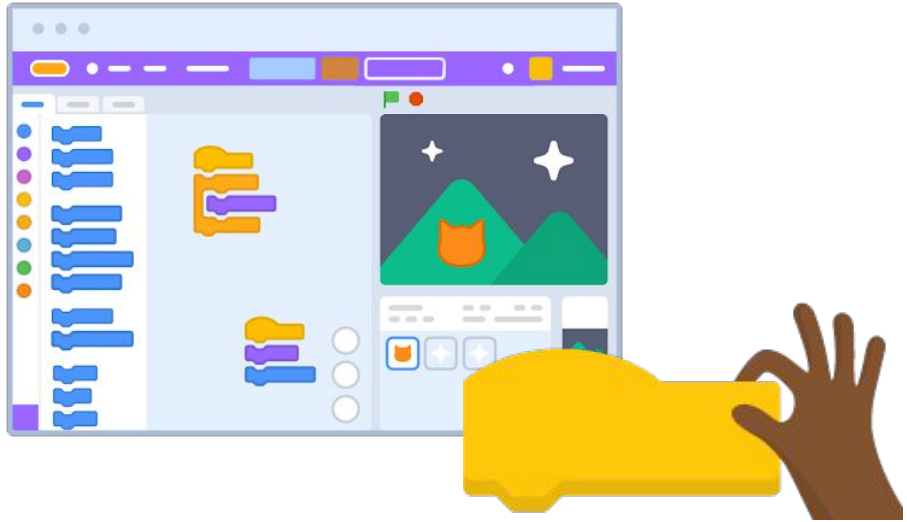
LEVEL UP WITH SCRATCH WORKSHOP SERIES

Boring Backdrops Begone: Animating Backdrops with Code

SCRATCH™

Session Overview

- Brief Introduction to Creative Learning with Scratch
- How to Design and Draw Backdrops
- Let's Try the Tools! Did You Know...
- Intimidated by Drawing? Remix!
- Import SVGs
- Backdrop Powers
- Animate with Code!
- Parallax
- Simple Scrolling Background
- Level Up Your Infinite Scroll
- Advanced Scrolling Background: User-Controlled
- Use Stamps or Clones
- Wrap Up - Debugging and Reflection



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Scratch Learning Resource Designer
@algorithmar and @scratchlycaterton

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Learning Goals

- Experiment with different ways of creating backdrops and understand the limitations and benefits of vector vs bitmap graphics
- Iterate on different solutions to code effects and scene changes to bring static backdrops to life
- Explore interactive backgrounds that engage the user
- Remix our starter projects to add personalized touches and additional elements
- Reflect on finalized projects and the creative process with peers
- Communicate and share projects with your learning community and the greater Scratch online community

Getting Started

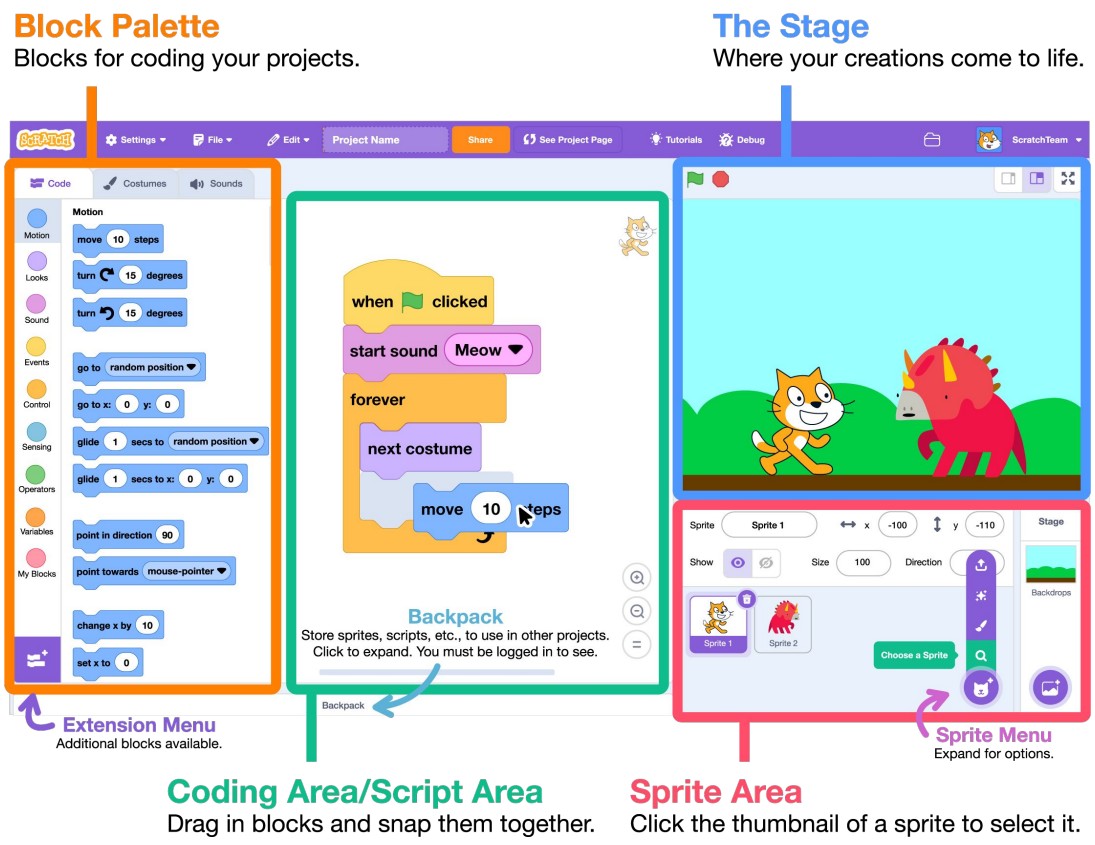
Click “Create” or log in to your free account to save projects.

go to: scratch.mit.edu

Set your language and block color mode.

Choose a sprite. Drag and drop code blocks to create a script.

scratchfoundation.org/learn/learning-library/getting-started



Creative Learning

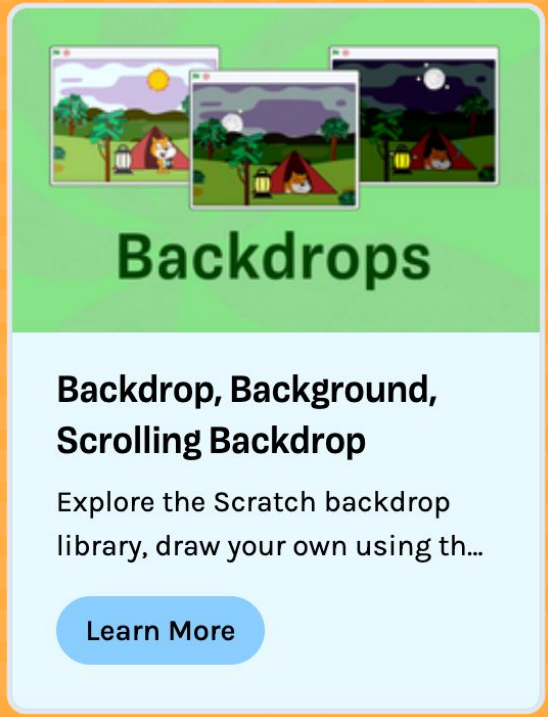
As facilitators, we want to support **playful learning and tinkering mindset values** so that participants can:

- Engage playfully in **projects** that are meaningful to them and elicit joy
- Collaborate with **peers** to experiment, share, and celebrate ideas
- Develop a mindset that is **comfortable with the discomfort** of getting stuck
- Develop a mindset that thinks critically about **strategies for getting unstuck**

scratchfoundation.org/learn/learning-library/scratch-creative-learning-philosophy

Let's Imagine...

What will you create?



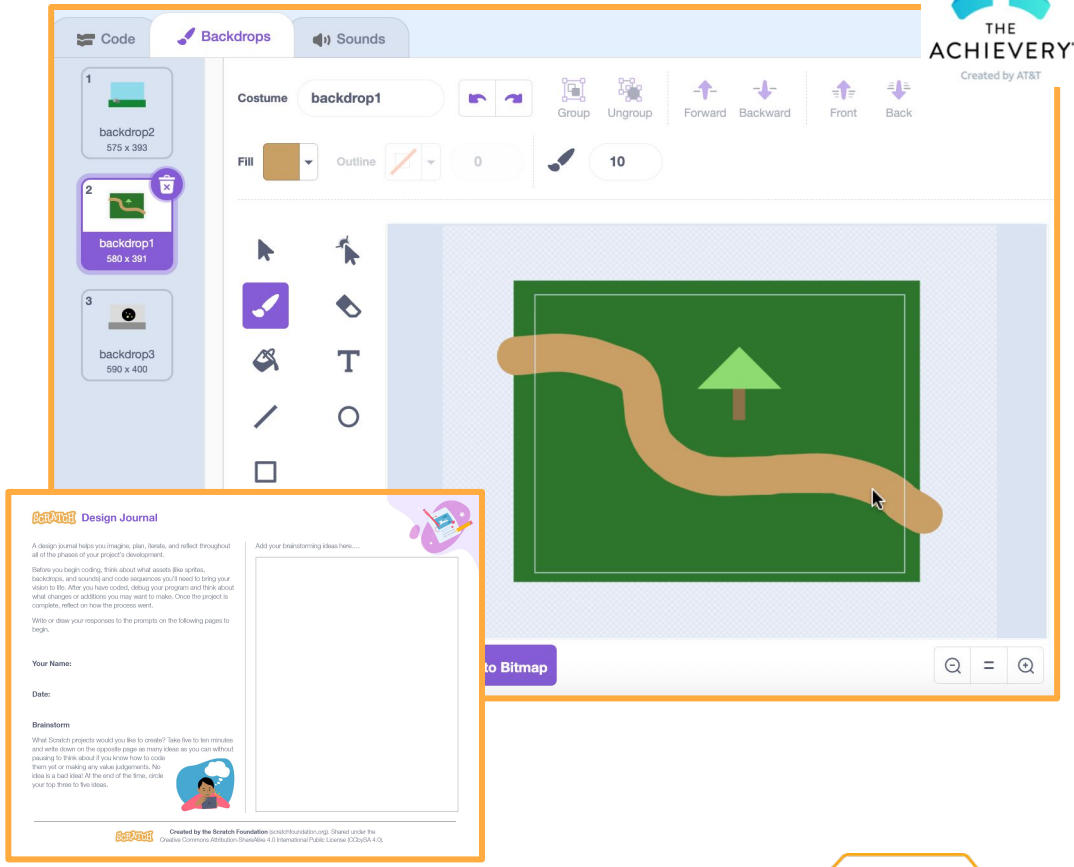
Achievery Unit

How to Design and Draw Backdrops

Take a minute and imagine a new world. What would exist there? Use the Scratch Design Journal to record brainstorming and sketches.

Create your own backdrop of this world with the Scratch Paint Editor!

Check out our Achievery Units “How to Draw Backdrops in Scratch” and “Backdrop Design” with videos full of tips and tricks.



THE ACHIEVERY™
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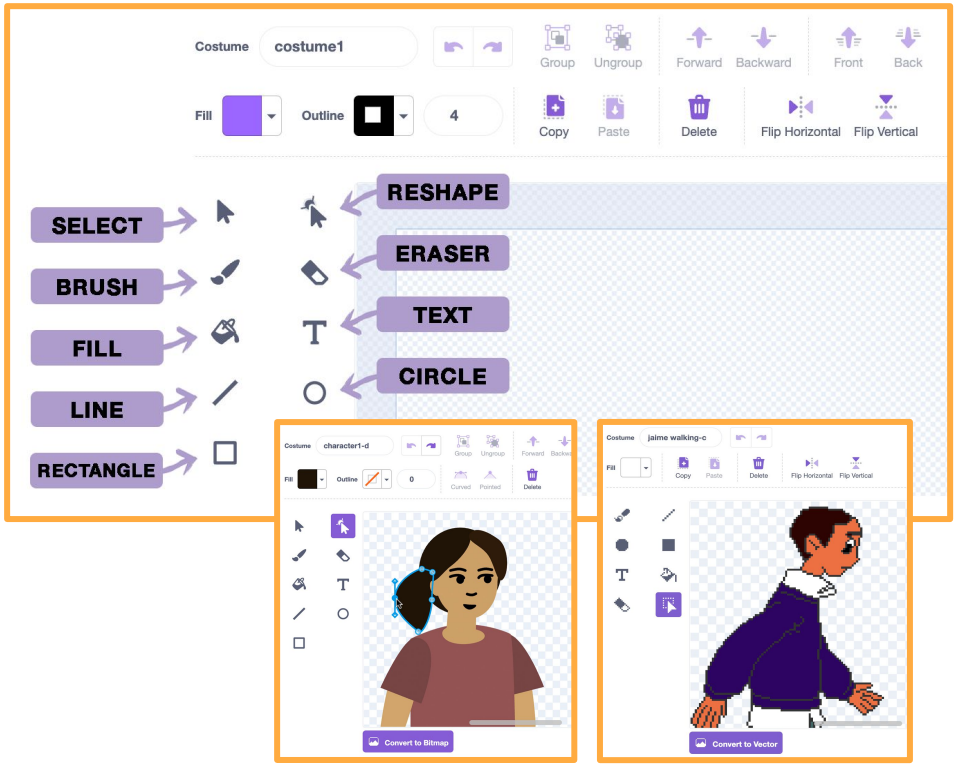
Let's Try the Tools!

Our resources on Sprite Creation (like coding cards and videos) contain helpful details on using the Paint Editor tools.

There are two modes for using the Paint Editor in Scratch:

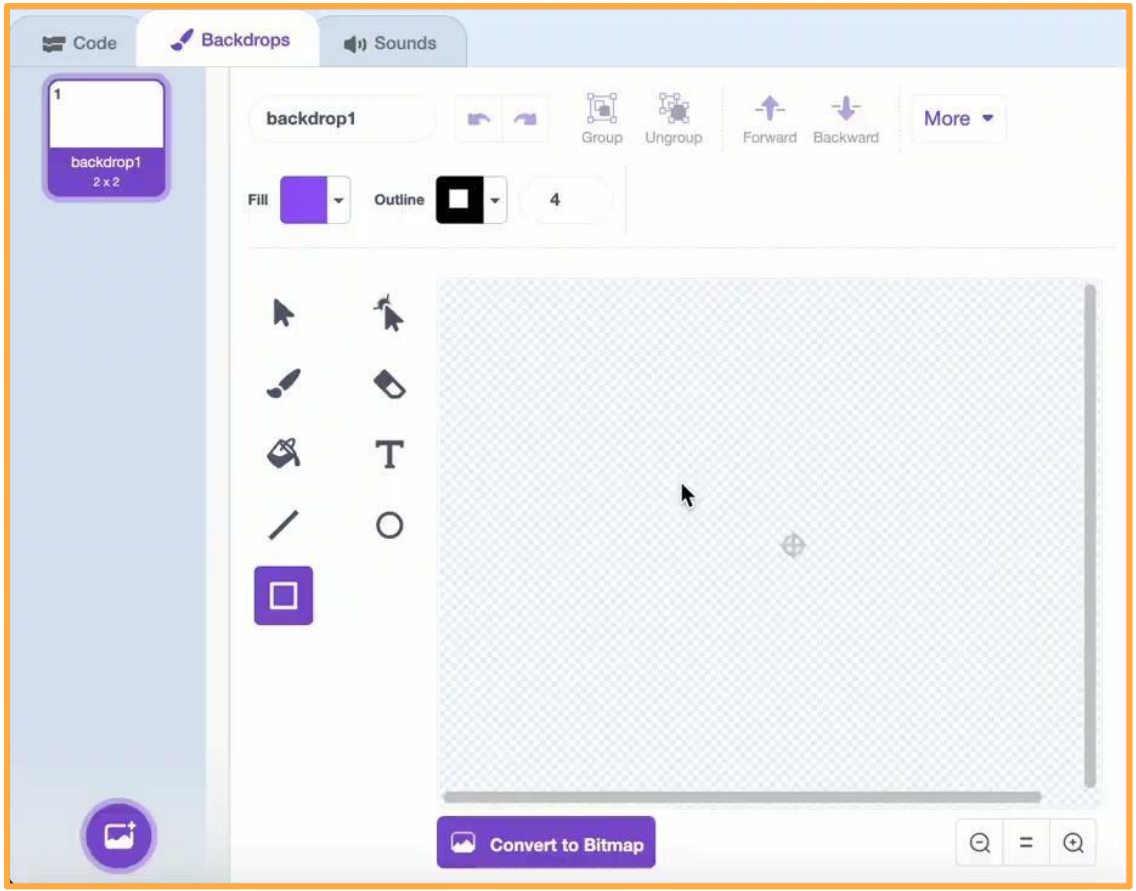
- **Vector-mode** allows you to create and edit shapes (Scratch default)
- **Bitmap-mode** allows you to edit photos and paint with pixels

Vector-mode allows users to adjust colors, change the shape of an object in the costume, and add and remove elements. This flexibility is important if you or another Scratcher wants to remix.



Did You Know...

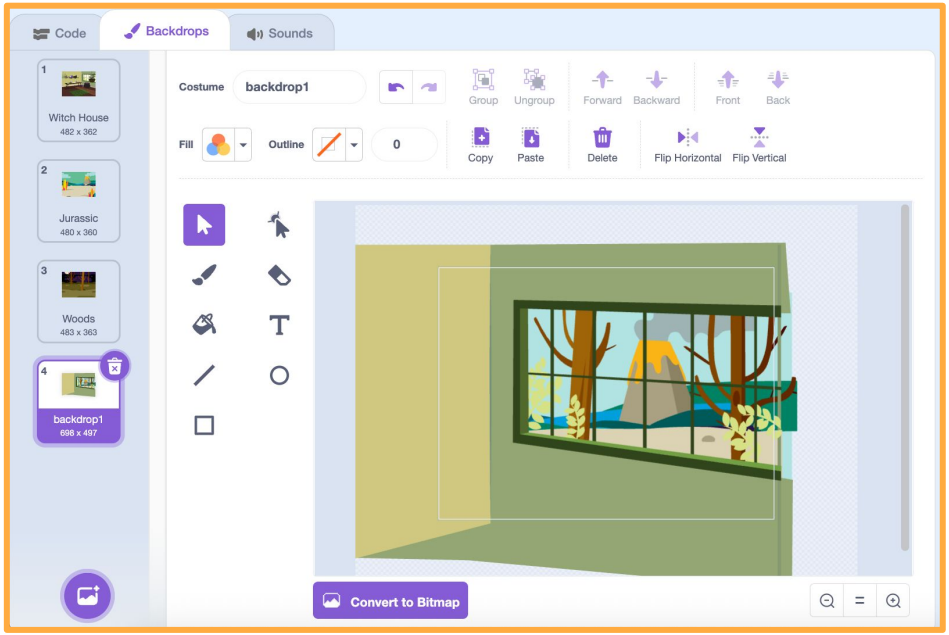
- Remove the interior of shapes/create another path with the eraser
- Fill a custom path with color and gradients
- Remove points to break a path with the eraser on an unfilled shape
- Create a gradient, then rotate to change its angle

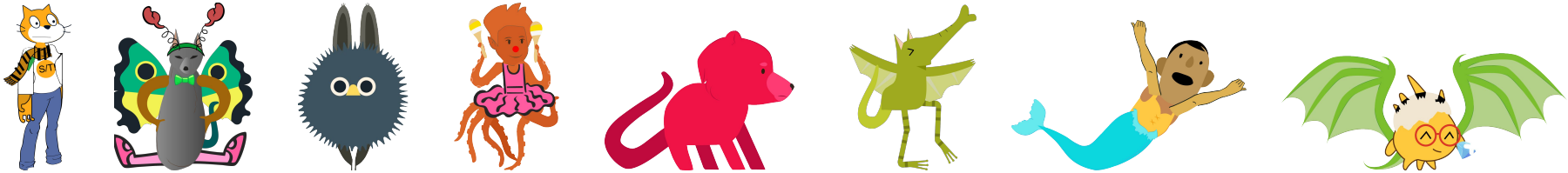


Intimidated by Drawing? Remix!

Mix, match, and edit desired pieces of vector sprites already in the Sprite and Backdrop libraries, as well as add missing elements with shape and line tools.

Recolor, resize, reshape, remix!





Thank you to Scratch users 311ra, Chumie, RealAimkidBunni, SaffronChai, Tutorial-Doggy, TinkaTonka510, bgordi0077, girlugotthis, and Heartofthehawk for remixed sprite examples. Can you tell which sprite pieces were used?

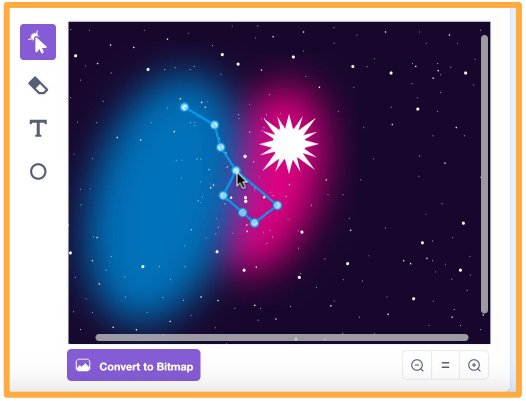
Import Images

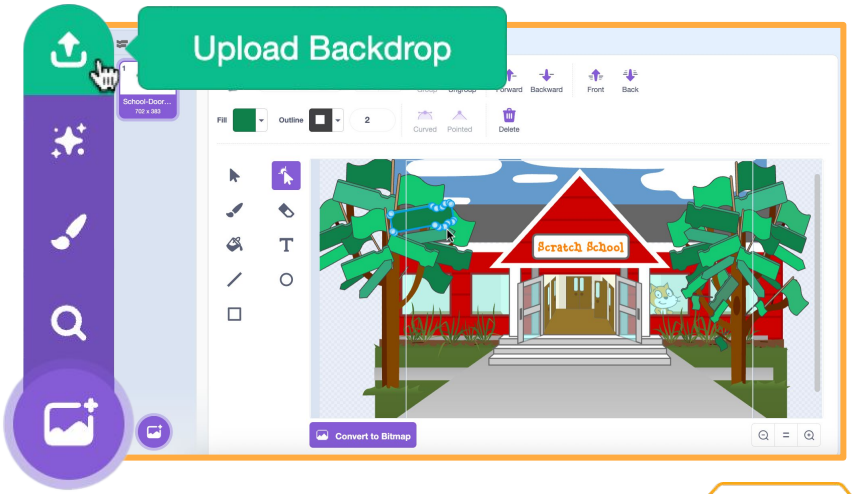
You could also use other drawing programs at your disposal and import SVGs (ideally) or PNGs into sprite or backdrop costumes.

SVGs will come in as vector sprites and allow you or others to continue to edit. They will also retain their sharpness.

Or create a hand-drawn image to scan/photograph and upload. PNG and JPG will upload as Bitmap.

See an SVG backdrop here: 1035152010
See uploaded art here 1221466959



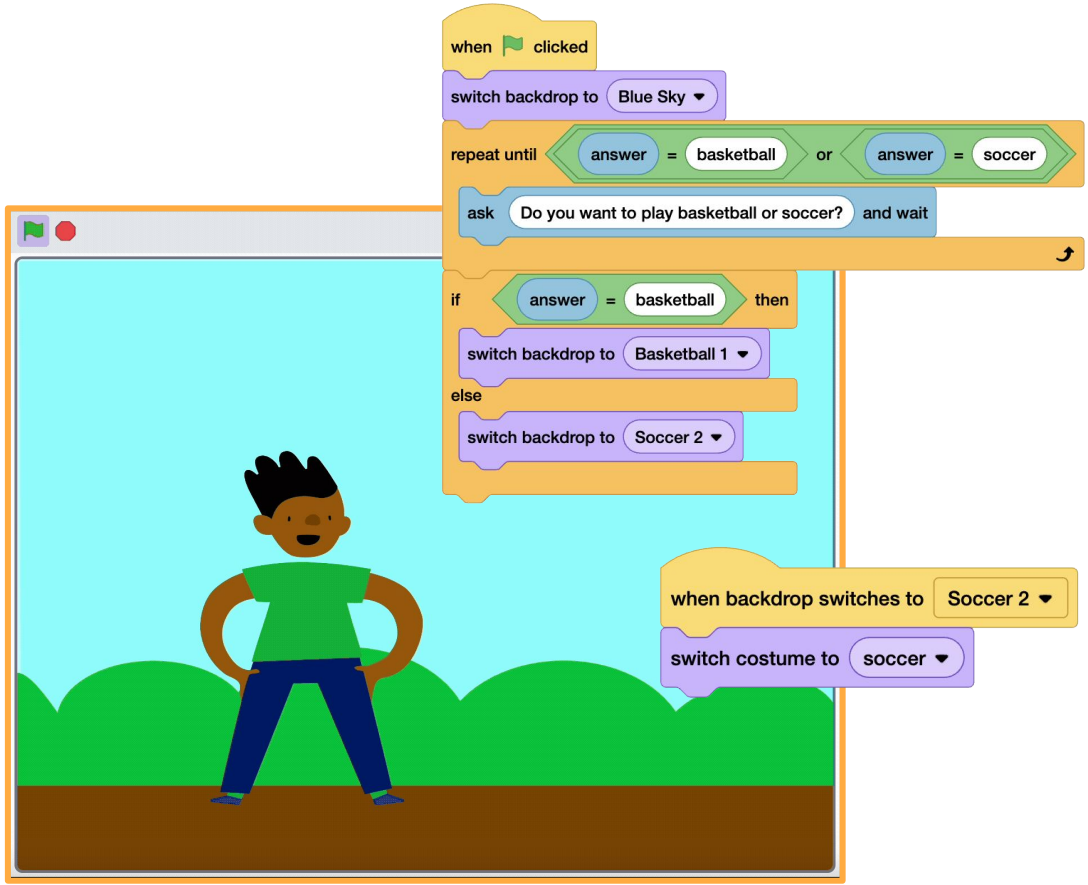


Backdrop Powers

Backdrops don't have Motion blocks, but they have Looks. Use keyboard keys, mouse clicks, or a broadcast to change the scene.

Or did you know the backdrop can also ask the user questions? Use the "ask" Sensing block. The answer could switch the backdrop.

Scripts can also be triggered on sprites based on the backdrop.

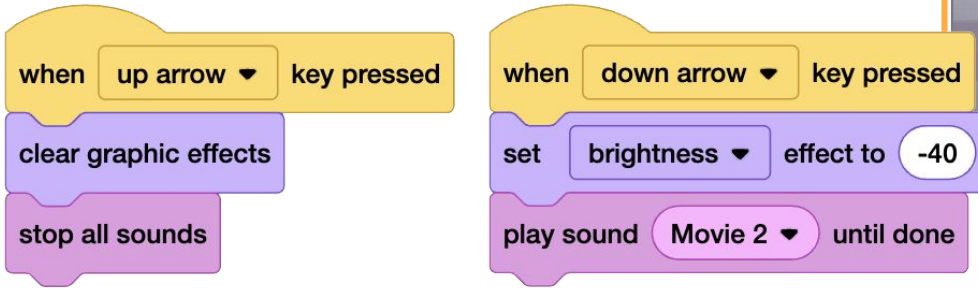


An example project: 1212916337
More on Conditional Statements

Animate with Code!

You can use Looks blocks effects to fade backdrops in and out, or set and change the mood of a scene.

Try effects like brightness. Use keyboard keys or devices, like the micro:bit's tilt, to control. No device? Try creating a slider variable to store the brightness.



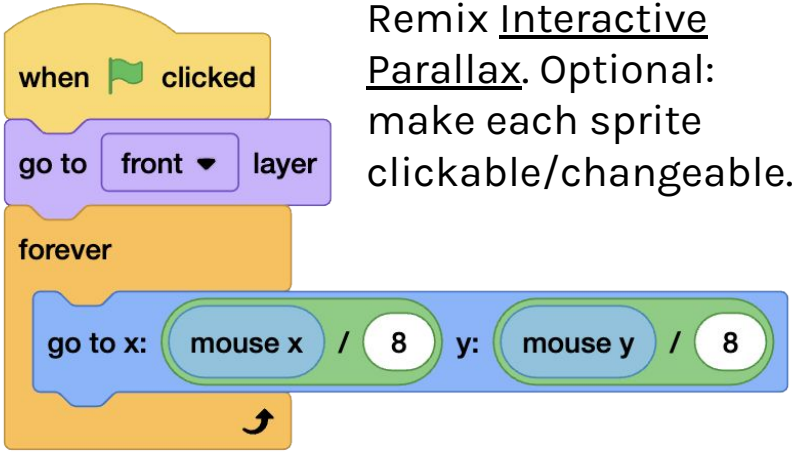
Example projects: [1212884220](), [748866200](), [740008689]()

More on [Conditional Statements](), [Variables](), and [micro:bit]()

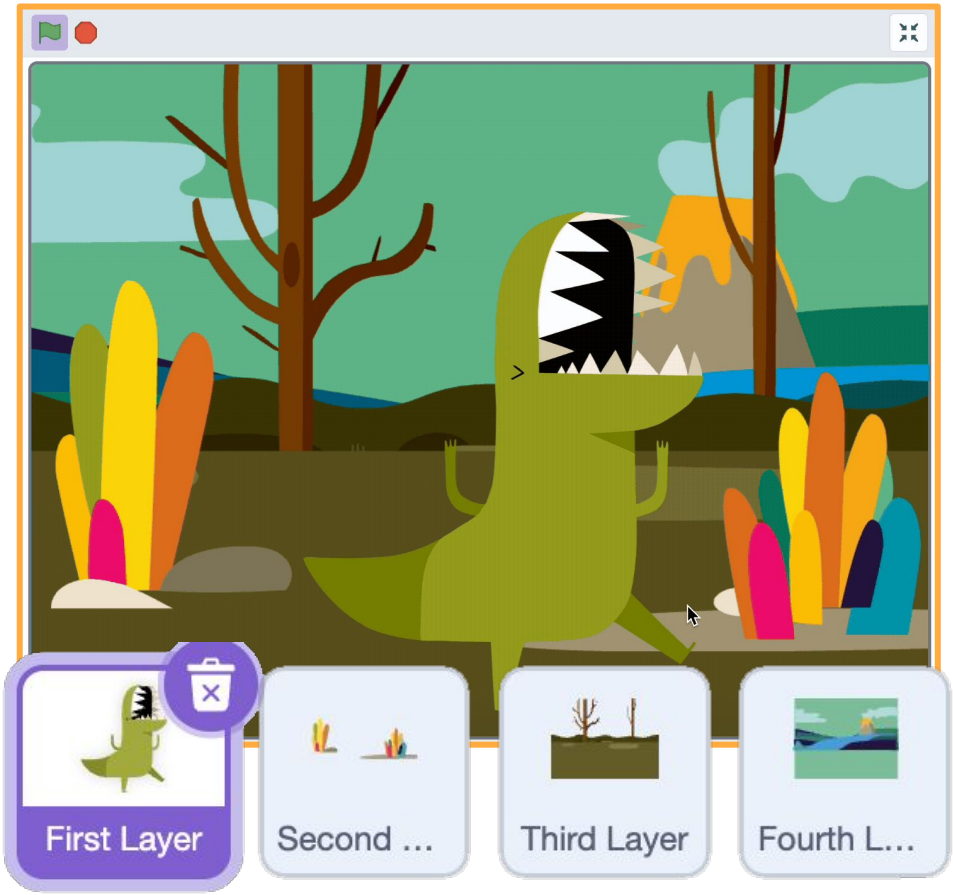
Starter Project

Parallax

A parallax is where the movement of the mouse (or other controller) adjusts the viewer's perspective. Create backgrounds as sprites to use Motion blocks.



Remix Interactive Parallax. Optional: make each sprite clickable/changeable.

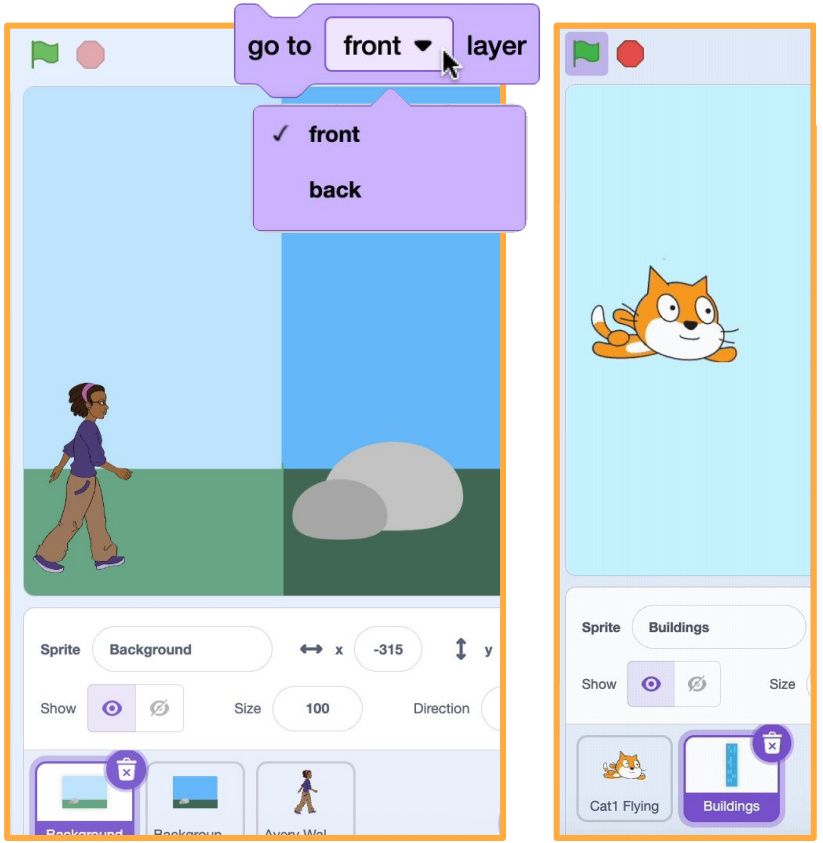


Achievery Unit

Simple Scrolling Background

Click on Stage/Backdrops and notice there are no “Motion” blocks available. If we want to make a background have movement/be able to scroll, we need to create a background as a sprite instead.

See our Achievery Unit Scrolling Background. Or see another method in the “Moving Background” lesson in the Backdrop Design unit and in our Make It Fly in-editor tutorial. Watch layer order!

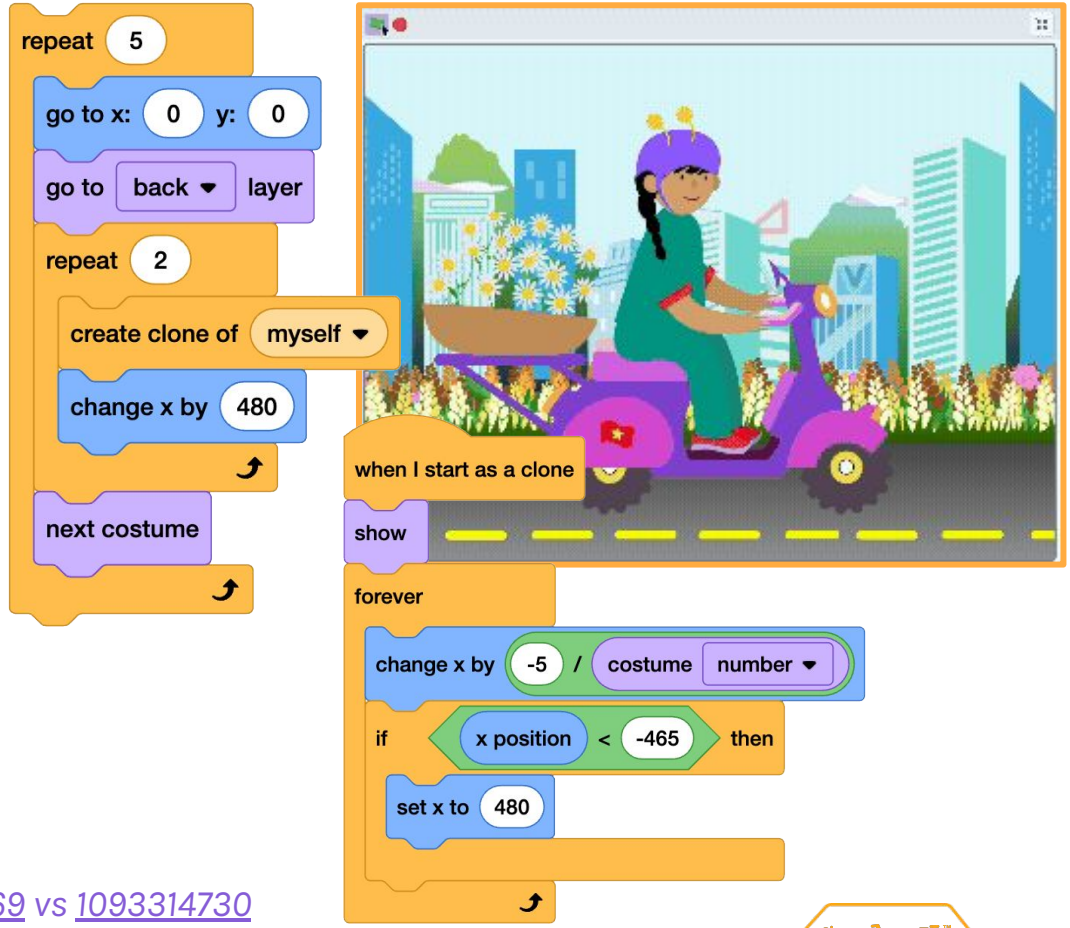


Some example projects: 485684952, 1110545496, 1029856280

Level Up Your Infinite Scroll

Clones and some math can level up your infinite scroll, creating a layered scene with parts that move at slower speeds when set further away and faster when set closer (just as you'd perceive motion in real life).

In this infinite scroll example project, two clones of each costume move across the stage, always resetting when they exit the opposite side.

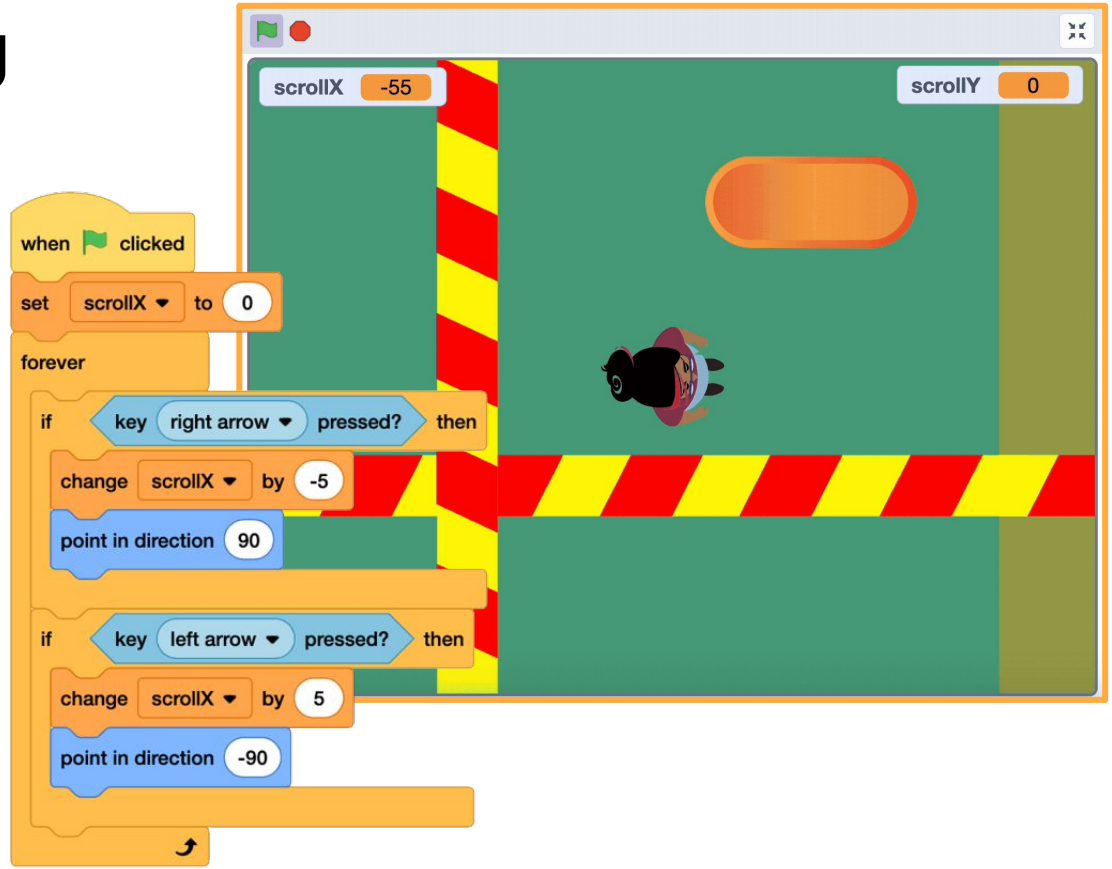


Similar but different code approaches: 1221523069 vs 1093314730

Advanced Scrolling Background: User-Controlled

You can create a more advanced version of a scrolling background, where the user controls the background movement and position via keyboard keys to explore the scene!

See our Video Tutorial | Advanced Topics: User-Controlled Scrolling Background and Coding Cards.

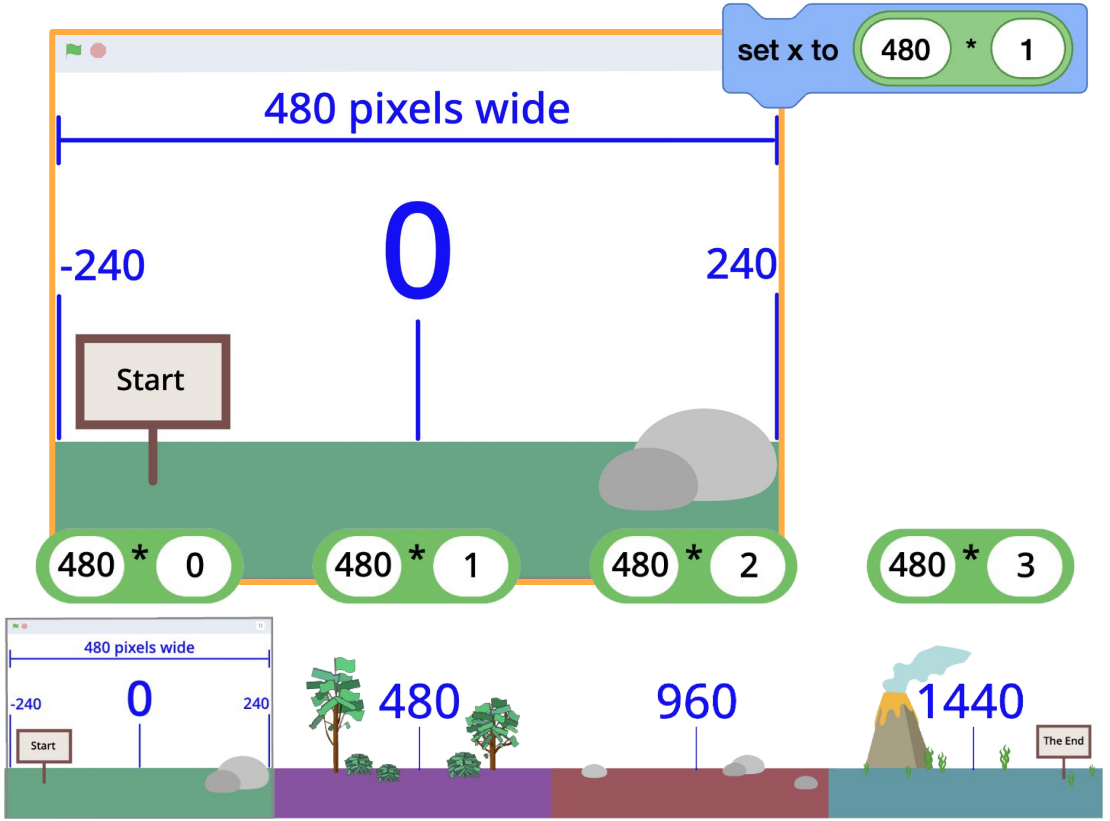


Set End-to-End

Draw a few backgrounds as sprites, wide as the stage.

To line up all the background sprites end-to-end, knowing that the stage is 480 pixels wide, you can use a mathematical expression to quickly position each sprite.

Set the x-position of the first background at 480 times zero (480 x 0 = 0). The next at 480 times one (480 x 1 = 480), etc.



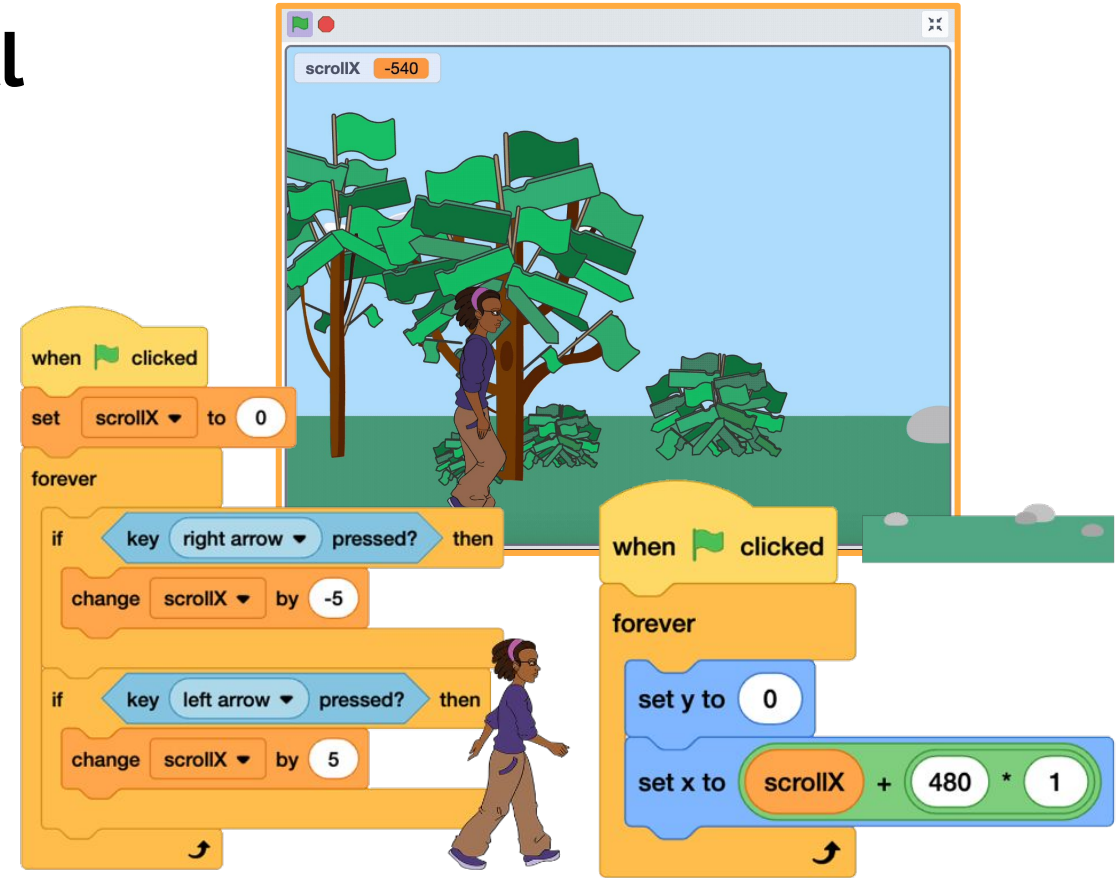
Simultaneous Scroll

Create a variable that will allow you to change the position of all the background sprites simultaneously.

On the main walking sprite, create a script that changes the variable (scrollX) by a positive or negative amount when keys are pressed.

Then, on the background sprites, adjust the x position to add the variable, so backgrounds move simultaneously.

Example project: 969838240



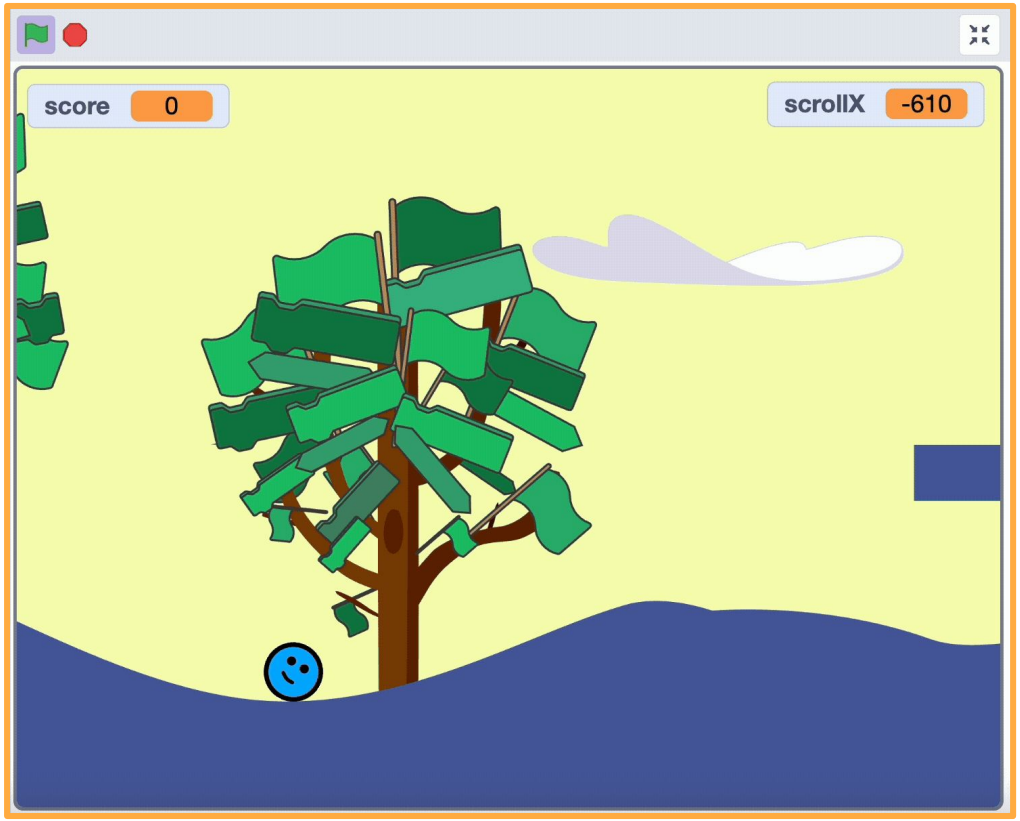
Experiment!

What if you want the player sprite to look like it is walking by cycling through the costumes?

What if you want to ensure that the walking sprite can't go off the edge of the first or last background sprite?

What if you want to add other sprites to interact with your walking sprite?

What if you want to scroll along the x and y axis? (Top down view.)



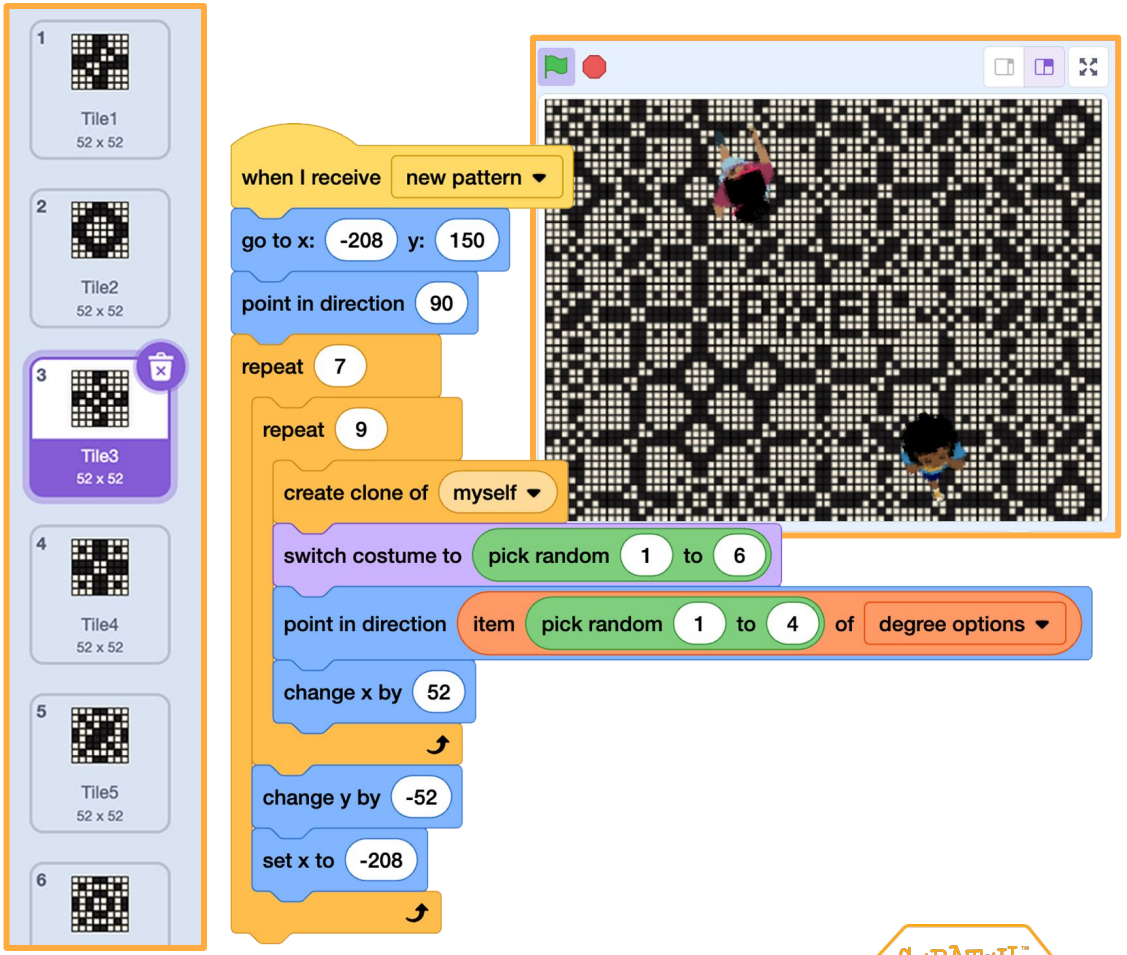
Some example projects: 970482174 and 970438551

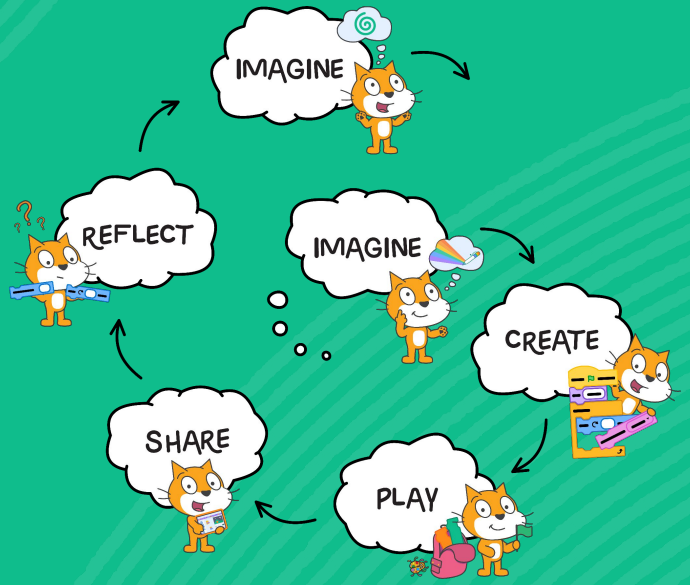
Use Stamps or Clones

Want to create an ever-changing background that is similar but different each time the program is run? Try creating a piece of the background that can be repeatedly stamped or cloned on the stage in a pattern.

Choose a costume and/or direction at random to add more variety/change each time.

Example project: 1171784325
More on the Stamp block and Clones





Debug, Share, and Reflect

Continue Along the Creative Learning Spiral

Debugging

Debugging strategies to suggest include:

- Read Aloud/Explain the Code Step-By-Step
- Break Long Sequences Apart
- Add Temporary Waits to Slow Action
- Tinker with the Block Order
- Is There a Similar but Different Block Option?
- Check the Values/Inputs

See our Debugging resources for more

Prompts to Try

- “Ask Three Before Me,” ask three peers before asking a facilitator.
- I don’t know, but let’s see if anyone else in the room might know/find out together.
- Which category do you think would be helpful?
- Can you say more about that?
- Let’s test it out. What do you observe?
- Walk me through your code. What does it say?

Pair Programming

Have groups of different experience levels? Try pair programming! One person serves as “**driver**” (creating scripts), while the other is a “**navigator**” (reviewing, advising, etc.) and roles are switched frequently.

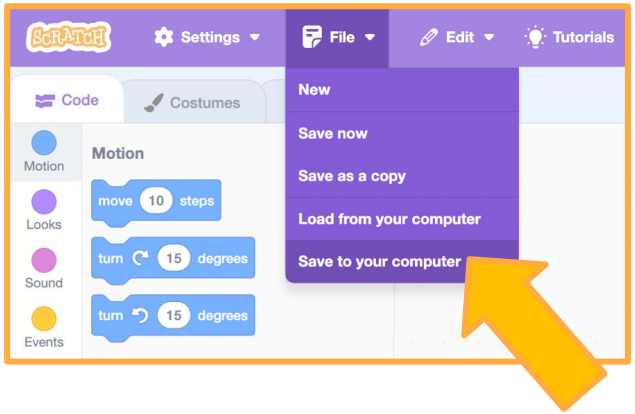
For an animated background project, pairing up users who are interested in drawing with users who have more experience coding, for example, can create rich and dynamic projects in addition to opportunities for them to teach and learn from each other.

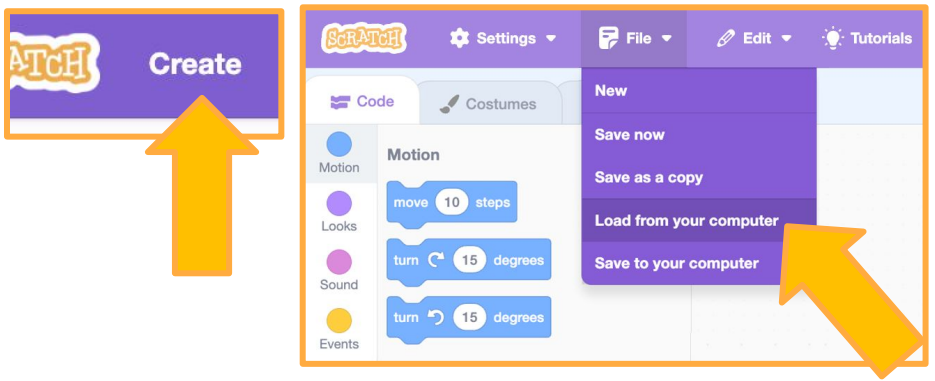
Saving

If you have a Scratch account, your project will save automatically.

If you don't have a Scratch account yet, you can save your project to your computer. Click "**File**," then choose "**Save to your computer**."

Next time you want to work on your project, go to scratch.mit.edu and click "Create." Then click "**File**," choose "**Load from your computer**," and upload your project.





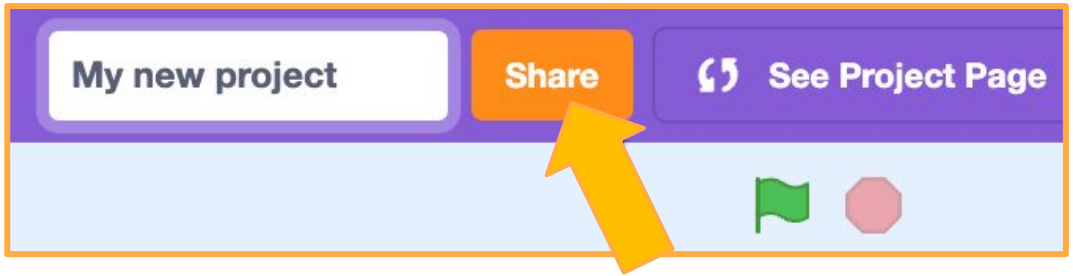
Share Your Project

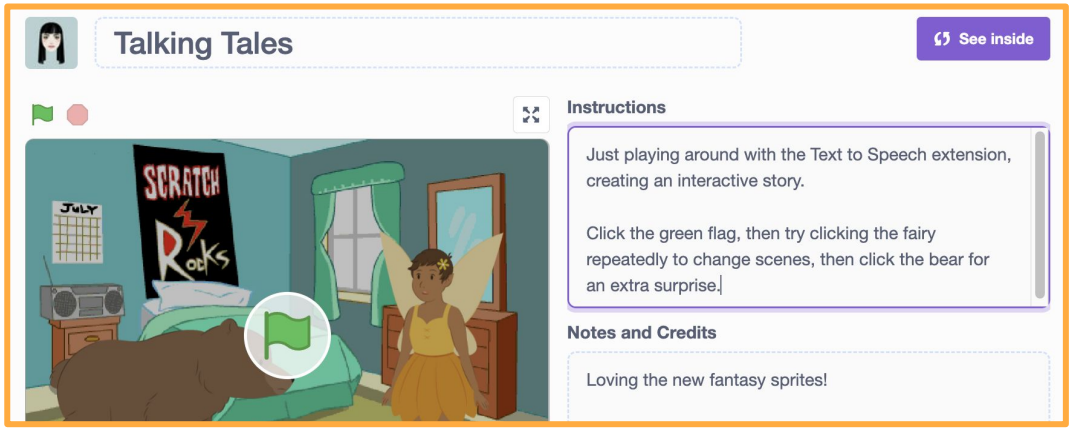
If you have a Scratch account, you can share your project and add it to studios.

Click the orange “**Share**” button at the top of the Scratch editor to share your project with the Scratch community.

Click the “See Project Page” button to go to the project page. This is where you can **add instructions and notes** about your project.

Now other Scratchers can see and interact with your project!





Reflection

- What was fun about this activity?
- What struggles or frustrations did you have during this activity?
- Many pathways, many solutions: Compare your code with other solutions. Was your solution similar or different? Why did you choose the blocks you did?
- If you had more time what would you add or change?

See our Reflection and Sharing resources for more

Prompts to Try

- I love it! What is it?
- What are your next steps for this project? What do you want to do in the future?

"Turn & Talk" is one technique to reflect and share in a physical environment.

Breakout rooms are an option for small group reflection in virtual spaces.

Record reflections using Scratch's sound editor. Then, add to a reflection project.

After-Activity Reflection

Share Option #1: Create a Class Studio to Gather Shared Projects

Studios are a space on Scratch where users can come together to make, share, and collect projects related to a particular theme, idea, or prompt.

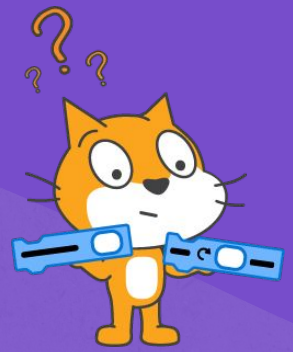
Share Option #2: Gallery Walk

Have your project open on your computer. Walk around the room (or take turns sharing your screen in a virtual space) to experience each other's creations. Take time to look at projects and read/listen/interact with them to learn more about your peers.

More on Teacher Accounts, Studios, and our Reflection and Sharing resources

Wrapping Up

Reflecting on Our Session, Resources, Next Steps



Get a copy of our Creative Learning Materials!

In addition to the resources shared throughout these slides:

- See our Learning Library at scratchfoundation.org/learn/learning-library to find lesson plans, coding cards, tutorial videos, and more! For this session, our Backdrop/Background resources would be perfect to explore.
- Getting Started with Scratch
- Scratch Creative Learning Philosophy

Find help, inspiration, and information:

- Visit scratch.mit.edu/ideas and scratch.mit.edu/starter-projects
- Click “Tutorials” to see in-editor guides
- Watch tutorial videos on our channel youtube.com/c/ScratchTeam

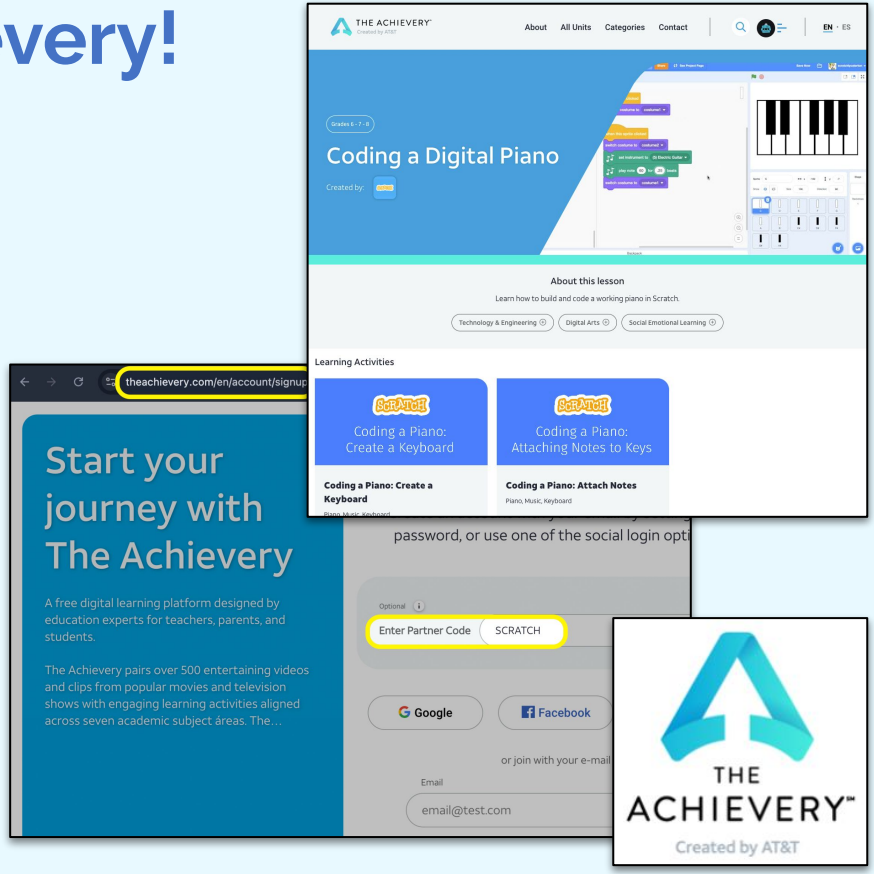
Find Scratch on The Achievery!

The Achievery platform connects K-12 students to a new world of digital learning.

Scratch Foundation has teamed up with The Achievery to provide free beginner and intermediate creative coding lesson plans on a variety of topics for educators, caregivers, and learners.

Sign up (for free!) by using our custom code “SCRATCH” when you register to support our work!

theachievery.com/account/signup



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Thank you!

Be sure to subscribe to our Scratch Foundation YouTube channel for Educators (@scratchfoundation).

Keep an eye on our Event page for additional opportunities: scratchfoundation.org/get-involved/events

Helpful Links:

- Scratch Application: scratch.mit.edu
- Learning Library: scratchfoundation.org/learn/learning-library
- Email Signup: scratch.mit.edu/connect
- Follow us on Instagram and Facebook @ScratchTeam
- Also see our YouTube channel @scratchteam for tutorials