



Sample Project: Interactive Art



Sample Project: Storytelling in Scratch

Coding in Scratch: Instructor Guide

Scratch 3 is a free, browser-based programming language that is designed for students ages 8 to 16 and supported by an active community of millions of users. Students can use Scratch to design music videos, animations, and video games while learning the fundamentals of coding. Scratch encourages you to share your work and “remix” others’ projects to create something new.

The partnership between Vernier Software & Technology and Scratch creates the ability to integrate data-collection technology into science and computer science activities. With this integration, students can learn coding by purposefully and successfully applying their skills to fun, hands-on coding projects. This helps students make natural connections between the digital and physical worlds.

Scratch is developed by the Lifelong Kindergarten Group at the MIT Media Lab.

Teaching with Scratch

Scratch is a wonderful tool for creating interactive and compelling projects and is suitable for all classes, not just technology courses. Like spreadsheet, word-processing, presentation, or other productivity software, Scratch can enhance the learning experience.

- **Demonstrate understanding of a learning objective:**
Life science students can create Scratch animations to show the food chain in a particular biome. In a Language Arts class, students can create animations that mirror the components of an essay.
- **Explore models of principles to be learned:**
Scratch can be used to simulate ideas and processes such as photosynthesis or projectile motion. Exploring the code upon which the simulation runs and changing or adjusting it can help students understand how the simulation works.

For additional ideas on how Scratch can be used in the classroom, explore this Scratch Across the Curriculum (<https://scratch.mit.edu/studios/25882648>) studio on the Scratch website.



Sample Project:
Interactive Art

The background appears stationary.

Objects farther from the viewer appear to move slowly.

Objects closer to the viewer appear to move more quickly.

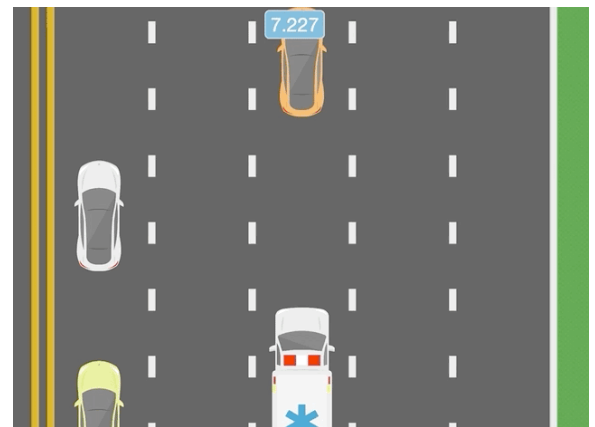
Overview of Activities

Objectives

- Students will become more familiar with basic coding structures such as events, conditional statements, and loops.
- Students will practice computational thinking as they construct Scratch projects.
- Students will learn to create standard Scratch projects, such as animations and games, similar to projects they can use in other classes.

List of Activities (in suggested order)

1. Sustainable Living Interactive Poster
2. Storytelling in Scratch
3. Interactive Art
4. Emergency Game
5. Lunar Lander



Sample Project: Emergency Game

What's Included

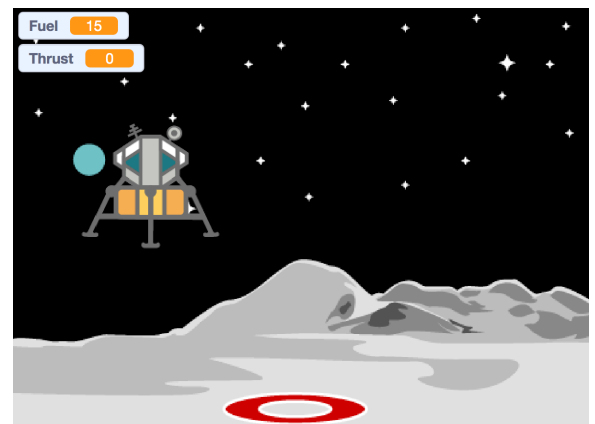
Each activity folder contains the following:

Student instructions document (.pdf)

- The student instructions document guides students through the process of creating the program.
- Each activity also includes optional extensions that challenge students to further develop their coding skills.

Multiple Scratch project files (.sb3)

- Starter: Students use the starter project as a starting point for each activity.
- Complete: Instructors can review the complete project as they prepare for the activity.
- Extensions: The extension files are solutions to the extensions in the student instructions for each activity.



Sample Project: Lunar Lander



Sample Project Sprites: Interactive Art

How to Use these Activities

Now it's time for you to start coding! You'll start by creating the code for the five landscape sprites.

1. Instructor reviews the activity.

- Open and run the completed project sb3
(See "How to Open and Run a Scratch Project File," below.)
- Review the student instructions document.

2. Instructor gives students the activity.

- Share with students the student instructions and the starter sb3 file.
- Students open the starter sb3 file in Scratch and follow the student instructions to complete the project.
- Optional extension activities are at the end of the student instructions document. Instructors may require that students complete some or all of the extension activities.

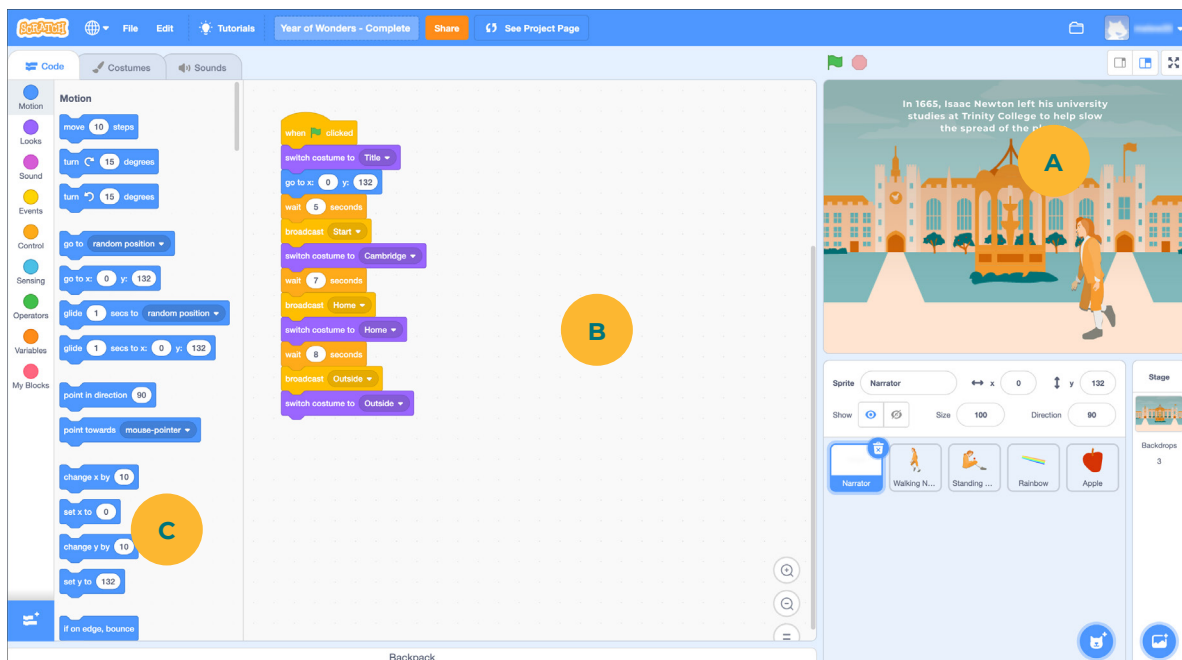
3. Students share their completed projects with the instructor.

- If students are logged into a Scratch account and using the online editor, they can use the Share button to publish the project. They can then share the URL with their instructor.
- If students are not logged into a Scratch account, or they are using the Scratch Desktop app, they can download their project and share it with their instructor. To download a project, students should choose "Save to my computer" from the File menu.

Overview of the Scratch Editor

The Scratch window is divided into three main sections.

- Stage and Sprites:** The Stage is where the action happens! Below the Stage, you'll see all the sprites used in your Scratch project. Sprites can be anything from game elements to story characters to user instructions.
- Sprite Code:** The center section is where you create programs for each sprite.
- Block Palettes and Code:** The interlocking blocks on the left, organized into palettes like "Motion", "Looks", and "Variable", are the code you use to control Sprites and the Stage. You drag blocks from this section into the Sprite Code section to create your program.



Example
The Scratch Window

How to Open and Run a Scratch Project File (.sb3)

1. **Open the Scratch editor.**
 - For the online editor, open a browser window and navigate to scratch.mit.edu. Click on the “Create” button.
 - For the Scratch Desktop app, simply open the software.
2. **From the File menu, choose “Load from your computer”.**
3. **Navigate to and select the Scratch project file you want to open.**
4. **The Scratch project will open in the editor.**
5. **Projects can be written to run in one of two ways:**
 - Most projects run when you click or tap the “green flag” icon above the Stage.
 - Some projects run when you click or tap on a Sprite on the Stage.

Instructor Notes

- **The activities in this e-book can be completed in any order.** However, if students are new to Scratch, it will be easiest to go through the activities in the order indicated above.
- **The activities can be used in in-person or remote learning environments.** When using these activities for remote learning, you may want to create a Teacher Account on the Scratch website. Learn more about Teacher Accounts at <https://scratch.mit.edu/educators/faq>
- **Sensor data can enhance student projects.** None of the activities in this e-book requires the use of Vernier sensors. However, all of the activities include optional extensions that use the Go Direct Force and Acceleration Sensor (order code GDX-FOR). Learn how to connect a Scratch project to the Force and Acceleration Sensor at <https://scratch.mit.edu/vernier>

