|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Our Lady’s RC Primary School, A Voluntary Academy    **Subject statement of intent for Computing** : At Our Lady and St Paul’s we reflect the National Curriculum’s belief that high-quality Computing education provides the foundations for understanding the world through the specific disciplines of Computer Science, Information Technology and Digital Literacy. Technology has changed our lives and is vital to the world’s future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena and God’s great world. | | | | | | | |
| Statutory Requirements | EYFS | KS1 | | KS2 | | | |
| **Development Matters 2020 for 3 and 4 year olds:**   * Remember rules without needing an adult to remind them. * Match their developing physical skills to tasks and activities in the setting. * Explore how things work   **Reception:**  • Show resilience and perseverance in the face of a challenge. • Know and talk about the different factors that support their overall health and wellbeing: -sensible amounts of ‘screen time’   * Develop their small motor skills so that they can use a range of tools competently, safely and confidently. * Explore, use and refine a variety of artistic effects to express their ideas and feelings.   **ELG:**   * Be confident to try new activities and show independence, resilience and perseverance in the face of challenge.   • Explain the reasons for rules, know right from wrong and try to behave accordingly  Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. | 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. | | 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 | | | |
|  | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Computer science  **Hardware** |  | 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  Understanding and identifying barcodes, QR codes and RFID  Identifying devices and applications that can scan or read barcodes, QR codes and RFID  Acknowledging that corruption can happen within data during transfer (for example when downloading, installing, copying and updating files) |
| Computer science  **Networks and data representation** |  | Understanding what the internet is |  | 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  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 |
| Computer science  **Computational thinking** | Using logical reasoning to read simple instructions and predict the outcome | 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 |
| Computer science  **Programming** | Following instructions as part of practical activities and games and learning to debug when things go wrong  Learning to give simple instructions  Learning that an algorithm is a set of instructions to carry out a task, in a specific order  Experimenting with programming a Bee-bot and learning how to give simple commands  Learning to debug instructions, with the help of an adult, when things go wrong | Programming a Bee-bot/Virtual Bee-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 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  Incorporating variables 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 | 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 |
| Information Technology  **Using software** | Using a simple online paint tool to create digital art | 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 a software programme (Sonic Pi or Scratch) to create music  Using video editing software or animation software to animate  Identify ways to improve and edit programs, videos, images etc.  Independently learning how to use 3D design software package | 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 to design a product  Creating a website with embedded links and multiple page |
| Information Technology  **Using email and the internet** | Participating in group image searches, led by the teacher | Searching and downloading images from the internet safely  Understanding that we are connected to others when using the internet | Understanding that personal information should not be shared on the internet.  Learning how to be respectful to others when sharing content online. | 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  Identifying useful terms and phrases for search engines | Understanding why some results come before others when searching  Understanding that information on the internet is not all grounded in fact | Developing searching skills to help find relevant information on the internet  Understanding how apps can access our personal information and how to alter the permissions. | Understanding how search engines work |
| Information Technology  **Using 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 | Understanding how data is collected | Designing a weather station which gathers and records sensor data | Understanding how barcodes, QR codes work  Gathering and analysing data in real time  Creating formulas and sorting data within spreadsheets |
| Information Technology  **Wider use of technology** |  | Recognising common uses of information technology, including beyond school  Understanding some of the ways we can use the internet | Learning how computers are used in the wider world | Understanding the purpose of emails.  Learning what a search engine is  Recognising how social media platforms are used to interact | Understanding that software can be used collaboratively online to work as a team | Learn about different forms of communication that have developed with the use of technology. | 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 |
| **Digital literacy** | Recognising that a range of technology is used in places such as homes and schools  Learning to log in and log out  When using the internet alongside an adult, or independently, learning what to do if they come across something that worries them or makes them feel uncomfortable | 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  Recognising when someone has been unkind online  Learning some top tips for staying safe online  Understanding how we ‘share’ information on the internet | Understanding that personal information should not be shared on the internet.  Learning how to be respectful to others when sharing content online. | 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  Learning that not all information on the internet is factual  Understanding who personal information should/ should not be shared with | 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  Learning about different forms of advertising | Learning about how permissions work and how to change them  Identifying possible issues with online communication  Considering the effects of screen-time on physical and mental wellbeing  Learning about online bullying and where to seek advice | Understanding the importance of secure passwords and how to create them, along with two-step authentication  Using search engines safely and effectively  Recognising that updated software can help to prevent data corruption and hacking  Considering their digital footprint and online reputation and future implications they may have  Learning about how to collect evidence and report online bullying concerns |