Lutley
Primary School

Curriculum
Progression Document
Computing

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Lutley Primary School

Computing Curriculum Intent

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As a values-led school, our curriculum is underpinned by Learning, Caring, Aiming High-Together. It is through these values that we develop the whole child. It is our intent that children leave Lutley ready to move forward in their learning, kind, resilient and well equipped digital and global citizens.

Computing Subject Intent

It is our intent that we develop technology literate children, using a range of devices and applications to enhance, motivate and support their learning in innovative ways. Lutley children will be responsible digital citizens who appreciate the benefits of using technology to create their own content. They will develop a range of strategies to keep themselves safe from the potential dangers online to effectively connect with the world.

Essential Characteristics in the Subject

Competence in coding for a variety of practical and inventive purposes, including the application of ideas within other subjects. • The ability to connect with others safely and respectfully, understanding the need to act within the law and with moral and ethical integrity. • An understanding of the connected nature of devices. • The ability to communicate ideas well by using applications and devices throughout the curriculum. • The ability to collect, organise and manipulate data effectively

Threshold Concepts

Code
This concept involves developing an understanding of instructions, logic and sequences.
Connect
This concept involves developing an understanding of how to safely connect with others.
Communicate
This concept involves using apps to communicate one's ideas.
Collect
This concept involves developing an understanding of databases and their uses

Computing in the Early Years Foundation Stage

Developing Early Computing Skills

Developing Early Computing Skills

Each area of the EYFS curriculum has an **Early Learning Goal**, which is the standard that a child is expected to achieve by the end of their reception year. The ELG (Early Learning Goals) covers all of the 7 areas of learning as specified in the Early Years Foundation Stage Curriculum.

The following link to the teaching and learning of computing in our EYFS:
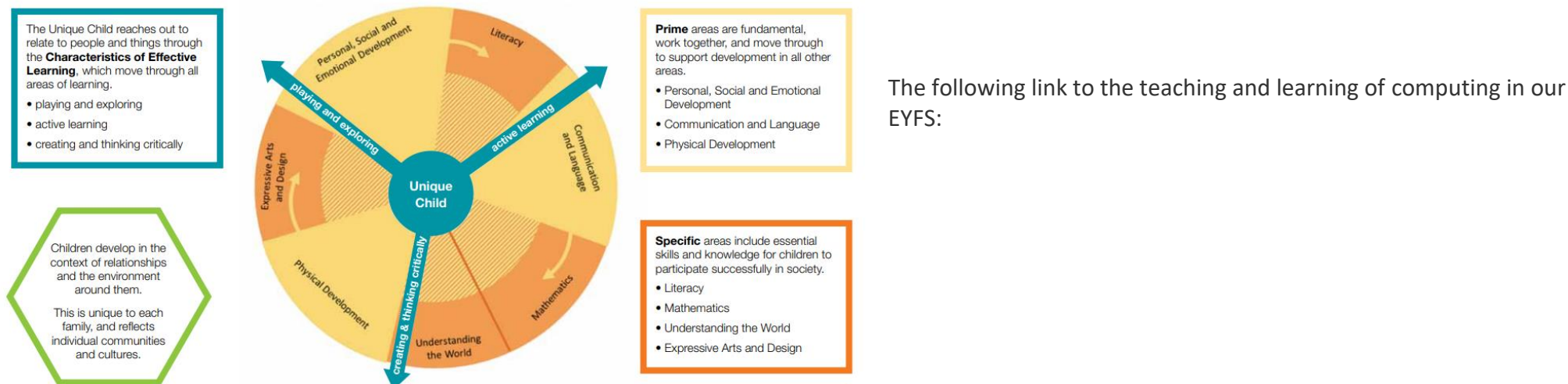
ELG 15: Technology	ELG 15: Technology (Exceeding)
• Children recognise that a range of technology is used in places such as homes and schools. • They select and use technology for particular purposes.	• Finds out about and uses a range of everyday technology. • Selects appropriate applications that support an identified need, for example in deciding how best to make a record of a special event in their lives, such as a journey on a steam train.

Computing and the National Curriculum

Computing and the National Curriculum: Key Stage One

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

Aims

The national curriculum for computing aims to ensure that all pupils:

- Can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation.
- Can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems.
- Can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems.
- Are responsible, competent, confident and creative users of information and communication technology.

Pupils should be taught to:

- Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.
- Create and debug simple programs.
- Use logical reasoning to predict the behaviour of simple programs.
- Use technology purposefully to create, organise, store, manipulate and retrieve digital content.
- Recognise common uses of information technology beyond school.
- Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

Computing and the National Curriculum: Key Stage Two

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

Aims

The national curriculum for computing aims to ensure that all pupils:
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- Can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems.
- Are responsible, competent, confident and creative users of information and communication technology.

Pupils should be taught to:
- 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.
- Understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration.
- Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.
- Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that 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.

Implementation of Whole School Computing Programme of Study

Lutley Primary School's Computing Programme of Study Y1 - 6

Kapow Scheme of work Overview with links to National Curriculum

Key stage 1 - National Curriculum Computing subject content Pupils should be taught to:	Kapow Topics
Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.	Y1 > Programming: Beebots, Algorithms Unplugged, Y2 > What is a Computer?, Programming: ScratchJr, Algorithms and Debugging, International Space Station
Create and debug simple programs.	Y1 > Programming: Beebots, Algorithms Unplugged Y2 > Programming: ScratchJr, Algorithms and Debugging
Use logical reasoning to predict the behaviour of simple programs.	Y1 > Programming: Beebots, Digital Imagery Y2 > Programming: ScratchJr, Algorithms and Debugging
Use technology purposefully to create, organise, store, manipulate and retrieve digital content.	Y1 > Getting Started, Digital Imagery, Introduction to Data, Rocket to the Moon Y2 > Word processing, Programming: ScratchJr, International Space Station, Stop Motion
Recognise common uses of information technology beyond school.	Y1 > Getting Started, Digital Imagery, Introduction to Data Y2 > What is a Computer?, Stop Motion
Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.	Y1 > Getting Started, Digital Imagery Y2 > Word processing

Key stage 2 - National Curriculum Computing subject content Pupils should be taught to:	Kapow Topics
Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.	Y3 > Journey Inside a Computer, Programming: Scratch Y4 > HTML, Computational Thinking Y5 > Micro:bit, Sonic Pi Y6 > Intro to Python, Skills Showcase
Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.	Y3 > Programming: Scratch Y4 > HTML, Investigating Weather, Computational Thinking Y5 > Micro:bit, Sonic Pi Y6 > Intro to Python, Skills Showcase
Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.	Y3 > Journey Inside a Computer, Programming: Scratch Y4 > HTML, Computational Thinking Y5 > Micro:bit, Sonic Pi, Y6 > Intro to Python, Skills Showcase
Understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration.	Y3 > Networks, Emailing, Journey Inside a Computer Y4 > Collaborative Learning, How the Internet Works, Y5 > Micro:bit, Search Engines, Mars Rover Y6 > Bletchley Park, Skills Showcase, Big Data
Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.	Y3 > Digital Literacy Y4 > How the Internet Works Y5 > Search Engines Y6 > Bletchley Park, Skills Showcase
Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.	Y3 > Emailing, Top Trumps Databases, Digital Literacy Y4 > Collaborative Learning, Website Design, Investigating Weather, Y5 > Online Safety, Micro:bit, Sonic Pi, Mars Rover Y6 > Bletchley Park, Skills Showcase, Big Data
Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	Y3 > Emailing Y4 > Website Design, HTML, Investigating Weather Y5 > Online Safety, Search Engines, Y6 > Bletchley Park, Skills Showcase, Big Data

	Autumn		Spring		Summer	
EYFS	**All about me / People who help us** Pupils to take a 'selfie' on an iPad for their self-portrait. CD player in each classroom for children to independently play music/stories. Introduce pupils to the computers/how to use a mouse. Children to create a fireworks picture on the computer- **Revelation Art Simple.** Making marks and clicking to select colours. Understanding the need for being safe on iPads/Computers/phones- pin codes to protect them. Introduce the **Beebots**. Pupil begin to learn how to programme them with an adult. - **Cameras**- pupils learn how to take a photograph and scroll through to find their photographs.		**Hot and cold places / Animals** Learning how to navigate around on **Google Expeditions** by exploring a Dinosaur museum and learning facts. Begin to navigate themselves on Espresso, to watch a video about Dinosaurs. Using **cameras** to delete photographs. Go on a walk around the school to identify different types of technology- e.g. the kitchen and office. Begin to use devices such as Chromebooks. Introduction to **Microsoft Word**- its purpose and how to use it. Learning to show increasing control creating pictures. Create farm animals, selecting colours and showing good control using **Revelation Art Simple**. Begin to learn how to log on the school system with their own username and password.		**Space / Under the sea** Learning to use **Beebots** linking to direction on space related mat. Giving instructions to travel to the different planets. Developing confidence with **Google Expeditions,** using it to learn facts. Identifying a range technology at home and at school e.g. Alexa. Independently and safely use technology to enhance their play e.g. **cameras, iPads**. - Learning to select different applications linked to their current interests. E.g. **Microsoft Word, Espresso Videos, Revelation Art** etc. Finding out about and use an increasing range of technology. Using Smart watches / digital clocks / stop watches or heart monitors - for exercise. Exploring how technology can help us monitor the weather. Increasing confidence in logging on to computers using their own username and password.	
Year 1	**Getting Started** *(5 lessons)* Introducing children to logging in and using technology for a purpose, including creating art. **Go to topic** Recognising common uses of information technology. Logging in and saving work on their own account. Knowing what to do if they have concerns about content or contact online. Understanding of how to create digital art using an online paint tool Learning to locate where keys are on the keyboard. Developing basic mouse skills.	**Programming: Beebots** *(5 lessons)* Using Bee-Bots to navigate an area and constructing simple algorithms, through the story of The Three Little Pigs. **Go to topic** Learning how to explore and tinker with hardware to find out how it works. Constructing a series of instructions into a simple algorithm. Applying computing concepts to real world situation in an unplugged activity.	**Algorithms Unplugged** *(5 lessons)* Learning how computers handle information by exploring 'unplugged' algorithms- completing tasks away from the computer. **Go to topic** Understanding how to create algorithms. Learning that computers need information to be presented in a simple and clear way. Understanding how to break a computational thinking problem into smaller parts in order to solve it.	**Digital Imagery** *(5 lessons)* Taking and manipulating digital photographs, including adding images found via a search engine. **Go to topic** Using technology purposefully to create, organise, store, manipulate and retrieve digital content. Knowing what to do if they have concerns about content or contact online. Using logical reasoning to predict the behaviour of simple programs. Using cameras or tablets to take photos.	**Introduction to Data** *(5 lessons)* Learning about what data is and how it can be represented and using these skills to show the findings of a minibeast hunt. **Go to topic** Using technology purposefully to create, organise, store, manipulate and retrieve digital content. Selecting software appropriately. Recognising uses of technology beyond school.	**Rocket to the Moon** *(5 lessons)* Appreciating the value of computers, understanding that they helped us get to the moon. **Go to topic** Using technology purposefully to create, organise, store, manipulate and retrieve digital content. Selecting software appropriately.
Year 2	**What is a Computer?** *(5 lessons)* Children explore exactly what a computer is, identifying and learning how inputs and outputs work, how computers are used in the wider world and designing their own computerised invention. **Go to topic** Learning about inputs and outputs and how they are used in algorithms. Understanding what a computer is and the role of individual components.	**Word Processing** *(5 lessons)* Using their developing word processing skills, pupils write simple messages to friends and learn why we must be careful about who we talk to online. **Go to topic** Using word processing software to type and reformat text. Understanding the importance of staying safe online.	**Programming: Scratch Jr** *(5 lessons)* Using the app 'ScratchJr', pupils programme a familiar story and an animation of an animal, make their own musical instruments and follow an algorithm to record a joke. **Go to topic** Creating and debugging simple programs. Using logical reasoning to predict the behaviour of simple programs. Understanding what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions. Using technology purposefully to create, organise, store, manipulate and retrieve digital content.	**Algorithms and Debugging** (5 lessons) Identifying problems with code using both 'unplugged' and 'plugged' systems to diagnose and correct errors in an algorithm- a process known as 'debugging'. **Go to topic** Creating and debugging simple programs. Using logical reasoning to predict the behaviour of simple programs. Understanding what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.	**International Space Station** (5 lessons) Building on their understanding of how computers sense the world around us, pupils learn how data is collected, used and displayed to keep astronauts safe on-board the ISS. **Go to topic** Using technology to create and label images and to put data into a spreadsheet. Consider inputs and outputs to understand how sensors work.	**Stop Motion** (5 lessons) Pupils create simple animations, storyboarding their ideas then decomposing it into small parts of action to be captured using Stop Motion Animation Software. **Go to topic** Using technology purposefully to create, organise, store, manipulate and retrieve digital content Understanding how to use tablets or computers to take photos

Year 3	**Emailing** *(5 lessons)* Pupils learn how to send emails, including attachments and how to be responsible digital citizens. **Go to topic** Learn about cyberbullying and fake emails. Understanding the purpose of emails.	**Journey Inside a Computer** *(5 lessons)* Children learn about the different parts of a computer through role-play and develop their understanding of how they follow instructions. **Go to topic** Understanding what different components of a computer do. Understanding that programs execute by following precise and unambiguous instructions.	**Top Trumps Databases** *(5 lessons)* Developing their understanding of data and databases, children play with and create their own Top Trumps cards, learning how to interpret information by ordering and filtering. **Go to topic** Using technology purposefully to create, organise, store, manipulate and retrieve data.	**Digital Literacy** *(5 lessons)* Developing their video skills, pupils create a book trailer, storyboarding their trailers before then filming and editing their videos, adding effects such as transitions, music, voice and text. **Go to topic** Using technology purposefully to create, organise, store, manipulate and retrieve digital content, including searching for relevant information.	**Programming: Scratch** *(5 lessons)* Using Scratch, with its block-based approach to coding, pupils learn to tell stories and create simple games. **Go to topic** Using logical reasoning to explain how simple algorithms work. Designing, writing and debugging programs that accomplish specific goals, including controlling or simulating physical systems. Solving problems by decomposing them into smaller parts. Using sequence, selection, and repetition in programs. Working with variables and various forms of input and output.	**Networks** *(5 lessons)* To understand how computers communicate, children learn about networks and how they are used to share information. **Go to topic** Identifying network components and how data is transferred.
Year 4	**Collaborative Learning** *(5 lessons)* Learning to work collaboratively in a responsible way using tools including Google Docs and Sheets. **Go to topic** Selecting using and combining a variety of software to design and create a range of programs, systems and content that accomplish given goals. Understanding opportunities offered by the World Wide Web for communication and collaboration.	**How the Internet Works** *(5 lessons)* We use the Internet every single day, but 30 years ago, it didn't exist. In this topic, pupils learn how data is transferred around the world using the world wide web. **Go to topic** Understanding computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration. Identify components of a network and understand how they used to connect to the Internet.	**Website Design** *(5 lessons)* Pupils design and create their own websites, considering content and style, as well as understanding the importance of working collaboratively. **Go to topic** Selecting using and combining a variety of software to design and create a range of programs, systems and content that accomplish given goals. Understanding opportunities offered by the World Wide Web for communication and collaboration.	**HTML** *(5 lessons)* Pupils explore the language behind well-known websites, while developing their understanding of how to change the core characteristics of a website using HTML and CSS. **Go to topic** Recognising that information on the Internet might not be true or correct. Using technology safely, by recognising acceptable/unacceptable behaviour and knowing what to do when they have concerns about content or contact online. Understanding that websites can be altered by exploring the code beneath the site. Designing, writing and debugging programs that accomplish specific goals. Solving problems by decomposing them into smaller parts.	**Investigating Weather** *(5 lessons)* Children investigate the role of computers in forecasting and recording weather as well as how technology is used to present forecasts. **Coming Soon** Understanding why some sources are more trustworthy than others. Understanding the role of inputs and outputs in computerised devices.	**Computational Thinking** *(5 lessons)* Through developing their understanding of the four pillars of computational thinking, children learn to identify them in different contexts. **Go to topic** Understand what decomposition is and how it facilitates problem solving. Designing, writing and debugging programs that accomplish specific goals Understand abstraction and patterns recognition.
Year 5	**Online Safety** *(5 lessons)* Pupils create an online safety resource for younger children using tools such as presentation software, video tools or a simple stop-motion animation. **Go to topic** Recognising that information on the Internet might not be true or correct. Using technology safely, by recognising acceptable/unacceptable behaviour and knowing what to do when they have concerns about content or contact online.	**Micro:bit** *(5 lessons)* Programming a small device called a micro:bit to display animations or messages on its simple LED display using block coding. **Go to topic** Using block coding to program a device To explore variables and different forms of input. Understand how external devices can be programmed by a separate computer.	**Search Engines** *(5 lessons)* To enable children to quickly and accurately find information and become independent learners, they need to develop their searching skills and learn how to identify trustworthy sources. **Go to topic** Recognising that information on the Internet might not be true or correct. Know how to use key words to quickly find accurate information.	**Sonic Pi** *(5 lessons)* Composing music using code through Sonic Pi, pupils can import samples, add drum beats and compose simple tunes culminating in a 'battle of the bands' using live loops of music. **Go to topic** Selecting using and combining a variety of software to design and create a range of programs, systems and content that accomplish given goals. Using programming language to create music, including use of loops.	**Mars Rover 1** *(5 lessons)* Pupils explore inputs and outputs as well as Binary numbers to understand how the Mars Rover transmits and receives data and how scientists are able to control it to explore another planet! **Go to topic** Understanding computer networks including the internet; how they can provide multiple services, such as the world-wide web; and the opportunities they offer for communication and collaboration.	**Mars Rover 2** *(5 lessons)* Children learn how the Mars Rover is able to send images all the way back to Earth and experiment with online CAD software to design new tyres for it. **Go to topic** Developing their CAD skills. Understanding how image data is transferred.

				Using search technologies effectively, appreciating how results are selected and ranked, and be discerning in evaluating digital content. Recognising that computers transfer data in binary and understand simple binary addition.	
Year 6	**Bletchley Park** *(10 lessons)* Children learn about the history of Bletchley Park, including: key historical figures, how the first modern computers were created at as part of a WWII code breaking team and consider how computers have evolved over time. They then go on to investigate secret codes and how they are created, exploring 'brute force' hacking and learn how to make passwords more secure. <u>**Go to topic**</u> Understanding the importance of secure passwords and using searching and word processing skills to create a presentation. Using programming software to understand hacking, relating this to computer cracking codes in WWII.	**Intro to Python** *(5 lessons)* Building on their knowledge of coding from previous years, children are introduced to the text-based programming language Python, which is the language behind many apps and programs, such as Dropbox. <u>**Go to topic**</u> Editing sound recordings for specific purpose. Learning about the history of computers and how they evolved over time.	**Big Data 1** *(10 lessons)* Children learn how data is collected and stored by exploring barcodes, QR codes and RFID chips, and investigate how collecting big data can be used to help people in a variety of different scenarios. <u>**Go to topic**</u> Understanding that websites can be altered by exploring the code beneath the site. Designing, writing and debugging programs that accomplish specific goals Solving problems by decomposing them into smaller parts.	**Big Data 2** *(10 lessons)* Children learn the difference between mobile data and Wi-Fi and how data is transferred and use their understanding of big data to design their own smart school. <u>**Go to topic**</u> Understanding how learning can be applied to a real world context. Selecting, using and combining a variety of software to design and create a range of programs, systems and content to collect, analyse, evaluate and present data. Understanding that computer networks provide multiple services Understanding how barcodes and QR codes work.	**Skills Showcase** *(5 lessons)* Reflecting on and showcasing their computing skills, pupils create an entire project around a specific theme. **Coming Soon** Showcasing their digital literacy skills. Demonstrating their computational thinking skills by designing and debugging programs, using different inputs and outputs. Understanding how search engines work and knowing how to use them safely and effectively.

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Lutley Primary School

Implementation of Whole School Computing Programme of Study
Progression of Skills
Kapow

Progression of Skills - Kapow

- **Computer Science**
  - Hardware
  - Networks and Data Representation
  - Computational Thinking
  - Programming

- **Information Technology**
  - Using Software
  - Using Email and Internet
  - Using Data
  - Wider use of technology

- **Digital Literacy**

Progression of Skills – Computer Science

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Hardware	• Learning about what technology is and how it is useful • Identify and name technological equipment in the home and at school • Introduction to using cameras to take, view and delete photographs • Introduction to using iPads and computers including mouse and keyboard. • Introduction to keeping safe when using technology • Learning to use Beebots to learn about code and algorithms • Introduction to chromebooks and hard stations.	• Learning how to explore and tinker with hardware to find out how it works • Understanding that computers and devices around us use inputs and outputs, identifying some of these • Learning where keys are located on the keyboard • Learning how to operate a camera	• Understanding what a computer is and that it's made up of different components • Recognising that buttons cause effects and that technology follows instructions • Learning how we know that technology is doing what we want it to do via its output. • Using greater control when taking photos with tablets or computers • Developing confidence with the keyboard and the basics of touch typing	• Understanding what the different components of a computer do and how they work together • Drawing comparisons across different types of computers • Learning what a server does	• Learning about the purpose of routers	• Learning that external devices can be programmed by a separate computer • Learning the difference between ROM and RAM • Recognising how the size of RAM affects the processing of data • Understanding the fetch, decode, execute cycle	• Learning about the history of computers and how they have evolved over time • Using the understanding of historic computers to design a computer of the future • Learning how barcodes, QR codes and RFID work • Learning about some of the methods which cause data corruption
Networks and Data Representation	n/a	n/a	n/a	• Learning what a network is and its purpose • Identifying the key components within a network, including whether they are wired or wireless • Recognising links between networks and the internet • Learning how data is transferred	• Consolidating understanding of the key components of a network • Understanding that websites & videos are files that are shared from one computer to another • Learning about the role of packets • Understanding that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration	• Learning the vocabulary associated with data: data and transmit • Learning how the data for digital images can be compressed • Recognising that computers transfer data in binary and understanding simple binary addition • Relating binary signals (Boolean) to the simple character-based language, ASCII Learning that messages can be sent by binary code, reading binary up to 8 characters and carrying out binary calculations Understanding how bit patterns represent images as pixels	• Understanding that computer networks provide multiple services

Computational Thinking	• Learning to use algorithms to control a Beebot to follow a swt of instructions • Learn to 'debug' a set of instructions if the outcome was incorrect	• Learning that decomposition means breaking a problem down into smaller parts • Using decomposition to solve unplugged challenges • Using logical reasoning to predict the behaviour of simple programs • Developing the skills associated with sequencing in unplugged activities • Learning that an algorithm is a set of step by step instructions used to carry out a task, in a specific order • Follow a basic set of instructions • Assembling instructions into a simple algorithm	• Articulating what decomposition is • Decomposing a game to predict the algorithms used to create it Using decomposition to decompose a story into smaller parts • Learning what abstraction is Learning that there are different levels of abstraction • Explaining what an algorithm is Following an algorithm • Creating a clear and precise algorithm • Learning that computers use algorithms to make predictions Learning that programs execute by following precise instructions Incorporating loops within algorithms	• Using decomposition to explain the parts of a laptop computer Using decomposition to explore the code behind an animation • Using repetition in programs • Understanding that computers follow instructions • Using an algorithm to explain the roles of different parts of a computer • Using logical reasoning to explain how simple algorithms work • Explaining the purpose of an algorithm • Forming algorithms independently	• Solving unplugged problems by decomposing them into smaller parts • Using decomposition to understand the purpose of a script of code • Using decomposition to help solve problems • Identifying patterns through unplugged activities • Using past experiences to help solve new problems • Using abstraction to identify the important parts when completing both plugged and unplugged activities • Creating algorithms for a specific purpose	• Decomposing animations into a series of images • Decomposing a program without support • Decomposing a story to be able to plan a program to tell a story • Predicting how software will work based on previous experience • Writing more complex algorithms for a purpose	• Decomposing a program into an algorithm • Using past experiences to help solve new problems • Writing increasingly complex algorithms for a purpose
Programming	• Learning to use algorithms to control a Beebot to follow a set of instructions • Learn to 'debug' a set of instructions if the outcome was incorrect	• Programming a Bee-bot/Blue-bot to follow a planned route • Learning to debug instructions when things go wrong • Developing a how to video to explain how the Bee-bot/ Blue-bot works. • Learning to debug an algorithm in an unplugged scenario	• Using logical thinking to explore software, predicting, testing and explaining what it does • Using an algorithm to write a basic computer program • Learning what loops are • Incorporating loops to make code more efficient	• Using logical thinking to explore more complex software; predicting, testing and explaining what it does • Incorporating loops to make code more efficient • Remixing existing code • Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected	• Understanding that websites can be altered by exploring the code beneath the site • Coding a simple game • Using abstraction and pattern recognition to modify code	• Programming an animation • Iterating and developing their programming as they work • Beginning to use nested loops (loops within loops) • Debugging their own code • Writing code to create a desired effect • Using a range of programming commands • Using repetition within a program • Amending code within a live scenario	• Debugging quickly and effectively to make a program more efficient • Remixing existing code to explore a problem • Using and adapting nested loops • Programming using the language Python • Changing a program to personalise it • Evaluating code to understand its purpose • Predicting code and adapting it to a chosen purpose • Altering a website's code to create changes

Implementation

Progression of Skills – Information Technology

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Using Software	• Introduction to basic programmes such as Relevation Art simple, word, google expedition, espresso. • Begin to control mouse to select and click on programmes or options within programmes such as: Revelation art simple Introduction to J2E suite	• Using a basic range of tools within graphic editing software • Taking and editing photographs • Understanding how to create digital art using an online paint tool • Developing control of the mouse through dragging, clicking and resizing of images to create different effects Developing understanding of different software tools	• Developing word processing skills, including altering text, copying and pasting and using keyboard shortcuts • Using word processing software to type and reformat text • Using software to create story animations • Creating and labelling images	• Taking photographs and recording video to tell a story. • Using software to edit and enhance their video adding music, sounds and text on screen with transitions	• Building a web page and creating content for it • Designing and creating a webpage for a given purpose • Use Google online software for documents, presentations, forms and spreadsheets. • Work collaboratively with others	• Using logical thinking to explore software more independently, making predictions based on their previous experience • Using software programme Sonic Pi to create music • Using the animation software: Stop Motion to create video animation • Identify ways to improve and edit final products • Independently learning how to use 3D design software package TinkerCAD • Using logical thinking to explore software independently, iterating ideas and testing continuously • Using search and word processing skills to create a presentation • Planning, recording and editing a radio play • Creating and editing sound recordings for a specific purpose • Creating and editing videos, adding multiple elements: music, voiceover, sound, text and transitions to create a video advert • Using design software TinkerCAD to design a product • Creating a website with embedded links and multiple pages	• Using logical thinking to explore software independently, iterating ideas and testing continuously • Using search and word processing skills to create a presentation • Planning, recording and editing a radio play • Creating and editing sound recordings for a specific purpose • Creating and editing videos, adding multiple elements: music, voiceover, sound, text and transitions to create a video advert • Using design software TinkerCAD to design a product • Creating a website with embedded links and multiple pages
Using Email and the Internet	• Introduction to the internet including what it is, how it is used, how to stay safe. • Navigate to internet browser such as explorer or google chrome	• Searching and downloading images from the internet safely		• Learning to log in and out of an email account • Writing an email including a subject, 'to' and 'from' • Sending an email with an attachment • Replying to an email		• Developing searching skills to help find relevant information on the internet • Learning how to use search engines effectively to find information, focussing on keyword searches	• Understanding how search engines work

							and evaluating search returns	
Using Data	• Introduction to data representations – simple graphs on j2E • Introduction to data and information and how technology can store data.	• Introduction to spreadsheets • Representing data in tables, charts and pictograms • Sorting data and creating branching databases • Identifying where digital content can have advantages over paper when storing and manipulating data	• Collecting and inputting data into a spreadsheet Interpreting data	• Understanding the vocabulary associated with databases: field, record, data • Learning about the pros and cons of digital versus paper databases • Sorting and filtering databases to easily retrieve information • Creating and interpreting charts and graphs to understand data	• Designing a weather station which gathers and records sensor data	• Understanding how data is collected	• Understanding how barcodes, QR codes and RFID work • Gathering and analysing data in real time • Creating formulas and sorting data within spreadsheets
Wider use of technology	• Identify technology in home and school and its uses.	• Recognising common uses of information technology, including beyond school • Recognising uses of technology beyond school	• Learning how computers are used in the wider world	• Understanding the purpose of emails	• Understanding that software can be used collaboratively online to work as a team	• Learning what a search engine is	• Learning about the Internet of Things and how it has led to 'big data'. • Learning how 'big data' can be used to solve a problem or improve efficiency

Implementation

Progression of Skills – Digital Literacy

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Digital Literacy	• Identifying technology • Begin to explain the use for specific technology • Begin to log in and out • Begin to explain what to do if they see something on a device that worries them	• Logging in and out and saving work on their own account • Understand the importance of a password • When using the internet to search for images, learning what to do if they come across something online that worries them or makes them feel uncomfortable	• Understanding how to stay safe when talking to people online. Not sharing personal information and what to do if they see or hear something online that makes them feel upset or uncomfortable	• Learning to be a responsible digital citizen; understanding their responsibilities to treat others respectfully and recognising when digital behaviour is unkind • Learning about cyberbullying • Learning that not all emails are genuine, recognising when an email might be fake and what to do about it	• Recognising what appropriate behaviour is when collaborating with others online • Recognising that information on the Internet might not be true or correct and that some sources are more trustworthy than others	• Identifying possible dangers online and learning how to stay safe. • Creating an animation about digital safety • Recognising that information on the Internet might not be true or correct and learning ways of checking validity Learning to use an online community safely	• Understanding the importance of secure passwords and how to create them • Using search engines safely and effectively • Recognising that updated software can help to prevent data corruption and hacking

Implementation

Approaches to Teaching and Learning in Computing

Teaching and learning will focus on a range of agreed entitled experiences and there will be a focus on:

- Developing a clear progression of knowledge and skills linked to the essential learning objectives of the subject. These are set out as overall skill concepts with progression for each year group.
- Ensuring that appropriate opportunities are taken to develop the major cross-curricular skills such as English, Mathematics and Foundation subject skills.
- The study of each key concept, software or hardware in sufficient depth to obtain a depth of knowledge and skills.
- The effective use of a range of software and hardware including: hard stations, mobile devices and cameras.
- The consistent use of a range of teaching and learning approaches to engage pupils in the study of computing. This will include objective and question led learning, observation and recording, class and group discussion, role play, teaching of specific knowledge and retrieval practise activities.
- Using a range of technology in the wider curriculum by making the most of mobile devices.
- Making decisions on when to use technology and for what purpose.
- Encouraging discussion on finding solutions using computers by breaking things down into part – decomposition, pattern recognition, abstraction and algorithms.
- Teacher scaffold of thinking logically through a problem to develop step by step systematic approaches by children.
- Exploring Predict, run, investigate, modify, make when using code to write algorithms to control online and physical systems (e.g Lego, Beebots).
- Use of non-computer based activities to teach computing to support understanding or abstract concepts and deepen learning.
- Strong approach to collaboration activities to strengthen verbal reasoning and sharing of ideas to work towards a goal or outcome.
- Combining elements of teacher modelling / demonstration with explorative child led activities

Implementation

Teaching, Recording, Feedback, Assessment and Reporting

These areas are intrinsically linked, with the aim of making progression against the threshold concepts clear to all stakeholders.

This will happen by:

- Threshold concepts for this subject cover each phase (KS1, LKS2 and UKS2), these concepts form the basis of learning objectives for each lesson taught. These are based on the National Curriculum programme of study.
- Learning objectives are shared with children each lesson.
- Threshold concepts are repeated throughout each phase so that children gain a deep understanding of them, rather than moving on to the threshold concepts for later year groups.
- Children are given a context through which they can explore each learning objective.
- Progress milestones for each threshold concept are used to inform and create steps of success, which are referred to throughout lessons.
- The key knowledge for each unit is shared with children and parents through a knowledge organiser, which may include diagrams, key vocabulary, essential facts and key people associated with the learning. It will also highlight the key learning that will have taken place prior to this and pose questions which will form the basis of the learning enquiry.
- Teaching is focused on input, experiences and activities which promote the development of each threshold concept so that children can achieve the milestones specific to their phase.
- The various methods of recording should demonstrate the children's understanding of the lesson's learning objective and how deeply they have understood the objective based on their success against the steps of success. Evidence of pupils' outcomes should be saved as a record of progress against objectives.
- All Gap Tasks should be meaningful and purposeful and linked to small next steps for progress. They should be scaffolded where necessary.
- Teachers should use observations and work recorded by children to make judgements of the children's current progress against their year group's expectations.
- Regular retrieval practice focuses on children knowing and remembering more of what they have been taught.
- Assessment information will be used to plan future work for the class, including any intervention.
- This continual assessment will be used to report to parents. End of year academic reports will contain comments about an individual pupil's progress against the year group expectations, threshold concepts and progress milestones.
- All formative and summative assessments made will be used to inform discussions around pupils' progress and attainment in the subject at appropriate times, for example discussions with other professionals and reporting to parents on during parent consultation evening etc.

Implementation

Equality of Provision and Inclusion

Teachers ensure that the classroom is an inclusive environment in which pupils feel all contributions are valued and positive steps are taken to allow all pupils to participate. Teaching is responsive to pupil's different learning styles and takes account of their experiences and starting points, in order to engage all pupils. Pupil grouping in the classroom is planned and varied. Teaching styles include collaborative learning so that pupils appreciate the value of working together. All pupils are encouraged to question, discuss and collaborate in problem solving tasks. Teachers challenge stereotypes and foster pupil's critical awareness and concepts of fairness, enabling them to detect bias and challenge inequalities. Resources and displays reflect the experience and backgrounds of pupils, promote diversity and challenge stereotypes across the curriculum. They are reviewed regularly to ensure that they reflect the inclusive ethos of the school.

The curriculum at our school is planned, organised and taught in ways which are compatible with the Equality Act 2010 and school's Equal Opportunities Policy. As a school we will take reasonable and necessary steps to ensure that all children can access a broad and balanced curriculum. This includes ensuring that the environment is accessible as well as lesson content. In some instances, we may consult with external agencies for advice to meet the needs of some children to ensure that they are able to participate in all lessons across the curriculum. A wide variety of strategies are used to ensure that teaching meets the needs of different groups of pupils including those that are more-able, those identified with special educational needs, and those from different ethnic or gender groups. These include:

Differentiating Lessons by:
- Using a range of differentiated resources.
- Providing differentiated tasks where appropriate.
- Differentiating questions.
- Using a range of groupings within the class to teach children and support them.
- The amount of adult support that is given and adapting this as necessary including specialist technology support staff.

Effective Lesson Planning and Management
- Setting clear objectives that are understood by each pupil.
- Presenting work in small achievable steps.
- Planning varied activities that motivate pupils and providing alternative activities where needed.
- Creating an atmosphere of encouragement and providing opportunities for pupils to achieve success.
- Identifying the most suitable pace for each student in order to provide sufficient individual challenge whilst fostering enthusiasm and facilitating concentration.
- Involving pupils in taking responsibility for their own learning and encouraging them to develop effective study skills.

- Providing deepening activities for students.

The Appropriate Deployment of Resources

- Analysing the suitability of resources and developing additional resources where necessary.
- Ensuring that teaching assistants and support staff are effectively deployed.
- Considering how specialist equipment can be of help and motivation to pupils.
- Careful assessment and monitoring.
- Using pupil's records and day to day achievements in computing to support planning.
- Carefully monitoring pupils' progress to ensure that success is built upon.
- Providing regular feedback to pupils on progress and actively involve pupils in the assessment.

Implementation

Reading in Computing

At Lutley Primary School, reading is at the heart of the curriculum. It is our intent to ensure that every child not only develops the skills of reading but also a love of reading that will last them a lifetime. Our children read at home and school for pleasure, for information and to expand and enhance their knowledge and understanding across all subjects. Our children not only learn to read, they read to learn. Appropriate opportunities are taken to enhance children's learning in computing through reading with the use of high-quality texts across a wide range of genres and purposes, in order to impact on learning in the following ways:

- Knowledge of an extensive and rich vocabulary.
- Fluency and accuracy in reading across a wide range of contexts throughout the curriculum.
- The motivation to read for both study and for pleasure.
- Extensive knowledge through having read a rich and varied range of texts.
- Excellent phonic knowledge and skills.
- An excellent comprehension of texts.
- A desire to embrace challenging activities, including opportunities to undertake high-quality research across a range of computing skills.
- The ability to think, reflect, debate, discuss and evaluate their use of technology.
- The ability to consistently support, evaluate and challenge their own and others' views using detailed, appropriate.

Implementation

SMSC and Rights Respecting in Computing

Rights Respecting and SMSC within the curriculum

As a Rights Respecting School, our children not only respect their rights but they actively promote them. They understand that their rights are universal and unconditional and are true Change Makers when it comes to championing the rights of others in our own community and across the world. We have been awarded the Gold Rights Respecting School Award which means that we have been recognised by Unicef UK for our Rights Respecting School ethos ensuring that teaching children about their rights is explicitly embedded into our school curriculum. Rights Respecting underpins the work we do throughout SMSC development and the two core areas work hand in hand together to equip children with the key skills that they need to become Global Citizens.

What does this look like?

SMSC and Rights Respecting are not lessons which are taught in isolation, they are interwoven throughout our curriculum. Computing naturally provides rich opportunities for learning about the convention and there are clear links with global citizenship and sustainable development. Our staff have a deep understanding of the United Nations Convention on the Rights of the Child (UNCRC) and are able to make links in lessons which are deep and meaningful. Staff are able to enhance teaching and learning by modelling rights respecting language and attitudes and making strategic decisions about the content of curriculum lessons that involve the children. Where appropriate, particular articles or areas of SMSC are linked to areas of History to provide children with a broad knowledge and understanding.

What impact does this have?

Due to the fact rights and SMSC development are integrated into our broad and balanced curriculum, children understand the importance of the convention and their SMSC key skills and it becomes a fundamental part of our school ethos. We have found that bringing a rights perspective to areas of the curriculum can enhance and enrich learning and instil a rights respecting ethos within our school. By ensuring that children have a rich SMSC and Rights Respecting understanding, we ensure that they are ready to embrace the challenges of creating a happy and successful adult life in modern Britain.

Implementation

Using Skills Builder in Computing

These are the skills that underpin success at every stage of life: they unlock learning while at school, ensure young people are fully prepared for the independence of university and college, and empower people to land their dream job. At Lutley, we use skills builder framework in many ways.

A mastery approach underpins the framework
– that means, no steps should be skipped and only when a step is mastered should learners move onto the next one.

Mastery of a step is evident when a child or young person is regularly able to demonstrate that step in different contexts.

Once staff know where the children are in the essential skills they are working on, they can focus the activities, in this subject, towards the specific next skill steps.

Implementation

Lutley
Primary School

Evaluating the Impact of our Computing Curriculum

Subject Leadership in Computing

Subject leadership tasks include:
- Leading staff meetings/ staff CPD.
- A self-review by staff of how confident they were in teaching each subject and training requirements that they needed to be more effective.
- Work alongside other subject leaders for consistency across subjects.
- Report back to the SLT on findings and to contribute to the School Improvement Plan and report to Governors (when necessary).
- Resourcing their subject to ensure that children have sufficient resources to be successful including the lowest 20% of children.
- Promoting reading at the heart of the curriculum by provide high quality texts to support their subject.
- Monitor the equality of provision for all to ensure there is consistency across year groups, phases and whole school.
- Implement knowledge organisers in their subject and through book monitoring cross reference to the outcomes.
- Moderation of work across year groups, phases and across the whole school.
- Facilitate 'bring and brag' opportunities for staff to share good practice across the school.
- Compiling a portfolio of work across the school to show the impact the curriculum on learning.
- Lesson observations and drop ins.
- Team teaching.
- Coaching conversations.

Through these leadership tasks, subject leaders are able to:

Rationale and aims about the content and sequencing of the curriculum
- Identify and describe the key strengths and areas for development in their subject.
- Discuss these strengths and areas for development specific to year groups, phases or whole school.
- Describe how do they know it is happening and working in their subject and what is looks like now.

Pupils are accessing sufficient coverage and depth in line with the planned curriculum
- Explain how they guarantee and ensure progression for pupils within their subject curriculum.
- Can show where knowledge builds across a year/year group/key stage.
- Can show where knowledge builds in depth overtime.
- Explain how they ensure that there is suitable challenge and ambition for all pupils in their subject.

Plan for an equality of access for pupils to the curriculum provision
- Share the timetabling arrangements for their subject across the provision, including how often learners get access to their subject area, how they know, how they check.
- Describe the outcomes of their last monitoring and explain what it told them about their subject.

- Explain and show their curriculum is resourced, especially for pupils with additional needs, including bespoke resources needed on occasion and how do they research these.
- Explain and describe what coverage is like for all pupils such as SEND, particularly those with low attainment in basic skills such as reading.

Staff training and expertise to deliver the curriculum

- Explain how the leader and how the staff keep knowledge and understanding of the curriculum up to date.
- Describe the impact of CPD they have undertaken and how it's been relevant to subject curriculum implementation.
- Explain how they support those who are not subject specialists.
- Has evidence to show the impact that the training has had on teachers' subject knowledge and their ability to implement the curriculum.
- Can describe the impact that the training has had on support staff subject knowledge and their ability to implement the curriculum.

Assessment is purposeful to the development of the curriculum

- Describe the purpose of assessment in their subject and explain why the subject is assessed in this way.
- Explain how they assure accuracy of assessment.
- Explain and show how assessment inform and improves the curriculum.
- Share what the assessment information tells them about the quality of the curriculum.

Subject Leadership Files

In a computing subject leadership file:
- Subject leader action plan.
- Portfolio of children's work.
- A curriculum overview establishing coverage and depth.
- An effective Action Plan that is targeted to specific aspects of pupils' learning.
- Book scrutiny outcomes and the next steps linked to this.
- Examples of impact that the leader has made within: standards, pupil engagement, behaviour, spiritual, moral, social and cultural education, provision for vulnerable groups...
- Gifted and talented/more able provision.
- Pupil attitudes and pupils' targets from pupil voice.
- Resource requirements and resource ordering.
- Educational visits/specialist visitor provision across the school linked to the subject.
- Lesson observation outcomes, providing a framework for developmental observation.
- Monitoring schedule.
- Use of audit tools to determine level of CPD needed for staff and confidence in teaching
- Hardware / Software audit tools in use to ensure correct provision.
- Records of task delegation for set up of software used throughout the curriculum.