Lesson 1: Programming a screen turtle

Introduction

This lesson will introduce pupils to programming in Logo. Logo is a text-based programming language where pupils type commands that are then drawn on screen. Pupils will learn the basic Logo commands, and will use their knowledge of them to read and write code.

Note: This lesson includes opportunities to play a video or demonstrate something in Logo. It is easier for pupils to understand what they are seeing if you are demonstrating and explaining it. This also gives pupils the chance to ask questions without falling behind in the video. We recommend that you use the videos to see what to demonstrate, then show pupils with a live demonstration, however, videos are provided if you wish to use them instead.

Learning objectives

To identify that accuracy in programming is important
- I can program a computer by typing commands
- I can explain the effect of changing a value of a command
- I can create a code snippet for a given purpose

Key vocabulary

- Program
- Turtle — an arrow or turtle image on screen that draws a line as it is programmed
- Commands
- Code snippet — this could be the same as a program; it can have several sets of commands in one program

Preparation

Subject knowledge:
- You will need to be able to access and demonstrate the version of Logo that you are using.
- You will need to be aware of the Logo commands introduced in this lesson. You can find these in the 'Glossary' handout.

Year 4 – Repetition in shapes
Lesson 1 – Programming a screen turtle

Lesson plan

You will need:
- [Slides](#) (ncce.io/pg4a-1-s)
- 'Basic commands' activity: [activity sheet](#) (ncce.io/pg4a-1-a1-w)
- [Lesson 1 'Glossary' handout](#) (ncce.io/pg4a-1-hg)
- A version of Logo, for example:
    - You can use Turtle Academy online at [turtleacademy.com/playground](#)
    - You can download FMSLogo from [fmslogo.sourceforge.net](#)
    - You can use Logotacular for iPad
- Mini whiteboards and pens

Assessment opportunities

Activity 1: You can assess pupils' ability to use basic Logo commands accurately.

Activity 2: You can assess pupils' ability to change the values in commands.

Activity 3: You can assess pupils' ability to read code, and to plan and write commands to draw a digit.

Outline plan

Please note that the slide deck labels the activities in the top right-hand corner to help you navigate the lesson.

Timings are rough guides

Introduction (Slides 2–3) 5 mins	**Introducing Logo** Display slide 2 and outline the lesson objective and success criteria. Display slide 3 and click through the animation. Discuss the meaning of the word 'accurate' and explain to pupils that accuracy will be important in their programming work.
Activity 1 (Slides 4–11) 20 mins	**Basic commands in Logo** Display slide 4. Explain that in this unit of work, pupils will be programming on screen by learning a new language of commands that we can use to tell the computer to do something. When they program the screen turtle correctly, it will draw a line, as if it has a pen underneath it. Open Logo, or refer to the screenshot on the slide, and outline the different parts of the interface: the command box that you type into, the screen

turtle in the centre, and the drawing box where the turtle carries out your commands.

Move on to slide 5. Play the video on the slide, or demonstrate in Logo how to program the turtle to move backwards and forwards. Explain that the unit is measured in pixels (dots that make up the screen) — the higher the number after the command, the longer the line drawn. Type **CS** and ask pupils to describe what happens (the screen clears). Explain that **CS** stands for 'clear screen'.

Ask pupils to open Logo and practise getting the turtle to move forwards and backwards. Encourage them to test a range of numbers after the commands.

After a few minutes, explain that as well as moving forwards and backwards, the turtle can also turn right and left. Ask pupils what they think the commands to turn right and left might be. Display slide 6 and play the video on the slide, or demonstrate in Logo. Explain that **RT** stands for 'right' and **LT** stands for 'left', and these commands are each followed by the number of degrees (you may need to recap this from their work in maths). Demonstrate how to use **RT** and **LT** followed by the number of degrees (eg `RT 90` and `LT 90`), or highlight this in the video.

Display slide 7 and recap the basic Logo commands that pupils have just learnt about.

Display slide 8, which shows guided exploration questions, and allow pupils time to experiment with Logo commands. Hand out the 'Basic commands' activity sheet and ask pupils to write their answers in the first table.

Explain that you can also combine commands, rather than typing them in step by step. Display slide 9 and play the video on the slide, or demonstrate how to combine a few commands together on one line, eg `FD 100 RT 90 FD 100`.

Introduce two more tools, **PU** for 'pen up' and **PD** for 'pen down'. Display slide 10 and play the video on the slide, or demonstrate in Logo: type **PU** and then move the turtle, showing that it stops leaving a trail, and when you are ready to draw again, type **PD** and then continue programming as normal. Point out that these two commands, along with **CS**, are not followed by numbers.

	Note: In Scratch, pupils learn about 'setup' and the need to use the **pen down** block before they start to make their code 'work'. In Logo, the pen is automatically down unless the user raises it. Display slide 11. Ask pupils to answer the questions in the second table in the 'Basic commands' activity sheet.
Activity 2 (Slides 12–13) 15 mins	**Creating a code snippet** Display slide 12. Explain that you have created a code snippet (a chunk of commands) to create one of the numbers from 0 to 9, and pupils need to work out which number it is. Read out the commands `FD 100 RT 90 FD 200` and draw the lines with a pen on your classroom board as you go along. Ask pupils to follow on their whiteboards, starting in the top left, facing right. Ask pupils which number they have drawn (7). Ask pupils to use Logo to program the turtle to draw the same digit by following the commands. Compare their work and evaluate whether the instructions worked. Display slide 13. Ask pupils to choose one more digit from the slide and write down instructions to create the digit, then test them in Logo. Choose pupils to share their code snippets and explain their thinking. **Scaffolded activity:** Some pupils may find it useful to have a copy of the Lesson 1 'Glossary' handout to remind themselves of the possible commands during this activity.

Plenary
(Slides 14–15)
 	
5 mins
	Display slide 14. Ask pupils to solve a Parson's Problem, in which they need to order the commands to create the digit 0.
	
	Ask them how they worked it out, then display slide 15 to reveal the correct answer:
	
	`FD 100 RT 90`
	`FD 200 RT 90`
	`FD 100 RT 90`
	`FD 200 RT 90`

Next time (Slides 16–17) 5 mins	Review the assessment and summary slides.

This resource is available online at ncce.io/pg4a-1-p. Resources are updated regularly — please check that you are using the latest version.