Educate Together Academy Trust
Computing Programme of Study

<u>Intent</u>

Computing in Educate Together is a subject that not only stands alone but is woven and an integral part of all learning. Computing, in general, is a significant part of everyone's daily life and children should be at the forefront of new technology, with a thirst for learning what is out there. Computing within Educate Together provides a wealth of learning opportunities and transferrable skills explicitly within the Computing lesson and across other curriculum subjects.

Through the study of Computing, children will be able to develop a wide range of fundamental skills, knowledge and understanding that will equip them for the rest of their life. Computers and technology are such a part of everyday life that our children need to be exposed to a thorough and robust Computing curriculum which allows them to develop problem solving, creativity and critical thinking, to be active and safe participants in the digital world.

<u>Aims</u>

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.

Key Stage	Subject Content
Key Stage 1	- 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.
Key Stage 2	- 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.

Online Safety

Children will cover objectives relating to Online Safety through the South West Grid for Learning 'Digital-Literacy' Scheme from Foundation Stage upwards. Digital Literacy is broken down into categories relating to Privacy Security, Digital Footprint Reputation, Self-image Identity, Creative Credit Copyright, Relationships Communication, Information Literacy, Cyberbullying and Internet Safety

Class teachers will teach one unit per term over the course of the academic year. Key online safety messages will be reinforced during all computing lessons, and other cross-curricular lessons. School will take part in Online Safety Day each year with challenges that involve parental engagement.

Year Group	Description of learning activities/outcomes
Foundation Stage	• Pupils learn that they can go to exciting places online, but they need to follow certain rules to remain safe. • Pupils learn that it is important to speak to trusted adults if they see something online that worries or confuses them. • Pupils learn that many websites ask for information that is private and discuss how to responsibly handle such requests. • Pupils are introduced to the concept of having ownership over creative work. They practice putting their name on something they produce. • Children will think about who they can trust to ask for help (H13). *Suggested Complimentary Resources: The adventures of smartie the penguin https://tinyurl.com/ybexvzp8*
Year One	• Pupils learn that they can go to exciting places online, but they need to follow certain rules to remain safe. • Pupils search for pictures online by clicking on letters of the alphabet. They learn that directory sites with alphabetical listings offer one way to find things on the Internet. • Pupils learn that many websites ask for information that is private and discuss how to responsibly handle such requests. • Pupils are introduced to the concept of having ownership over creative work. They practice putting their name and date on something they produce. • Pupils explore how they can use email to communicate with real people within their schools, families, and communities. • Children will understand the meaning of 'personal information' and why this is not shared (H12) *Suggested Complimentary Resources: Hectors world https://tinyurl.com/zxea4gt*
Year Two	• Pupils understand that they should stay safe online by choosing websites that are good for them to visit, and avoid sites that are not appropriate for them. • Pupils learn that the information they put online leaves a digital footprint or "trail." This trail can be big or small, helpful or hurtful, depending on how they manage it. • Pupils learn that children sometimes can act like bullies when they are online. They explore what cyberbullying means and what they can do when they encounter it. • Pupils understand that keyword searching is an effective way to locate information on the Internet. They learn how to select keywords to produce the best search results. • Pupils discuss criteria for rating informational websites and apply them to an assigned site. Pupils learn that all websites are not equally good sources of information. • Children will understand how to stay safe online especially when using games and talking to others (H12) • Children will recognise comfortable/ uncomfortable feelings and will know who to speak to for help(R10) • *Suggested Complimentary Resources: Lee and Kim: online gaming https://tinyurl.com/sb6amds*

Year Three	• Pupils explore reasons why people use passwords, learn the benefits of using passwords, and discover strategies for creating and keeping strong, secure passwords. • Pupils explore the concept that people can connect with one another through the Internet. They understand how the ability for people to communicate online can unite a community. • Pupils examine product websites and understand that the purpose of the site is to encourage buying the product. Pupils learn methods used to promote products on these sites. • Pupils explore the similarities and differences between in-person and online communications, and then learn how to write clear and respectful messages. • Pupils learn how to communicate effectively by email, taking into account the purpose and audience of their message, and the tone they want to convey. • Children will identify how and why we use the internet and will develop their understanding of how to be SMART on line. • They will be able to understand what a reliable source of information is and will begin to critically analyse images online (H4). *Suggested Complimentary Resources The adventures of Kara and Winston and the SMART crew (Part 1 _ https://tinyurl.com/wofco65*
Year Four	• Pupils explore what it means to be responsible to and respectful of their offline and online communities as a way to learn how to be good digital citizens. • How can you protect yourself from online identity theft? Pupils think critically about the information they share online. • Pupils consider that they may get online messages from other kids that can make them feel angry, hurt, sad, or fearful. Pupils identify actions that will make them Upstanders in the face of cyberbullying. • Pupils learn strategies to increase the accuracy of their keyword searches and make inferences about the effectiveness of the strategies. • Pupils learn that copying the work of others and presenting it as one's own is called plagiarism. They also learn about when and how it's ok to use the work of others. • Children will understand who to go to if they are upset. • They will understand safety issues about meeting people offline. *Suggested Complimentary Resources: The adventures of Kara and Winston and the SMART crew (Part 2 https://tinyurl.com/wofco65* *https://tinyurl.com/yxoq3qtt (Fake News)*
Year Five	• Pupils learn how to create secure passwords in order to protect their private information and accounts online. • Pupils work together to outline common expectations in order to build a strong digital citizenship community. Each member of the class signs a We the Digital Citizens Pledge. • Pupils learn what spam is, the forms it takes, and then identify strategies for dealing with it. • Pupils reflect on the importance of citing all sources when they do research. They then learn how to write bibliographical citations for online sources. • Pupils learn how photos can be altered digitally. They will consider the creative upsides of photo alteration, as well as its power to distort our perceptions of beauty and health. • Children will further develop their understanding of how to SMART online. • Children will be taught how to be responsible and respectful online including passwords, not sharing photos etc. *Suggested Complimentary Resources NSPCC Share aware https://tinyurl.com/sjkkgql*

Year Six	• Pupils learn that the Internet is a great place to develop rewarding relationships. But they also learn not to reveal private information to a person they know only online. • Pupils explore Spider-Man's motto, "with great power comes great responsibility" through the lens of digital citizenship. They create comic strips show a digital superhero who witnesses an act of poor digital citizenship, and then helps resolve it. • Pupils learn that children's websites must protect their private information. They learn to identify these secure sites by looking for their privacy policies and privacy seals of approval. • Pupils explore how it feels to be cyberbullied, how cyberbullying is similar to or different than in-person bullying, and learn strategies for handling cyberbullying when it arises. • Pupils explore how the media can play a powerful role in shaping our ideas about girls and boys. They practice identifying messages about gender roles in two online activity zones for kids. • Children will learn about how to protect themselves online including the sharing of images and requests to meet people. *Suggested Complimentary Resources: Caught in the web https://tinyurl.com/vn5dcek*

Year Group	Suggested Resources & outcomes Programming	Suggested Resources & outcomes Information Technology
Year One	• Children understand algorithms as sequences of instructions in everyday contexts. • The children take real-world problems and then plan a sequence of steps to solve these. • Children can program beebots using sequences of instructions before pressing go to implement an algorithm. • Children can give explanations for what they think a program will do. • *Resources: Beebots, real-life situations such as recipes.*	• Children can use digital technology to access, store and retrieve content. • Children can create their own original digital content. • Children recognise common uses of information technology beyond school. • *Resources: Chromebooks, Busy Things, iPads*
Year Two	• Children understand algorithms as sequences of instructions in everyday contexts. • Children recognise that common sequences of instructions or sets of rules can be thought of as algorithms such as procedures in class, recipes, spelling rules, number patterns. • Children can program on screen using sequences of instructions to implement an algorithm. • Children can create programs as sequences of instructions. • *Resources: Scratch Jr, Beebot app, Busy Things, Blubots*	• Children can store, organise and retrieve content on digital devices for a given purpose. • Children can create and edit original content for a given purpose using digital technology. • *Resources: Chromebook, Google Drive, Word, Powerpoint, Publisher, Busy Things, iPad Photos*

Year Group	Suggested Resources & outcomes Programming	Suggested Resources & outcomes Information Technology
Year Three	• Children can design and write a program using block language, without user interaction. For example, creating a short-scripted animation using pre-built sprites where there are elements of movement and dialogue. • Children's programs include a sequence of commands or blocks in an appropriate order. • Children can write a program to produce output on screen, such as moving sprites or displayed text. • Children can explore simulations of physical systems on screen. • The children can experiment with some on-screen simulations of physical systems. • For example, a ball bouncing on a bat, car moving around a track. • Children can explain a simple, sequence-based algorithm in their own words. • Children can detect errors in programs. • Children understand that computer networks transmit information in a digital (binary) format. • Children understand that e-mail is possible through the internet, and that these are sent and received through servers connected to the internet. • *Resources: ScratchJR, Scratch, Busy Things*	• Children can use a range of programs and software on laptops and tablets with some degree of independence. • Children can design and create digital content with some degree of independence. (e.g. planning and shooting a video, planning and writing survey questions) • Children can search for information within a single site. • Children understand that search engines select pages according to keywords found in content. • *Resources: iMovie, Google Docs, Busy Things, Swiggle for safe searching*

Year Group	Suggested Resources & outcomes Programming	Suggested Resources & outcomes Information Technology
Year Four	• Children can write a program that displays a question, accepts a typed input and responds in an appropriate way to what is typed. (E.G. as a simple dialogue, or a simple maths game, quiz) • Children can create and explain an algorithm using sequence and repetition in their own words. • Given an algorithm using sequence and repetition, children can give a coherent, logically reasoned explanation of what it does and how it works. • Children can use logical reasoning to detect and correct errors in programs. They can give reasons for these errors and explain how they have fixed them. • Children can design and write programs using a block language to a given brief, including simple interaction. • Children can develop their own simulation of a simple physical system on screen (E.G. a simple animation or on-screen prototype for a product made in D&T) • Children understand that the internet transmits information as packets of data and that the information they send and receive is automatically broken down into packets of data, and that these sometimes take different routes across the internet. • Children understand how the internet makes the web possible. • Children can give an explanation of how requests for web pages and the HTML for those pages are transmitted via the internet. • *Resources: Scratch, Chrome, Swiggle*	• Children can use and combine a range of programs on a computer. • Children can use multiple programs on laptop or tablet computers to achieve particular goals. (E.G. record audio and use in samples of a composition, create HTML content in a text editor and preview in a browser, analyse data in a spreadsheet and create a presentation to show results of their analysis) • Children can design and create content on a computer in response to a given goal with some degree of independence. • Children can collect and present data. • Children can use computers to collect numerical data and present this to an audience. • Children can use a standard search engine with safe mode locked in place to find information effectively. • Children understand that search engines rank pages according to relevance and that top results on the first page are likely to be most relevant. • Children can reconsider their keywords to ensure their search is effective. • *Resources: Chrome, Google Suite, Swiggle, Keynote*

Year Group	Suggested Resources & outcomes Programming	Suggested Resources & outcomes Information Technology
Year Five	• Children design, write, test and debug a program using a block language based on their ideas. • Children can explain what bugs they found and how they fixed them with a degree of independent working. • Children can experiment with computer control applications. • Children can use simple computer control and/or sensors with products they make in design and technology. • Children can take a complex problem, identify component parts, use decomposition to break this problem down and then plan how the can solve the problem by working through the elements they have identified. • Children can use sequence, selection and repetition in programs. Programs should include sequences of commands or blocks, some repetition and selection. Repetition might include exit conditions (e.g. repeat… until…) Selection would normally be of an if… then or if… then… else type. • Children can write a program and a game that accepts keyboard and mouse input and produces output on screen and through speakers. • Children can explain a rule-based algorithm in their own words, explaining what it does and how it works. • When given an algorithm for a particular purpose (e.g. a rule-based algorithm for a computer game or a sequence of steps to draw a geometric pattern) children use logical reasoning to identify possible errors in the algorithm, explaining why they believe the algorithm is incorrect. • Children can understand how data routing works on the internet. • Children can give a coherent explanation of how data packets are routed from one computer to another on a separate network, which is also connected to the internet. • Children understand how web pages are created and transmitted. • Children explain how HTML is used to create a webpage and how it is transmitted as packets of digital data over the internet. Children have an awareness of simple HTML tags (such as <h1> and <p>) for marking up a webpage. • *Resources: Lego WeDo kits, Scratch*	• Children can use multiple devices to achieve particular goals. The devices might include web servers, al lowing them to use cloud-based applications. E.G. They might use local media in conjunction with Scratch. • Children can design and create programs on a computer in response to a given goal. • Children can analyse and evaluate information. • Working with text, audio, images or video, the child can analyse information, perhaps summarising this. They should evaluate the quality of the information, looking for bias or questioning assumptions that have been made. • Children use filters to make an effect use of a standard search engine. • Children can use a search engine effectively, to search for particular information on the web using built-in search tools to filter their results, ,such as by time, location or reading level. • Children understand that search engines use a cached copy of the crawled web to select and rank results • Children explain how a search engine creates an index from a cached copy of the web and uses this to select and rank results. Children might also show awareness of the page Rank algorithm in which results are ranked according to the number and quality of in-bound links. • *Resources: Chrome, Google Apps, Swiggle*

Year Group	Suggested Resources & outcomes Programming	Suggested Resources & outcomes Information Technology
Year Six	• Children can design a program of their own and write this in a programming language other than Scratch, such as TouchDevelop or App Inventor. • Children can test and debug their code, explain what bugs they found and how they fixed these. • Children can design, write and debug their own computer control application. They can add computer control and/or sensors to a smartphone app or to products they design and make in D&T, perhaps using Lego WeDo kits, MaKey MaKey or similar. They can show evidence of designing, writing and debugging their program, ensuring that this functions correctly on the available hardware form. • Children can use sequence, selection, repetition and variables in programs. • Children's programs should include sequences of commands or blocks, repetition selection and variables. Repetition might include exit conditions (e.g. repeat until) and perhaps a counter-variable for iteration. Selection would normally be of an if… then or if…. Then… else…. Type. Children are able to combine repletion with selection and variables. Programs might include a simple smartphone app. • Children can write a program that accepts inputs other than keyboard and mouse and produces outputs other than screen or speakers. • Children can give clear and precise logical explanations of algorithms. • Children can use logical reasoning to detect and correct errors in algorithms and programs, explaining why possible corrections would correct the bug identified. • Children understand how mobile phone or other networks operate. They know that information is transmitted digitally, and have some understanding of the network topology involved. Children show some understanding of the interactions between a phone, cell transmitters/receivers and the network's control systems. • Children understand how domain names are converted into IP addresses on the internet using the domain name system (DNS) using something similar to a set of phone books. • Children show an awareness of the looked up addresses (DNS records) being copied (cached)) and that more local records are used in preference to more authoritative records in most circumstances. • *Resources: Lego WeDo, MaKey MaKey, Scratch, Touch Develop, App Inventor*	• Children select, use and combine a range of programs on multiple devices. • Children can choose from a range of programs to achieve particular goals. • Children can plan, design and implement a system with multiple, interrelated components with a given goal in mind (E.G. Develop smartphone app, taking into account input, output and connectivity, the operating system, the algorithms, code and user interface of their own program. • Children can analyse and evaluate data. • Children evaluate the quality of numerical data, deciding the extent to which is it affected by systematic or random errors. They should analyse their data, perhaps producing summary statistics, looking for relationships, trends and exceptions. (E.G. Conduct market resource for an app) • Children can use effectively a range of different search technologies, including alternatives to Google and site-specific search engines. • Children demonstrate awareness of the Page Rank algorithm, explaining that the quality of a page is determined largely on the basis of the number and quality of links pointing to that page in the engine's cached copy of the web, and that quality is itself determined recursively through page rank. *Resources: Chrome, Google Apps, Swiggle*