Original Cards in This Pack

- Animate a Name Coding Cards
- Imagine a World Coding Cards
- Chase Game Coding Cards
- Make Music Coding Cards (see new Sound and Music Cards for more)
- Animate a Character
- Create a Story
- Pong Game Coding Cards
- Let's Dance Coding Cards
- Jumping Game Coding Cards
- Virtual Pet Coding Cards
- Catch Game Coding Cards
- Video Sensing Coding Cards
- Make It Fly Coding Cards
- Micro:bit Coding Cardsards

New Cards in This Pack

- Sprite Creation Cards
- Conditional Statements Coding Cards
- Variables and Lists Coding Cards
- My Blocks Coding Cards

- Makey Makey Coding Cards

- Bring Yourself In Lesson Coding Cards
- Paper Planes, Turtle Graphics, and Computational Concepts Lesson Coding Cards
- Scratch Lab Face Sensing Lesson Coding Cards

Specialized Cards in This Pack

- Build the Change Coding Cards
- Designing for Creative Learning Prototype to Scratch Cards
- Hour of Code 2024 with Scratch: Invention Station Coding Cards
- Hour of Code 2024 with Scratch: Spreading Kindness Coding Cards

Note: This digital card set differs from the physical card set you can purchase, which only includes the original cards minus "Make It Fly" and "micro:bit." This digital card set includes newer cards.

Animate a Name Cards

Animate the letters of your name, initials, or favorite word.

Animate a Name Cards

Try these cards in any order:

- Color Clicker
- Spin
- Play a Sound
- Dancing Letter
- Change Size
- Press a Key
- Glide Around

Color Clicker

Make a letter change color when you click it.

Color Clicker

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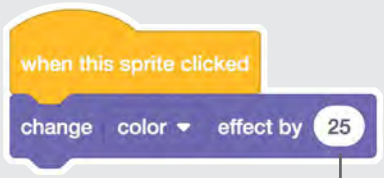
GET READY

Choose a letter from the Sprite Library.

Choose a backdrop.

To see just the letter sprites, click the **Letters** category at the top of the Sprite Library.

ADD THIS CODE



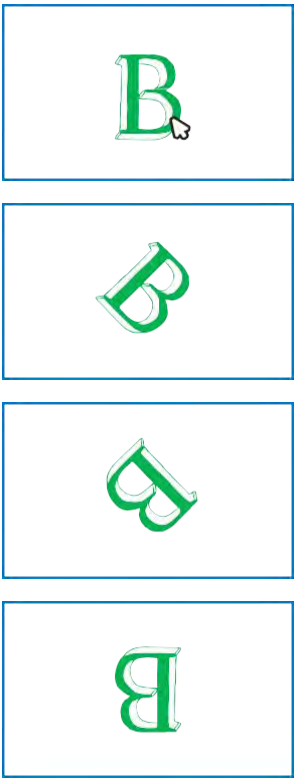
Try different numbers.

TRY

Click your letter.

Spin

Make a letter turn when you click it.



Spin

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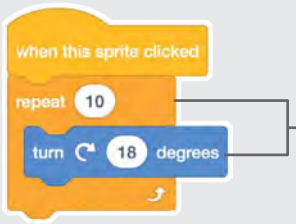
GET READY

Go to the Sprite Library.

Click the **Letters** category.

Choose a letter sprite.

ADD THIS CODE



Try different numbers.

TRY IT

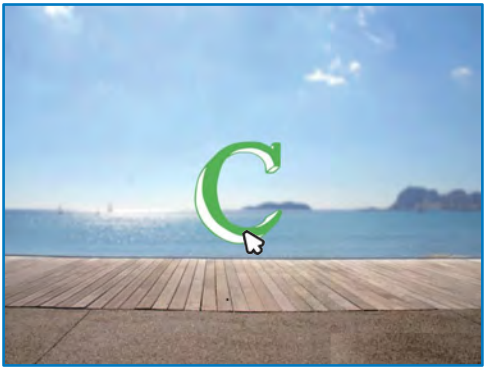
Click your letter.

TIP

Click this block to reset the sprite's direction.

Play a Sound

Click a letter to play a sound.



Play a Sound

scratch.mit.edu

GET READY

Go to the Sprite Library.

Click the **Letters** category.

Choose a letter sprite.

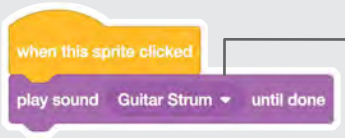
Choose a backdrop.

Click the **Sounds** tab.

Choose a sound.

ADD THIS CODE

Click the **Code** tab.



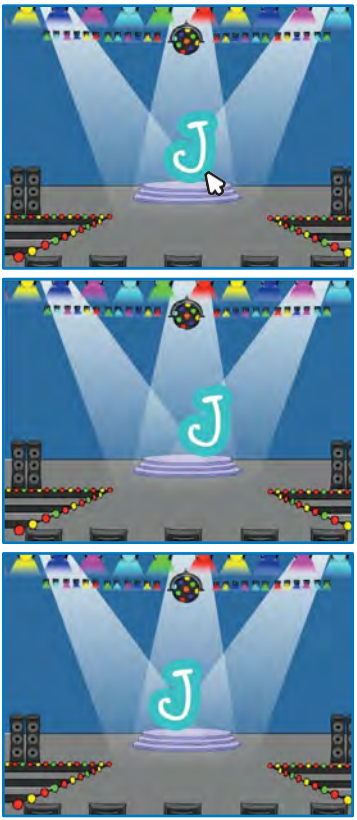
Choose a sound from the menu.

TRY IT

Click your letter.

Dancing Letter

Make a letter move to the beat.



Dancing Letter

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GET READY

Choose a backdrop.

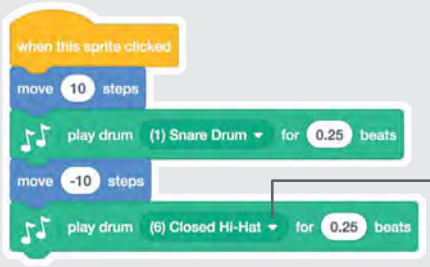
Choose a letter from the Sprite Library.

Click the **Extensions** button (at the bottom left).

Then click **Music** to add the music blocks.

ADD THIS CODE

Type a minus sign to move backward.



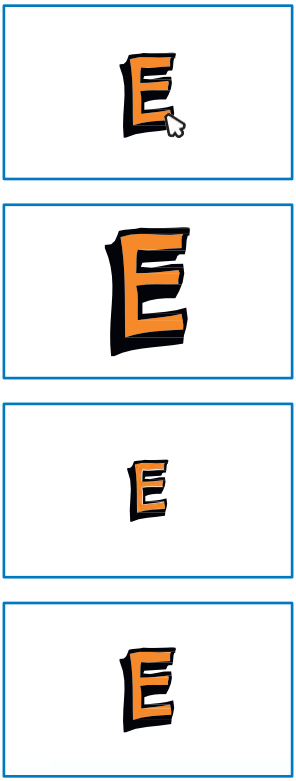
Choose a drum from the menu.

TRY IT

Click your letter.

Change Size

Make a letter get bigger and then smaller.



Change Size

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GET READY

Go to the Sprite Library.

Click the **Letters** category.

Choose a letter sprite.

ADD THIS CODE

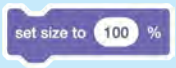
Type a minus sign to get smaller.

TRY IT

Click your letter.

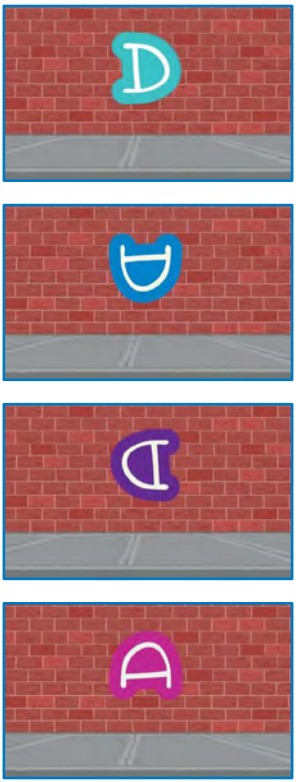
TIP

Click this block to reset the size.



Press a Key

Press a key to make your letter change.



Press a Key

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GET READY

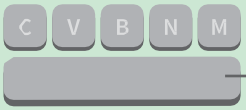
Choose a backdrop.

Choose a letter from the Sprite Library.

ADD THIS CODE

Try different numbers.

TRY IT



Press the space key.

TIP

You can choose a different key from the menu. Then press that key!

Glide Around

Make a letter glide smoothly from place to place.

Glide Around

scratch.mit.edu

GET READY

Choose a backdrop.

Choose a letter from the Sprite Library.

ADD THIS CODE

Try different numbers.

TRY IT

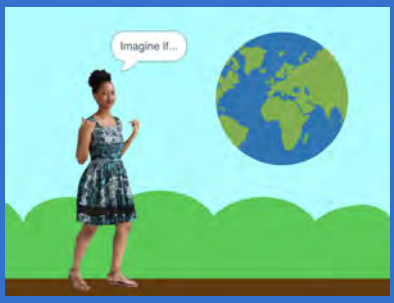
Click your letter to start.

TIP

When you move a sprite, you can see the numbers for x and y update.

x is the position from left to right.
y is the position up and down.

Imagine a World



Imagine a world where anything is possible!

Imagine a World

Try these cards in any order:

- Say Something
- Fly Around
- Go Right and Left
- Go Up and Down
- Change Costumes
- Glide from Here to There
- Grow and Shrink
- Change Backdrops
- Add a Sound

Say Something

Type what you want your sprite to say.

Say Something

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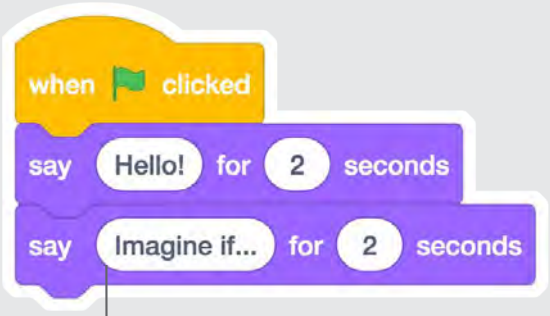
GET READY

Select the sprite you want to talk.

ADD THIS CODE



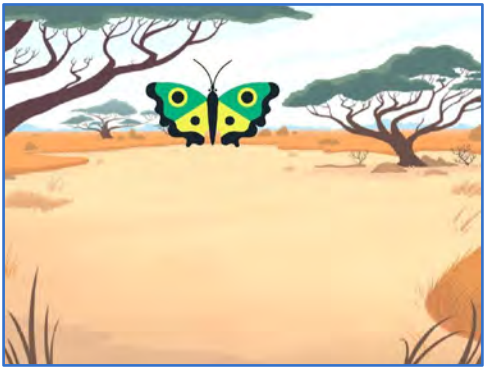
Type what you want to say.

TRY IT

Click the green flag to start.

Fly Around

Press the space key to glide glide.



Fly Around

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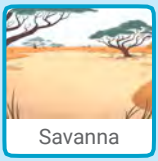
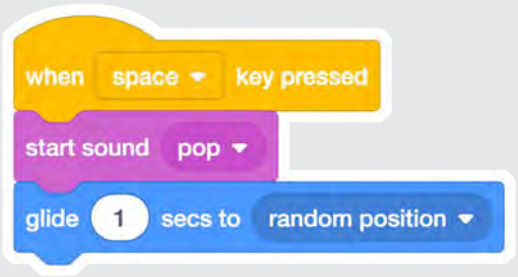
GET READY

Choose a sprite.

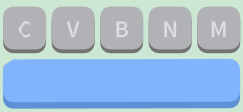
Choose a backdrop.



ADD THIS CODE



TRY IT



Press the **space** key to glide.

Go Right and Left

Press arrow keys to move right and left.

Go Right and Left

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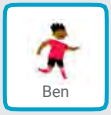
GET READY

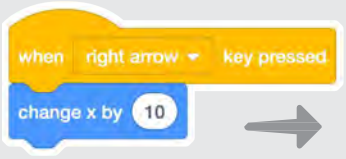
Choose a sprite.

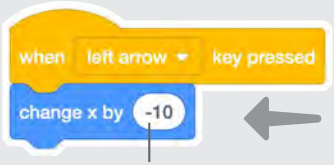
Choose a backdrop.

ADD THIS CODE

Change x to move your character *side to side.*







Type a minus sign to move *left*.

TRY IT

Press the right and left arrow keys on your keyboard.

Go Up and Down

Press arrow keys to move up and down.

Go Up and Down

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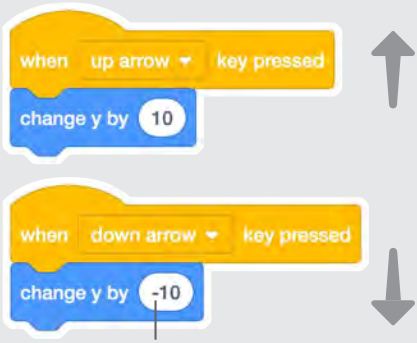
GET READY

Choose a sprite.

Choose a backdrop.

ADD THIS CODE

Change y to move your character *up and down.*



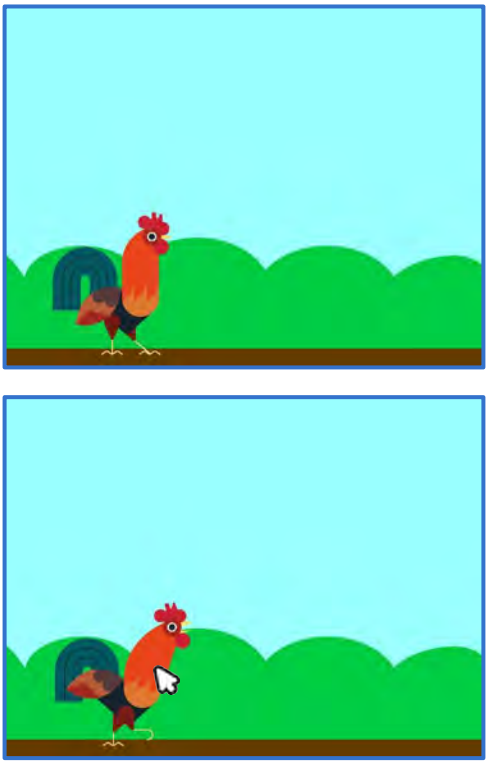
Type a minus sign to move *down*.

TRY IT

Press the up and down arrow keys on your keyboard.

Change Costumes

Animate a sprite when you click it.



Change Costumes

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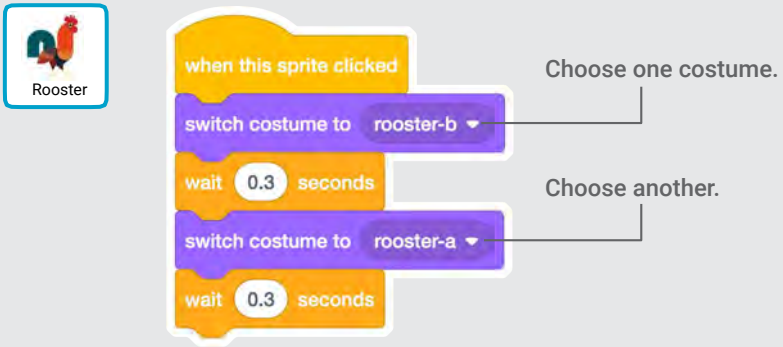
GET READY

Choose a sprite.

Choose a backdrop.

ADD THIS CODE



TRY IT

Click your sprite.

Glide From Here to There

Make a sprite glide from one point to another.

Glide From Here to There

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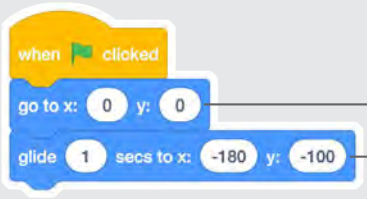
GET READY

Choose a sprite.

Choose a backdrop.

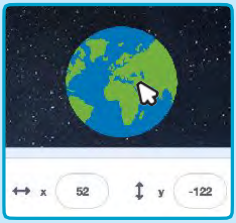
ADD THIS CODE



TRY IT

Click the green flag to start.

TIP



When you move a sprite, you can see the numbers for **x** and **y** update.

x is the position from left to right.
y is the position up and down.

Grow and Shrink

Make a sprite change size when you click it.

Grow and Shrink

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GET READY

Choose a backdrop.

Choose a sprite.

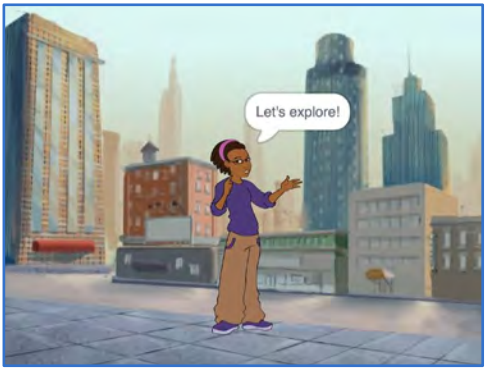
ADD THIS CODE

TRY IT

Click your sprite.

Change Backdrops

Change scenes by switching backdrops.



Change Backdrops

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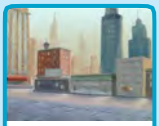
GET READY

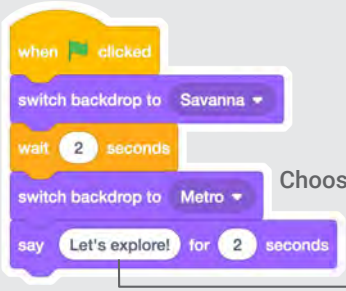
Choose two backdrops.


Savanna


Metro

Choose a sprite.

ADD THIS CODE



Choose the backdrop you want to start with.

Choose the second backdrop.

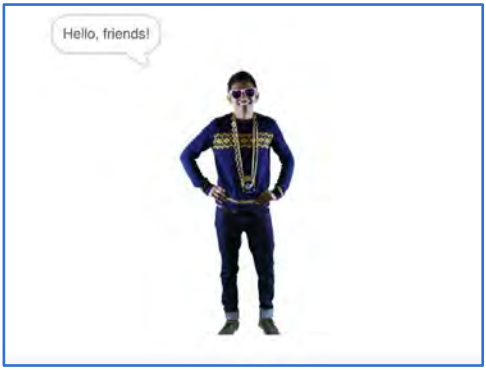
Type what you want to say.

TRY IT

Click the green flag to start.

Add a Sound

Add your voice or other sounds to your project.



Add a Sound

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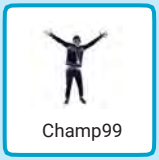
GET READY

Choose a sprite.

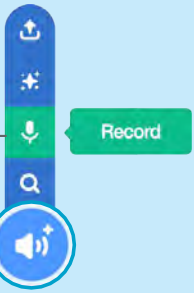


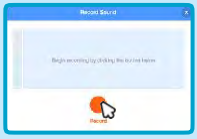
Sounds

Click the Sounds tab.

Then click Record from the pop-up menu.

Or, click here to choose a sound from the library.





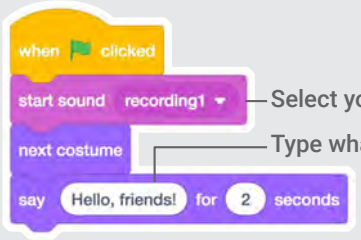
To record your voice or other sound, click the red button.

If your device is unable to record, you can choose a sound.

ADD THIS CODE

Code

Click the Code tab.



TRY IT.

Click the green flag to start.

Chase Game Cards

Make a game where you chase a character to score points.

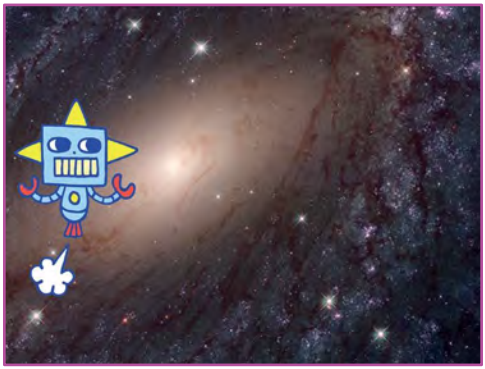
Chase Game Cards

Use these cards in this order:

1. **Move Left and Right**
2. **Move Up and Down**
3. **Chase a Star**
4. **Play a Sound**
5. **Add a Score**
6. **Level Up!**
7. **Victory Message**

Move Left and Right

Press arrow keys to move left and right.



Move Left and Right

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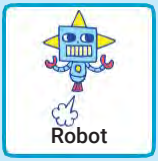
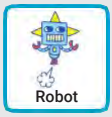
GET READY

Choose a backdrop.

Choose a character.



ADD THIS CODE



Choose **right arrow**.

Choose **left arrow.**

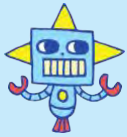
Type a minus sign to move left.

TRY IT

Press the arrow keys.

TIP

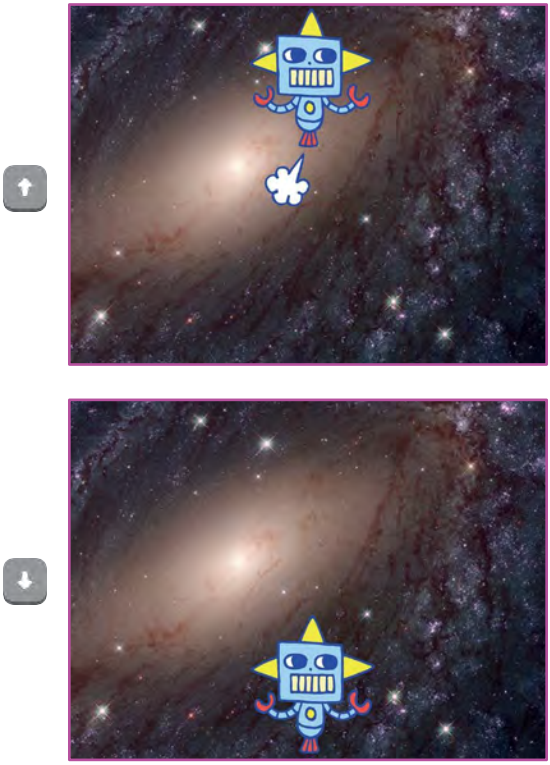
Type a negative number to move to the left.



Type a positive number to move to the right.

Move Up and Down

Press arrow keys to move up and down.



Move Up and Down

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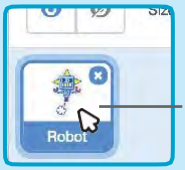
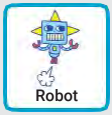
GET READY



Click your character to select it.

ADD THIS CODE



Choose **up arrow.**

Use the **change y by** block to move up.

Choose **down arrow**.

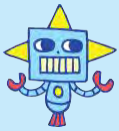
Type a minus sign to move down.

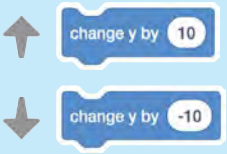
TRY IT

Press the arrow keys.

TIP

y is the position on the Stage from top to bottom.



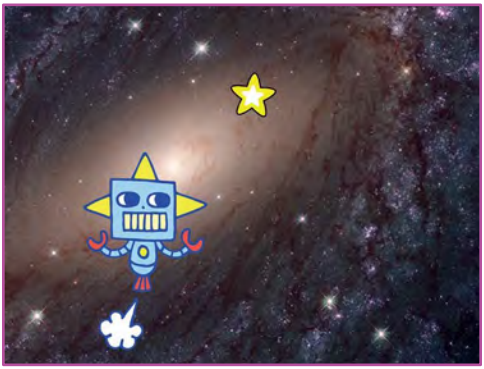


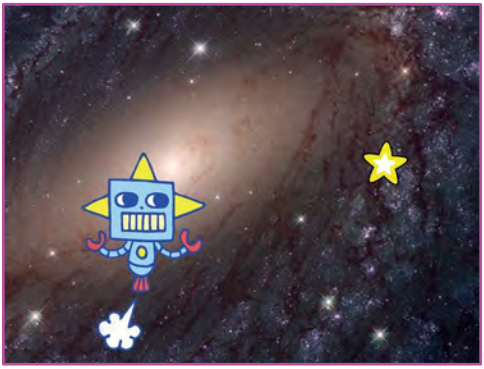
Type a positive number to move up.

Type a negative number to move down.

Chase a Star

Add a sprite to chase.





Chase a Star

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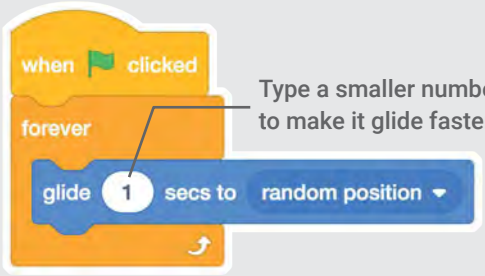
GET READY

Choose a sprite to chase, like Star.

ADD THIS CODE



Type a smaller number (like 0.5) to make it glide faster.

TRY IT

Click the green flag to start.

Click the stop sign to stop.

Play a Sound

Play a sound when your character touches the star.

Play a Sound

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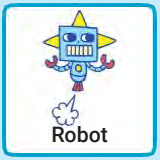
GET READY



Click to select the Robot sprite.

Sounds

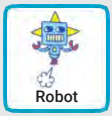
Click the **Sounds** tab.

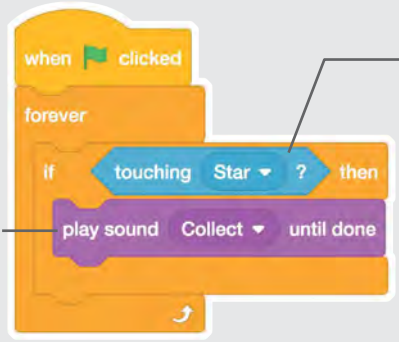
Choose a sound from the Sounds Library, like Collect.

ADD THIS CODE

Code

Click the **Code** tab and add this code.





Choose your sound from the menu.

Insert the **touching** block into the **if then** block.

TRY IT

Click the green flag to start.

Add a Score

Score points when you touch the star.

Add a Score

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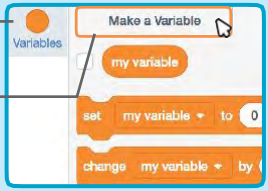
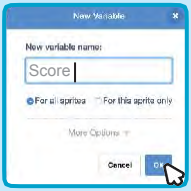
GET READY

Choose **Variables**.

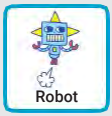
Click the **Make a Variable** button.





Name this variable **Score** and then click **OK**.

ADD THIS CODE

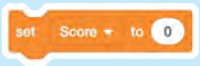


Select **Score** from the menu.

Add this block to reset the score.

Add this block to increase the score.

TIP

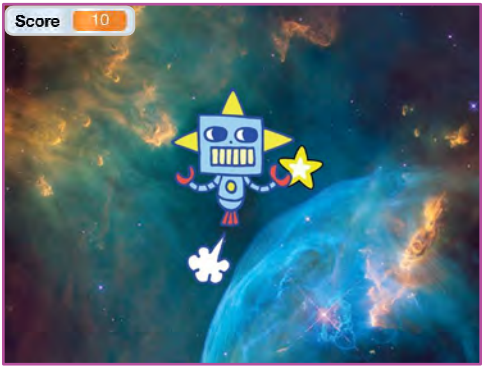


Use the **set variable** block to reset the score to zero.

Use the **change variable** block to increase the score.

Level Up!

Go to the next level.



Level Up!

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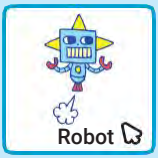
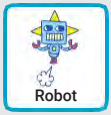
GET READY

Choose a second backdrop, like Nebula.

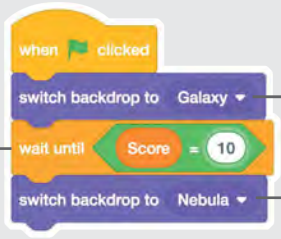


Select the Robot

ADD THIS CODE

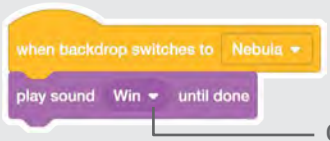


Insert the **Score** block into the **equals** block (from the Operators category).



Choose your first backdrop.

Choose the backdrop to switch to.



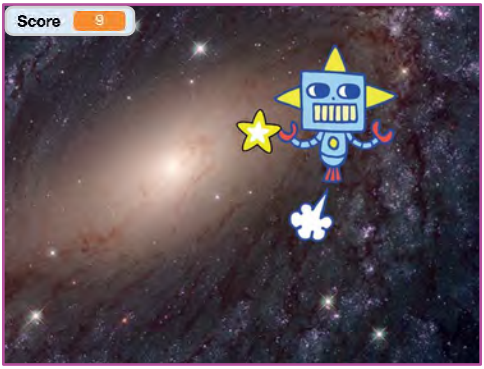
Choose a sound.

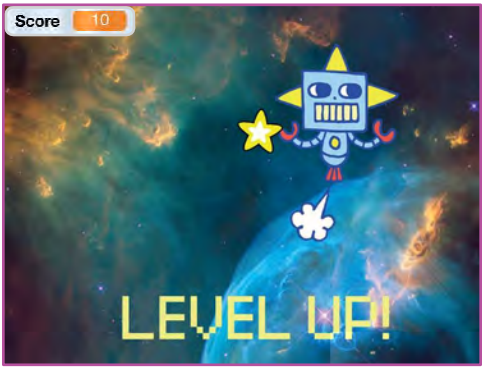
TRY IT

Click the green flag to start the game!

Victory Message

Show a message when you go to the next level.





Victory Message

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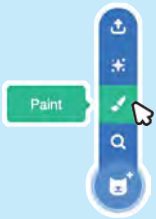
GET READY

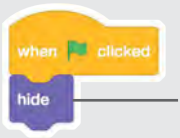


Click the **Paint** icon to make a new sprite.

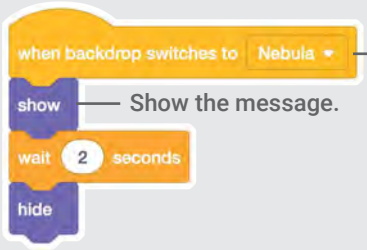
Use the **Text** tool to write a message, like “Level Up!”

You can change the font color, size, and style.

ADD THIS CODE



Hide the message at the beginning.



Choose the backdrop for the next level.

Show the message.

TRY IT

Click the green flag to play your game.

Make Music Cards

Choose instruments, add sounds, and press keys to play music.

Make Music Cards

Try these cards in any order:

- Play a Drum
- Make a Rhythm
- Animate a Drum
- Make a Melody
- Play a Chord
- Surprise Song
- Beatbox Sounds
- Record Sounds
- Play a Song

Play a Drum

Press a key to make a drum sound.

Play a Drum

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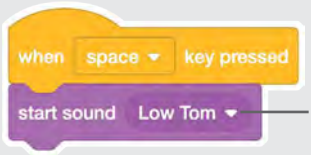
GET READY

Choose a backdrop.

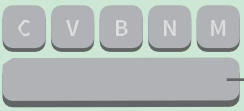
Choose a drum.

ADD THIS CODE



Select the sound you want from the menu.

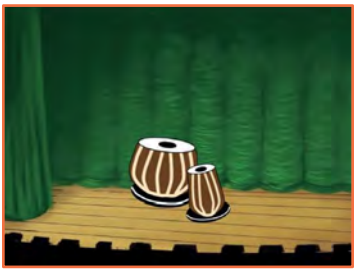
TRY IT

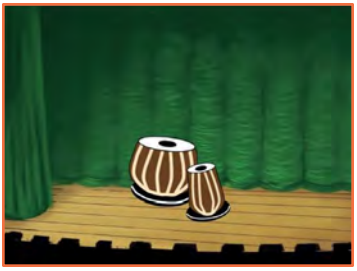


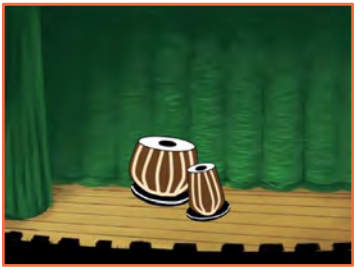
Press the **space** key on your keyboard.

Make a Rhythm

Play a loop of repeating drum sounds.







Make a Rhythm

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GET READY

Choose a backdrop.

Choose a drum from the Music category.

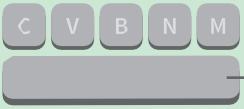
To see just the music sprites, click the **Music** category at the top of the Sprite Library.

ADD THIS CODE

Type how many times you want to repeat.

Try different numbers to change the rhythm.

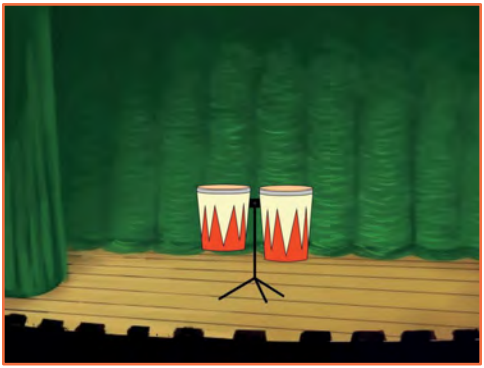
TRY IT



Press the **space** key on your keyboard.

Animate a Drum

Switch between costumes to animate.



Animate a Drum

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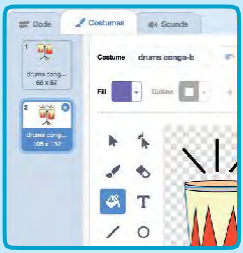
GET READY

Choose a drum.

Costumes

Click the **Costumes** tab to see the costumes.

You can use the paint tools to change colors.



ADD THIS CODE

Code Click the **Code** tab.

Choose a sound from the menu.

TRY IT

Press the **left arrow** key on your keyboard.

Make a Melody

Play a series of notes.

Make a Melody

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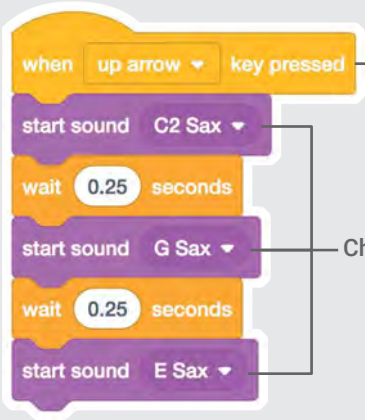
GET READY

Choose an instrument, like Saxophone.

To see just the music sprites, click the **Music** category at the top of the Sprite Library.

ADD THIS CODE



Choose **up arrow** (or another key).

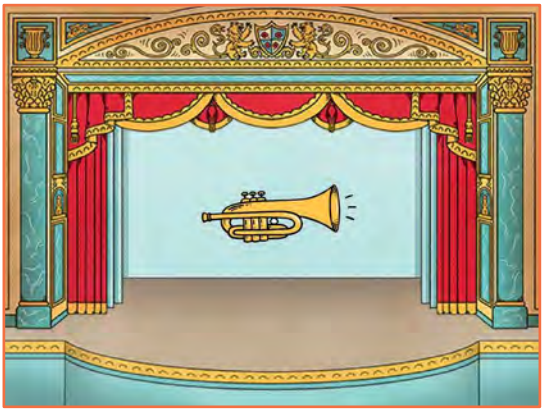
Choose different sounds.

TRY IT

Press the **up arrow** key.

Play a Chord

Play more than one sound at a time to make a chord.



Play a Chord

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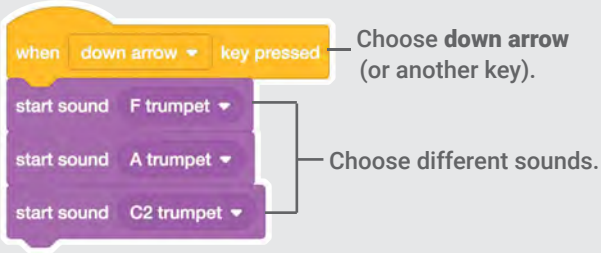
GET READY

Choose an instrument, like Trumpet.

To see just the music sprites, click the **Music** category at the top of the Sprite Library.

ADD THIS CODE



TRY IT

Press the **down arrow** key.

TIP

Use start sound to play sounds play at the same time.

Use play sound until done to play sounds one after another.

Surprise Song

Play a random sound from a list of sounds.

Surprise Song

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GET READY

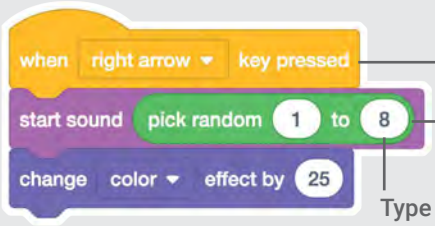
Choose and instrument, like Guitar.

Sounds

Click the **sounds** tab to see how many sounds are in your instrument.

ADD THIS CODE

Code Click the **Code** tab.



Choose **right arrow**.

Insert a **pick random** block.

Type the number of sounds in your instrument.

TRY IT

Press the **right arrow** key.

Beatbox Sounds

Play a series of vocal sounds.

Beatbox Sounds

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GET READY

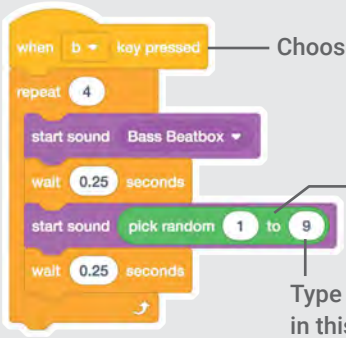
Choose the Microphone sprite.

Sounds

Click the **Sounds** tab to see how many sounds are in your instrument.

ADD THIS CODE

Code Click the **Code** tab.



Choose **b** (or another key).

Insert a **pick random** block.

Type the number of sounds in this sprite.

TRY IT

B Press the **B** key to start.

Record Sounds

Make your own sounds to play.

Record Sounds

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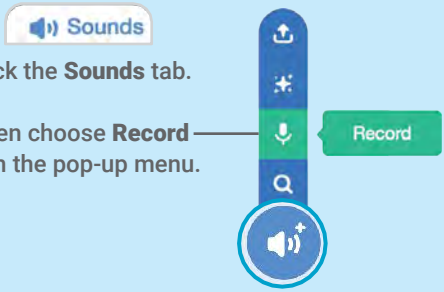
GET READY

Choose a backdrop.

Choose any sprite.



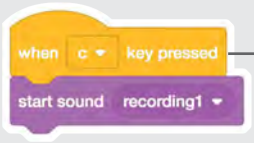
Click the **Sounds** tab.

Then choose **Record** from the pop-up menu.

Click the **Record** button to record a short sound.

ADD THIS CODE

Click the **Code** tab.



Choose **c** (or another key).

TRY IT

Press the **C** key to start.

Play a Song

Add a music loop as background music.

Play a Song

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GET READY

Choose a sprite, like Speaker.

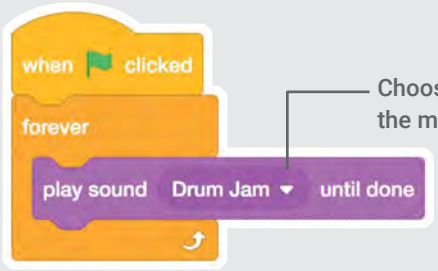
Sounds Click the **Sounds** tab.

Choose a sound from the Loops category, like Drum Jam.

To see just the music loops, click the **Loops** category at the top of the Sounds Library.

ADD THIS CODE

Code Click the **Code** tab.



Choose your sound from the menu.

TRY IT

Click the green flag to start.

Animate a Character Cards

Bring characters to life with animation.

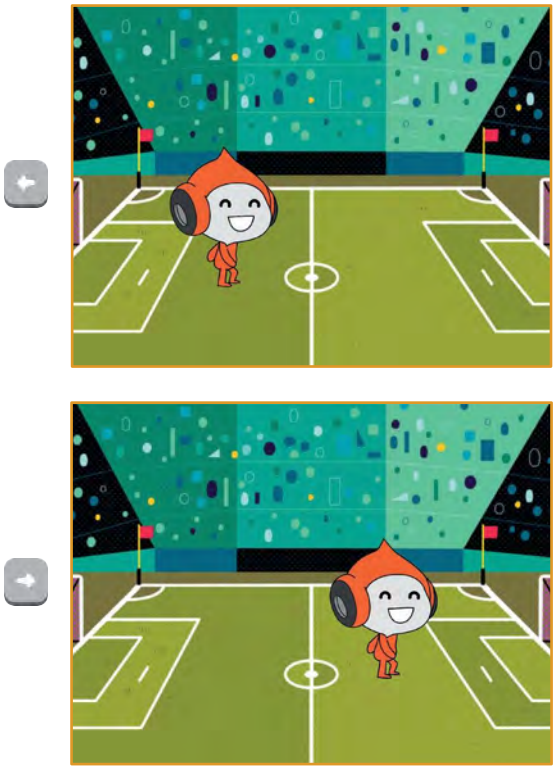
Animate a Character Cards

Try these cards in any order:

- Move with Arrow Keys
- Make a Character Jump
- Switch Poses
- Glide from Point to Point
- Walking Animation
- Flying Animation
- Talking Animation
- Draw an Animation

Move with Arrow Keys

Use the arrow keys to move your character around.



Move with Arrow Keys

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GET READY

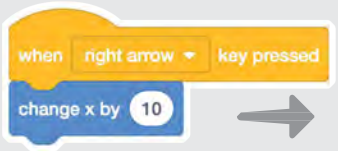
Choose a backdrop.

Choose a character.

ADD THIS CODE

Change x

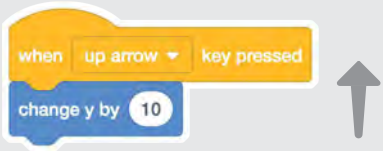
Move your character *side to side.*



Type a minus sign to move *left*.

Change y

Move your character *up and down.*



Type a minus sign to move *down*.

TRY IT

Press the arrow keys on your keyboard to move your character around.

Make a Character Jump

Press a key to jump up and down.

Make a Character Jump

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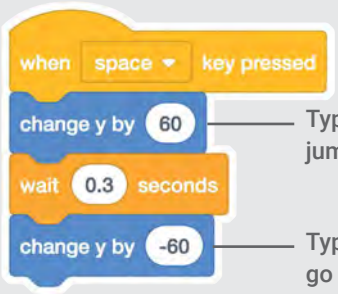
GET READY

Choose a backdrop.

Choose a character.

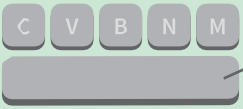
ADD THIS CODE



Type how high to jump.

Type a minus sign to go back down.

TRY IT



Press the space key on your keyboard.

Switch Poses

Animate a character when you press a key.

Switch Poses

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GET READY

Choose a character with multiple costumes, like Max.

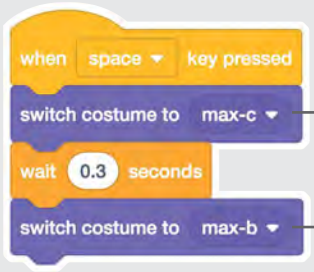
Scroll over sprites in the Sprite Library to see if they have different costumes.

Costumes

Click the **Costumes** tab to view all of your sprite's costumes.

ADD THIS CODE

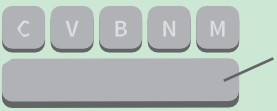
Code Click the **Code** tab.



Choose a costume.

Choose a different costume.

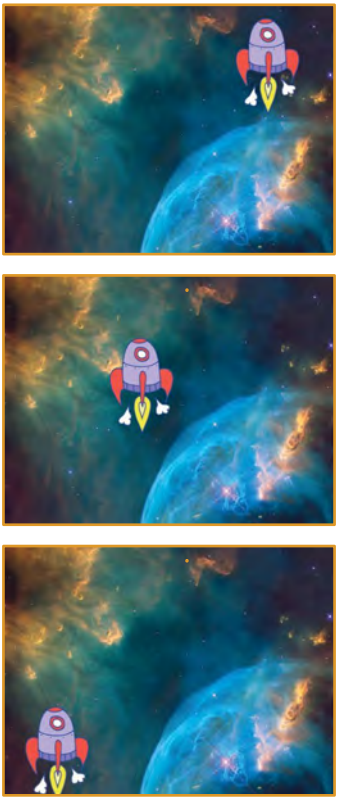
TRY IT



Press the **space** key on your keyboard.

Glide from Point to Point

Make a sprite glide from point to point.



Glide from Point to Point

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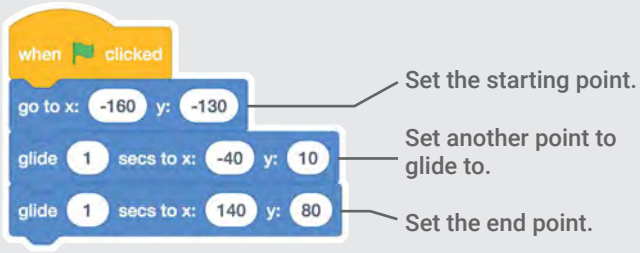
GET READY

Choose a backdrop.

Choose a character.

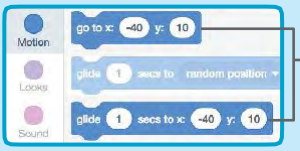
ADD THIS CODE



TRY IT

Click the green flag to start.

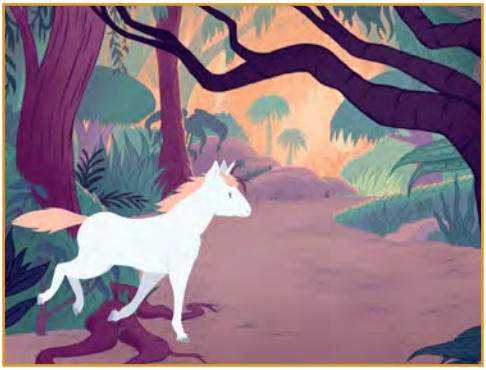
TIP

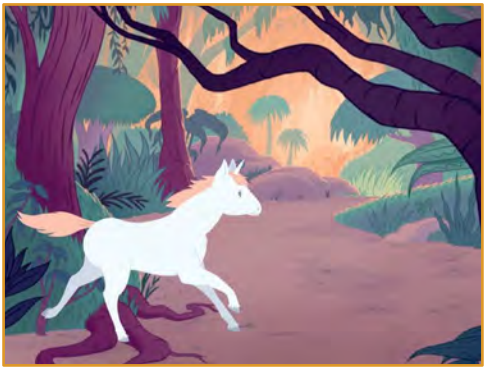


When you drag a sprite, its x and y positions will update in the blocks palette.

Walking Animation

Make a character walk or run.





Walking Animation

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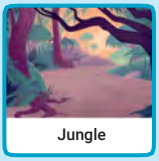
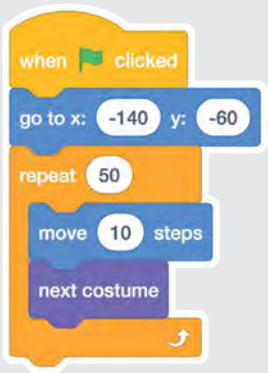
GET READY

Choose a backdrop.



Choose a walking or running sprite.

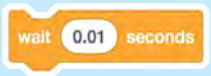
ADD THIS CODE



TRY IT

Click the green flag to start.

TIP



If you want to slow down the animation, try adding a **wait** block inside the **repeat** block.

Flying Animation

Have a character flap its wings as it moves across the stage.

Flying Animation

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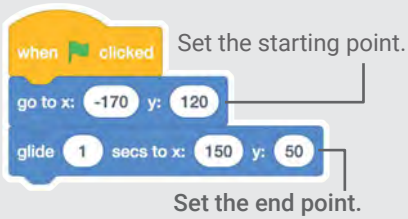
GET READY

Choose a backdrop.

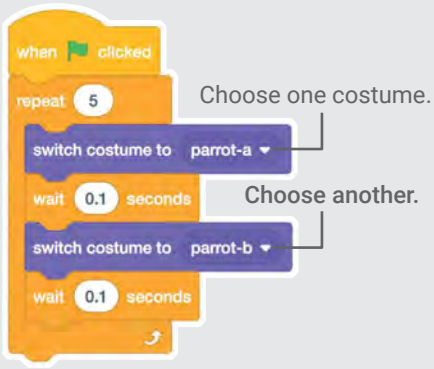
Choose Parrot (or another flying sprite).

ADD THIS CODE

Glide across the screen



Flap the wings



TRY IT

Click the green flag to start.

Talking Animation

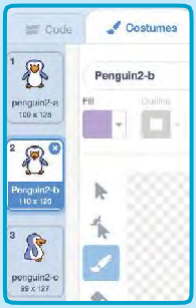
Make a character talk.

Talking Animation

scratch.mit.edu

GET READY

Choose Penguin 2.



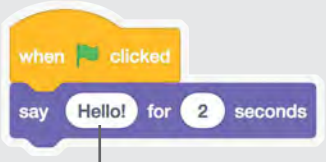
Costumes

Click the **Costumes** tab to view the penguin's other costumes.

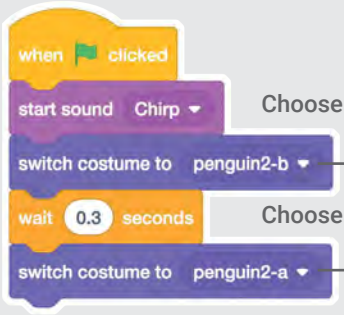
ADD THIS CODE

Code

Click the **Code** tab.



Type what you want your character to say.



Choose one costume.

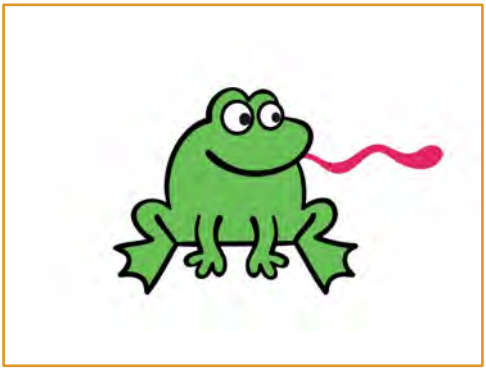
Choose another.

TRY IT

Click the green flag to start.

Draw an Animation

Edit a sprite's costumes to create your own animation.



Draw an Animation

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GET READY

Choose a character.

Click the **Costumes** tab.

Right-click (on a Mac, control-click) a costume to duplicate it.

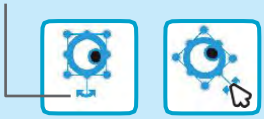
Now you should have two identical costumes.

Click a costume to select and edit it.

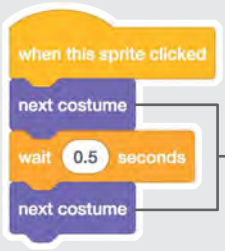
Click the **Select** tool.

Select a part of the costume to squeeze or stretch it.

Drag the handle to rotate an object you've selected.



ADD THIS CODE



Code

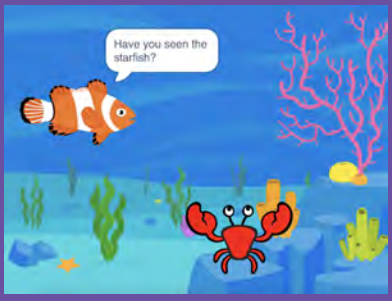
Click the **Code** tab.

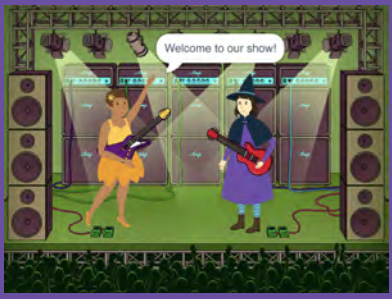
Use the **next costume** block to animate your character.

TRY IT

Click the green flag to start.

Create a Story Cards





Choose characters, add conversation, and bring your story to life.

Create a Story Cards

Start with the first card, and then try the other cards in any order:

- **Start a Story**
- **Start a Conversation**
- **Switch Backdrops**
- **Click a Character**
- **Add Your Voice**
- **Glide to a Spot**
- **Walk onto the Stage**
- **Respond to a Character**
- **Add a Scene**

Start a Story

Set the scene and have a character say something.

Start a Story

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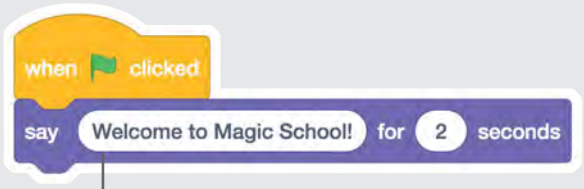
GET READY

Choose a backdrop.

Choose a character.

ADD THIS CODE



Type what you want your character to say.

TRY IT

Click the green flag to start.

Start a Conversation

Make two characters talk to each other.

Start a Conversation

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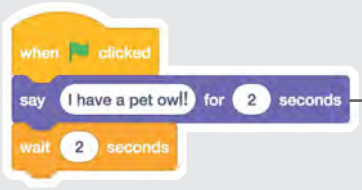
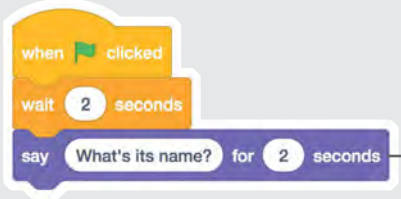
GET READY

Choose two characters, like Witch and Elf.

ADD THIS CODE

Click the thumbnail for each character, and then add its code.



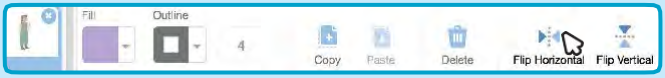


Type what you want each character to say.

TIP

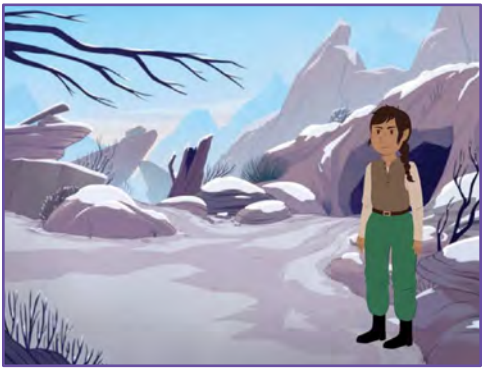
Costumes

To change the direction a character is facing, click the **Costumes** tab, then click **Flip Horizontal**.



Switch Backdrops

Change from one backdrop to another.



Switch Backdrops

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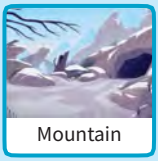
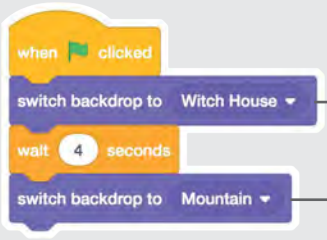
GET READY

Choose a character.

Choose two backdrops.



ADD THIS CODE



Choose the backdrop you want to start with.

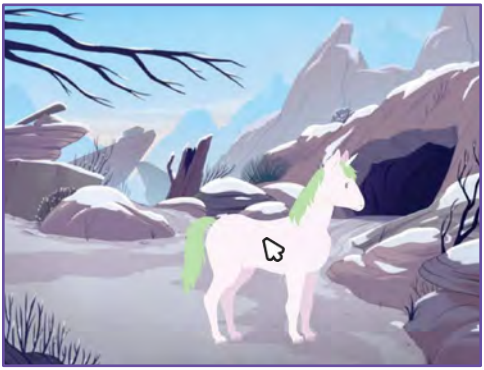
Choose the second backdrop.

TRY IT

Click the green flag to start.

Click a Character

Make your story interactive.



Click a Character

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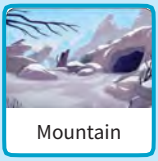
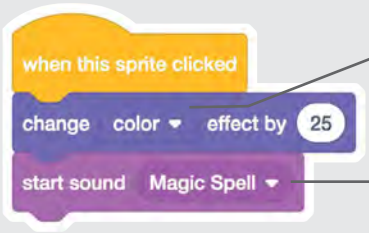
GET READY

Choose a backdrop.



Choose a character.

ADD THIS CODE



You can choose different effects.

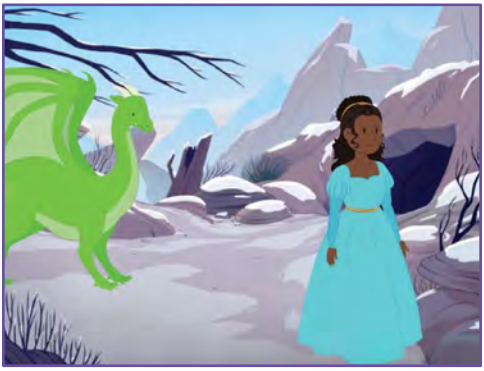
Select a sound from the menu.

TRY IT

Click your character.

Add Your Voice

Record your voice to make a character talk.



Add Your Voice

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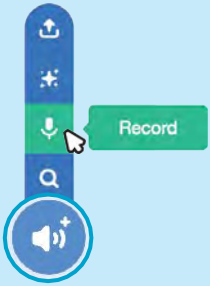
GET READY

Choose a sprite.

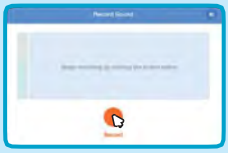
Sounds

Click the **Sounds** tab.



Choose **Record** from the pop-up menu.

Click **Record**.

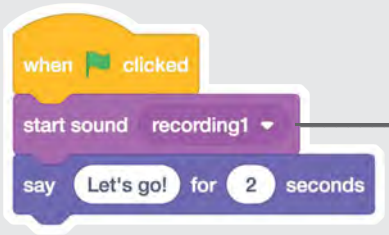


When you're done, click **Save**.

ADD THIS CODE

Code

Click the **Code** tab.



Select your recording from the menu.

TRY IT

Click the green flag to start.

Glide to a Spot

Make a character move across the Stage.

Glide to a Spot

scratch.mit.edu

GET READY

Choose a backdrop.

Mountain

Choose a character.

Owl

ADD THIS CODE

Owl

TRY IT

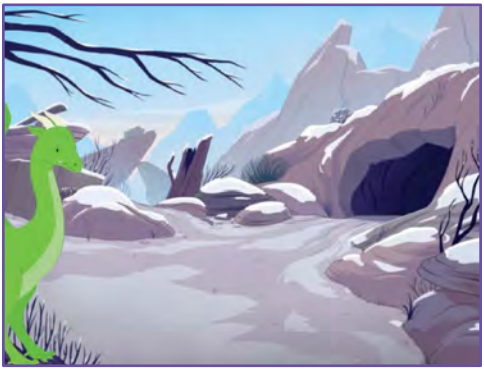
Click the green flag to start.

TIP

When you drag a sprite, the numbers for **x** and **y** will update in the blocks palette.

Walk onto the Stage

Have a character enter the scene.



Walk onto the Stage

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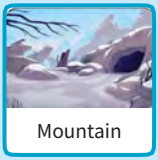
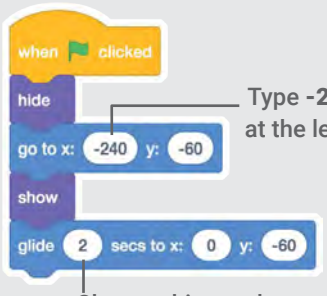
GET READY

Choose a backdrop.



Choose a character.

ADD THIS CODE

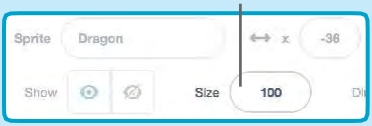


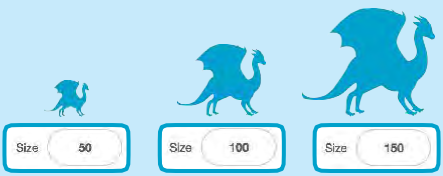
Type **-240** to place your sprite at the left edge of the Stage.

Change this number to glide faster or slower.

TIP

Change the size of a sprite by typing a smaller or larger number.





Respond to a Character

Coordinate a conversation so that one character talks after another.

Respond to a Character

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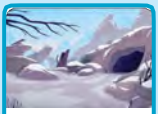
GET READY

Choose a backdrop.



Mountain

Choose two characters.

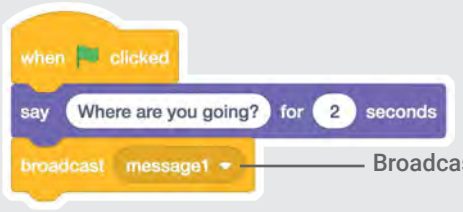
Goblin

Princess

ADD THIS CODE

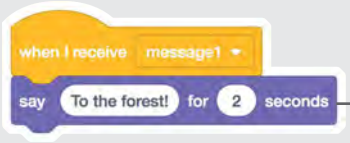
Click the thumbnail for each character, and then add its code.

Goblin



Broadcast a message.

Princess



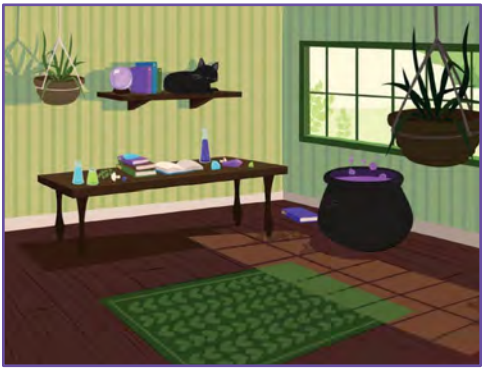
Tell this character what to do when it receives the broadcast.

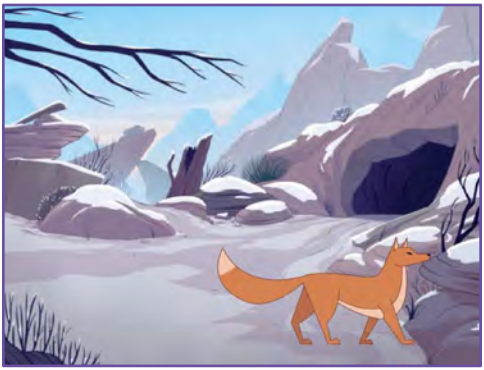
TIP

You can click the menu to add a new message.

Add a Scene

Create multiple scenes with different backdrops and characters.





Add a Scene

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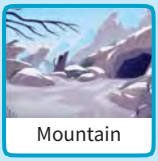
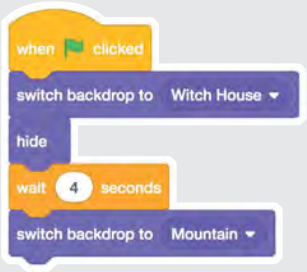
GET READY

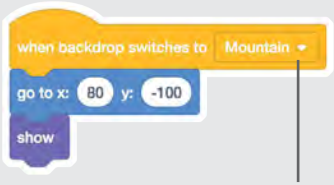
Choose two backdrops.



Choose a character.

ADD THIS CODE



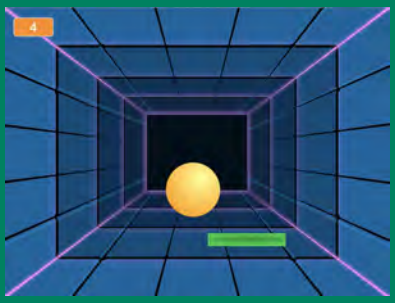


Choose the backdrop name from the menu.

TRY IT

Click the green flag to start.

Pong Game Cards



Make a bouncing ball game and score points to win!

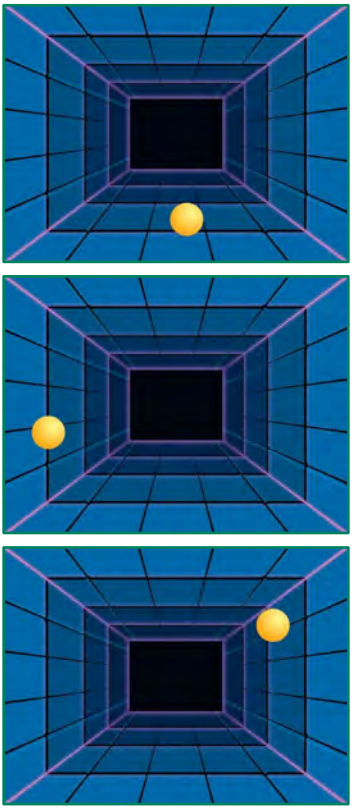
Pong Game Cards

Use these cards in this order:

1. Bounce Around
2. Move the Paddle
3. Bounce off the Paddle
4. Game Over
5. Score Points
6. Win the Game

Bounce Around

Make a ball move around the Stage.



Bounce Around

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GET READY

Choose a backdrop.

Choose a ball.

ADD THIS CODE

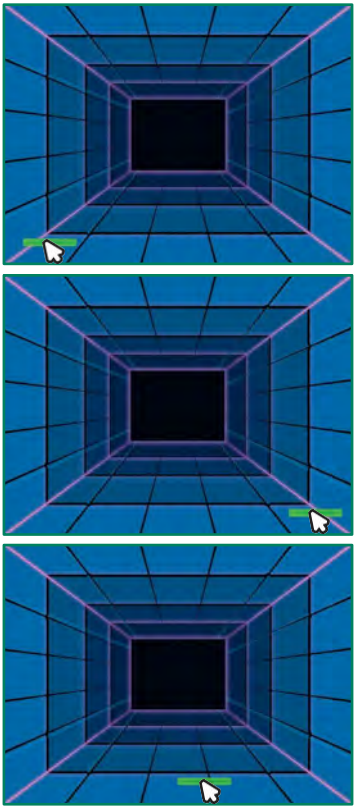
Type a larger number to move faster.

TRY IT

Click the green flag to start. 

Move the Paddle

Control a paddle by moving your mouse pointer.



Move the Paddle

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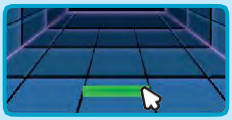
GET READY

Choose a sprite for hitting the ball, like Paddle.



Then, drag your paddle to the bottom of the Stage.

ADD THIS CODE

Insert the **mouse x** block into the **set x to** block.

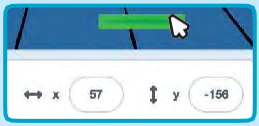
TRY IT

Click the green flag to start.

Move your mouse pointer to move the paddle.

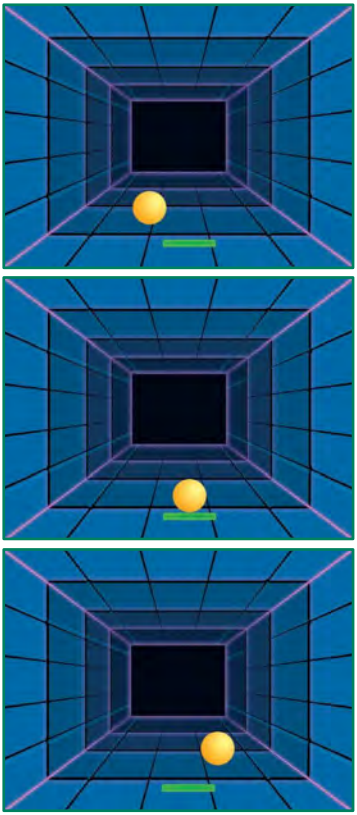
TIP

You can see the **x** position of the paddle change as you move the mouse pointer across the Stage.



Bounce Off the Paddle

Make the ball bounce off the paddle.



Bounce Off the Paddle

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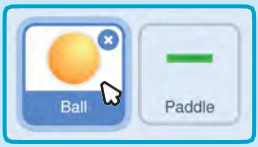
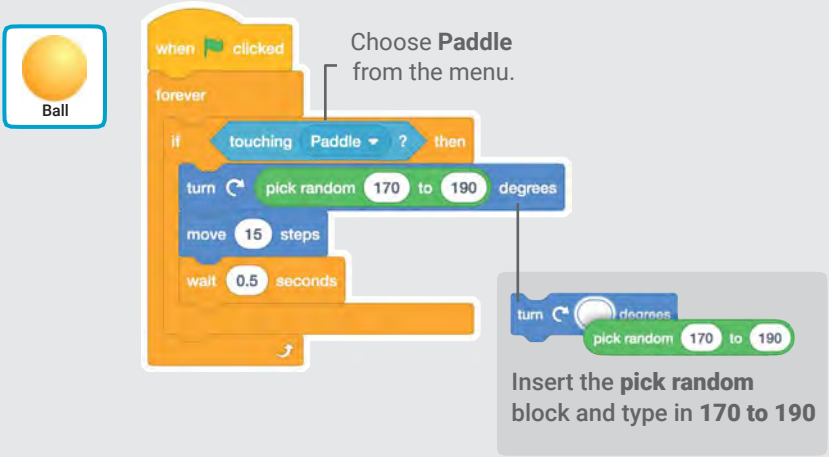
GET READY

Click to select the Ball sprite.



ADD THIS CODE

Add this new stack of blocks to your Ball sprite.

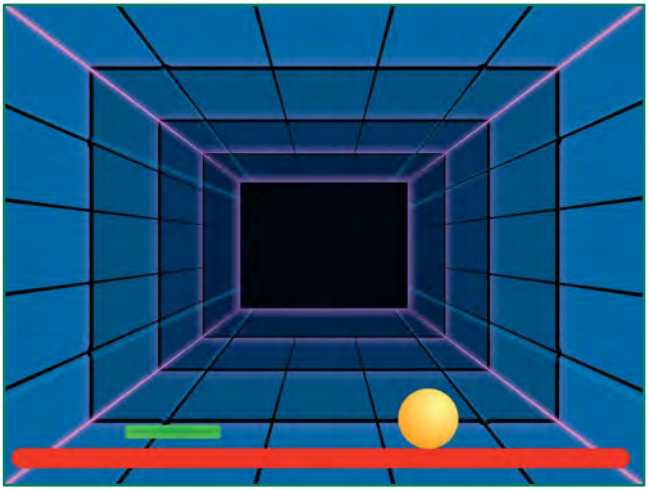


TRY IT

Click the green flag to start.

Game Over

Stop the game if the ball hits the red line.



Game Over

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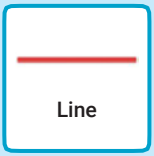
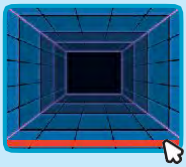
GET READY

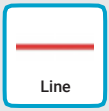


Choose the sprite called Line.



Drag the Line sprite to the bottom of the Stage.

ADD THIS CODE



Set the position of the Line.

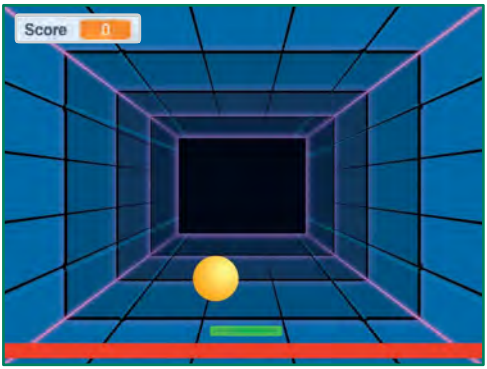
Choose **Ball** from the menu.

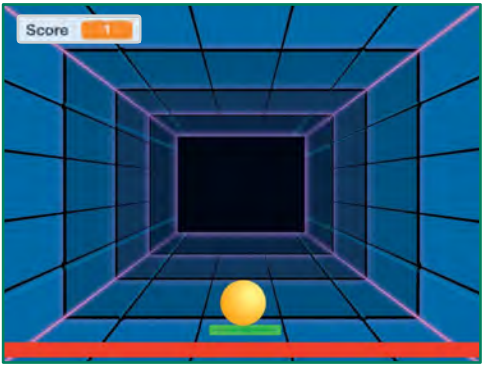
TRY IT

Click the green flag to start.

Score Points

Add a point each time you hit the ball with the paddle.





Score Points

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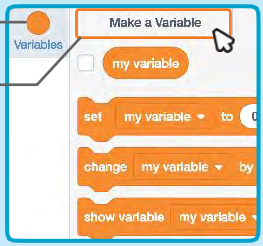
GET READY

Choose **Variables**.

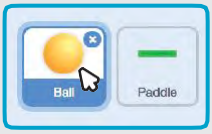
Click the **Make a Variable** button.

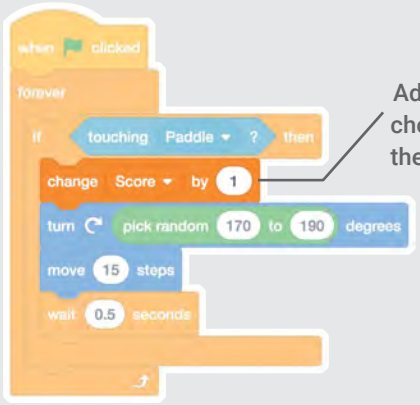


Name this variable **Score** and then click **OK**.

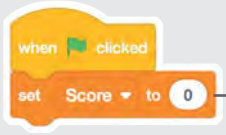
ADD THIS CODE

Click to select the Ball sprite.





Add this block and choose **Score** from the menu.



Use this block to reset the score. Choose **Score** from the menu.

Win the Game

When you score enough points, display a winning message!

Win the Game

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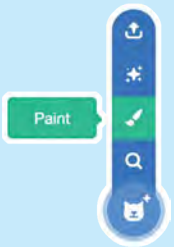
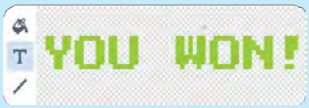
GET READY



Click the **Paint** icon to make a new sprite.

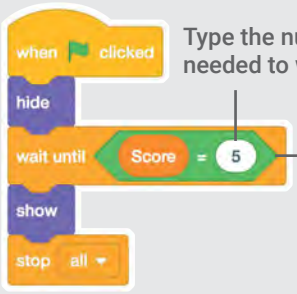
Use the **Text** tool to write a message, like "You Won!"



You can change the font color, size, and style.

ADD THIS CODE

Code Click the **Code** tab.



Type the number of points needed to win the game.

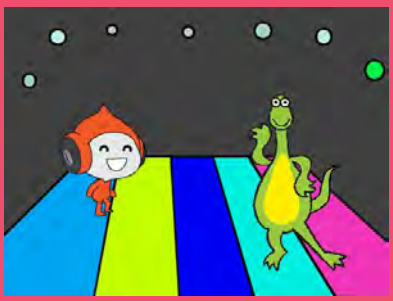
Insert the **Score** block into the **equals** block from the Operators category.

TRY IT

Click the green flag to start.

Play until you score enough points to win!

Let's Dance Cards



Design an animated dance scene with music and dance moves.

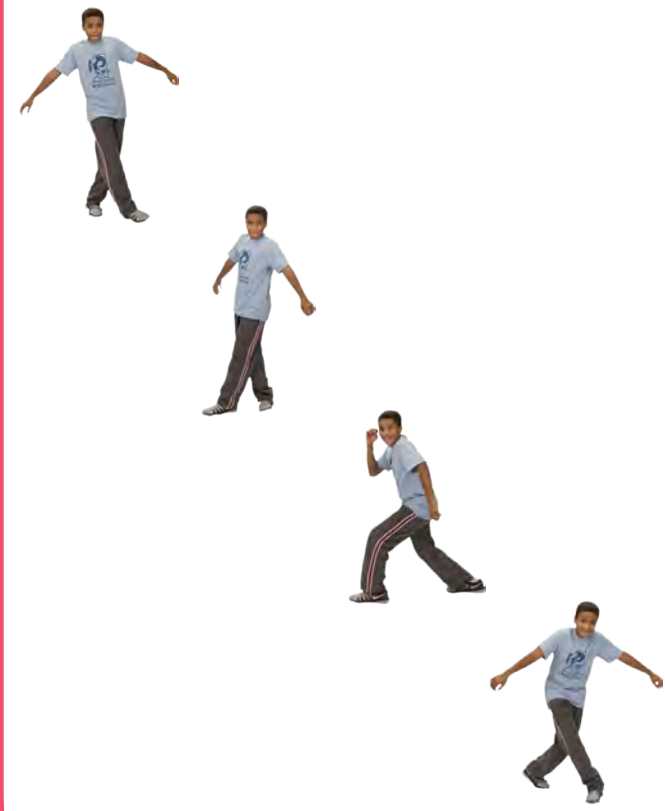
Let's Dance Cards

Try these cards in any order:

- Dance Sequence
- Dance Loop
- Play Music
- Take Turns
- Starting Position
- Shadow Effect
- Interactive Dance
- Color Effect
- Leave a Trail

Dance Sequence

Make an animated dance.



Dance Sequence

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GET READY

Choose a dancer.

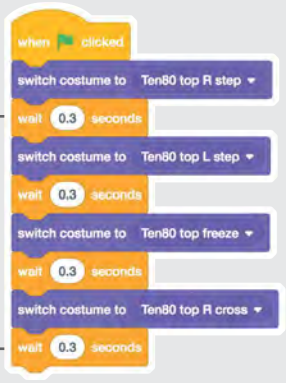
Click the **Costumes** tab to see the different dance moves.

To see just the dance sprites, click the **Dance** category at the top of the Sprite Library.

ADD THIS CODE

Click the **Code** tab.

Type how long to wait between dance moves.



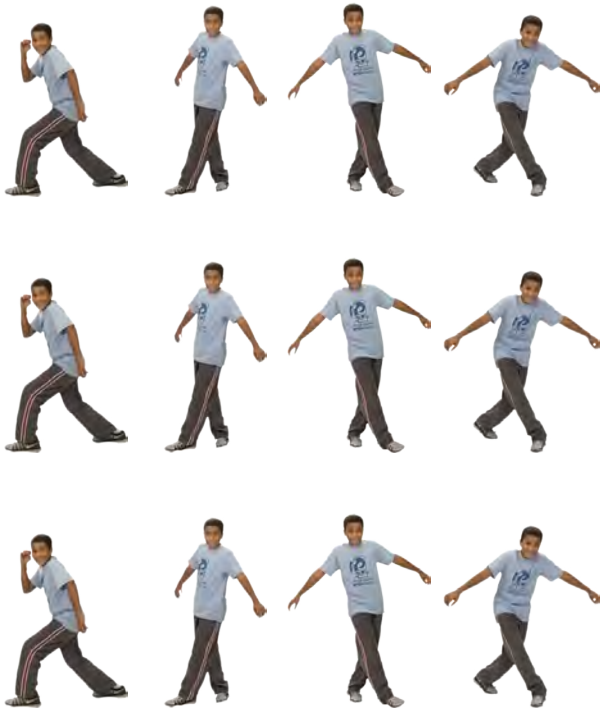
Pick different dance moves.

TRY IT

Click the green flag to start

Dance Loop

Repeat a series of dance steps.



Dance Loop

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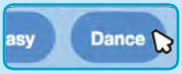
GET READY

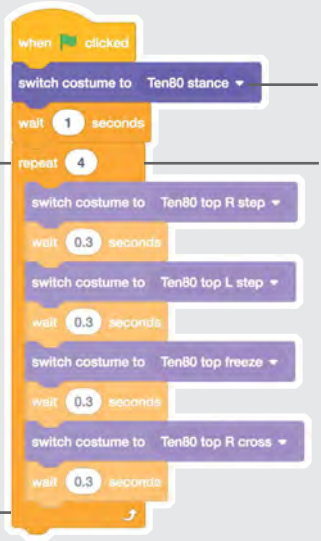
Go to the Sprite Library.



Click the **Dance** category.

Choose a dancer.

ADD THIS CODE



Choose a dance pose.

Type how many times you want to repeat the dance.

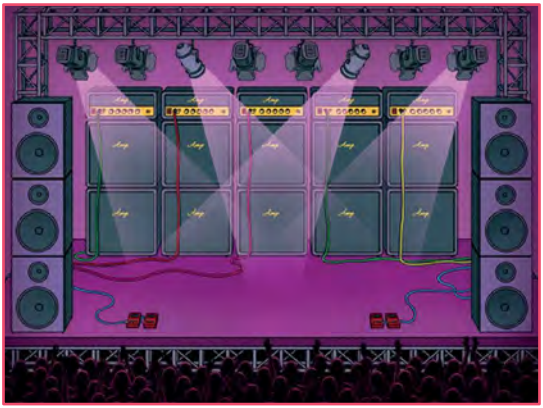
Add a **repeat** block around your dance sequence.

TRY IT

Click the green flag to start. 

Play Music

Play and loop a song.



Play Music

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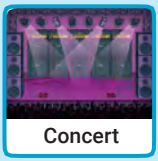
GET READY

Choose a backdrop.

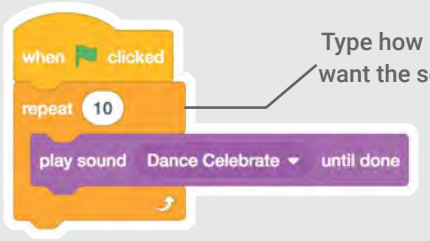


Sounds Click the **Sounds** tab.

Choose a song from the **Loops** category.

ADD THIS CODE

Code Click the **Code** tab.



Type how many times you want the song to repeat.

TIP

Make sure to use play sound Dance Celebrate until done (not start sound Dance Celebrate) or else the music won't finish playing before it begins again.

Take Turns

Coordinate dancers so that one begins after the other finishes.

Take Turns

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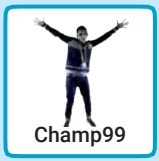
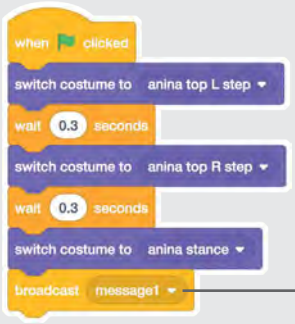
GET READY

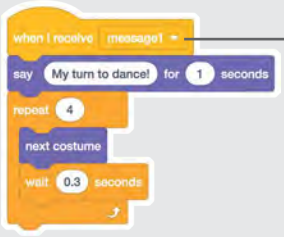
Choose two dancers from the Dance category.



ADD THIS CODE



Broadcast a message.



Tell this dancer sprite what to do when it receives the message.

TRY IT

Click the green flag to start.

Starting Position

Tell your dancers where to start.

Starting Position

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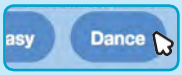
GET READY

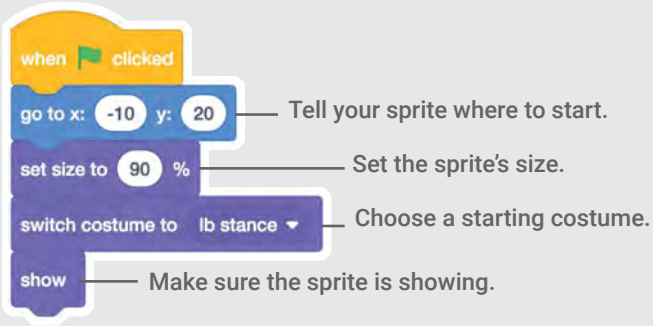
Go to the Sprite Library.



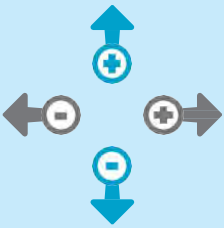
Click the **Dance** category.

Choose a dancer.

ADD THIS CODE



TIP



Use 

to set a sprite's position on the Stage.

x is the position on the Stage from left to right.

y is the position on the Stage from top to bottom.

Shadow Effect

Make a dancing silhouette.

Shadow Effect

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GET READY

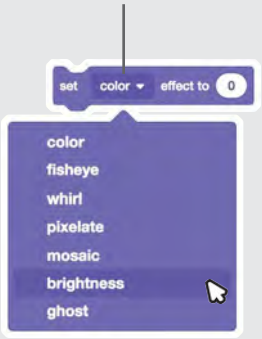
Go to the Sprite Library.

Click the **Dance** category.

Choose a dancer.

ADD THIS CODE

Choose **brightness** from the menu.



Set the brightness to **-100** to make the sprite completely dark.

TRY IT

Click the green flag to start.

Click the stop sign to stop.

Interactive Dance

Press keys to switch dance moves.

Interactive Dance

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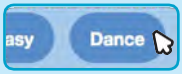
GET READY

Go to the Sprite Library.

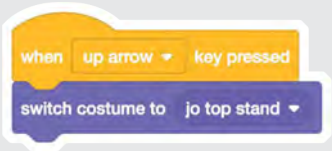


Click the **Dance** category

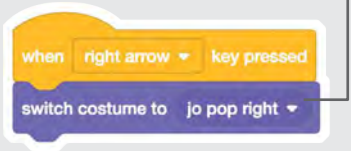
Choose a dancer.

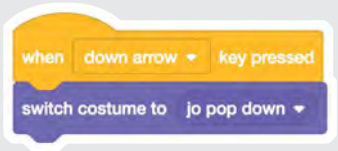
ADD THIS CODE

Choose a different key to press for each dance move.



Pick a dance move from the menu.



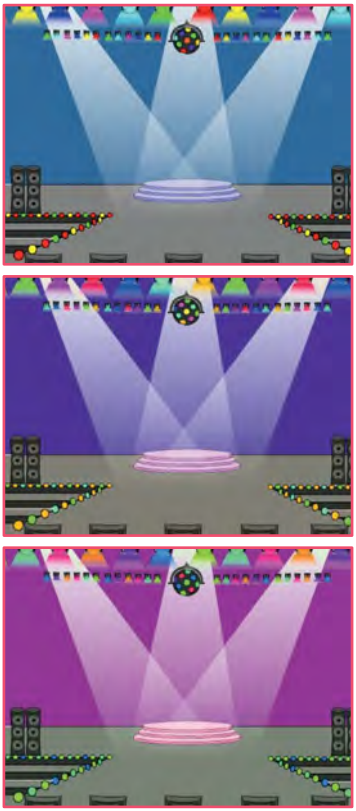


TRY IT

Press the arrow keys on your keyboard.

Color Effect

Make the backdrop change colors.



Color Effect

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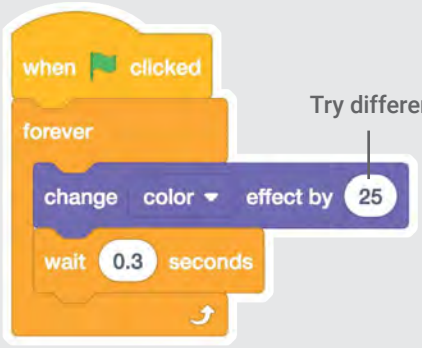
GET READY

Choose a backdrop.

ADD THIS CODE



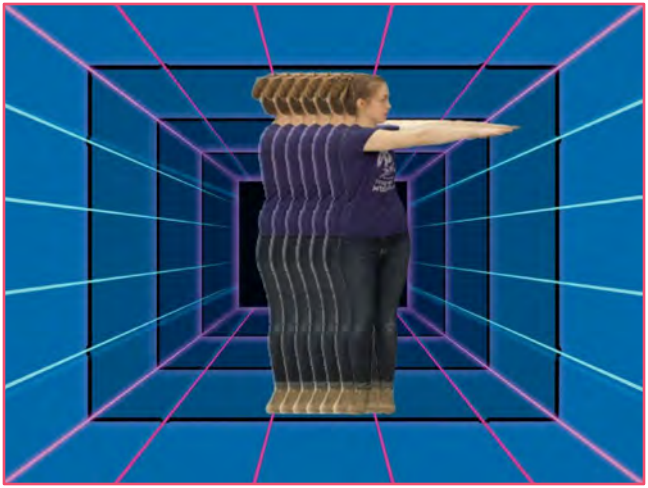
Try different numbers.

TRY IT

Click the green flag to start.

Leave a Trail

Stamp a trail as your dancer moves.



Leave a Trail

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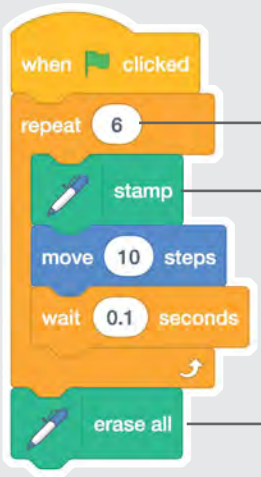
GET READY

Choose a dancer from the Dance category.

Click the **Extensions** button, and then click **Pen** to add the blocks.

ADD THIS CODE



Type how many times to repeat.

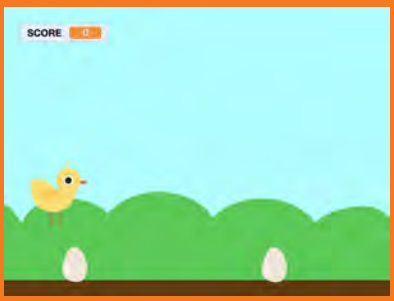
Stamp an image of the sprite on the Stage.

Clear all the stamps.

TRY IT

Click the green flag to start.

Jumping Game Cards



Make a character jump over moving obstacles.

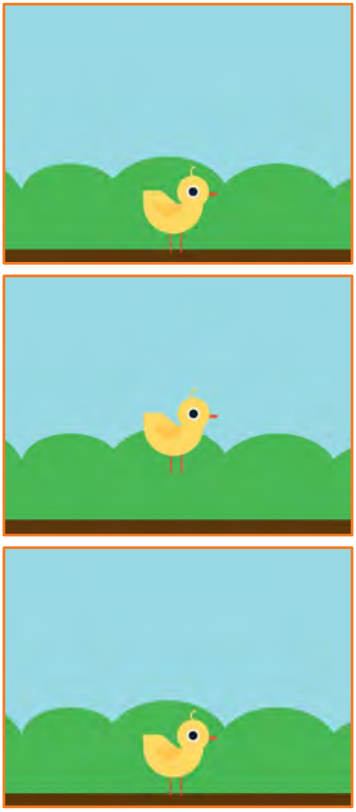
Jumping Game Cards

Use these cards in this order:

1. Jump
2. Go to Start
3. Moving Obstacle
4. Add a Sound
5. Stop the Game
6. Add More Obstacles
7. Score

Jump

Make a character jump.



Jump

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GET READY

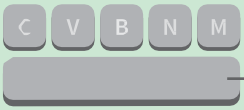
Choose a backdrop.

Choose a character, like Chick.

ADD THIS CODE

Type a minus sign to go back down.

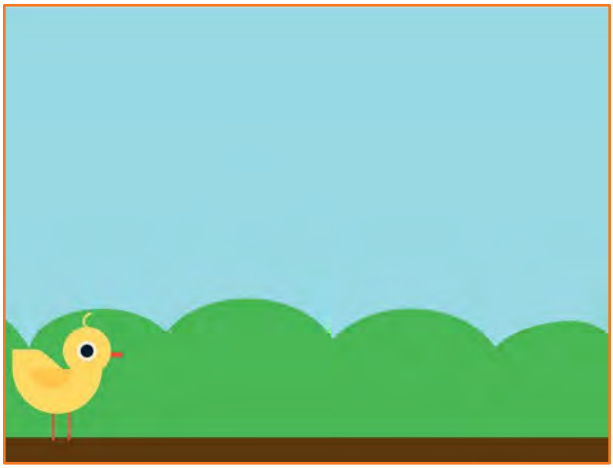
TRY IT



Press the **space** key on your keyboard.

Go to Start

Set the starting point for your sprite.



Go to Start

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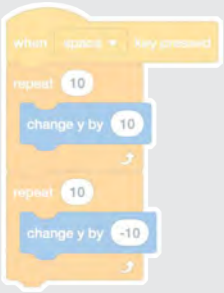
GET READY

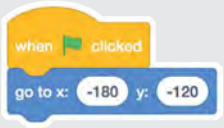
Drag your character to where you want it.

When you move your character, its **x** and **y** position will update in the blocks palette.

Now when you drag out a **go to** block, it will set to your character's new position.

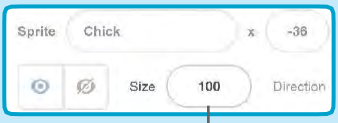
ADD THIS CODE

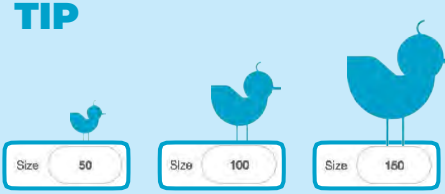




Set the starting position.
(Your numbers may be different.)

TIP

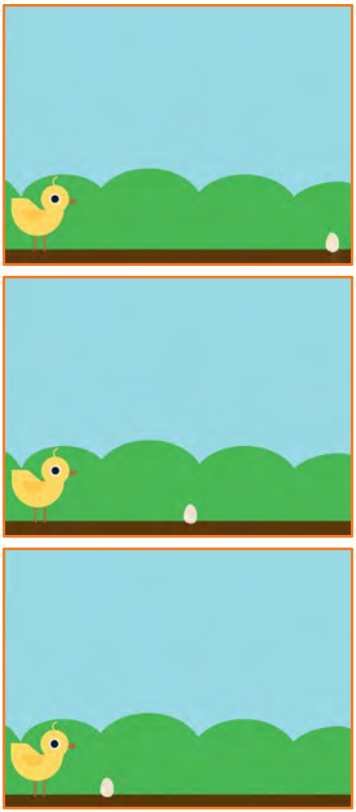




Change the size of a sprite by typing a smaller or larger number.

Moving Obstacle

Make an obstacle move across the Stage.



Moving Obstacle

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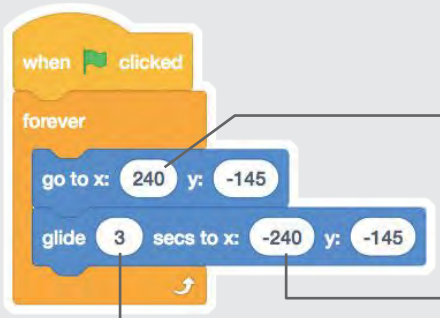
GET READY

Choose a sprite to be an obstacle, such as Egg.

ADD THIS CODE



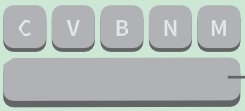
Start at the right edge of the Stage.

Glide to the left edge of the Stage.

Type a smaller number to go faster.

TRY IT

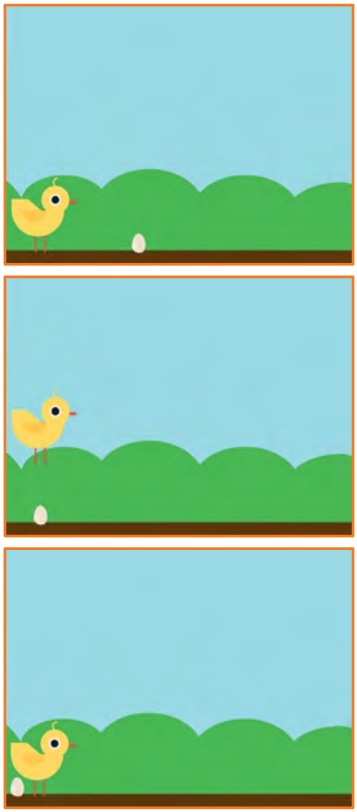
Click the green flag to start.



Press the **space** key on your keyboard.

Add a Sound

Play a sound when your sprite jumps.



Add a Sound

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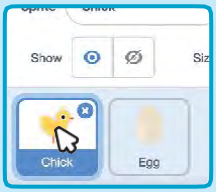
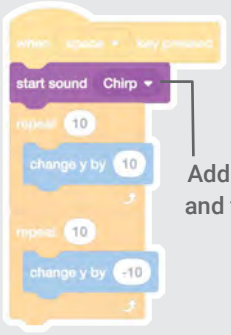
GET READY

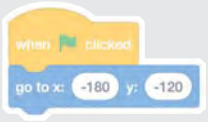
Click to select the Chick sprite.



ADD THIS CODE

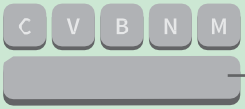


Add the **start sound** block, and then select a sound.



TRY IT

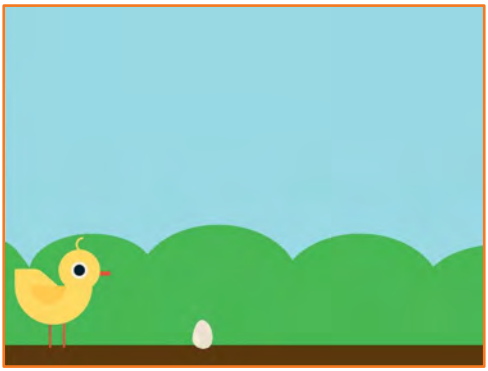
Click the green flag to start.

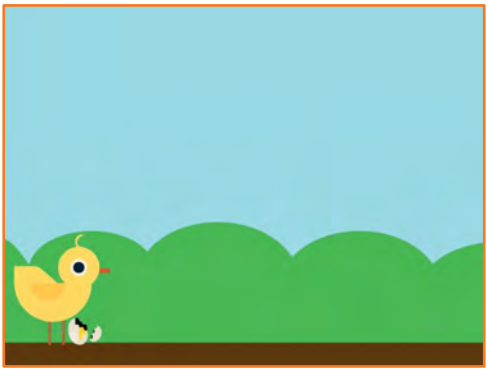


Press the **space** key on your keyboard.

Stop the Game

Stop the game if your sprite touches the egg.





Stop the Game

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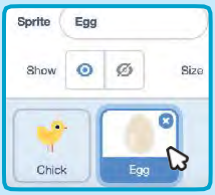
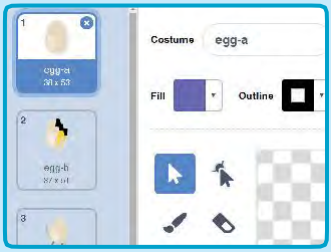
GET READY

Click to select the Egg sprite.



Costumes

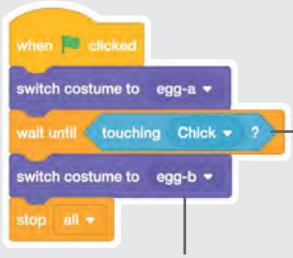
Click the **Costumes** tab to see the Egg sprite's costumes.



ADD THIS CODE

Code

Click the **Code** tab and add this code.

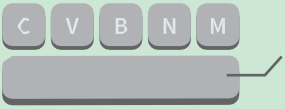


Choose a second costume for the Egg sprite to change to.

Insert the **touching** block and choose **Chick** from the menu.

TRY IT

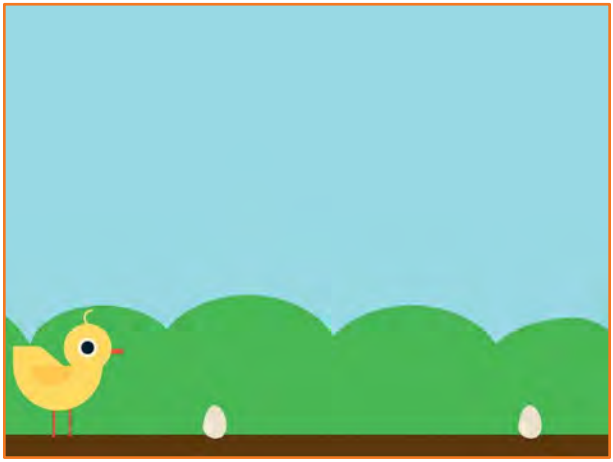
Click the green flag to start.



Press the **space** key on your keyboard.

Add More Obstacles

Make the game harder by adding more obstacles.



Add More Obstacles

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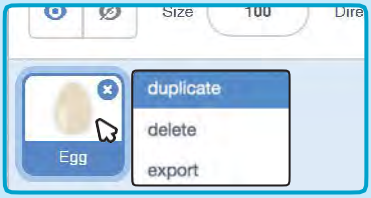
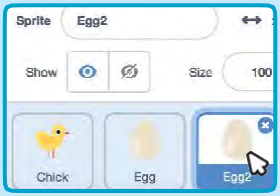
GET READY

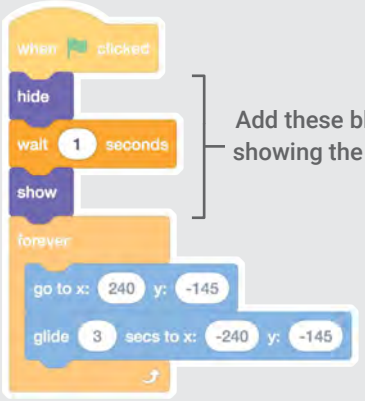


To duplicate the Egg sprite, right-click (Mac: control-click) on the thumbnail, and then choose **duplicate**.



Click to select **Egg2**.

ADD THIS CODE



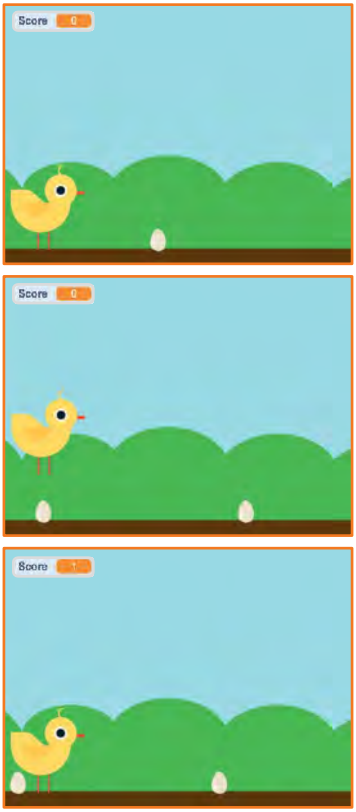
Add these blocks to wait before showing the second egg.

TRY IT

Click the green flag to start.

Score

Add a point each time your sprite jumps over an egg.



Score

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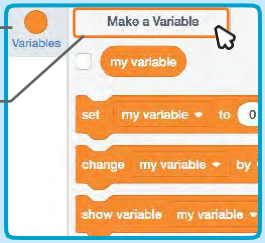
GET READY

Choose **Variables**.

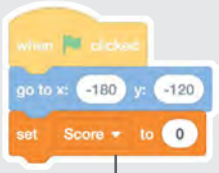
Click the **Make a Variable** button.



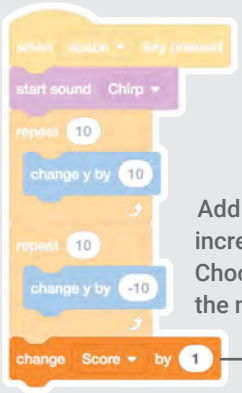
Name this variable **Score** and then click **OK**.

ADD THIS CODE

Click the Chick sprite and add two blocks to your code:



Add this block to reset the Score. Choose **Score** from the menu.

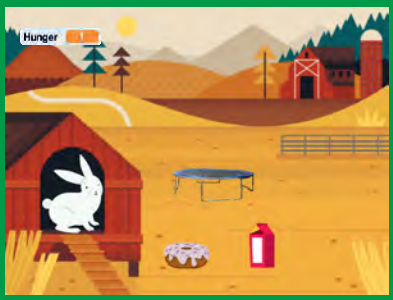


Add this block to increase the score. Choose **Score** from the menu.

TRY IT

Jump over the eggs to score points!

Virtual Pet Cards



Create an interactive pet that can eat, drink, and play.

Virtual Pet Cards

Use these cards in this order:

1. Introduce Your Pet
2. Animate Your Pet
3. Feed Your Pet
4. Give Your Pet a Drink
5. What Will Your Pet Say?
6. Time to Play
7. How Hungry?

Introduce Your Pet

Choose a pet and have it say hello.

Introduce Your Pet

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GET READY

Choose a backdrop, like Garden Rock.

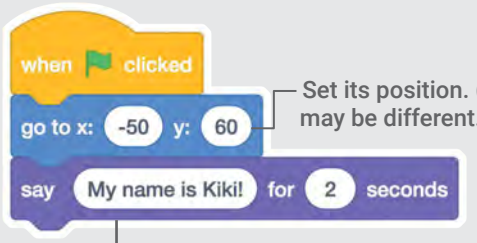
Choose a sprite to be your pet, like Monkey.

Pick a sprite with more than one costume.

Scroll over sprites in the Sprite Library to see their different costumes.

ADD THIS CODE

Drag your pet to where you want it on the Stage.



Set its position. (Your numbers may be different.)

Type what you want your pet to say.

TRY IT

Click the green flag to start.

Animate Your Pet

Bring your pet to life.

Animate Your Pet

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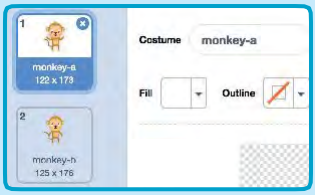
GET READY

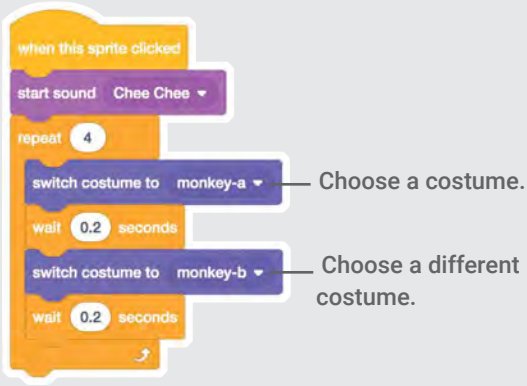
Costumes

Click the **Costumes** tab to see your pet's costumes.



ADD THIS CODE

Code Click the **Code** tab and add this code.



TRY IT

Click your pet.

Feed Your Pet

Click the food to feed your pet.

Feed Your Pet

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GET READY

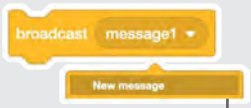
Click the **Sounds** tab.

Choose a sound from the Sounds Library, like Chomp.

Choose a food sprite, like Bananas.

ADD THIS CODE

Click the **Code** tab.



Select **New message** and name it **food**.

Broadcast the **food** message.

Select your pet.

Choose **food** from the menu.

Choose **Bananas** from the menu.

Glide to the starting position.

TRY IT

Click the food.

Give Your Pet a Drink

Give your pet some water to drink.

Give Your Pet a Drink

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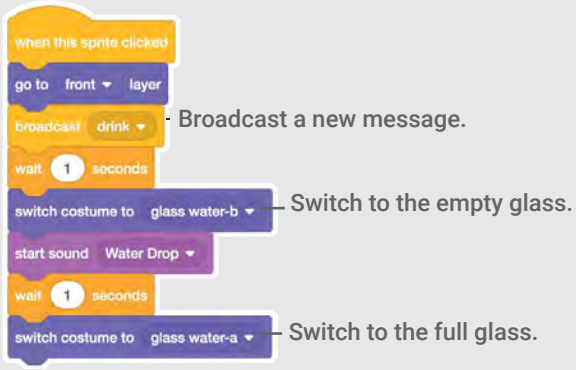
GET READY

Choose a drink sprite, like Glass Water.

ADD THIS CODE

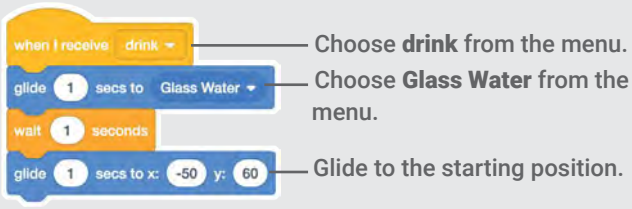


Broadcast a new message.

Switch to the empty glass.

Switch to the full glass.

Tell your pet what to do when it receives the message.



Choose **drink** from the menu.

Choose **Glass Water** from the menu.

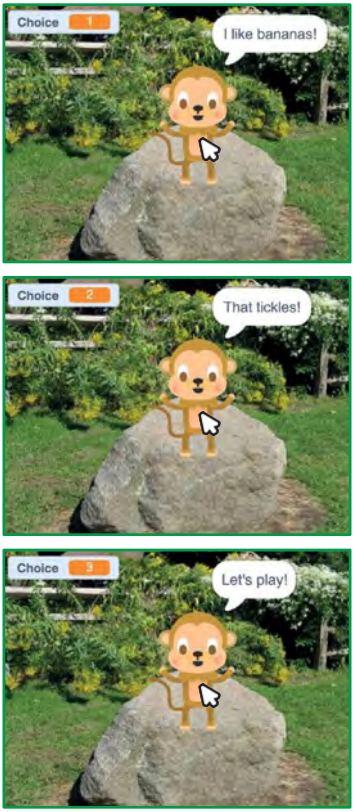
Glide to the starting position.

TRY IT

Click the drink to start.

What Will Your Pet Say?

Let your pet choose what it will say.



What Will Your Pet Say?

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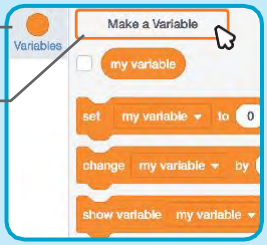
GET READY

Choose **Variables**.

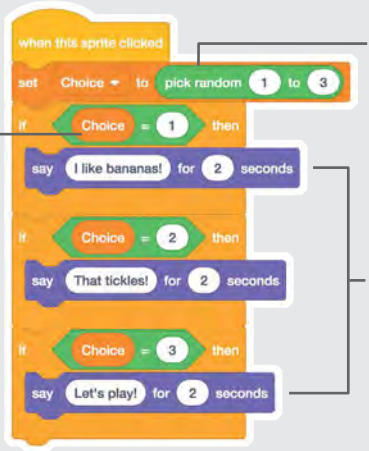
Click the **Make a Variable** button.



Name this variable **Choice** and then click **OK**.

ADD THIS CODE

Insert the **Choice** block into the **equals** block from the Operators category.



Insert the **pick random** block.

Type things for your pet to say.

TRY IT

Click your pet to see what it says.

Time to Play

Have your pet play with a ball.

Time to Play

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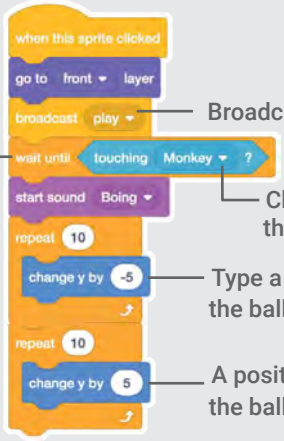
GET READY

Choose a sprite, like Ball.

ADD THIS CODE

Insert the touching block into the **wait until** block.



Broadcast a new message.

Choose **Monkey** from the menu.

Type a minus sign to make the ball move down.

A positive number makes the ball move up.

Choose **play** from the menu.

Pick **Ball** from the menu.

TRY IT

Click the ball.

How Hungry?

Keep track of how hungry your pet is.

How Hungry?

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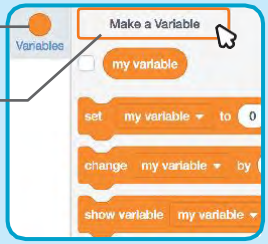
GET READY

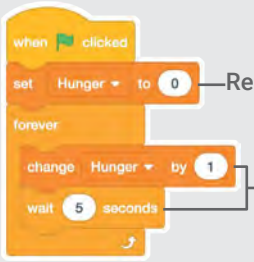
Choose **Variables**.

Click the **Make a Variable** button.



Name this variable **Hunger** and then click **OK**.

ADD THIS CODE



Reset hunger level.

Increase hunger level every 5 seconds.

Choose **food** from the menu.

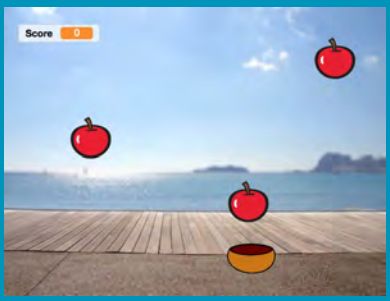
Type a minus sign to make your pet less hungry when it gets food.

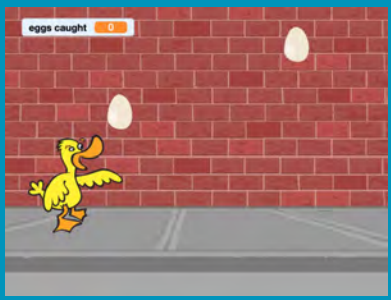
TRY IT

Click the green flag to start.

Then click the food.

Catch Game Cards





Make a game where you catch things falling from the sky.

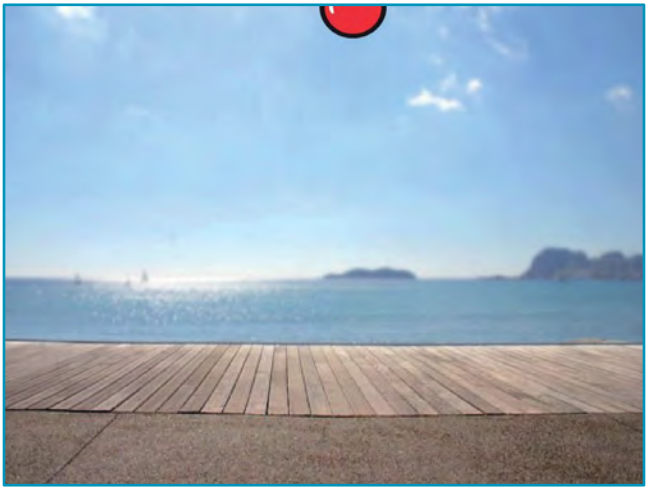
Catch Game Cards

Use these cards in this order:

1. Go to the Top
2. Fall Down
3. Move the Catcher
4. Catch It!
5. Keep Score
6. Bonus Points
7. You Win!

Go to the Top

Start from a random spot at the top of the Stage.



Go to the Top

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GET READY

Choose a backdrop, like **Boardwalk**.

Choose a sprite, like **Apple**.

ADD THIS CODE

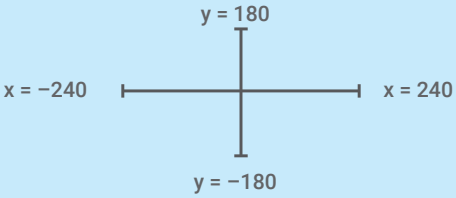
Type 180 to go to the top of the stage.

TRY IT

Click the green flag to start.

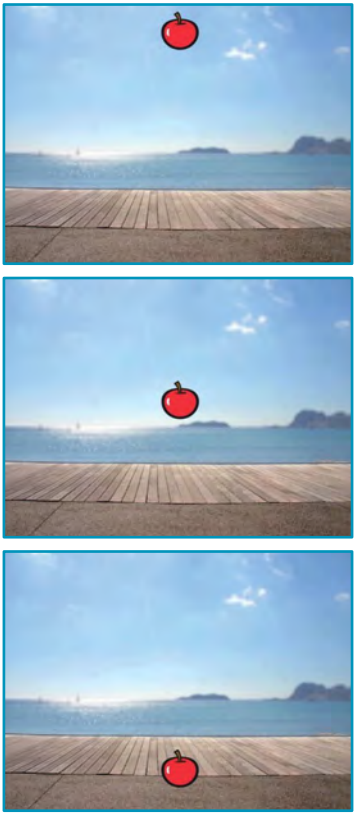
TIP

y is the position on the Stage from top to bottom.



Fall Down

Make your sprite fall down.



Fall Down

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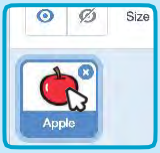
GET READY



Click to select the **Apple** sprite.

ADD THIS CODE

Keep the previous code as is, and add this second stack of blocks:

Insert the **y position** block into this block from the Operators category.

Type a minus sign to fall down.

Check if near the bottom of the Stage.

Go back to the top of the Stage.

TRY IT

Click the green flag to start.

Click the stop sign to stop.

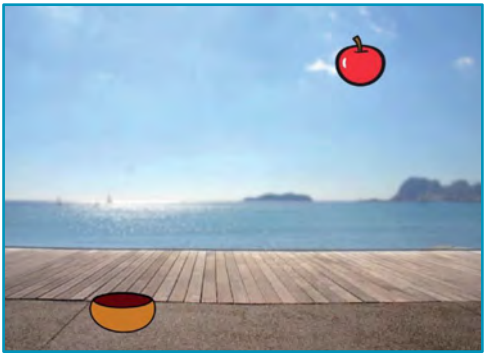
TIP

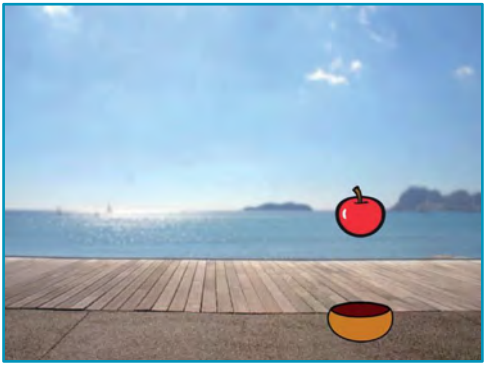
Use 

to move up or down.

Move the Catcher

Press the arrow keys so that the catcher moves left and right.





Move the Catcher

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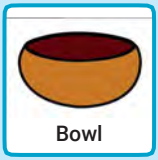
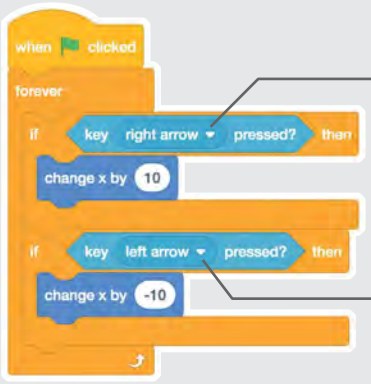
GET READY

Choose a catcher like **Bowl**.



Drag the bowl to the bottom of the Stage.

ADD THIS CODE



Choose the **right arrow** from the menu.

Choose the **left arrow** from the menu.

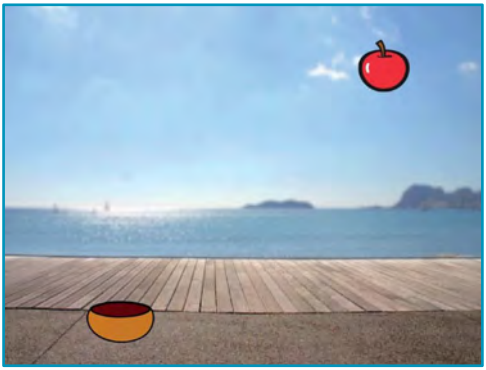
TRY IT

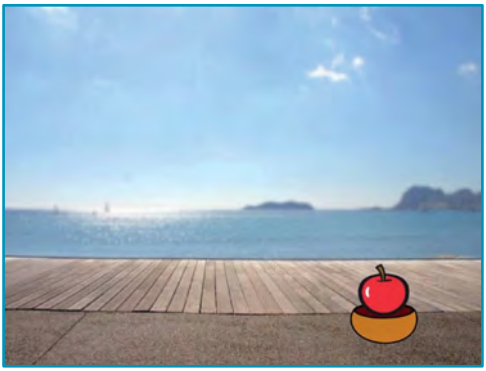
Click the green flag to start.

Press the arrow keys to move the catcher.

Catch It!

Catch the falling sprite.





Catch It!

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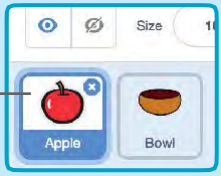
GET READY

Click to select the **Apple**.



ADD THIS CODE

Choose **Bowl** from the menu.

Choose a sound.

TIP

Sounds

Click the **Sounds** tab if you want to add a different sound.

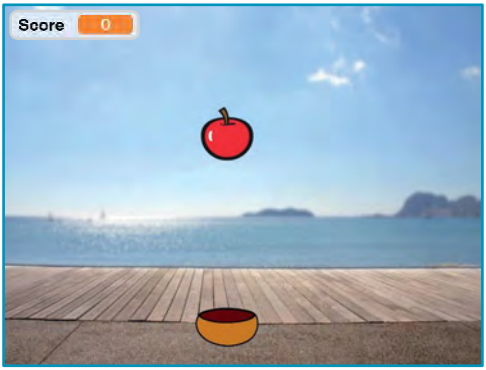
Then choose a sound from the Sounds Library.

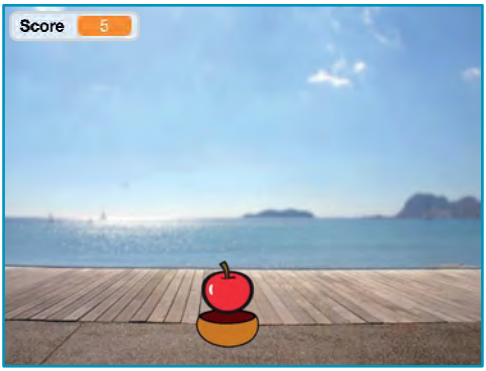
Code

Click the **Code** tab when you want to add more blocks.

Keep Score

Add a point each time you catch the falling sprite.





Keep Score

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GET READY

Choose **Variables**.

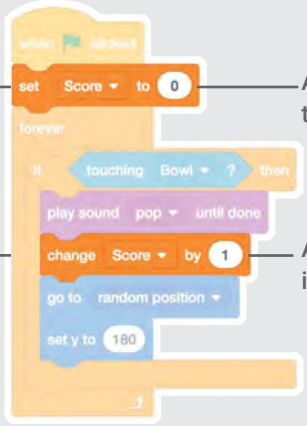
Click the **Make a Variable** button.

Name this variable **Score** and then click **OK**.

ADD THIS CODE

Add two new blocks to your code:

Choose **Score** from the menu.



Add this block to reset the score.

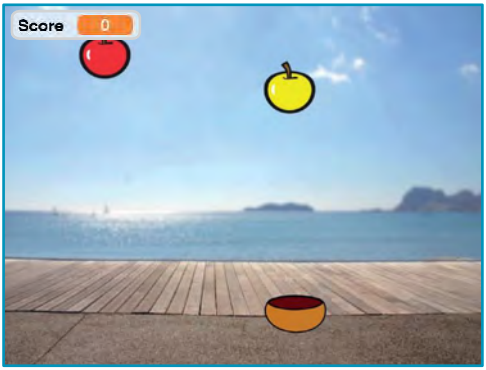
Add this block to increase the score.

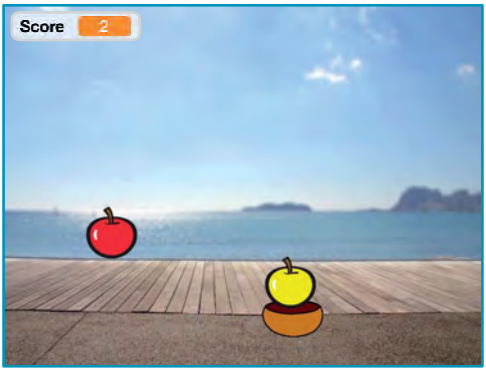
TRY IT

Click the green flag to start.
Then, catch apples to score points!

Bonus Points

Get extra points when you catch a golden sprite.





Bonus Points

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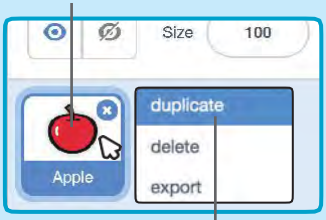
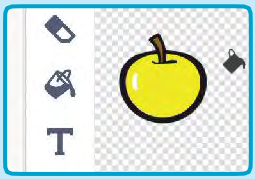
GET READY

To duplicate your sprite, right-click (Mac: control-click).



Choose **duplicate**.

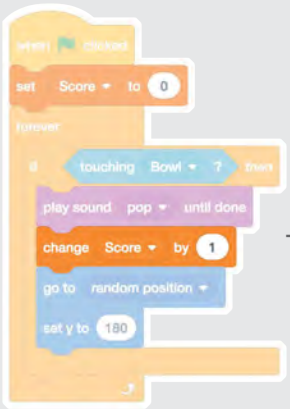
Costumes Click the **Costumes** tab.



You can use the paint tools to make your bonus sprite look different.

ADD THIS CODE

Code Click the **Code** tab.



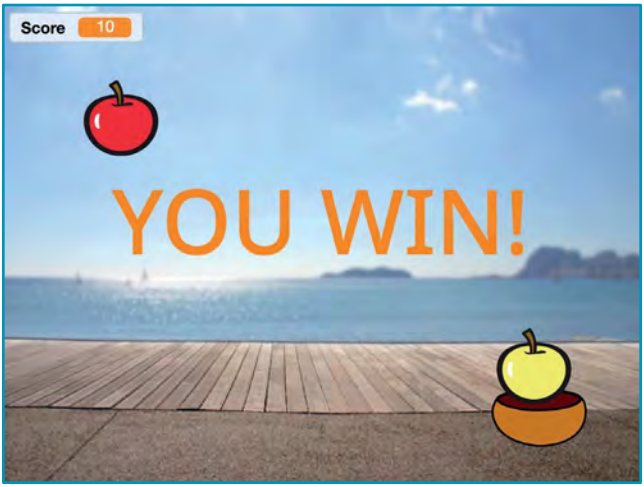
Type how many points you get for catching a bonus sprite.

TRY IT

Catch the bonus sprite to increase your score!

You Win!

When you score enough points, display a winning message!



You Win!

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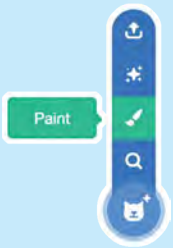
GET READY



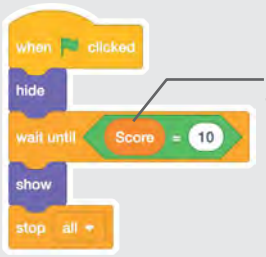
Click the **Paint** icon to make a new sprite.

Use the **Text** tool to write a message, like "You Win!"

You can change the font color, size, and style.

ADD THIS CODE

Click the **Code** tab.



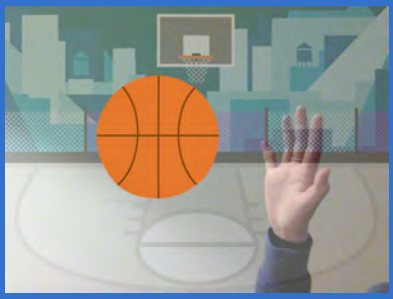
Insert the **Score** block from the Variables category.

TRY IT

Click the green flag to start.

Play until you score enough points to win!

Video Sensing Cards



Interact with projects using video sensing.

Video Sensing Cards

Try these cards in any order:

- Pet the Cat
- Animate
- Pop a Balloon
- Play the Drums
- Keep Away Game
- Play Ball
- Start an Adventure

Pet the Cat

Make the cat meow when you touch it.

Pet the Cat

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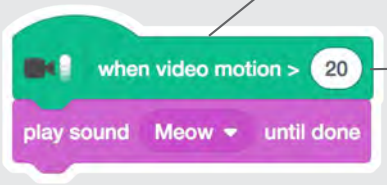
GET READY

Click the **Extensions** button
(at the bottom left of the screen).

Choose **Video Sensing**
to add the video blocks.

ADD THIS CODE



This will start when it senses video motion on a sprite.

Type a number between 1 and 100 to change the sensitivity.

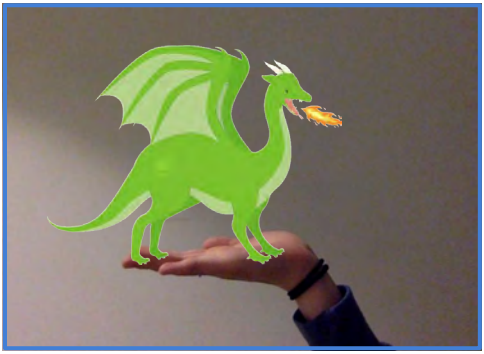
1 will start with very little movement, 100 requires a lot of movement.

TRY IT

Move your hand to pet the cat.

Animate

Move around to bring a sprite to life.



Animate

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GET READY

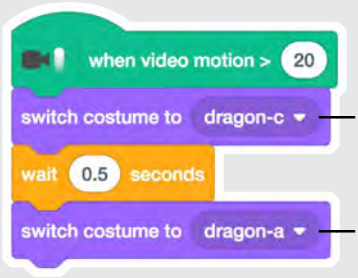
Click the **Extensions** button, then choose **Video Sensing**.

Choose a sprite to animate.

Pick a sprite with more than one costume.

Scroll over sprites in the Sprite Library to see their different costumes.

ADD THIS CODE



Choose one costume.

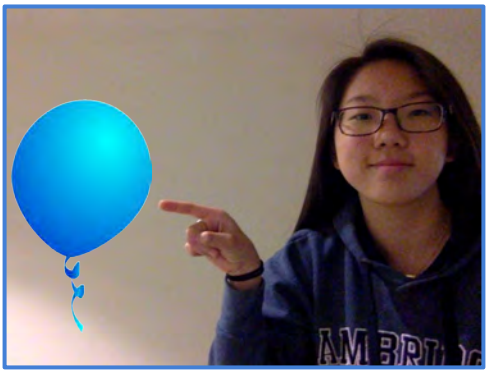
Choose a different costume.

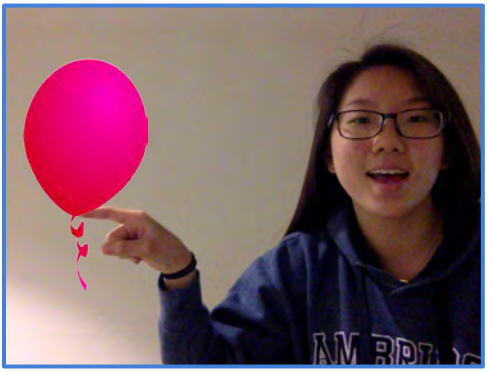
TRY IT

Move around to animate the dragon.

Pop a Balloon

Use your finger to pop a balloon.





Pop a Balloon

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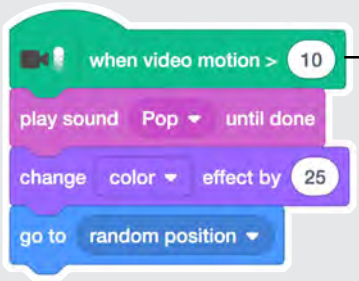
GET READY

Click the **Extensions** button, then choose **Video Sensing**.

Choose a sprite, like Balloon1.

ADD THIS CODE



Type a larger number to make it harder to pop.

TRY IT

Use your finger to pop the balloon.

Play the Drums

Interact with sprites that play sounds.

Play the Drums

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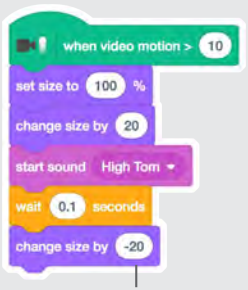
GET READY

Click the **Extensions** button, then choose **Video Sensing**.

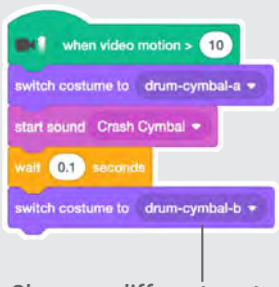
Choose two sprites, like Drum and Drum-cymbal.

ADD THIS CODE

Click on a drum to select it, then add its code.



Type a minus sign to get smaller.



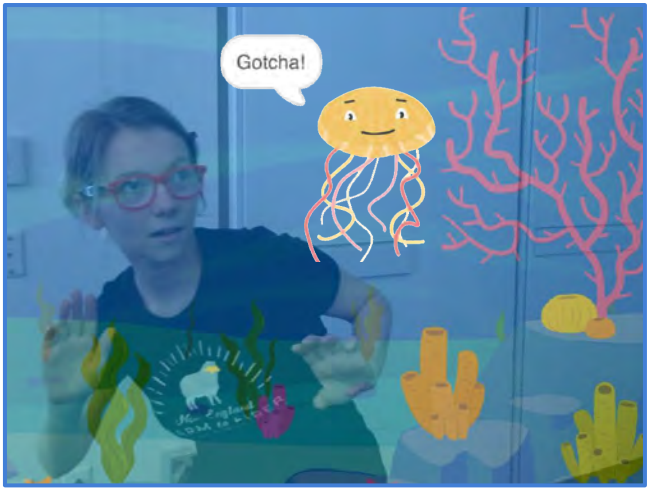
Choose a different costume.

TRY IT

Use your hands to play the drums!

Keep Away Game

Move around to avoid a sprite.



Keep Away Game

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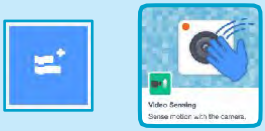
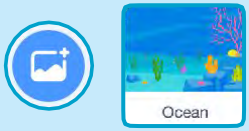
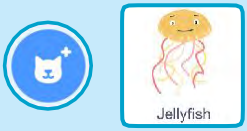
GET READY



Click the **Extensions** button, then choose **Video Sensing**.

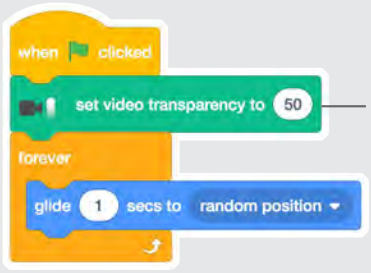


Choose a backdrop, like Ocean.

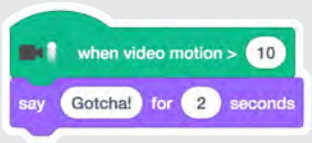


Choose a sprite, like Jellyfish.

ADD THIS CODE



Type a number between 0 and 100.
(0 to show the video, 100 to make the video transparent.)

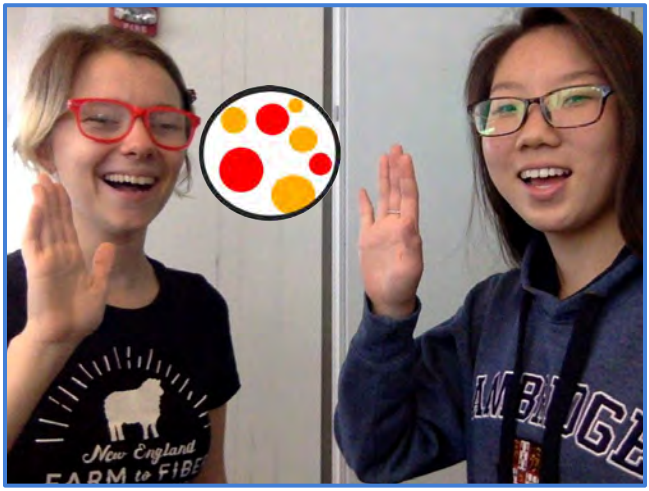


TRY IT

Move around to avoid the jellyfish.

Play Ball

Use your body to move a sprite across the screen.



Play Ball

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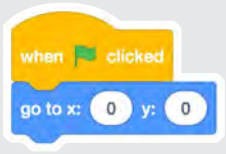
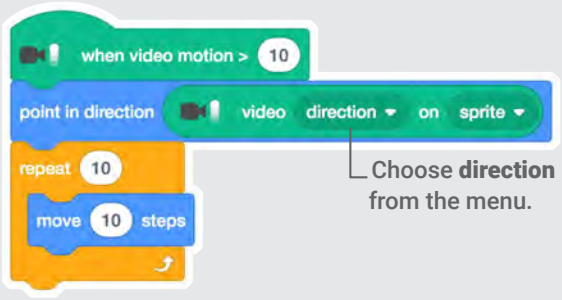
GET READY

Click the **Extensions** button, then choose **Video Sensing**.

Choose a sprite, like Beachball.

ADD THIS CODE





Choose **direction** from the menu.

TRY IT

Use your hands to push the beach ball around the screen. Try it with a friend!

Start an Adventure!

Interact with a story by moving your hands.

Start an Adventure!

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GET READY

Click the **Extensions** button.

Choose **Video Sensing.**

Choose a backdrop.

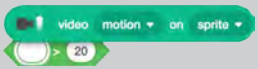
Choose a sprite.

Costumes

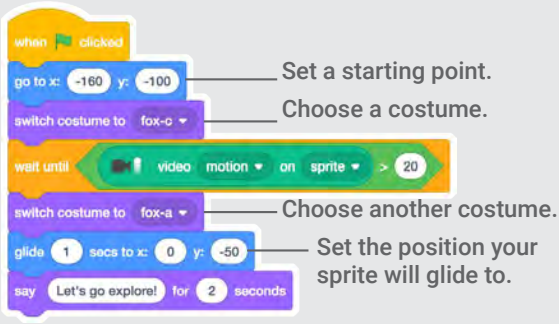
Click the **Costumes** tab to see your sprite's other costumes.

ADD THIS CODE

Code Click the **Code** tab.



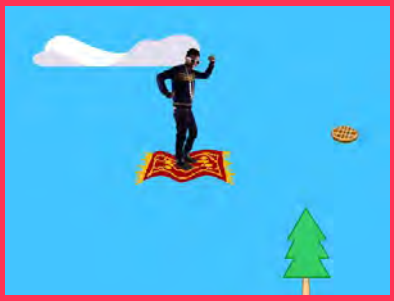
Insert the **video motion on sprite** block into the **greater than** block from the Operators category.

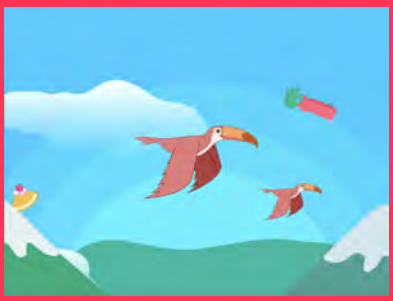


TRY IT

Click the green flag. Then wave to wake up the fox.

Make it Fly Cards





Choose any character and make it fly!

Make it Fly Cards

Use these cards in this order:

1. Choose a Character
2. Start Flying
3. Switch Looks
4. Make it Interactive
5. Floating Clouds
6. Flying Hearts
7. Collect Points

Choose a Character

Choose a character to fly.

Choose a Character

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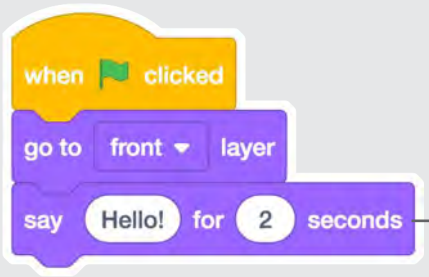
GET READY

Choose a backdrop, such as “blue sky2”.

Choose a sprite from the **Flying** theme.

ADD THIS CODE



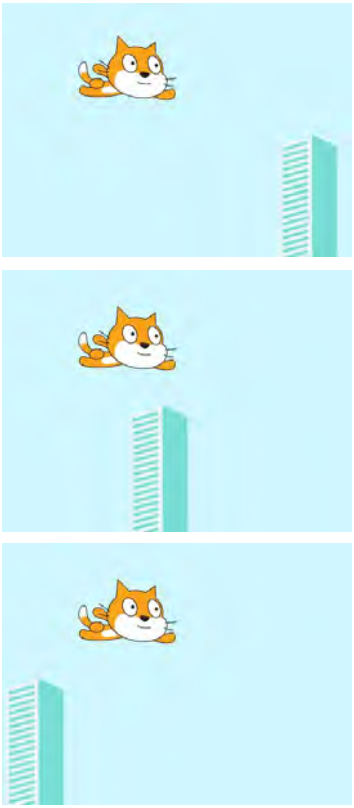
Type what you want your sprite to say.

TRY IT

Click the green flag to start

Start Flying

Move the scenery so your character looks like it's flying.



Start Flying

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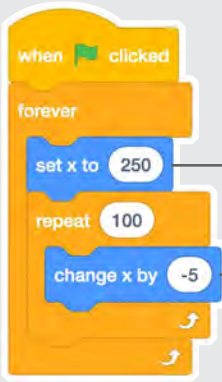
GET READY

Choose a sprite to fly by, such as Buildings

ADD THIS CODE

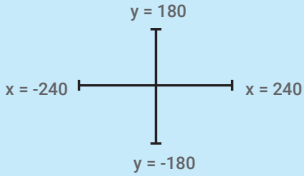


Start from the right end of the stage.

Type a negative number to move left.

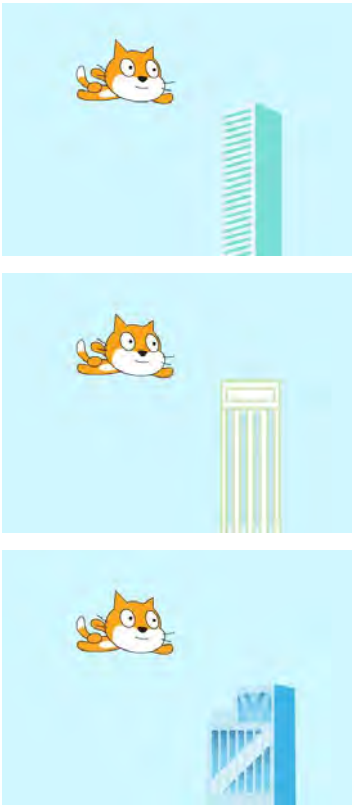
TIP

x is the position on the Stage from left to right.



Switch Looks

Add variety to your scenery.



Switch Looks

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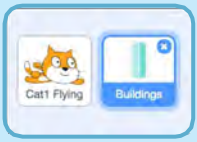
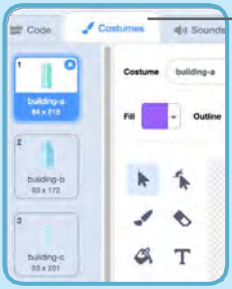
GET READY

Click to select the Buildings **sprite**.





Then, click the **Costumes** tab to see the different building costumes.

ADD THIS CODE

Click the Code tab.

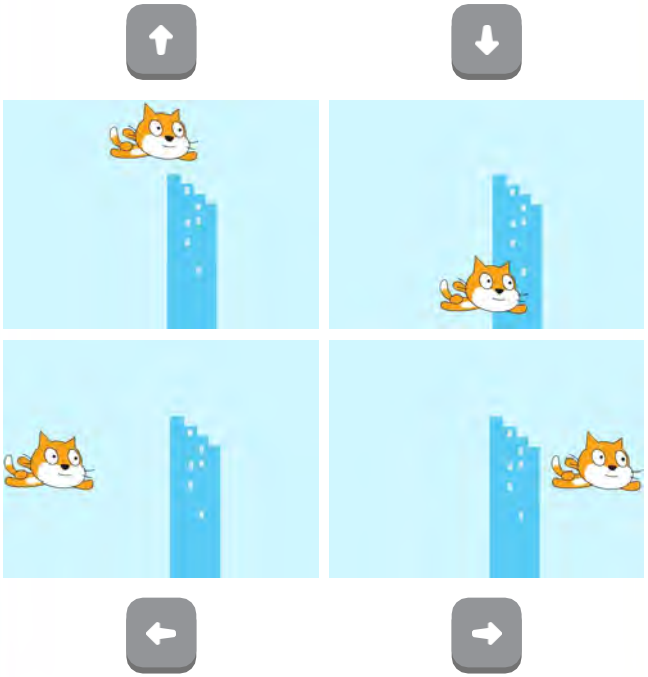
Add this block to switch costumes.

TRY IT

Click the green flag to start

Make It Interactive

Make your character move
when you press a key.



Make It Interactive

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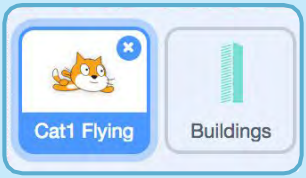
GET READY

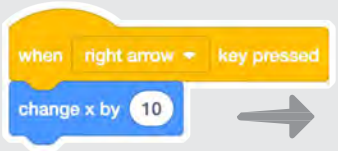
Click to select your flying sprite.



ADD THIS CODE

Change x

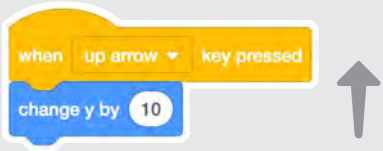
Move your character *side to side.*

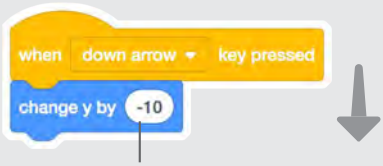


Type a minus sign to move *left*.

Change y

Move your character *up and down.*





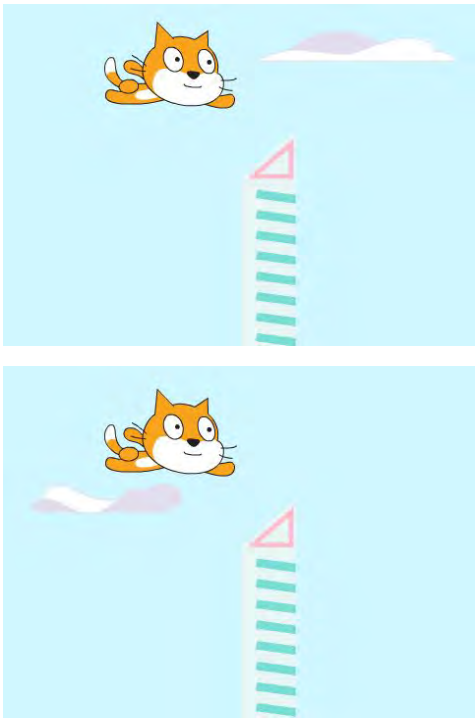
Type a minus sign to move *down*.

TRY IT

Press the arrow keys on your keyboard to move your character around.

Floating Clouds

Make clouds float by in the sky!



Floating Clouds

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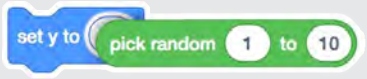
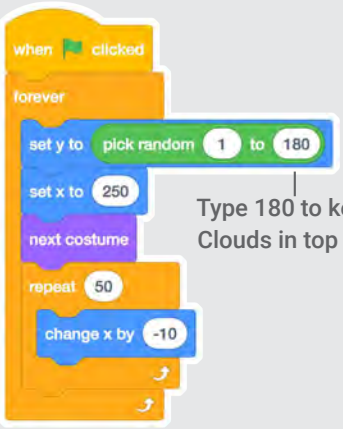
GET READY

Choose Clouds from the library.

ADD THIS CODE



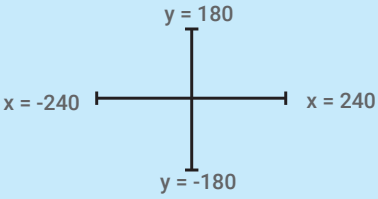
Drag the **pick random** block into the **set y to** block.



Type 180 to keep Clouds in top half.

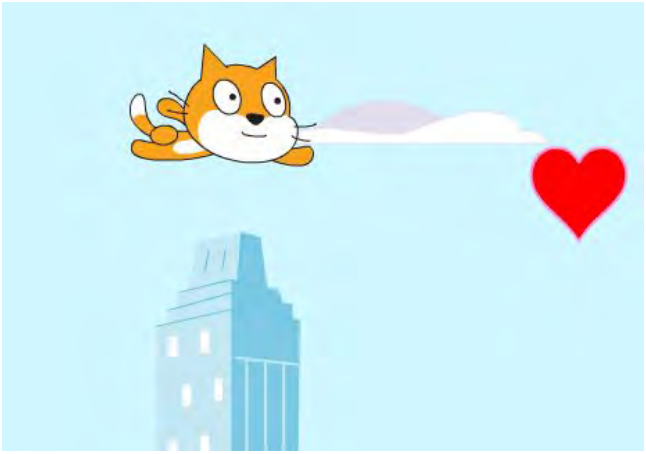
TIP

y is the position on the Stage from top to bottom.



Flying Hearts

Add hearts or other floating objects to



Flying Hearts

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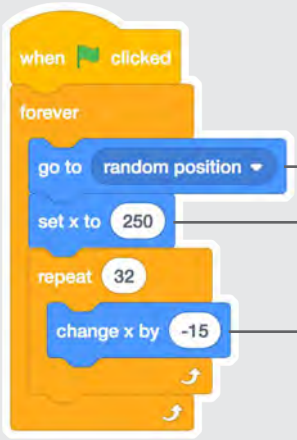
GET READY

Choose a sprite, such as Heart.

ADD THIS CODE



Moves the sprite up and down

Sets your sprite's position at the far right of the stage

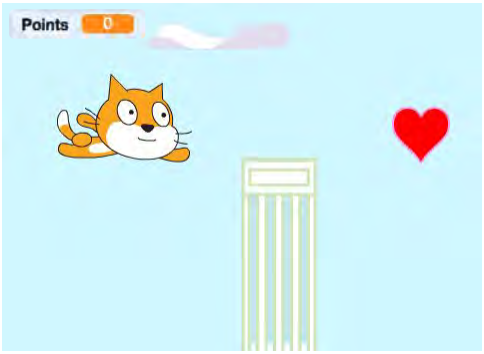
Moves the sprite across the stage

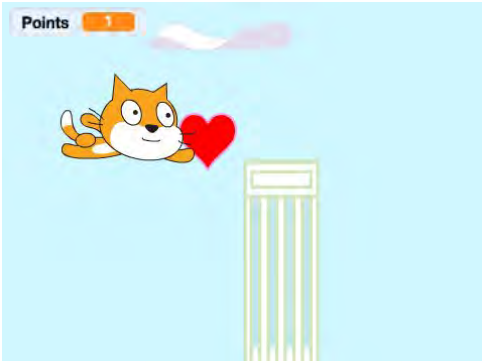
TRY IT

Click the green flag to start

Collect Points

Add a point each time you touch a heart or other object.





Collect Points

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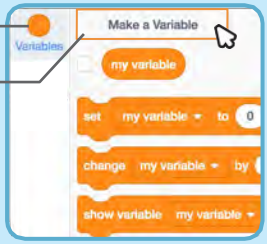
GET READY

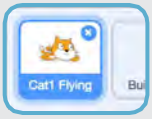
Select **Variable**

Click the Make a Variable **button.**

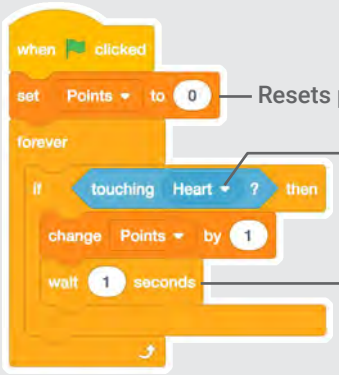


Name this variable **Points** and then click OK.

ADD THIS CODE



Select your flying sprite.



Resets points at the start.

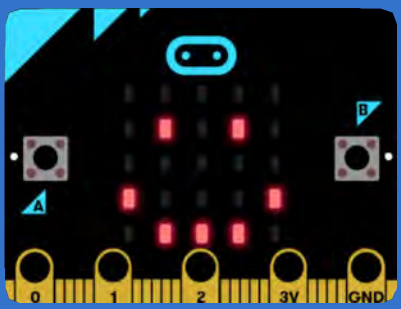
Choose Heart from the menu.

Add a point.

TRY IT

Click the green flag to start

micro:bit Cards



Make projects that connect to the physical world with micro:bit!

micro:bit Cards

Try these cards in any order:

- **Cast a Spell**
- **Squeak**
- **Move Around**
- **Press a Button**
- **Jump**
- **Move Back and Forth**
- **Create an Emoji**

Cast a Spell

Make something happen when you move the micro:bit.

Cast a Spell

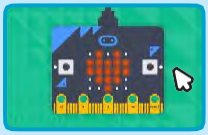
scratch.mit.edu/microbit

GET READY

Choose a backdrop.

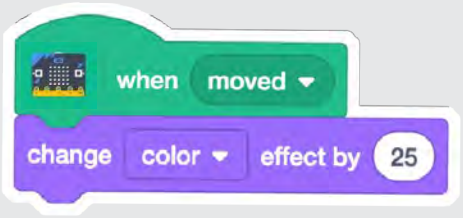
Choose a sprite.

Click the Extensions button.



Then, click to add the micro:bit extension.

ADD THIS CODE

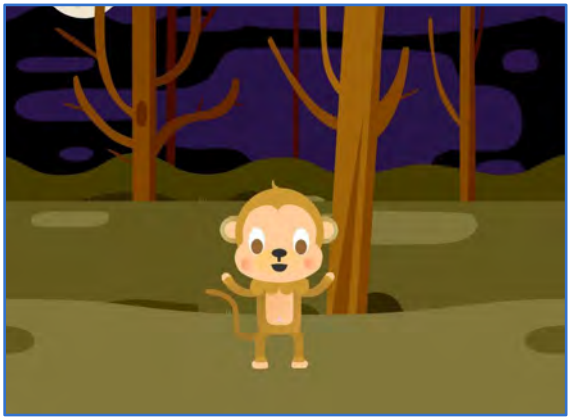


TRY IT

Move the micro:bit to start.

Squeak

Make a sound when you shake the micro:bit.



Squeak

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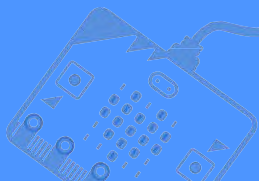
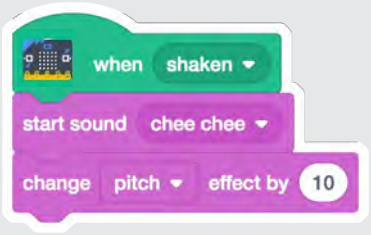


GET READY

Choose a sprite, like Monkey.

ADD THIS CODE



TRY IT

Shake the micro:bit to start.

Click the stop sign to reset the pitch.

TIP

You can click the **Sounds** tab to view your character's sounds.

Click this button to add a sound from the Sound library.

Move Around

Make a character glide around the screen.

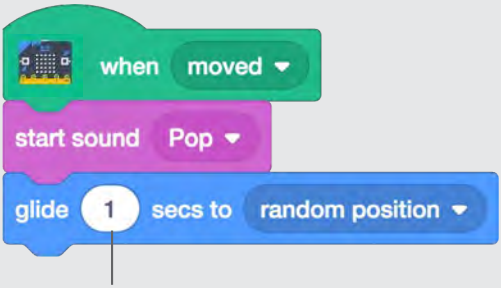
Move Around

scratch.mit.edu/microbit

GET READY

Choose a sprite, like Ghost.

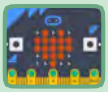
ADD THIS CODE



To move faster, type a smaller number, like 0.5

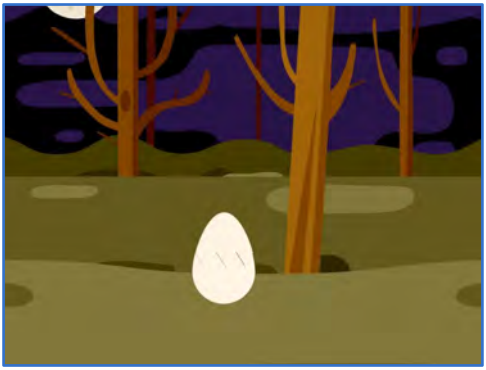
TRY IT

Move the micro:bit to start.



Press a Button

Make something happen when you press the micro:bit button.



Press a Button

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GET READY

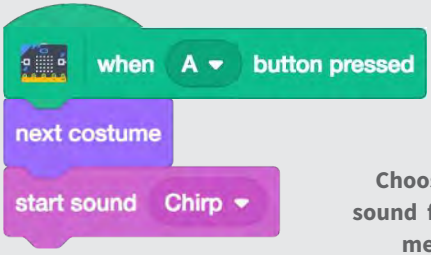
Choose a sprite with multiple costumes, like Hatchling.

Click the Sounds tab.

Choose a sound, like Chirp.

ADD THIS CODE

Click thetab. Code



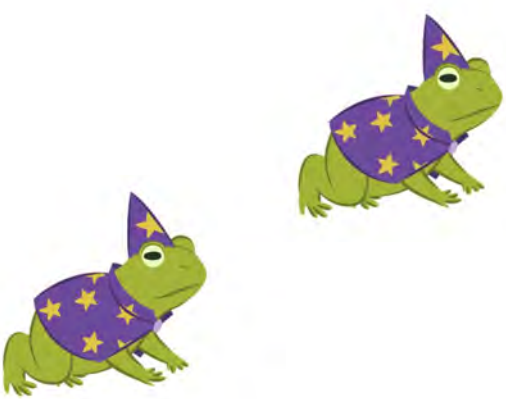
Choose your sound from the menu.

TRY IT

Press the A button on the micro:bit to start.

Jump

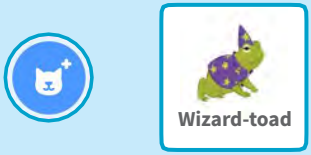
Have a character jump up and down.



Jump

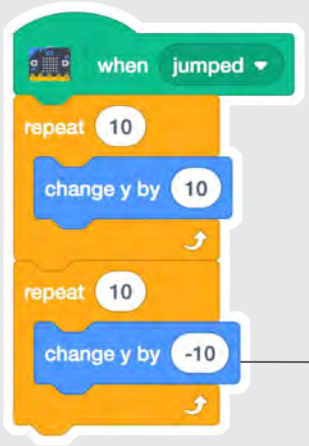
scratch.mit.edu/microbit

GET READY



Choose a sprite, like Wizard-toad.

ADD THIS CODE



Type a minus sign to move down.

TRY IT

Jump with the micro:bit to start.

Move Back and Forth

Move a character from side to side when you tilt the micro:bit.

Move Back and Forth

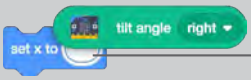
scratch.mit.edu/microbit

GET READY

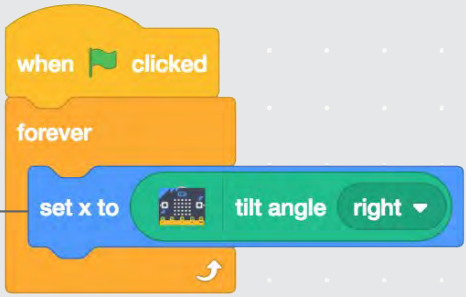
Choose a backdrop, like Witch House

Choose a sprite, like Witch

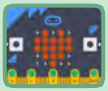
ADD THIS CODE



Insert the tilt angle block into the set x block.



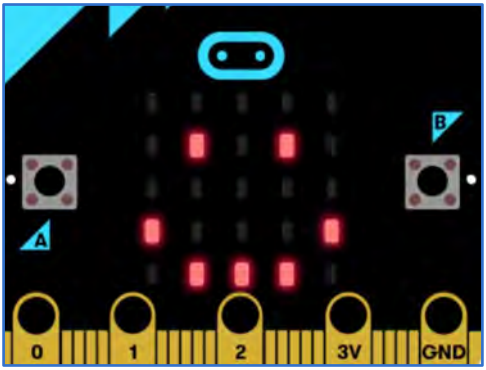
TRY IT

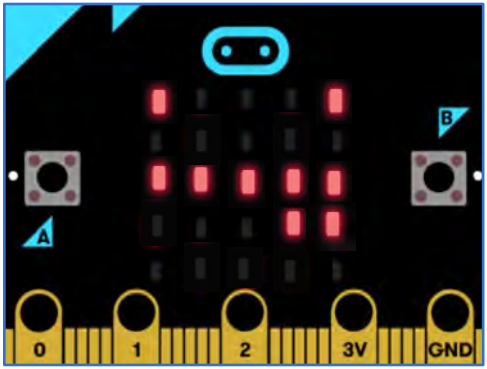


Tilt the micro:bit to move your character from side to side.

Create an Emoji

Make your own emoji on the micro:bit display.

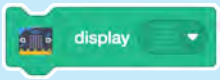




Create an Emoji

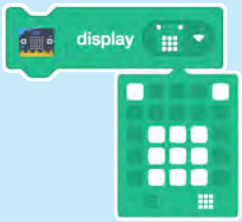
scratch.mit.edu/microbit

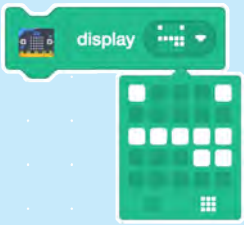
GET READY

Drag out a 

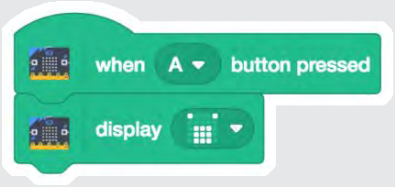
block and click on the grid.

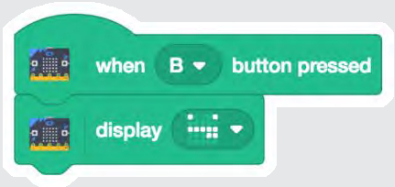
Click the individual squares to turn them on or off in your design.



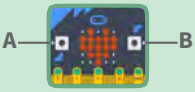


ADD THIS CODE





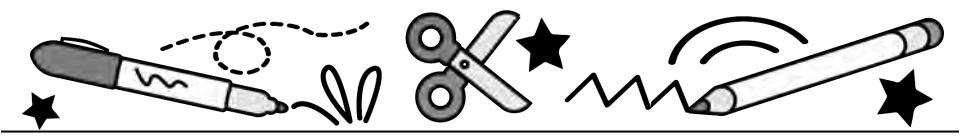
TRY IT



Press the A and B buttons to show your emojis on the micro:bit.

Create a Sprite

Explore digital drawing, remixing, or uploading to create original sprites



Cards in This Pack

- Design Your Sprite
- Using the Paint Editor
- Options to Customize Sprites
- Create a Sprite by Remixing
- Bring Your Drawings into Scratch
- Animate Your Sprite
- Code the Sprite
- Create an Asset Pack
- Collaborate: Export or Backpack / Collaborate: Remix

Design Your Sprite

What sprite do you want to create? When you are brainstorming ideas, ask yourself:

- What items are unique to your culture, community, language, or location that would be fun to animate in Scratch or share with your peers?
- What is your favorite activity or hobby? Food? Native animal or family pet? Native plant? Item of dress? Book character?
- Is there already a sprite in the library that you'd want to remix or change?

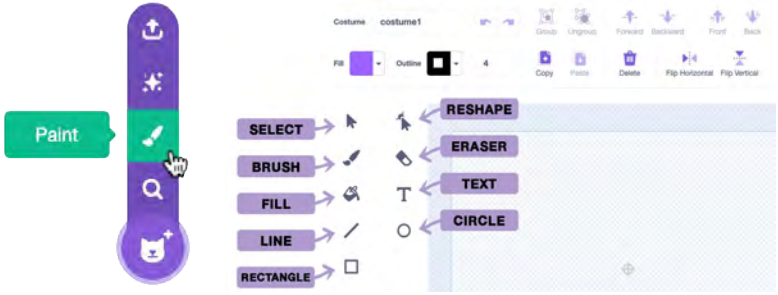
Sprite examples by pondermake, SaffronChai, Chumie, algorithmar, and watse166.

Design Your Sprite

- There are two modes for using the Paint Editor in Scratch:
    - Vector-mode allows you to create and edit shapes (Scratch default).
    - Bitmap-mode allows you to edit photos and paint with pixels.
- We recommend using vector-mode, when drawing sprites, as it allows other users to make adjustments and add and remove elements if they remix your creations.

Using the Paint Editor

TOOLS TO TRY



	Click and drag with the Line, Circle, or Rectangle tools to **create a shape**. Hold down the Shift key while dragging to create equal sides, or 45 and 90 degree angles with lines.
	Using the Select tool, select a shape and click and drag one of the corner points to **resize** it.
	To **rotate** a shape once you've made it, use the Select tool to grab the anchor under the shape and drag it. Hold down the Shift key while dragging to rotate at 45 degree angles.
	Using the Reshape tool, click on one of the points of a shape and **move the point** around to alter the shape. Click + Shift key to select and move multiple points at once.
	Using the Reshape tool, click on a part of the shape that doesn't have a point to **add a new point**, or click on a point and press "Delete" to **remove a point**.

Using the Paint Editor

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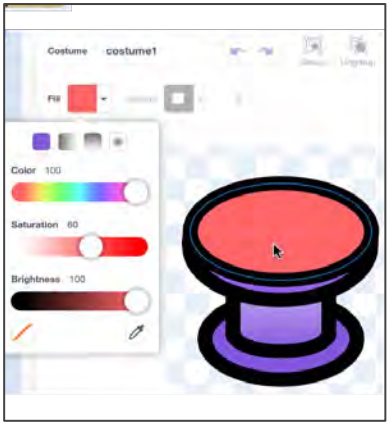
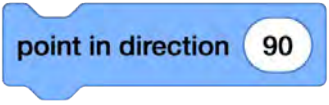
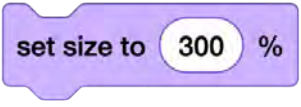
	Using the Reshape tool, click on a point and choose whether it is **curved or pointed**. Click on a point and drag rotate the handles attached to the point to **alter the shape of a curve**.
	Using the Select tool, select a shape and click the buttons on the top menu to **copy and paste** a duplicate.
	Using the Select tool, select a shape and click the flip horizontal or flip vertical buttons on the top menu to **flip** a shape.
	Using the Select tool, select a shape and click the Forward, Backward, Front, or Back buttons to change the **layer order.**
 	Select the fill from the dropdown and use the fill (paint bucket) tool to adjust a shape's color. Or using the Select tool, select a shape and then use the Fill and Outline dropdowns to adjust the **color, saturation, brightness, and outline**. You can also choose to use a **gradient**. Use the eyedropper to select a color from another shape. Use the red strikethrough to fill with no color.
	Using the select tool and holding down the "Shift" key, select multiple shapes to **group** them (helpful to move several shapes together).
	Use the brush tool for **freehand line drawing**. The example to the right shows hand drawn whiskers.
	Use the **eraser** tool to remove parts of the drawing from *all* shapes and layers it comes into contact with when clicking and dragging. You can use the reshape tool to then adjust the new points created.
	The **text** tool comes with a dropdown list of font options to choose from, and Fill and Outline dropdowns to change text color and outline.

Options to Customize Sprites







- Let's explore different ways to rotate sprites, change their size, change their color or brightness, etc.
- We can adjust the look of sprite costumes using the Paint Editor tools.
- Or we can adjust sprites using code blocks.

Options to Customize Sprites

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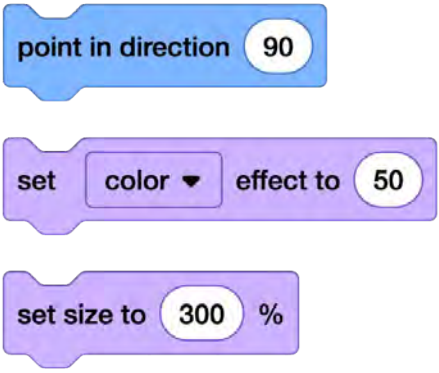
EDIT THE COSTUME IN THE PAINT EDITOR

Rotate with Select

Recolor with Fill

Resize with Select

ADJUST THE SPRITE WITH CODE



Experiment!

Do you notice any differences between using these code blocks to adjust a sprite versus using the Paint Editor tools above?

What happens if you use both methods?

Create a Sprite by Remixing

- Remixing parts of existing sprites could make creating a new unique sprite faster and easier.
- The sprite library contains a mix of bitmap and vector sprites. You can remix and re-imaging either type of sprite, but for this exercise, we are going to focus on vector sprites because they are easier to edit and customize, mix and match.

Sprite remix examples by algorithmar, bgordi0077, RealAimkidBunni, and Chumie.

Create a Sprite by Remixing

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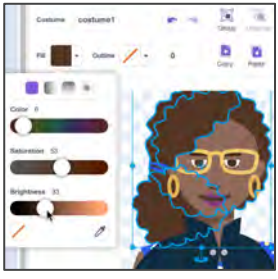
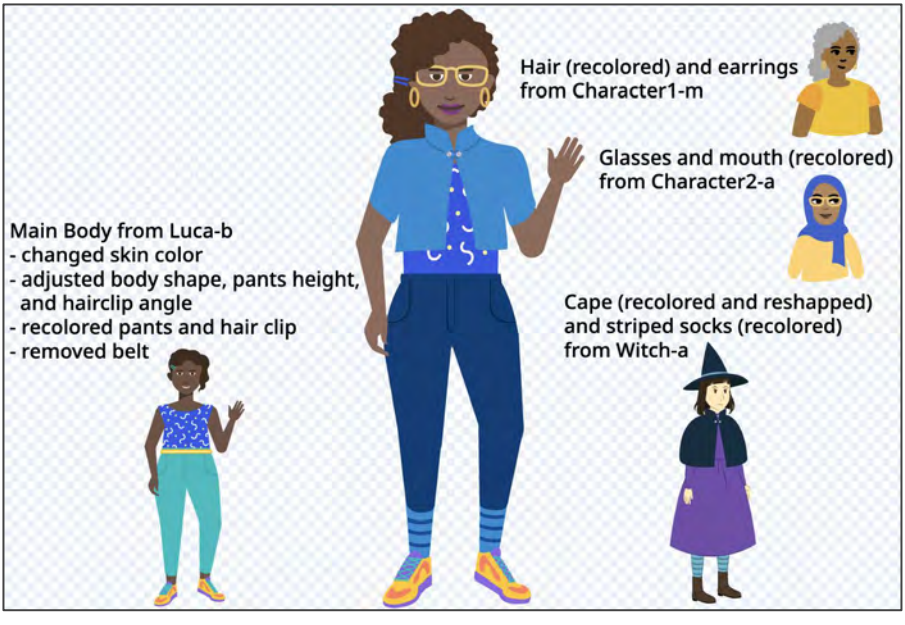
Choose two or more vector sprites with elements you like. Remember, some sprites have multiple costumes with elements/poses.



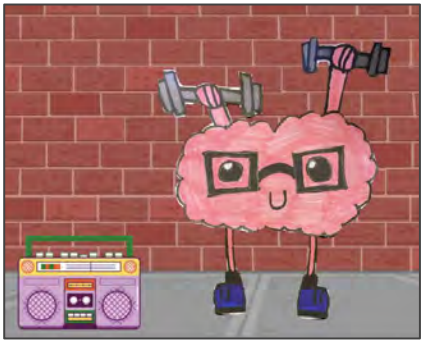
Recolor with Fill

Resize with Select

Use Reshape



Bring Your Drawings into Scratch



You can upload an original hand-drawn image or photograph to create a sprite. Keep in mind:

- You can choose a JPG, PNG, or SVG file.
- Keep each of your files under 10MB.
- Do not upload materials under copyright.
- Be sure that your upload follows the Community Guidelines and does not reveal personal information (like a photo with your face).

Sprite example drawings by algorithmar's two daughters.

Bring Your Drawings In

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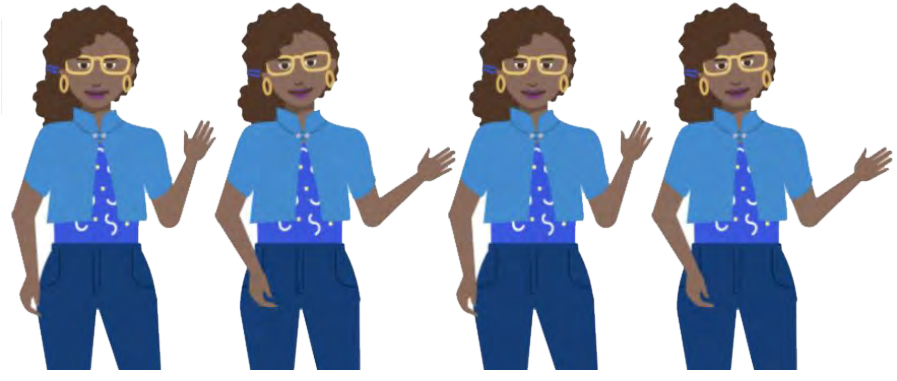
Options to Remove the Background:

- Before you upload the file, use **online tools or software**
- Use the **tools in the Scratch Paint Editor** after a file has been uploaded
    - In bitmap-mode, use the eraser tool to remove the image background or other pieces you don't want from your image.
    - You'll know you are in bitmap-mode when you see the "Convert to Vector" button at the bottom of the screen.
- You can choose to convert it to vector when done using the "Convert to vector" button to more easily rotate or resize, if desired.

Animate Your Sprite



There are many ways you might choose to animate your character. For instance:

- Try moving or gliding your character to a new location.
- Try changing the direction of the character to tilt back and forth.
- Or try adding additional costume drawings to change the position of certain elements and create movement as costumes are changed. Flip this card over for more.

Animate Your Sprite

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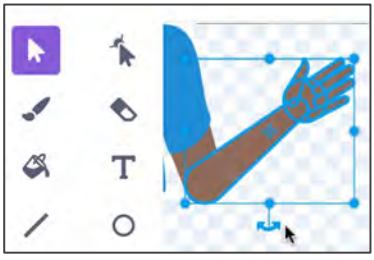
GET READY

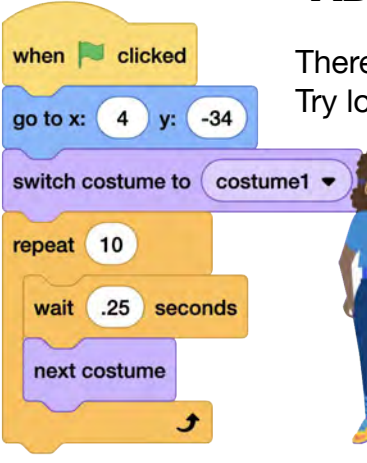
Duplicate your sprite costume on the costume tab. (Right click, Duplicate.)

Use the select tool, then click and drag on the canvas to select multiple items.

Try rotating and moving incrementally.

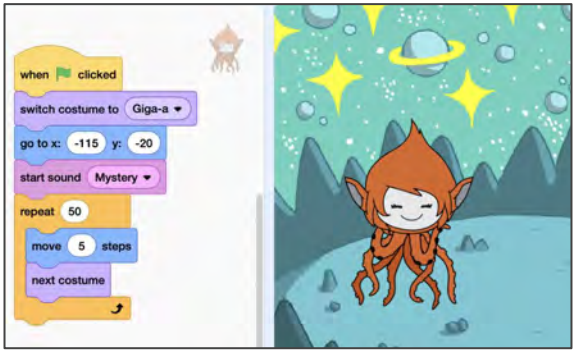


ADD CODE



There are many ways to animate. Try looping through the costumes.

Code Your Sprite



Click the Code tab, then try adding a few blocks! A great place to find tips for getting started, tutorials, Scratch Coding Cards, and more is the Scratch Ideas page (scratch.mit.edu/ideas). Try:

- using blocks to hear or see what you want to say on the stage
- adding text or custom backgrounds
- using motion blocks to give the sprite movement
- using event blocks (like “broadcast” or “when clicked”) to trigger action or make the project interactive.

Code Your Sprite

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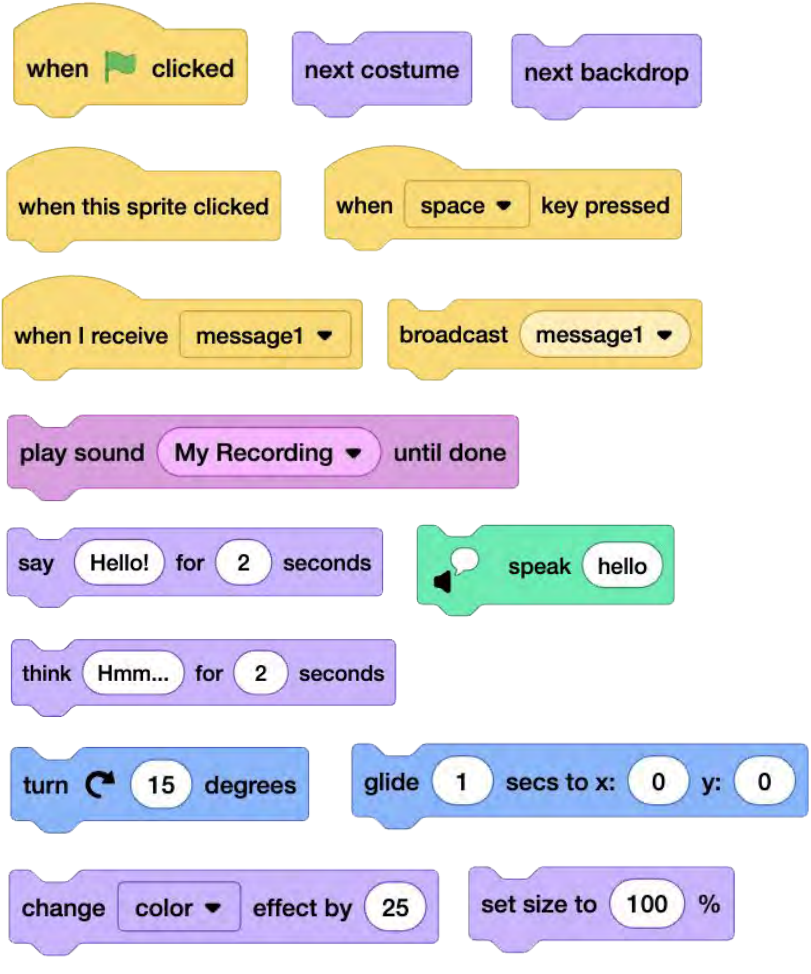
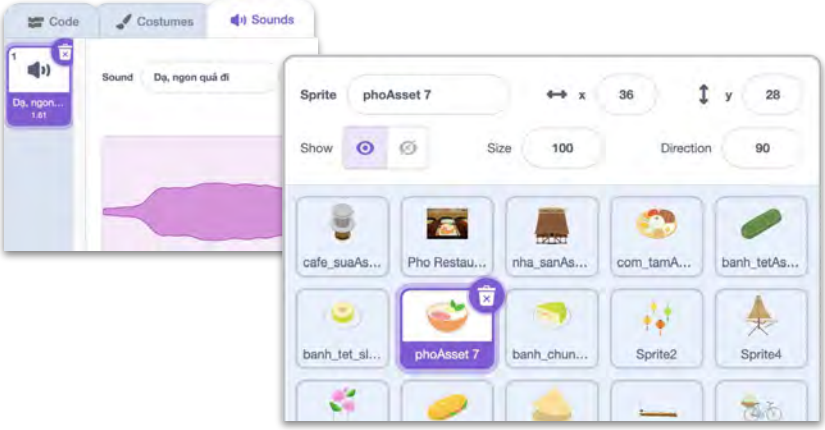
BLOCKS TO TRY



Create an Asset Pack

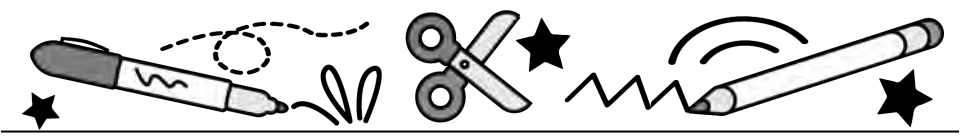


Assets, in Scratch, can include:

- sprites
- costumes
- sounds
- backdrops
- code snippets

An **asset pack** is a collection of assets related to a specific theme, project type, cultural event, cultural symbols or customs, geographical region, or idea.

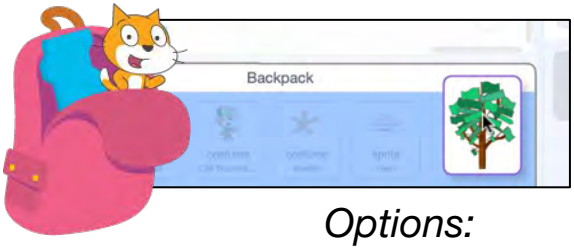
Asset Pack example made by STEAM for Vietnam.

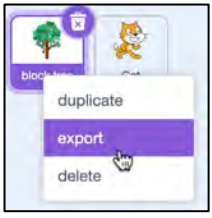


Create an Asset Pack

- **Name your sprite** and costumes with something descriptive.
- Consider creating **multiple costumes** for your sprite to show animation or variation.
- Consider adding at least one **related sound** for each sprite you create. Upload a sound or create an original sound by recording yourself, or noises in your environment.
- When creating an asset pack to share, we recommend creating your **backdrop as a sprite** instead, for easy backpacking or exporting.
- If you did not make a sound or an image yourself or you remixed someone else's creation, it is important to **provide credit** in the Notes and Credits section.

Collaborate: Export or Backpack





Options:

- **Export a sprite, costume, or sound:** Right-click the asset. Choose “export.” To add the asset to a project, choose the **upload** option in the sprite, costume, or sound menu to upload from your files.
- **Backpack a sprite, costume, or sound:** You must be logged in to access the backpack at the bottom of the editor screen. Click it to open the backpack and drag-and-drop a sprite, costume, or sound inside. To add the asset to a different project, open the backpack and drag-and-drop the asset into the sprite, costume, or sound area.

Collaborate: Remix

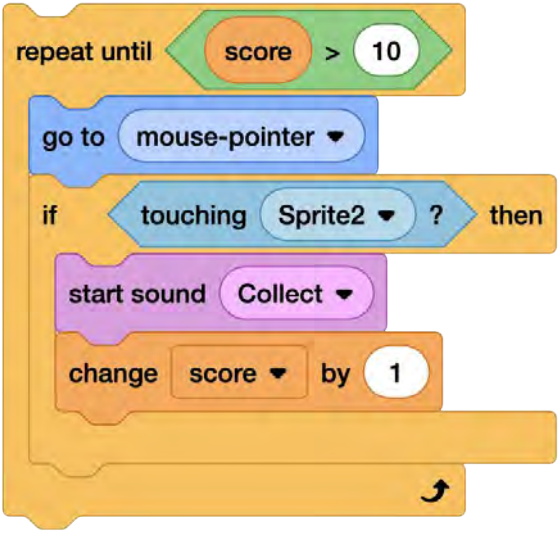
Scratch embraces remix culture. Remixing is when you build upon someone else's projects, code, ideas, images, or anything else shared on Scratch to make your own unique creation.

When remixing an asset, **make changes** like:

- adding code to animate the asset
- placing it in a new scene with other assets or add related sounds
- using the tools in the paint or sound editor to make adjustments to it
- adding additional elements you felt were missing

Just make sure that you **give credit** to whomever created the original asset in the Notes and Credits section.

Conditional Statements

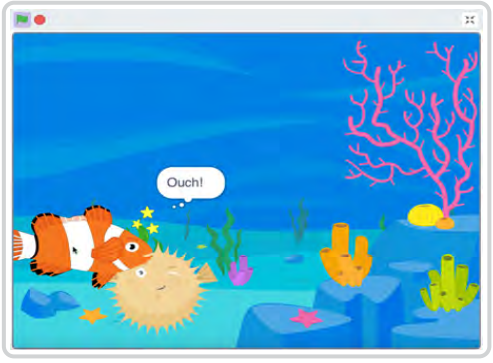


Create dynamic programs that are interactive or offer multiple outcomes

Cards in This Pack

- Fish Game: Code the Fish
- Different Code, Similar Results
- Conditional Statements: “If Then”
- Conditional Statements: “Until”
- Operators in Conditional Statements
- Fish Game: Nested Condtional Statements
- Nested Conditional Statements
- Create a Maze Game
- Create a Math Game

Fish Game: Code the Fish



- Have you ever wanted to create a Scratch program that is interactive or offers multiple outcomes? Let's create a fish game that the user can interact with, and code different animations triggered by conditional statements.
- First, let's code a sprite to be controlled by the user's mouse. Then, use a conditional statement to trigger costume changes when sprites touch.
- See additional cards to code other sprites and trigger additional animations.

Fish Game: Code the Fish

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GET READY

Choose two sprites.

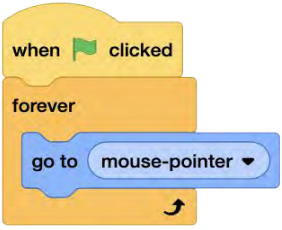
Fish and Pufferfish

Choose any backdrop.

Underwater

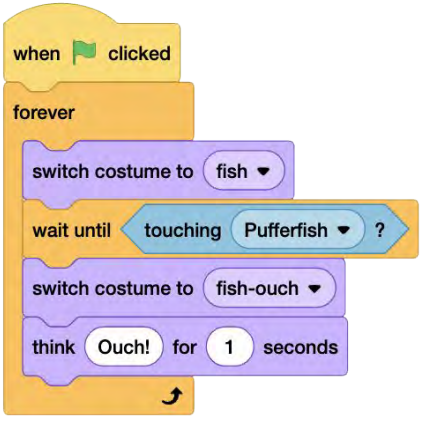
ADD CODE

1. Add code to make the fish continuously follow your mouse.

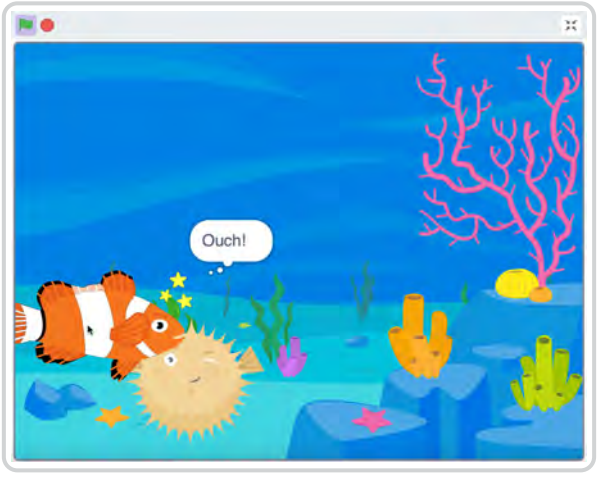


2. Create an additional costume for the fish that will show when it touches the pufferfish. You can duplicate and edit the fish costume to show stars or a funny face, etc.

3. Create a second script that uses a conditional statement to make the fish change costumes when it touches the pufferfish. Test and debug!



Different Code, Similar Results



- There is often more than one solution/more than one way to code a program to get a similar result.
- Experiment with using different types of conditional statements (like “wait until” versus “if then else”). What differences, if any, do you notice?

Different Code, Similar Results

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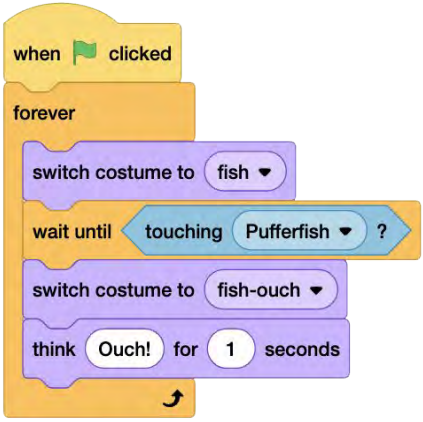
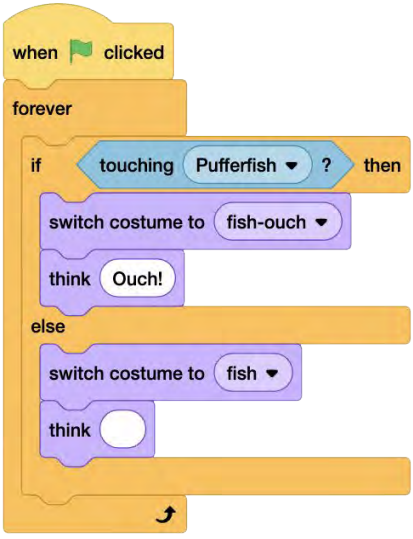
COMPARE CODE

1. The first code stack on the right is the code tried on the “Fish Game: Code the Fish” card.
2. Compare it to the second code stack below that uses an “if than else” statement instead of a “wait until” conditional statement. What is the same and what is different?
3. Test each code stack. Make the fish touch the pufferfish and then move it away quickly, what do you observe happening?
4. Experiment and customize! What solution works best for your game?





Conditional Statements: “If Then”

Boolean blocks that report "true" or "false" are used in conditional statement blocks. Try using:

- user actions, such as pressing keyboard keys or mouse positioning or clicking
- sprite interactions (touching another sprite), comparisons (distance between sprites), and touching colors of sprites or backdrops
- data input by users, data stored in variables and lists, or data stored in reporter blocks

Conditional Statements: “If Then”

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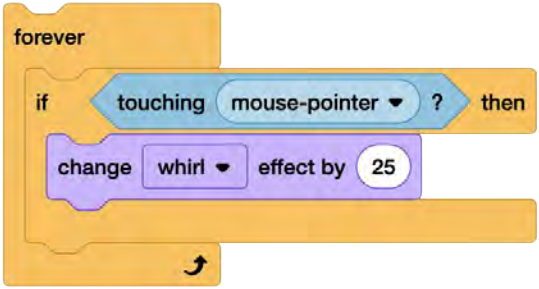
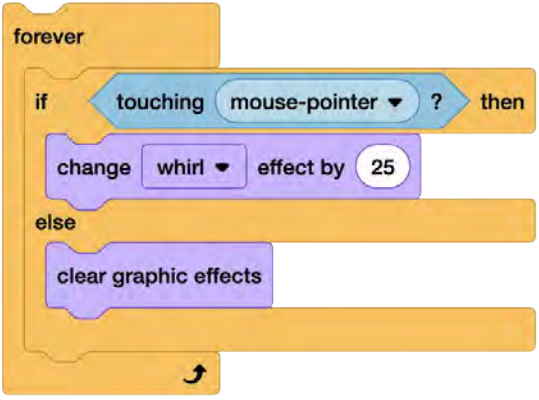
Experiment with “if (something) is true or false then” conditional statement blocks. What is the difference between these scripts below?

IF THEN

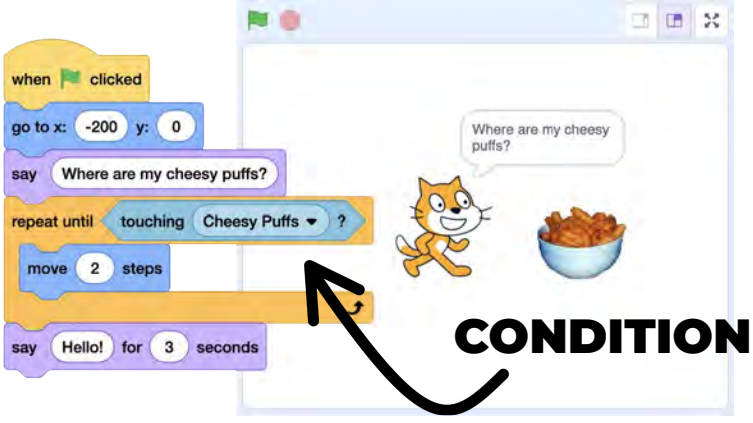


IF THEN ELSE



Try different conditions and customize the results. What is the difference if the condition block is not in a forever loop?

Conditional Statements: “Until”



Boolean blocks that report "true" or "false" are used in conditional statement blocks. Try using:

- user actions, such as pressing keyboard keys or mouse positioning or clicking
- sprite interactions (touching another sprite), comparisons (distance between sprites), and touching colors of sprites or backdrops
- data input by users, data stored in variables and lists, or data stored in reporter blocks

Conditional Statements: “Until”

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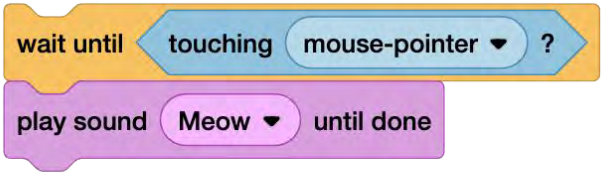
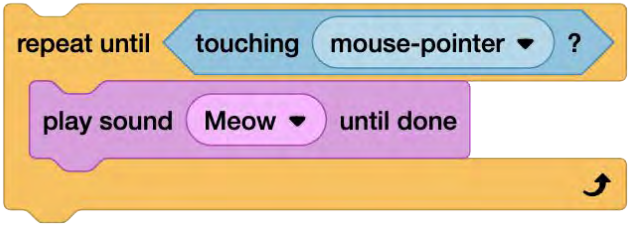
Experiment with “until (something) is true or false” conditional statement blocks. What is the difference between these scripts below?

WAIT UNTIL

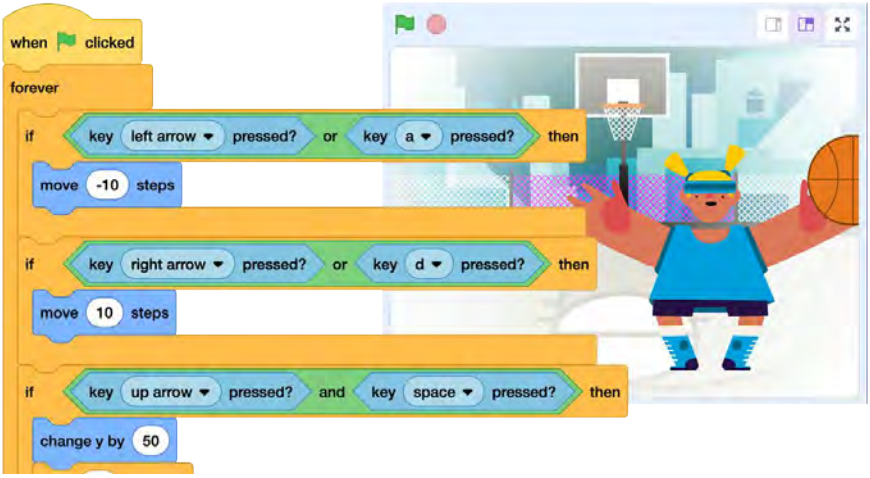


REPEAT UNTIL



Try different conditions and customize the results. What is the difference if the condition block is inside a forever loop?

Operators in Conditional Statements



Using operators in conditional statements with sensing blocks or reporter blocks can give you a wider range of conditions to choose from.

Scratch comes with some built-in reporter blocks that store information, like the x or y position of a sprite, the volume in the project, the sprite's size, etc. Looks for these oval blocks under a number of the block categories.

Operators in Conditions

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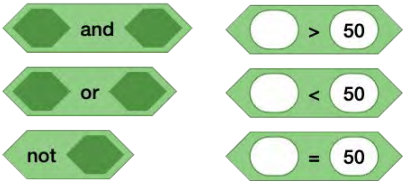
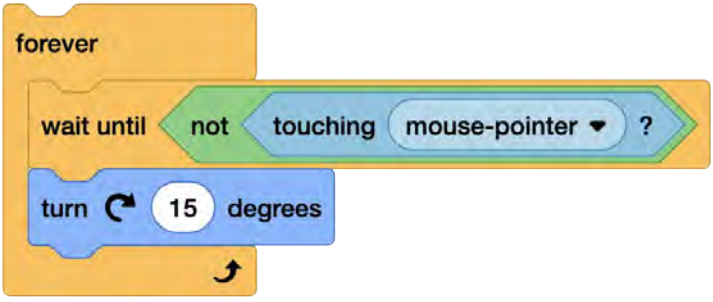
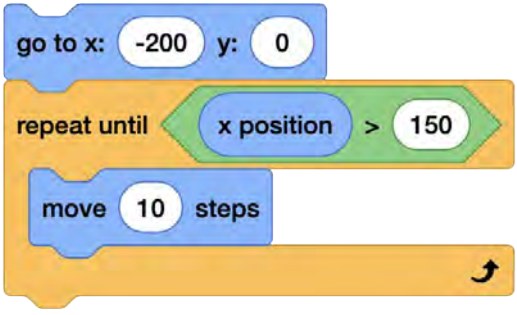
Experiment with different operators in your condition, such as:



"NOT" OPERATOR

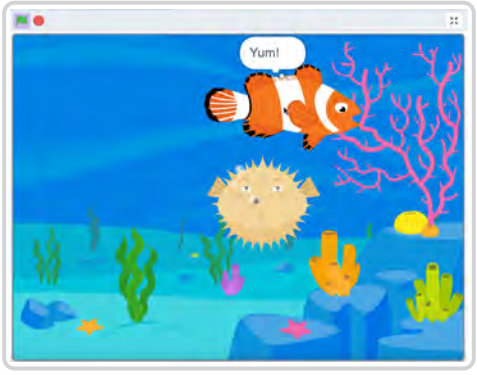


COMPARISON OPERATORS



Try using "and" or "or." What is the effect of two conditions needing to be true, or multiple options that make it true?

Fish Game: Nested Conditional Statements



- Imagine a project where multiple effects can be triggered based on the distance between sprites, colors sprites are touching, or other conditions.
- Nested conditional statements are where one conditional statement is placed inside another. Use them to add additional complexity to your program.
- You could use nested statements to add scoring, or use color as another condition.

Fish Game: Nested Condition

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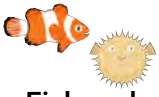
GET READY

Choose two sprites.



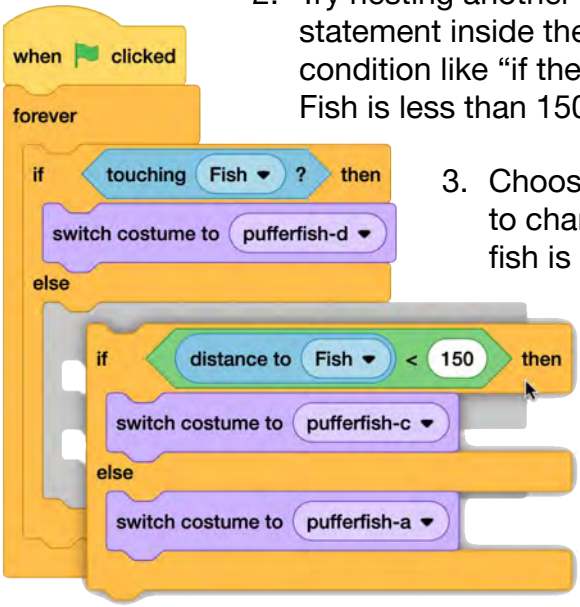
Fish and Pufferfish

Choose any backdrop.

Underwater

ADD CODE

1. Add an “if then else” block to the pufferfish so it changes costumes when it touches the fish.

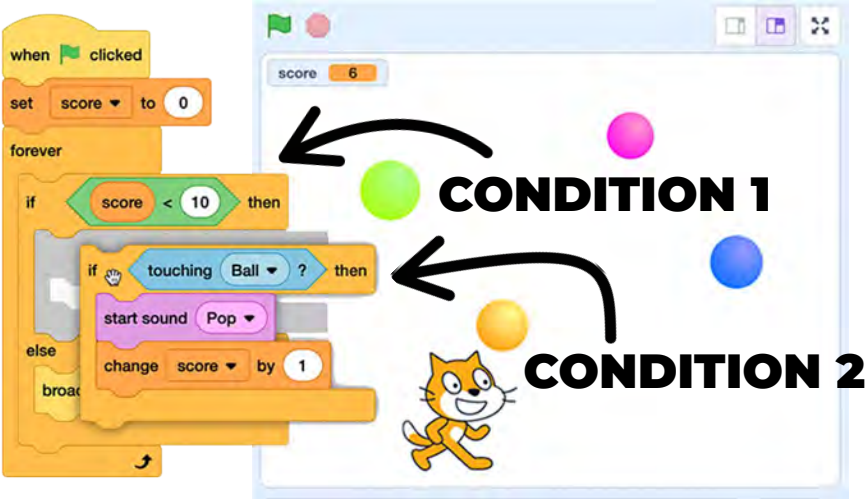


2. Try nesting another “if then else” statement inside the first. Add a condition like “if the distance to the Fish is less than 150 pixels then…”

3. Choose a third costume to change to when the fish is close.

Test the code. What is the difference if the sequence is reversed and it checks the distance first?

Nested Conditional Statements



Nested conditional statements are where one conditional statement is placed inside another. The first condition is checked and, depending on if it is true or false, the program may then move forward to check the nested condition inside.

This means that the sequence of the nested statements is important.

Nested Conditional Statements

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Experiment with nested conditional statements using two or more “until (something) is true or false” or “if (something) is true or false then” conditional statement blocks.

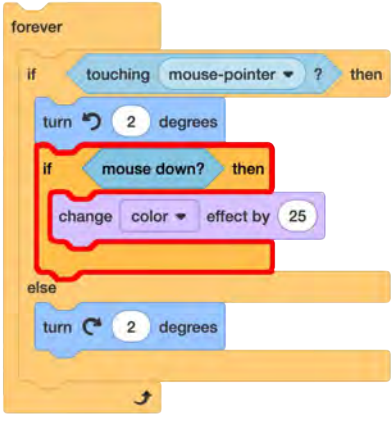
GET READY

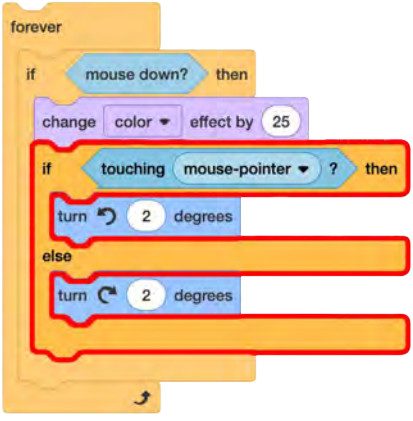
Choose two sprites.

Cat

Dog2

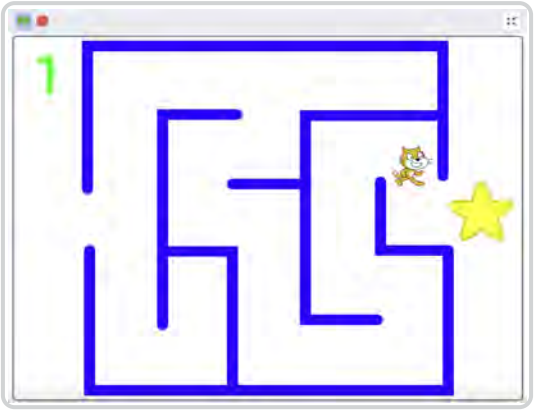
ADD CODE





These code stacks use the same blocks. The difference is the sequence (which conditional statement is nested). Code each sprite with a different stack. Click the mouse when touching each sprite and when not touching each sprite. What differences do you notice? Customize and experiment!

Create a Maze Game



- Use the line tool to create maze walls with color. Use the “touching color” condition to stop sprite movement through the walls. To select the color, use the eyedropper tool.

- Make sure your sprite can fit through all passages and around all corners.
- Bonus: Try using another conditional statement to code a winning animation when the end is reached!

Create a Maze Game

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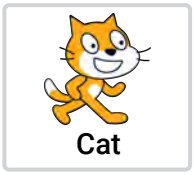
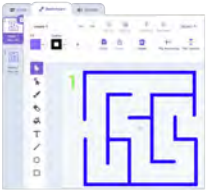
GET READY

Choose any sprite.



Create maze backdrops using the paint editor line tool.

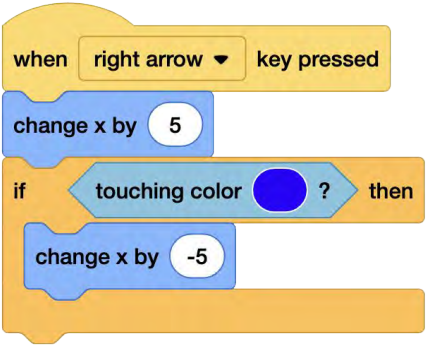


ADD CODE

1. Add code to move the sprite up and down when arrow keys are pressed by changing y, and move left and right by changing x. Use positive and negative numbers.

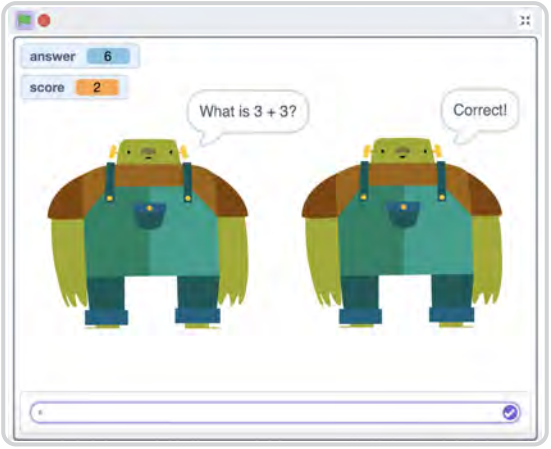
2. Add an “if then” conditional statement to reverse the move if touching the maze wall color.

3. If necessary, add code to change maze backdrops.



You could add a sprite at maze end and use a conditional statement to change the backdrop when touched.

Create a Math Game



- Choose addition, subtraction, division, or multiplication questions to ask a user.
- Use a conditional statement to check the answer given, and have the program respond differently if the answer is correct or incorrect.
- Use a score variable to record points.
- Bonus: Try using My Blocks to make your program more efficient to write and edit.

Create a Math Game

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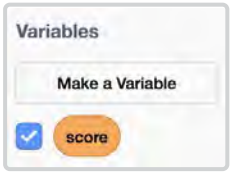
GET READY

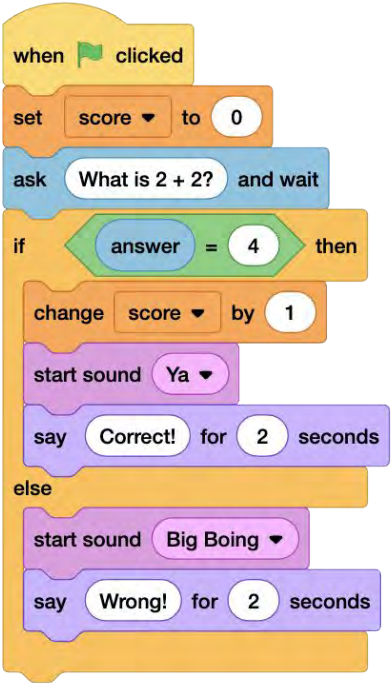
Choose any sprite.

Create a "score" variable



ADD CODE

1. Use the ask block to ask a math question.
2. Add an "if then else" conditional statement block. Then, use an equals operator block to set the condition to "answer" equals the correct answer.
3. Add blocks to say "Correct" if the answer is correct, else "Wrong." Customize with sounds or other effects.
4. Use variable blocks to set and change the score.



Variables and Lists

Store and recall information to create customized animations, stories, and games

Cards in This Pack

- Reporter Blocks in Scratch
- Brightness Slider
- Interactive Storytelling
- Musical List
- Generate a Melody: Repeat through a List
- Generate a Sum: Repeat through a List

Perhaps you have used a variable to store a game score, but did you know a variable can hold numbers or text (also known as a "string")? See these cards for examples of non-score uses for variables and lists. See our in-editor tutorials or other coding cards for instructions on how to set up a basic score.

Reporter Blocks in Scratch

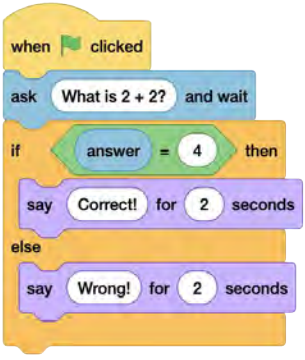
- Variables and lists hold information you can use in your program, but Scratch comes with some built-in reporter blocks that also store information.
- Unlike a stack block, reporter blocks go inside another block to serve as an input.
- You can click on a reporter block in the block palette or in the script area to see the piece of data it currently holds or the value it reports. Or check a box next to many of these reporter blocks to display them on the stage via a stage monitor.

Reporter Blocks in Scratch

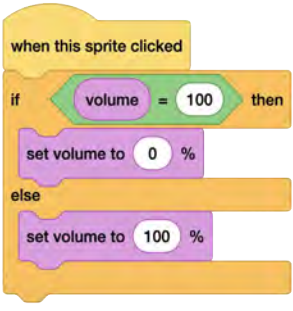
scratch.mit.edu

EXPERIMENT WITH SOME REPORTERS

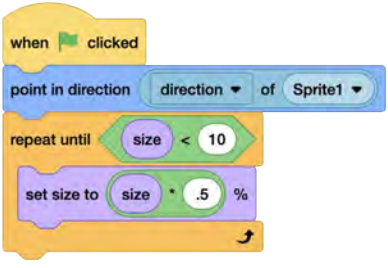
When you use the “ask” block to pose a question to a user, the answer they enter into the dialogue box is stored in a reporter block called “answer.”



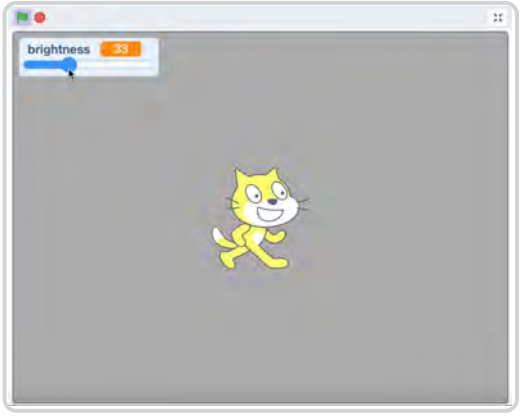
The “volume” reporter block stores the number representing the current volume of the sprite, clone, or stage.



You can use reporter blocks that store the position, direction, and size of sprites to perform calculations or mirror properties.



Brightness Slider



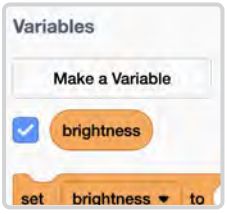
- Scratch comes with some built-in reporter blocks that store information, but what if you want to store and recall information for which there is no reporter block, like the sprite color or brightness?
- Let's create a project where a variable controls the brightness of the sprite.
- And let's put the power in the hands of users, by letting them control the value in the variable with a slider.

Brightness Slider

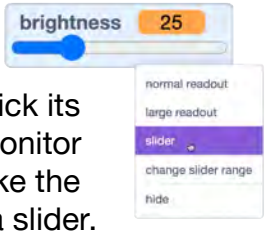
scratch.mit.edu

GET READY

Create a variable called “brightness.”

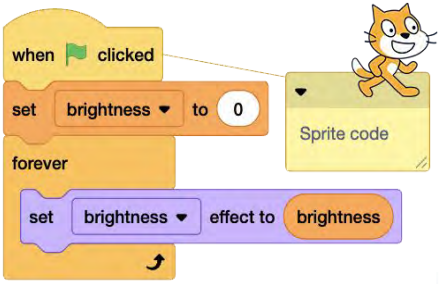


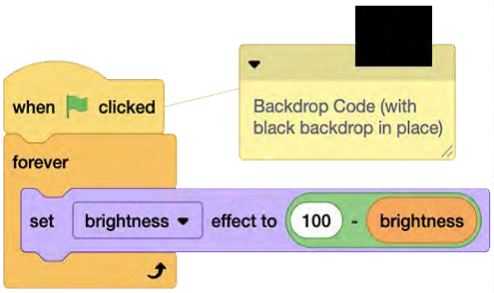
Right-click its stage monitor and make the readout a slider.



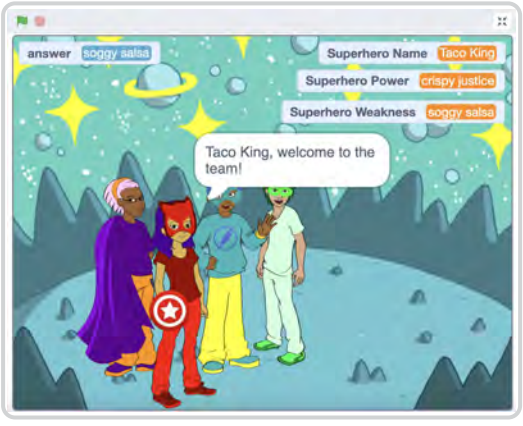
ADD CODE

1. Create a short script that sets the “brightness” variable to 0.
2. Then, have the program forever set the brightness effect to the number in the “brightness” variable. Test it out!
3. Try adding code to make another sprite or the backdrop have the opposite effect.





Interactive Storytelling



- You can pass information to a variable or list by clicking or moving a sprite, adjusting a slider, via code blocks, and more!
- You can also pass information from one reporter block, variable, or list to another. This could be helpful because variables and reporter blocks can only hold one piece of information at a time.
- Let's create a project that collects the user's answers to multiple questions, and repeats them back in the form of a story!

Interactive Storytelling

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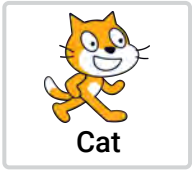
GET READY

Create multiple variables.

Choose any sprite.



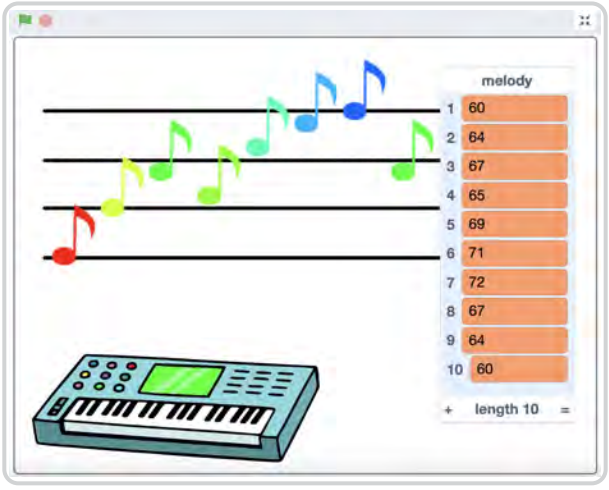
ADD CODE

1. Create individual variables for each answer you are collecting. The “answer” reporter block can only hold one piece of data at a time, so use the “set [variable] to” block to pass the “answer” into a variable for storage after each related question is asked.

2. Use a “say” block and a “join” block to weave each answer stored in a variable into a story sentence.

Alternative: Store and retrieve answers from a list!

Musical List



- You can use a predefined list to determine animation.
- Try creating a melody project, storing song notes in a list that create a musical score that can be played.
- As a bonus, you can use the Pen extension to stamp notes on a scale and produce a visual representation of your musical score.

Musical List

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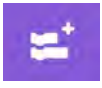
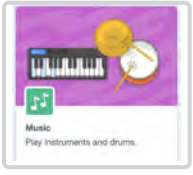
GET READY



Add the Music extension.



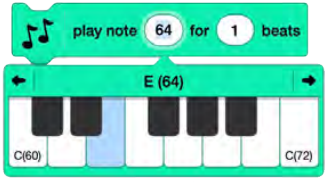
Choose any sprite.

Keyboard

ADD CODE

1. Create a list. Add song notes to the list via the stage monitor (add rows manually and type note numbers in) or by using the “add to [list]” block.

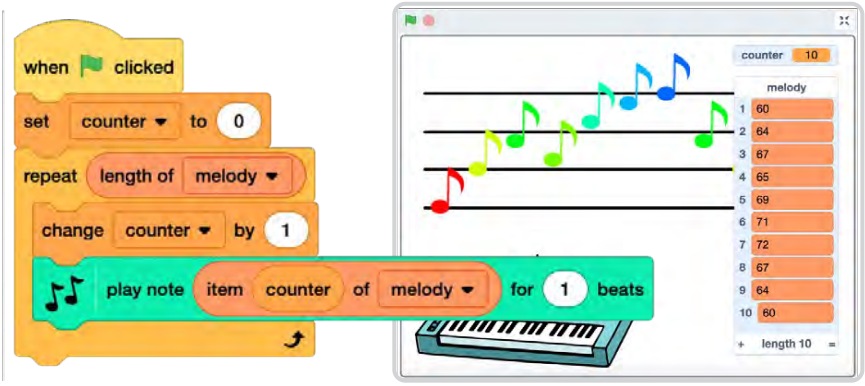
   You can find note numbers by clicking on the input of the “play note” music block.



2. Write a script to play each note on the list by item number, or let the program pick the note to play randomly.

See the next card to learn how to create a “counter” variable to automate moving/repeating through the list in order.

Generate a Melody: Repeat through a List



- While there is no “next item of list” block, you can create a script that loops through the items of a list in order.

  The ability to automate moving or repeating through a list can speed up your coding process and make editing scripts quicker.

- This can be useful if you want to add items of a list together, speak or say items in a list, etc.

Generate a Melody

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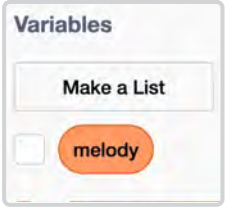
GET READY

Create a list.



Create a variable.

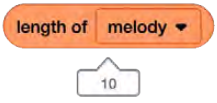
ADD CODE

Step through the code on the card front to see what it does:

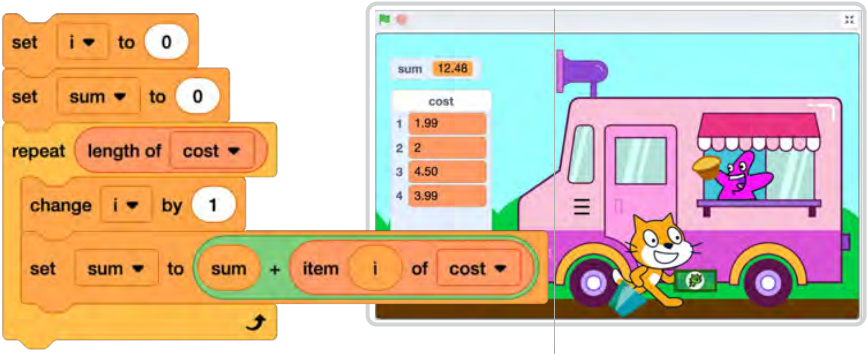
1. Changes the “counter” variable (that stores a number to represent an item number on the list) by one.

2. Plays the note number associated with that item number (the number entered on that line of the list). Note: This is why it is important to first set “counter” to zero first each time the program runs.

3. Repeat as many times as there are rows in the list/for the length of the list.



Generate a Sum: Repeat through a List



- While there is no “next item of list” block, you can create a script that loops through the items of a list in order.

  The ability to automate moving or repeating through a list can speed up your coding process and make editing scripts quicker.

- This can be useful if you want to add items of a list together, speak or say items in a list, etc.

Generate a Sum

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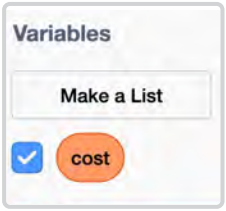
GET READY

Create a list.

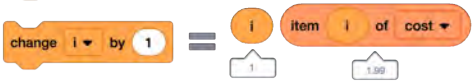


Create two variables.

ADD CODE

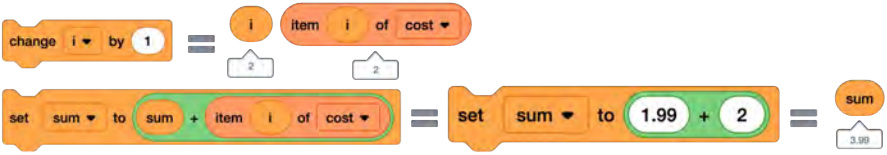
Step through the code on the card front to see what it does:

1. Changes the “i” variable (that stores a number to represent an item number on the list) by one.

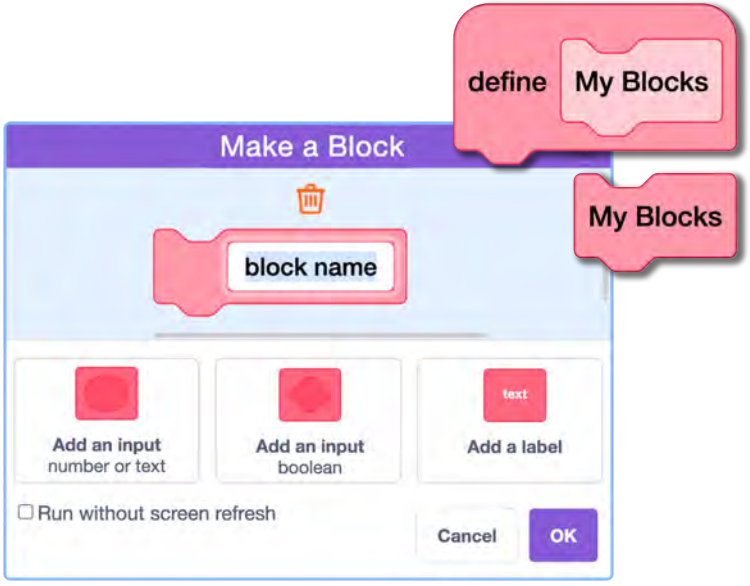


2. Adds the amount associated with that item number (the number entered on that line of the list) to the value already stored in the “sum” variable, creating a new “sum” value. Note: This is why it is important to set “sum” and “i” to zero first each time the program runs.

3. Repeat for the length of the list.



My Blocks

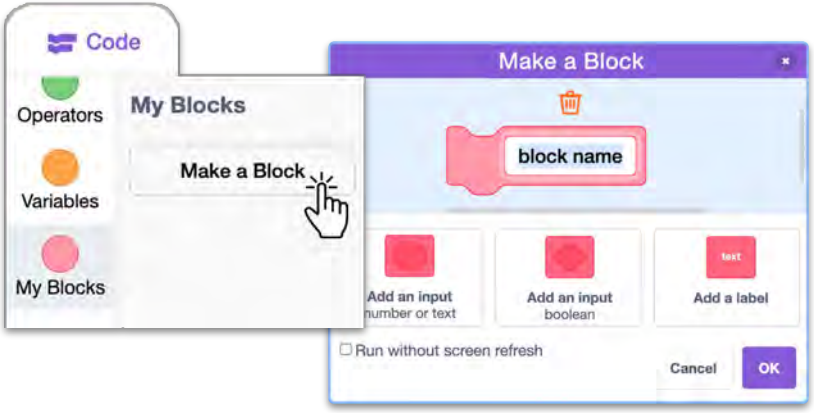


Explore procedures/routines and modularizing your code for effeciency

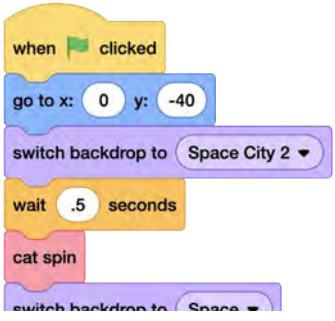
Cards in This Pack

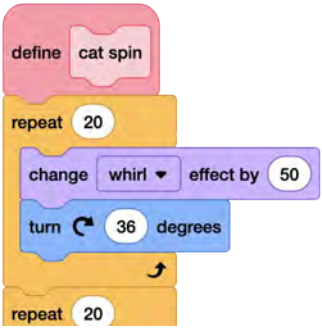
- Create a My Block
- My Block: Fade In and Out
- My Block: Music
- My Block with Parameters: Speak and Say
- My Block with Parameters: Move, Move
- My Block vs Broadcast

Create a My Block



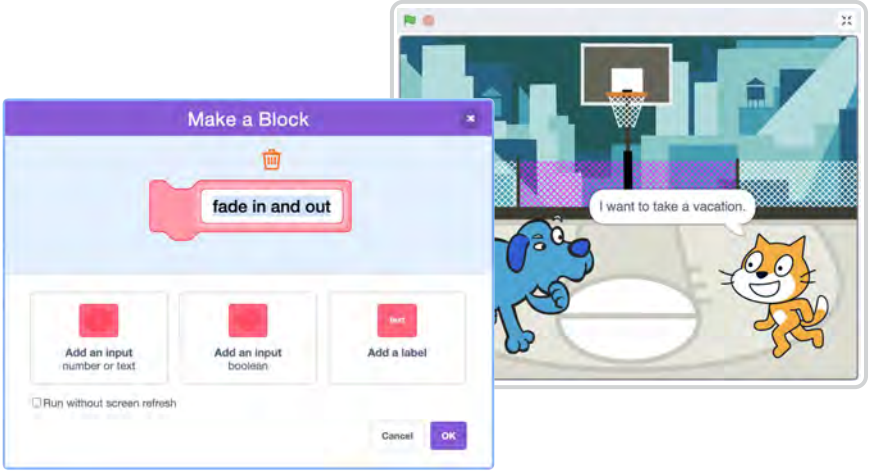
- Click on the “Make a block” button under the “My Blocks” category.
- Give your block any name you want, but it is best if it is a descriptive name so you can recall later what the block does.
- For a basic block, once you’ve provided a name, simply click “OK.”
- For an advanced block, add any additional inputs or labels needed.
- You can always edit blocks later.





- Once a new block is created, a “define” event handler block will appear on the scripts area. Place all the blocks to make up your steps (procedure) under it.
- Once defined, you can use your custom block in your main program.
- Creating separate procedures as custom blocks makes the code faster to write and read, and easier or quicker to edit.
- Note: A custom block is specific to the sprite where it was defined.

My Block:
Fade In and Out



- Say you are creating an animation and you want a sprite to fade in and out as the scene changes/change opacity (also known as the “ghost” effect in Scratch).
- Rather than write the same steps over multiple times in a program, you can place those steps in a My Block and simply call that block each time you need it.

My Block: Fade In and Out

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GET READY

Choose any sprite.

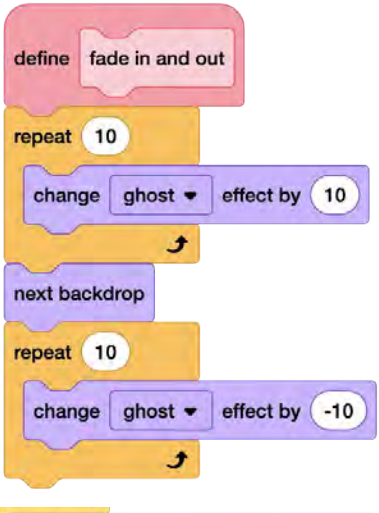
Cat

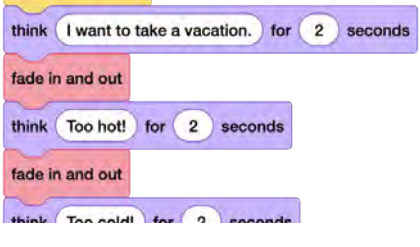
Choose any backdrop.

Basketball

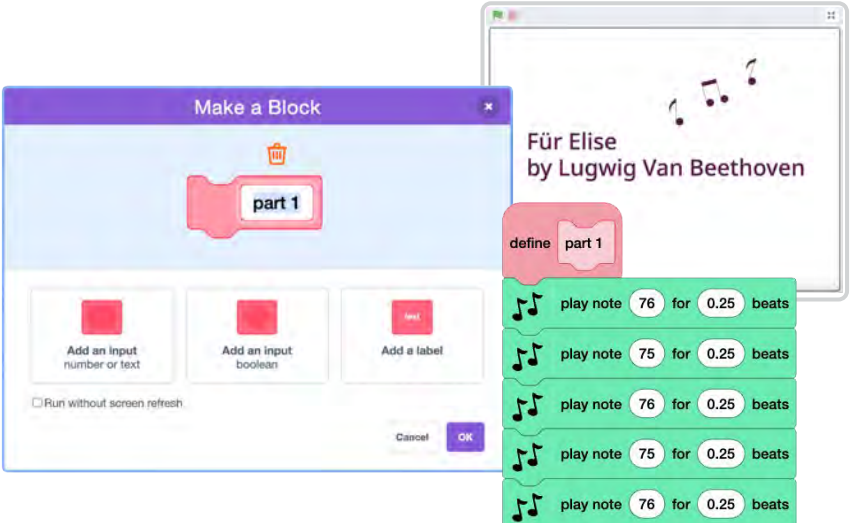
ADD CODE

1. Create a My Blocked called something like “fade in and out.”
2. Under the “define” block that appears on the stage, add steps to change the ghost effect to 100, switch the backdrop, and then change the ghost effect to 0.
3. Use the My Block in your main program each time you want the sprite to fade in and out and the backdrop to change.





My Block: Music



- You can use music blocks from the Music extension to create a song in Scratch.
- Rather than write the same sequence of notes over and over when they repeat in your song, you can place those notes in a My Block and simply call that block each time you need it, for instance each time a chorus is called.

My Block: Music

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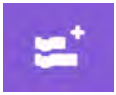
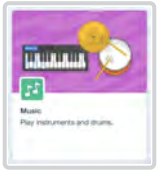
GET READY

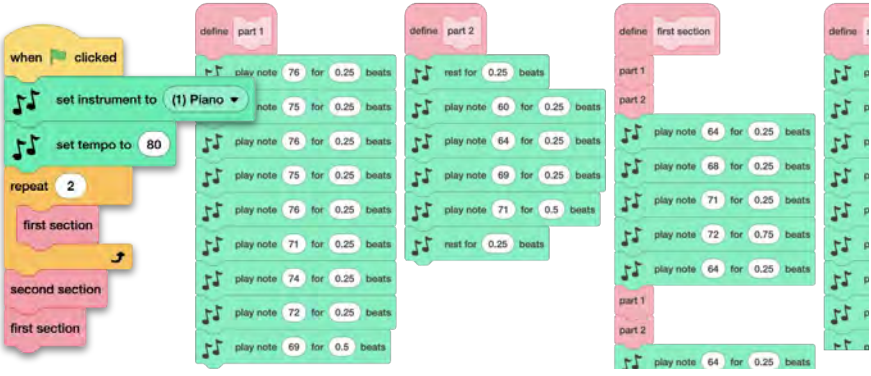
Choose any sprite.



Add Music extension.

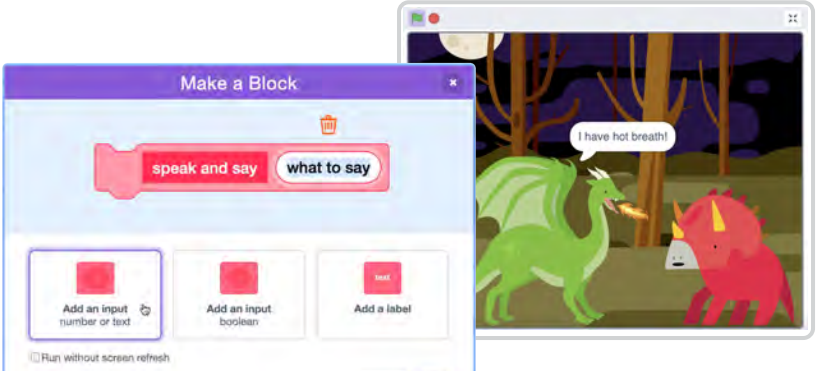


ADD CODE



1. Compose the sections of your song. You can create multiple My Blocks for different sections/parts.
2. My Blocks can also be placed within other My Blocks to further simplify the code.
3. Use My Blocks in the main program, along with repeat blocks (if applicable) to compose a whole song. Set the instrument and the tempo.

My Block with Parameters: Speak and Say



- What if you want to perform the same procedure (set of steps) each time the custom block is called in the main program, but with a small modification each time (like the text shown or spoken)? Create a My Block with parameters!
- With an input in place, the custom block will use the parameter (the data provided in the input bubble) when running.

My Block with Parameters: Speak and Say

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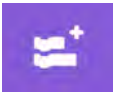
GET READY

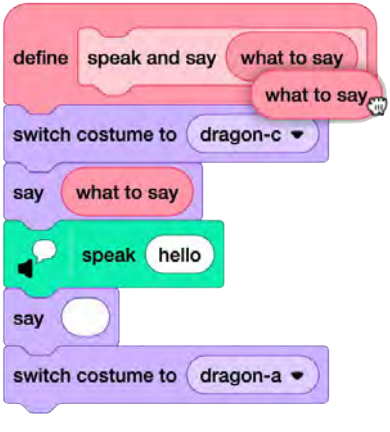
Choose any sprite.

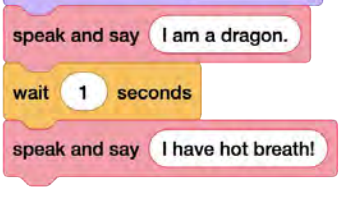


Add Text to Speech extension.

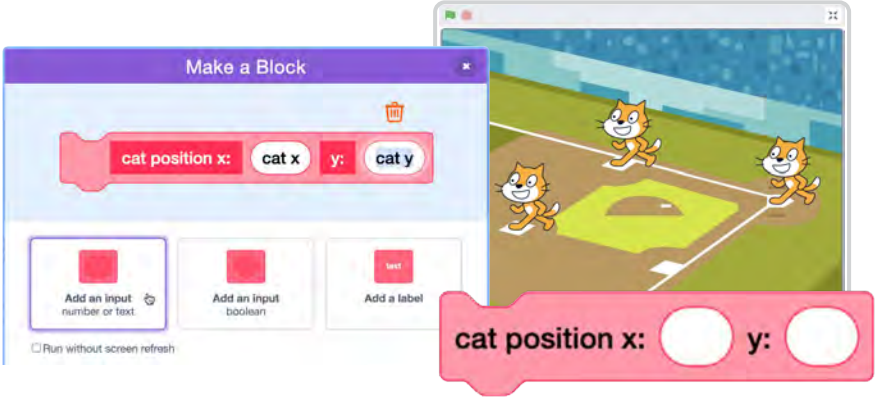
ADD CODE

1. Add an input when creating your My Block.
2. When defining the block steps, click on the input label and drag it out to place it in a code block. In this case, add it to the first “say” and “speak” blocks.
3. Now, when you use this custom block in the main program, you can see the blank input bubble where you can enter the parameter. In this case, the parameter is the text to say and speak.





My Block with Parameters: Move, Move



- What if you want to perform the same procedure (set of steps) each time the custom block is called in the main program, but with a small modification each time (like the sprites coordinates)? Create a My Block with parameters!
- With an input in place, the custom block will use the parameter (the data provided in the input bubble) when running.

My Block with Parameters: Move, Move

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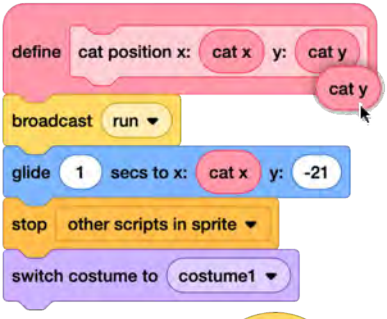
GET READY

Choose any sprite.

Choose any backdrop.

ADD CODE

1. Add two inputs when creating your My Block (for x and y position). Add a label (descriptive text) between the inputs to help you remember what each input bubble is for when you use it in your main program.



2. When defining the block steps, click on the input label and drag it out to place it in a code block. In this case, x and y position. (Note, this My Block also sends a broadcast.)

3. Now, when you use this custom block in the main program, enter the new parameters each time.

My Block vs Broadcast

- My Block: the program pauses and runs through all the steps under the “define” block before preceding.
- Broadcast: the program sends the message and then proceeds with the next steps in the program, so code sequences may run simultaneously.
- Note: Unlike a broadcast that can be sent globally between all sprites and backdrops, a My Block is local, usable only by the sprite it is defined on. The call for the custom block isn’t received by any other sprites, even if their custom block has the same name.

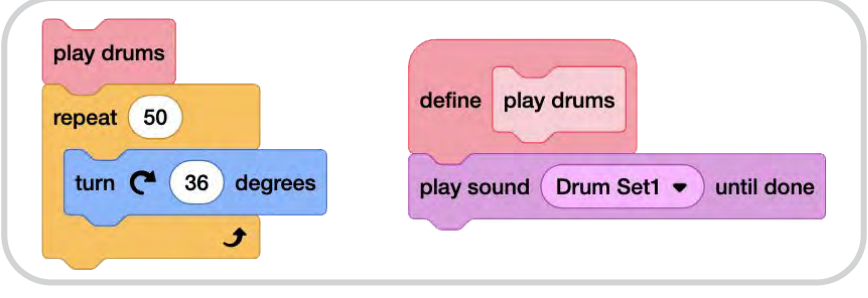
My Block vs Broadcast

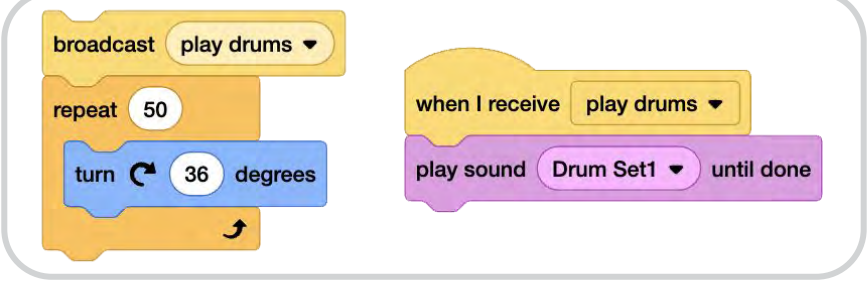
scratch.mit.edu

EXPERIMENT

Try these two code sequence pairings to see the difference between calling for a custom block and calling for a broadcast.

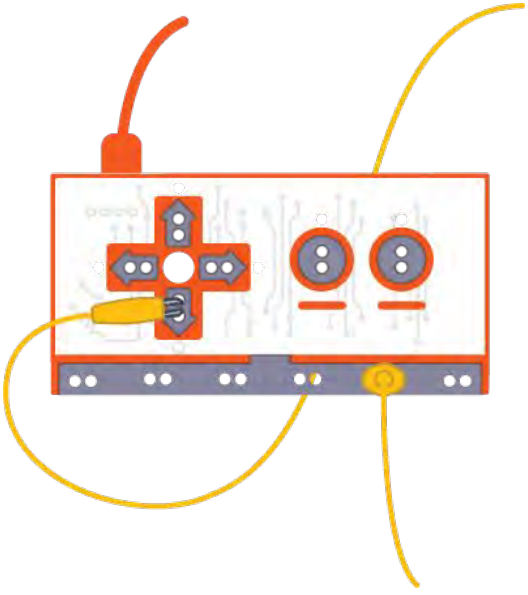
What else could you try? Costume changes? Motion?





What if you used “broadcast and wait”?

Makey Makey Cards



Make projects that connect to the physical world with Makey Makey!

Cards in This Pack

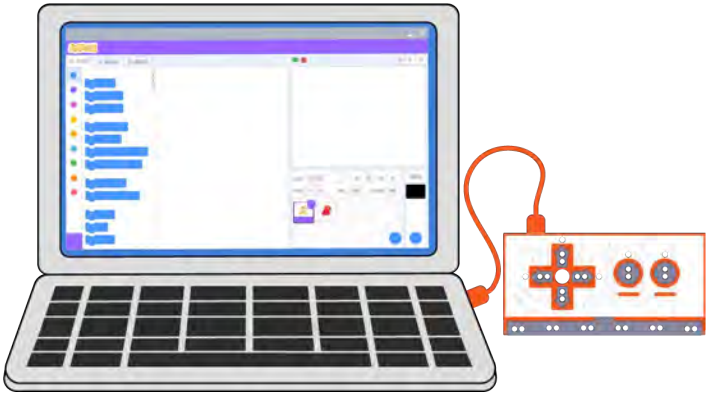
- Set Up Makey Makey

Try These Cards In Any Order:

- Electric High Five
- Makey Secret Code
- Foil Piano
- Art Comes Alive

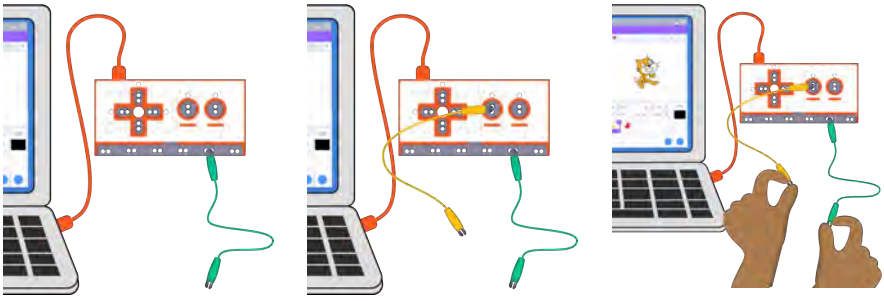
Or combine with other cards like “Make It Fly” to create an external keyboard to control a game!

Set Up Makey Makey



Instructions:

1. Plug the Makey Makey Board into your computer using the provided cable. You should see a light turn on on the board to know it is connected properly. (There is no need to install drivers, etc.)
2. Open Scratch and create a new project.



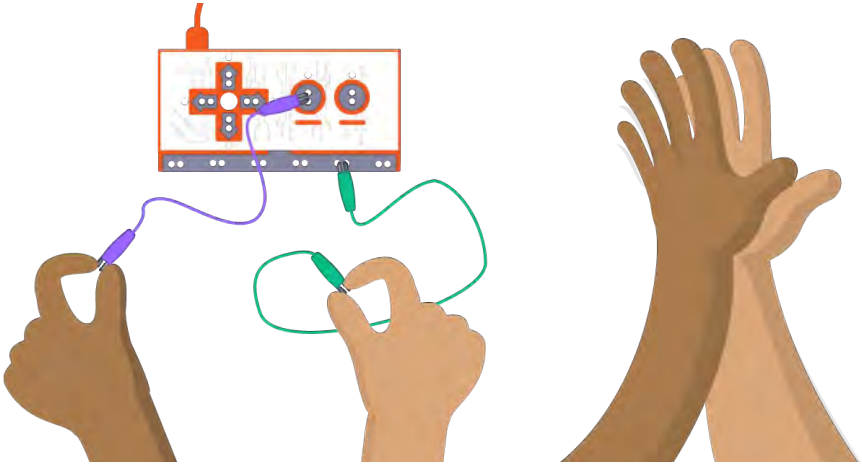
3. Connect an alligator clip to any set of holes along the “EARTH” strip on the bottom of the board.

4. Connect an alligator clip to any of the holes aligned with a keyboard key.

5. Create a script to run when that keyboard key is pressed.

6. Close the circuit to make the program register that keyboard key was pressed by holding the metal part of each alligator clip (key and EARTH).

Electric High Five



Instructions:

1. Connect one alligator clip to EARTH.
2. Connect a second alligator clip to a keyboard key.
3. Have each person touch an alligator clip and give a high five to close the circuit and see the result!

Electric High Five

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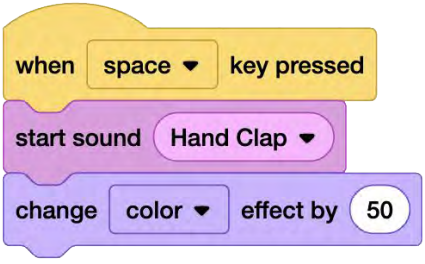
GET READY

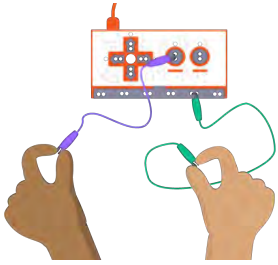
Choose any sprite.

Find a partner.

ADD CODE AND TEST



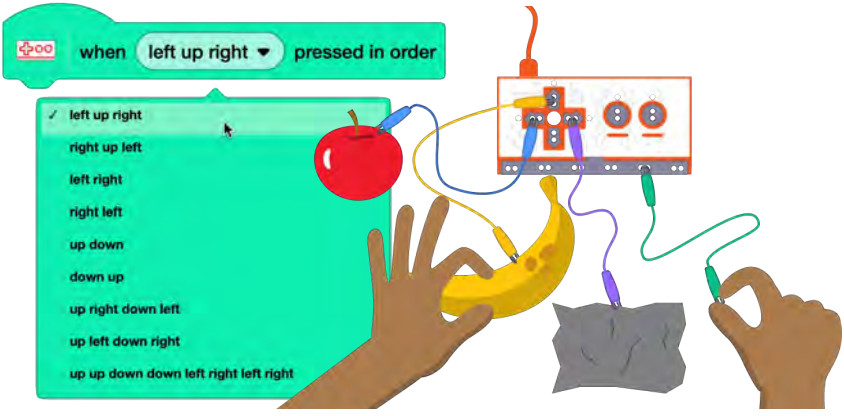
Add code to happen when the keyboard key is pressed.



One person holds the alligator clip connected to the keyboard key. The other holds the clip connected to EARTH.

Now, give a high five to close the circuit and run your code!

Makey Secret Code



Instructions:

1. Use the blocks available under the Makey Makey Extension.
2. Select a keyboard combination to activate your secret code program.
3. Touch the alligator clips or connected conductive objects in the right order to close the circuit and see the result!

Makey Secret Code

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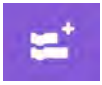
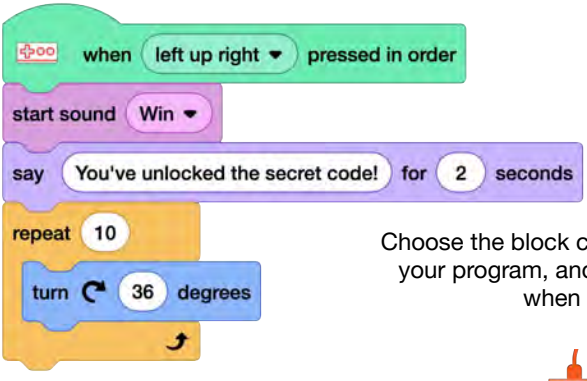
GET READY

Choose any sprite.



Add the Makey Makey Extension.

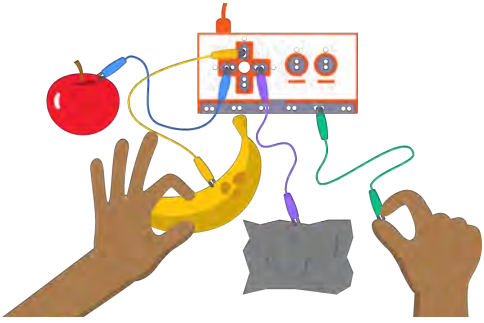
ADD CODE AND TEST



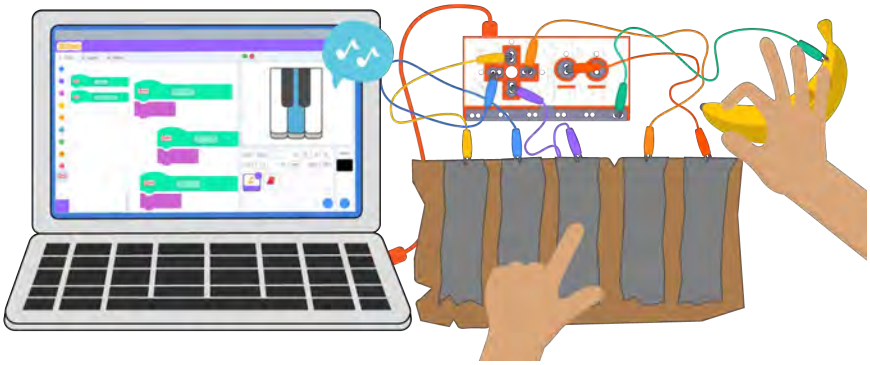
Choose the block combination to activate your program, and write a script to run when received.

Close the circuit to register each keyboard press by touching EARTH and each keyboard input in order.

Debug your code and test the conductivity of materials by trying actual keyboard keys versus the Makey Makey.



Foil Piano



Instructions:

1. Connect one alligator clip to EARTH and various alligator clips to multiple keyboard keys, which will represent various musical notes.
2. Code a project so key presses play different notes.
3. Use foil, bananas, Play-doh, or other conductive materials as external keys.

Foil Piano

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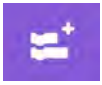
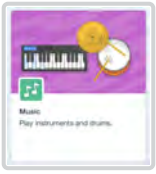
GET READY

Choose any sprite or draw your own.



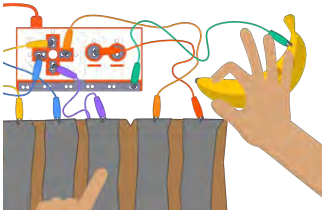
Optional: add the Music Extension.

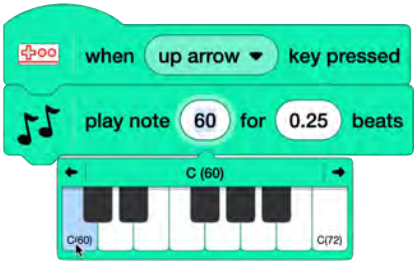


ADD CODE AND TEST

Select note sounds in the Sound library to play when different keyboard keys are pressed.

You can use either the “when [space] key pressed” block under the Events category or the blocks in the Makey Makey Extension.

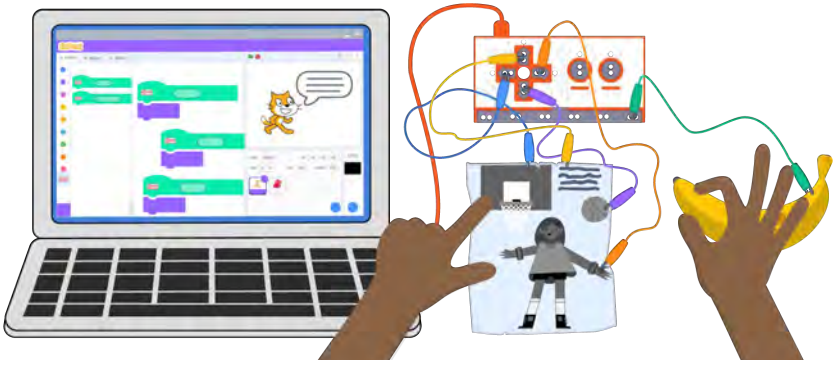




Or add the Music Extension and select notes to play when different keyboard keys are pressed. Notes can be customized for beat count and instrument.

Close the circuit to register each keyboard press by touching EARTH and a keyboard input.

Art Comes Alive



Instructions:

1. Create a drawing, informational sheet, poem, or poster you want to connect to the digital space.
2. Use a graphite pencil, foil, conductive tape, or conductive paint to create connection points with pieces.
3. Use Makey Makey and Scratch to provide additional information when participants interact with your work.

Art Comes Alive

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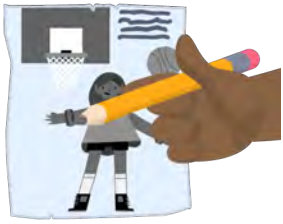
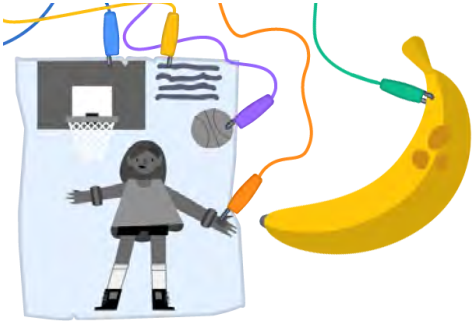
GET READY

Choose any sprite.

Create your drawing.

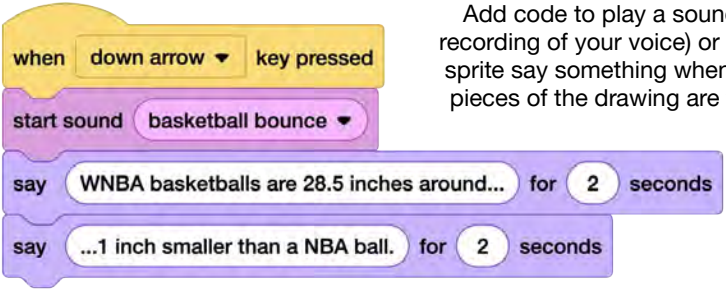


ADD CODE AND TEST



Connect different pieces of your drawing to alligator clips. Make sure the conductive pieces don't overlap, so only one key is registered as pressed at a time.

Don't forget to connect EARTH.

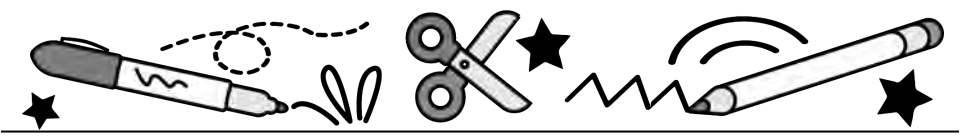


Add code to play a sound (like a recording of your voice) or have your sprite say something when different pieces of the drawing are touched.

Bring Yourself Into Scratch:

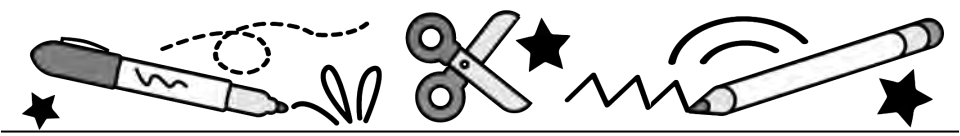
Sharing Identity, Voice & Creativity

Explore creating and animating an original Scratch sprite



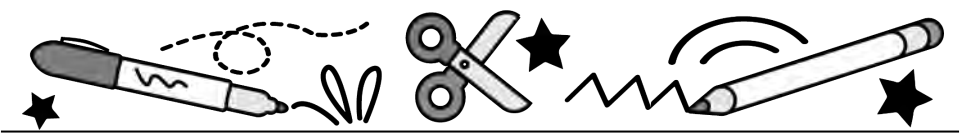
Cards in This Pack

- “About Me” Brainstorm
- Design Your Sprite
- Using the Paint Editor
- Code the Sprite (fewer blocks; for Grades 3-5 or new Scratchers)
- Code the Sprite (additional blocks; for Grades 5+ or experienced Scratchers)
- Create an Asset Pack
- Collaborate: Export or Backpack / Collaborate: Remix



“About Me” Brainstorm

- What is your favorite activity or hobby? Or is there an activity that is particular to the region where you live?
- What is your favorite family or community tradition?
- What food is important to you or your culture? Or is there a food that is particular to the region where you live?
- Do you have a family pet? Or are there native animals or plants that have special meaning to you or your culture?
- Is there an item of dress that has significance in your family, culture, or the region where you live?
- Who/what is your favorite book character?



“About Me” Brainstorm

- Is there an important landmark, style of architecture, or landscape feature that has meaning to you or the region where you live?
- How do you get from place to place? Is there a mode of transport that is unique or significant to your culture or the region where you live?
- What other items unique to your community, culture, language, or location would be fun to animate in Scratch or share with your peers?

Now, it is time to **pick one idea** to turn into a unique asset (a character or a “sprite” in Scratch).

Design Your Sprite

Options:

- **Create a sprite using the Scratch paint editor tools.**
- **Hand-draw**: Create a hand-drawn image to scan/photograph and upload as a sprite.
- **Remix**: Mix, match, and edit desired pieces of vector sprites already in the Scratch Library, as well as add missing elements with shape and line tools.

Sprite examples by pondermake, SaffronChai, Chumie, algorithmar, and watse166.

Design Your Sprite

- There are two modes for using the paint editor in Scratch:
    - Vector-mode allows you to create and edit shapes (Scratch default).
    - Bitmap-mode allows you to edit photos and paint with pixels.
- We recommend using vector-mode, as it allows other users to make adjustments and add and remove elements if they remix your creations.

Using the Paint Editor

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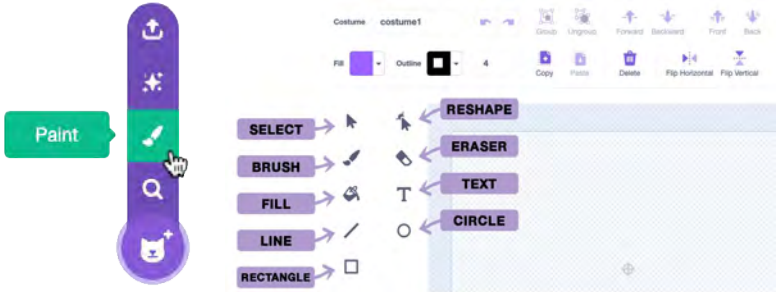
TOOLS TO TRY



	Click and drag with the Line, Circle, or Rectangle tools to **create a shape**. Hold down the Shift key while dragging to create equal sides, or 45 and 90 degree angles with lines.
	Using the Select tool, select a shape and click and drag one of the corner points to **resize** it.
	To **rotate** a shape once you've made it, use the Select tool to grab the anchor under the shape and drag it. Hold down the Shift key while dragging to rotate at 45 degree angles.
	Using the Reshape tool, click on one of the points of a shape and **move the point** around to alter the shape. Click + Shift key to select and move multiple points at once.
	Using the Reshape tool, click on a part of the shape that doesn't have a point to **add a new point**, or click on a point and press "Delete" to **remove a point**.

Using the Paint Editor

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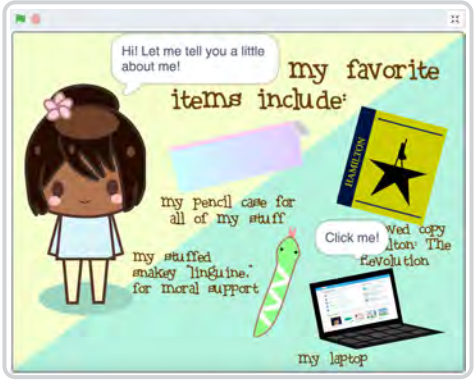
 Curved	Using the Reshape tool, click on a point and choose whether it is **curved or pointed**. Click on a point and drag rotate the handles attached to the point to **alter the shape of a curve**.
 Copy	Using the Select tool, select a shape and click the buttons on the top menu to **copy and paste** a duplicate.
 Flip Vertica	Using the Select tool, select a shape and click the flip horizontal or flip vertical buttons on the top menu to **flip** a shape.
 Forward	Using the Select tool, select a shape and click the Forward, Backward, Front, or Back buttons to change the **layer order.**
 	Select the fill from the dropdown and use the fill (paint bucket) tool to adjust a shape's color. Or using the Select tool, select a shape and then use the Fill and Outline dropdowns to adjust the **color, saturation, brightness, and outline**. You can also choose to use a **gradient**. Use the eyedropper to select a color from another shape. Use the red strikethrough to fill with no color.
 Group	Using the select tool and holding down the "Shift" key, select multiple shapes to **group** them (helpful to move several shapes together).
	Use the brush tool for **freehand line drawing**. The example to the right shows hand drawn whiskers.
	Use the **eraser** tool to remove parts of the drawing from *all* shapes and layers it comes into contact with when clicking and dragging. You can use the reshape tool to then adjust the new points created.
	The **text** tool comes with a dropdown list of font options to choose from, and Fill and Outline dropdowns to change text color and outline.

Code Your Sprite



Communicate to a viewer why you chose to create this asset/this sprite.

Options:

- Write text on the screen using the text tool in the paint editor
- Record your voice and use a block to play the sound
- Have the sprite talk

Project example is a remix of an original project by cantalloupe.

Code Your Sprite

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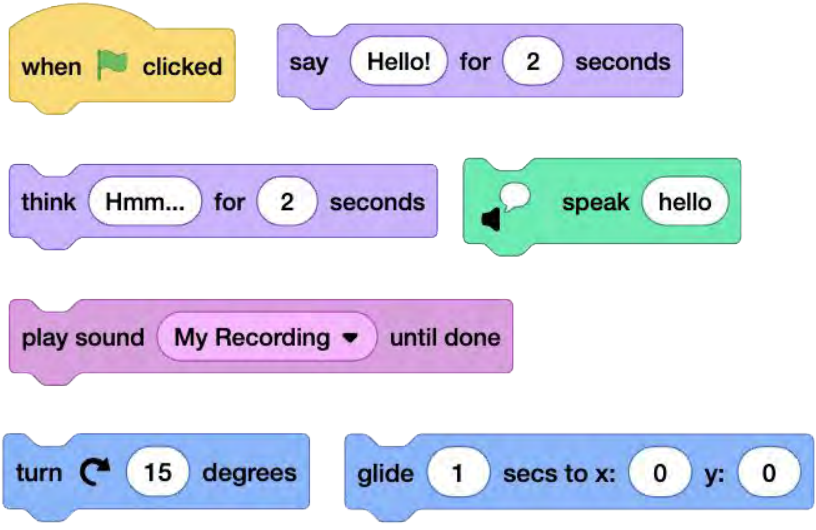
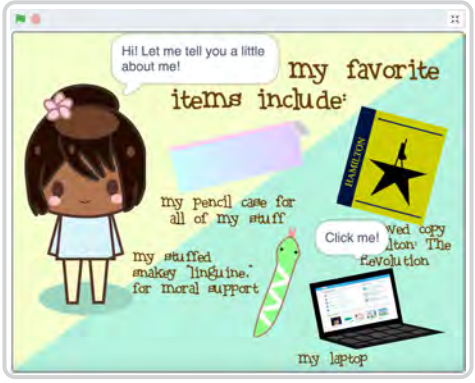
BLOCKS TO TRY



Animate your original sprite. Options include:

- using blocks to hear or see what you want to say on the stage
- adding text or custom backgrounds
- using motion blocks to give the sprite movement

Code Your Sprite



Communicate to a viewer why you chose to create this asset/this sprite.

Options:

- Write text on the screen using the text tool in the paint editor
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Project example is a remix of an original project by cantalloupe.

Code Your Sprite

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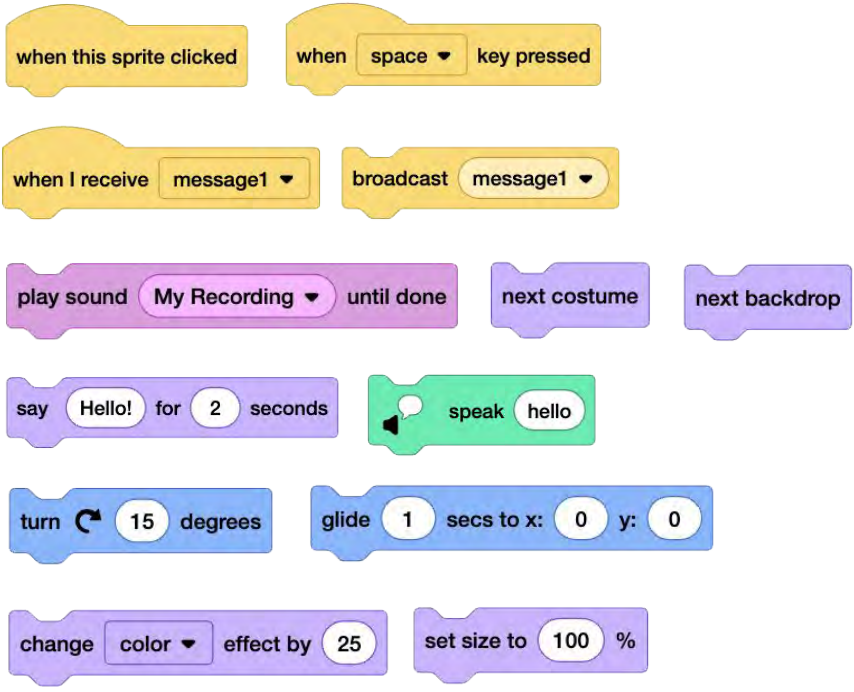
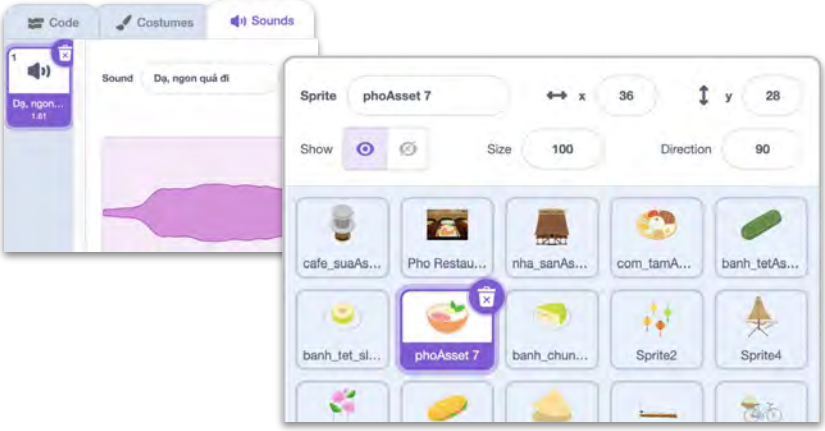
BLOCKS TO TRY



Animate your original sprite, along with one or more other sprites, in a digital collage. Use motion blocks and event blocks (like “broadcast” or “when clicked”) to trigger action or make the project interactive.

Create an Asset Pack

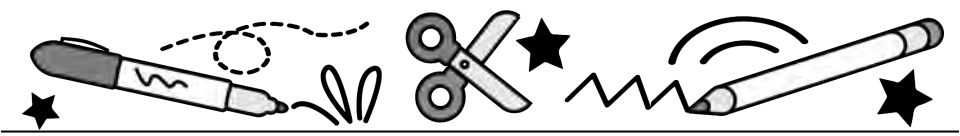


Assets, in Scratch, can include:

- sprites
- costumes
- sounds
- backdrops
- code snippets

An **asset pack** is a collection of assets related to a specific theme, project type, cultural event, cultural symbols or customs, geographical region, or idea.

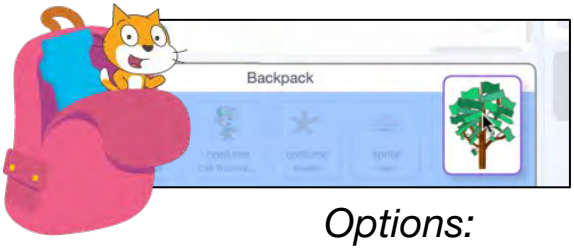
Asset Pack example made by STEAM for Vietnam.

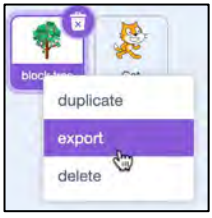


Create an Asset Pack

- **Name your sprite** and costumes with something descriptive.
- Consider creating **multiple costumes** for your sprite to show animation or variation.
- Consider adding at least one **related sound** for each sprite you create. Upload a sound or create an original sound by recording yourself, or noises in your environment.
- When creating an asset pack to share, we recommend creating your **backdrop as a sprite** instead, for easy backpacking or exporting.
- If you did not make a sound or an image yourself or you remixed someone else's creation, it is important to **provide credit** in the Notes and Credits section.

Collaborate: Export or Backpack





Options:

- **Export a sprite, costume, or sound:** Right-click the asset. Choose “export.” To add the asset to a project, choose the **upload** option in the sprite, costume, or sound menu to upload from your files.
- **Backpack a sprite, costume, or sound:** You must be logged in to access the backpack at the bottom of the editor screen. Click it to open the backpack and drag-and-drop a sprite, costume, or sound inside. To add the asset to a different project, open the backpack and drag-and-drop the asset into the sprite, costume, or sound area.

Collaborate: Remix

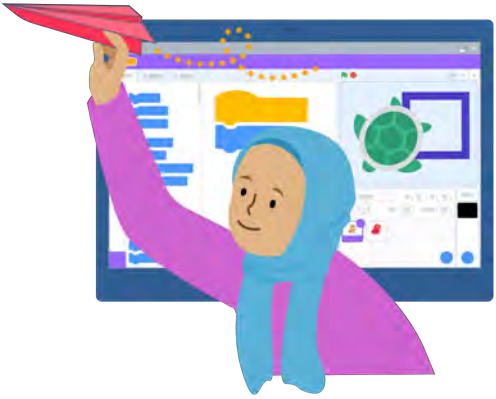
Scratch embraces remix culture. Remixing is when you build upon someone else's projects, code, ideas, images, or anything else shared on Scratch to make your own unique creation.

When remixing an asset, **make changes** like:

- adding code to animate the asset
- placing it in a new scene with other assets or add related sounds
- using the tools in the paint or sound editor to make adjustments to it
- adding additional elements you felt were missing

Just make sure that you **give credit** to whomever created the original asset in the Notes and Credits section.

Paper Planes, Turtle Graphics, and Computational Concepts

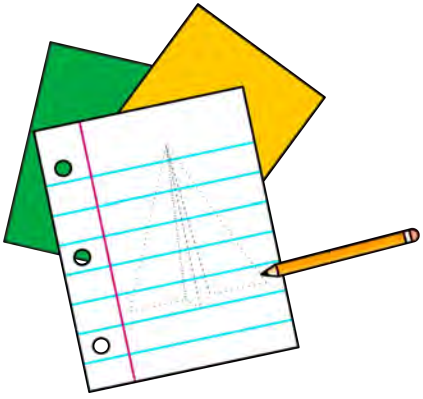


Explore Decomposition and Sequencing

Cards in This Pack

- Fold a Paper Plane / Reflection
- Customize Your Plane / Practice Decomposition
- Turtle Graphics / Draw with a Virtual Pen
- Key Points / Reflection
- Advanced Challenge / Creating Patterns (Looping)

Fold a Paper Plane



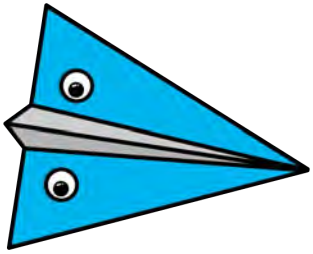
Instructions:

1. Fold the paper in half.
2. Unfold and then fold the top two corners into the center line.
3. Repeat step one and fold the paper in half again.

Reflection

- Does your plane fly? How far? What was the flight path (straight, in a circle, up then down)?
- Does the size of the paper matter? Does the material (tissue paper, construction paper, printer paper…) matter? Does the condition of the paper matter (is it crisp or wrinkled)? Experiment! Test different materials and conditions and see the results.
- Can you debug any issues? How could the instructions be written in a different way to help you achieve different results?
- What additional steps would you add to make your plane fly straighter or fly further?

Customize Your Plane



Options:

- Write a message on your paper plane. What message would you share with learners in a different part of the world or with your future self or with a classmate if you could throw your plane far enough to reach them?
- Add designs, your name, characters, etc., to help you identify your plane among all the others.

Practice Decomposition

Think of a simple activity you know how to do well (kick a ball, make a food, go through a morning routine, etc.) and write out the steps to describe it to a computer. Share these steps with a peer. Determine if they are ordered correctly and clearly enough/contain enough detail that one could follow without asking for additional clarification.

Activity: _____

Step 1: _____

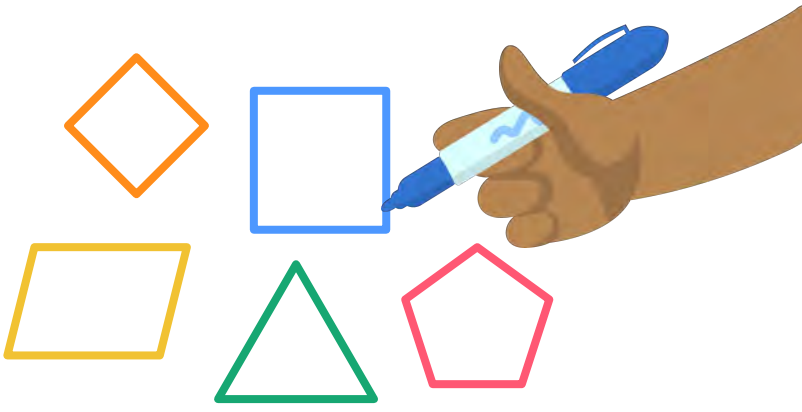
Step 2: _____

Step 3: _____

Step 4: _____

Step 5: _____

Turtle Graphics



Instructions:

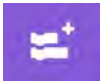
1. Look at these shapes and pick one to recreate in Scratch.
2. Study your shape. Are the sides the same length or different length? Are the angles the same or different? Are there any points where the steps you'd take might be the same/repeat?

Draw with a Virtual Pen

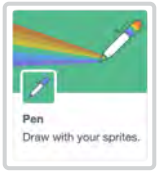
scratch.mit.edu

GET READY

Choose any sprite.

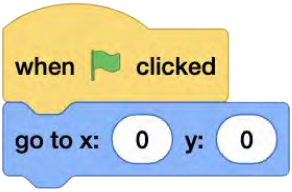


Add Pen Extension.

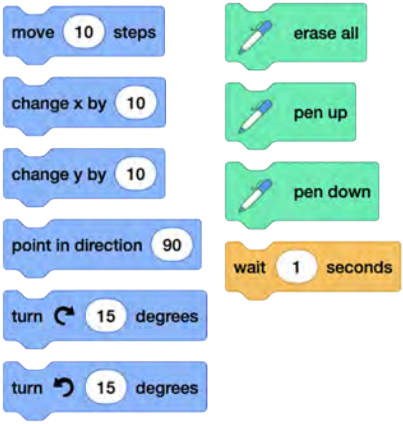


ADD CODE

Position Sprite



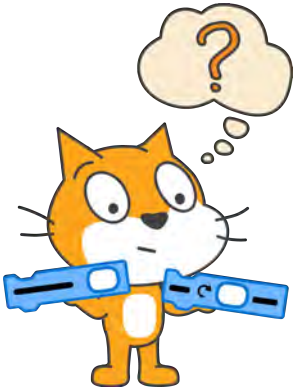
Blocks to Try



TRY IT

You don't have to use all of these blocks, and you can use any of these blocks as many times as you need. Create your script, test, and debug.

Key Points



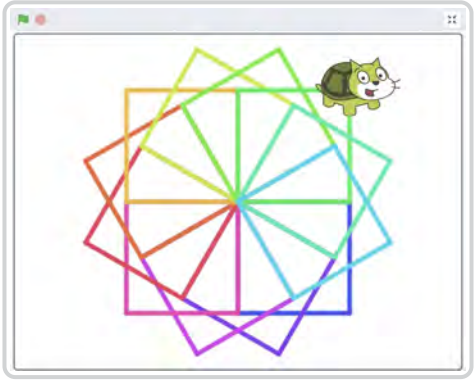
Remember:

1. Details matter.
2. Sequential order matters.
3. We can't make assumptions about the computer's knowledge. A programmer has to be very explicit in their instructions.

Reflection

- Did your shape look as expected? If not, can you spot the problem and debug?
- Do you need to slow down the action? How can you use the wait block to help?
- Sequential order matters: Where have you used blocks like erase all, pen up, and pen down in your sequence? What happens if you place these blocks at the beginning or end of a sequence or in a different order?
- There is often more than one solution or path to accomplish a task. Compare your code with other solutions drawing the same shape (in pairs or a small group). Was your solution similar or different? Analyze the other solution(s) and discuss why you chose the blocks you did.

Advanced Challenge



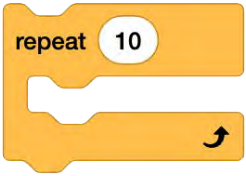
Options:

- Customize your shape using additional blocks (such as set pen size and color)
- Create a paper plane sprite or turtle sprite by drawing one using the Paint Editor tools
- Create a complex shape using a loop

Creating Patterns

scratch.mit.edu

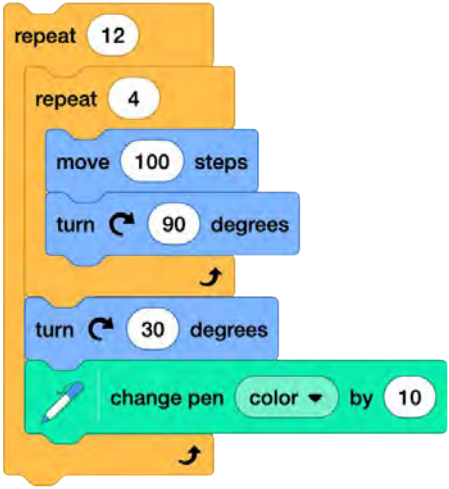
BLOCKS TO TRY



Select a “repeat” block from the Control category.

Select a block that sets or changes the pen size or color from the Pen category.

CREATE YOUR CODE



Examine this example script:

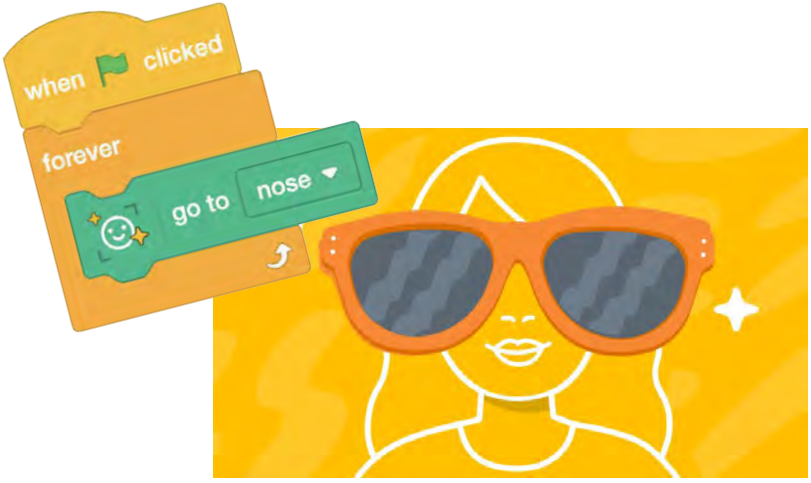
What shape do you think the interior repeat script makes?

A circle is 360 degrees. You can use a math equation to determine how many times to repeat the shape and how many degrees to turn. In this script: 30 x 12 = 360.

What happens if you move the “change pen color” block inside the interior repeat script?

Create your script, test, and debug.

Scratch and AI: Face Sensing



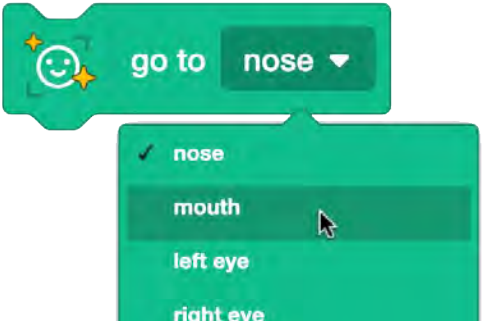
Explore ways AI can be integrated into Scratch projects on Scratch Lab

Cards in This Pack

- Try Out Face Sensing
- Create a Face Filter
- Create a Face Sensing Game
- Create a Face Sensing Sound Board
- Use Your Nose As a Pen
- Fool the AI / Save Your Project

Or combine with other cards like “Pong Game” or “Catch Game” but alter the code to make your face control the player!

Try Out Face Sensing



- Go to **lab.scratch.mit.edu/face** and **click the "Try it out" button**.
- **Select the "go to nose" block**.
- **Click the block while your face is visible on the stage**. Did the sprite go to your nose? Move and click again.
- What happens if you click on the dropdown list and choose another feature for the sprite to go to?

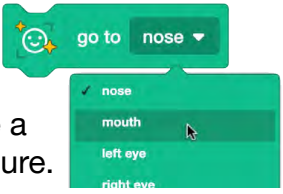
Try Out Face Sensing

lab.scratch.mit.edu/face

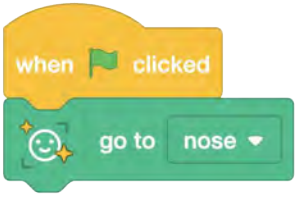
GET READY

Choose any sprite.

Choose a facial feature.



ADD CODE

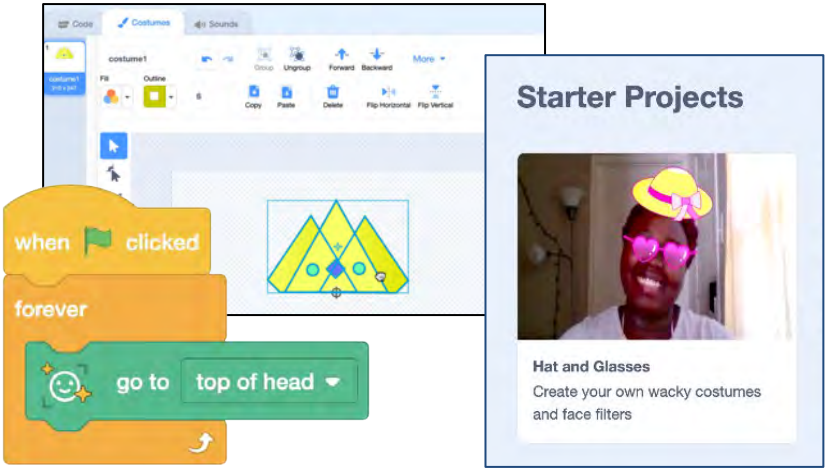


1. Add a “when green flag clicked” block to the “go to nose” block. Click the green flag.

2. Next, add a “forever” loop to have the sprite stick to your chosen feature.

3. Try adding additional blocks from the Motion or Looks category to animate the sprite.

Create a Face Filter



- Go to **lab.scratch.mit.edu/face**.
- Draw your own hat, glasses, or other accessory with the **Scratch paint editor** tools and **code a face filter**.
- *Optional*: On the Face Sensing homepage, click on the **“Hat and Glasses” starter project** to experiment with the sprites and sample code.

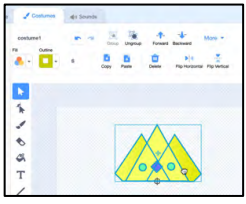
Create a Face Filter

lab.scratch.mit.edu/face

GET READY

Choose “Paint” from the sprite menu.

Use the tools to draw a hat costume or two.



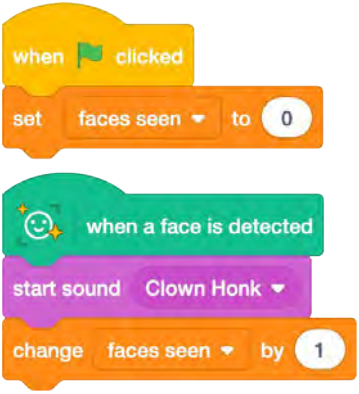
ADD CODE

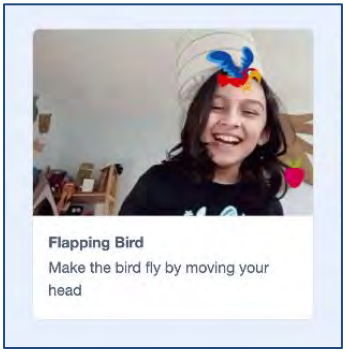
1. Add code so it sticks to the top of your head.

2. Next, add blocks so the sprite scales to match the size and points in the direction of your face.

Have multiple costumes? Add code to switch costumes.

Create a Face Sensing Game





- Go to **lab.scratch.mit.edu/face**.
- **Code a game that uses your face to score points or control a player sprite**.
- *Optional*: On the Face Sensing homepage, click on the **"Flapping Bird" starter project** to experiment with the sprites and sample code.

Face Sensing Game

lab.scratch.mit.edu/face

GET READY

Choose a first sprite.

Choose a second sprite.

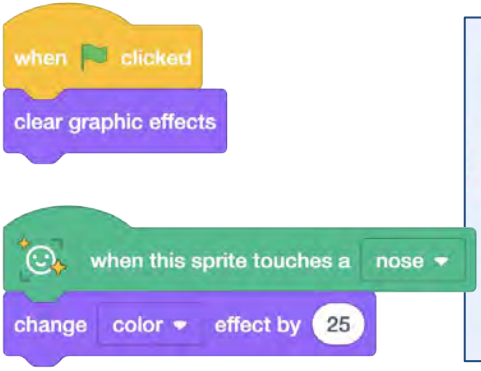
ADD CODE

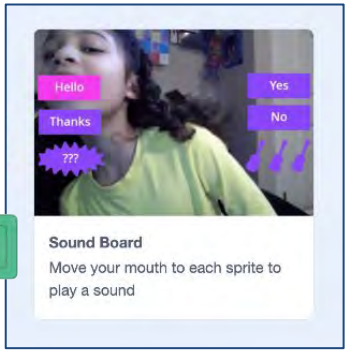
1. Add code to the first sprite so you can control it with your face. This will be the player.

2. Add code to the second sprite so it moves to a random position on the stage and gives the player a point when they touch.

3. Create a score variable to track points. Don't forget to reset it each time a new game is started. Make customizations!

Create a Face Sensing Sound Board





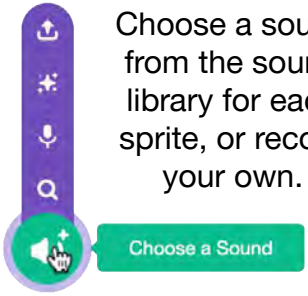
- Go to **lab.scratch.mit.edu/face**.
- Choose a variety of fun sounds or record your own and **code a sound board.** Or code effects controlled by your face.
- *Optional*: On the Face Sensing homepage, click on the **"Sound Board" starter project** to experiment with the sprites and sample code.

Sound Board

lab.scratch.mit.edu/face

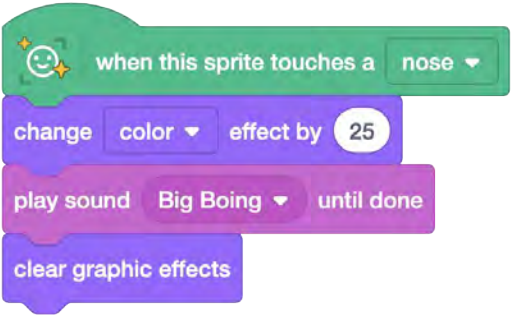
GET READY

Choose a few sprites, or draw your own.



Choose a sound from the sound library for each sprite, or record your own.

ADD CODE



1. Add code to each sprite to play a sound, change an effect, or perform another animation when parts of your face touch them.

2. Try adding multiple sounds to a sprite. Use the “pick random” operator so each time is a surprise.

Use Your Nose As a Pen

- Go to **lab.scratch.mit.edu/face** and **click the "Try it out" button**.
- **Add the Pen Extension.**
- **Select the "go to nose" block**.
- **Put the pen down** and use your nose to draw.
- *Optional*: Use your head tilt to put the pen up and down. Or try adjusting the pen size based on your face size.

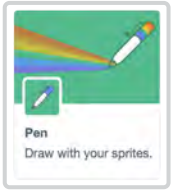
Use Your Nose As a Pen

lab.scratch.mit.edu/face

GET READY

Choose any sprite to act as the Pen.

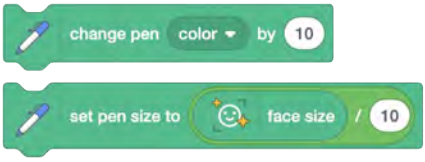
Add Pen Extension.



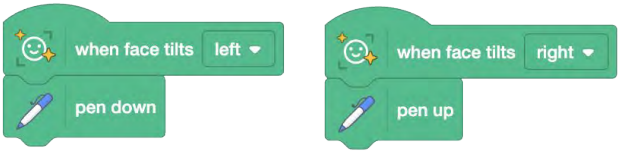
ADD CODE

1. Add a Pen block to put the pen down. Then have the pen follow your nose.

2. Try variations like changing the pen color or setting the pen size based on your face size.



3. Want more control? Use “when face tilts” to control when the pen is up and when it is down.



Fool the AI

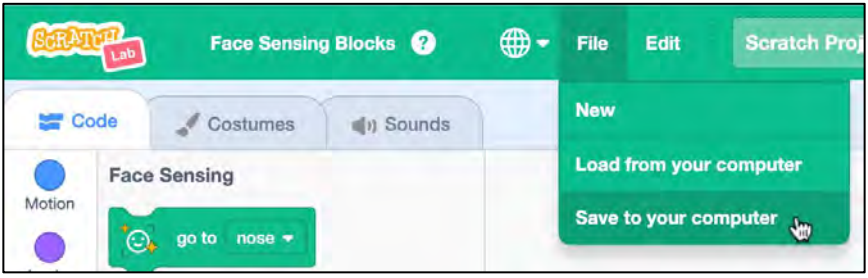
Face Sensing blocks try to detect if a face exists, but they are not able to identify who the face is, or even if it is a human face! That means sometimes the AI makes interesting mistakes. Identifying these mistakes can help us see the difference between our own human intelligence and AI.

Can the AI find the parts of a face if:

- you are in disguise, your face is covered, or your face is tilted or upside down?
- the lighting in the room is very bright or very dark?
- you step out of frame and hold up a drawing of a smiley face? a stuffed animal? a pet? two googly eyes attached to fingertips? or another facelike object made of different materials or from nature?

What variables can you change to try to fool it into thinking it sees a face? What limitations can you find?

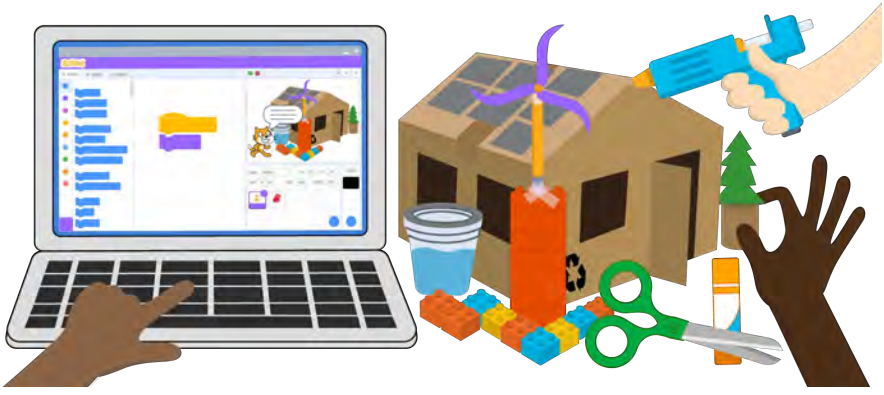
Save Your Project



Projects created on Scratch Lab cannot be saved to an account on scratch.mit.edu. But the file can be saved to your computer and uploaded to the Scratch Lab project page if you want to continue working on your project.

- Click "**File**," then choose "**Save to your computer**."
- Next time you want to work on your project, **go to lab.scratch.mit.edu/face** and click "**File**," choose "**Load from your computer**," and upload your project.

Build the Change



What design features are important to consider if you are creating a building that is good for the well-being of the environment and people in the community?

The LEGO Group X SCRATCH

Creating Sustainable Futures

Cards in This Pack

- Create Your Sprites
- Remove Image Backgrounds
- Code Your Sprite
- Add Digital Elements
- Using the Paint Editor
- Collaborate: Export or Backpack / Collaborate: Remix
- Interactive Prototype with Makey Makey

Combine with other cards like “Imagine a World,” “Animate a Character,” or “Create a Story” to learn how to animate your sprites!

Create Your Sprites

Options:

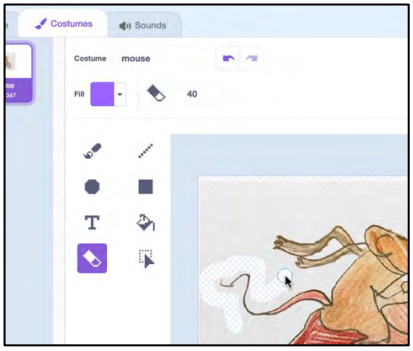
- **Upload a picture**: Take a picture of your physical prototype and upload it into Scratch as a sprite.

  You may want to take pictures of individual pieces to animate seperately.

- **Create a sprite using the Scratch paint editor tools.**

- There are two modes for using the paint editor in Scratch:
    - **Vector-mode** allows you to create and edit shapes (Scratch default).
    - **Bitmap-mode** allows you to edit photos and paint with pixels.
- To upload a file as a sprite, hover over the sprite menu in the lower-right corner of the sprite area and choose “Upload.” Then, select the file you want to create a sprite from. Your image will appear on the costume tab as bitmap when it has been uploaded.

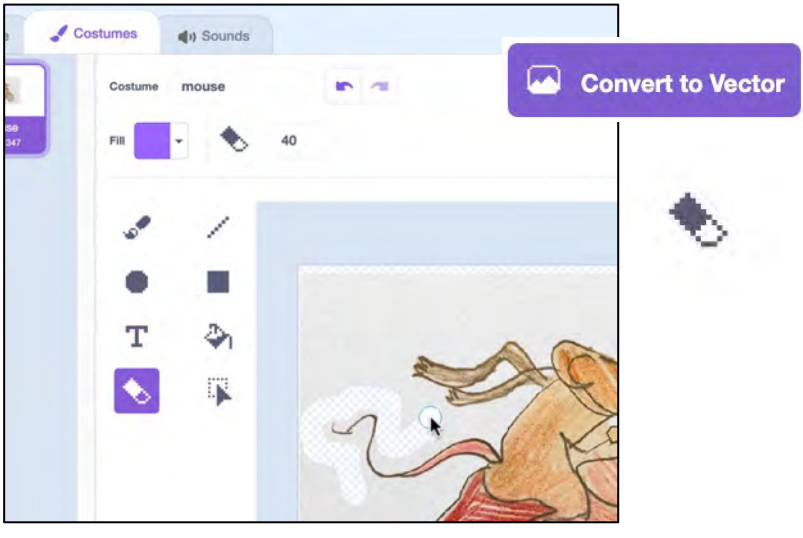
Remove Image Backgrounds



It is best if the images you chose have a transparent background, such as a PNG with transparent background or SVG file.

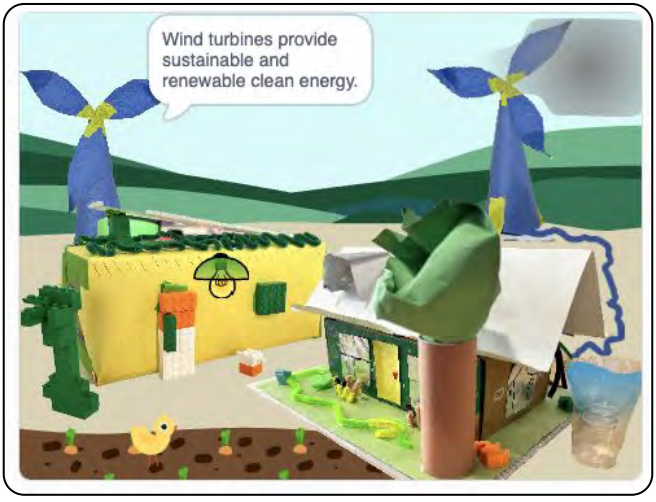
Options:

- You can remove the background using the **tools in the Scratch paint editor** after a file has been uploaded.
- Or, before you upload the file, using **online tools or software**.



- In the Scratch paint editor in bitmap-mode, use the eraser tool to remove the background or other pieces you don't want from your image.
- You'll know you are in bitmap-mode when you see the "Convert to Vector" button at the bottom of the screen.

Code Your Sprite



Options:

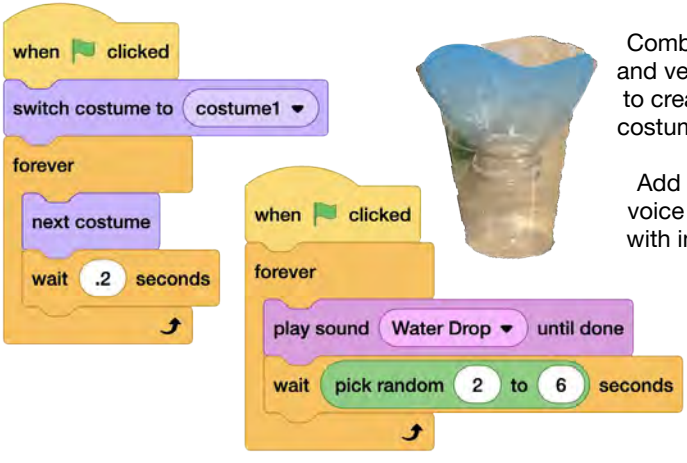
- Create an **informational project**.
- Create a **story with characters** and your prototype as a background.
- **Animate elements** or **add interactivity**.

Example project scratch.mit.edu/projects/981427021 by algorithmar

Code Your Sprite

scratch.mit.edu

IDEAS TO TRY

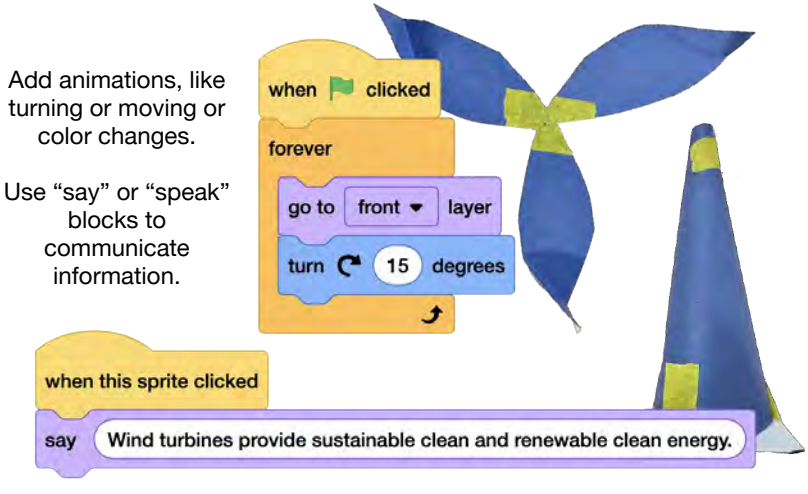


Combine photos and vector shapes to create multiple costume changes.

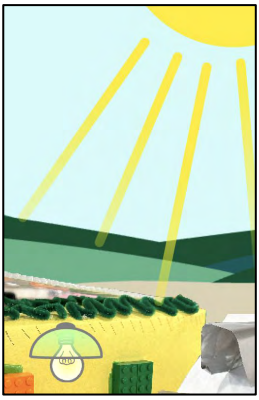
Add sounds or voice recordings with information.

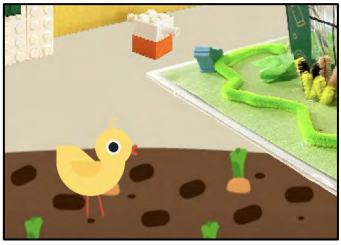
Add animations, like turning or moving or color changes.

Use “say” or “speak” blocks to communicate information.



Add Digital Elements





Options:

- Add a narrator sprite(s) to share information.
- Create a background (or two!) to represent how your prototype would fare in different seasons
- What additional elements did you want to represent (like animals or plants) that you could add and animate digitally?

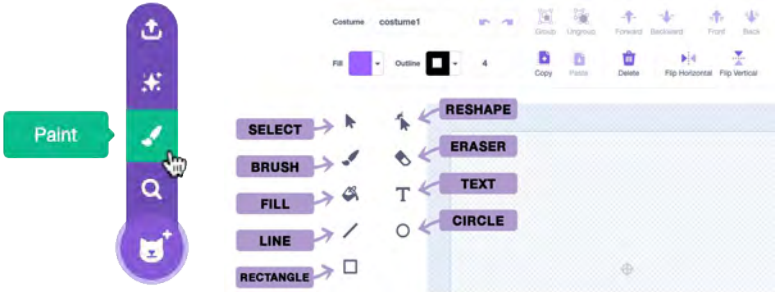
Add Digital Elements

- What environmental sounds could you add or create that represent the area where your prototype resides? (Birds or other animals, water, electricity…)
- Have others created relevant sprites that you can remix and use in your project to add additional elements? (Just make sure to give credit to the original creator on your project page.)

Using the Paint Editor

scratch.mit.edu

TOOLS TO TRY



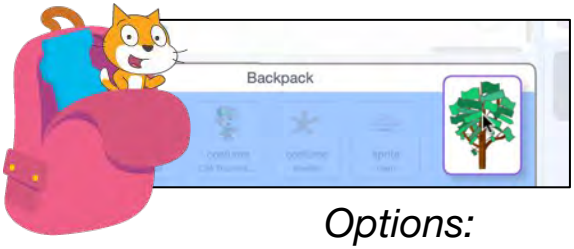
	Click and drag with the Line, Circle, or Rectangle tools to **create a shape**. Hold down the Shift key while dragging to create equal sides, or 45 and 90 degree angles with lines.
	Using the Select tool, select a shape and click and drag one of the corner points to **resize** it.
	To **rotate** a shape once you've made it, use the Select tool to grab the anchor under the shape and drag it. Hold down the Shift key while dragging to rotate at 45 degree angles.
	Using the Reshape tool, click on one of the points of a shape and **move the point** around to alter the shape. Click + Shift key to select and move multiple points at once.
	Using the Reshape tool, click on a part of the shape that doesn't have a point to **add a new point**, or click on a point and press "Delete" to **remove a point**.

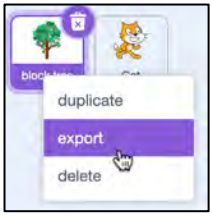
Using the Paint Editor

scratch.mit.edu

 Curved	Using the Reshape tool, click on a point and choose whether it is **curved or pointed**. Click on a point and drag rotate the handles attached to the point to **alter the shape of a curve**.
 Copy	Using the Select tool, select a shape and click the buttons on the top menu to **copy and paste** a duplicate.
 Flip Vertica	Using the Select tool, select a shape and click the flip horizontal or flip vertical buttons on the top menu to **flip** a shape.
 Forward	Using the Select tool, select a shape and click the Forward, Backward, Front, or Back buttons to change the **layer order.**
 	Select the fill from the dropdown and use the fill (paint bucket) tool to adjust a shape's color. Or using the Select tool, select a shape and then use the Fill and Outline dropdowns to adjust the **color, saturation, brightness, and outline**. You can also choose to use a **gradient**. Use the eyedropper to select a color from another shape. Use the red strikethrough to fill with no color.
 Group	Using the select tool and holding down the "Shift" key, select multiple shapes to **group** them (helpful to move several shapes together).
	Use the brush tool for **freehand line drawing**. The example to the right shows hand drawn whiskers.
	Use the **eraser** tool to remove parts of the drawing from *all* shapes and layers it comes into contact with when clicking and dragging. You can use the reshape tool to then adjust the new points created.
	The **text** tool comes with a dropdown list of font options to choose from, and Fill and Outline dropdowns to change text color and outline.

Collaborate: Export or Backpack





Options:

- **Export a sprite, costume, or sound:** Right-click the asset. Choose “export.” To add the asset to a project, choose the **upload** option in the sprite, costume, or sound menu to upload from your files.
- **Backpack a sprite, costume, or sound:** You must be logged in to access the backpack at the bottom of the editor screen. Click it to open the backpack and drag-and-drop a sprite, costume, or sound inside. To add the asset to a different project, open the backpack and drag-and-drop the asset into the sprite, costume, or sound area.

Collaborate: Remix

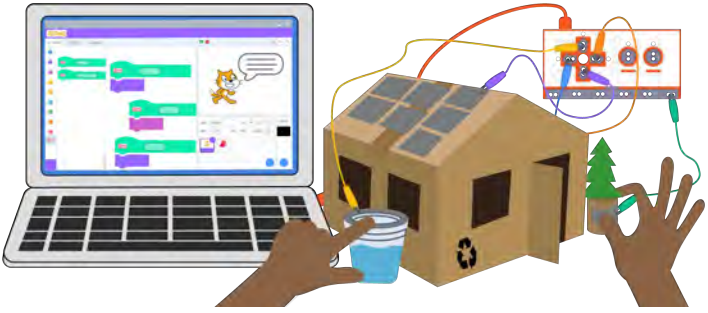
Scratch embraces remix culture. Remixing is when you build upon someone else's projects, code, ideas, images, or anything else shared on Scratch to make your own unique creation.

When remixing an asset, **make changes** like:

- adding code to animate the asset
- placing it in a new scene with other assets or add related sounds
- using the tools in the paint or sound editor to make adjustments to it
- adding additional elements you felt were missing

Just make sure that you **give credit** to whomever created the original asset in the Notes and Credits section.

Interactive Prototype with Makey Makey



1. Plug the Makey Makey Board into a computer using the provided cable.

2. Add conductive materials (conductive paint or tape, foil, Play-doh, scrap metal, etc.) to points on your prototype, and attach alligator clips connected to keyboard inputs on the Makey Makey.

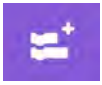
3. Open Scratch. Create a new project where sprites provide additional information or are animated when participants interact with your work.

Interactive Prototype

scratch.mit.edu

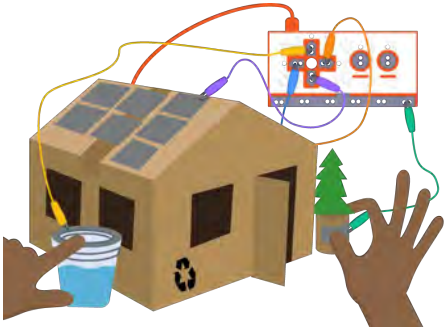
GET READY

Choose any sprite.



Optional: Add the Makey Makey Extension, or use the "when [space] key pressed" block under the Events category.

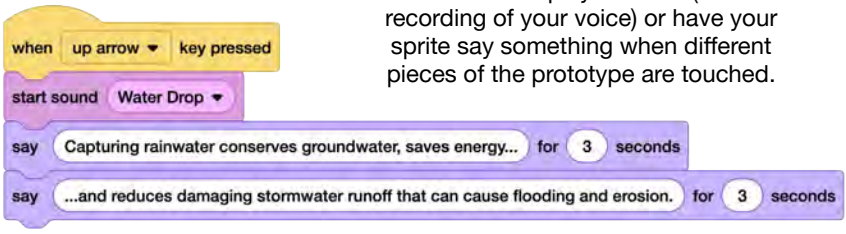
ADD CODE AND TEST



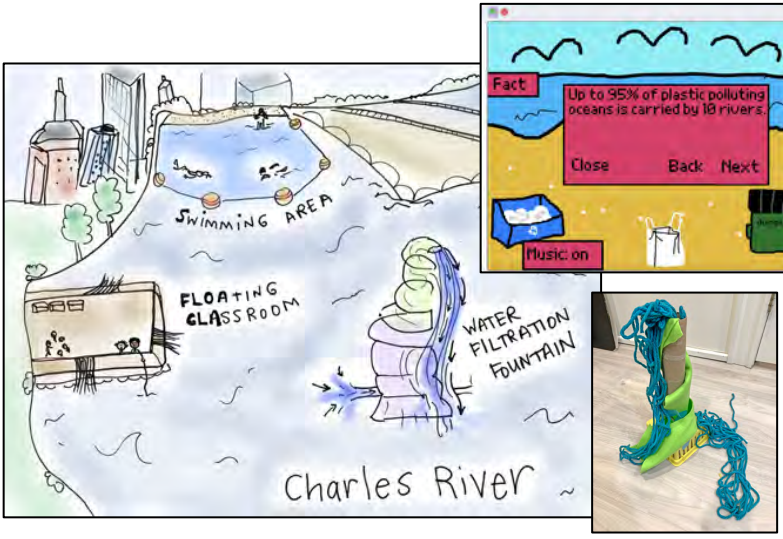
Connect the conductive points on your prototype to alligator clips. Don't forget to establish EARTH.

Close the circuit to register each keyboard press by touching EARTH and each spot on the prototype.

Add code to play a sound (like a recording of your voice) or have your sprite say something when different pieces of the prototype are touched.



From Prototypes to Public Service Announcements



Exploring Creative Problem Solving

Cards in This Pack

- Project Message
- Prototype Your Solution
- Code Your Sprite
- Scratch Project Inspiration / Reflection

Combine with other cards like “Imagine a World” or “Create a Story” to learn how to animate your sprites!

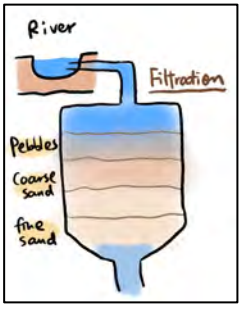
Project Message

1. **Identify** a real world problem.
2. **Imagine** a world where the problem is solved: What would it look like, feel like, sound like, etc.?
3. **Research** the problem.
4. **Brainstorm possible solutions**.

Possible Places to Research:

- Kiddle Safe Search
  https://www.kiddle.co
- Global Goals Project Podcast
  https://www.globalgoals.org/podcast
- Interview a Community Member
  https://www.climatehubs.usda.gov/sites/default/files/Interview--Lesson%20plan.pdf

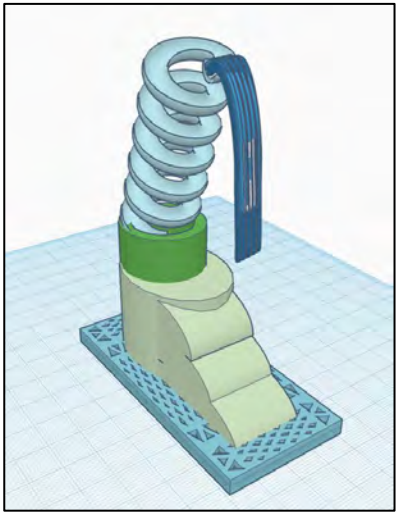
Choose one of your solutions to explore.



Water Filtration System Drawing
Image Source: Tracy Tang

Petition for Awareness Scratch Project
Image Source: @shoothoops00

Prototype Your Solution



Options:

- **Unplugged**: Use art materials and recyclables to create your prototype
- **Digital**: Use applications like Tinkercad
- **Digital:** Use the Scratch paint editor

Example solutions shown above: unplugged and Tinkercad versions of a water filtration fountain.

Prototype in Scratch

- Open scratch.mit.edu
- Choose “Create”
- Design your own solution by drawing sprites and backdrops
    - use the paint editor tools
    - upload photos of your prototype
    - remix available sprites
- Consider adding a narrator sprite(s) to share information
- Consider adding sounds related to your prototype

Code Your Sprite

Options:

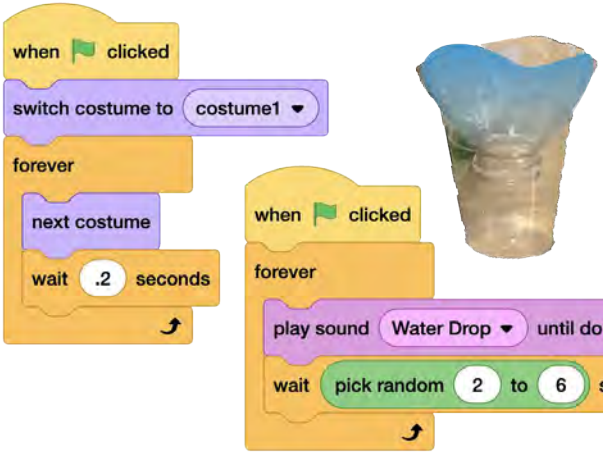
- Create an **informational project**.
- Create a **story with characters** and your prototype as a background.
- **Animate elements** or **add interactivity**.

Example project scratch.mit.edu/projects/725319255 by pixelmoth

Code Your Sprite

scratch.mit.edu

IDEAS TO TRY

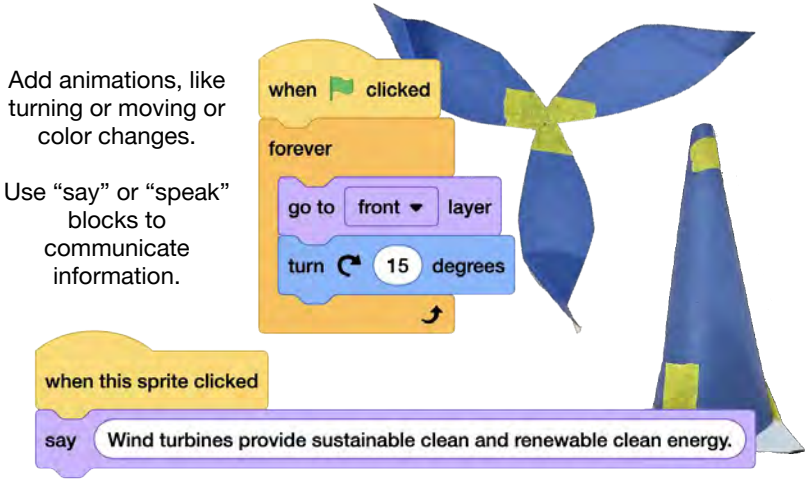


Combine photos and vector shapes to create multiple costume changes.

Add sounds or voice recordings with information.

Add animations, like turning or moving or color changes.

Use “say” or “speak” blocks to communicate information.

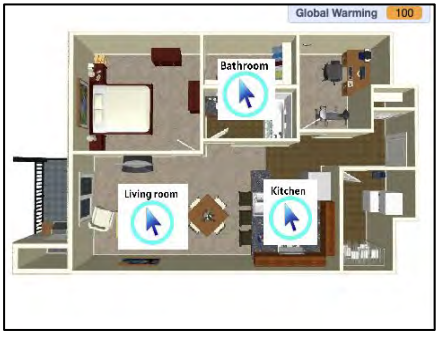


Scratch Project Inspiration

Plastic Pollution Simulation
By Action_project

Help Save the Earth!
By Maltese_Falcon

Graffiti Public Service Announcement
By NutMeg_Coder

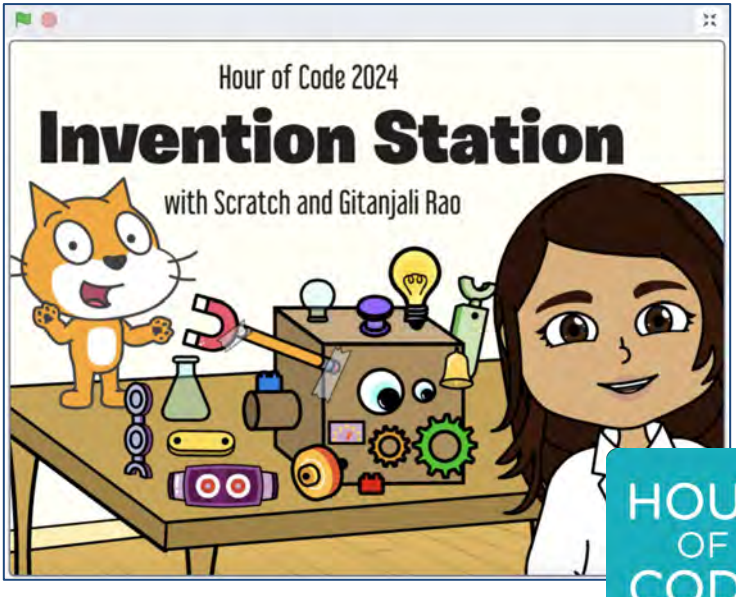


Global Warming Simulation
By Owen-Wong

Reflection

- Step back and examine the process:
  - What have you learned about the problem?
  - Where did you get stuck?
  - How did you get unstuck?
- What would you change about your solution? Have others explored a similar real world problem? What was their solution? If you've learned new information, how might you iterate on your solution?
- What is something you are looking for feedback on?

Hour of Code™ 2024 with Scratch



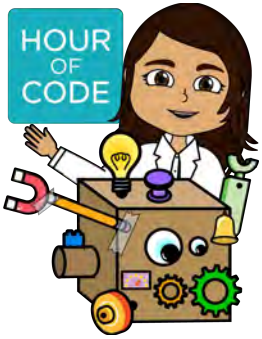
Inventing with Gitanjali Rao

Cards in This Pack

- Meet Gitanjali Rao / Gitanjali's Innovation Process
- Invention Station Project
- Options to Customize Sprites
- Record Your Message
- Make Sprites Draggable
- Conditional Statements
- Create a Sprite to Represent You / Create a Sprite by Remixing
- Using the Paint Editor

The 'Hour of Code™'/'Hora del Código®' is a global initiative by Computer Science Education Week and Code.org to introduce millions of students to one hour of computer science and computer programming.

Meet Gitanjali Rao



For Hour of Code™, Scratch has teamed up with inspiring young scientist and innovator Gitanjali Rao (gitanjalirao.net).

At the Scratch Foundation, we design products and programs that support learners as they develop their thinking, their voice, and their identity. So, the Scratch Team is excited to create and explore with Gitanjali for Hour of Code because she inspires young innovators to try new ideas and develop meaningful solutions in community with others.

When thinking about a new invention, Gitanjali relies on the design thinking, creativity, and curiosity skills, as well as her Innovation Process. Flip this card over for more.

Gitanjali's Innovation Process

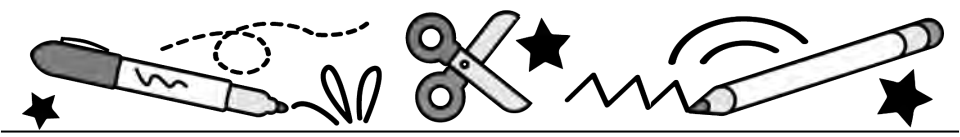
- Observe
- Brainstorm
- Research
- Build
- Communicate

And don't forget to Debug and Iterate!

Learn more about Gitanjali Rao and her inventions on her website at gitanjalirao.net!

Invention Station Project

- As Gitanjali shares in ScratchCat's "Hour of Code 2024 - Invention Station Starter Project" (projects/1047946712), "When I'm inventing, I like to build my idea as soon as possible, so that I'm able to visualize it and I have more motivation to keep going."
- We will build/prototype an invention following her process, and design a solution to a problem that you identify. Let's create something awesome that helps change the world!



Step 1: Click, drag, or hover over objects. Some sprites will respond to your mouse or when touching the box or are close to the box. Experiment to see!

Step 2: Remix the project.

Step 3: Drag each sprite to the box and create your own invention.

Step 4: Customize sprites in the costume editor and/or add your own.

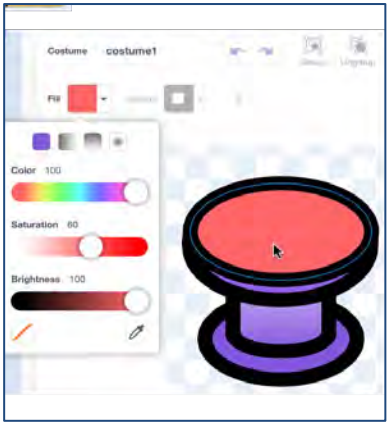
Step 5: Animate! Explore code blocks to rotate sprites, change their size, change their color/brightness/other effect, switch costume, play a sound, etc., when touching the box or when clicked…

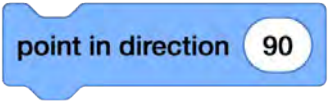
Step 6: Share details about your invention! Record and/or write a message to play about what your invention does, and give it a name and description.

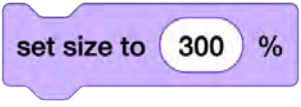
Optional: Add a sprite to represent you to the project.

See cards in this set for more information.

Options to Customize Sprites







- Let's explore different ways to rotate sprites, change their size, change their color or brightness, etc.
- We can adjust the look of sprite costumes using the Paint Editor tools.
- Or we can adjust sprites using code blocks.

Options to Customize Sprites

scratch.mit.edu

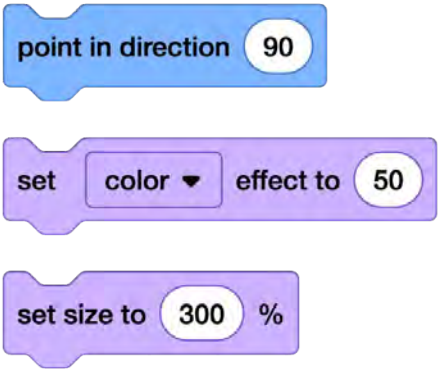
EDIT THE COSTUME IN THE PAINT EDITOR

Rotate with Select

Recolor with Fill

Resize with Select

ADJUST THE SPRITE WITH CODE



Experiment!

Do you notice any differences between using these code blocks to adjust a sprite versus using the paint editor tools above?

What happens if you use both methods?

Record Your Message

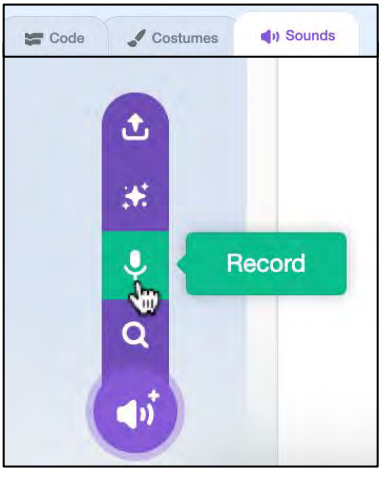
- You can add sounds to project by:
  - Adding a Sound from the Library
  - Uploading a Sound
  - Recording a Sound
  - Using Text to Speech Blocks
- Try sharing details about your invention by recording a message to play about what your invention does using Scratch's record and sound editing functions.
- Add code to the the "My Invention Button" sprite to play your recording.

Record Your Message

scratch.mit.edu

RECORD AND EDIT

1. Select the “Sounds” tab. Hover over the Sounds menu at the bottom of the tab, and select “Record.”



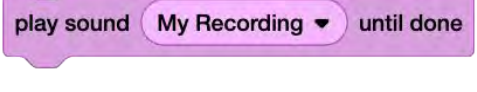
2. See the audio meter on the side registering sounds it is hearing.

3. Press the record button and then stop when done. You check the recording and edit out blank air before and after your recording using the sliders. Save when done.

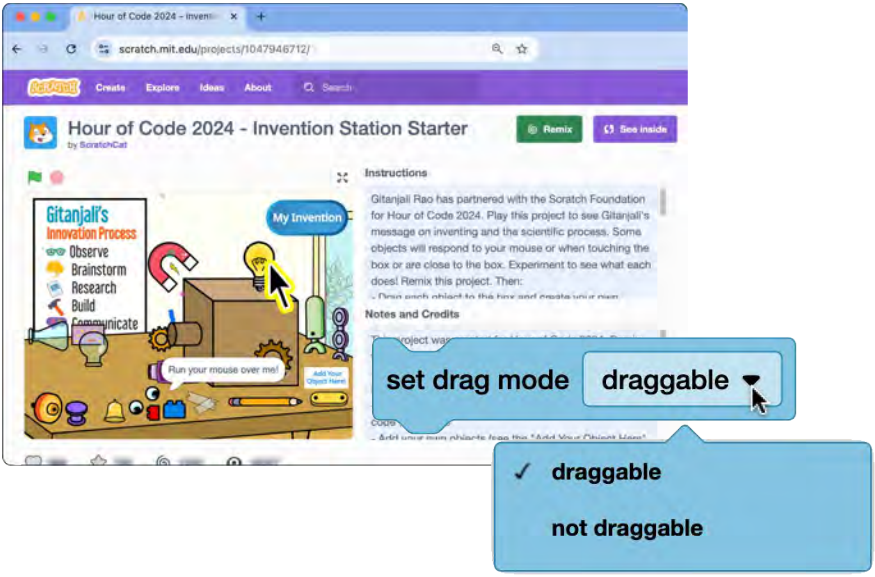
4. Then, use the sound editor tools to make edits, if necessary, like shortening the length or adjusting the volume.

ADD CODE

5. Add code to a sprite to make it play.



Make Sprites Draggable



- By default, sprites can only be dragged/moved around with the mouse when working in the Project Editor, but not when viewed on the Project Page.
- So how do we make objects draggable when on the Project Page? Set the drag mode.

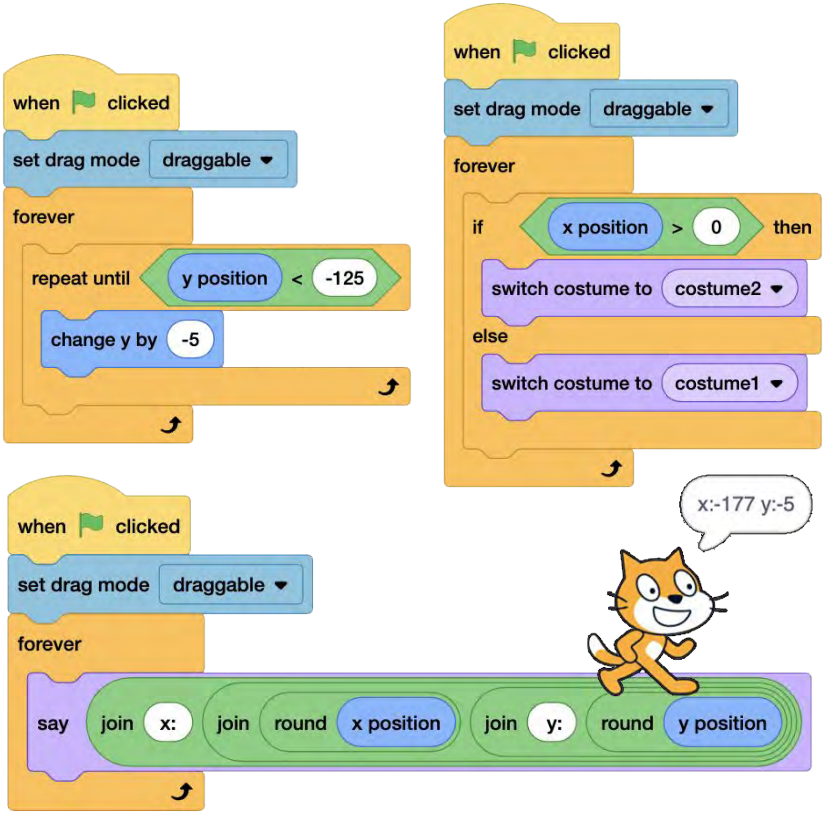
Make Sprites Draggable

scratch.mit.edu

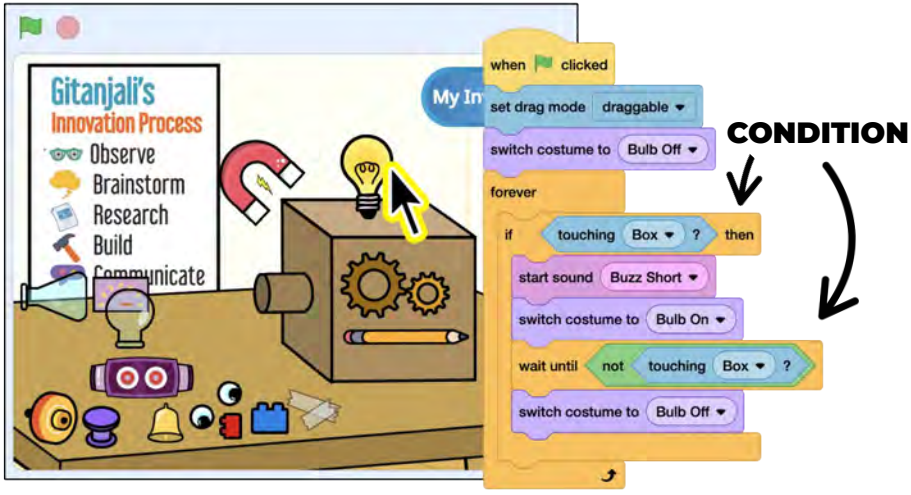
TRY THIS!

Set the drag mode on your sprite as “draggable” or “not draggable.” View the project full screen or view the Project Page. See if you can drag the sprite around with a mouse.

How will you use this? Try these scripts to see what they do.



Conditional Statements



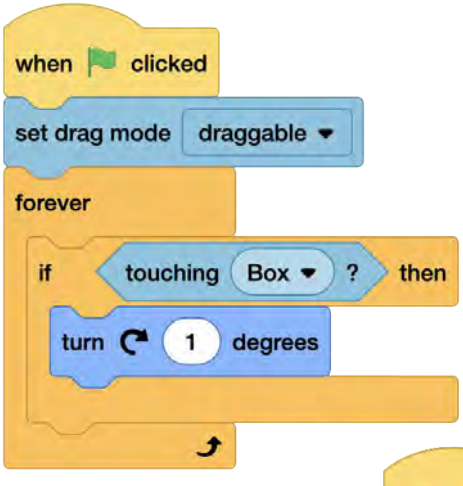
Boolean blocks that report "true" or "false" are used in conditional statement blocks. Try using:

- user actions, such as pressing keyboard keys or mouse positioning or clicking
- sprite interactions (touching another sprite), comparisons (distance between sprites), and touching colors of sprites or backdrops
- data input by users, data stored in variables and lists, or data stored in reporter blocks

Conditional Statements

scratch.mit.edu

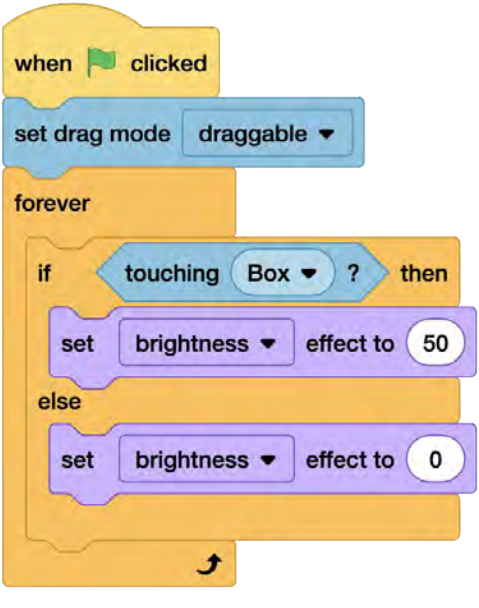
TRY THIS



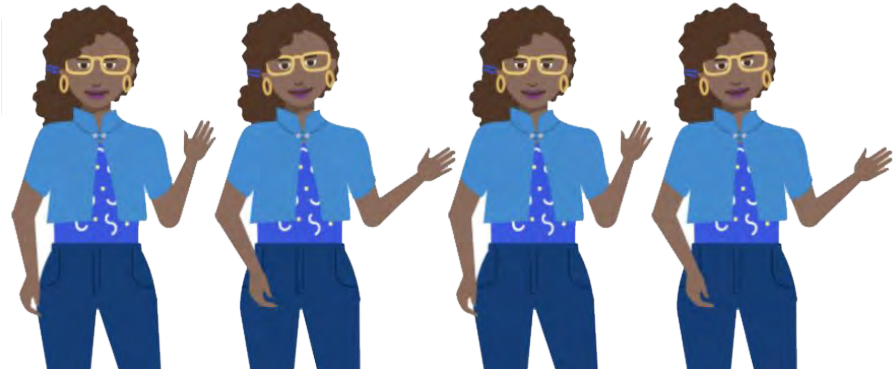
In ScratchCat's "Hour of Code 2024 - Invention Station Starter Project" (projects/1047946712), some sprites are coded using the **"touching box" sensing block** inside an **"if then" or "if then else" conditional statement**.

Create a code stack to make something happen if a sprite is touching the "Box" sprite, if touching the mouse pointer, if a key is pressed…

Sprites could rotate, change their size, change their color/ brightness/other effect, switch costume, play a sound, etc.



Create a Sprite to Represent You

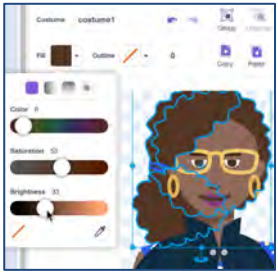


- Perhaps you want to add a character to your project to represent you that can speak about your invention and why you chose to invent it.
- What if you don't have a representation character, or you want to **create or change a character to represent you better**? You could **draw and upload** one, create one using **our Paint Editor tools**, or…
- Let's explore **remixing sprites to create your own**. Flip this card over for more.

Create a Sprite by Remixing

scratch.mit.edu

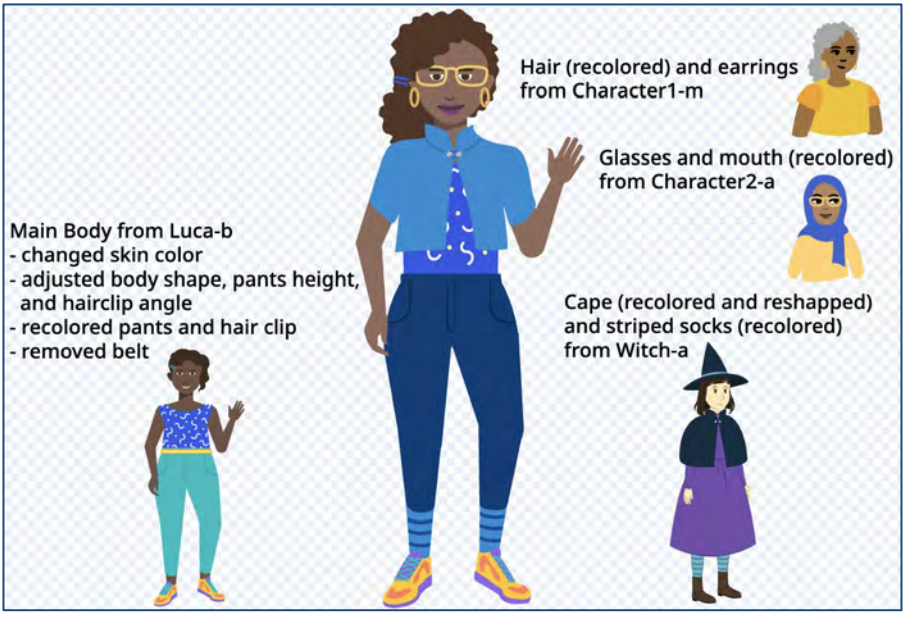
Choose two or more vector sprites with elements you like. Remember, some sprites have multiple costumes with elements/poses.



Recolor with Fill

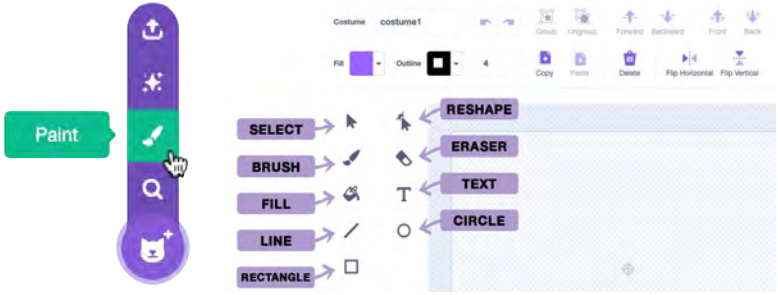
Resize with Select

Use Reshape



Using the Paint Editor

TOOLS TO TRY



	Click and drag with the Line, Circle, or Rectangle tools to **create a shape**. Hold down the Shift key while dragging to create equal sides, or 45 and 90 degree angles with lines.
	Using the Select tool, select a shape and click and drag one of the corner points to **resize** it.
	To **rotate** a shape once you've made it, use the Select tool to grab the anchor under the shape and drag it. Hold down the Shift key while dragging to rotate at 45 degree angles.
	Using the Reshape tool, click on one of the points of a shape and **move the point** around to alter the shape. Click + Shift key to select and move multiple points at once.
	Using the Reshape tool, click on a part of the shape that doesn't have a point to **add a new point**, or click on a point and press "Delete" to **remove a point**.

Using the Paint Editor

scratch.mit.edu

	Using the Reshape tool, click on a point and choose whether it is **curved or pointed**. Click on a point and drag rotate the handles attached to the point to **alter the shape of a curve**.
	Using the Select tool, select a shape and click the buttons on the top menu to **copy and paste** a duplicate.
	Using the Select tool, select a shape and click the flip horizontal or flip vertical buttons on the top menu to **flip** a shape.
	Using the Select tool, select a shape and click the Forward, Backward, Front, or Back buttons to change the **layer order.**
 	Select the fill from the dropdown and use the fill (paint bucket) tool to adjust a shape's color. Or using the Select tool, select a shape and then use the Fill and Outline dropdowns to adjust the **color, saturation, brightness, and outline**. You can also choose to use a **gradient**. Use the eyedropper to select a color from another shape. Use the red strikethrough to fill with no color.
	Using the select tool and holding down the "Shift" key, select multiple shapes to **group** them (helpful to move several shapes together).
	Use the brush tool for **freehand line drawing**. The example to the right shows hand drawn whiskers.
	Use the **eraser** tool to remove parts of the drawing from *all* shapes and layers it comes into contact with when clicking and dragging. You can use the reshape tool to then adjust the new points created.
	The **text** tool comes with a dropdown list of font options to choose from, and Fill and Outline dropdowns to change text color and outline.

Hour of Code™ 2024 with Scratch

Spreading Kindness with Gitanjali Rao

Cards in This Pack

- Meet Gitanjali Rao / Scratch Community Guidelines
- Kindness Community Project
- Create a Sprite to Represent You / Create a Sprite by Remixing
- Using the Paint Editor
- Animate Your Sprite
- Record Your Message

The 'Hour of Code™'/'Hora del Código®' is a global initiative by Computer Science Education Week and Code.org to introduce millions of students to one hour of computer science and computer programming.

Meet Gitanjali Rao

For Hour of Code™ 2024, Scratch has teamed up with inspiring young scientist and innovator Gitanjali Rao (gitanjalirao.net).

One of Gitanjali's inventions is Kindly, an AI-based anti-cyberbullying service that aims to detect and prevent cyberbullying at an early stage.

At Scratch, we have a strong focus on building community, kindness, and respect through our Community Guidelines, which include "Treat everyone with respect" and "Help keep the site friendly" by reporting inappropriate comments or projects to our moderation team and welcoming fellow Scratchers to share about things that excite them and are important to them.

Scratch Community Guidelines

Scratch is a friendly and welcoming community for everyone, where people create, share, and learn together. We welcome people of all ages, races, ethnicities, religions, abilities, sexual orientations, and gender identities.

Help keep Scratch a welcoming, supportive, and creative space for all by following these Community Guidelines:

Treat everyone with respect.

Scratchers have diverse backgrounds, interests, identities, and experiences. Everyone on Scratch is encouraged to share things that excite them and are important to them—we hope that you find ways to celebrate your own identity on Scratch, and allow others to do the same. It's never OK to attack a person or group's identity or to be unkind to someone about their background or interests.

Be safe: keep personal and contact information private.

For safety reasons, don't give out any information that could be used for private communication, in person or online. This includes sharing real last names, phone numbers, addresses, hometowns, school names, email addresses, usernames or links to social media sites, video chatting applications, or websites with private chat functionality.

Give helpful feedback.

Everyone on Scratch is learning. When commenting on a project, remember to say something you like about it, offer suggestions, and be kind, not critical. Please keep comments respectful and avoid spamming or posting chain mail. We encourage you to try new things, experiment, and learn from others.

Embrace remix culture.

Remixing is when you build upon someone else's projects, code, ideas, images, or anything else they share on Scratch to make your own unique creation.

Remixing is a great way to collaborate and connect with other Scratchers. You are encouraged to use anything you find on Scratch in your own creations, as long as you provide credit to everyone whose work you used and make a meaningful change to it. And when you share something on Scratch, you are giving permission to all Scratchers to use your work in their creations, too.

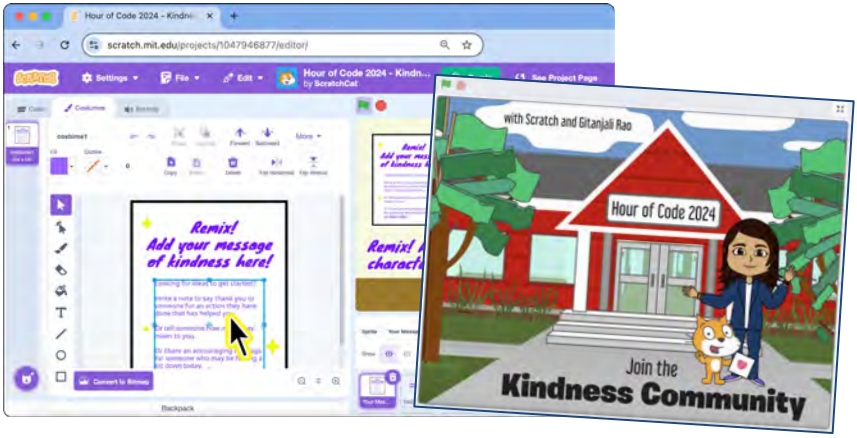
Be honest.

It's important to be honest and authentic when interacting with others on Scratch, and remember that there is a person behind every Scratch account. Spreading rumors, impersonating other Scratchers or celebrities, or pretending to be seriously ill is not respectful to the Scratch Community.

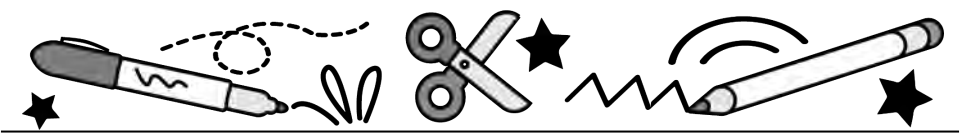
Help keep the site friendly.

It's important to keep your creations and conversations friendly and appropriate for all ages. If you think something on Scratch is mean, insulting, too violent, or otherwise disruptive to the community, click "Report" to let us know about it. Please use the "Report" button rather than engaging in fights, spreading rumors about other people's behavior, or otherwise responding to any inappropriate content. The Scratch Team will look at your report and take the appropriate action.

Kindness Community Project



- Use our starter project to share a unique message of kindness inspired by Gitanjali's work to combat cyberbullying.
- You can remix ScratchCat's Hour of Code 2024 - Kindness Starter (projects/1047946877) to create and share your message and join our Kindness Community!
- Or create your own project about spreading kindness.



Step 1: Play the project to hear Gitanjali's message on kindness.

Step 2: Remix the project.

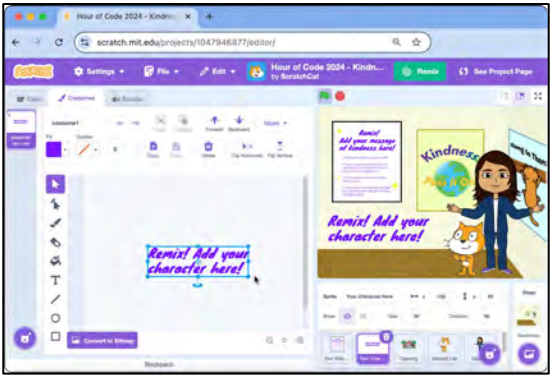
Step 3: Add your message of kindness to the "Your Message Here!" sprite provided by editing the sprite costume.

Step 4: Add a character to represent you to the "Your Character Here" sprite provided by editing the sprite costume.

This could be a vector drawing you create with the Paint Editor, an uploaded drawing (best with the background removed), or a remixed sprite from the sprite library.

Optional: Animate your sprite. Record your message of kindness. Further customize with new backgrounds, dialog, etc.

Create a Sprite to Represent You



- In projects, like our Kindness Community project (projects/1047946877), you may be invited to add your character to a scene.
- What if you don't have a representation character, or you want to **create or change a character to represent you better**? You could **draw and upload** one, create one using **our Paint Editor tools**, or…
- Let's explore **remixing sprites to create your own**. Flip this card over for more.

Create a Sprite by Remixing

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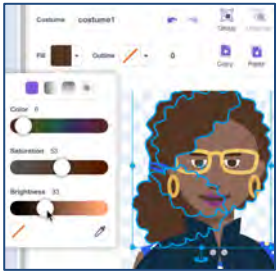
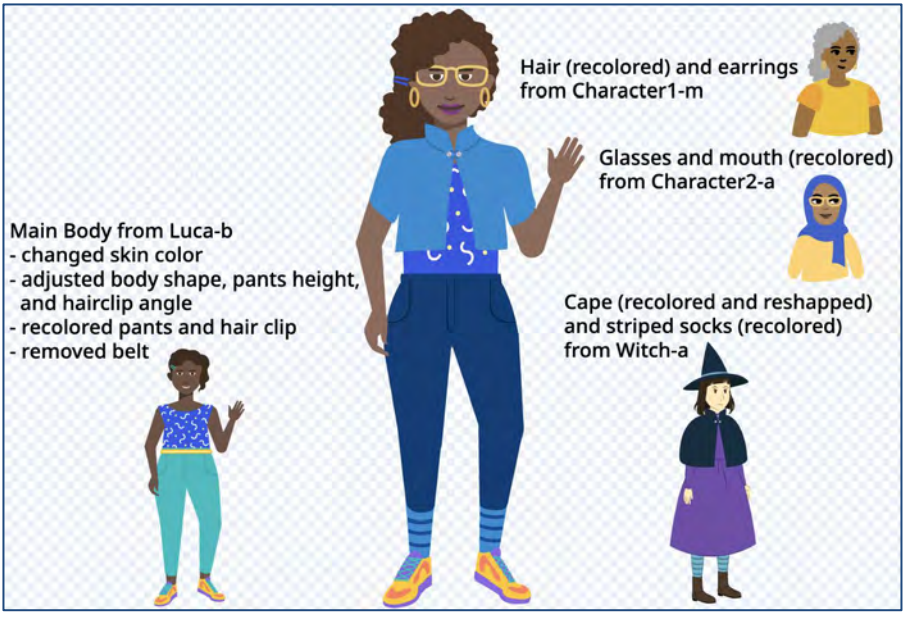
Choose two or more vector sprites with elements you like. Remember, some sprites have multiple costumes with elements/poses.



Recolor with Fill

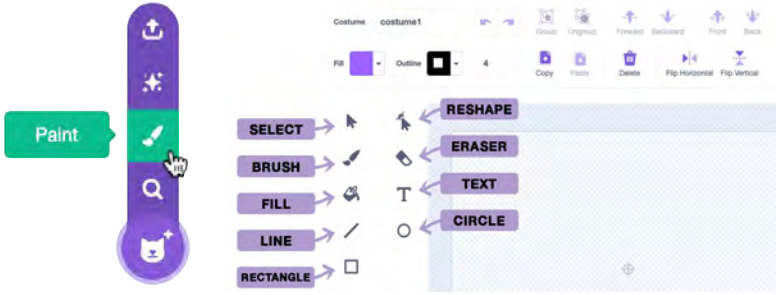
Resize with Select

Use Reshape



Using the Paint Editor

TOOLS TO TRY



	Click and drag with the Line, Circle, or Rectangle tools to **create a shape**. Hold down the Shift key while dragging to create equal sides, or 45 and 90 degree angles with lines.
	Using the Select tool, select a shape and click and drag one of the corner points to **resize** it.
	To **rotate** a shape once you've made it, use the Select tool to grab the anchor under the shape and drag it. Hold down the Shift key while dragging to rotate at 45 degree angles.
	Using the Reshape tool, click on one of the points of a shape and **move the point** around to alter the shape. Click + Shift key to select and move multiple points at once.
	Using the Reshape tool, click on a part of the shape that doesn't have a point to **add a new point**, or click on a point and press "Delete" to **remove a point**.

Using the Paint Editor

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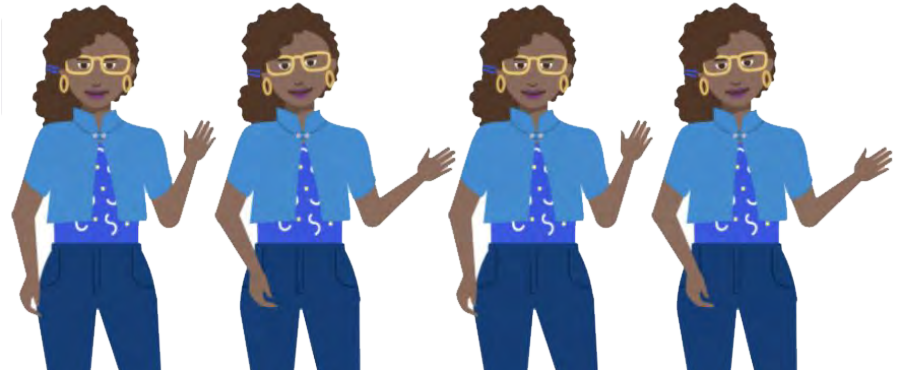
	Using the Reshape tool, click on a point and choose whether it is **curved or pointed**. Click on a point and drag rotate the handles attached to the point to **alter the shape of a curve**.
	Using the Select tool, select a shape and click the buttons on the top menu to **copy and paste** a duplicate.
	Using the Select tool, select a shape and click the flip horizontal or flip vertical buttons on the top menu to **flip** a shape.
	Using the Select tool, select a shape and click the Forward, Backward, Front, or Back buttons to change the **layer order.**
 	Select the fill from the dropdown and use the fill (paint bucket) tool to adjust a shape's color. Or using the Select tool, select a shape and then use the Fill and Outline dropdowns to adjust the **color, saturation, brightness, and outline**. You can also choose to use a **gradient**. Use the eyedropper to select a color from another shape. Use the red strikethrough to fill with no color.
	Using the select tool and holding down the "Shift" key, select multiple shapes to **group** them (helpful to move several shapes together).
	Use the brush tool for **freehand line drawing**. The example to the right shows hand drawn whiskers.
	Use the **eraser** tool to remove parts of the drawing from *all* shapes and layers it comes into contact with when clicking and dragging. You can use the reshape tool to then adjust the new points created.
	The **text** tool comes with a dropdown list of font options to choose from, and Fill and Outline dropdowns to change text color and outline.

Animate Your Sprite



There are many ways you might choose to animate your character. For instance:

- Try moving or gliding your character to a new location.
- Try changing the direction of the character to tilt back and forth.
- Or try adding additional costume drawings to change the position of certain elements and create movement as costumes are changed. Flip this card over for more.

Animate Your Sprite

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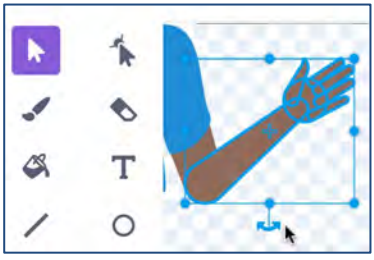
GET READY

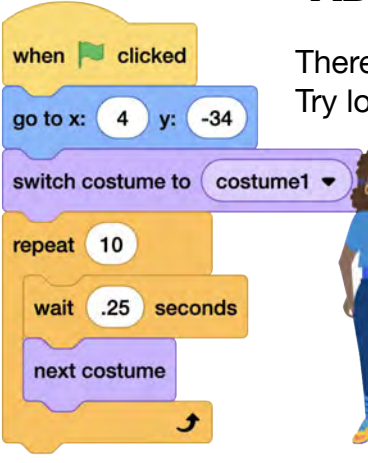
Duplicate your sprite costume on the costume tab. (Right click, Duplicate.)

Use the select tool, then click and drag on the canvas to select multiple items.

Try rotating and moving incrementally.



ADD CODE



There are many ways to animate. Try looping through the costumes.

Record Your Message

- You can add sounds to project by:
  - Adding a Sound from the Library
  - Uploading a Sound
  - Recording a Sound
  - Using Text to Speech Blocks
- Consider recording your message of kindness to play when it is visible on your screen by using Scratch's record and sound editing functions.

Record Your Message

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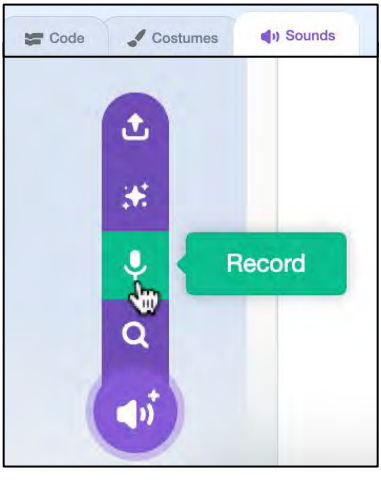
RECORD AND EDIT

1. Select the “Sounds” tab. Hover over the Sounds menu at the bottom of the tab, and select “Record.”



2. See the audio meter on the side registering sounds it is hearing.

3. Press the record button and then stop when done. You check the recording and edit out blank air before and after your recording using the sliders. Save when done.

4. Then, use the sound editor tools to make edits, if necessary, like shortening the length or adjusting the volume.

ADD CODE

5. Add code to a sprite to make it play.