# Animating Sprites Lesson:

This is an example of a sprite.

A sprite can be any thing, person, or place you want it to be. You control what a sprite does. Sprites start out knowing how to do some things, like move, turn, and talk, but it is your job to make sprites do more complicated actions by combining the things it already knows. So in a way, you are teaching the sprite what to do. You can teach it to walk, jump, pick up objects, go through mazes, and many other things.

Let us see what Scratch looks like when you start it up. You tell a sprite to do something by putting a Script Block into the Main Script Window. The Script Blocks you can choose from are organized into categories for Motion, Looks, Sound, Pen, Control, Sensing, Numbers, and Variables. We’ll be learning all about those different commands. To pick which Sprite you are controlling, you select it from the window on the bottom right. You can see your sprites acting out their commands in your World Preview Window.

In this lesson you will teach a cat to walk when the arrow keys are pressed on the keyboard. To make the cat walk, you have to tell it, step by step, everything it must do. For walking, there are four steps:

1. Move the cat
2. Change the cat’s legs so they go back and forth
3. Move when someone types on the keyboard
4. Turn around and face either right or left

We’ll implement each of those steps.

## Move the cat

Tell the cat to move by dragging  to the script window. You can activate script blocks by double clicking them. You’ll see that when a script is activated, it is outlined with a heavy white line along the edges. Try it out.

Why does the block say 10 steps? A larger number will move the cat further at one time. A positive (+) number moves the cat to the right while a negative (-) number moves the cat to the left. You can play around with different numbers of steps, both positive and negative. Note that the Sprite won’t move completely off the stage, even if you give it a large number of steps. When you’re done, put the steps back to 10.

## Change the cat’s legs

To make it look like the cat is moving its legs, you need to tell the sprite to switch between different **costumes.** This sprite has two costumes already where the cat’s legs are in different positions. You can look at these costumes by clicking on the Costumes tab.

If we switch back and forth between these two costumes, the cat will look like it is taking steps.

Tell the cat to switch costumes by going back to the **Code** tab, click **Looks** in the Top Left Menu, and then find and drag it into the script window. If you double click on  the cat will look like it is moving its legs. Try it out. We’ve now switched between costumes to **animate** the cat!

Of course, to look like the cat is walking, we want the cat to move while it is moving its legs. You can make the cat do both steps one after another by connecting the two blocks together. When Script Blocks are connected, they activate one after the other, starting from the top.

Activate both blocks by double clicking on them. How does this look?


## Move in response to keyboard input

We don’t want to have to double-click on the commands every time we want the cat to move; instead, you want the cat to move to the right when someone presses the right arrow key.

To make the cat respond to the keyboard, add to the top of the list of commands. The commands will then start when the key is pressed.

You can find this command by clicking **Events** in the Top Left Menu.

Drag to the script window and snap it to the top of your list. Change the keystroke to **right arrow** instead of **space**. Test out your scripts now.

## Turn around

Right now, your cat only moves to the right. Let us try to make the cat move to the left when the left arrow key is pressed. You can duplicate (or copy) the existing script by right clicking on the script and choosing duplicate on the pop-up menu.

The first thing to change will be to respond to the “left arrow” key instead of the “right arrow” key. Does this script “know” that you want the cat to move to the left now? Of course not; we need to tell the cat how to move to the left.

You can start by having the cat move -10 steps, which does move him to the left, but the cat is walking backwards!

We want the cat to face left when he is walking left. The easiest way to do that is to tell the cat to face left when the users presses the left arrow key. You can find the block **point in direction** under the Motion blocks; make this the first block that is executed after the user presses the left arrow key. Change the argument to it so it says **-90 (left).** Test it. What is wrong?

You’ll see that your cat turns to the left, but he is upside down! The problem is, the default way for Scratch objects to change directions is to turn, either clockwise or counter-clockwise.

Look at the information pane above the Cat Sprite. One of the fields is **Direction.** When you click on this info, a pop-up will show a large circle that illustrates the current direction, with 3 small icons beneath it. The first icon (selected now), shows that this Sprite can rotate freely. The second icon (two arrows) means the Sprite can only turn left or right. Try it! The last icon means the image of the Sprite never rotates. (Expert tip: Even though the Sprite might not look like it is pointing in a certain direction, it still is and it will move in that specified direction.)

To fix this, we need to change how the cat points in different directions; we can do this by selecting the box with the double-arrowed line. Now, the cat points in directions by flipping itself. Now, you should get the result you want. Make sure you are moving +10 steps (and not -10 steps); your sprite will move according to the direction it is facing.

When you test your program, you should now see that moving left works great, but now moving right does not! How can we fix this?

We need to fix the right moving scripts so that it begins with the block **point in direction 90 (right)**.

## Saving your work

You are now done with your first Scratch lesson. You’ve created a cat sprite that looks like it walks when the left and right arrow keys are pressed. You will add on to this cat sprite in future lessons, so you need to save your work.

**Save** your project so you can use it later. Save it as **“Lesson 1”.** Make sure you can find it in your projects. Go back to your project and “Share” it so others can see it!

# Things to Remember

You control what a Sprite does. Each sprite has its own Scripts, Costumes, and Sounds.

To make a sprite do something, you put commands in the **Script** box. When Script Blocks are connected, they activate one at a time, starting from the top. You can double-click on commands to make them execute. You can copy a group of commands by right clicking a selecting “duplicate”. You can disconnect a list of commands by grabbing the commands that should be removed.

You can make a sprite respond to the keyboard by adding **When key Pressed** to the top of a list of commands. The commands underneath it will start when that key is pressed.

Sprites can have different costumes. A sprite can switch between costumes to change the way it looks. You can edit and make new costumes for a sprite. You can face a sprite the opposite way by editing the costume and flipping it horizontally