

UNIT 1

EXPLORING



YOU ARE HERE



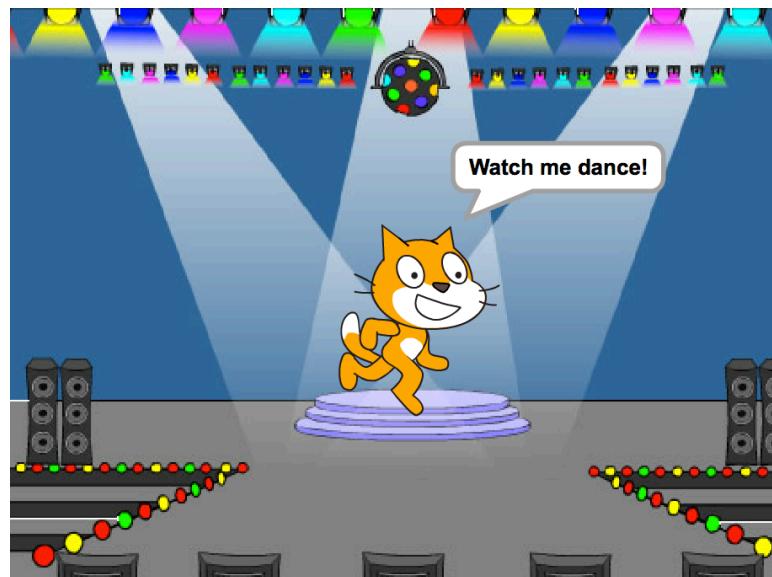
WHAT'S INCLUDED

PROGRAMMED TO DANCE
STEP-BY-STEP
10 BLOCKS
MY STUDIO
DEBUG IT!
ABOUT ME

STEP-BY-STEP

NEW TO SCRATCH? CREATE YOUR FIRST SCRATCH PROJECT!

In this activity, you will follow the Step-by-Step Intro in the Tips Window to create a dancing cat in Scratch. Once you have completed the steps, experiment by adding other Scratch blocks to make the project your own.



START HERE

- Follow the Step-by-Step Intro in the Tips Window.
- Add more blocks.
- Experiment to make it your own!

turn (15 degrees)

turn (15 degrees)

glide (1 secs to x: y:)

change tempo by (20)

What blocks do you want to experiment with?

The Scratch Tips window titled "Step-by-Step Intro". It shows a stage with a boy and a cat. A speech bubble from the cat says "Watch me dance!". Below the stage, a list of steps is shown:

- ★ 1 Start Moving

Instructions: Drag a MOVE block into the Scripts area. The Scripts area shows a sequence of blocks:

```
move (10 steps)
turn (15 degrees)
turn (15 degrees)
```

Notes: Then, click on that block to make the cat move:

THINGS TO TRY

- Try recording your own sounds.
- Create different backdrops.
- Turn your project into a dance party by adding more dancing sprites!
- Try designing a new costume for your sprite.

FINISHED?

- + Add your project to the Step-by-Step Studio: <http://scratch.mit.edu/studios/475476>
- + Challenge yourself to do more! Play with adding new blocks, sound, or motion.
- + Help a neighbor!
- + Choose a few new blocks to experiment with. Try them out!

10 BLOCKS

WHAT CAN YOU CREATE WITH ONLY 10 SCRATCH BLOCKS?

Create a project using only these 10 blocks. Use them once, twice, or multiple times, but use each block at least once.

START HERE

- Test ideas by experimenting with each block.
- Mix and match blocks in various ways.
- Repeat!

FEELING STUCK?

THAT'S OKAY! TRY THESE THINGS...

- Test ideas by trying out different block combinations. Mix and match blocks until you find something that interests you!
- Try brainstorming ideas with a neighbor!
- Explore other projects to see what others are doing in Scratch. This can be a great way to find inspiration!

go to x: 0 y: 0

glide 1 secs to x: 0 y: 0

say Hello! for 2 secs

show

hide

set size to 100 %

play sound meow until done

wait 1 secs

when this sprite clicked

repeat 10

FINISHED?

- + Add your project to the 10 Blocks Studio:
<http://scratch.mit.edu/studios/475480>
- + Play with different sprites, costumes, or backdrops.
- + Challenge yourself to do more! See how many different projects you can create with these 10 blocks.
- + Swap projects with a partner and remix each others' creations.

MY STUDIO

WHAT CAN BE CREATED WITH SCRATCH?

In this activity, you will investigate the range of creative possibility with Scratch by exploring some of the millions of projects on the Scratch website – and start a collection of favorites in a Scratch studio!

The screenshot shows the 'My Studio' page on the Scratch website. It displays four project cards:

- Scratch Cat**: A cat character running across a grassy field.
- Full 16 Frame Scratch ...**: A cat character in a different pose.
- Automatic Drawing**: A complex geometric drawing made by a Scratch script.
- Slideshow**: A thumbnail showing a person working at a computer.
- NiavL**: A thumbnail of a flower drawing.

Below the cards, there is a message: "Updated 28 May 2013 My studio of interesting projects."

START HERE

- ☐ Browse projects on the Scratch homepage OR click on "Explore" to search for specific types of projects.
- ☐ Create a new studio from your My Stuff page.
- ☐ Add three (or more!) inspiring projects to your studio.

The screenshot shows the 'My Stuff' page. On the left, there's a sidebar with options: Profile, My Stuff (selected), Account settings, and Sign out. The main area shows two project cards:

- Maze**: Last modified: 22 Sep 2011. Includes a green and yellow bar chart icon, a 'See inside' button, and a 'Unshare' button.
- About Me**: Last modified: 27 May 2013. Includes a small character icon, a 'See inside' button, and a 'Unshare' button.

At the top right, there are '+ New Project' and '+ New Studio' buttons.

The screenshot shows the Scratch homepage. At the top, it says "Create stories, games, and animations Share with others around the world". Below that are three buttons: "TRY IT OUT", "SEE EXAMPLES", and "JOIN SCRATCH". To the right, there's a preview of a Scratch script for a cat character.

A creative learning community with 5,671,545 projects shared

[ABOUT SCRATCH](#) | [FOR EDUCATORS](#) | [FOR PARENTS](#)

Featured Projects

- Scratch's SINGATHON!** by helloyowuzzup
- Simple Angle Calculator** by junebeetle
- Escape** by devindubois
- FINISHED Rainbowdas...** by 2009312
- Matoran** by GoldenMiru

Featured Studios

- Blender**
- ESCAPE**
- FINISHED Rainbowdas...**
- Matoran**

THINGS TO TRY

- ☐ Use the search bar to find projects that relate to your interests.
- ☐ Explore each of the Animations, Art, Games, Music, & Stories categories on the Explore page.
- ☐ Look through the Featured Studios on the homepage for ideas.

FINISHED?

- + Challenge yourself to do more! The more Scratch projects you explore, the more you learn about what can be accomplished in Scratch!
- + Find studios created by other Scratchers that you find interesting!
- + Ask a neighbor what strategies they used to find interesting projects.
- + Share your newly created studio with a neighbor!

DEBUG IT!

HELP! CAN YOU DEBUG THESE FIVE SCRATCH PROGRAMS?

In this activity, you will investigate what is going awry and find a solution for each of the five Debug It! challenges.

START HERE

- Go to the Unit 1 Debug It! studio:
<http://scratch.mit.edu/studios/475483>
- Test and debug each of the five debugging challenges in the studio.
- Write down your solution or remix the buggy program with your solution.

FEELING STUCK?

THAT'S OKAY! TRY THESE THINGS...

- Make a list of possible bugs in the program.
- Keep track of your work! This can be a useful reminder of what you have already tried and point you toward what to try next.
- Share and compare your problem finding and problem solving approaches with a neighbor until you find something that works for you!

DEBUG IT! 1.1 <http://scratch.mit.edu/projects/10437040>

When the green flag is clicked, both Gobo and Scratch Cat should start dancing. But only Scratch Cat starts Dancing! How do we fix the program?

DEBUG IT! 1.2 <http://scratch.mit.edu/projects/10437249>

In this project, when the green flag is clicked, the Scratch Cat should start on the left side of the stage, say something about being on the left side, glide to the right side of the stage, and say something about being on the right side. It works the first time the green flag is clicked, but not again. How do we fix the program?

DEBUG IT! 1.3 <http://scratch.mit.edu/projects/10437366>

The Scratch Cat should do a flip when the space key is pressed. But when the space key is pressed, nothing happens! How do we fix the program?

DEBUG IT! 1.4 <http://scratch.mit.edu/projects/10437439>

In this project, the Scratch Cat should pace back and forth across the stage, when it is clicked. But the Scratch Cat is flipping out – and is walking upside down! How do we fix the program?

DEBUG IT! 1.5 <http://scratch.mit.edu/projects/10437476>

In this project, when the green flag is clicked, the Scratch Cat should say 'Meow, meow, meow!' in a speech bubble and as a sound. But the speech bubble happens before the sound – and the Scratch Cat only makes one 'Meow' sound! How do we fix the program?

FINISHED?

- + Discuss your testing and debugging practices with a partner. Make note of the similarities and differences in your strategies.
- + Add code commentary by right clicking on blocks in your scripts. This can help others understand different parts of your program!
- + Help a neighbor!

ABOUT ME

HOW CAN YOU COMBINE INTERESTING IMAGES AND SOUNDS TO MAKE AN INTERACTIVE COLLAGE ABOUT YOURSELF?

Experiment with sprites, costumes, backdrops, looks, and sounds to create an interactive Scratch project – a project that helps other people learn more about YOU and the ideas, activities, and people that you care about.



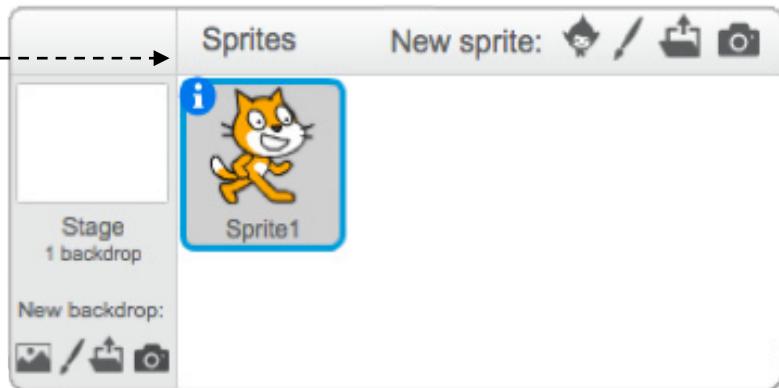
START HERE

- Create a sprite.
- Make it interactive.
- Repeat!

```
when this sprite clicked
play sound [whoop v] until done
```

```
when this sprite clicked
repeat (10)
  turn (15) degrees
  wait (0.3) secs
  turn (15) degrees
  wait (0.3) secs
end
```

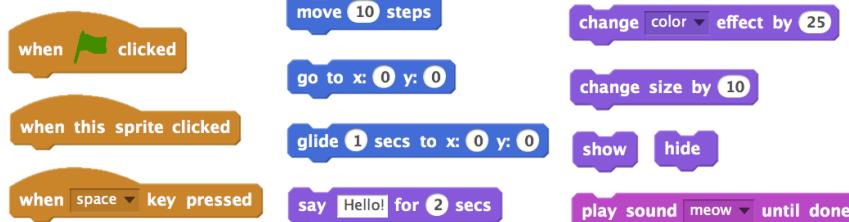
Make your sprite interactive by adding scripts that have the sprite respond to clicks, key presses, and more!



THINGS TO TRY

- Use costumes to change how your sprite looks.
- Create different backdrops.
- Try adding sound to your project.
- Try adding movement into your collage.

BLOCKS TO PLAY WITH



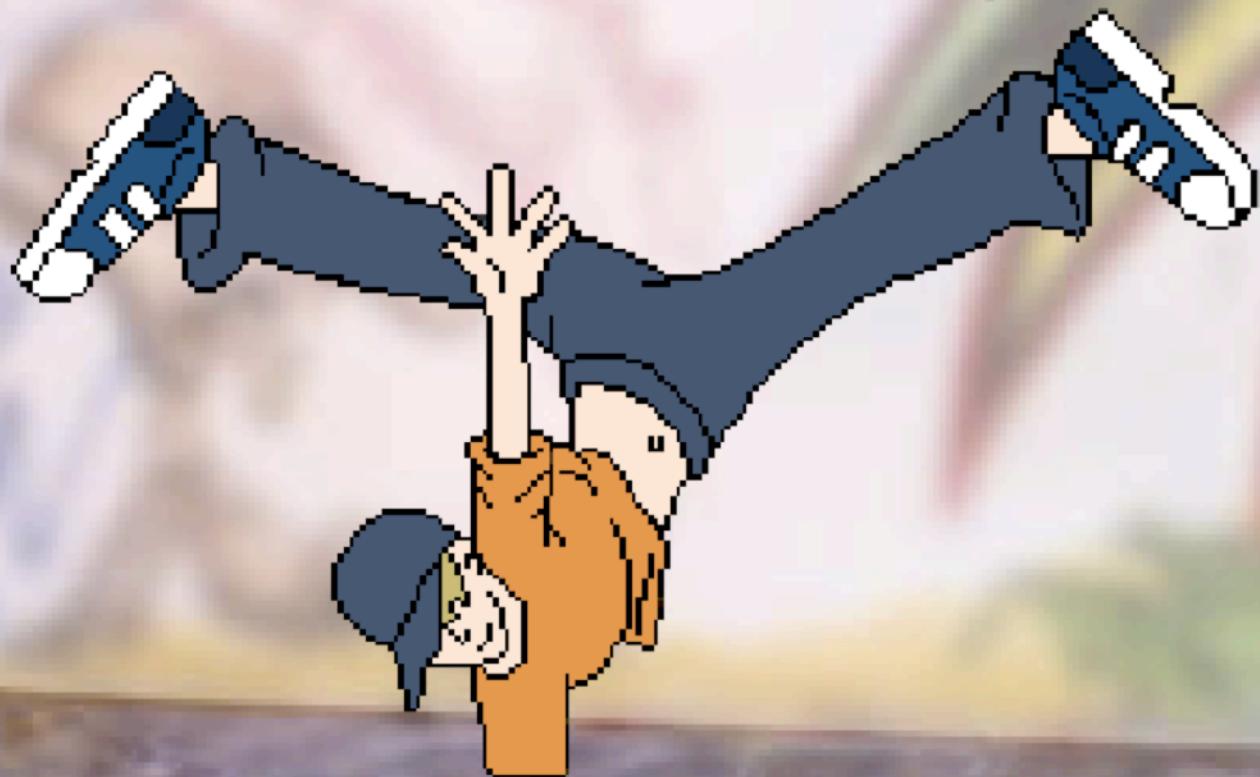
FINISHED?

- + Add your project to the About Me Studio: <http://scratch.mit.edu/studios/475470>
- + Challenge yourself to do more! Play with adding new blocks, sound, or motion!
- + Help a neighbor!

UNIT 2

ANIMATIONS

Turn up the music!



YOU ARE HERE

WHAT'S INCLUDED



0

1

2

3

4

5

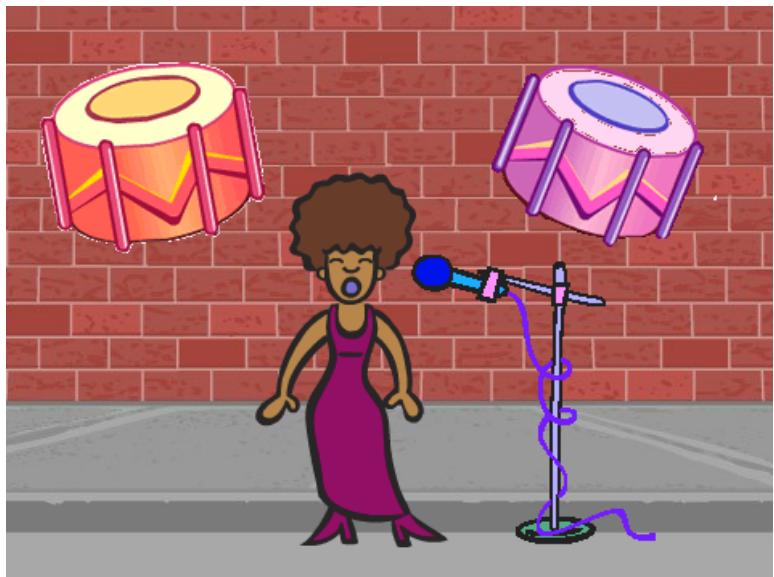
6

PERFORMING SCRIPTS
BUILD-A-BAND
ORANGE SQUARE, PURPLE CIRCLE
IT'S ALIVE!
DEBUG IT!
MUSIC VIDEO

BUILD-A-BAND

HOW CAN YOU UTILIZE SCRATCH TO CREATE SOUNDS, INSTRUMENTS, BANDS, OR STYLES OF MUSIC THAT REPRESENT THE MUSIC YOU LOVE MOST?

In this activity, you will build your own music-inspired Scratch project by pairing sprites with sounds to design interactive instruments.

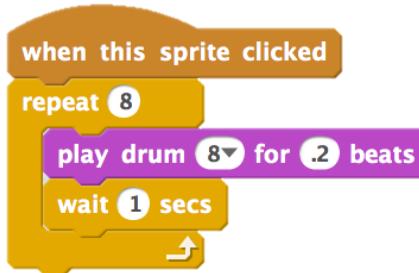


START HERE

- Create a sprite.
- Add sound blocks.
- Experiment with ways to make your instruments interactive.



Choose instruments from the sprite library or create your own.



THINGS TO TRY

- Use repeat blocks to make a sound play more than once.
- Import or record your own sounds or experiment with the Sounds editor.
- Try playing with the tempo blocks to speed up or slow down the rhythm.

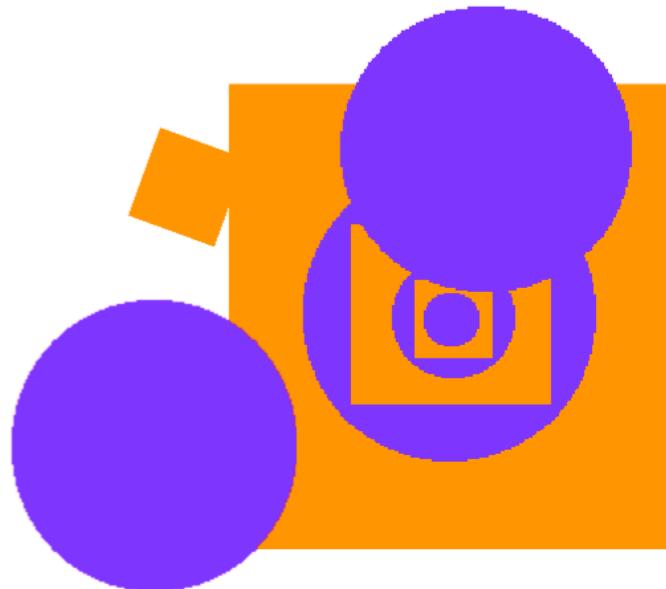
FINISHED?

- + Add your project to the Build-A-Band Studio: <http://scratch.mit.edu/studios/475523>
- + Challenge yourself to do more! Invent a new instrument or record your own sounds.
- + Help a neighbor!

ORANGE SQUARE, PURPLE CIRCLE

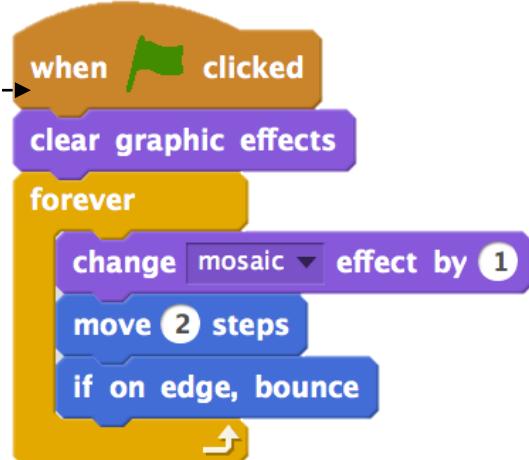
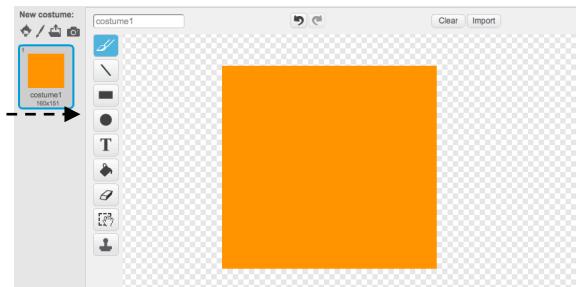
WHAT PROJECT CAN YOU CREATE THAT INCLUDES AN ORANGE SQUARE AND A PURPLE CIRCLE?

In this challenge, you'll create a project that includes an orange square and a purple circle. What will you create?



START HERE

- Draw your sprites using the Paint Editor.
- Add different Looks and Motion blocks to bring your sprites to life.
- Repeat!



FEELING
STUCK?

THAT'S OKAY! TRY THESE THINGS...

- Try brainstorming with a neighbor!
- Create a list of things you would like to try before you start building your project in Scratch!
- Explore other projects to see what others are doing in Scratch - this can be a great way to find inspiration!

- + Add your project to the Orange Square, Purple Circle Studio: <http://scratch.mit.edu/studios/475527>
- + Explore the difference between bitmap mode and vector mode, located at the bottom of the paint editor.
- + Challenge yourself to do more! Add another shape and color.
- + Swap projects with a partner and remix each other's creations.
- + Help a neighbor!

FINISHED?

IT'S ALIVE!

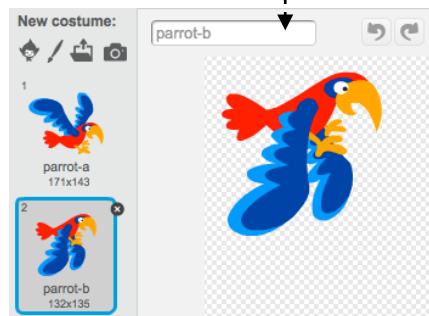
HOW CAN YOU TAKE AN IMAGE OR A PHOTO AND MAKE IT COME ALIVE?

In this activity, you will explore ways of bringing sprites, images, and ideas to life as an animation by programming a series of costume changes.



START HERE

- Choose a sprite.
- Add a different costume. →
- Add blocks to make the image come alive. ↗
- Repeat!



THINGS TO TRY

- Try sketching your animation ideas on paper first – like a flipbook.
- Experiment with different blocks and costumes until you find something you enjoy.
- Need some inspiration? Find projects in the Animation section of the Explore page.

FINISHED?

- + Add your project to the It's Alive studio: <http://scratch.mit.edu/studios/475529>
- + Challenge yourself to do more! Add more features to your project to make your animations look even more lifelike.
- + Help a neighbor!
- + Share your project with a partner and walk them through your design process.
- + Find an animated project you're inspired by and remix it!

DEBUG IT!

HELP! CAN YOU DEBUG THESE FIVE SCRATCH PROGRAMS?

In this activity, you will investigate what is going awry and find a solution for each of the five Debug It! challenges.

START HERE

- Go to the Unit 2 Debug It! Studio:
<http://scratch.mit.edu/studios/475539>
- Test and debug each of the five debugging challenges in the studio.
- Write down your solution or remix the buggy program with your solution.

FEELING STUCK?

THAT'S OKAY! TRY THESE THINGS...

- Make a list of possible bugs in the program.
- Keep track of your work! This can be a useful reminder of what you have already tried and point you toward what to try next.
- Share and compare your problem finding and problem solving approaches with a neighbor until you find something that works for you!

DEBUG IT! 2.1 <http://scratch.mit.edu/projects/23266426>

In this project, Scratch Cat wants to show you a dance. When you click on him, he should do a dance while a drum beat plays along with him. However, as soon as he starts to dance he stops but the drumming continues without him! How do we fix this program?

DEBUG IT! 2.2 <http://scratch.mit.edu/projects/24268476>

In this project, when the green flag is clicked Pico should move towards Nano. When Pico reaches Nano, Pico should say "Tag, you're it!" and Nano says "My turn!" But something is wrong! Pico doesn't say anything to Nano. How do we fix the program?

DEBUG IT! 2.3 <http://scratch.mit.edu/projects/24268506>

This project is programmed to draw a happy face but something is not quite right! The pen continues to draw from one of the eyes to the smile when it should not be doing so. How do we fix the program?

DEBUG IT! 2.4 <http://scratch.mit.edu/projects/23267140>

In this project, when the green flag is clicked an animation of a flower growing begins and stops once it has fully bloomed. But something is not quite right! Instead of stopping when all the petals have bloomed, the animation starts all over. How do we fix this program?

DEBUG IT! 2.5 <http://scratch.mit.edu/projects/23267245>

In this project, the Happy Birthday song starts playing when the green flag is clicked. Once the song finishes, instructions should appear telling us to "click on me to blow out the candles!" But something is not working! The instructions to blow out the candles are shown while the birthday song is playing rather than after it finishes. How do we fix this program?

FINISHED?

- + Add code commentary by right clicking on blocks in your scripts. This can help others understand different parts of your program!
- + Discuss your testing and debugging practices with a partner – make notes of the similarities and differences in your strategies.
- + Help a neighbor!

MUSIC VIDEO

HOW CAN YOU COMBINE ANIMATION WITH MUSIC TO CREATE YOUR OWN SCRATCH-INSPIRED MUSIC VIDEO?

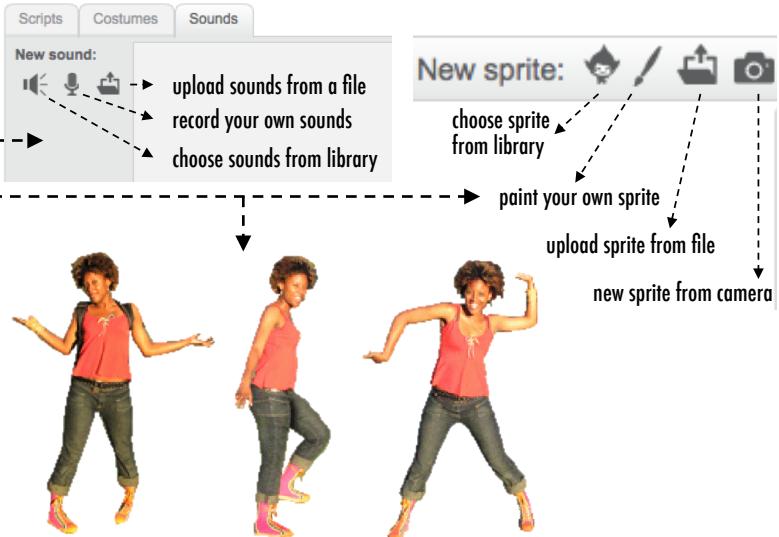
In this project, you will explore ideas related to theatre, song, dance, music, drawing, illustration, photography, and animation to create a personalized music video!



START HERE

- Add sound.
- Create and animate a sprite.
- Make them interact together!

```
when this sprite clicked
  change whirl effect by -50
  play drum 2 for .5 beats
  change whirl effect by 50
  play drum 8 for .5 beats
  switch costume to cassy-dancing-1
  play drum 2 for 0.125 beats
  turn ↘ 15 degrees
  play drum 6 for 0.25 beats
  turn ↗ 15 degrees
  play drum 2 for .25 beats
  switch costume to cassy-dancing-2
  play drum 8 for .5 beats
```



THINGS TO TRY

- Use costumes to help bring your animations to life!
- Make your sprite interactive by adding scripts that have the sprite respond to clicks, key presses, and more.
- Add instructions on the project page to explain how people can interact with your program.

BLOCKS TO PLAY WITH

```
when green flag clicked
when this sprite clicked
when space key pressed
```

```
turn ↘ 15 degrees
turn ↗ 15 degrees
if on edge, bounce
rest for 0.25 beats
switch costume to costume1
next costume
costume #
switch backdrop to backdrop1
play drum 1 for 0.25 beats
```

```
wait 1 secs
repeat (10)
forever
```

- + Add your project to the Music Video studio: <http://scratch.mit.edu/studios/475517>
- + Be sure to give credit to any music, code, or other work used in your project.
- + Challenge yourself to do more! Create your own sprites, sounds, or costumes!

FINISHED?

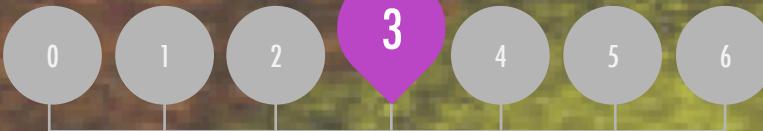
UNIT 3

STORIES



YOU ARE HERE

WHAT'S INCLUDED



CHARACTERS
CONVERSATIONS
SCENES
DEBUG IT!
CREATURE CONSTRUCTION
PASS IT ON

CHARACTERS

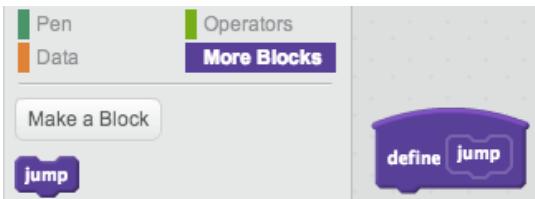
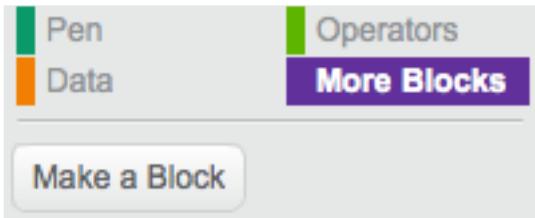
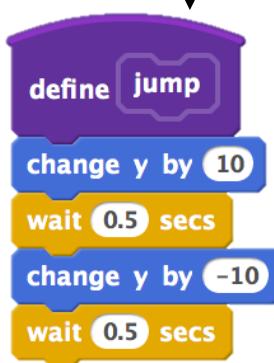
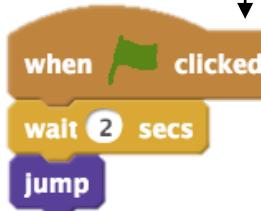
DO YOU WANT TO CREATE YOUR OWN SCRATCH BLOCKS?

Experiment with the Make a Block feature in Scratch! In this project, you will create your own blocks that define two behaviors for two different characters.



START HERE

- Choose from the library, paint, or upload two sprite characters.
- Click on the Make a Block button in the More Blocks category to create and name your block.
- Add blocks under the Define block to control what your custom block will do.
- Experiment with using your block to program your characters' behaviors.
- Repeat!



THINGS TO TRY

- Feeling stuck? That's okay! Check out this video to get started with the Make a Block feature: <http://bit.ly/makeablock>
- Explore other projects in the Characters Studio to see what new blocks others have created.
- Sometimes there can be more than one way of defining the same behavior. Experiment with different block combinations to try out multiple options and outcomes.

FINISHED?

- + Add your project to the Characters Studio: <http://scratch.mit.edu/studios/475545>
- + Challenge yourself to do more! Experiment with adding different characters and behaviors using the Make a Block feature.
- + Help a neighbor!

CONVERSATIONS

WHAT ARE DIFFERENT WAYS TO COORDINATE INTERACTIONS BETWEEN SPRITES?

In this activity, you'll explore different ways to program sprites to have conversations! Experiment with timing and explore using broadcast by remixing a joke project.



START HERE

- Look inside the Penguin Jokes project:
<http://scratch.mit.edu/projects/10015800>
- Investigate the code to see how the wait and say blocks are used to coordinate the conversation.
- Remix the project to use the broadcast and when I receive blocks instead of wait blocks.

```
when green flag clicked
  say [Hello! for 2 secs]
  wait (2 secs)
  say [What do Penguins love to eat? for 3 secs]
  wait (2 secs)
  say [Nope... for 2 secs]
  wait (2 secs)
  say [Ice-burgers! for 2 secs]
```

```
when I receive [message1 v]
  broadcast [message1 v]
  broadcast [message1 v] and wait
```

FEELING STUCK?

THAT'S OKAY! TRY THESE THINGS...

- Brainstorm ideas with a neighbor! Generate a list of possible solutions and test them out together.
- Try using the broadcast and when I receive blocks in different parts of your project.
- Explore projects in the Conversations studio to get inspiration for different ways to coordinate conversations between sprites.

- + Add your project to the Conversations studio:
<http://scratch.mit.edu/studios/475547>
- + Challenge yourself to do more! Add other characters and conversations.
- + Share your project with a neighbor and walk them through your process of exploration and design.
- + Help a neighbor!

FINISHED?

SCENES

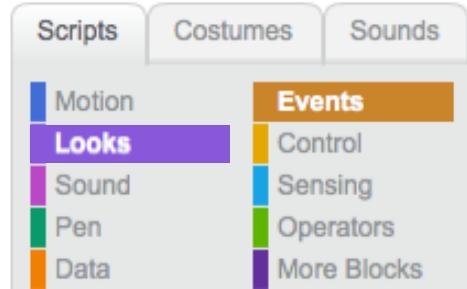
WHAT IS THE DIFFERENCE BETWEEN THE STAGE AND SPRITES?

In this activity, you will create a project that experiments with backdrops, like a story with multiple scenes or a slideshow.



START HERE

- Choose from the library, paint, or upload multiple backdrops into your project.
- Experiment with blocks from the Looks and Events categories to initiate switching backdrops.
- Add scripts to the stage and sprites to coordinate what happens when the backdrop changes in your project!



switch backdrop to backdrop1 ▾

when backdrop switches to backdrop1 ▾

backdrop name

THINGS TO TRY

- Look for blocks under the sprites and the stage related to backdrop and test them out to see what they do!
- Need more inspiration? Explore the Scratch online community to discover projects that use multiple backdrops.

FINISHED?

- + Add your project to the Scenes Studio: <http://scratch.mit.edu/studios/475550>
- + Challenge yourself to do more! Add more backdrop changes to your project.
- + Help a neighbor!
- + Return to one of your previous projects or find a project you are inspired by and remix it by adding switching backdrops.

DEBUG IT!

HELP! CAN YOU DEBUG THESE FIVE SCRATCH PROGRAMS?

In this activity, you will investigate what is going awry and find a solution for each of the five Debug It! challenges.

START HERE

- Go to the Unit 3 Debug It! Studio:
<http://scratch.mit.edu/studios/475554>
- Test and debug each of the five debugging challenges in the studio.
- Write down your solution or remix the buggy program with your solution.

FEELING STUCK?

THAT'S OKAY! TRY THESE THINGS...

- Make a list of possible bugs in the program.
- Keep track of your work! This can be a useful reminder of what you have already tried and point you toward what to try next.
- Share and compare your problem finding and problem solving approaches with a neighbor until you find something that works for you!

DEBUG IT! 3.1 <http://scratch.mit.edu/projects/24269007>

In this project, the Scratch Cat teaches Gobo to meow. But when it's Gobo's turn to try – Gobo stays silent. How do we fix the program?

DEBUG IT! 3.2 <http://scratch.mit.edu/projects/24269046>

In this project, the Scratch Cat is supposed to count from 1 to the number the user provides. But the Scratch Cat always counts to 10. How do we fix the program?

DEBUG IT! 3.3 <http://scratch.mit.edu/projects/24269070>

In this project, the Scratch Cat is doing roll call with Gobo's friends: Giga, Nano, Pico, and Tera. But everything is happening all at once! How do we fix the program?

DEBUG IT! 3.4 <http://scratch.mit.edu/projects/24269097>

In this project, the Scratch Cat and Gobo are practicing their jumping routine. When Scratch Cat says "Jump!", Gobo should jump up and down. But Gobo isn't jumping. How do we fix the program?

DEBUG IT! 3.5 <http://scratch.mit.edu/projects/24269131>

In this project, the scene changes when you press the right arrow key. The star of the project – a dinosaur – should be hidden in every scene except when the scene transitions to the auditorium backdrop. In the auditorium, the dinosaur should appear and do a dance. But the dinosaur is always present and is not dancing at the right time. How do we fix the program?

FINISHED?

- + Add code commentary by right clicking on blocks in your scripts. This can help others understand different parts of your program!
- + Discuss your testing and debugging practices with a partner, and make note of the similarities and differences in your strategies.
- + Help a neighbor!

PASS IT ON

WHAT CAN WE CREATE BY BUILDING ON OTHERS' WORK?

In this project, you will start developing an animated story project, and then you will pass the story on to others to remix, extend, or reimagine!

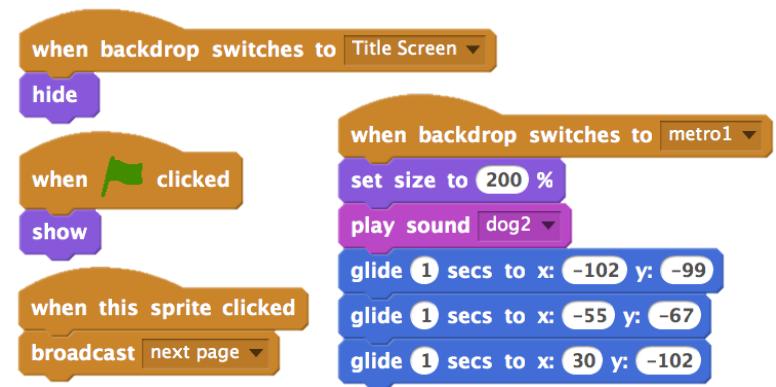


START HERE

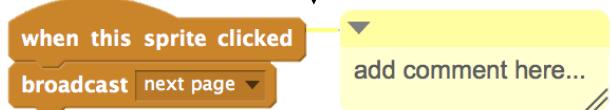
- Work on a story project that focuses on characters, scene, plot, or whatever element excites you.
- After 10 minutes, save and share your project online.
- Rotate & extend another story project by remixing it.
- Repeat!

THINGS TO TRY

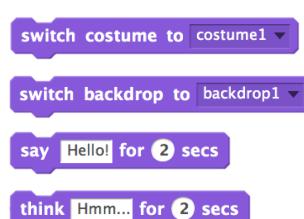
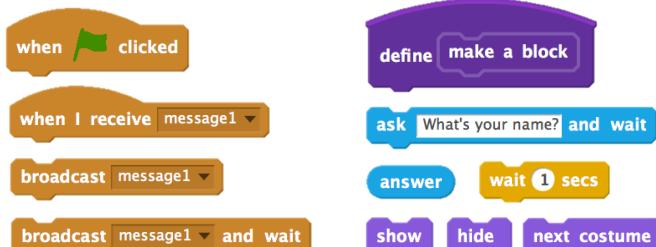
- Brainstorm different possibilities for remixing, extending, or reimaging a story. Do you want to add a new scene to the end? Could you imagine what happens before the story begins? What if a new character was added? How about inserting a plot twist? What else?



- Adding comments in your code can help others understand different parts of your program. To attach a comment to a script, right click on a block and add a description.



BLOCKS TO PLAY WITH



- + Add your project to the Pass It On studio: <http://scratch.mit.edu/studios/475543>
- + Help a neighbor!
- + Return to all the projects you contributed to and check out how the stories evolved!

FINISHED?

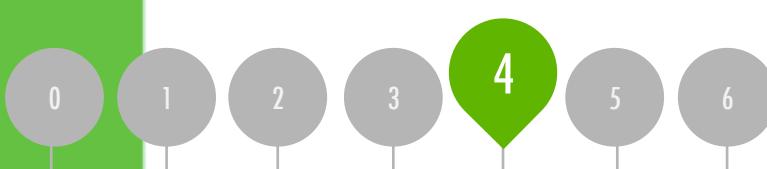
UNIT 4

GAMES



YOU ARE HERE

WHAT'S INCLUDED



DREAM GAME LIST
STARTER GAMES
SCORE
EXTENSIONS
INTERACTIONS
DEBUG IT!

MAZE

HOW CAN YOU USE SCRATCH TO BUILD AN INTERACTIVE GAME?

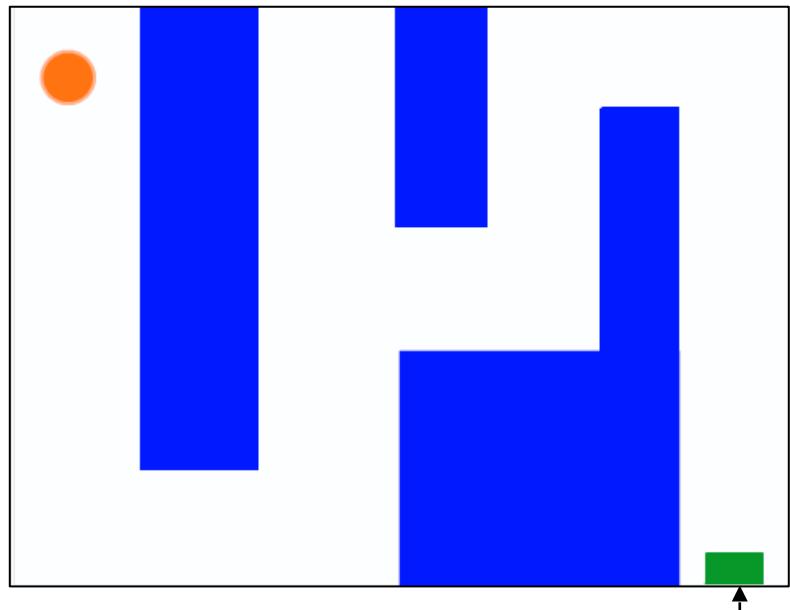
In this project, you will create a game. This game includes interactions between sprites, score, and levels. You move a sprite from the start of a maze to the end without touching the walls.

START HERE

- Draw a maze-like background and use different colors for the walls and end-of-maze marker.
- Add a sprite.
- Make your game interactive!

THINGS TO TRY

- Add multiple levels to your game! This can be done through the use of different backdrops and using broadcast blocks to trigger the next level.
- Use the make a variable block to keep score!
- Experiment with timer blocks to add new challenges to your maze!



when right arrow key pressed
point in direction 90
move 10 steps

when down arrow key pressed
point in direction 180
move 10 steps

when left arrow key pressed
point in direction -90
move 10 steps

when up arrow key pressed
point in direction 0
move 10 steps

These scripts give the player control over sprite movement in the maze.

when green flag clicked
go to x: -205 y: 147

This tells your sprite where to begin and marks the start of the maze.

when green flag clicked
forever
if touching color blue ? then
move -10 steps

This will cause your sprite to bounce off the blue walls of the maze.

when green flag clicked
forever
if touching Ball ? then
say You win!

This tells the end-of-maze sprite that players win when the ball touches this sprite.

BLOCKS TO PLAY WITH

when space key pressed
when up arrow key pressed
when m key pressed
when I receive message1

score
set score to 0
change score by 1
show variable score
hide variable score

- +
< = >
not
and
or

pick random 1 to 10
touching ?
touching color ?
color is touching ?
timer
reset timer

- + Add your project to the Games Studio: <http://scratch.mit.edu/studios/487504>
- + Swap games with a partner and walk each other through your creations.

FINISHED?

PONG

HOW CAN YOU USE SCRATCH TO BUILD AN INTERACTIVE GAME?

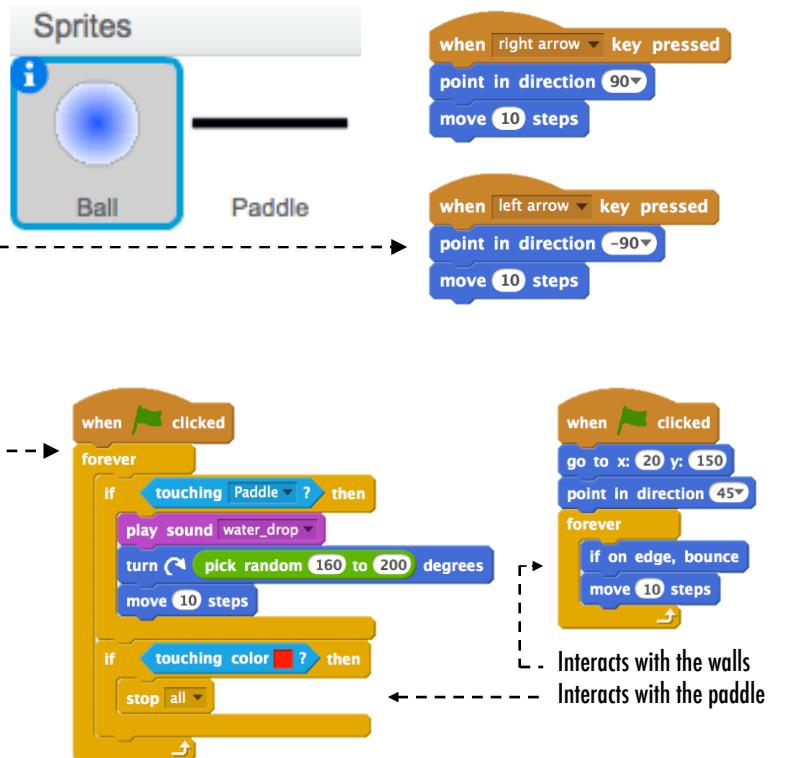
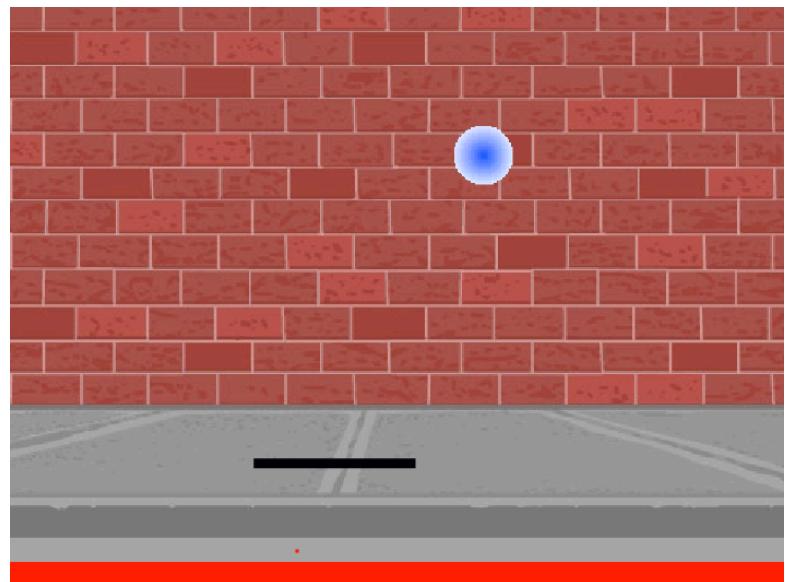
In this project, you will create a game. This game includes interactions between sprites, score, and levels. The game is similar to the classic game of pong, where the goal is to keep the sprite from getting past you.

START HERE

- Create two sprites: a paddle for the user to control and a ball the user will be playing with.
- Make your paddle sprite interactive.
- Bring your game to life!

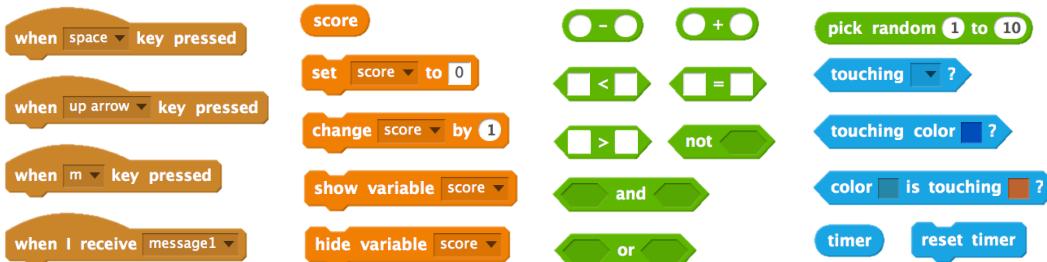
THINGS TO TRY

- How do you add difficulty to your game? Creating different levels, using a timer, or keeping score are a few examples of things you could do.
- Experiment with changing the look of your game by editing the backdrops!
- Explore using different key presses to control your sprites!



These control the ball - if touching the paddle or a wall, it continues moving. If touching red (meaning the ball moved past the paddle) the game ends.

BLOCKS TO PLAY WITH



FINISHED?

- + Add your project to the Games Studio: <http://scratch.mit.edu/studios/487504>
- + Swap games with a partner and walk each other through your creations.

SCROLLING

HOW CAN YOU USE SCRATCH TO BUILD AN INTERACTIVE GAME?

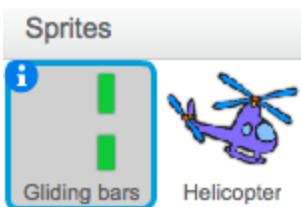
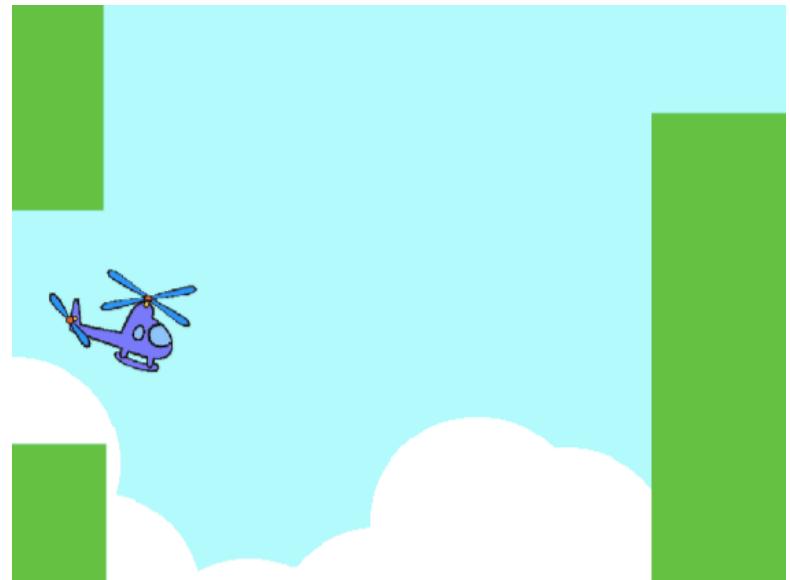
In this project, you will create a game. This game includes interactions between sprites, score, and levels. The game is similar to Flappy Bird, where the goal is to keep an object from falling to the ground or touching certain objects.

START HERE

- Create two sprites: one for the player to control (helicopter) and one to avoid (gliding bars).
- Make the helicopter interactive.
- Bring your game to life by adding scripts to make the gliding bars scroll across the stage!

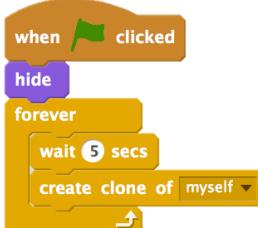
THINGS TO TRY

- How do you add difficulty to your game? Creating different levels, using a timer, or keeping score are a few examples of things you could do.
- Experiment with changing the look of your game by editing the backdrops!
- Explore using different key presses to control your sprites!



when space key pressed
change y by 20

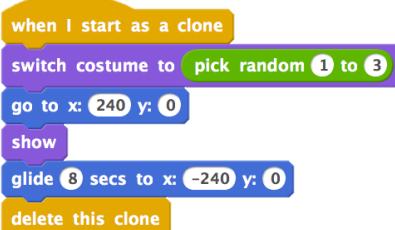
Controls sprite movement



when green flag clicked
go to x: 0 y: 0
set size to 30 %
wait (2 secs)
forever
change y by -2

Causes sprite to constantly fall downward

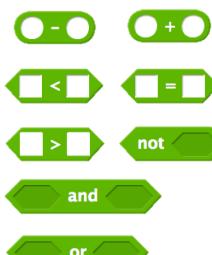
This creates clones, which are used in the script below to make the bars scroll across the screen:



when green flag clicked
forever
if touching color green ? then
stop all

Specifies when the game ends

BLOCKS TO PLAY WITH



- + Add your project to the Games Studio: <http://scratch.mit.edu/studios/487504>
- + Swap games with a partner and walk each other through your creations.

FINISHED?

SCORE

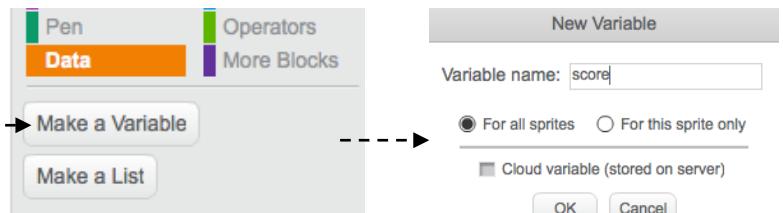
HOW CAN YOU KEEP SCORE IN A SCRATCH PROJECT?

Fish Chomp is a game where players try to catch as many fish as they can by guiding a sprite with the mouse. In this activity, you will remix Fish Chomp by adding a score with variables.



START HERE

- Go to the Fish Chomp project page:
<http://scratch.mit.edu/projects/10859244>
- Click on the Make a Variable button in the Data category to create and name a variable for score.
- Experiment with your new variable blocks to incorporate score into your project!



FEELING
STUCK?

THAT'S OKAY! TRY THESE THINGS...

- Not sure how to work with variables? Check out this project for more information: <http://scratch.mit.edu/projects/2042755>
- Or take a look at this video: <http://youtu.be/uXq379XkhVw>
- Explore and study code in games that use score to learn more about creating variables and incorporating score into a project.

FINISHED?

- + Add your project to the Fish Chomp Remix studio: <http://scratch.mit.edu/studios/475615>
- + Challenge yourself to do more! How can you use score to add difficulty to your game design?
- + Find a game you are inspired by and remix it!

EXTENSIONS

HOW CAN YOU EXTEND AND REIMAGINE GAMES IN SCRATCH?

Get into game design by adding extended features within your Scratch project! Choose at least one (or more!) of the following extensions and add it to your previously started maze, pong, or scrolling games.

START HERE

- Go to the Extensions studio:
<http://scratch.mit.edu/studios/475619>
- Choose one (or more) of the extensions to explore.
- Incorporate your choice into your previously started game projects!

- + **SCORE** <http://scratch.mit.edu/projects/1940443>
Demonstrates how to set and change a score. Receive 10 points every time the Scratch cat is clicked.
- + **LEVELS** <http://scratch.mit.edu/projects/1940453>
Demonstrates how to change levels. Score increases by 1 every time the space bar is pressed. Level increases by 1 for every 10 points.
- + **TIMER** <http://scratch.mit.edu/projects/1940445>
Demonstrates how to use a timer. Use the mouse to navigate the Scratch cat to Gobo.
- + **ENEMIES** <http://scratch.mit.edu/projects/1940450>
Demonstrates how to add an enemy. Avoid the tennis ball by using the up and down arrow keys.
- + **Rewards** <http://scratch.mit.edu/projects/1940456>
Demonstrates how to collect items. Use the arrow keys to move the Scratch cat around to collect quest items.
- + **MOUSE** <http://scratch.mit.edu/projects/25192659>
Demonstrates how to program the mouse to control game play. Move the mouse to move the paddle.
- + **RESTART** <http://scratch.mit.edu/projects/25192935>
Demonstrates how to make a button to restart the game. Click on the RESTART button to restart.
- + **MENU** <http://scratch.mit.edu/projects/25192991>
Demonstrates how to display a menu screen at the beginning of the game. Click START or DIRECTIONS on the menu screen.
- + **MULTIPLAYER** <http://scratch.mit.edu/projects/25192711>
Demonstrates how to add another player to the game. Player 1 uses the arrow keys to navigate Pico through the maze, and player 2 uses the W, A, S, D keys to navigate Nano through the maze.

THINGS TO TRY

- + The backpack can be an extremely useful tool while programming in Scratch. It can store everything from lines of code, to music files, to sprites, and more. Try using it to incorporate extensions into your game projects.
- + Alternatively, sketching out ideas and bits of code in your design journal is another great method for planning how to incorporate your extensions.

FINISHED?

- + Add another extension to your maze, pong, or scrolling game.
- + Challenge yourself to do more! Continue going through each of the extensions and add them to your games.
- + Help a neighbor!
- + Share your project with a neighbor and give each other feedback on your games.

INTERACTIONS

WHAT DIFFERENTIATES A SCRATCH PROJECT FROM A STILL IMAGE OR A VIDEO?

Tackle these nine puzzles that engage some of the more advanced concepts in Scratch related to interactivity. Each of these challenges has several possible solutions.

START HERE

- ❑ Create a Scratch program for each of the nine interactivity puzzles.

FEELING
STUCK?

THAT'S OKAY! TRY THESE THINGS...

- ❑ Before getting started in Scratch, write down ideas in your design journal for possible ways of programming each of the interactivity puzzles.
- ❑ Work with a neighbor. Collaborating with a partner can be a great way to solve problems and gain new perspectives on ways of programming in Scratch!

❑ **PUZZLE 1:** Whenever you press the B key, the sprite gets a little bigger. Whenever you press the S key, the sprite gets a little smaller.

❑ **PUZZLE 2:** Whenever the sprite hears a loud sound, it changes color.

❑ **PUZZLE 3:** Whenever the sprite is in the top 25% of the screen, it says "I like it up here."

❑ **PUZZLE 4:** When the sprite touches something blue, it plays a high note. When the sprite touches something red, it plays a low note.

❑ **PUZZLE 5:** Whenever two sprites collide, one of them says: "Excuse me."

❑ **PUZZLE 6:** Whenever the cat sprite gets near the dog sprite, the dog turns and runs from the cat.

❑ **PUZZLE 7:** Whenever you click on the background, a flower appears at that spot.

❑ **PUZZLE 8:** Whenever you click on a sprite, all other sprites do a dance.

❑ **PUZZLE 9:** Whenever you move the mouse-pointer, the sprite follows but doesn't touch the mouse-pointer.

FINISHED?

- + Add each of the projects you create to the Interaction Studio: <http://scratch.mit.edu/studios/487213>
- + Help a neighbor!
- + Discuss your strategies for approaching each puzzle with a partner. Take notes about the similarities and differences in your methods.

DEBUG IT!

HELP! CAN YOU DEBUG THESE FIVE SCRATCH PROGRAMS?

In this activity, you will investigate what is going awry and find a solution for each of the five Debug It! challenges.

START HERE

- Go to the Unit 4 Debug It! Studio:
<http://scratch.mit.edu/studios/475634/>
- Test and debug each of the five debugging challenges in the studio.
- Write down your solution or remix the buggy program with your solution.

FEELING STUCK?

THAT'S OKAY! TRY THESE THINGS...

- Make a list of possible bugs in the program.
- Keep track of your work! This can be a useful reminder of what you have already tried and point you toward what to try next.
- Share and compare your problem finding and problem solving approaches with a neighbor until you find something that works for you!

DEBUG IT! 4.1 <http://scratch.mit.edu/projects/24271192>

In this project, the "Inventory" list should be updated every time Scratch Cat picks up a new item. But Scratch Cat can only pick up the laptop. How do we fix the program?

DEBUG IT! 4.2 <http://scratch.mit.edu/projects/24271303>

In this project, Scratch Cat gets 10 points for collecting Yellow Gobos and loses 10 points for colliding with Pink Gobos. But something isn't working. How do we fix the program?

DEBUG IT! 4.3 <http://scratch.mit.edu/projects/24271446>

In this project, Scratch Cat is thinking of a number between 1 and 10. But something is wrong with the guess checking – it doesn't work consistently. How do we fix the program?

DEBUG IT! 4.4 <http://scratch.mit.edu/projects/24271475>

In this project, the "# of hits" display should increase by 1 every time the Scratch Cat is hit by a tennis ball. But the "# of hits" increases by more than 1 when Scratch Cat is hit. How do we fix the program?

DEBUG IT! 4.5 <http://scratch.mit.edu/projects/24271560>

In this project, Scratch Cat is navigating a maze to get to the yellow rectangle. But Scratch Cat can walk through walls. How do we fix the program?

FINISHED?

- + Add code commentary by right clicking on blocks in your scripts. This can help others understand different parts of your program!
- + Discuss your testing and debugging practices with a partner. Make note of the similarities and differences in your strategies.
- + Help a neighbor!