



CREATIVE COMPUTING

Harvard Graduate School of Education

UNIT 2

OVERVIEW

THE “BIG IDEA”

Kids have shared more than six million projects in the Scratch online community – animations, stories, games, and beyond – and one of our goals with the guide is to reflect this enormous diversity of creations. Within activities, we support opportunities to personalize and avoid presenting challenges that have only one “right” answer; across activities, we engage learners in a variety of genres. In this unit, we start to explore this creative diversity with a deep dive into animation, art, and music.

Creative diversity in Scratch has often been highlighted by learners. Here are a few quotes from learners who were asked, “If you had to explain what Scratch is to one of your friends, how would you describe it?”

It's just that there's endless possibilities. It's not like you can just make this project or this project and that's all that you can make.

Nevin, 9 years old

It's really great to express yourself creatively. You could do anything with it. You can make video games, music, art, videos, anything. The possibilities are endless, no limitations, really.

Lindsey, 12 years old

It's a program that lets you explore your imagination. You can do whatever you want in it. You can create anything. There really is no limit to what you can make. You design your own stuff, and once you start you just don't want to stop because as you learn more, you can see there's more possibilities, and the more possibilities there are, the more you want to expand on what you just learned.

Bradley, 12 years old

Well, I like that you can sort of do anything on it. It's like you can do whatever you want, really. You can be as creative as you want to be.

Aaron, 10 years old

LEARNING OBJECTIVES

Students will:

- + be introduced to the computational thinking concepts of loops, events, and parallelism
- + become more familiar with the concepts of sequence
- + experiment with new blocks in the Events, Control, Sound, and Looks categories
- + explore various arts-themed Scratch programs
- + create an animated music video project

KEY WORDS, CONCEPTS, & PRACTICES

- | | |
|---------------|---------------------|
| + loops | + scripts |
| + events | + presentation mode |
| + parallelism | + bitmap |
| + control | + vector |
| + broadcast | + animation |
| | + gallery walk |

NOTES

- + Many activities in this unit include elements of sound and music. We recommend having headphones readily available for students.

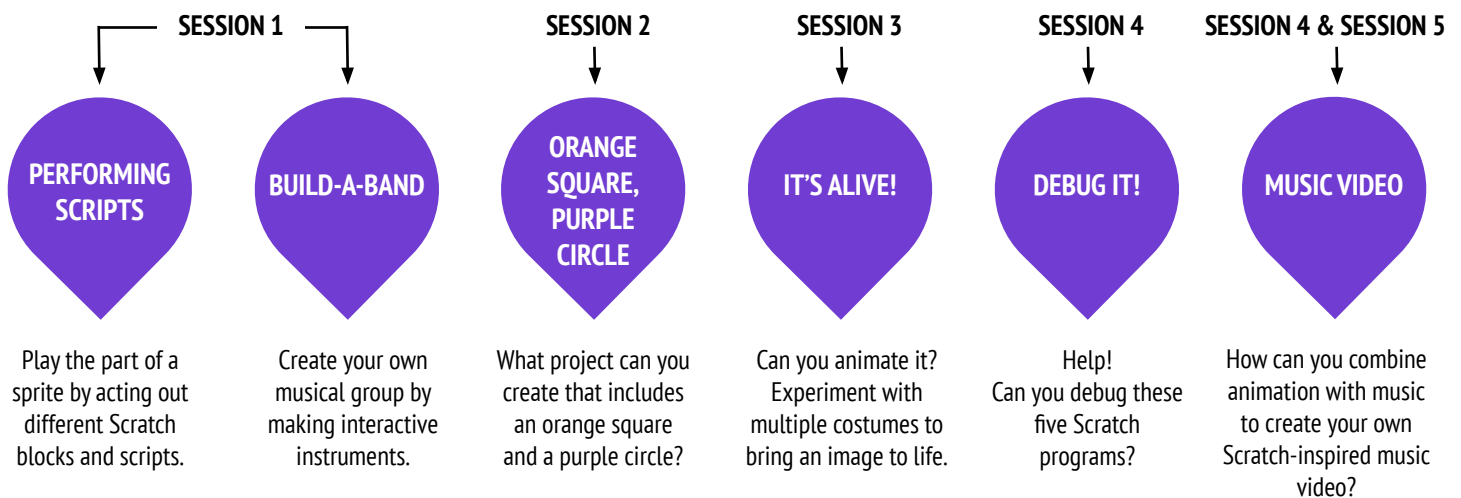
CHOOSE YOUR OWN ADVENTURE



Programming in Scratch is like directing theatre. In theatre, just as in Scratch, there are characters (sprites, in Scratch parlance), costumes, backdrops, scripts, and a stage. Scratch programming utilizes cues called “events”, which signal when things should occur in a project, such as: activating a project (when green flag clicked), triggering sprites’ actions (when this sprite clicked), or even sending a silent cue across sprites or backdrops (broadcast).

Inspired by the theatre metaphor, this unit’s arts-themed activities are designed to help students explore the computational concepts of loops, events, and parallelism, culminating in the design of personalized music videos.

POSSIBLE PATH



PERFORMING SCRIPTS

 SUGGESTED TIME
30–45 MINUTES

ACTIVITY DESCRIPTION

- Optionally, have a projector connected to a computer with Scratch open to display which blocks and scripts will be performed.
- Ask for two volunteers.
- Prompt the two volunteers to act out a series of instructions (either by “programming” the volunteers through the Scratch interface or through printed-out physical versions of the Scratch blocks).
 - Have one person do one thing (like walk across the room).
 - Have that person “reset”.
 - Have that person do two things simultaneously (like walk across the room and talk).
 - Add the second person, by having the second person simultaneously (but independently) do a task, like talking.
 - Have the second person do a dependent task, like responding to the first person instead of talking over.
- Reflect on the experience as a group to discuss the concepts of events and parallelism using the reflection prompts to the right.

NOTES

- + This activity highlights the notion of “reset”, which is something Scratchers often struggle with as they get started. If they want things to start in a particular location, with a particular look, etc., students need to understand that they are completely responsible for programming those setup steps.
- + This activity can be useful for demonstrating the broadcast and when I receive block pair.

OBJECTIVES

- By completing this activity, students will:
- + be introduced to the concepts of events (one thing causing another thing to happen) and parallelism (things happening at the same time) through performance
 - + be able to explain what events are and how they work in Scratch
 - + be able to explain what parallelism is and how it works in Scratch

RESOURCES

- projector (optional)
- physical Scratch blocks (optional)

REFLECTION PROMPTS

- + What are the different ways that actions were triggered?
- + What are the mechanisms for events in Scratch?
- + What were the different ways in which things were happening at the same time?
- + What are the mechanisms that enable parallelism in Scratch?

REVIEWING STUDENT WORK

- + Can students explain what events and parallelism are and how they work in Scratch?

NOTES TO SELF

- _____
- _____
- _____
- _____

BUILD-A-BAND

 SUGGESTED TIME
30–45 MINUTES

OBJECTIVES

- By completing this activity, students will:
- + create a program that combines interactive sprites with interesting sounds
 - + develop greater fluency with sequence, loops, events, and parallelism
 - + practice experimenting and iterating in building up project creations

ACTIVITY DESCRIPTION

- Optionally, show example projects from the Build-a-Band studio and have the Build-a-Band handout available to guide students.
- Give students time to create interactive instruments by pairing sprites with sounds. Encourage them to experiment with different ways to express sounds in Scratch by exploring other blocks in the Sounds category or using the editing tools within the Sounds tab.
- Allow students to demonstrate their bands to one another or let students walk around to interact with classmates' instruments. We recommend a gallery walk: have students put their projects in presentation mode and then invite them to walk around and explore each other's projects. Optionally, have students add their projects to the Build-a-Band studio or a class studio.
- Ask students to think back on the design process by responding to the reflection prompts in their design journals or in a group discussion.

RESOURCES

- Build-a-Band handout
- Build-a-Band studio
<http://scratch.mit.edu/studios/475523>

REFLECTION PROMPTS

- + What did you do first?
- + What did you do next?
- + What did you do last?

REVIEWING STUDENT WORK

- + Do projects make creative use of sounds?
- + Are the sprites in the projects interactive?

NOTES

- + To share as a whole group, have students perform their Scratch instruments together to form a class band!

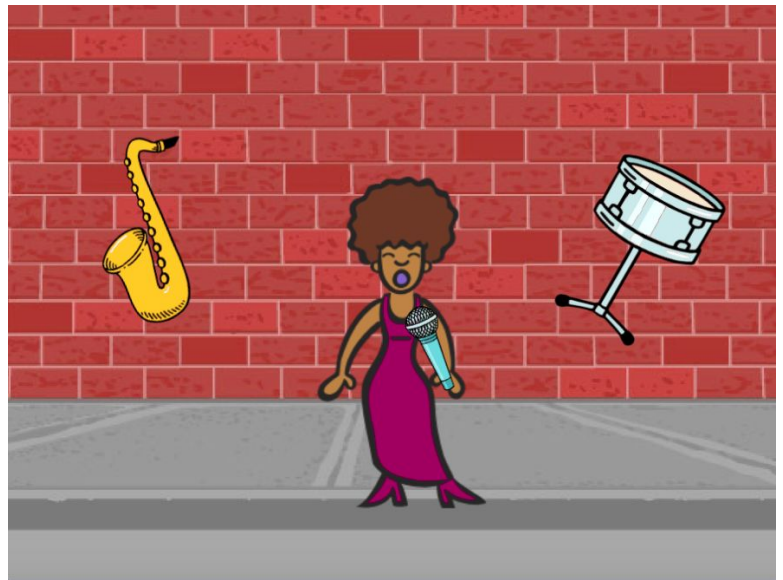
NOTES TO SELF

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BUILD-A-BAND

HOW CAN YOU UTILIZE SCRATCH TO CREATE SOUNDS, INSTRUMENTS, BANDS, OR STYLES OF MUSIC THAT REPRESENT THE MUSIC YOU LOVE MOST?

In this activity, you will build your own music-inspired Scratch project by pairing sprites with sounds to design interactive instruments.

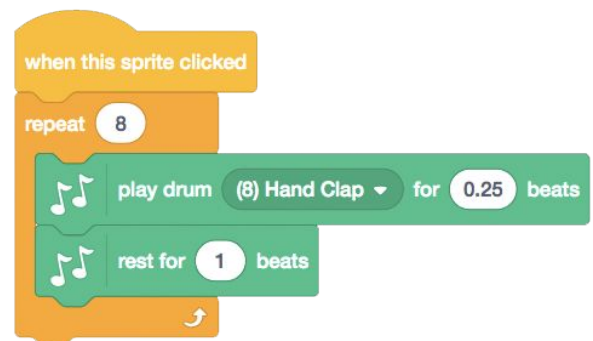
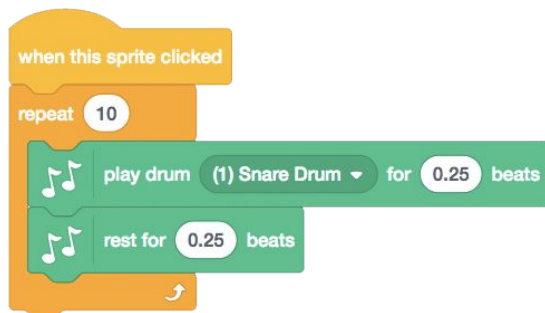


START HERE

- Create a sprite.
- Add sound blocks.
- Experiment with ways to make your instruments interactive.



Choose instruments from the sprite library or create your own.



THINGS TO TRY

- Use repeat blocks to make a sound play more than once.
- Import or record your own sounds or experiment with the Sounds editor.
- Try playing with the tempo blocks to speed up or slow down the rhythm.

FINISHED?

- + Add your project to the Build-A-Band Studio:
<http://scratch.mit.edu/studios/475523>
- + Challenge yourself to do more! Invent a new instrument or record your own sounds.
- + Help a neighbor!

ORANGE SQUARE, PURPLE CIRCLE



SUGGESTED TIME
30–45 MINUTES

OBJECTIVES

By completing this activity, students will:

- + express their creativity by completing an arts-themed challenge
- + gain more fluency with Looks blocks and the paint editor

ACTIVITY DESCRIPTION

- Optionally, show example projects from the Orange Square, Purple Circle studio and have the Orange Square, Purple Circle handout available to guide students.
- Give students time to create a project that includes an orange square and a purple circle. Invite students to experiment with Looks blocks and the paint editor to explore their artistic abilities.
- Encourage students to share their creative work with others. We recommend gallery walk: have students put their projects in presentation mode and then invite them to walk around and explore each other's projects. Optionally, have students add their projects to the Orange Square, Purple Circle studio or a class studio.
- Ask students to think back on the design process by responding to the reflection prompts in their design journals or in a group discussion.

RESOURCES

- Orange Square, Purple Circle handout
- Orange Square, Purple Circle studio
<http://scratch.mit.edu/studios/475527>

REFLECTION PROMPTS

- + How did you incorporate an orange square and a purple circle into your project? Where did this idea come from?
- + What was challenging about this activity?
- + What was surprising about this activity?

REVIEWING STUDENT WORK

- + Do projects include an orange square and a purple circle?

NOTES

- + If students have questions, remind them that they can open the Tips Window to learn more about specific blocks or different parts of the Scratch editor.
- + Scratch supports both bitmap and vector graphics. Help students navigate to the vector mode or bitmap mode button in the paint editor to design and manipulate different types of images and text.

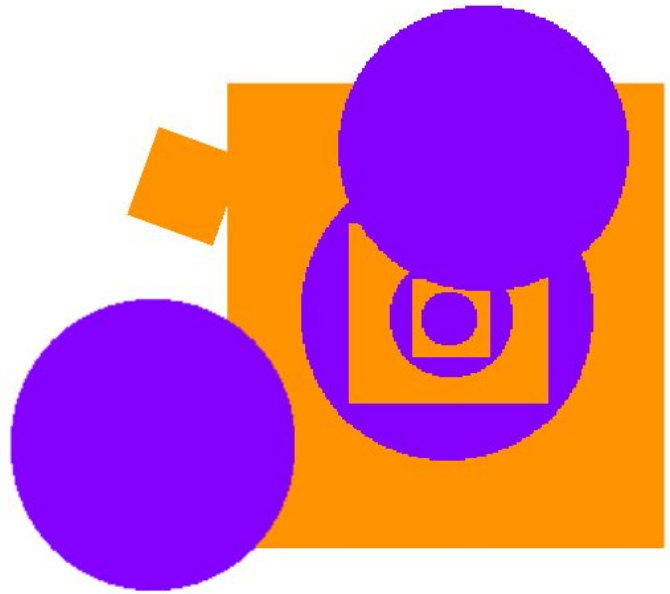
NOTES TO SELF

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ORANGE SQUARE, PURPLE CIRCLE

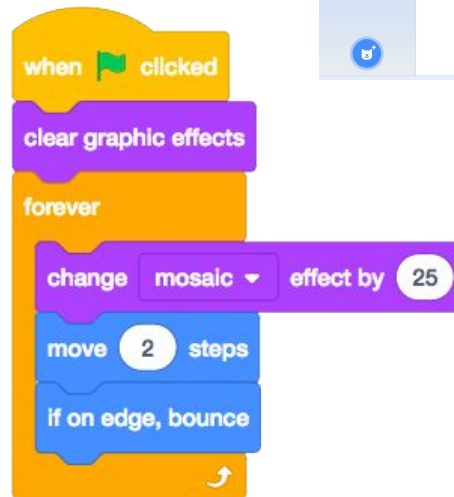
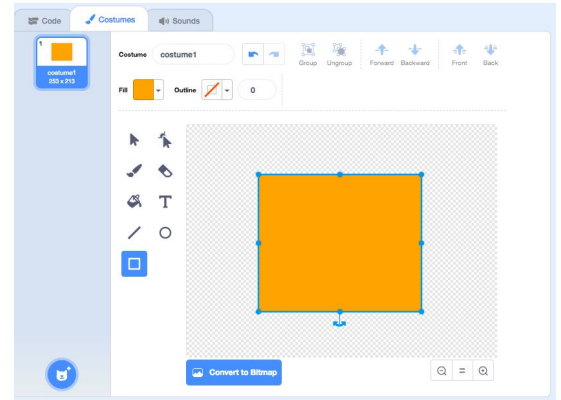
WHAT PROJECT CAN YOU CREATE
THAT INCLUDES AN ORANGE
SQUARE AND A PURPLE CIRCLE?

In this challenge, you'll create a project that includes an orange square and a purple circle. What will you create?



START HERE

- Draw your sprites using the Paint Editor.
- Add different Looks and Motion blocks to bring your sprites to life.
- Repeat!



FEELING
STUCK?

THAT'S OKAY! TRY THESE THINGS...

- Try brainstorming with a neighbor!
- Create a list of things you would like to try before you start building your project in Scratch!
- Explore other projects to see what others are doing in Scratch – this can be a great way to find inspiration!

FINISHED?

- + Add your project to the Orange Square, Purple Circle Studio: <http://scratch.mit.edu/studios/475527>
- + Explore the difference between bitmap mode and vector mode, located at the bottom of the paint editor.
- + Challenge yourself to do more! Add another shape or color.
- + Swap projects with a partner and remix each other's creations.
- + Help a neighbor!