# Animating a Scene in Scratch

We are going to animate a short scene where three friends share a joke. Animating a story in Scratch is much like performing a play or recording a television show. A good place to start is with a script – this is a special way of writing a story for a play, television, or Scratch that helps us know what is most important. For this scene, we'll start with a script that's already been written – "The Joke".

## Choosing our Characters

At the top of the page is a section labeled "Dramatis Personae" which is Latin for "people in the story". It tells us the names of our characters, and any important information about them we'll need to put on our play – such as how old they are, if they are a boy or girl, and sometimes how they look.

To tell this story in Scratch, we'll need sprites to represent each of these characters, just like we would need actors for a play or film. So our first step will be to create these sprites.

Open the scratch website: http://scratch.mit.edu. You should see a screen like this:
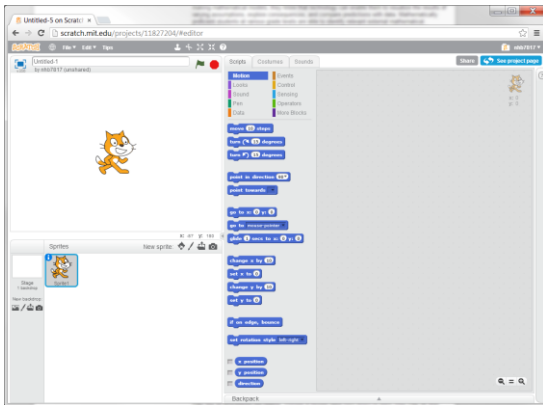


For this Scratch project, we don't need Scratch Cat at all. You can remove him from your Sprites area by right clicking him there and selecting "delete" from the menu that opens up:
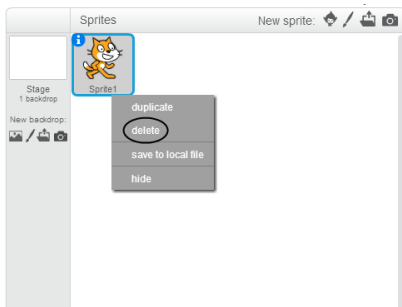
Then we need to add our new sprites to represent our characters.  We can pick a sprite from Scratch's library ![icon], draw our own ![icon], upload images from our computer ![icon], or even use a webcam ![icon].  For this project, we'll load sprites from the Sprite Library – we can do this by clicking the Gigi icon ![icon] next to the words "New Sprite:"
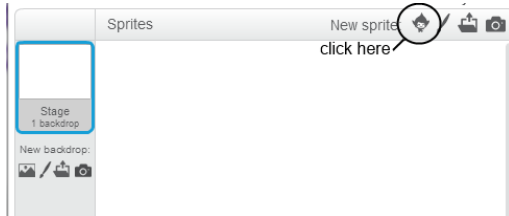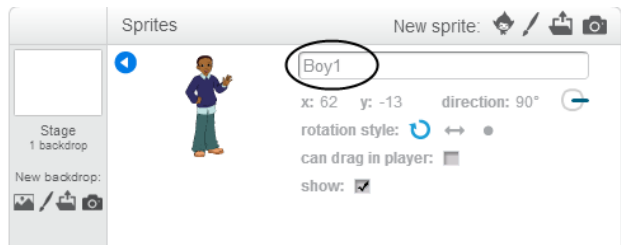


This opens up the Sprite Library:
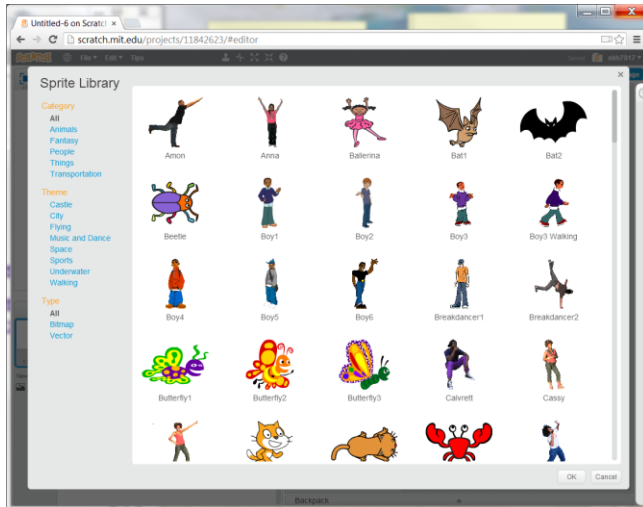


Let's use Boy 1 for Frank.  Clicking on him will add him to our Sprites area (and the Stage):
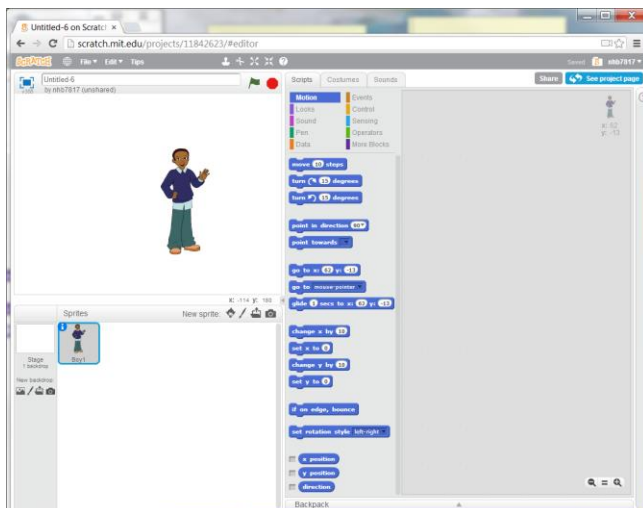
But notice he is named "Boy 1". Let's change that to Frank. Click the information icon [i] on the Boy 1 sprite to open his information:



Here we can change his name by typing "Frank" in the textarea that currently says "Boy 1". When you finish click ◀ to return to the Sprite area. Frank's name should now be displayed under his image:
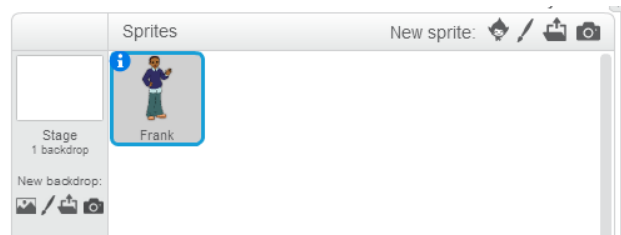


Now, repeat the steps you used to create Frank's sprite to create a sprite for Sam. We'll use Boy2 from the Sprite Library for him. In the stage, position Frank and Sam so that they are standing together on the right side of the stage:



Next, we need to add a sprite for Heather. Let's use Girl2… but wait, there are two Girl2's! Girl2 and Girl2 Walking:
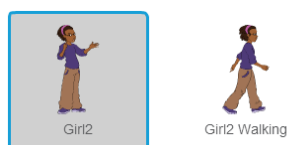
Let's go ahead and load both, and rename them as Heather and Heather Walking.

**Setting the Stage**

The next section of our script is a scene, Scene 1. Immediately under its title we see several sentences in parentheses "()". These are the stage directions, and they tell us what should be happening in the scene (Frank and Sam are standing on a sidewalk, and Heather is off to one side).

Since Frank and Sam should be standing on a sidewalk, let's add that next. We can use a backdrop to add scenery to our stage. Just like with Sprites, you can load a backdrop from the Backdrop Library 🖼, paint your own ✏, upload an image from your computer 📤, or take a picture with your webcam 📷. Let's use a backdrop from the Library. Click the library icon:
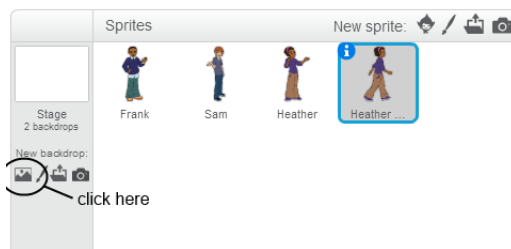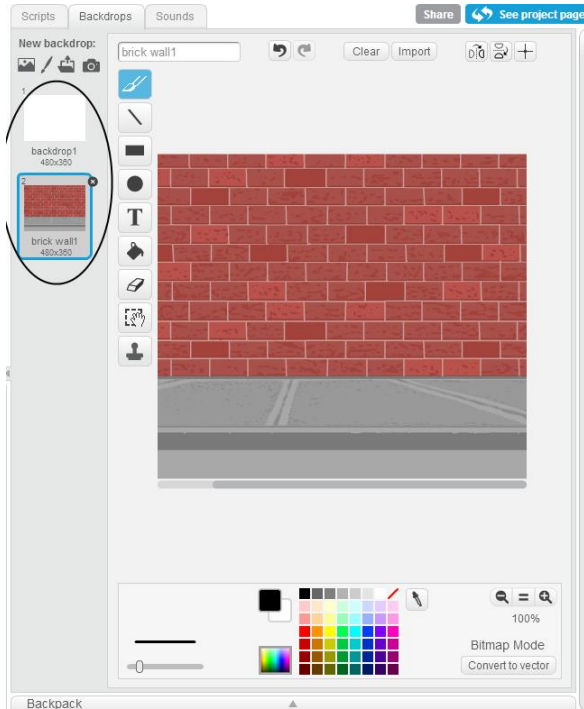


This will load the Backdrop Library. Find and double-click the brick wall 1 backdrop:
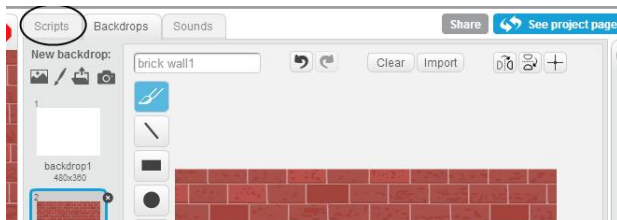


This will load it as a new backdrop in our Scratch Project:
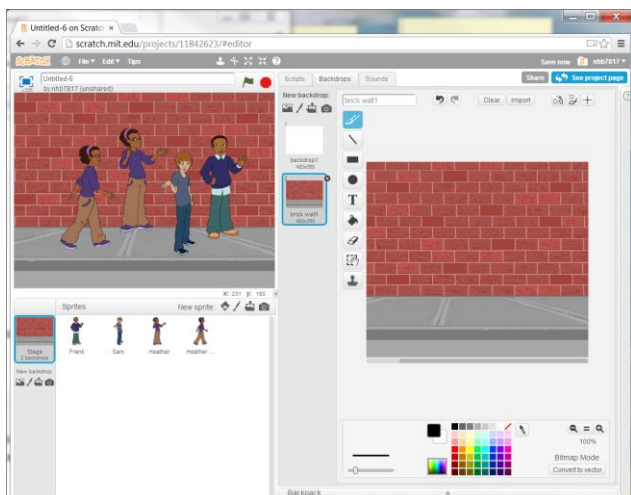
Notice our stage can have multiple backdrops – currently we have two, one is blank white, and one is our sidewalk:



We can have a different backdrop for every scene – or even multiple backdrops within a single scene! To change them, we need to write a script for our stage. Click the "Scripts" tab:



This will open the Scripts editor:
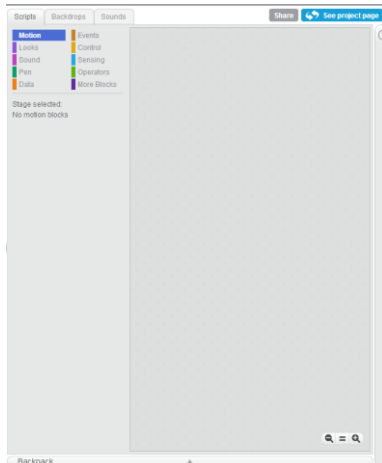


If you don't see the Scripts tab, make sure the stage is highlighted in your Sprites area:



The blue outline means that the Stage is what we currently are editing. If it isn't outlined, click it.

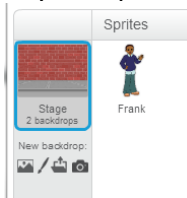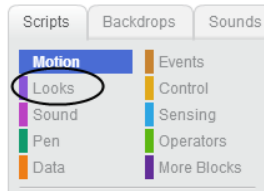Because we may switch backdrops while the Scratch application is running, we need to make sure that our backdrop is displayed when our scene begins. Select the Looks palette by clicking the word "Looks".



The palette should look like this:
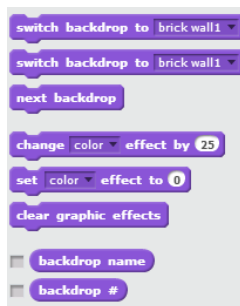


The blocks in this palette all change the way the stage looks. We can show the specific backdrop with a `switch backdrop to brick wall1` block. Drag the block to the Scripts area. Now, we need to tell Scratch when to switch the backdrop. Select the Events palette by clicking the word "Events".



The palette should look like this:
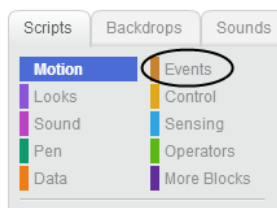
The ![when I receive message1] block allows us to tell other blocks to run when the message in the drop-down box is broadcasted. We need to have an event for the start of the scene – open the drop-down menu and click "new message…":
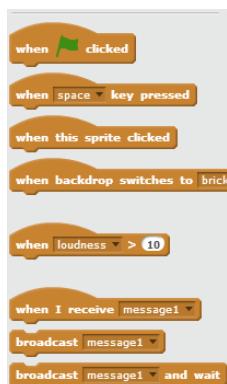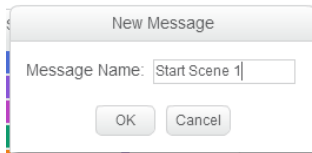


This opens a dialog where you can enter the message "Start Scene 1".



Then drag the ![when I receive message1] and click it on top of the ![switch backdrop to brick wall1] block. This is like a movie director shouting "action" this lets the sprites and stage know that the scene is beginning. Your script should look like this:



But for the scene to start, we need to broadcast the message "Start Scene 1". We'll do this in the stage as well. Drag the ![when flag clicked] block to the Scripts area, and then drag out the ![broadcast Start Scene 1] block and snap it into the ![when flag clicked] block. Now, when someone clicks the ![flag] (which is kind of like the play button on your DVD player), the stage will broadcast "Start Scene 1" to all scripts in your Scratch application, just like the director shouting "Action!" Your Scripts area should now look like this:



Now, we need to position our Sprites in the scene. Just like with the backdrop, our Sprites may move and change as our play unfolds, so we need to tell them where to begin the scene. Let's start with Frank. Select his sprite in the Sprite area:
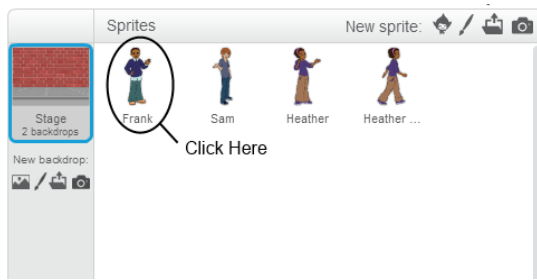
Then drag the when I receive Start Scene 1 to the Script area (remember, it is in the Events palette). Now, when we start the scene, we want Frank to be standing at the right side of the stage. We can drag him around the stage to where we want him. Once we have him there, can find out his coordinates by clicking the [i] icon on his sprite.
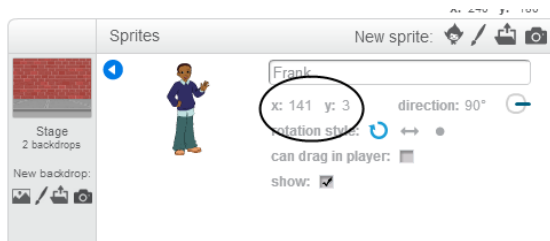


Here we see that Frank's Sprite is at (141, 3). We can tell the sprite to always start there with a go to x: 141 y: 3 block (from the Motion palette). Connect this block to when I receive Start Scene 1 in your Scripts area. If the values for x and y aren't 141 and 3, you can type those numbers in yourself. Your script should look like this:



Just like the Stage can have multiple backdrops, Sprites can have multiple Costumes. If we click the "Costume" tab while Frank's sprite is selected, we can see his costumes:
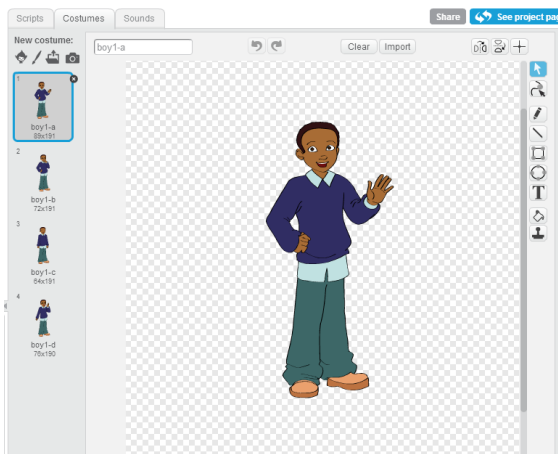
We can select which costume the sprite should use with the `switch costume to boy1-d` block (you can find it in the Looks palette). Let's use costume "boy1-d." Our final script looks like this:



So, when Scene 1 starts, Frank will move to (141, 3) and change to costume "boy1-d".

For Heather, we have two sprites. We only want one of these to be on stage at a time. We can hide the "Heather" sprite with a `hide` block (it's in the Looks palette). Connect this to a `when I receive Start Scene 1` block in Heather's Script area, and she will vanish from the stage when the scene begins. For Sam's sprite and Heather's walking sprite, go through the same steps we did with Sam's sprite. Your final stage should look like this:



**Animating the Scene**

Now we're ready to animate our scene. In the script we see that Frank asks "What do porcupines say after they kiss?" We can make Frank say this phrase with a `say Hello! for 2 secs` block. Type what we want Frank to say in the text box. This will appear in a text balloon above Frank's head for as many seconds as we specify. Since we want Frank to say this as soon as the scene starts, we can add it to his current script:



Now, when we click the 🏁 it appears over his head for two seconds:

After Frank asks his question, we need Sam to think about it. But Sam's sprite needs to know the question has been asked. To let one sprite let another sprite know something, we use `broadcast message1▼` and `when I receive message1▼` blocks, with custom messages. Let's add a message "Frank tells a joke" and have Frank's sprite broadcast it. Now Frank's script looks like:
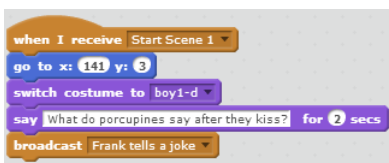


Next, we need to tell Sam what to do when he receives the "Frank tells a joke." We want to trigger it with a `when I receive Frank tells a joke▼` block. Then we want him to think hard. We can do this by switching to a thoughtful costume with `switch costume to boy2-e▼` and we can make a thought bubble appear above his head with a `think Hmm... for 2 secs` block. The final script should look like:



Now if we click the 🏳, Frank tells his joke, and then Sam thinks about the joke.

Our script tells us that Heather should walk up and tell the punchline next. How can we make Heather walk? In the Motion palette we have the `glide 1 secs to x: -269 y: -16`, which causes a sprite to move across the screen. Unlike the `go to x: 141 y: 3` block, this movement takes several seconds (however many we tell it to last). How long should we take? Remember, Frank tells the joke for 2 seconds, and Sam thinks about the answer for 2 seconds… so we might take 4 seconds (2+2=4). So let's say 4 seconds, and let's move Heather to somewhere just behind Frank. Our final script will look something like:

Now when we click the 🏳, Heather drifts across the screen.  But her feet don't move.  How can we fix this?  Look at her costumes:
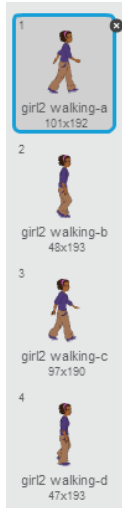


If we were to switch her costume over and over again, it would look like she was taking steps. We can switch her costume with a `next costume` block (in the Looks palette).  We need to do this over and over again – which is exactly what happens if we place it inside of a `forever` block, which repeats any blocks inside of itself forever (it can be found in the Control palette).

Now, we want Heather's legs to move as she is gliding across the screen.  This means that the two blocks need to run in *parallel* (at the same time).  If we snap the `forever` block to Heather's `glide 1 secs to x: -269 y: -16` block, then the glide will happen *before* Heather's legs begin to move.

Instead, we need to start a second script with a second `when I receive Start Scene 1` block.  Our script then looks like:
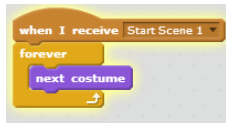


If you try clicking 🏳, you'll see Heather's legs moving very, very fast as she drifts across the stage.  It's too fast to look like a walk – we need to slow her down.  We can use a `wait 1 secs` block

to do this – snap it in right after the ![next costume] block inside the ![forever] loop.  Adjust how long the

![wait 1 secs] block waits until it looks right when you click ![flag].

Once Heather reaches her friends Frank and Sam, we want her to stop walking and give the

punchline.  But her walking sprite doesn't have a good speaking pose.  We can swap the

Heather Walking sprite with the Heather sprite once she reaches the group, by using a ![hide]

block on her walking sprite, and a ![show] block on her other sprite.  We'll also need to use

![broadcast message1] and ![when I receive message1] blocks to let the hidden sprite know it's time to swap places,

with a "Heather reached the group" message.  Snap the ![show] block under Heather Walking's

![glide 1 secs to x: -269 y: -16] block, and then a ![broadcast Reaches the group] block.  You'll also need to snap a ![show]

block into the top of the script, or after the first time you click ![flag], the walking Heather won't

appear.  The final scripts should look like this:
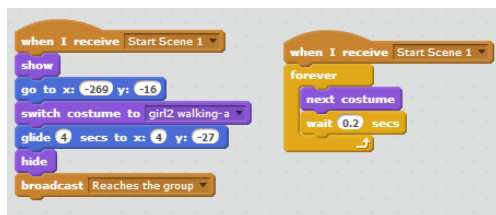


Then, in the Heather sprite, use a ![go to x: 141 y: 3] block to move to the same location as the

Heather Walking sprite and a ![show] block to make her appear.  Attach these to a

![when I receive Reaches the group] block.  Now, when you click the ![flag], Heather will walk towards Sam and

Frank, and then stop and stand next to them.  At this point, we want her to deliver the

punchline, "Ouch!"  We can add a ![say Hello! for 2 secs] block to make this happen.  Once Heather says

her line, Sam should be startled, and Frank agrees her answer is right.  So we need to have

Heather's sprite let Sam and Frank's sprites know it spoke the punchline with another

![broadcast message1] block.

Then, in Sam and Frank's scripts, use a ![when I receive Heather tells the punchline] to change Sam's costume to a

startled one, and to make Frank say "That's it!"  Then you can use ![say Hello!] blocks to make

everyone laugh.

## Adding a Title Sequence

Before we finish up, let's add a title to our Scratch play. We want this to show on-screen briefly when the user clicks the 🚩. We can use Scratch's built-in painting ability to draw a simple title on our first backdrop:



Then we want to change the Stage's script to display this backdrop for a few seconds, before broadcasting our "Start Scene 1" message. The script to do so looks like this:



If you click the 🚩, you'll see the play starts with the title. But our actors are over the top of it:
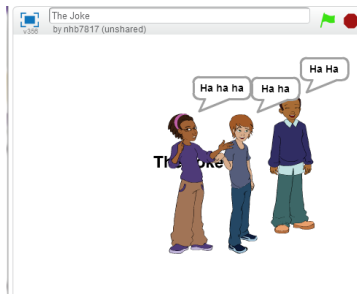


We can fix that by adding a startup script to each of our sprites, hiding them:



Be sure to add a show block after each sprite's when I receive Start Scene 1 as well, or they'll stay hidden the whole play!