

Simple Loops

Ages: 5-7

Length: 1 hour

Equipment: PDF print out

Introduction

This lesson introduces the relevant words; **Loops** and **instructions** through activities that link to student's lives to help them relate to the concepts introduced.

Curriculum Alignment	<ul style="list-style-type: none">UK National Curriculum Computing Key Stage 1
Learning Objective	<ul style="list-style-type: none">To identify a loop in a programTo discuss the benefit of a loop in a programTo create a program using a loop
Keywords	<ul style="list-style-type: none">LoopInstructions
Resources	<ul style="list-style-type: none">MiRo Lesson – Loops – Student tasks
Lesson Sections	<ul style="list-style-type: none">Setting the SceneActivity 1 – LoopsActivity 2 – MiRo simulator vs MiRo RobotSummary

Setting the Scene

Do you do something more than once?

Loops are used to save time saying the same thing over and over again.

Concept	How it is used
<p>A loop is used when an action needs to be completed more than once.</p> <p><i>Can you think of a time where you had to do the same thing more than once?</i></p>	<p>If you need to move forward 4 steps, you could say:</p> <p>Move forward Move forward Move forward Move forward</p> <p>It is easier and saves time to say</p> <p>Move forward 4 times</p>

First let us look at when to use a loop.

Scenarios are focused on getting students to think about when a loop is used to save time.

Scenario 1	Scenario 2
<p>A dance routine consists of individual steps to complete. However, if you were told each step it would take a lot of time to work through.</p> <p>If the steps are combined i.e. stamp left foot 4 times, it will save time and make it easier to follow the steps.</p>	<p>Building a tower using blocks.</p> <p>If the instructions were to place one block on top of another each time it could take time to give the instructions to build up 10 blocks.</p> <p>If the instruction was building a tower placing blocks on top of each other 10 times, it is easier to follow and quicker to say.</p>

Without a loop



With a loop



Small Group Activity 1

Each student needs to have a pencil, ruler, and paper.

Students follow the ***instructions***

1. Draw a 1cm line
2. Draw a 1cm line
3. Draw a 1cm line
4. Draw a 1cm line
5. Draw an arrowhead at the end of the line

How could this be changed to use a ***loop***? ***Draw a 1cm line 4 times***

Small Group Activity 2

Each student is given a dot to dot worksheet and asked to complete one **instruction** at a time: draw a line from number 1 to 2, draw a line from number 2 to 3 etc

How could this be made easier?

Draw a line from 1 number to the next in order 64 times.

Whole Class Activity

Take students to an open area and put them in groups of two.

- Place one student at the opposite end to the other. One student will be the robot and the other student is the programmer.
- The programmer needs to give one instruction at a time to get the other person from one side of the room to the other, i.e. take one step, take one step.....
- Swap roles and this time ask the programmer to think how they can use a loop to say how many times to complete one action.
- Discuss which **instructions** saved time.

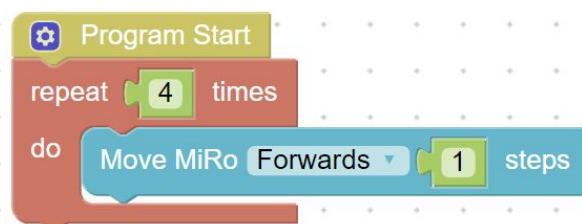
Differentiation

- If pupils need extra support, ask them to think about a PE activity circuit training. How are they asked to complete actions?
- For higher ability pupils ask them to consider how they would write the instructions to draw a square, with and without a loop.

How can we use a loop with MiRo programming?

We are going to create a program for MiRo with and without a loop.

Activity 4 - Predict what will happen:



What was your prediction?

Remember there is no fail in computing only debugging, fixing and learning!



Summary


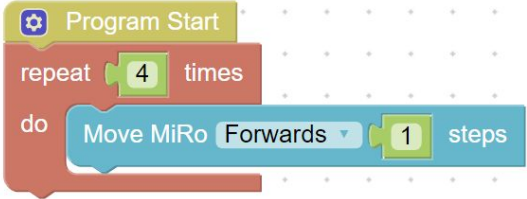
Have a discussion with the class about what they have learnt in the lesson. Discuss the new words learnt **loop and instruction** and talk through any difficulties they had.

Ask students to complete the self-assessment and can be done by thumbs up, down and centre or using the images; on the following 3 questions

Questions
Can you identify a loop in a program?
Can you discuss the benefit of a loop in a program?
Can you create a program using a loop?

Step-by-step

Create the programs to run and see if your predictions were correct

<p>Program 1</p> <ul style="list-style-type: none"> → Add Program Start from setup. → Add Move MiRo [forwards] [1] steps from simple motion and connect to the Program Start block. → Add Move MiRo [forwards] [1] steps from simple motion and connect to the previous block. → Add Move MiRo [forwards] [1] steps from simple motion and connect to the previous block. → Add Move MiRo [forwards] [1] steps from simple motion and connect to the previous block. 	<p>** Discuss what is happening with each block and can introduce the use of right click and duplicate if students are confident.</p> 
<p>Program 2</p> <ul style="list-style-type: none"> → Add Program Start from setup. → Add repeat [10] times from loops and connect to the Program Start block. → Set to 4. → Add Move MiRo [forwards] [1] steps from simple motion and connect into the repeat [4] times block. 	<p>Important to point out that this program is doing the same as the previous program but in fewer blocks. This means it saves time to build and for the program to read. This is called efficient code.</p> 
<p>After each program creation -</p> <ul style="list-style-type: none"> → Click Simulator Play OR → Click Robot play 	<p>** If you are using the physical MiRO ensure the IP address is correctly added to the onscreen code to allow the code to be communicated to MiRO to action.</p>

Were your predictions correct?

What can you edit on the program and what effect does this have?