Snowball scramble

Scratch lesson plan – Code Playground

BARCLAYS

Lesson overview

In this lesson, students will create a fast-paced game in Scratch called "**Snowball scramble**," where a penguin must dodge flying snowballs. They will learn how to use sprite cloning, random motion, and control blocks to create multiple projectiles efficiently. By the end of the lesson, students will understand cloning, looping and how to manage interactions between sprites.

Time	Key learning outcomes	Resources
30 mins	• Understand how to clone sprites to manage multiple sprites efficiently • Program snowballs to move randomly using loops and control blocks • Implement collision detection and create a responsive game environment.	• Computers, laptops, or tablets with internet access • Access to Scratch website - https://scratch.mit.edu • Projector or interactive whiteboard for demonstrations • The "**Snowball scramble**" Scratch starter project, preloaded or shared via link.

Content

Introduction

In Scratch, cloning allows us to create many snowballs without cluttering our workspace. It's efficient and makes coding easier. This game is all about dodging fifty snowballs. We'll use cloning and loops to make it happen.

Think of how a snowstorm looks with snow coming from all direction. Cloning allows us to recreate that effect with one snowball sprite.

Loading Snowball scramble

Guide students to open the preloaded "Snowball scramble" Scratch project. The link is provided in the workbook. Make sure they can identify the key sprites, the snowball and the penguin.

Watch our Snowball scramble project video to help the children understand the code and what things do. As you watch along our expert will guide them through the session, explaining things as they watch.

On the next page, we've provide you a guide for the steps they'll take before playing the game.

Activity – Using clones (20 mins)

Reviewing Snowball scramble (5 minutes)

Let's explore the project to see what's already set up. Have the children, explore the penguin sprite to see how it follows the mouse or their finger on screen to move it left or right to dodge the snowball.

The snowball will fire down the screen in both a random start point and angle towards the bottom of the screen.

Get the children to press the ⚑ at the top of the project window to allow them to control the penguin and see how the snowball comes in and down.

Ask your class

- Why do you think this type of random movement makes the game more challenging?

Creating and controlling snowball clones (15 mins)

Your class will need to click or tap into the snowball sprite to see the code used with it. Have them explore the scripts as there is more than one for this sprite. You'll start with the biggest script at the bottom which currently controls the single snowball. Your class will split this piece of code into three sections:

1. Split the code block from the first '**go to x**' block, getting the children to move this to the right of the three starting blocks of this script
2. Split the new code block this time from the '**forever**' block, moving it towards the bottom.

Now they've split them. They'll need to add the following to each of the sections:

When ⚑ clicked section

3. They'll need to add the '**repeat' block and then put the** '**create clone of myself**' (both found in the gold 'Control' area) inside this repeat block. They'll change the number from 10 to 50 for the number of snowballs they'll need.

Now they've set this up the snowballs will repeat 50 times, but they'll need to make sure the same random movement applies to all the clones. To do this:

Go to x section

3. They need to add the 'when I start as a clone' block giving them space to add others. This applies the code to all clones
4. The snowball should be hidden at first so they'll add a '**hide**' block under the 'when I start as a clone' block.

Activity – Using clones (cont)

Go to x section (cont)

6. The next step is to add a '**Wait until [] seconds**' (gold Control area). To make the snowballs fire at random times during the 30 seconds game, they'll add a 'pick random' block (green Operator area) and alter the numbers to be 1 to 30 representing the time they could fire
7. They'll need to drag and connect the main section (**go to x**) underneath these three added. Then add a 'delete the clone'.

Forever loop section

8. They only need to add a '**when I start the clone**' at the top of this section and a '**delete this clone**' at the end.

Now this is complete, get the children to test the game by clicking on the ⚑ to now see all those snowballs raining down on our penguin. If they are skilful they'll avoid the snowballs, if they get hit though there's nothing to show their hits. They'll need to show the variable score for hits on screen.

Adding the hits score

9. To do this they will need to go to the 'Variables' area and click to show the variable. Clicking the white box next to hits to show the score.

Playing the game (5 mins)

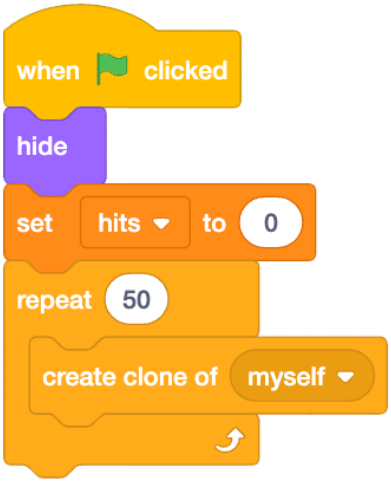
We've provided the finale for the game if they avoid the snowballs in the 30 seconds of the game. If you're watching the video. We explain how all this code works to help the children understand what made this section happen.

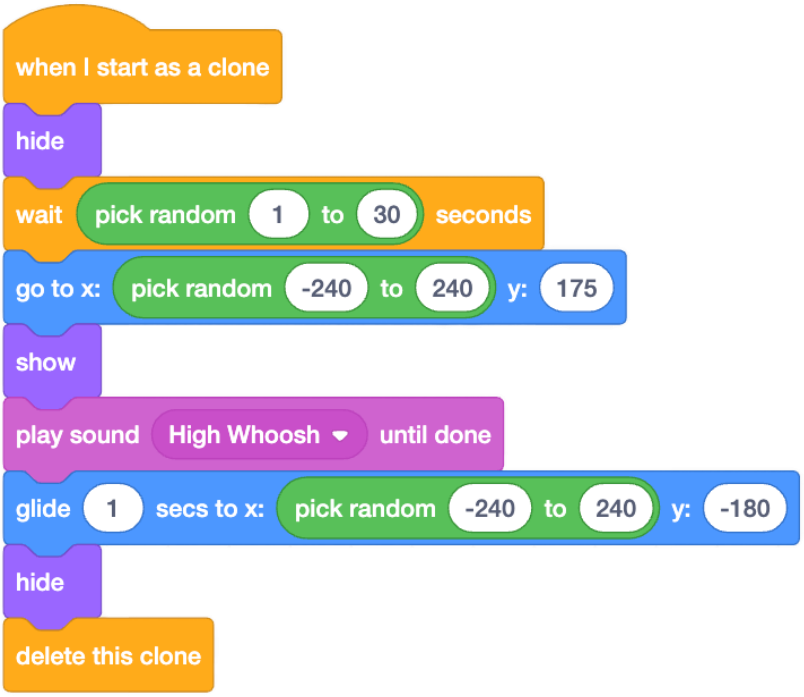
If instead, they just want to play the game, and they make it through. All the children need to do to win the game is hit Casey's target. The snowball will move across the screen in a random movement. As the snowball goes over the red target, they'll need to click the 'Throw' button. A successful hit awards the win.

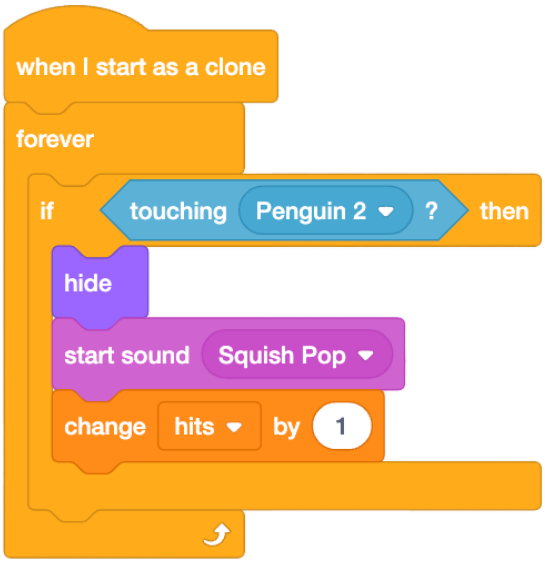
Ask your class

- Why is cloning useful in games like this?
- How do loops make your code cleaner and easier to manage?
- What features could ass to make this game more challenging?

Code snippets







Summary

The following information is an example of what a child at an expected level would be able to demonstrate when completing these activities with additional examples to demonstrate how this would vary for a child with emerging or exceeding achievements.

Assessment guidance

Differentiation – Lower ability/ASN

- Focus on creating and testing a single snowball's movement before introducing cloning
- Provide our workbook with step-by-step screenshots for adding blocks
- Pair students for collaborative learning.

Differentiation – Higher ability/extension

- Challenge students to add animations when penguin dodges or gets hit
- Introduce a scoring change where players gain points for dodging snowballs
- Encourage students to design their own sprites or levels.

Assessment questions

- What is cloning, and why was it useful with this project?
- How does the repeat block help create multiple snowballs?
- What happens when a snowball touches the penguin?
- How could you make the game more challenging or fun?