

Coding with Scratch: Learning Loops

Computing | Year 3 | Planning Overview

Introduction

In this unit, Coding with Scratch: Learning Loops, children will develop their coding skills by learning about loops. Children will use visual coding blocks within the online programming platform, Scratch, to write algorithms. They will learn about the three different sorts of loops available in Scratch: the count-controlled repeat loop, the forever loop and the repeat until loop. They will begin to recognise when to use each type of loop and will be introduced to nested loops.

As they write algorithms in Scratch, children will have the opportunity to test their code and debug as required.

After learning about all three loops, children will be encouraged to apply their knowledge and skills in a final project to create a simple catching game in Scratch. As part of their game, children will learn about using variables to create a scoring system.

Throughout the unit children will develop their coding vocabulary as they plan, evaluate and edit their algorithms.

Accompanying this unit is a helpful [document](#) which collates the subject knowledge for the unit.

Further support with using Scratch can be found in our [Scratch guide](#).

Hardware and Software

Hardware:

- PC devices, such as laptops, Chromebooks and/or tablets

Software:

- Scratch Online accessed via [Scratch](#)

Health and Safety

Children should be encouraged to have good posture and sit up to the computer. Children should not spend extended periods of time looking at the screen. Ensure safe and responsible use of portable digital devices, discouraging children moving around the classroom with technology. Make sure that food and drink are kept away from all electronic items.

Scratch Safety

Showing or creating the flashing sprite effect could be problematic for children with conditions such as epilepsy. Discretion is advised.

Home Learning

In this task, children will make use of forever loops to create a virtual fish tank. They will program a variety of fish to move around the tank.

In this task, children will use a count-controlled loop to program an animal sprite to make it bounce up and down a specific number of times on a trampoline.

Disclaimer

External Links:

We hope you find the information on our website and resources useful. This resource contains links to external websites and/or external apps. Please be aware that the inclusion of any link in this resource should not be taken as an endorsement of any kind by Twinkl of the linked website and/or app, or any association with its operators. You should also be aware that we have no control over the availability of the linked pages and/or apps. If the link is not working, please let us know by contacting TwinklCares and we will try to fix it although we can assume no responsibility if this is the case. We are not responsible for the content of external sites and/or external apps.

Assessment Statements

By the end of this unit...

Working Towards the Expected Level:

- With support, children begin to explain how simple algorithms work and can describe what the outcome of an algorithm may be. They can edit an algorithm to correct an error and know that this called debugging.
- Children understand what a loop is and know that there are different sorts of loops. They can select coding blocks to repeat sequences and create repetition.
- With scaffolding, children begin to break problems down into smaller parts to write simple programs.

Working At the Expected Level:

- Children are beginning to use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.
- Children can use sequence, selection, and repetition in programs; they are introduced to variables and various forms of input and output.
- Children write and debug simple programs that accomplish specific goals. They are developing the skill of solving simple problems by decomposing them into smaller parts.

Working At Greater Depth:

- Children confidently use logical reasoning to explain how some algorithms work and to detect and correct errors in algorithms and programs. They have the resilience to keep testing and debugging programs.
- Children understand the different elements of coding and can choose when to use sequence, selection, and repetition in programs. They begin to develop an understanding of variables and make choices about which form of input and output to use.
- Children confidently solve problems by decomposing them into smaller parts. With increasing independence, they design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems.

Lesson Breakdown

1. Scratch Revisited

Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.

To write algorithms using coding blocks in Scratch.

Resources

Hardware

- PC devices, Chromebooks and/or tablets

Software:

- Scratch Online version accessed via

Additional Lesson Information and Possi

Scratch is a free online program that allows children to use a visual block coding language to create digital stories, games and animations. The is a useful resource to support you as you lead your children through this unit of work.

As a teacher, it is recommended that you create a teacher's account and create a space to see your class' work. Creating a teacher's account allows you to see each child's work in one space. To do this, you will need to sign up to Scratch online using the **For Educators** option on the homepage and create a **Teacher Account**. The sign up page can be found here: Once you have done this, click on **My Classes**, click **+ New Class** and input your class' details.

You can also create studios for your class. This allows you to create collections for your class's various projects. To do this, click on **My Classes**, click **Studios** and click **+ New Class Studio**. You will need to name the studio and write a short description. Once you have done this, click **Add Class Studio** and your studio will be created. You can then add the children's projects to the studio you have created using the **Studios** tab.

Scissor Disclaimer:

To ensure the safety of the children in your setting, it is your responsibility to assess whether adult supervision or other appropriate safety measures are required when using scissors.

2. Repetition Loops (Count-Controlled)

Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.

To use a loop to repeat an action or sequence multiple times.

Resources

Hardware:

- PC devices, such as laptops, Chromebooks and/or tablets

Software:

- Scratch Online version accessed via

Additional Lesson Information and Possible Misconceptions

Children will need to be familiar with the idea of a loop being something which repeats itself. Looking at a clock can be a good way to introduce this idea. Children can see that when the hands of the clock have made one complete circuit they repeat this over and over again. Activities within a day can also be used to explain a simple loop. Explore five or six activities that the majority of children will do during a day (get out of bed, get dressed, clean teeth, come to school, go home, clean teeth, get into bed) and develop the idea that these activities are repeated everyday.

3. Repetition Loops (Drawing Regular Polygons)

Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.

To use a loop to repeat a sequence of instructions for a specific task.

Resources

Hardware:

- PC devices, such as laptops, Chromebooks and/or tablets

Software:

- Scratch Online version accessed via

Additional Lesson Information and Possible Misconceptions

Familiarity with regular polygons will be advantageous in this lesson. Children will need to understand that in a regular polygon all the sides are equal in length and all the angles are the same size.

When investigating regular polygons, ensure that children understand that by travelling around the perimeter of the shape they have made a full turn of 360° . In a regular triangle this will have been completed in three equal turns of 120° , in a square it will have been completed in four equal turns of 90° and so on. Children should begin to see a relationship between the number of turns and sides and the number of times they need to repeat the instructions inside their loop.

4. Forever Loops

Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.

To use a forever loop to repeat instructions continuously.

Resources

Hardware:

- PC devices, such as laptops, Chromebooks and/or tablets

Software:

- Scratch Online version accessed via

Additional Lesson Information and Possible Misconceptions

In this lesson, children need to understand the difference between a count-controlled repeat loop and a forever loop. They need to recognise that a forever loop will run continuously and forever unless interrupted or stopped in some way. Children should begin to recognise and explore situations where a forever loop would be more appropriate than a repeat loop.

5. Repeat until Loops

Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.

To use a repeat until loop to repeat actions until a certain condition is met.

Resources

Hardware:

- PC devices, such as laptops, Chromebooks and/or tablets

Software:

- Scratch Online version accessed via

Additional Lesson Information and Possible Misconceptions

In this lesson, children are introduced to the repeat until loop. They will need to be familiar with the concept of using the word 'until' within everyday language before they can move on to using it within coding. Children need to understand that the repeat until loop will repeat the instructions inside the loop until a certain condition is met. The green Operators blocks in Scratch can be used to set simple conditions. Other blocks will need to be added to the Operators blocks to customise them and set specific conditions, such as 'repeat until size equals 50'. Ensure that children look closely at the shapes of the blocks as these shapes are key in deciding where to place the different types of blocks.

6. Loops in Games

Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.

Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.

To design a simple catching game, making use of appropriate loops.

Additional Lesson Information and Possible Misconceptions

In this lesson, children will combine what they have learnt so far in Scratch to create a simple catching game. They will need to select and make use of loops to make the objects move and interact throughout their game.

Within in this lesson, children will be supported as they are introduced to variables in the form of a score. Variables, in coding terms, can be viewed as boxes which can hold a value. This value can be stored in Scratch's memory and used within programs. The value can be edited. In the Variables category, children can make a new variable and call it score. They can then set a target score for their game, making the game much more interesting to play.

Children should be encouraged to be creative when designing their game and thinking about how they can improve it; adding a theme and sound effects. They will need to test and debug their algorithms. It is important that children realise that this is an essential part of coding and game development and have the opportunity to develop the resilience to do this.