Digital Learning Cornwall

Independent guidance | consultation | training

Helping busy schools make informed EdTech choices

Intent & Progression - Curriculum Milestones for Computing

'Curriculum Intent'

Computing knowledge & understanding underpins modern life and the 21st Century. Children need to build vital confidence, knowledge and understanding of the way technologies work - and how internet-connected systems can be employed - in order to adapt flexibly to ever rapid change over coming years.

It is important that Computing knowledge begins to develop from the earliest years, and builds appropriately as children develop. As learners revisit areas of understanding, and become ever-more confidently equipped, they will be able to harness the many opportunities that modern technology presents, while remaining safe and necessarily critical.

Our intent for children's learning across Computing is mapped into three strands, dividing this broad subject into 3 main areas that build progressively throughout a child's time in primary education.

Computer Science
Information Technology
Digital Literacy

The objectives of the National Curriculum have been used as a starting point for devising our ambitious ***curriculum milestones*** – the points at which we aim for children to have mastered specific aspects of knowledge and understanding. We cover everything contained in the National Curriculum but, in addition – to reflect the ever-growing breadth and importance of Computing – we have widened the scope of our milestones, with the intention that children become further equipped with a toolkit that is fit for their next steps in education, and for mastering the modern digital world. Going over and above the objectives of the national curriculum can be seen across all three strands, and is especially notable within Digital Literacy, with Internet Safety and Operational Core Skills becoming expanded aspects that have become evermore relevant to children's engagement with the modern world.

Intent & Progression - Curriculum Milestones for Computing

5 key aims:

- ***Our curriculum is greatly ambitious and receives regular updates placing it above and beyond the aims and objectives stated in the national curriculum.***
- ***Children will understand that information technology consists of a wide variety of computer systems and contexts, relevant to the ever-changing modern world.***
- ***Our curriculum allows children to understand and apply the fundamental principles and concepts of computer science, including logic, algorithms, data and information, and programming, including hardware.***
- ***Children are responsible, competent, confident and creative users of IT. The curriculum teaches children to be cautious and safe users of internet-connected technologies, as befits our modern age and digitally connected communities.***
- ***The curriculum allows children to become confident creators of digital artefacts and media, applying new and unfamiliar technologies to their productions.***

Digital Learning Cornwall

Independent guidance | consultation | training

Helping busy schools make informed EdTech choices

Intent & Progression - Curriculum Milestones for Computing

Curriculum Progression

Progression through the curriculum milestones, and wider learning opportunities found within units of work, is based on key items of knowledge and skill being re-visited and expanded upon – sometimes referred to as a 'spiral curriculum'. This allows children to build, step by step, longer-term understanding by regularly revisiting and reusing each aspect of knowledge as they progress through the Computing curriculum.

Our curriculum milestones are shown below, along with written outlines on *why* we have chosen these curriculum milestones as they progress through the Computing curriculum. You will find further specific guidance per teaching unit on this matter, within each unit's *Read First* document: the **Why This? Why Now?** section.

Adapting and focusing for your school

As with other subjects, it is important that curriculum lead staff can articulate how the subject has been interpreted within the context of the school. Your intent may have a particular emphasis that places it within your particular school's development plan and local community requirements. For example, if your school has identified a specific need or lack of understanding in a particular area, it may well make sense to include this in your intent statement. Or perhaps the school has noted a rise in internet safety issues occurring outside of school, and therefore have highlighted this as a key point of emphasis for the curriculum to cover.

It is worth all staff understanding this local emphasis in the curriculum intent, and being able to explain how they have adapted cross-curricular units for a particular local context. For example, the school may have been studying local history and geography, and this might have fed into the context for a cross-curricular unit, e.g. 3D design, website creation or podcast production. Any examples where a unit has been given local context for the school, or where cross-curricular links have been made, can be useful in this regard. Ofsted want you to have put your school's stamp on how your curriculum has been interpreted and adapted over time.

Digital Learning Cornwall

Independent guidance | consultation | training

Helping busy schools make informed EdTech choices

Intent & Progression - Curriculum Milestones for Computing

Computer Science

A hugely important element of Computing subject knowledge, all children should have an understanding of how modern devices and software operate at code level. Many children are competent consumers of screen-based media and games – yet we want them to progress to become confident in their understanding of *how* such systems work. We want children to know that algorithms and programs are devised by humans and, if run successfully, will perform functions for us in the background, seamlessly and systematically.

The key theme of **Programming, including Controlling Hardware** is introduced through numerous unplugged activities at the early years stage, consolidated with further related terminology such as **algorithms** in year 1. **Predicting** and **debugging** are brought in as learning is consolidated in year 2. Ever more advanced concepts then follow throughout Key Stage 2: **sequencing** and **decomposing** in year 3; **loops** and **refactoring** (improving code) in year 4; **selection** concepts, **event** and **count-controlled loops** at year 5; **variables** and applying these to hardware in year 6. Learner's understanding builds through this spiral-based approach to the curriculum, with each year group's tasks necessarily referring back to knowledge and understanding that has been built up in earlier units.

Data & Information is the second theme of Computer Science, and an ever-important area for the modern, data-driven age. This area contains understanding of web-based databases and following rules to rank results – very much aligned to the algorithmic understanding that is built up in the earliest stages of *Computer Science*. **Similarities** are noted in the early years through non-screen, hands-on activities, with children creating and naming **groups** in Year 1. Year 2 strengthens understanding, with children uncovering **answers** to **questions** by looking carefully at data, while also learning how to input data. Year 3 adds understanding of a branching database, with children **categorising** objects according to yes/no answers. In year 4, previous knowledge helps children to then **collect data** and choose how often to collect **data samples**. Year 5 moves to flat-file database thinking, with children using criteria to **search data** and **sort** according to attributes. In year 6, previous understanding culminates in spreadsheet competency, recognising that formulas can calculate using data that has been input, and answer questions that are posed.

Digital Learning Cornwall

Independent guidance | consultation | training

Helping busy schools make informed EdTech choices

Intent & Progression - Curriculum Milestones for Computing

Strand	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Computer Science							
Programming, including Controlling Hardware	*I can understand a large task as smaller steps (links to algorithms and decomposition)*	*I can understand and create **algorithms** (steps or rules as instructions, e.g. how to make a sandwich)* *I understand that **algorithms** must be precise*	*I can **predict** the behaviour of simple programs* *I can create and run a **program** (an algorithm or multiple algorithms that can be understood by a computer)* *I can **debug** (find and fix a problem) within a simple program*	*I can create a **sequence** of connected commands* *I can use a **forever loop** (code that is always active while a program runs)* *I can add extra **code** to enhance the function of a **program*** *I can control or simulate **programmable hardware** (e.g. a Sphero robot)* *I can **decompose** (break into smaller chunks) a programming problem* *I can **debug** errors across a sequence of code*	*I can create a program that uses **loop** commands to achieve a particular outcome* *I can recognise that some programs can be run at the same time (**concurrency**)* *I can recognise that the order of **commands** may produce a different outcome* *I can identify a way to **refactor** (improve) my code* *I can explain the **outcome** of changes to code*	*I can create and modify a **count** or **event-controlled** loop* *I can use **selection** in my programs. (Also known as **conditionals** or **If / Then** statements). (e.g. if a character moves onto a yellow square, then gain two points)* *I can create an **'if... then... else...'** statement that will result in different outcomes* *I can create my own **variable** for use in a program*	*I can program the way that a **variable** changes* *I can use the value of a **variable** as a trigger for another event* *I can **program** and **debug** multiple functions on programmable hardware (e.g. with a Microbit)*

Digital Learning Cornwall

Independent guidance | consultation | training

Helping busy schools make informed EdTech choices

Intent & Progression - Curriculum Milestones for Computing

Data & Information	I can begin to notice **similarities** between items	*I can place **objects** into groups (e.g. these shapes are all red)* *I can decide on **labels** for groups (e.g. these shapes all have four sides)*	*I can **enter data** into a computer system* *I can use a computer to **present data*** *I can find **answers** to **questions** by looking at **data***	*I can create questions with yes / no answers to **categorise** objects* *I can retrieve **information** from different levels of a **branching database***	*I can use a digital device to **collect data** automatically* *I can choose how often to collect **data samples***	*I can choose multiple criteria to **search** data to answer a given question (**AND and OR**)* *I can choose which **attribute** to **sort** data by answering a given question* *I can choose an appropriate graph to visually compare **data***	*I can collect data and enter it into a **spreadsheet*** *I recognise that data can be **calculated** using different **operations*** *I can apply a **formula** to **calculate** the data I need to answer questions*

Intent & Progression - Curriculum Milestones for Computing

Information Technology
Children need to understand the broad range of roles and purposes for technology in the modern world. We split this section into two themes: **Computer Systems & Concepts** and **Creating Digital Artefacts & Media**.

Computer Systems & Concepts builds awareness, followed by deeper understanding, of the hardware and software systems that people increasingly use for purpose in everyday life. This includes an understanding of the technical processes that occur between devices, now that internet-connected services are a ubiquitous part of leisure and work. Children begin their understanding in Reception by exploring **devices**, leading to the identification of examples of **information technology** in Year 1. Year 2 moves understanding onwards with identifying major **parts of devices**, and identifying examples of information technology beyond children's immediate lives. Year 3 tackles the basics of **networked devices**, while also exploring the key concepts of **input** and **output**; learning builds upon this in year 4, moving to understand the **interconnection of networks** (the **internet**) and the **world wide web**. Year 5 adds understanding of **web search processes** and **digital communications** such as **email** and web-based collaboration, building on inputs and outputs and networking knowledge from the previous two years. Year 6 moves knowledge onwards and consolidates once again, covering how networks function in further detail, including **data packets**, and understanding the many different ways that connections between computers allow us to work in different ways.

Digital Media is a broad theme that reflects how technology has become an integral part of the way images, video, animation and audio are manipulated and published – children can become very inspired by an understanding of such processes, enabling modern and useful creativity. Schools have the ability to let children design, edit, produce, perform and publish, in a seamless way that has never been so easy or accessible.

In Reception year, children begin by talking about **pictures**, **video** and **sound** that are viewed on **digital devices**, before moving on to make their own **graphical marks** and **images** using **devices** in year 1. Year 2 moves on to children **capturing** and **manipulating** digital images, while also introducing **sound creation** and adjustment in a fun and accessible way. Year 3 brings previous understanding together as children create **animation**, while experimenting with **font styles** and **effects** in their creative **design** work. Children create **podcasts** in year 4, adding to previously taught understanding of **audio** and **editing**, while also improving their **image editing** understanding. Year 5 takes previous

image editing techniques into the realm of **video editing**, while introducing **vector graphics** into the repertoire of graphic design skills that children have accumulated. Year 6 adds to children's understanding further, with **web design** including **navigation paths**, and **3D model** creation for purpose.

NB: It is worth noting that the *Information Technology* strand has themes that relate back to *Computer Science*. For example, **Computer Systems & Concepts** covers **inputs and outputs** at year 3 – these concepts lay the groundwork very much for understanding selection (if/then/else statements) in year 5, and also to the functioning of variables in year 6.

Digital Learning Cornwall

Independent guidance | consultation | training

Helping busy schools make informed EdTech choices

Intent & Progression - Curriculum Milestones for Computing

Strand	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Information Technology							
Computer Systems & Contexts	*I can talk about technology, using pictures and memory recall*	*I can identify examples of **technology** in the classroom*	*I can identify the major parts of **digital devices** (e.g. keyboard, screen, power, batteries, touchscreen)* *I can **identify** information technology in the school, home, and beyond*	*I can identify **networked devices** around me (e.g. networked printer, wireless laptop)* *I can identify **inputs** and **outputs** of common computing devices (e.g inputs: keys on a keyboard, temperature sensor, tilting a device; outputs: screen display, printer)*	*I can recognise that the **world wide web** is part of the internet* *I understand that the global interconnection of networks is the **internet***	*I can explain that a **search engine** uses **web crawlers** to create an **index*** *I can explain that a search engine follows **rules** to **rank** results* *I understand that **emails** and other digital communications can be sent and received from various types of digital device*	*I understand that **computer systems** transfer information over networks in **data packets*** *I understand that **connections** between computers allow us to work together*

Digital Learning Cornwall

Independent guidance | consultation | training

Helping busy schools make informed EdTech choices

Intent & Progression - Curriculum Milestones for Computing

Digital Media	*I can talk about pictures, **video** and **sound** that are viewed on **digital devices***	*I can use an **app** or **website** to make graphical marks or pictures*	*I can use **technology** to capture (e.g. with an iPad) and manipulate (position, re-size, rotate) photos* *I can create **audio** using digital technology* *I can **edit** and **adjust** audio using digital technology*	*I can design and plan for an **animation** (e.g. stop-frame animation on an iPad)* *I can create and edit an **animation*** *I can recognise that different **font styles** and **effects** are used for particular purposes* *I can use technology to organise and manipulate **digital content***	*I can identify the **input** and **output** devices used to record and play sound* *I can **plan** purposefully for a **podcast** audio production* *I can **record** and **edit** sound using digital technology as part of an audio production* *I can manipulate and adjust **images** for a particular purpose* *I can consider the impact of changes made on the quality of an image*	*I can edit **video**, bringing together different media elements (e.g. stills, video, captions and sound) to produce an effective final product* *I can create a **vector drawing** that is comprised of lines and shapes of different colours* *I can **resize, duplicate, rotate** and **align** objects in vector drawings* *I can use **grouping** and **layers** in a vector drawing*	*I can recognise the common features of a **web page*** *I can devise my own web design which contains navigation paths (menus, **hyperlinks** etc.)* *I can recognise the difference when working with **3D objects** in comparison to 2D* *I can produce a **3D model** and decide how it can be improved*

Digital Learning Cornwall

Independent guidance | consultation | training

Helping busy schools make informed EdTech choices

Intent & Progression - Curriculum Milestones for Computing

Digital Literacy

Modern life is infused by technology and powerful cloud-based systems. Children need to understand the potential of such technologies, and how to interact with such services on a daily basis. Our framework adds in the theme of **Operational Core Skills**, including an emphasis on children's ability to operate various types of device, utilise multiple apps, as well as typing with confidence and speed.

Such skills become a modern toolkit of understanding, that enable individuals to communicate and collaborate successfully with digital tools that have become a standard part of life and work.

We take children from experimentation and hand-eye coordination at Reception level, to using **websites, touch-screens** and **trackpads** with increasing fluency in year 1, to basic keyboarding skills of **typing** and **editing** at year 2. Year 3 moves understanding onwards with **punctuation**, typing confidence and **searching** the internet, with year 4 adding correct **spell-checker** usage plus using **multiple apps** and **web browser tabs**. Year 5 adds proficient editing and improving of **on-screen writing**, including **digital thesaurus** usage, while combining multiple pieces of software to accomplish **specific goals**. Year 6 consolidates all previous skills, with an emphasis on editing on-screen writing for **clarity**, **purpose** and **effect** – we also, at this last point, believe that children should be able to type at speed with accurate spelling and punctuation, including digital conventions.

Intent & Progression - Curriculum Milestones for Computing

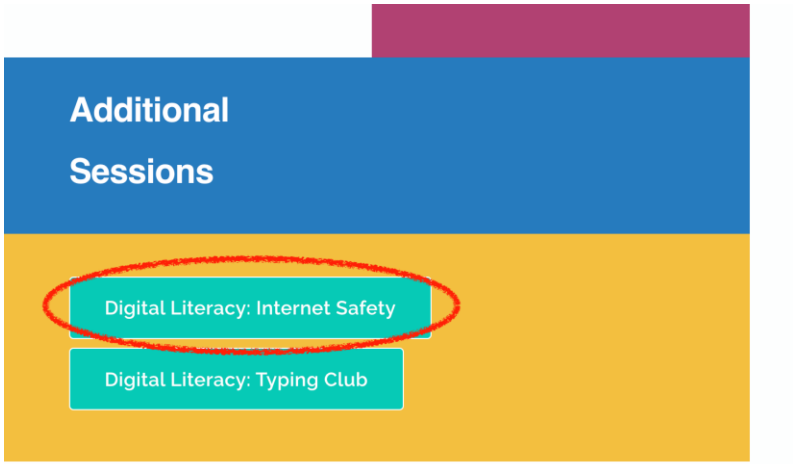
Staying Safe

Internet Safety continues its rise to become one of the most important topics for young people's wellbeing. While it's true that internet-based services will hopefully become more regulated over time – as society interprets and responds to the pros and cons of such facilities for children – there can be no doubt that preparing children for the dangers of internet-based communication is an essential and necessary goal.

We need to give children the knowledge to understand when services may not be safe; that contact and content could be inappropriate or dangerous; that they can look after their bodies and minds and understand that limits on screen-based activities are necessary to stay healthy; that posting pictures or videos to internet-based services may carry considerable risks; that fraud and scams are rife on the internet and to be wise with guarding personal information.

The curriculum milestones in this area progress across the eight themes suggested by the government-backed UK Council for Internet Safety. We have picked what we consider to be the most salient and relevant milestones from their revised Education for a Connected World framework, and ordered them into an age-appropriate progression.

Self-image and Identity;
Online relationships;
Online reputation;
Online bullying;
Managing online information;
Health, well-being and lifestyle;
Privacy and security
Copyright and ownership



Within our online collated scheme, you will see that each year group has its own guidance document under Additional Sessions (at the base of each page) labelled *Internet Safety*.

We understand that this area of learning belongs as much within PSHE as it does within Computing, and probably as time continues it will find more of a natural place within PSHE. In practical terms, our guidance and suggestions may well complement a PSHE scheme being used by a school. Such schemes often include internet safety elements, but if you feel it's an area of further importance to your school (or feel you need to do more to cover this area that does, indeed, also fall under OFSTED safeguarding) then do look to our guidance for ideas that may well be relevant.

The safer internet day events can be worth following and promoting, though be aware that once a year is certainly not enough for this topic. It is also worth stating that such themes are used within other units of work in our scheme, when relevant, and there can be, of course, further opportunities to teach around internet safety across many other areas of your whole curriculum. For a school to be truly modern and relevant, and prepare children for the modern world, the themes surrounding internet safety need to run through much of what children are taught across their time at school.

Digital Learning Cornwall

Independent guidance | consultation | training

Helping busy schools make informed EdTech choices

Intent & Progression - Curriculum Milestones for Computing

Strand	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Digital Literacy							
Operational Core Skills	*I can use hand-eye coordination to operate devices such as touch-screens*	*I can choose letters on a **keyboard** to create words* *I can use **apps** or **websites** to aid my learning* *I can **save and retrieve** work that I have produced (includes **auto-save**)* *I can move a **cursor** with the trackpad and **click** on an icon*	*I can **type** and **edit** basic text* *I can use **two-finger scrolling** on a touchpad* *I can use the **shift key** to create capital letters*	*I know how to **search** for items on the internet* *I can **type** confidently and independently* *I can type **basic punctuation** correctly within on-screen writing (spaces, commas, full stops, question marks)* *I can perform a **two-finger click or right-click** to access additional options*	*I can **type** to achieve specific goals, including accurate punctuation* *I can check and correct my spellings digitally* *I can successfully use multiple **apps** or **web browser tabs** at the same time*	*I can edit and improve **on-screen writing**, including digital thesaurus use* *I can combine a variety of **software** (programs that run on computers) to accomplish given goals*	*I can **re-order** on-screen sentences for clarity, purpose and effect* *I can **type at speed** with accurate spelling and correct use of punctuation conventions*
Self-image & Identity	*I know that being on-screen is different to real life.*	*If something happens that makes me feel sad, worried, uncomfortable or frightened I can give examples of when and how to speak to an adult I can trust.*	*I can describe how images can be fake*	*I can describe ways in which media can shape ideas about gender.*	*I can describe ways in which people might make themselves look different online*	*I can explain how identity online can be copied, modified or altered.*	*I can explain how I can represent myself in different ways online.*

Digital Learning Cornwall

Independent guidance | consultation | training

Helping busy schools make informed EdTech choices

Intent & Progression - Curriculum Milestones for Computing

Online relationships	*I recognise that people can talk to each other using technologies.*	*I can recognise some ways in which the **internet** can be used to communicate.*	*I can explain some risks of communicating **online** with others I don't know well.*	*I can explain how my and other people's feelings can be hurt by what is said or written online.*	*I can explain what it means to 'know someone' online and why this might be different from knowing someone in real life.*	*I can explain how impulsive and rash communications online may cause problems (e.g. flaming, content produced in live streaming).*	*I can demonstrate how I would support others (including those who are having difficulties) online.*
Online reputation	*I can talk about different types of information on the internet, e.g. pictures / text / video.*	*I can describe what information I should not put **online** without asking a trusted adult first.*	*I can explain how information put online about me can last for a long time.*	*I know who I should ask if I am not sure if I should put something online.*	*I can describe how others can find out information about me by looking online.*	*I can describe ways that information about people online can be used by others to make judgments about an individual.*	*I can describe some simple ways that help build a positive online reputation.*
Online bullying	I know that people can be kind, or might be unkind, online.	I can describe how to behave online in ways that do not upset others		*I can describe rules about how to behave online and how I follow them.*	I can explain why I need to think carefully about how content I post might affect others, their feelings and how it may affect how others feel about them (their reputation).	I can explain how I would report online bullying on the apps and platforms that I use.	I can identify a range of ways to report concerns both in school and at home about online bullying.
Managing online information	*I can use, talk about or read different on-screen programs, pictures, stories or information.*	*I can identify devices I could use to access information on the internet.*	*I can demonstrate how to navigate a simple webpage to get to information I need (e.g. home, forward, back buttons; links, tabs and sections).*	*I can evaluate digital content and can explain how I make choices from search results.*	*I can **analyse** information and differentiate between 'opinions', 'beliefs' and 'facts'.*	*I can explain why lots of people sharing the same opinions or beliefs online does not make those opinions or beliefs true.*	*I can demonstrate strategies to enable me to analyse and evaluate the validity of 'facts' and I can explain why using these strategies are important.*

Digital Learning Cornwall

Independent guidance | consultation | training

Helping busy schools make informed EdTech choices

Intent & Progression - Curriculum Milestones for Computing

Health, wellbeing & lifestyle	*I can talk about the difference between activities that are online or offline.*	*I can explain rules to keep us safe when we are using technology both in and beyond the home.*	*I can create **rules** for using technology **safely***	*I can identify situations when I might need to limit the amount of time I use technology.*	*I can describe ways technology can affect healthy sleep and can describe some of the issues.*	*I can describe common systems that regulate age-related content (e.g. PEGI, BBFC, parental warnings) and describe their purpose.*	*I can assess and action different strategies to limit the impact of technology on my health (e.g. nightshift mode, regular breaks, correct posture, sleep, diet and exercise).*
Privacy and security	*I can talk about trusting people (e.g. parents, teachers).*	*I can identify some simple examples of my personal information (e.g. name, address, birthday, age, location).*	*I can explain why I should always ask a trusted adult before I share any information about myself online.*	*I can describe simple strategies for creating and keeping passwords private.*	*I can explain how internet use can be monitored.*	*I can explain how many free apps or services may read and share my private information (e.g. friends, contacts, likes, images, videos, voice, messages, geolocation) with others.*	*I can compare and evaluate different methods of online communication*
Copyright & ownership	*I know that work I create belongs to me.*	*I can name my work so that others know it belongs to me.*	*I can recognise that content on the internet may belong to other people.*	*I can explain why copying someone else's work from the internet without permission can cause problems.*	*When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it.*	*I can demonstrate the use of search tools to find and access online content which can be reused by others.*	*I can recognise the implications of linking to (and using) content owned by other people*