Junior Jam

iMedia

Level 1 iProgram – iLogic

KS2 PPA Cover Planning

- Work Schemes
- Learning Objectives
- Key Skills

Level 1

iLogic Unit Length: 5 – 7 hours

Course overview: Pupils will use games to learn key coding skills. They will learn how to use the coding language 'Blockly' to introduce key programming elements such as functions, loops, conditionals and variables. This will progress into using code to create 'Spirograph' style artwork and creating a modern version of an Etch-A-Sketch.

Learning Outcome for the course: To learn what algorithms are and use them to code a variety of programs. They will know what functions are and that computer science is the art of blending human ideas with digital tools.

Keywords: Algorithm; Computer Science; Programming; Blockly; Conditional; Variable; Binary; Computer Scientist; LED; Repeat; Angle

Apps Used Include: Tynker, Lightbot, Hopscotch, Binary, Sphero Edu.

Learning Session 1: Pupils will be introduced to computer science looking at the evolution of computing, its history and functionality within the present day. By looking at how computers communicate and the introduction of the programming language 'Blockly', Pupils will write a series of programs to achieve a set of simple tasks.

Learning Session 2: Pupils will begin learning about algorithms and that they are sets of functions or instructions that make up a code. Pupils will understand the importance of getting an algorithm correct. They will then use algorithms to solve levels on the Lightbot app and then proceed to use them to try and solve Rubik's cubes.

Learning Session 3: Pupils will continue to focus on algorithms, ensuring they are comfortable in their understanding and ability to break a problem down. Extra rules, such as the use of loops, will be introduced to help pupils simplify their instructions, emphasising the advantage of using repetition and sequence. Pupils will be set the task of creating shapes using algorithms on the Hopscotch app.

Learning Session 4: This learning session is all about variables, what they are, and how to use them. Pupils will learn that variables in coding represent values that can change. This knowledge will be used to create shapes and patterns that look like a spirograph.

Learning Session 5: Pupils will develop their ability to create algorithms within a practical context, evaluating and solving a problem efficiently. This is followed by the introduction of conditionals, allowing pupils to create their own set of rules enabling them to use the app 'Hopscotch' to create their own Etch-A-Sketch.

Learning Session 6: Pupils will program a physical robot called Sphero to do a series of tasks. They will use the programming language Blockly to control Sphero to move over an arrow laid out on the floor, change the light inside to the same colour as the arrow and then return to the centre.

Learning Session 7: During this learning session, pupils will be tasked with using the knowledge they have gained throughout this course to create a more advanced piece of artwork so they can set up an art gallery in the classroom and showcase their work to the other pupils.

Contingency: Additional lesson plans are in place for less able pupils and higher ability pupils.

iMedia

In this document we will provide you with key information relating to our PPA Cover

Secure Website

We have created a unique portal for your school on our secure website, where you can access key information. We have found this to be a quick and easy way to provide all the information you require. Using your login, you can access our relevant policies and instructor information, including photos for identification purposes. The website address is www.juniorjam.co.uk/protected; please use the username and password from your order confirmation. You will also be given a restricted-access user, which means you can share this log-in with your staff without them being able to access personal data or your order information. We ask that, when in the portal, you update the key contacts for the school, including your subject leaders.

OFSTED, Planning and Overview Documents

Shortly after booking, the main contact will receive an email containing your planning documents. By clicking the links in this email, you can view the planning, unit overviews, and National Curriculum links for each level we are delivering. These documents are important and necessary should OFSTED decide to conduct a Deep Dive into one of the subjects we are providing. If your subject coordinators need access to these documents, they can be found in the Deep Dive section of your portal, accessed through the restricted-access user. If OFSTED schedules a visit on a day we are present, please contact the Junior Jam office so we can inform our staff members. Within the portal, our dedicated Deep Dive section provides all the key information behind our rationale for the 3 I's and guides you to the documents needed for a successful inspection of the subject we are teaching. We provide progression maps, curriculum links, short-term planning, learning objectives for each lesson, and knowledge organisers. We are happy for you to add our knowledge organisers to your website.

Assessment

At the end of each half term, our staff will produce a Course Evaluation for each class they teach. This will directly link to the National Curriculum and detail how the class, as a whole, has achieved key curriculum objectives. The evaluations will be accessible via your portal. Junior Jam also offers Reporting & Assessing, where each child receives individual grades at the end of each half term—this is an optional extra and must be requested with your sales agent prior to the course starting.

A written report for your pupils is outside the scope of your PPA Cover contract. However, if you provide our staff member with time and resources during their PPA teaching time, they will endeavour to complete it for you — this time cannot be during lunch or break. If no time is available within your PPA Cover, additional time can be requested from your Junior Jam sales agent.

Requirements

The lessons require access to a smartboard or projector. Staff will connect their Junior Jam iPads to the boards using our own cables and connectors.

PPA Questionnaire

Before your first PPA Cover session, our instructor will arrive 30 minutes early to complete a brief questionnaire about your school and the classes they will be teaching. If you could arrange for either the main contact or another member of your team (SLT/Class Teacher) to go through this with our staff member, it would greatly benefit the lessons. You can also use this time to show our staff around the school and explain your safeguarding and behaviour policies.

iMedia Uploads

As part of our iMedia provision, you will be able to view and share some of the work pupil's produce.
Our staff will upload pupil's work on our secure website. Again, these can be found on your portal, within the Impact section of the Deep Dive tab. Work will be viewable at the end of each completed half term. There are some subjects where uploads are not produced due to GDPR and safeguarding; for more information on this please view our Digital Procedure Policy within the secure section of our website. The work uploaded will vary depending on the specific topic being taught.

Level 1 iLogic: Curriculum links

The learning pathways for each iMedia subject are in line with the Curriculum 2014. Below outlines all the curriculum points hit during this unit. iMedia levels are topic-based so pupils will be learning beyond these attainment targets and in real-life contexts.

Curriculum 2014

Computing

- 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.
- Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.
- Select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information.
- Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Level 1 iLogic: - Learning Objectives and Lesson Outcomes

Learning Session 1

Learning Objective:
Today we will learn about computer science. We will begin by looking at the meaning of this term, then adding simple code to a program to make it run.

Lesson Plan:

Introduction 5-10 Mins	**Focus**	Pupils will be introduced to the course and what they will be doing over the next half term. Pupils will also look at the keywords: - Computer Science - Binary - Programming - Blockly
	Teaching Point	The instructor will define each keyword and introduce the idea of computer science and what that entails.
Main Content 10-15 Mins	**Focus**	Pupils will explore the fact that computer science is the art of using computers to solve problems. They will learn what binary is and will be introduced to the programming language 'Blockly'.
	Teaching Point	The instructor will teach pupils that binary is the language that a computer speaks and will ask pupils to write their names in binary. Pupils will then learn that Blockly is a coding language and will be used on the app 'Tynker' to control a character to complete tasks.
Demonstration 5-10 Mins	**Instructor-Led Activity**	The instructor will demonstrate how to program a character using the Blockly language on Tynker.
Task 25 Mins	**Focus**	Pupils will use Tynker to build sequences using instructions such as 'walk' or 'jump'. The blocks at the top of the screen are used first, they must be placed in the correct order to complete each level.
	Differentiation/ Extension	Pupils will be able to write different words or their full name in binary and progress further on the app Tynker.
Plenary 5 Mins	**Recap**	Pupils will recall what computer science is, the characters of the binary alphabet and what programming means.
	Lesson Conclusion	Pupils can ask questions to consolidate their learning and pack away any resources.

Learning Session 2

Learning Objective:
Today we will learn about Algorithms, what they are, how they work and why we use them.

Lesson Plan:

Introduction 5-10 Mins	**Focus**	Pupils will recap the previous learning session's content and understand this session's learning objective. Pupils will look at the keyword: - Algorithm
	Teaching Point	The instructor will define that an algorithm is a set of instructions usually written for a computer.
Main Content 10-15 Mins	**Focus**	The pupils will explore what algorithms can do and how to use them to solve problems; they will find out that computers always follow instructions exactly as given.
	Teaching Point	The instructor will teach pupils about the importance of giving the correct instructions. Pupils will watch a video of a robot being programmed to learn that any instructions given need to be very specific. The instructor will ask pupils for an algorithm to make a bowl of cereal. They will also use algorithms to try solving a Rubik's cube before using them in the Lightbot app.
Demonstration 5-10 Mins	**Instructor-Led Activity**	The instructor will demonstrate how algorithms can help solve Rubik's cubes. The instructor will also take the pupils through using the Lightbot app and show them how they can direct characters on the iPad to complete tasks.
Task 25 Mins	**Focus**	Pupils will try solving one side of a Rubik's cube by following algorithms. They will also code a robot called 'Lightbot' in a 3D space to light up platforms to get to the next level, and they will learn that giving the wrong instructions to Lightbot will cause them to reassess their code and debug it to achieve success in that level.
	Differentiation/ Extension	Pupils will be able to solve at least one side of the Rubik's cube. They will also progress further on the Lightbot app, using more complex algorithms that require repeats.
Plenary 5 Mins	**Recap**	Pupils will recall what algorithms are, reasons why a robot can solve Rubik's cubes faster than humans and tell the instructor an algorithm for completing an everyday task such as making a bowl of cereal.
	Lesson Conclusion	Pupils can ask questions to consolidate their learning and pack away any resources.

Learning Session 3

Learning Objective:
Today we will learn how to create shapes using algorithms in Hopscotch.

Lesson Plan:

Introduction 5-10 Mins	**Focus**	Pupils will recap the previous learning session's content and understand this session's learning objective. Pupils will look at the keywords: - Repeat - Angle
	Teaching Point	The instructor will define each keyword and introduce how to write code to create shapes, using certain functions such as 'Repeat'.
Main Content 10-15 Mins	**Focus**	Pupils will explore the keyword Repeat when it comes to creating their code.
	Teaching Point	The instructor will teach pupils that repeats can shorten algorithms so that they are easier to create and easier to read. This will be done by starting out with long drawn-out algorithm and demonstrating that it can be done in a much shorter and more efficient way by using repeats.
Demonstration 5-10 Mins	**Instructor-Led Activity**	The instructor will demonstrate how to code shapes on the app 'Hopscotch' using repeats.
Task 25 Mins	**Focus**	Pupils will use the app Hopscotch to make characters move around the screen; these movements will create shapes when coded correctly. Pupils will start by coding a square without using repeats and then progress onto using repeats to shorten the code. Finally, pupils will change the algorithms to create other shapes like hexagons and triangles.
	Differentiation/ Extension	Pupils will code multiple characters on one screen to create a different shape when the code begins. Pupils will also begin to customise other elements of their code such as changing the shape, colour and size.
Plenary 5 Mins	**Recap**	Pupils will recall what algorithms and repeats are, what the angle for the corner of a square is, and what might need changing in the code to change the shape that is created.
	Lesson Conclusion	Pupils can ask questions to consolidate their learning and pack away any resources.

Learning Session 4

Learning Objective:
Today we will learn about Variables and how they can affect a basic algorithm.

Lesson Plan:

Introduction 5-10 Mins	**Focus**	Pupils will recap the previous learning session's content and understand this session's learning objective. Pupils will look at the keyword: - Variable
	Teaching Point	The instructor will define variables and introduce the basics of how they are used. Instructors will do this using real-world/everyday explanations to make it more relatable to the pupils and therefore easier to understand.
Main Content 10-15 Mins	**Focus**	The pupils will look at an everyday product such as t-shirts, to further understand variables before using them.
	Teaching Point	The instructor will teach pupils about variables by explaining that if there are different colours and different sizes of something, there is a variety of that thing, 'size' and 'colour' being the variables that can change. Pupils will learn that variables can be used for anything in our code that is subject to change, such as the length of a line, which can increase as the program continues to run.
Demonstration 5-10 Mins	**Instructor-Led Activity**	The instructor will demonstrate how to add a variable, give it a name and change it in the app Hopscotch.
Task 25 Mins	**Focus**	Pupils will code shapes that start with a short line in the centre and make their way out and across the screen by using a variable to increase the length of each line every time a new line is drawn.
	Differentiation/ Extension	Pupils will create different expanding shapes using the techniques learnt in Learning Session 2. Pupils will also begin to experiment with other parts of their code, such as colour, line width and angles, to make shapes and patterns that look like a spirograph.
Plenary 5 Mins	**Recap**	Pupils will recall what variables are, how they help us in programming and what the angle is for a corner of a triangle.
	Lesson Conclusion	Pupils can ask questions to consolidate their learning and pack away any resources.

Learning Session 5

Learning Objective:
Today we will learn how to code one object to do different things using conditionals, for example, move left when the iPad is tilted left.

Lesson Plan:

Introduction 5-10 Mins	**Focus**	Pupils will recap the previous learning session's content and understand this session's learning objective. Pupils will look at the keyword: - Conditionals
	Teaching Point	The instructor will define conditionals and explain them in a way that's easier to understand using the words **when** or **if**.
Main Content 10-15 Mins	**Focus**	Pupils will explore the keyword conditionals and that it means doing an action or task when something else happens, such as "**when** it is dark, **then** turn on the light."
	Teaching Point	The instructor will introduce an Etch-A-Sketch by showing a video of one being used to create a picture, then instead of using the previous conditional 'When Game Starts,' pupils will begin to use 'When iPad is Tilted'.
Demonstration 5-10 Mins	**Instructor-Led Activity**	The instructor will demonstrate how to code a character to draw a line by using different conditionals. The conditionals will control the direction the characters move in the app Hopscotch.
Task 25 Mins	**Focus**	Pupils will create a modern Etch-A-Sketch by using tilts to control the character by coding on an iPad rather than with physical dials. They must create a conditional for all four directions.
	Differentiation/ Extension	Pupils will be able to add variables to change the colour of the line as they draw it. They can then add separate controls with 'When [colour] is tapped' conditionals to change the line to that chosen colour. Finally, they can debug errors in their code.
Plenary 5 Mins	**Recap**	Pupils will recall what conditionals are and which conditionals are needed to complete a modern digital Etch-A-Sketch.
	Lesson Conclusion	Pupils can ask questions to consolidate their learning and pack away any resources.

Learning Session 6

Learning Objective:
Today we will learn how to code for an external object.

Lesson Plan:

Introduction 5-10 Mins	**Focus**	Pupils will recap the previous learning session's content and understand this session's learning objective. Pupils will look at the keyword: - LED
	Teaching Point	The instructor will show the Sphero robot to the pupils.
Main Content 10-15 Mins	**Focus**	Pupils will explore what Sphero is, how it works and some of its capabilities.
	Teaching Point	The instructor will explain to the pupils that they are going to be controlling the Sphero robot using programming to complete given tasks.
Demonstration 5-10 Mins	**Instructor-Led Activity**	The instructor will demonstrate how to connect their iPads to the Sphero, how to make the Sphero move and how to change the colour of the LED on the Sphero.
Task 25 Mins	**Focus**	From a central starting position, pupils will code Sphero to move to the tip of a coloured arrow of their choice, change the LED colour on the Sphero to the colour of that arrow and then return to the centre.
	Differentiation/ Extension	Pupils will program the Sphero to complete two arrows, with two colour changes. If pupils have completed their Sphero code and are waiting for their turn with the Sphero, they can return to Tynker or Lightbot and progress through more levels using their improved coding skills gained over the last few weeks.
Plenary 5 Mins	**Recap**	Pupils will recall what external object we have been controlling, what would happen if we gave the wrong instructions and what blocks are needed to make Sphero complete a desired task set out for them.
	Lesson Conclusion	Pupils can ask questions to consolidate their learning and pack away any resources.

Learning Session 7

Learning Objective:
Today we will learn how to create a piece of art using various programming techniques such as conditionals and variables.

Lesson Plan:

Introduction 5-10 Mins	**Focus**	Pupils will recap the learning from the whole course's content and understand this session's learning objective.
	Teaching Point	The instructor will ask and answer questions about any aspect that pupils have learnt about in this course. Pupils will be creating artwork using programming.
Main Content 10-15 Mins	**Focus**	Pupils will be reminded of all the techniques used to program so far.
	Teaching Point	The instructor will recap various techniques on Hopscotch so that pupils can progress with these techniques to create a main project.
Demonstration 5-10 Mins	**Instructor-Led Activity**	The instructor will demonstrate how to combine variables, conditionals and other functions to create artwork.
Task 25 Mins	**Focus**	When pupils are creating their artwork, they will take the tasks used in previous learning sessions and develop them even further by using new conditionals, variables and changing parts of code that they may not have done previously. Pupils will set up a galloping gallery to display their artwork to the rest of the class.
	Differentiation/ Extension	Pupils will create more interesting shapes and patterns with less prompts before setting up their iPad for the gallery.
Plenary 5 Mins	**Recap**	Pupils have the opportunity to tell the rest of the class how they achieved something in their project.
	Lesson Conclusion	Pupils can ask questions to consolidate their learning and pack away any resources.

Differentiation

Pupils of a lower ability will be encouraged to learn the basic skills that the class are learning. If it is too much for them to move on, they will stay on Tynker, but be encouraged to work to a higher level than the rest of the class did before they moved on.

Pupils of a higher ability will be able to make each of their Hopscotch tasks more advanced by changing different elements of their work. For example, when doing the artwork, they can add more characters that will do more advanced movements or patterns.