Grow with Code Variation for Scratch Jr.	Grades 3 & 4

Coding Guide

This is a simplified coding lesson that uses Scratch Jr. instead of Scratch. Scratch Jr. uses pictograms on their coding blocks instead of text to illustrate that block's functions. This program will be useful for students whose literacy skills are not yet at a level where they can easily understand the language written on Scratch blocks, or as practice to familiarize students with the logic of block coding and building basic algorithms.

For a coding lesson that includes loops to repeat events (and to more closely meet Algebra – Coding curriculum expectations for grades 3 & 4, which include "sequential, concurrent, and repeating events"), please refer to the **Grow with Code Coding Guide.**

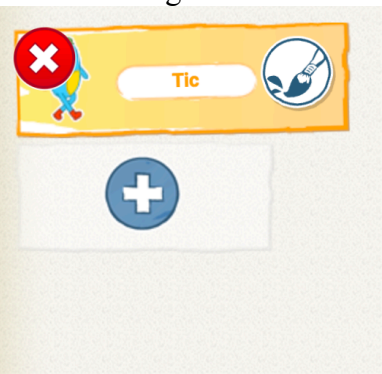
In this simplified coding guide, we will use Scratch Jr. to create a scene with a background, a sun that moves when you click it, a raincloud that moves when you click it, a plant that grows larger when you click it, and flowers that appear.

Choose Background

We want to choose a suitable habitat background for our growing plant. Click the **background button** in the top centre of the screen to open a background library. In this example, we've selected the river background (students may select another background that they feel is appropriate for a plant, such as a forest background depicting springtime or summer).

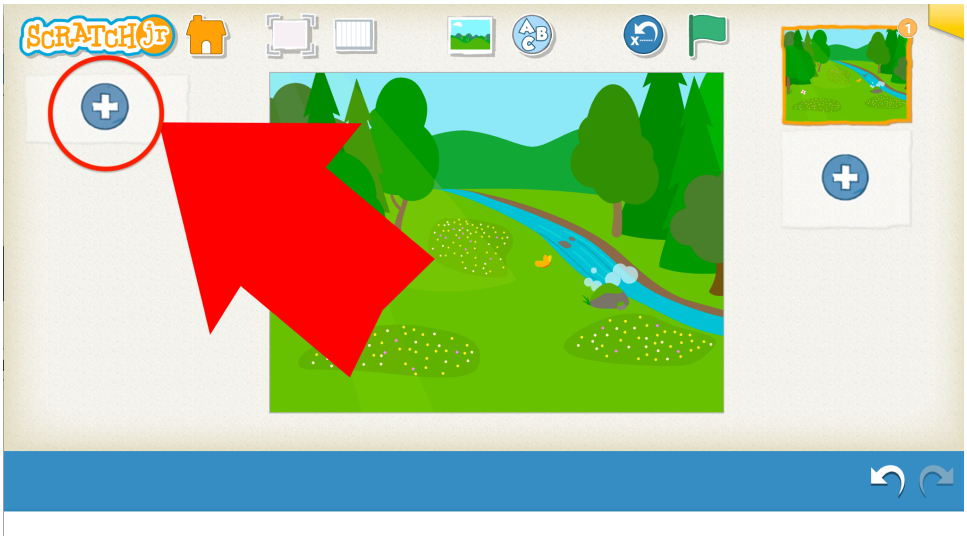
Create Sprites

For this lesson, we won't need the Tic sprite. We can remove it by clicking and holding the Tic sprite button until it shakes and a red X appears. Clicking the red X will delete the Tic sprite.



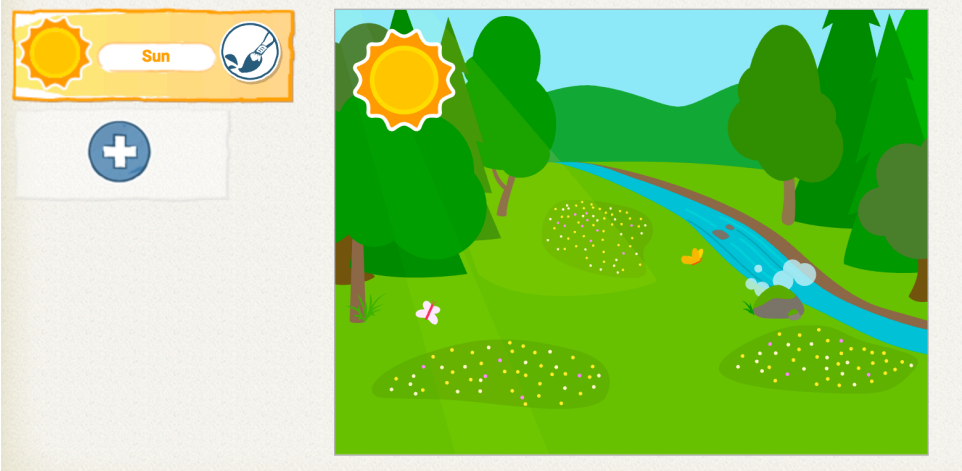
Sun Sprite

To add a new sprite, click the plus sign (+) in the sprite panel on the left side of the screen. This will open a library of sprites.



Choose the Sun sprite.

Use the mouse to drag the Sun sprite into position in your scene.

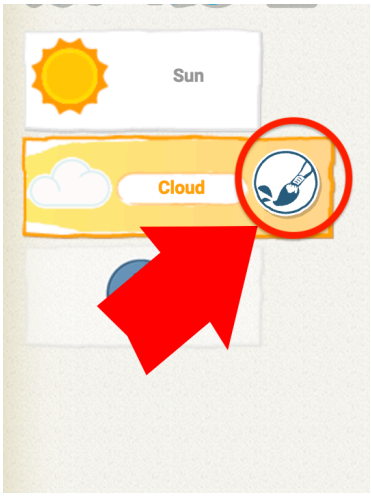


Cloud Sprite

Click the plus sign (+) in the sprite panel to open the sprite library again.

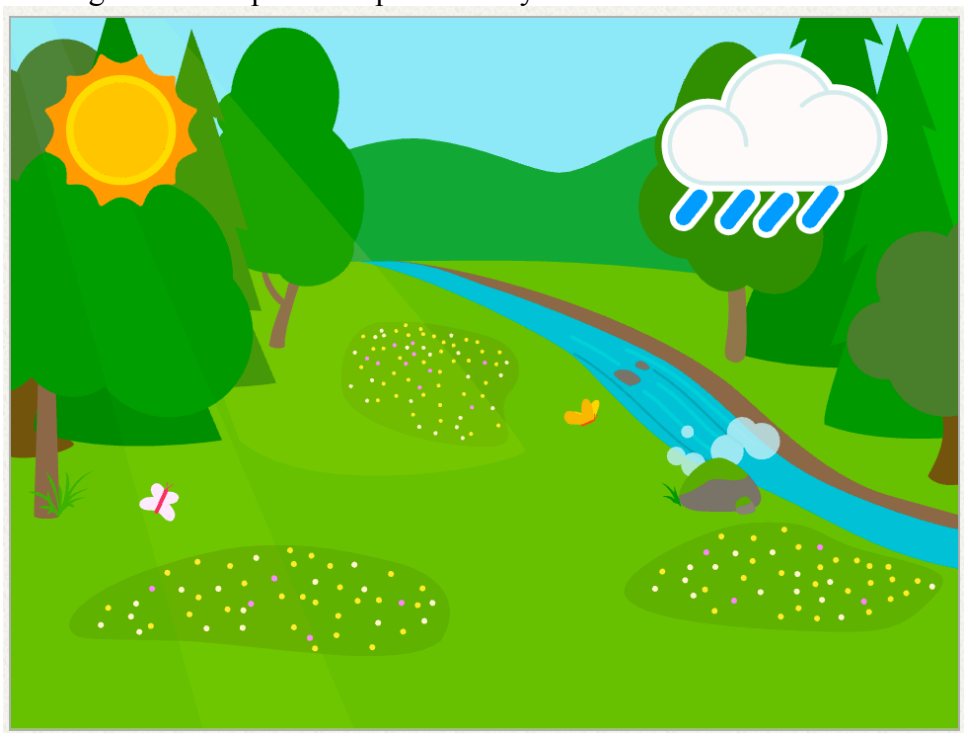
Select the Cloud Sprite.

We want to add rain to our cloud sprite. To do this, click the paintbrush icon on the cloud sprite button.



Use the line drawing tool and blue paint to draw rain falling from the cloud. If you make a mistake, you can use the scissors icon to remove parts of your drawing (by clicking directly on the parts that you want to remove).

Use the mouse to drag the cloud sprite into position in your scene.

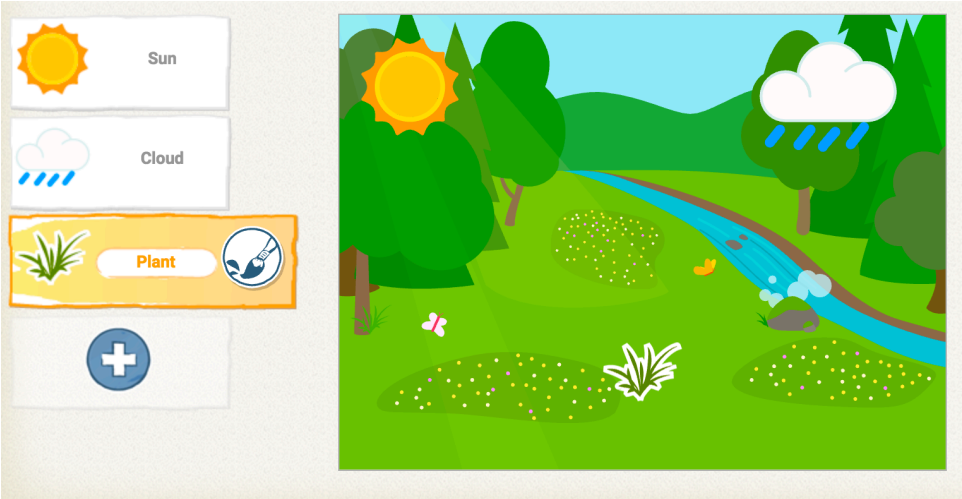


Plant Sprite

Click the plus sign (+) in the sprite panel to open the sprite library again.

Select the plant sprite.

Use the mouse to drag the plant sprite into position in your scene.



Flower Sprite

Click the plus sign (+) in the sprite panel to open the sprite library again.

Select the daffodil sprite.

Use the mouse to drag the daffodil sprite into position in your scene, on top of the plant sprite.

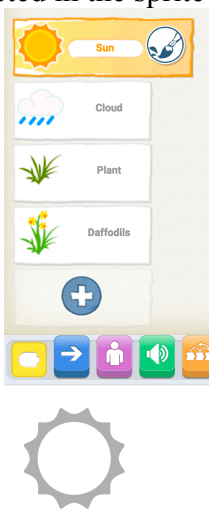
Animate Sprites

At the bottom of the screen is a blank area (called a canvas) where we can build our code. In Scratch Jr. programs are coded by linking blocks together. The code is read from left to right; the first block on the left will be the first step of the program, and then the code will be read in order from one block to the next.

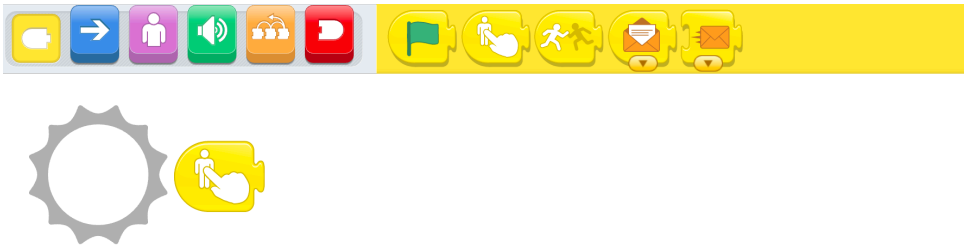
We will create programs for each sprite so that it moves or changes when we click upon that sprite in the scene.

Sun Sprite

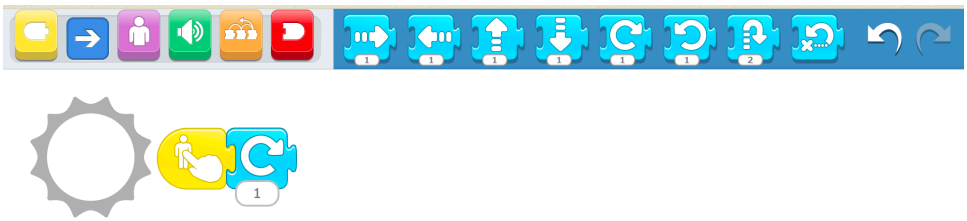
Make sure that the Sun sprite button is selected in the sprite list.



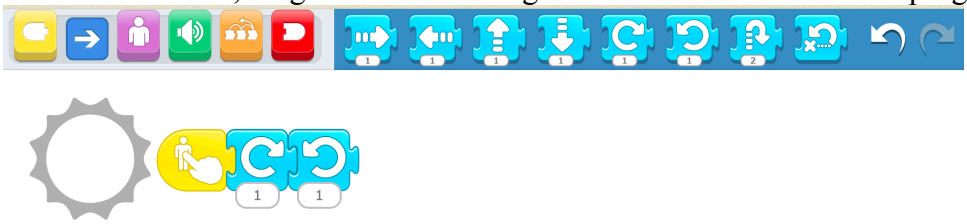
Click the yellow code button. These are event blocks that start a program. Choose the **When This Sprite is Clicked** block and drag it onto the coding canvas:



Click the blue code button (with an arrow). These are motion blocks that code movement for the sprite. Choose the **turn right** block, drag it onto the coding canvas and connect it directly to the first yellow block.



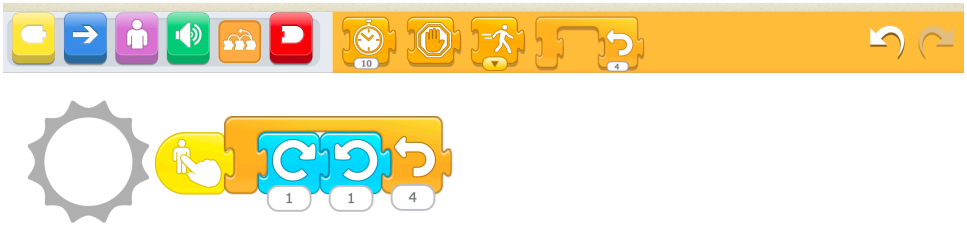
Next, choose the **turn left** block, drag it onto the coding canvas and connect it to the program.



Test the program by clicking on the sun sprite in the scene. The sun should move back and forth once every time you click on the sun.

We can make the sun sprite wiggle more by repeating movements, either by extending our pattern of turn blocks (e.g., adding another turn right block, then another turn left block to our program), or by placing our two turn blocks inside a **loop**.

The loop block can be found by clicking the orange coding button. Any blocks placed inside the loop block are repeated for the number of times indicated on the loop. In the image below, the sun sprite will more turn right and then turn left 4 times:



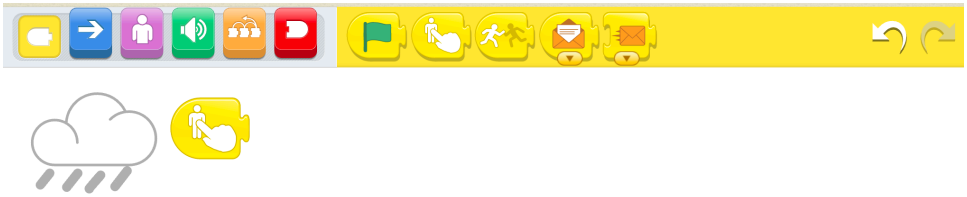
Click on the sun to see how the animation has changed.

Encourage students to change the number values on the blocks in this code to see how they affect the sun's movement.

Cloud Sprite

Make sure that the cloud sprite button is selected in the sprite list.

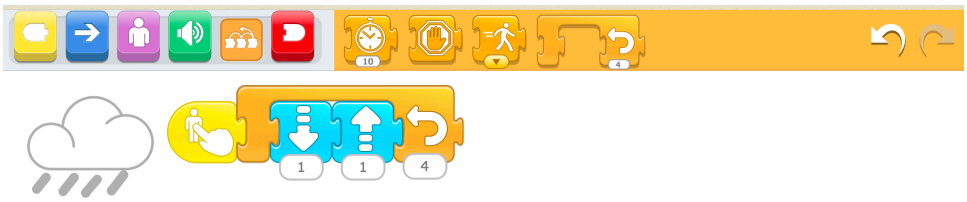
Click the yellow code button. These are event blocks that start a program. Choose the **When This Sprite is Clicked** block and drag it onto the coding canvas:



Click the blue code button (with an arrow). These are motion blocks that code movement for the sprite. Choose the **move down** block, drag it onto the coding canvas and connect it directly to the first yellow block. Then chose the **move up** block and add it to the program.

Test the program by clicking on the cloud sprite in the scene. The cloud should move up and down once every time you click on the cloud.

We can also add a loop to this program to repeat the up and down movements:



Click on the cloud in the scene to see how the animation has changed.

Encourage students to change the number values on the blocks in this code to see how they affect the cloud's movement.

Plant Sprite

Make sure that the Sun sprite button is selected in the sprite list.

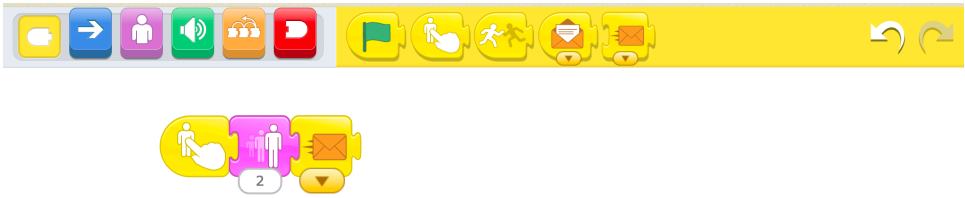
Click the yellow code button. These are event blocks that start a program. Choose the **When This Sprite is Clicked** block and drag it onto the coding canvas.

Click the purple **Looks** button. These are blocks that change a sprite's appearance. Choose the **Make This Sprite Bigger** block, drag it onto the coding canvas, and connect it to the yellow block:

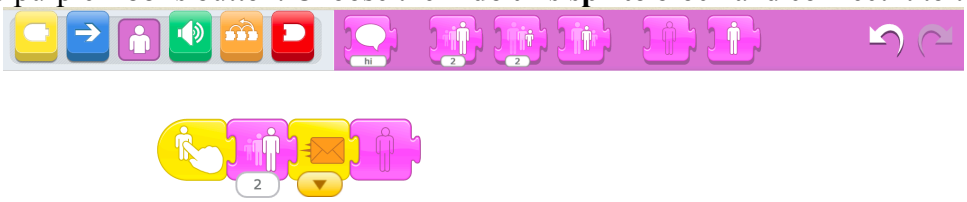
Test the program by clicking on the plant sprite in the scene. The plant sprite should grow larger every time it is clicked.

To represent that the plant is growing flowers, we want to make the daffodil sprite appear, and then make the plant sprite disappear. We can make this happen by having the plant program send a message to the flower program.

Click the yellow **Events** button. Select the **send message** block and add it to the program:



Next, click the purple **Looks** button. Choose the **hide this sprite** block and connect it to the program.



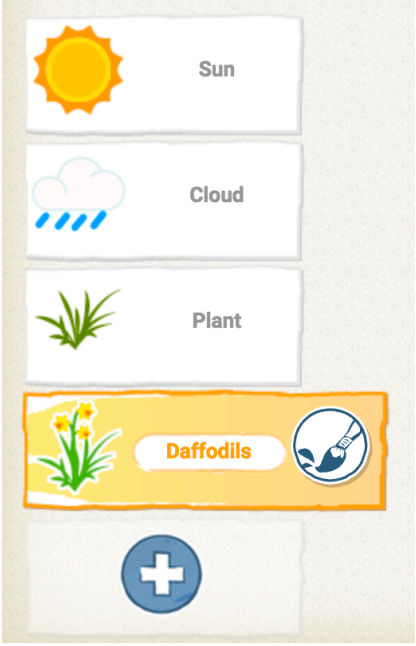
Test the program by clicking on the plant sprite in the scene. The plant sprite should grow larger and then disappear.

You'll notice that the daffodils sprite is not affected by this code. This is because we haven't built the program for the daffodils sprite yet.

Daffodils Sprite

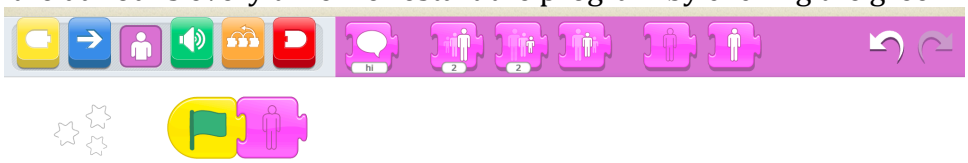
We are going to build three separate programs for the daffodils sprite. Each program starts with a yellow Event block.

Make sure that the daffodils sprite button is selected in the sprite list.



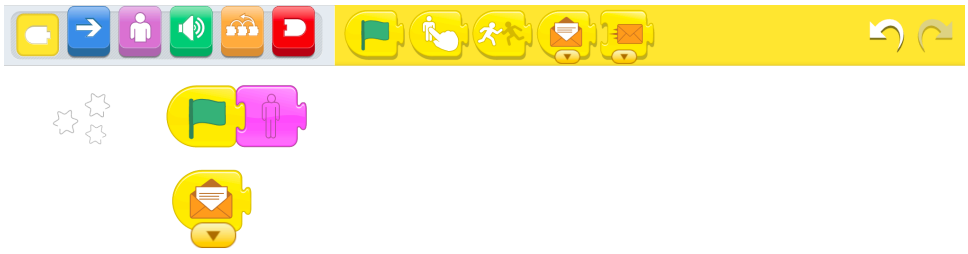
Click the yellow **Events** button. Select the **When Green Flag Clicked** block and drag it onto the canvas. Click the purple **Looks** button. Select the **Hide this Sprite** block and connect it to the **When Green Flag Clicked** block.

This will hide the daffodils every time we restart the program by clicking the green flag.



Start the next program by clicking the yellow **Events** button. Choose the **Receive Message** block and drag it onto the canvas.

This block will not connect to our first program:



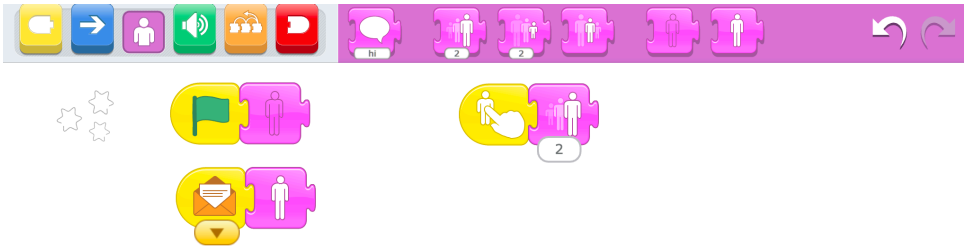
Click the purple **Looks** button. Select the **Show this Sprite** block and connect it to the **Receive Message** block.

This will make the daffodils appear in the scene when it receives the message sent by the plant sprite:

Note: the colour of the envelope on the **Send Message** and **Receive Message** blocks matter. If the envelopes are different colours, the blocks will not communicate. In our example, both the **Send Message** and **Receive Message** blocks show orange envelopes.

Click the yellow code button. Choose the **When This Sprite is Clicked** block and drag it onto the coding canvas. This is a new program and will not connect to either of the two existing programs.

Click the purple **Looks** button. These are blocks that change a sprite's appearance. Choose the **Make This Sprite Bigger** block, drag it onto the coding canvas, and connect it to the **When This Sprite Is Clicked** block:



Test the program by clicking on the daffodils sprite in the scene. The daffodils sprite should grow larger with every click.

Reset the program by clicking the green flag. Test every element of the code by clicking on different sprites.

Encourage students to iterate by adding and modifying existing code and testing it to see how their changes affect the outputs of their proram.