

Lesson 2.3: Crazy Shapes All Over the Place

Objectives

In this lesson, students will:

- ❖ Be introduced to cloning and discover its usefulness
- ❖ Experience coding using clones and artistic expression
- ❖ Practice programming concepts of events, loops, program timing, building upon and changing existing code to accomplish a task.

Agenda

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| 1. What is a Clone ? | 15 mins |
| 2. Student Activity: Crazy Shapes All Over the Place | 30 mins |
| 3. Wrap Up and Reflections | 5 mins |

Preparation

- Computers with internet connection
- Student Activity Worksheet, one per student

Resources & Links

- Balloon Clones Demonstration Project
<https://scratch.mit.edu/projects/314157820>
- Balloon Clones Starter Project:
<https://scratch.mit.edu/projects/314375509>
- Crazy Shapes Demonstration Project:
<https://scratch.mit.edu/projects/305924232>
- Crazy Shapes Starter project;
<https://scratch.mit.edu/projects/314405670>

1. What is a Clone ?



In computer science, cloning refers to making an exact copy of an object. In Scratch, each Sprite can create a clone of itself or of another sprite. When a clone is created, it inherits the position, the current costume and the local variables of its parent.

After creating a clone of a Sprite, the clone has to be deleted at some point. Remember that anything in your program: sprites, data, variables take memory when running. So if you create a 1000 clones of a Sprite and never delete them, your program might slow down. The tricky part will be when to delete a clone.



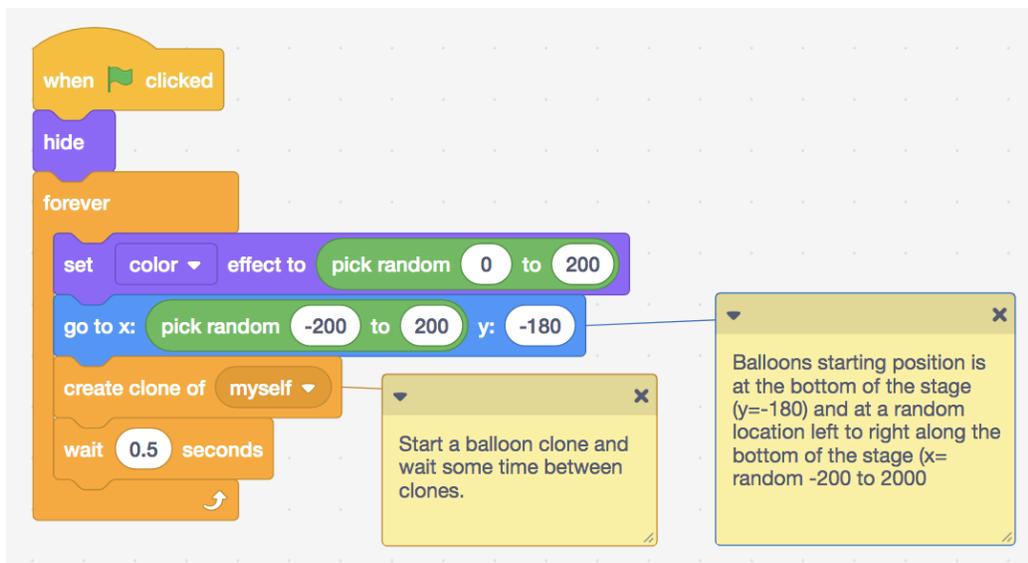
Programming Note: In computer science, inheritance is an important concept: objects can inherit from other objects, which enables programmers to extend their properties.

The cloning concept in Scratch is a much simplified version of inheritance, but it enables us to create a lot of sprites quickly.

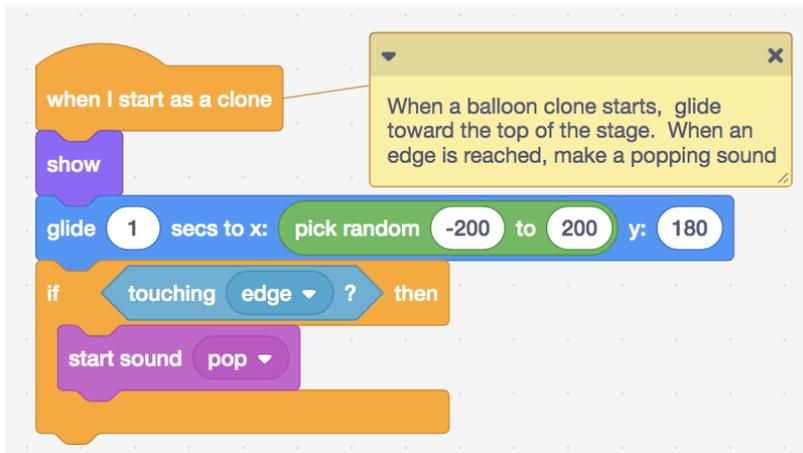
Demonstrate the following project that uses cloning to create the balloons. The goal is to have many balloons fly to the top and then disappear. <https://scratch.mit.edu/projects/314157820>

Point out how the balloon clones disappear when they reach the top and how the balloons fly up at different speeds.

Explain the code briefly to set the balloon color and initial position. Then explain the clone code. Use the comments as a guide for explaining the code.



The image shows a Scratch script for creating balloons. The script starts with a 'when green flag clicked' event, followed by a 'hide' block. A 'forever' loop contains the following blocks: 'set color effect to pick random 0 to 200', 'go to x: pick random -200 to 200 y: -180', 'create clone of myself', and 'wait 0.5 seconds'. Two yellow callout boxes provide comments: one says 'Start a balloon clone and wait some time between clones.' and the other says 'Balloons starting position is at the bottom of the stage (y=-180) and at a random location left to right along the bottom of the stage (x= random -200 to 2000)'. The 'go to x' block is connected to the second callout box, and the 'create clone of myself' block is connected to the first callout box.



When a clone of a balloon is created, it travels to a random location towards the top.

Student Activity: Flying Balloons



Instruct students to remix the following project:
<https://scratch.mit.edu/projects/314375509>

Tell them to save the project and run it, pointing out that the balloons are not being deleted when they reach the top. Also, each balloon travels at the same speed which is not as interesting as when the balloons fly at different speeds.

Instruct students to add code to:

1. Read the comments to help them understand the code. When code changes are made that affect a comment, the comment needs to be updated.
2. Delete the clone when it touches the edge
3. Glide a random number of seconds, somewhere between 0.5 and 1.5, they can adjust the numbers as desired.

2. Student Activity: Crazy Shapes All Over the Place



Now that you know how to clone sprites, you can do all kinds of cool things. This will be the next project you code.

Demonstrate the Crazy Shapes project: <https://scratch.mit.edu/projects/305924232>

Click on each numbered button to show a different effect. Click the spacebar between each button click to stop the previous script. Be sure to run it in full screen mode:





Distribute the activity worksheet, one per student.

Once students complete the activity, it could be helpful to review solutions using the demonstration project.

3. Wrap Up and Reflections



Reflection Points:

- What did you learn today?
- What is a clone?
- How is cloning objects useful?
- What was fun about today's activity?

Student Activity: Crazy Shapes All Over the Place

What to do:	Using/Answers:
<p>Remix and save.</p>	<p>314405670</p>
<p>Run the project. Which sprite creates the shapes?</p>	<p>_____</p>
<p>Try the following for Sprite1. Test the program after each change:</p> <ul style="list-style-type: none"> • Go to a random position on the stage before it creates a clone of itself. • Change the wait time to different values and observe what happens. When you wait longer, are there more clones on the stage? 	
<p>Add the when I start as a clone script for Sprite2. You can copy it from Sprite1.</p> <p>Before you run the program, detach the script from when the green flag clicked from Sprite1 so both sprites are not running at the same time. You can always try that later :-).</p>	
<p>Run the program and experiment changing the wait time between clones and the wait time when moving on the stage.</p> <p>How can you change the speed of the clones moving on the stage?</p>	
<p>Extended Activity</p>	
<p>Have fun exploring adding your own effects.</p> <p>Sprite3 has partial scripts to try a different effect. The wait time inside the repeat block is crucial to getting the effect you want.</p>	