



Functional functions

Scratch lesson plan – Code Playground



Lesson overview

In this lesson, students will create a project called "Functional functions" using Scratch. They will explore the concept of functions (custom blocks) and learn how they help organise and simplify code. By building a cat and mouse chase game, students will create and use custom blocks to control movement and update the score. They will see how breaking down a program into reusable functions makes coding more efficient and easier to debug. This lesson uses the functional functions workbook and instructional video to guide students step-by-step.

| Time | Key learning outcomes | Resources |
|---------|--|--|
| 45 mins | <ul style="list-style-type: none">Understand how to use custom blocks (functions) in ScratchLearn to organise and simplify code by breaking it into reusable partsCreate a game using custom functions for movement and scoring. | <ul style="list-style-type: none">Laptops or desktop computersAccess to Scratch website - https://scratch.mit.edu |

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Activity introduction

Introduce the concept of the project:

"Today, we'll create a game in Scratch where the cat chases a mouse, and we'll use functions (custom blocks) to organise our code."

Discuss the power of functions:

"Imagine if you had to write the same instructions over and over again. Functions help us avoid that by creating reusable blocks of code."

Real-life connection:

"Functions are used everywhere in programming – from making games to running websites. Breaking tasks into smaller parts makes coding easier and faster."

Tie this project to both maths and PSHE, encouraging logical thinking, pattern recognition and resilience when problem solving and debugging errors.

Scratch practical

Ask the children to log into Scratch and pick the farm backdrop to begin.

Show the functional functions video as a guided lesson pausing regularly when the pupils need to catch up.

- Children should be able to follow along with the workbook or the guided lesson video
- By the end of the lesson children should be able to create a working program showcasing the functional functions project.



Activity – Functional functions

This project will support you to create custom blocks in Scratch. By creating functions (custom blocks) for movement and scoring, these will help you build a structured and scalable game. This approach helps simplify complex scripts, making it easier to debug and improve your projects.

Class question:

"Why do you think programmers check their code for mistakes and try to make it shorter or neater?"

The enclosed code snippets will demonstrate to you how the functions works.

Scratch practical

Using the video and workbook support the children to follow the instructions and complete the coding project. Have them think of other ways to enhance the project if they have extra time.

Activity wrap up

Prepare to share your project with the class.

How did using functions make your code better?

Encourage customisation

- Add sound effects when the cat catches the mouse
- Use costumes to make the cat look like it's pouncing
- Create levels that increase difficulty.

Code snippets

```

when up arrow key pressed
  point in direction 0
  change y by 10
  
```

```

when right arrow key pressed
  point in direction 90
  move 10 steps
  
```

```

when clicked
  switch backdrop to Farm
  set score to 0
  forever
    if score = 100 then
      next backdrop
      play sound pop until done
      stop all
  
```

```

when down arrow key pressed
  point in direction 180
  change y by -10
  
```

```

when left arrow key pressed
  point in direction -90
  move 10 steps
  
```

```

define movement
  move 20 steps
  turn pick random 1 to 10 degrees
  wait 0.5 seconds
  if on edge, bounce
  turn pick random 1 to 10 degrees
  
```

```

define respawn
  hide
  change score by 10
  go to random position
  wait 1 seconds
  show
  
```

```

when clicked
  show
  forever
    movement
    if touching Cat 2 ? then
      respawn
  
```

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

- Provide step-by-step visuals from the workbook to support coding tasks
- Focus on creating one function at a time before combining them
- Allow paired work to help students learn collaboratively.

Differentiation – Higher ability/extension

- Challenge students to create a pause/play feature
- Encourage them to use broadcasts for more interactions
- Introduce another variable for adjusting difficulty levels through a timing system.

Plenary

- "What did you learn about using functions today?"
- "How did functions help to make your game more organised?"
- "How could you use functions in future Scratch projects?"

Assessment questions

- How did you program the movement using custom blocks?
- What Scratch blocks did you use to create and call functions?
- What improvements could you make to your game?