

Algorithms & Programming

Algorithms are sets of instructions. We use instructions every day to get things done. A chef follows a recipe to make her favourite dish; the recipe is an algorithm. A pupil may follow a set of instructions to carry out a science experiment in school, those instructions are an algorithm.

Programming is the implementation of algorithms. We learn to write computer programs so that computers can follow our instructions to behave intelligently, Add a little creativity to programming and it often results in innovation.

The workshops that fall under this category all have an element of programming, or at the very least algorithmic thinking within them. Pupils are taught to solve problems by writing and implementing their own algorithms, through dance and magic and more.

App in a Day: An Apps for Good Taster Workshop	"Apps have been changing the way people communicate, work and play. Traditional businesses, from media to retail, have been seeing their business models disrupted by start-ups that amass millions of users within the space of a few months with minimal marketing budgets." (Vision Mobile, 2014) Apps have become an important part of our digital world today and the industry attracts developers and designers from across all age groups, from teenagers to 65+.
Beautiful Numbers: Mathematical Art	This workshop draws the link between Mathematics, Art and Computing and has been adapted from the workshop materials produced at Langley Grammar School. We look at the Fibonacci number sequence and the concept of the Golden Ratio and discuss how this has been applied to art and design throughout the ages, as well as being present in nature. Pupils are encouraged to explore the Fibonacci number sequence and how it is constructed.
Funky Maths Calculator	This workshop addresses the concepts of simple algebraic equations and variables by teaching pupils to create their own calculator using the Scratch programming environment.
Get with the Algo-rhythm	The 'Computing through Dance' project was developed by the Digital Schoolhouse and Langley Grammar School's ICT Department to appeal to girls and incorporate computing in an innovative way into the curriculum. The project starts by creating flow charts of instructions to perform dance moves of a well know dance like; the Hokey Cokey, the rugby team (New Zealand And Tonga) Haka, Michael Jackson Moon Walk or a Tudor dance which many children study in Key Stage 2. The initial objective is to develop the understanding of a sequence and appreciate the importance of accurate instructions.

Just Dance with the Algorithm	Just Dance with the Algorithm was developed by Digital Schoolhouse in partnership with Ubisoft, and is based upon the original workshop 'Get with the Algo-rhythm'. This workshop combines dance and video games to teach core programming and computing concepts in a way that appeals to a diverse range of students. The workshop begins by creating flow charts of instructions to perform dance moves from popular music tracks.
Let's Doodle: What will you create? Also in Hardware and Processing	This is a computing lesson with a difference. This cross-curricular workshop developed with 3Doodler involves no programming, but covers every strand of the Computational Thinking Framework and allows pupils to accelerate and work towards Key Stage 3 strands in the Programmes of Study. The new Design & Technology Programmes of Study are also partially covered at both Key Stage 2 and Key Stage 3.
Let's Play Code Combat: Playing with Python	Code Combat is a multiplayer game to help people learn to program. Through solving puzzles and defeating ogres players progress through the game levels to learn increasingly complex programming concepts.
Let's Play Code Kingdoms	The original Code Kingdoms game referred to in this pack is no longer active, however all principles used throughout this unit can be applied to other graphics-based learning environments.
Loopy Games: An Iterative Games Design Workshop	Loopy Games aims to help pupils design and create their own game using methodology that reflects the processes followed in the UK Games Industry. Developed in consultation and collaboration with Kuato Studios and the Video Games Ambassadors, this workshop brings industry expertise into the classroom.
Machine Code Mario	Machine Code Mario introduces students to binary in an innovative way. Starting with investigating why computers use binary, students explore how to represent decimal numbers in binary and then how to use this knowledge to create Super Mario courses using Super Mario Maker 2 that test the players understanding of binary representation. The design, exploration and development stages of the beginner workshop fit nicely into KS2.
Oddventurous Gaming: Play the	We all play games; it's one of the most popular leisure activities in the UK. Whether it's playing video games or board games or even physical games; participating in them can help spark curiosity and develop important critical thinking & problem solving skills as well as address whatever issues the designer originally intended. This

Game, Be the Game!	workshop aims to teach pupils key concepts of games design. Developed in collaboration with Disney and Playniac the Digital Schoolhouse brings knowledge from the games industry into the classroom.
Part-Baked Games	Often, learning how to create a game can be quite daunting, especially when you consider all the elements that are needed to build it. Part-Baked Games provides the learner with the opportunity to create five different games using Construct 3 that are inspired by the BAFTA YGD rule cards in order to teach learners how to build common game mechanics and therefore provide them with the tools needed to create their own game at a later date. Each of the games are provided in a 'Part-Baked' form which means that all assets required for the game have been added and laid out as though the game were complete. Learners simply follow the instructions to add the game mechanics needed to complete the game.
Part-Baked Games: Chef's edition	Part-Baked Games: Chef's edition has been developed in partnership with Outright Games and introduces students to the concept of prototyping; both on paper and digitally. Learners begin by creating a paper prototype for their own version of Gigantosaurus and then a digital prototype based on these ideas. Students can use the recipe cards included in the resource pack for this workshop to aid them in building their games. They then compare this prototype to the released title and choose one feature to add to their own game. Students then modify their game.
Robo-Challenge Also in Hardware and Processing	The Robo-Challenge workshop is based on materials from the IBM Robo-Challenge competition. A yearly challenge run for year 5 and 6 students in the greater London area. The intention of this workshop is to integrate these outstanding resources within the Digital Schoolhouse educational framework and allow more students to be able to benefit from them.
Scratch Stories: Storytelling...with a twist!	Storytelling is something that captures the hearts and minds of all children. Scratch Stories uses just that to engage pupils in a workshop that not only inspires them to write their own story but to do so in a way that furthers their own learning and development in programming. This workshop covers both the Computing and English programmes of study at Key Stage 2, and many of the learning outcomes (particularly 1 - 5) are taken from the Upper Key Stage 2 Programme of Study for English.
Starlink: Battle for Atlas	This resource was originally developed by Magic Makers which is a Paris-based coding school developing creative programming workshop for kids. Since 2014, they have introduced more than

	10, 000 children to the basics of coding, with the ultimate objective of contributing to the development of creative programming in France. In preparation of the launch of Starlink: Battle for Atlas on October 16 2018, Ubisoft and Magic Makers collaborated to create a dedicated coding program based on the universe of the game.
Surprise Stories	Surprise Stories brings together the programmes of study for English and Computing in a way that is sure to leave the class giggling. The workshop inspires and encourages creativity and brings together creative writing along with key programming concepts.
The Maths Quiz	Taken from the material originally developed at Langley Grammar School, this workshop combines mental maths skills with computing and algorithmic thinking. The day begins by encouraging pupils to think about about algorithms and introduces this concept through magic. Early on pupils are encouraged to decompose existing puzzles and tricks to identify the algorithm behind them as well as extend their learning to develop their own puzzles and magic tricks. Pupils then move onto the concept of variables and random numbers using unplugged activities before the quiz is introduced.
iRobot	This workshop asks and answers the question 'What is artificial intelligence?'. Machines can do the most clever things, from beating humans at chess to flying planes and producing works of art. But machines carry these activities out by following computer programs. Programs written by humans. The machines are simply following the rules. So then where does the intelligence lie?

Communication & the Internet

The ability to communicate is a key aspect of human behaviour. A lot of technology that surrounds us today involves communication. Our devices communicate with each other so that they can work in sync. From Smart TV's, to our smartphones, tablets and desktop PC's, all our devices share information with each other so that we can work seamlessly from one device to another. In the near future the Internet of Things will connect every day devices, such as our fridge, coffee makers and more to the Internet so that they can work intelligently for us.

In this developing environment it is important for pupils to learn the key concepts that make up the networking and communication strand of the new Computing Programmes of Study. Each workshop that falls under this category has significant elements of it devoted to the teaching of this area; all of which will include a range of unplugged activities to make the concepts more accessible to the younger audience.

Cryptography: Secrets, Secrets, Secrets. Everyone has them!	The Digital Schoolhouse has teamed up with the Education Department at Bletchley Park to create a lesson that teaches pupils how to use advanced spreadsheet functionality covered at Key Stage 2 and Key Stage 3 in a fun and exciting lesson using secrets and encryption as the focus of the lesson.
Eco Gamer	Did you know that over 75% of video game packaging is made of plastic? Currently, only a small amount of packaging is made from recycled materials and it can be difficult to find somewhere that will recycle the packaging once you have finished with it. In 2019, SEGA developed new, revolutionary packaging for Football Manager 2020 that was 100% recycled and 100% recyclable. Here, you'll discover more about green practices within the video games industry...
Networks Unplugged	This workshop is based on the 'Networks Unplugged' material written by Mark Dorling and published with Computing At School (CAS). Networks Unplugged has been developed with the CS Unplugged pedagogy in mind; and therefore incorporates their activities.

**App in a Day: An Apps
for Good Taster
Workshop**

**Loopy Games: An Iterative
Games Design Workshop**

Data Representation

Computers are digital machines, so ultimately all the data that we see on a computer is actually stored in electrical circuits as electrical pulses which we commonly represent as 1's and 0's. These 1's and 0's are known as Binary.

All the workshops that fit under this category consider how computers represent information. While some workshops such as Crazy Graphics look at how computers represent images and the benefits of digital imagery. Others in development will consider the representation of sound and text.

Big Data	Big data is big business. This workshop explains how and why companies make money from our data. Students begin by learning about the difference between data and information, examine how an algorithm to find the highest number in a list will use a sorting algorithm and introduce the concept of filtering.
Crazy Graphics	This workshop enables pupils to lift the lid of computer graphics and explore how computers deal with the visually rich world around us. During this day pupils cover not only computational concepts, but also enable opportunities for coverage of programmes of study for Art, whilst building in numerical skills and understanding required for the Maths curriculum.
Databases Unplugged	This workshop is based on the material written by Mark Dorling and published with CS Unplugged. The day begins with a series of unplugged activities to introduce pupils to the fundamental concepts of databases. The skills and concepts developed here begin at a very simple level but progress to cover abstract concepts such as Relational Databases. The series has been aligned to match the scope, range and targets recommended in the Computing At Schools document "A Curriculum for Computing."
Machine Code Mario	Machine Code Mario introduces students to binary in an innovative way. Starting with investigating why computers use binary, students explore how to represent decimal numbers in binary and then how to use this knowledge to create Super Mario courses using Super Mario Maker 2 that test the players understanding of binary representation. The design, exploration

	and development stages of the beginner workshop fit nicely into KS2.
Switched on Sound	This workshop gives students the opportunity to explore some of the history of computerised music, including automation, punch cards and the development of digital music by composing their own multitracked piece of music using a Nintendo LABO piano. LABO is Nintendo's DIY cardboard kit crafted to work with Nintendo Switch.

Hardware & Processing

All workshops that fall under this category allow pupils to explore and learn about the hardware components that make up computers and computer systems. Pupils will be able to experiment with and manipulate a range of hardware and computing devices in order to improve their development in this area. Unplugged activities will also be used to illustrate key concepts in how computers process and execute instructions.

See above for more information:

Let's Doodle: What will you create?	Robo-Challenge
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IT/Digital Literacy & Online Safety

A key part of the new Computing Programmes of Study is the development of digital literacy skills to enable our pupils to become effective users of new technologies. Workshops that fall under this category will include skills in: movie making, graphics and animation as well as using and learning about new technologies.

E-Safety is an important strand in the new Computing Programmes of Study as well as schools' safeguarding strategies. Workshops are currently in development that effectively and creatively teach students to become responsible users of technology.

Crazy Mazes	What makes a maze crazy? This workshop will inspire pupils to rise to the challenge to discover the answer for themselves. Developed at the Townley Grammar Digital Schoolhouse, this workshop provides pupils with an excellent foundation for programming and development. Pupils begin the day by working through the facts related to computers and using these as a starting point for discussion.
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Cyber Safe	The 'Cyber Safe' workshop was developed by Estelle Ashman at the Gildredge House School Digital Schoolhouse to incorporate unplugged activities into the teaching of e-safety and introduce the iDEA Award badges.
Digital Footprint	The 'Digital Footprint' project was developed by the Digital Schoolhouse and V. Allen from Millais School to introduce pupils to the concept that their online activity leaves in effect a 'digital footprint' that can be used to identify them.
See above for more information:	Eco Gamer
App in a Day: An Apps for Good Taster Workshop	Let's Doodle: What will you create?
Loopy Games: An Iterative Games Design Workshop	Oddventurous Gaming: Play the Game, Be the Game!
Part-Baked Games	Switched on Sound

