they build the core project of the day. These blocks represent just **one way to complete the core project**, and club members may use different blocks to build their projects. These sheets simply suggest a solution you can refer to if a club member gets stuck or can't make his or her project function correctly.

Table of Contents

Activity 1: Gaming Story

Survey Video

In this video, club members will:
1. Watch a video that introduces the survey.
2. Complete the survey.
3. Submit the survey and watch the next video.

NOTE: The "next" arrow will turn green once the survey is complete. Clicking the green "next" arrow submits the survey.

Next

Introduction to Scratch Video [Optional]

In this video, club members will:
1. Learn about computer science and the programming language Scratch.

NOTE: If your club members have never been in a CS First club before, advise them to watch the introduction video.

Welcome to CS First!

Click "Watch introduction" to learn about CS First and Scratch.

Watch introduction   No thanks, I've seen it

Video 1: What is Computer Science?

In this video, club members will:
1. Open the "Day 1" starter project link next to the video.
2. In Scratch, click "remix."
3. Sign into Scratch with their username and password.

Video 2: Choose a Character

In this video, club members will:

1. Choose a story prompt.
2. Click on the android sprite, and choose a costume for the sprite.
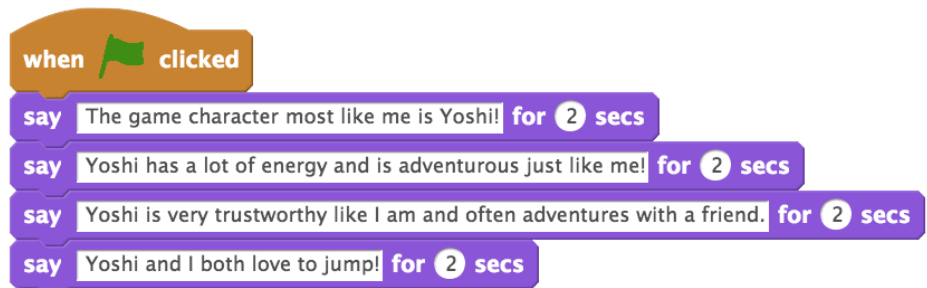
Costume for the **Android** sprite:

Video 3: Tell a Story

In this video, club members will:

1. Add at least three "say for 2 seconds" blocks to the android sprite.
2. Add text to the "say for 2 seconds" blocks to respond to one of the following questions:
   a. What game character is most like you and why?
   b. Why is your favorite game or app the best?
   c. Do you think kids should play more or fewer video games? Why?
3. Add a "when flag clicked" block to allow a user to easily start the program.

NOTE: The text in each "say" block will be unique to each member's project.

Costume for the **Android** sprite:


```
when ⚑ clicked
say  The game character most like me is Yoshi!  for 2 secs
say  Yoshi has a lot of energy and is adventurous just like me!  for 2 secs
say  Yoshi is very trustworthy like I am and often adventures with a friend.  for 2 secs
say  Yoshi and I both love to jump!  for 2 secs
```

Add-On 1: Flicker

In this video, club members will:

1. Start an effect to introduce the game with "when flag clicked" and "show" blocks.
2. Create a flickering effect using "repeat" and "switch costume" blocks
3. Make the flicker effect fade out using "repeat" and "change ghost effect" blocks.
4. Start the story after the introduction by adding "wait" blocks after each "when flag clicked" block.

Costume for the
Transition sprite:

Transition

```
when [flag] clicked
show
repeat (10)
    switch costume to [dots1 ▼]
    wait (0.1) secs
    switch costume to [dots2 ▼]
    wait (0.1) secs
repeat (10)
    change [ghost ▼] effect by (10)
hide
```
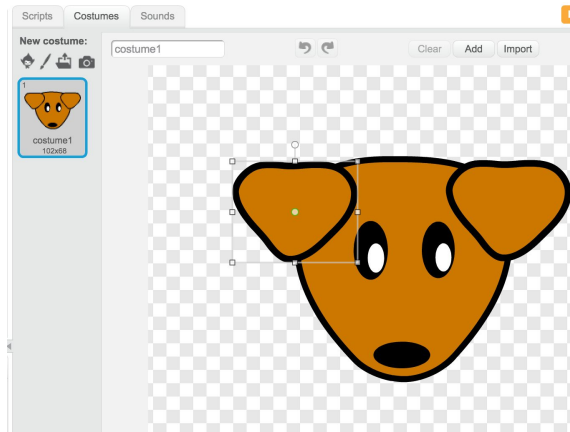
Add-On 2: Costume Creation

In this video, club members will:
1. Personalize the android sprite using vector tools, or draw their own sprite to incorporate in their project.

NOTE: Code and sprites will vary.

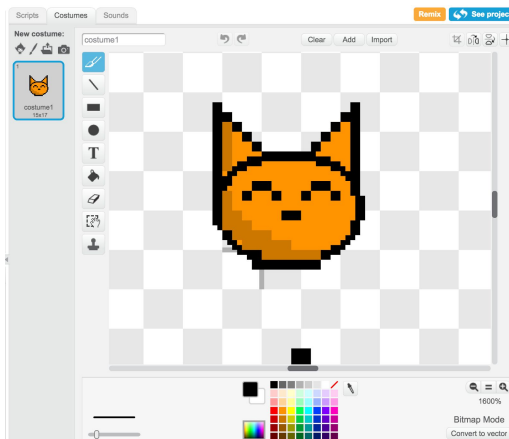Costume for the
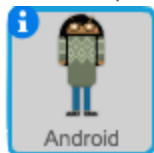**Android** sprite:

Add-On 3: Bitmap Characters

In this video, club members will:
1. Go to the "costumes" tab, click "paint new costume," and zoom all the way in.
2. Use the editing tools to create a character.
3. Use the "grow" tool to make the character larger on the stage.

NOTE: Code and sprites will vary. There is no code for this add-on.

Costume for the
Android sprite:

Add-On 4: Adding Sound

In this video, club members will:

1. Add sound effects to their project using a "play sound until done" block.
2. Add background music using the "play sound until done," "forever," and "when flag clicked" blocks.

NOTE: Code and sounds will vary for this add-on. If sounds aren't playing properly in the "forever" block, check that it contains a "play sound until done" and not a "play sound" block.

Costume for the
Android Sprite:

when 🏳 clicked
play sound pling.mp3 ▾ until done
say The game character most like me is Yoshi! for 2 secs
say Yoshi has a lot of energy and is adventurous just like me! for 2 secs
play sound pewpew.mp3 ▾ until done
say Yoshi is very trustworthy like I am and often adventures with a friend. for 2 secs
say Yoshi and I both love to jump! for 2 secs

when 🏳 clicked
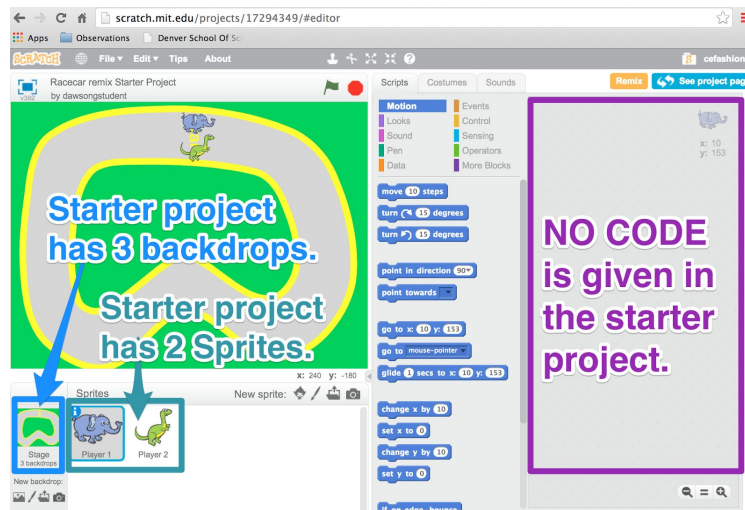forever
play sound electronics.mp3 ▾ until done

Activity 2 : Racing Game

Video 1: Opening the Starter Project

In this video, club members will:
1. Open the starter project on the CS First Page.
2. Remix the project.
3. Sign in to Scratch.

NOTE: Club members will not code any parts of this project until after they watch the second video.
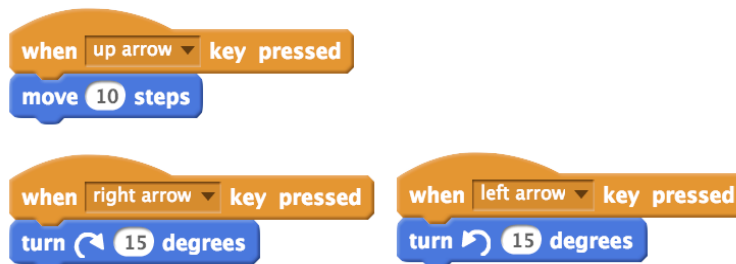

Video 2: Moving the Sprite

In this video, club members will:
1. Select Player 1 sprite, and create an event for the three arrow presses.
2. Add "move 10 steps" and "turn right 15 degrees" blocks to make the sprite move forward and turn right.
3. Figure out how to make the sprite turn left with the left arrow.

Costume for the
Player 1 sprite:

Video 3: Moving More Smoothly with "Repeat Until"

In this video, club members will:
1. Add a "repeat until" block to each event to make the sprite move more smoothly.
2. For each "repeat until" block, use a condition until not pressing the key.
3. Program the Player 2 sprite using the same blocks but different key presses.

NOTE: Club members may forget to change the keys that control the Player 2 sprite. The code should look similar, but different key presses should control the code for the Player 2 sprite.

Costume for the **Player 1** sprite:

Player 1

```
when up arrow key pressed
repeat until  not  key up arrow pressed?
    move 10 steps
```

```
when left arrow key pressed
repeat until  not  key left arrow pressed?
    turn ↺ 8 degrees
```

```
when right arrow key pressed
repeat until  not  key right arrow pressed?
    turn ↻ 8 degrees
```

Costume for the **Player 2** sprite:

Player 2

```
when w key pressed
repeat until  not  key w pressed?
    move 10 steps
```

```
when a key pressed
repeat until  not  key a pressed?
    turn ↺ 15 degrees
```

```
when d key pressed
repeat until  not  key d pressed?
    turn ↻ 15 degrees
```
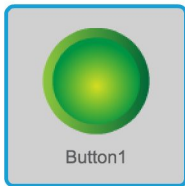
Add-On: Change Up Your Racetrack

In this video, club members will:
1. Add a sprite.
2. Change the backdrop using a "switch backdrop to" block and a "when sprite clicked" event.

NOTE: Club members can select any sprite to act as a button.

Costume for the
Button sprite:

Button1

when this sprite clicked
switch backdrop to next backdrop ▼

Racing Game Starter Project
by CSFirst

New button sprite added.

Add-On: Costume Change Key

In this video, club members will:

1. Select Player 1 sprite, and drag out a "next costume" block into the scripts area.
2. Connect a "when space key pressed" block to the "next costume" block, and change the value to the 1 key.
3. Select Player 2 sprite, and repeat steps 1-2 to make the "2" key change the costumes for Player 2.

NOTE: Costumes are preloaded into the starter project, but club members can also choose different costumes from the costume library.

Costume for the
Player 1 sprite:

Player 1

when 1 ▼ key pressed
next costume

Costume for the
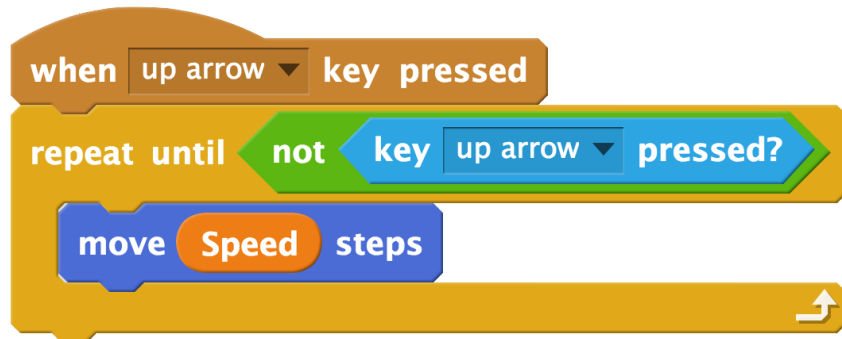**Player 2** sprite:

Player 2

when 2 ▼ key pressed
next costume

Add-On: Step on the Gas (Part 1)

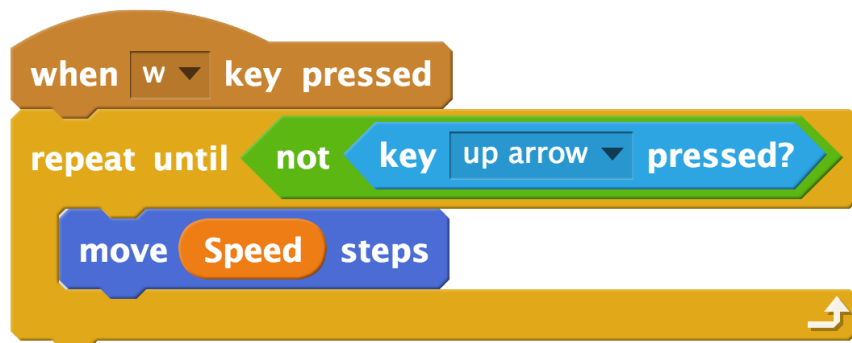**In this video, club members will:**
1. Create a variable in the data menu, and name it "speed."
2. Add the speed variable into the "move 10 steps" block.
3. Click the variable indicator on the stage twice until a slider appears.
4. Program the Player 2 sprite with the same steps.

NOTE: To get the variable slider bar to appear, club members must double click on the variable display.
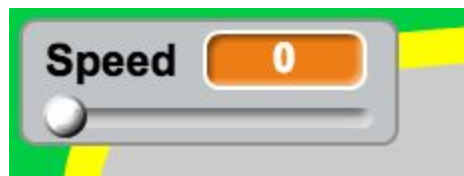
Costume for the
Player 1 sprite:

Player 1

```
when up arrow key pressed
repeat until not < key up arrow pressed? >
    move (Speed) steps
```

Costume for the
Player 2 sprite:

Player 2

```
when w key pressed
repeat until not < key up arrow pressed? >
    move (Speed) steps
```

Club members can
adjust the sliders

Speed 0

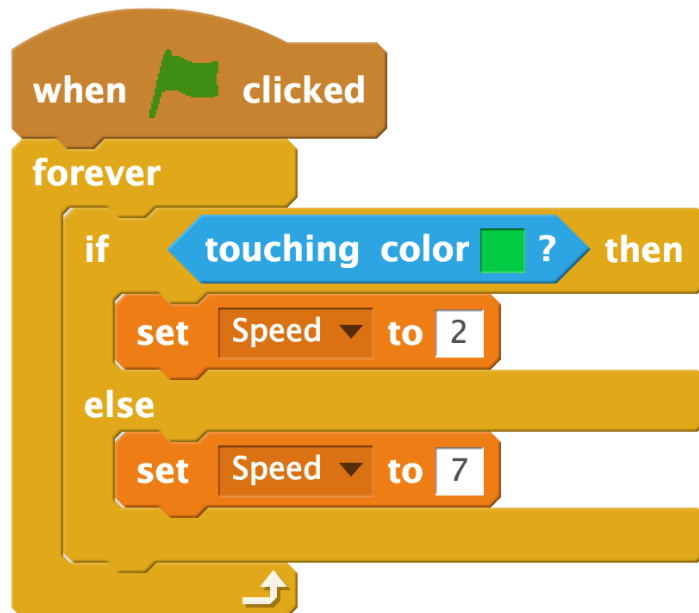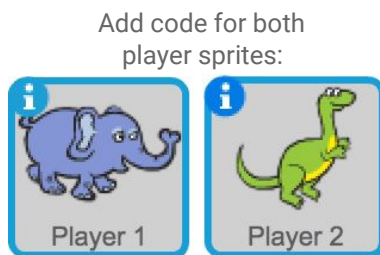## Add-On: Step on the Gas (Part 2)

In this video, club members will:

1. Select Player 1 sprite, and drag out a "when flag clicked" event.
2. Add a "forever" block to the "when flag clicked" event.
3. Place an "if-else" statement inside the "forever" block.
4. Program the "if-else" statement to say "if touching color green go slow, else go fast" using the "touching color" block and "set speed to" blocks.
   a. Create the same code for the Player 2 sprite when it touches the grass.

**NOTE:** Club members must complete the previous add-on (Part 1) before starting this add-on.

Add code for both
player sprites:

Player 1   Player 2

Add-On: Crash

In this video, club members will:

1. Select Player 1 sprite and drag out a "when flag clicked" event.
2. Add a "forever" block to the "when flag clicked" event.
3. Place an if statement inside the "forever" block.
4. Program the "If-Then" statement to say "if touching player 2, then play a sound."

NOTE: Club members can choose any sound from the sound library to play when the sprites touch. They must select the sprite they are adding the code to (Player 1), and add the sound to that sprite.

Costume for the
Player 1 sprite:

Player 1
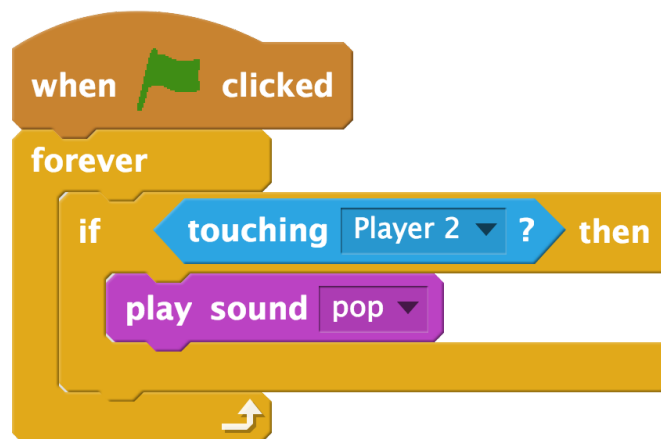
Add-On: Race Fans

In this video, club members will:
1. Code a new sprite to start the race using the "when flag clicked" and "say" blocks.
2. Add a sound from the library, and play it using a "play sound" block.
3. Add race fans to their project, and code them to cheer using "when flag clicked," "say," and "wait" blocks.

NOTE: Club members can choose any sound from the sound library.

Costume for a
new sprite:

Butterfly2

```
when [flag] clicked
wait 2 secs
say GO!! for 2 secs
wait 6 secs
say I want the elephant to win! for 2 secs
```
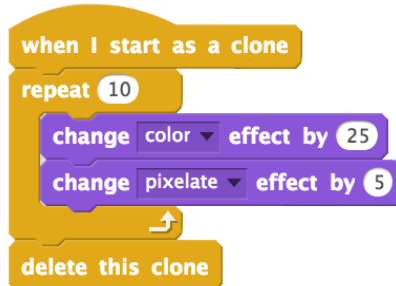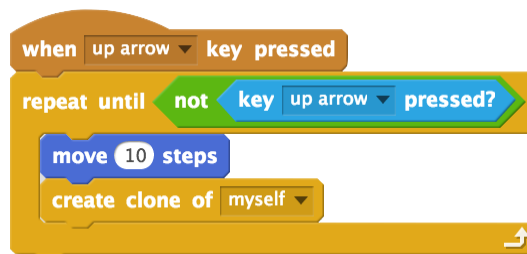
Add-On: Color Trail

In this video, club members will:
1. Create a clone when the player sprite moves forward using a "create clone of myself" block.
2. Make the clone repeat changing colors, then delete itself using "change effect," "delete this clone," and "repeat" blocks.
3. Tinker with the effect to make it your own by adding more "change effect" blocks and modifying the values.
4. Add the same effect, or a completely different one, to the second player sprite.

Add code to either
player sprite:

Player 1

Player 2

```
when [up arrow] key pressed
repeat until < not < key [up arrow] pressed? > >
    move 10 steps
    create clone of [myself]
```

```
when I start as a clone
repeat 10
    change [color] effect by 25
    change [pixelate] effect by 5
delete this clone
```

Activity 3: Maze Game

Video 1: Maze Game Introduction

In this video, club members will:

1. Open and remix one of the starter projects.
2. Sign in.

NOTE: Starter project options are listed below with sprites labeled. This solution sheet shows the player, obstacle and goal sprites for the "Sky Maze."
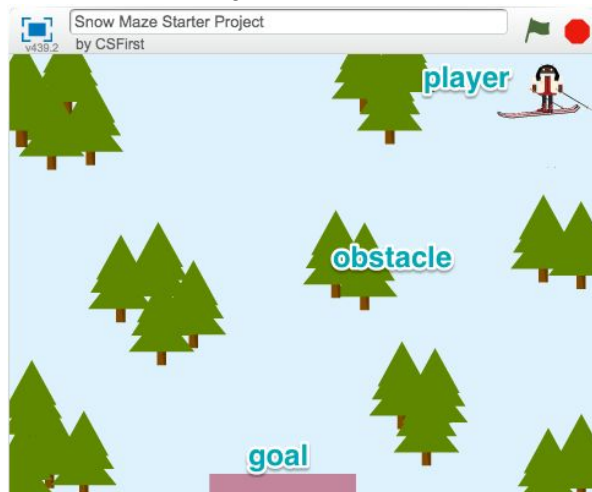
"Sky Maze" uses the white clouds as boundaries.

"Space Maze" uses the grey comets as boundaries.

"Forest Maze" uses the green grass as boundaries

**"Snow Maze" uses the green trees as the boundaries.**

Video 2: Follow the Mouse

In this video, club members will:
1. Make the player sprite go to the mouse pointer.
2. Make the player sprite keep going to the mouse pointer **forever.**
3. Make the player sprite follow the mouse sprite **when** it is clicked.

NOTE: The "if" statement will not work if club members click and drag the sprite to move it. Club members **must** click the sprite once, then allow it to follow the mouse sprite.
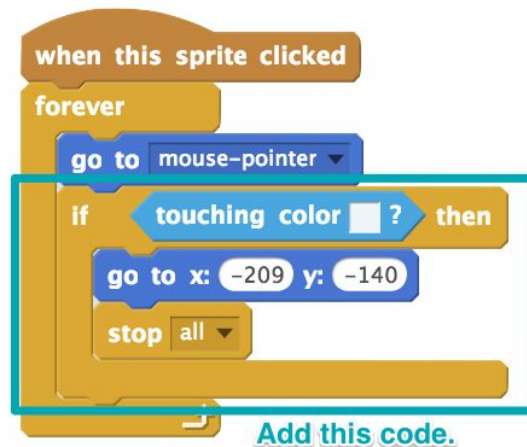
Costume for the **player** sprite:
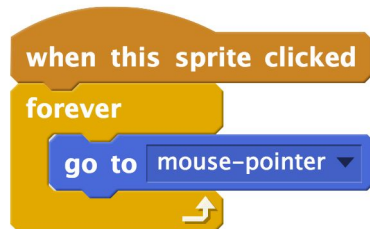
Video 3: Stay Inside the Lines

In this video, club members will:
1. Make the sprite return to the starting position if it touches the boundary by adding "touching," "go to x y," "stop all," and "if" blocks.

NOTE: The color in the "touching color" block should match the color of the maze boundaries.

Costume for the **player** sprite:

Video 4: Using If-Statements to Win

In this video, club members will:
1. Use an "if" block to check if the user has won the game.
2. Program their own, unique celebration. The example pictured here says "you win!"

Costume for the
player sprite:

Pegasus

```
when this sprite clicked
forever
    go to mouse-pointer ▾
    if < touching color [ ] ? > then
        go to x: -209 y: -140
        stop all ▾

    if < touching Goal ▾ ? > then
        say You win! for 2 secs
```

Add this code.

Add-On: Spinning Obstacle

In this video, club members will:
1. Program a spinning obstacle using a "turn" block and a forever loop. Start the obstacle spinning with an event.
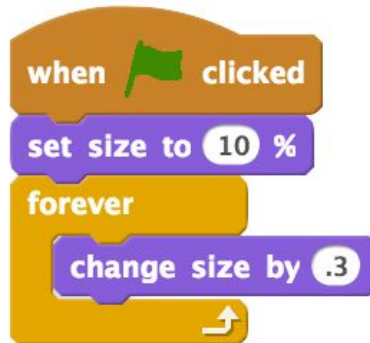
Costume for the
Obstacle sprite:

Obstacle

```
when 🏳 clicked
forever
    turn ↻ 1 degrees
```

Add-On: Overtaken

In this video, club members will:

1. Make the obstacle grow and shrink using "change size by," "set size to," "when flag clicked," and "forever" blocks.

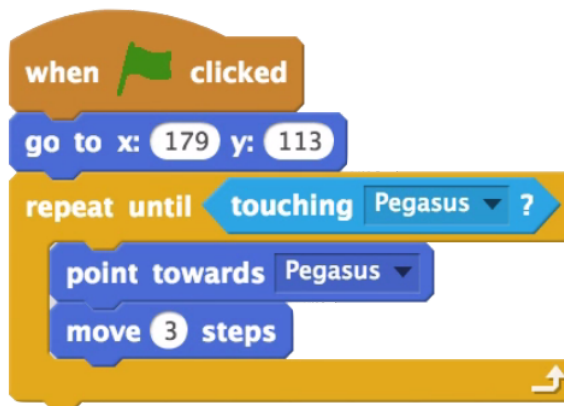Costume for the
Obstacle sprite:

Obstacle

```
when [flag] clicked
set size to 10 %
forever
    change size by .3
```

Add-On: Revenge

In this video, club members will:

1. Make the goal sprite chase the player using "point towards," "move" and "forever" blocks.
2. Change the message at the end of the game.
3. Stop the goal sprite from moving by replacing the "forever" block with "repeat until" and "touching" blocks.

Costume for the
Goal sprite:

Goal

```
when [flag] clicked
go to x: 179 y: 113
repeat until < touching Pegasus ? >
    point towards Pegasus
    move 3 steps
```

Add-On: Keeping Time

In this video, club members will:

1. Keep track of the player's time using "timer" and "say" blocks.

Costume for the **player** sprite:

Pegasus

```
when this sprite clicked
forever
    go to mouse-pointer
    if    touching color [ ] ?  then
        go to x: -209 y: -140
        stop all
    if    touching Goal ?  then
        say timer for 2 secs
```

Add this code.

Add-On: Keeping Time pt. 2

In this video, club members will:

1. Create a "fastest time" variable.
2. Set a new fastest time using the "fastest time" variable, an "if" statement, a "less than" operator, a "set fastest time to" block, and two "timer" blocks.
3. Set the starting fastest time.

NOTE: Create the orange "fastest time" blocks using the "make a variable" button in the data menu.

Costume for the **player** sprite:

Pegasus

Add-On: Redesign Your Maze

In this video, club members will:
1. Click the stage, then the backdrops tab to edit backdrops.
2. Use the reshape tool to change the shape of the boundaries.
3. Paint a new backdrop.

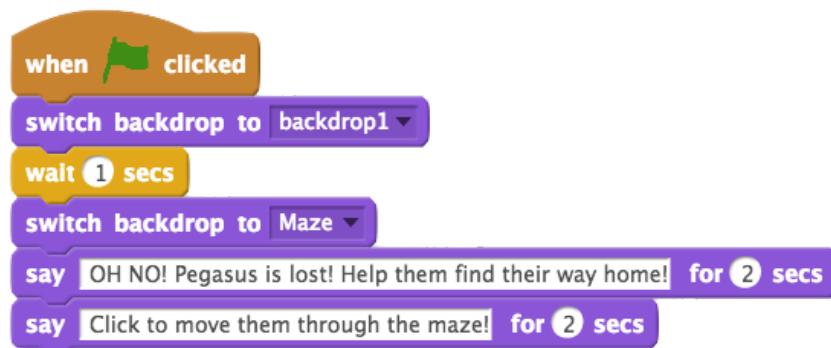**NOTE:** Code is not required for this add-on.

Add-On: Tell a Story

In this video, club members will:
1. Switch the sprite's costumes.
2. Use "say" blocks to tell a story.
3. Add an opening scene with a new backdrop.

NOTE: Club member code may differ greatly from this example, and could be for any sprite.

Costume for the
Goal sprite:

Goal

when [flag] clicked
switch backdrop to backdrop1 ▼
wait 1 secs
switch backdrop to Maze ▼
say [OH NO! Pegasus is lost! Help them find their way home!] for 2 secs
say [Click to move them through the maze!] for 2 secs

Activity 4: Platform Game

In this video, club members will:
1. Open the platform starter project.
2. Remix and sign in.
3. Add 2 sprites to the project.

In this video, club members will:
1. Program the player sprite to jump when the up arrow is pressed.
2. Create a condition that says if the sprite is not touching a platform, then it should move down.

Costume for the
Player sprite:
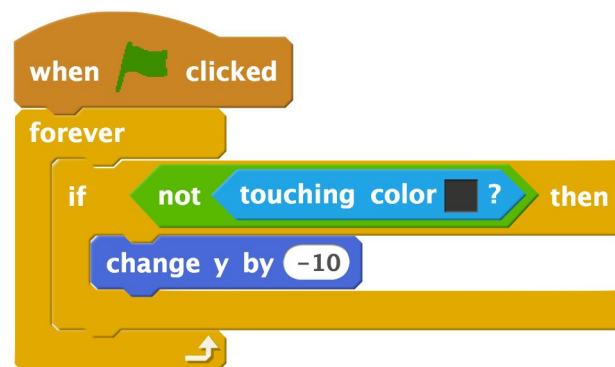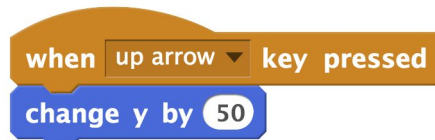
Video 3: Move the Sprite Left and Right

In this video, club members will:

1. Add an event for two arrow key presses.
2. Add a "change x by" block to make the sprite move left and right.
3. Add a "repeat until" block to each event to make the sprite move more smoothly.
4. For each "repeat until" block use a condition that makes the sprite move until the key is not pressed.

Costume for the **Player** sprite:
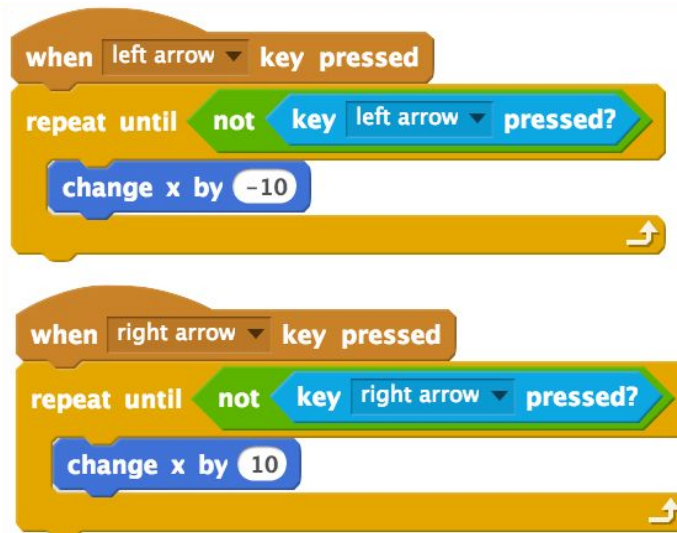
Video 4: Create a Winning Condition

In this video, club members will:

1. Program a decision for when the player sprite wins the game.
2. Add a celebration for when the player sprite wins the game.

NOTE: The winning condition will be different for each club member, but the if-statement should be the same in every member's project.

Costume for the
Player sprite:

Monkey2

```
when up arrow ▼ key pressed
change y by 50
```

```
when ⚑ clicked
forever
  if < not < touching color ■ ? > > then
    change y by -10
  if < touching Bananas ▼ ? > then
    say You win! for 2 secs
    repeat 48
      turn ↻ 30 degrees
```

```
when left arrow ▼ key pressed
repeat until < not < key left arrow ▼ pressed? > >
  change x by -10
```

```
when right arrow ▼ key pressed
repeat until < not < key right arrow ▼ pressed? > >
  change x by 10
```

Add new code.

Add-On: Time to Celebrate!

In this video, club members will:

1. Add a celebration for when the player wins.

NOTE: Club members have a number of options to choose from in the video. Below are the four options shown in the video. Code for the "player" sprite (in this case, the monkey).

Change Color:

Make Stamps:

Go to Random Places:

Dance:

Add-On: Moving Platforms

In this video, club members will:

1. Make platforms move using "glide" blocks.

Costume for the
Platform sprite:

Platform1

```
when [flag] clicked
forever
    glide 1 secs to x: -100 y: -100
    glide 1 secs to x: -159 y: 42
```
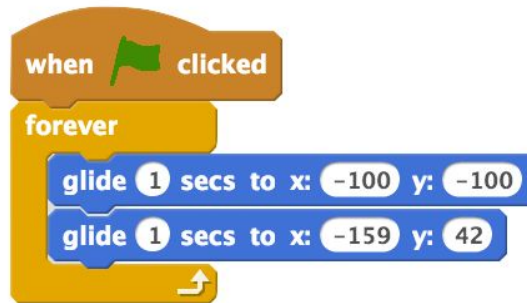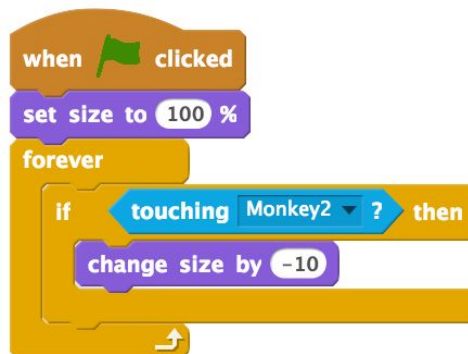
Add-On: Shrinking Platforms

In this video, club members will:

1. Make one of the platforms shrink when the player lands on it.

Costume for the
Platform sprite:

Platform1

```
when [flag] clicked
set size to 100 %
forever
    if < touching Monkey2 ? > then
        change size by -10
```
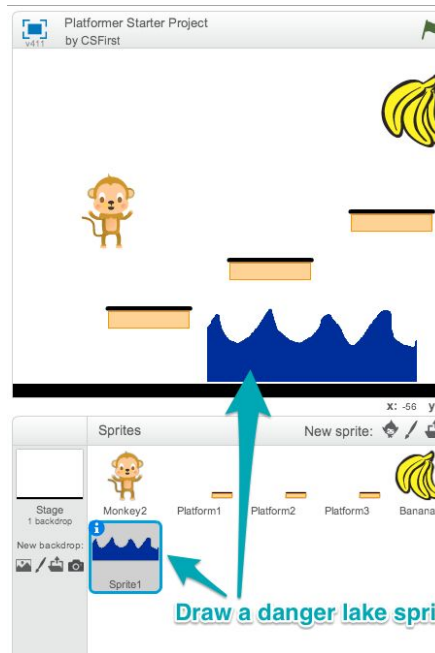
Add-On: Splash! You lose.

In this video, club members will:
1. Draw a Danger Lake sprite.
2. Create a losing condition with "sensing" blocks.

Costume for the **Player** sprite:

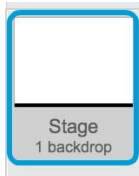## Add-On: Add Some Tunes

In this video, club members will:
1. Add a music loop to their program.

Backdrop for the **Stage:**

Add-On: Bug Fix: Land on Your Feet... or Not

In this video, club members will:

1. Change the color of the player's feet.
2. Change input values in the "sensing" blocks.

Costume for the **Player** sprite:

Monkey2

Player's new feet color

Add this code.

```
when [flag] clicked
forever
  if < not < color [ ] is touching [ ] ? >> then
    change y by (-10)

  if < touching (Bananas ▾) ? > then
    say [Thank you!] for (2) secs
    if < touching (Sprite1 ▾) ? > then
      say [You Lose!]
      stop [all ▾]
```

ThActivity 5: Escape Game

In this video, club members will:
1. Open Scratch, sign in, and create a new project.
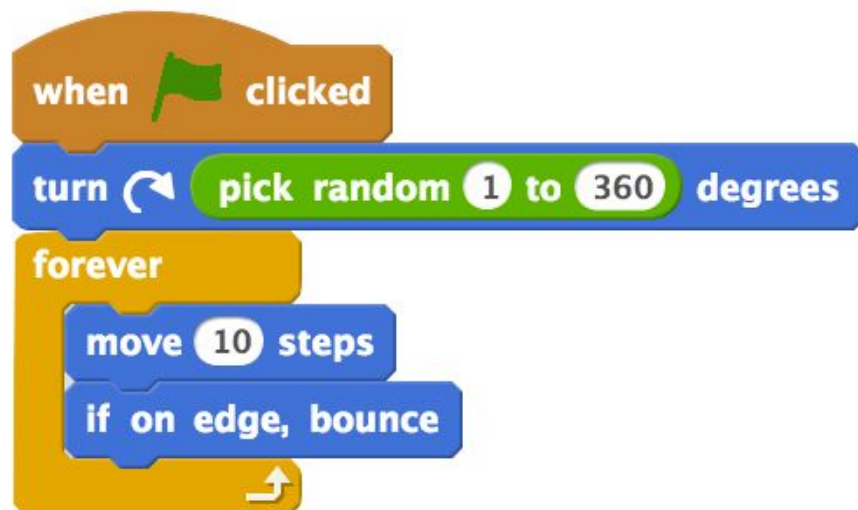2. Add a backdrop.
3. Add 2 sprites.

NOTE: Club members will not code any parts of this project until after watching the second video.

Video 2: The Chase Is On!

In this video, club members will:
1. Make the chaser sprite move forever.
2. Get the chaser sprite to bounce if it is on the edge.
3. Point the chaser sprite in a random direction when it starts.
4. Make the chaser sprite start moving when the green flag is clicked.

Costume for the **chaser** sprite:

Beetle


```
when [green flag] clicked
turn ↻ (pick random (1) to (360)) degrees
forever
    move (10) steps
    if on edge, bounce
```
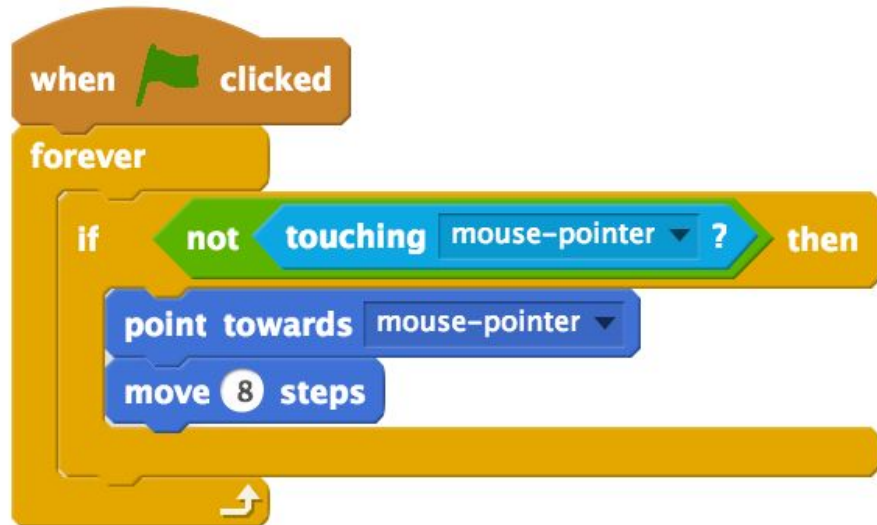
Video 3: Programming the Player Sprite

In this video, club members will:

1. Make the player sprite point towards the mouse pointer, then move forward.
2. Make the player sprite keep following the mouse pointer forever.
3. Only make the sprite move towards the mouse pointer if it is not touching the mouse pointer.
4. Make the player sprite move when the green flag is clicked.

Costume for the
player sprite:

Giga

```
when 🚩 clicked
forever
    if  not  touching mouse-pointer ▼ ? then
        point towards mouse-pointer ▼
        move 8 steps
```

Video 4: Keeping Score

In this video, club members will:
1. Make the chaser sprite "say" the amount of time the player sprite survived.
2. Make the chaser sprite "say" the amount of time the player sprite survived if the chaser sprite is touching the player sprite.
3. Duplicate the chaser sprite to make more obstacles for the player to avoid.

NOTE: At this point, club members may have added more chaser sprites to their game.
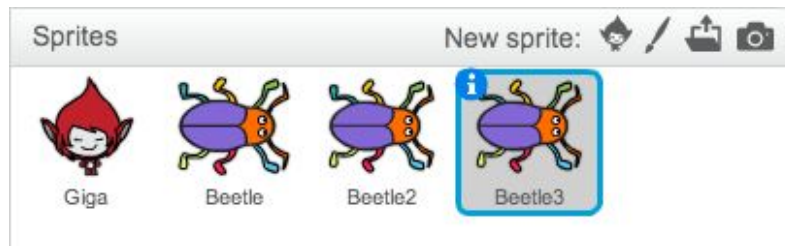
Costume for the **chaser** sprite:

Beetle

when [green flag] clicked
turn ↻ (pick random 1 to 360) degrees
forever
    move 10 steps
    if on edge, bounce
    if < touching Giga ? > then
        say (timer) for 2 secs
        say [ ] for 2 secs

Add this code.

Duplicate more chaser sprites.

Sprites   New sprite: 🐱 ✏️ 📁 📷

Giga   Beetle   Beetle2   Beetle3

Add-On: Play a Sound if Caught

In this video, club members will:
1. Add a sound to the project.
2. Program the project to play that sound.

Costume for the **chaser** sprite:

Beetle

```
when [flag] clicked
turn ↻ (pick random 1 to 360) degrees
forever
    move 10 steps
    if on edge, bounce
    if < touching [Giga ▾] ? > then
        play sound [screech ▾]        Add this code block.
        say (timer) for 2 secs
        say [ ] for 2 secs
```

Add-On: Play Your Game With A Friend

In this video, club members will:

1. Select one sprite to be controlled by another player, and rename it.
2. Remove the code that moves the sprite, NOT the rest of the code.
3. Program the second player's sprite to move forward when the up arrow is pressed.
4. Program the second player's sprite to move backward when the down arrow is pressed.
5. Program the second player's sprite to turn left when the left arrow is pressed.
6. ON THEIR OWN: Program the second player's sprite to turn right when the right arrow is pressed.
7. Figure out how fast they want player 2 to move.

Costume for the
chaser sprite:

Beetle

```
when [flag] clicked
turn ↻ (pick random (1) to (360)) degrees
forever
    if < touching (Giga ▾) ? > then
        say (timer) for (2) secs
        say [ ] for (2) secs
```

```
when (up arrow ▾) key pressed
repeat until < not < key (up arrow ▾) pressed? >>
    move (10) steps
```

```
when (right arrow ▾) key pressed
repeat until < not < key (right arrow ▾) pressed? >>
    turn ↻ (15) degrees
```

```
when (down arrow ▾) key pressed
repeat until < not < key (down arrow ▾) pressed? >>
    move (10) steps
```

```
when (left arrow ▾) key pressed
repeat until < not < key (left arrow ▾) pressed? >>
    turn ↺ (15) degrees
```

Add-On: Change up the Player

In this video, club members will:
1. Give the sprite a different costume.
2. Use the "or" block to check if the sprite is touching any chaser sprites.
3. Make the player sprite change costumes when it is touching a chaser sprite.
4. Use a "wait" block to slow down the pace of the costume changes.

Costume for the **player** sprite:

Giga

```
when [flag] clicked
forever
  if < touching Chaser 1 ? > or < touching Chaser 2 ? > or < touching Chaser 3 ? > then
    next costume
    wait .1 secs
```

Add-On: Speed Up the Chase

In this video, club members will:
1. Use "timer" to control the movement of the chaser sprite.
2. Use operators to change the speed.

Costume for the **chaser** sprite:

Beetle

```
when [flag] clicked
turn ↻ (pick random 1 to 360) degrees
forever
  move (timer / 2) steps          Add this code.
  if on edge, bounce
  if < touching Giga ? > then
    say (timer) for 2 secs
    say [ ] for 2 secs
```

Add-On: High Score

In this video, club members will:
1. Add a high score variable to store the highest score.
2. Use an if statement to record a new high score.
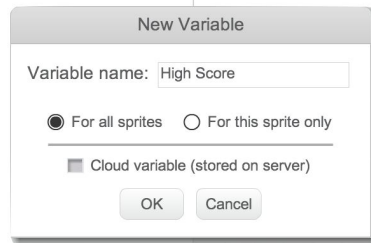
Costume for the **chaser** sprite:

Click "Data" menu.

Click "Make a Variable."

Name the variable and click "OK."

Add this code.

Activity 6: Launcher Game

Video 1: Launcher Games and Randomness

In this video, club members will:

1. Open the starter project on the CS First Page.
2. Remix the project and sign in to Scratch.
3. Add a sprite and shrink it.

NOTE: Club members will not code any parts of this project until after watching the second video.


Starter project has 1 sprite- the Finish line.

NO CODE is given in the starter project.
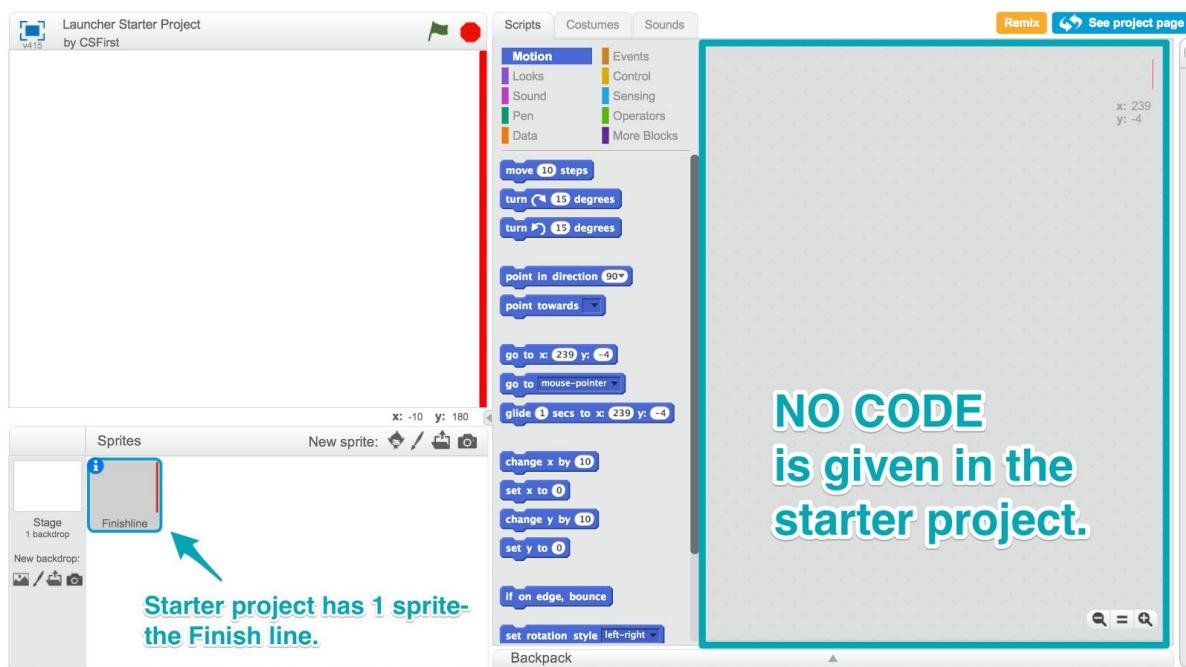
Video 2: Launch a Sprite

In this video, club members will:

1. Move the sprite forward when the spacebar is pressed.
2. Use a "repeat until" and a "touching finish line" block to repeat moving forward until the sprite reaches the finish line.
3. Set the starting position using a "go-to" block.

Costume for the
Player sprite:

Fish3

```
when space key pressed
repeat until  touching Finishline ?
    move 10 steps
go to x: -22 y: 3
```
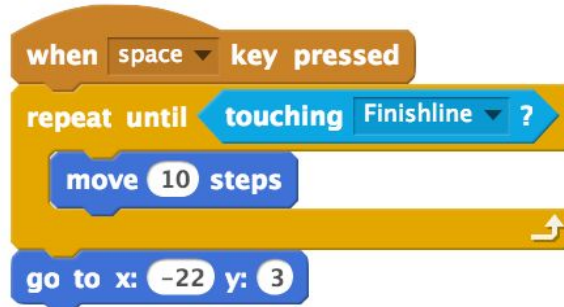
Video 3: Turn the Sprite Left and Right

In this video, club members will:

1. Create arrow key press events.
2. Program the arrow keys to turn the sprite right and left.
3. Use a "repeat-until" block, a "key-press sensing" block, and a "not" block to keep turning the sprite until the arrow keys are no longer being pressed.

Costume for the
Player sprite:

Fish3

```
when left arrow key pressed
repeat until  not  key left arrow pressed?
    turn ↺ 15 degrees
```

```
when right arrow key pressed
repeat until  not  key right arrow pressed?
    turn ↻ 15 degrees
```
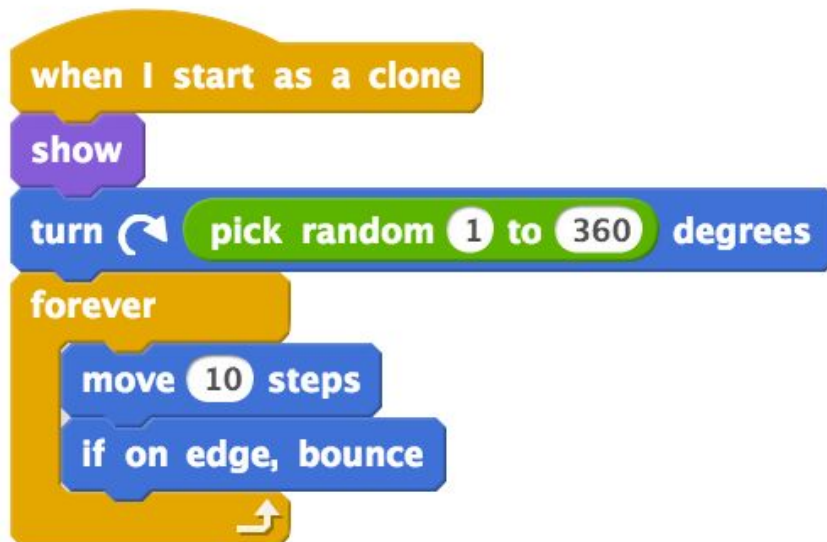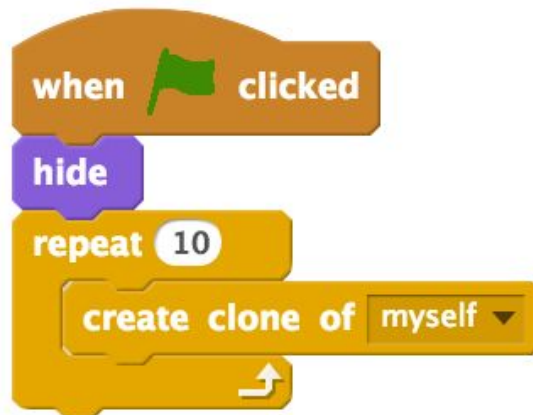
Video 4: Spawning Enemies

In this video, club members will use:

1. Add an enemy sprite.
2. Create a clone of the enemy when the flag is clicked.
3. Add a "when I start as a clone" event (found in control) to the code you already created for bouncing the sprite.
4. Add a "hide" block to the end of the flag event.
5. Add a "show" block to the beginning of the "when I start as a clone" event.

Costume for the
Enemy sprite:

Shark

```
when 🚩 clicked
hide
repeat 10
    create clone of myself ▼
```

```
when I start as a clone
show
turn ↻ pick random 1 to 360 degrees
forever
    move 10 steps
    if on edge, bounce
```

Video 5: Keeping Score

In this video, club members will use:
1. Create a "score" variable for the player sprite.
2. Make the score go up by 1 when the sprite touches the finish line.
3. Create enemy clones and program the sprite so it stops moving if it touches an enemy.
4. Make the game harder by having it create an enemy clone every time a point is scored.
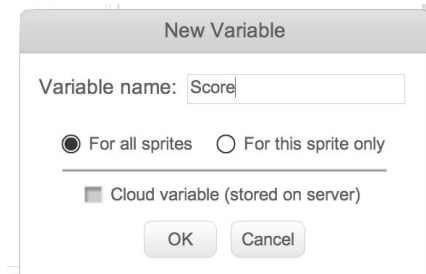
Costume for the
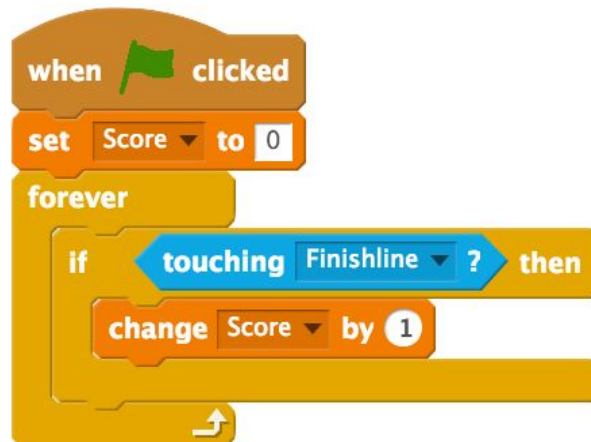**Player** sprite:

Click "Data" menu.

Click "Make a
Variable."

Name the variable and
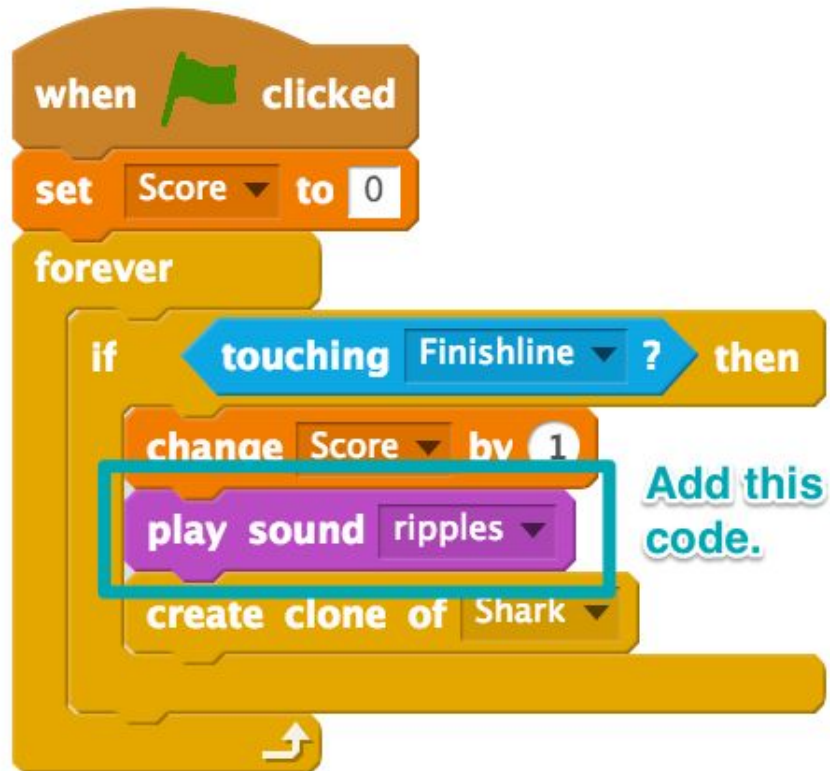click "OK."

Add this code.

Add-On: Finish Line Cheer

In this video, club members will use:

1. Add a sound that will play when a player touches the finish line.
2. Add a "play sound" Block.

Costume for the
Player sprite:



Fish3

Add-On: Play with a Friend Option 1

In this video, club members will use:
1. Copy the player 1 sprite.
2. Change player 2's appearance.
3. Change player 2's key press events.
4. Change the starting position of player 2.
5. Create a score for player 2.
6. Program player 2's score to start at 0.

Costume for the
Player sprite:

NOTE: Make sure students change the boxed values when they duplicate the code for their sprite.
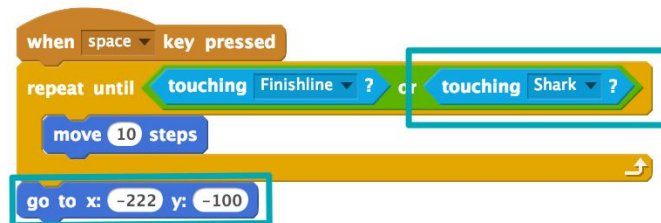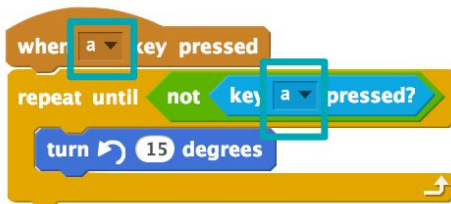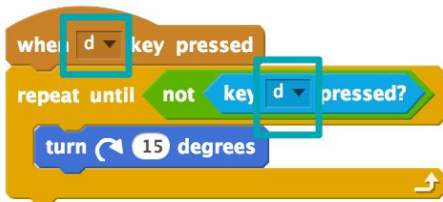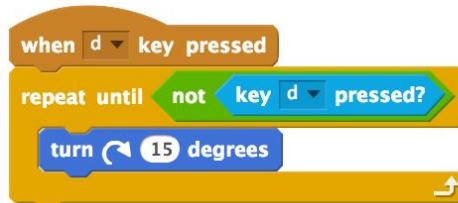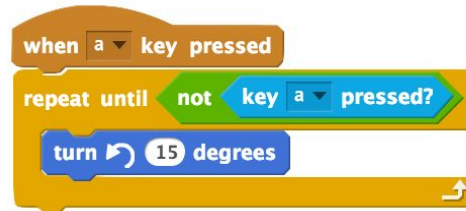
Add-On: Play with a Friend Option 2

In this video, club members will:
1. Add a key pressed event to your enemy sprite's script area.
2. Make your enemy sprite turn left.
3. Duplicate your code stack to program the enemy sprite to turn right.

Costume for the
enemy sprite:

```
when a ▼ key pressed
repeat until  < not < key a ▼ pressed? > >
    turn ↺ 15 degrees
```

```
when d ▼ key pressed
repeat until  < not < key d ▼ pressed? > >
    turn ↻ 15 degrees
```
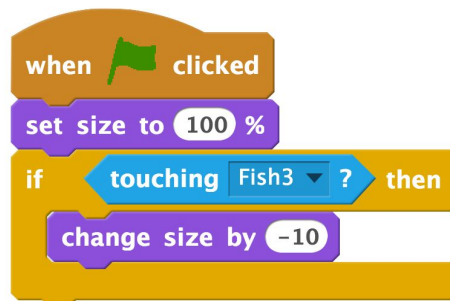
Add-On: Shrinking Finish Line

In this video, club members will:
1. Add "change size" blocks and "set size" blocks to your program.
2. Make your finish line shrink using negative numbers.
3. Reset the size of your finish line.

Costume for the
Finish line sprite:

Finishline

```
when 🏳 clicked
set size to 100 %
if < touching Fish3 ▼ ? > then
    change size by -10
```

Add-On: Bonus Points!

In this video, club members will:
1. Create a bonus sprite and make it appear randomly.
2. Reset the bonus sprite's location to its starting position.
3. Allow a player to earn points by touching the bonus sprite.

Add a new **bonus** sprite:

Apple

```
when [flag] clicked
hide
go to x: -200 y: -10
forever
  if < pick random 1 to 10 = 10 > then
    show
    glide 1 secs to x: -96 y: 24
    hide
    go to x: -200 y: -10
```

Costume for the **player** sprite:

Fish3

```
when [flag] clicked
set Score to 0
forever
  if < touching Finishline ? > then
    change Score by 1
    create clone of Shark
  if < touching Apple ? > then
    change Score by 1
```
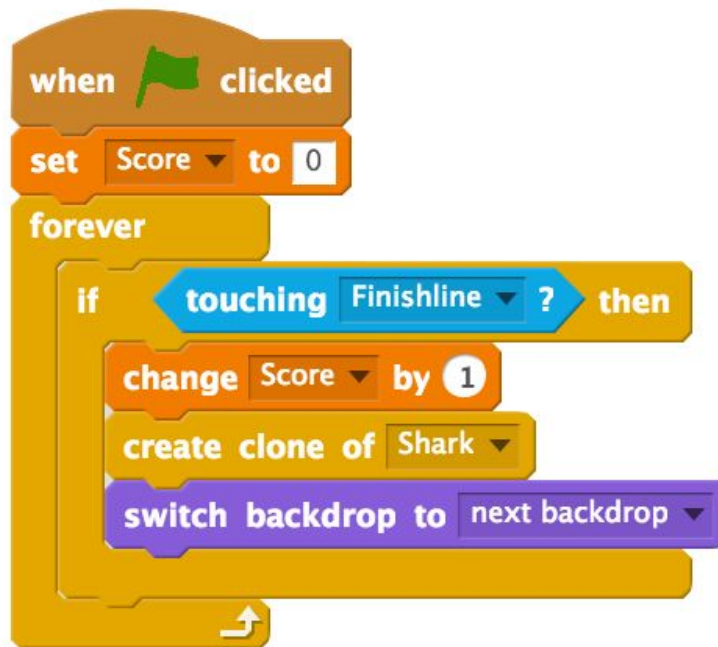
Add this code.

Add-On: Changing Level Design

In this video, club members will:

1. Add more backdrops to the project.
2. Add backdrop code to the player 1 sprite, and make the background switch forever.

NOTE: Final code for club members should look very similar to what is below. Values may vary in the different blocks.

Costume for the
player sprite:

Activity 7: Quest Game

Video 1: Activity 7 Survey

In this video, club members will:
1. Watch a video that introduces the survey.
2. Complete the survey.
3. Submit the survey and watch the next video.

NOTE: There are no wrong answers for the survey.

The "next" arrow submits the survey.

Video 2: Introduction to RPG's.

In this video, club members will:
1. Select a starter project.
2. Click remix.
3. Sign in.

NOTE: Club members do not add any code during this step.

Video 3: Places to Go

In this video, club members will:

1. Program the game to begin on the "town" backdrop using a "when flag clicked" and a "switch backdrop to town" block.
2. For each entrance sprite:
   a. Program the backdrop to change using the "touching," "switch backdrop," "when flag clicked," "forever," and "if" blocks.
   b. Hide all entrance sprites using a "broadcast" block, a "when I receive" block, and a "hide" block.
   c. Show all the entrances with "when backdrop switches to town" and "show" blocks.

Costume for the
Character2 sprite:

Costumes for the
all entrance sprites:
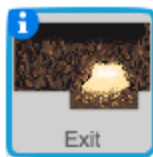
Video 4: Add an Exit

In this video, club members will:

1. Copy the code from the house sprite to the exit sprite by dragging each block stack onto the exit sprite in the sprite selector window.
2. Exchange the "show" and "hide" blocks (when the backdrop switches to "town" show, and when I receive "hide entrances" hide.)
3. Change the "switch backdrop" value to "town."
4. Remove the "broadcast" block.

Costume for the
Exit sprite:

Video 5: Hide the Object

In this video, club members will:
1. Select the object sprite and a costume from the costumes tab.
2. Show the object in one location using "when backdrop switches" and "show" blocks.
3. Hide the object at the start of the program using "when backdrop switches" and "hide" blocks.
4. Program a winning condition using "touching," "forever," and "if" blocks.

Costume for the
Object sprite:

Object

```
when backdrop switches to [cave ▼]
show
forever
    if < touching [Character ▼] ? > then
        play sound [fairydust ▼] until done
```

```
when backdrop switches to [town ▼]
hide
```
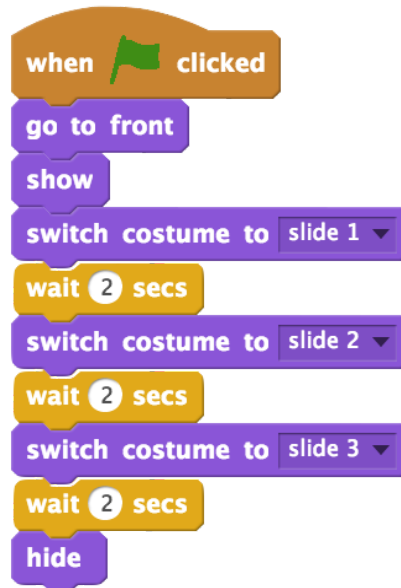
Video 6: Adding Storytelling Elements
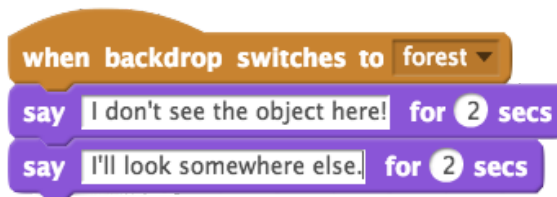
In this video, club members will:
1. Add text to the narrative sprite's three costumes to introduce the story.
2. Program the "narrative sprite" to show using "when flag clicked," "show," "go to front," "switch costume," "wait," and "hide" blocks.
3. Make the character2 sprite say something using "when backdrop switches" and "say" blocks.

NOTE: The example code below may differ from club member code.

Costume for the
Exit sprite:

Narrative


```
when [flag] clicked
go to front
show
switch costume to slide 1
wait 2 secs
switch costume to slide 2
wait 2 secs
switch costume to slide 3
wait 2 secs
hide
```

Costume for the
Character2 sprite:

Character2

```
when backdrop switches to forest
say I don't see the object here! for 2 secs
say I'll look somewhere else. for 2 secs
```

Add-On: Rearranging Furniture

In this video, club members will:

1. Use the vector editing tools to move objects and customize the backdrops in their RPG.

NOTE: No code is added during this video.

Add-On: Peek-a-boo

In this video, club members will:

1. Make the object appear only if it's close to the sprite using a "distance to" block, a "less than" operator, and "show," "hide," and "if else" blocks.

Costume for the
Object sprite:

Add-On: Code a Conclusion

In this video, club members will:

1. Add closing slides to end their RPG.
2. Program the "Narrative" sprite to cycle through the ending slides.
3. Use "broadcast" blocks to make the code run when the character finds the object.

NOTE: Club members may have a different number of closing slides than this example shows.

Costume for the
Narrative sprite:

Narrative

```
when I receive Game Over
show
go to front
switch costume to slide 4
wait 2 secs
switch costume to slide 5
wait 2 secs
```

Costume for the
Object sprite:

Object

```
when backdrop switches to town
hide

when backdrop switches to house
show
forever
    if touching Character ? then
        play sound fairydust until done
        broadcast Game Over
```
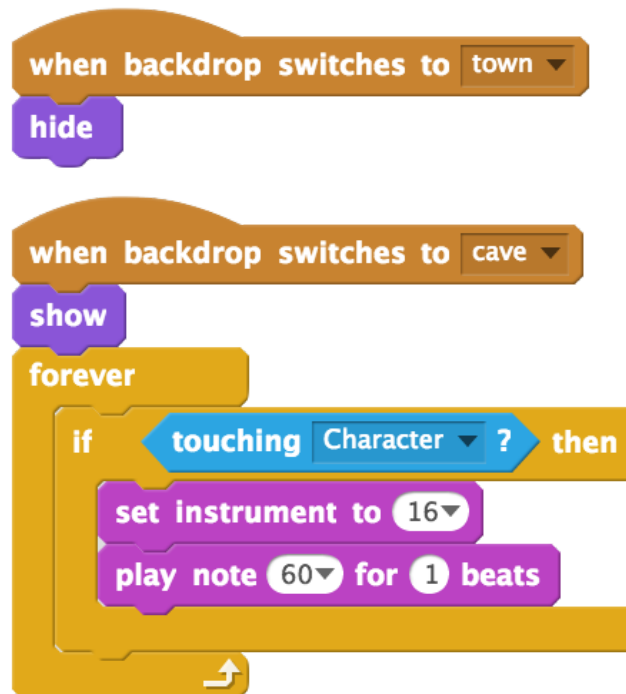
Add this code.

Add-On: Musical Objects

In this video, club members will:
1. Add a new sprite.
2. Add an instrument and note combination using "set instrument" and "play note" blocks.
3. Make the sound play as the sprite walks over the object using "touching," "if," and "forever" blocks.
4. Make the object show only in a specific location using the "when backdrop switches," "show," and "hide" blocks.
5. Duplicate the sprite, and change its appearance and sound as many times as they like.

NOTE: Code for one example sprite is shown, but club members are encouraged to create many sprites.

Costume for a **new** sprite:

Sprite1

```
when backdrop switches to [town ▼]
hide


when backdrop switches to [cave ▼]
show
forever
    if < touching [Character ▼] ? > then
        set instrument to (16▼)
        play note (60▼) for (1) beats
```

Add-On: Obstacle Obstruction

In this video, club members will:

1. Make the character move backwards when it bumps into obstacles using the "touching color," "move," "if," and "forever" blocks. To select a color in the "touching color" block, click on the block's color swatch, then the color you wish to select.
2. Ensure that the color rules work only for a specific backdrop using the "backdrop name," "equals," and "if" blocks.
3. Add as many color rules as they like using the same blocks.

NOTE: The example code below may differ from club member code.

Costume for the
**Character2** sprite:

Character2

Add-On: Hide and Seek

In this video, club members will:

1. Select the object sprite, and discard the "when backdrop switches to" block for the "touching character" conditional.
2. Drag the "backdrop #" block from the stage into the "objects" sprite.
3. Create a "object location" variable, and set it to a random number at the start of the program.
4. Build a conditional that checks if the backdrop number equals the object location variable.
5. If the condition is true, show the "object" sprite, and turn on the winning condition.

NOTE: The example code below may differ from club member code.
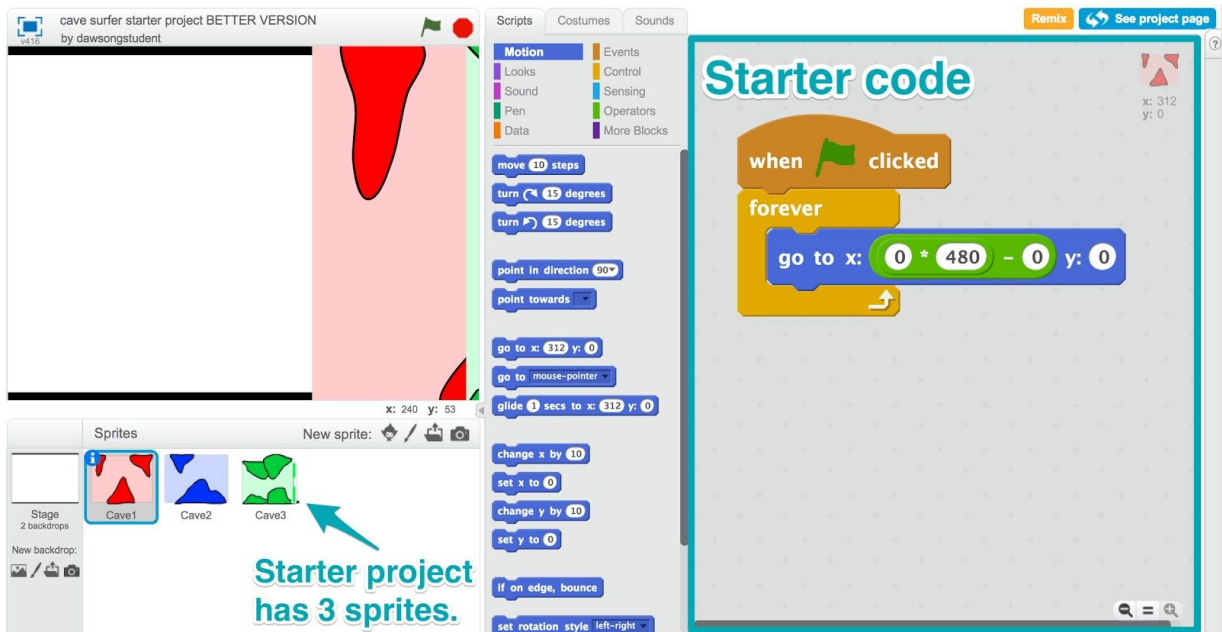
Costume for the
Object sprite:
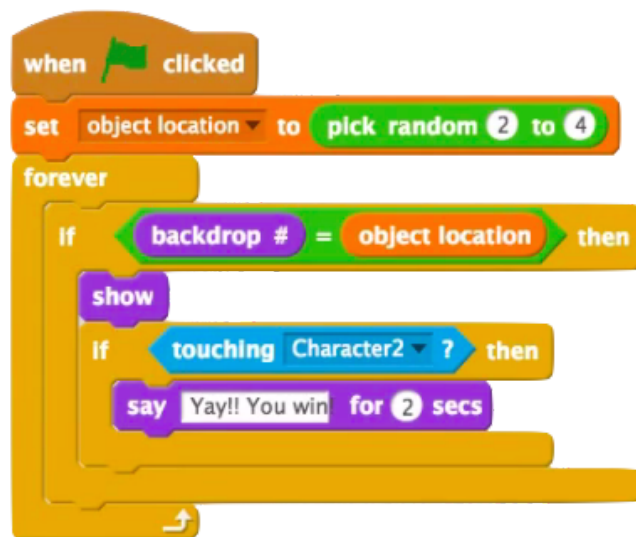
Activity 8: Cave Surfing Game

Video 1: Side Scrolling Games and If-Else Statements

In this video, club members will:
1. Open the starter project on the CS First page.
2. Remix the project.
3. Sign in to Scratch.

NOTE: Club members will not code any parts of this project until after they watch the second video.

Video 2: Create a Scrolling Backdrop

In this video, club members will:
1. Make the player sprite move across the screen.
2. Make the sprite keep moving across the screen.
3. Reset the sprite's position at the start of each game.
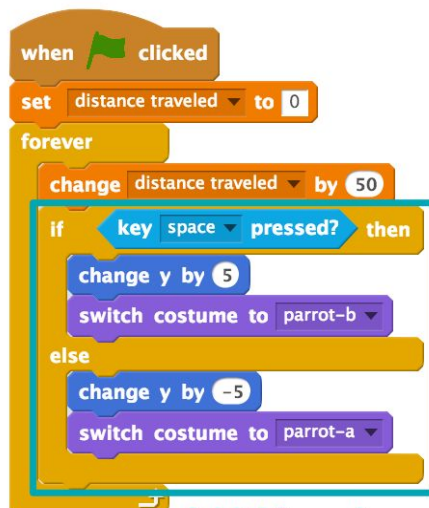
Costume for the
player sprite:

Parrot

```
when [green flag] clicked
set distance traveled to 0
forever
    change distance traveled by 50
```

Video 3: Making the Parrot Rise and Fall

In this video, club members will:
1. Add an if-else statement and a "space key pressed" block.
2. Program the "if" condition to move y by 5 and the "else" condition to move y by -5.
3. Add costume changes to make the sprite look more realistic as it flies up and down.

Costume for the
player sprite:

Parrot

```
when [green flag] clicked
set distance traveled to 0
forever
    change distance traveled by 50
    if < key space pressed? > then
        change y by 5
        switch costume to parrot-b
    else
        change y by -5
        switch costume to parrot-a
```

Add this code.

Activity 8: Cave Surfer Game

Video 4: Winning and Losing at Cave Surfing

In this video, club members will:

1. Program winning and losing conditions by adding "if," "touching color," and "stop all" blocks.
2. Add features to the winning and losing conditions to make gameplay more exciting.

NOTE: Club members can create their own winning and losing conditions. Below is an example:

Costume for the
player sprite:

Parrot

```
when [flag] clicked
set distance traveled to 0
forever
    change distance traveled by 50
    if < key space pressed? > then
        change y by 5
        switch costume to parrot-b
    else
        change y by -5
        switch costume to parrot-a

    if < touching color [black]? > then
        say Game over!! for 2 secs
        stop all

    if < touching color [green]? > then
        say You win! for 2 secs
        stop all
```

Add this code.

Add-On: Make Your Own Music

In this video, club members will:

1. Use the "play drum" blocks to add a drum beat.
2. Use the "play note" blocks to add background music.

NOTE: Club members can use multiple and varied beats and notes. Two examples are below:

Costume for the **player** sprite:

Parrot

when ⚑ clicked

play drum 2▾ for 0.25 beats
play drum 2▾ for 0.25 beats
play drum 1▾ for 0.25 beats
play drum 12▾ for 0.25 beats

when ⚑ clicked

play note 60▾ for .25 beats
play note 52▾ for .25 beats
play note 55▾ for .25 beats
play note 48▾ for .25 beats

Add-On: Add Another Cave Section

In this video, club members will:
1. Design a new cave sprite with black edges.
2. Copy the code from another cave.
3. Adjust the number to match the cave order.

NOTE: Club members must copy their code from one cave sprite to another for this to work. They also must change the code for the finish line cave to make it the last one.
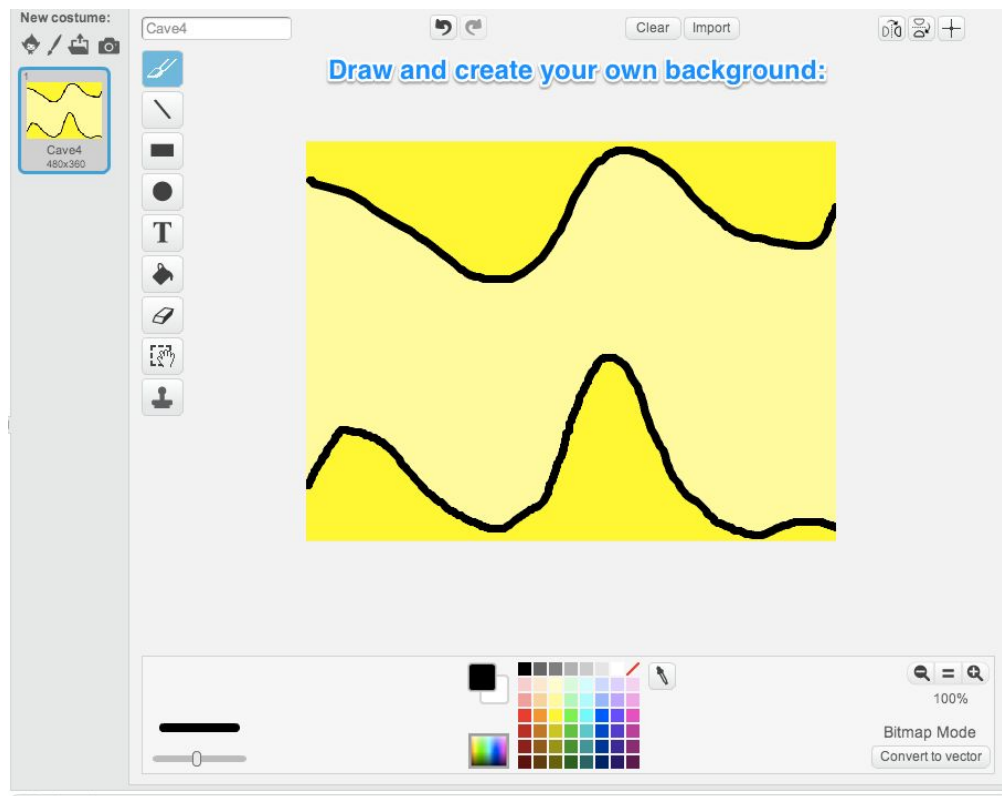
Add-On: Make the Game Harder

In this video, club members will:

1. Add blocks that tell the computer to wait until the spacebar is no longer being pressed to let the sprite move up more .
2. Change the difficulty level.

Costume for the **player** sprite:

Parrot

```
when [flag] clicked
set distance traveled ▼ to 0
forever
    change distance traveled ▼ by 50
    if  < key space ▼ pressed? > then
        change y by 5
        switch costume to parrot-b ▼
        wait until < not < key space ▼ pressed? > >
    else
        change y by -5
        switch costume to parrot-a ▼

    if < touching color [black] ? > then
        say Game over!! for 2 secs
        stop all ▼

    if < touching color [green] ? > then
        say You win! for 2 secs
        stop all ▼
```

Add this code.

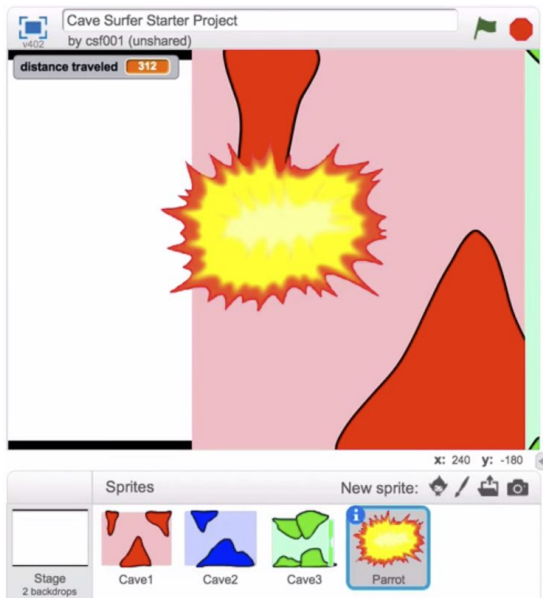## Add-On: Dangerous Cave Walls

In this video, club members will:

1. Download the "explosion" image, and add it as a costume.
2. Make the player sprite explode when it touches the walls of the cave.

Costume for the
player sprite:

Parrot

Example:

Add this code.

Add-On: Dive

In this video, club members will:
1. Use another "if-else" block to make the sprite move down even if the other keys are not pressed.
2. Create a keypress event to make the sprite dive, or move down faster than it falls.

Costume for the **player** sprite:

Parrot

```
when ⚑ clicked
set distance traveled ▼ to 0
forever
    change distance traveled ▼ by 50
    if key space ▼ pressed? then
        change y by 5
        switch costume to parrot-b ▼
    else
        if key down arrow ▼ pressed? then
            change y by -10
            switch costume to parrot-a ▼
        else
            change y by -5
            switch costume to parrot-a ▼
    if touching color ■ ? then
        say Game over!! for 2 secs
        stop all ▼
    if touching color ■ ? then
        say You win! for 2 secs
        stop all ▼
```

Add an "if-else,"
a "Change y By"
and a "switch
costume to" block.

Add-On: Add Another Level

In this video, club members will:

1. Remove the "stop all" and change the "you win!"
2. Reset the variable by changing "distance traveled" back to 0.
3. Make a new variable called "Level."
4. Make "Level" correspond to the speed of the sprite.
5. Use the "Set Level to" block to reset the game.
6. Add a "Change Level by 1" block to the winning condition.

NOTE: Final code for club members should look very similar to what is below. Values may vary in the different blocks.

Costume for the **player** sprite:

Parrot