

Year 3 – Programming B – Events and actions in programs

Unit introduction

This unit explores the links between events and actions, while consolidating prior learning relating to sequencing. Learners begin by moving a sprite in four directions (up, down, left, and right). They then explore movement within the context of a maze, using design to choose an appropriately sized sprite. This unit also introduces programming extensions, through the use of **Pen** blocks. Learners are given the opportunity to draw lines with sprites and change the size and colour of lines. The unit concludes with learners designing and coding their own maze-tracing program.

There are two Year 3 programming units:

- Programming A – Sequencing sounds
- Programming B – Events and actions in programs

This is unit B, which should be delivered after unit A.

Lesson	Brief overview	Learning objectives and Success Criteria
1 Moving a sprite	In this lesson, learners will investigate how characters can be moved using 'events'. They will analyse and improve an existing project, and then apply what they have learned to their own projects. They will then extend their learning to control multiple sprites in the same project. https://teachcomputing.org/curriculum/key-stage-2/programming-b-events-and-actions/lesson-1-moving-a-sprite	To explain how a sprite moves in an existing project <ul style="list-style-type: none"> • I can explain the relationship between an event and an action • I can choose which keys to use for actions and explain my choices • I can identify a way to improve a program
2 Maze movement	In this lesson, learners will program a sprite to move in four directions: up, down, left, and right. They will begin by choosing a sprite and sizing it to fit in with a given background. Learners will then create the code to move the sprite in one direction before duplicating and modifying it to move in all four directions. Finally, they will consider how their project could be extended to prove that their sprite has successfully navigated a maze. https://teachcomputing.org/curriculum/key-stage-2/programming-b-events-and-actions/lesson-2-maze-movement	To create a program to move a sprite in four directions <ul style="list-style-type: none"> • I can choose a character for my project • I can choose a suitable size for a character in a maze • I can program movement
3 Drawing lines	This lesson will introduce learners to extension blocks in Scratch using the Pen extension. Learners will use the pen down block to draw lines, building on the movement they created for their sprite in Lesson 2. Learners will then decide how to set up their project every time it is run. https://teachcomputing.org/curriculum/key-stage-2/programming-b-events-and-actions/lesson-3-drawing-lines	To adapt a program to a new context <ul style="list-style-type: none"> • I can use a programming extension • I can consider the real world when making design choices • I can choose blocks to set up my program
4 Adding features	In this lesson, learners will be given the opportunity to use additional Pen blocks. They will predict the functions of new blocks and experiment with them, before designing features to add to their own projects. Finally, they will add these features to their projects and test their effectiveness. https://teachcomputing.org/curriculum/key-stage-2/programming-b-events-and-actions/lesson-4-adding-features	To develop my program by adding features <ul style="list-style-type: none"> • I can identify additional features (from a given set of blocks) • I can choose suitable keys to turn on additional features • I can build more sequences of commands to make my design work
5 Debugging movement	This lesson explores the process of debugging, specifically looking at how to identify and fix errors in a program. Learners will review an existing project against a given design and identify bugs within it. They will then correct the errors, gaining independence as they do so. Learners will also develop their projects by considering which new setup blocks to use. https://teachcomputing.org/curriculum/key-stage-2/programming-b-events-and-actions/lesson-5-debugging-movement	To identify and fix bugs in a program <ul style="list-style-type: none"> • I can test a program against a given design • I can match a piece of code to an outcome • I can modify a program using a design
6 Making a project	In this lesson, learners will design and create their own projects. Using a template (which can be blank or partially completed), learners will complete projects to move a sprite around a maze, with the option to leave a pen trail showing where the sprite has moved. Ideally, projects will include setup blocks to position the sprite at the start of the maze and clear any lines already on the screen. https://teachcomputing.org/curriculum/key-stage-2/programming-b-events-and-actions/lesson-6-making-a-project	To design and create a maze-based challenge <ul style="list-style-type: none"> • I can make design choices and justify them • I can implement my design • I can evaluate my project

Subject knowledge

This unit focuses on the links between 'events' and 'actions' in programming, while also developing learners' understanding of sequencing. It highlights that events cause actions, and that the order of those actions can have an impact on the outcome of a program. This unit also further develops learners' understanding of design in programming, using the approach outlined below.

When programming, there are four levels that help to describe the stages of a project, known as levels of abstraction. Research suggests that this structure can support learners in understanding how to create a program and how it works.

- Task — this is what is needed
- Design — this is what it should do
- Code — this is how it is done
- Running the code — this is what it does

Spending time at the Task and Design levels before engaging in code writing aids learners in assessing the 'do-ability' of their programs and reduces a learner's cognitive load during programming.

Learners will move between the different levels throughout the unit. This is highlighted within each lesson plan.