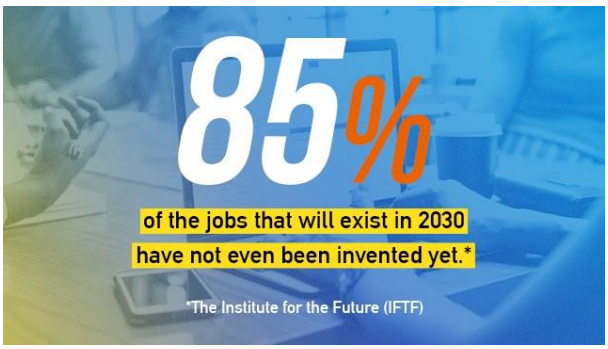
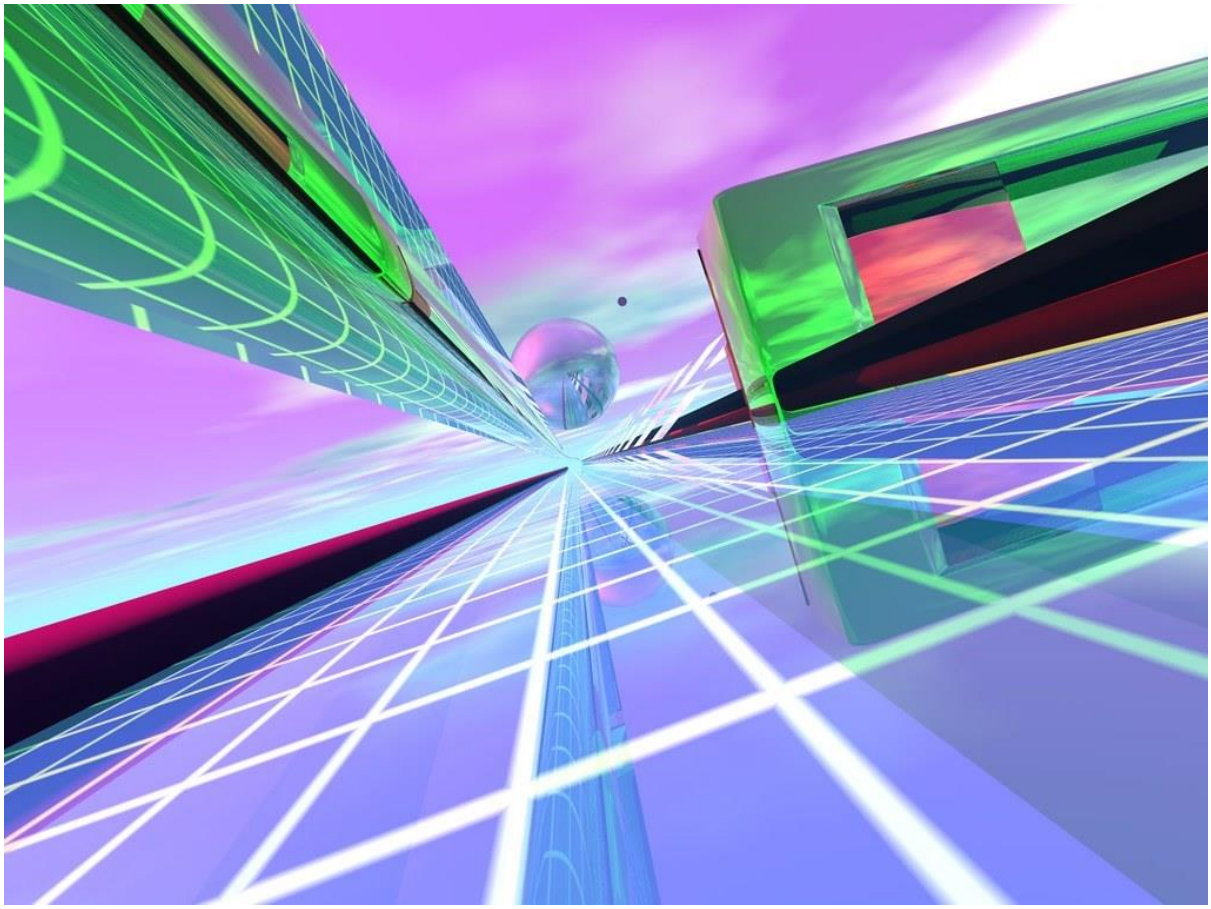
Computing @SJBSunderland

Computing has been re-imagined as a school subject that all children should learn to equip them for life and work. Computer science, the subject's underlying subject discipline, is an explicit part of the curriculum, alongside digital skills, online safety and competence. These are pretty ambitious changes. They represent a huge opportunity - and a huge challenge - that will only be met when every primary teacher embraces this new vision, with both enthusiasm and expertise.

A high-quality computing education equips pupils to use 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.



Intent



Our vision is for every child in the school to have an ambitious and engaging computing education. We continually evaluate the impact that our curriculum and resources are having on improving the quality of teaching computing in school, and the learning experience for young people.

We aim to prepare our children for a rapidly changing world through the use of technology at St John Bosco Catholic School. Our computing curriculum is designed to enable them to use computational thinking and creativity to further understand our world.

Our curriculum design has deep links with mathematics, science, and design and technology. At the core of our computing curriculum 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, we intend for our children to use information technology to create programs, systems and a range of content.

We aim to ensure 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.

https://youtu.be/HxySrSbSY7o

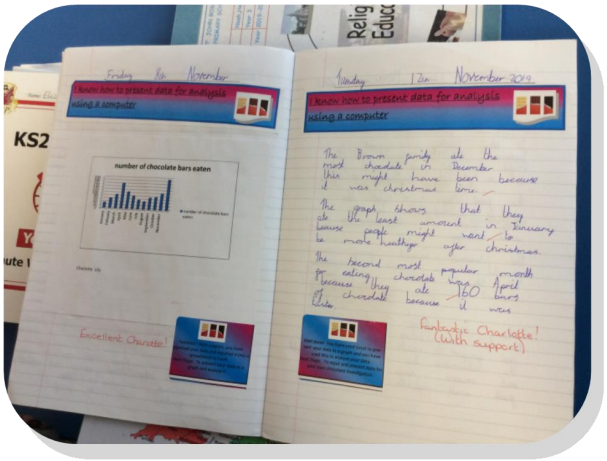
Computing is a young and exciting subject. We have an opportunity, together, to shape how it "lands" in the classroom, so that we can be truly proud of the education our young people receive.

Implementation

Our Computing curriculum amalgamates the best components of Microsoft Office, Teams, online resources and Purple Mash. It is comprised of three aspects: Digital Literacy, Computational Thinking and IT in the World. Computing skills are taught both discretely and cross-curriculum, supporting other areas of learning across the school. In **Reception and Key Stage 1**, children are taught to use equipment and software confidently and purposefully, to communicate and handle information and to support their problem solving, recording and expressive skills.

In **Key Stage 2**, our children extend their use of computing that they use for communication, investigation and programming and work to understand how to communicate safely. We aim to provide a clear and effective scheme of work that provides coverage in line with the National Curriculum. Teaching and learning should facilitate progression across all key stages within the strands of digital literacy, information technology and computer science. Children will have access to the hardware (computers, tablets, programmable equipment) and software that they need to develop knowledge and skills of digital systems and their applications.

Teaching and learning should facilitate progression across all key stages within the strands of digital literacy, information technology and computer science. Children will have the opportunity to explore and respond to key issues such as digital communication, cyberbullying, online safety, security, plagiarism and social media.



Impact

Computing has an increasing profile at our school. We aim to ensure that children have a secure and comprehensive knowledge of the implications of technology and digital systems. This is important in a society where technologies and trends are rapidly evolving. Children will be able to apply the British values of democracy, tolerance, mutual respect, rule of law and liberty when using digital systems. Our children are confident using a wide range of hardware and software, and are diligent learners who value online safety and respect when communicating with one another. There were no reported online safety incidents in the past 12 months, as a result of strong and consistent online safety procedures.

What computing looks like @SJBSunderland

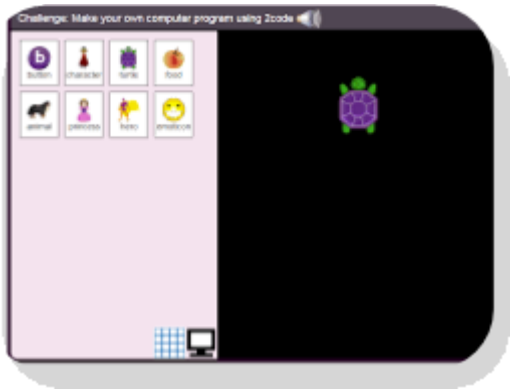
If you were to walk into Computing lessons at St John Bosco, you would see:

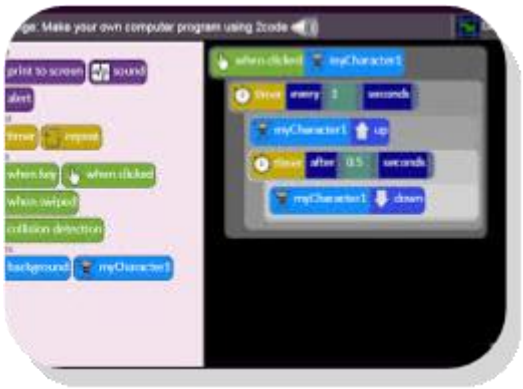
Proficient users of technology who are able to work both independently and collaboratively.

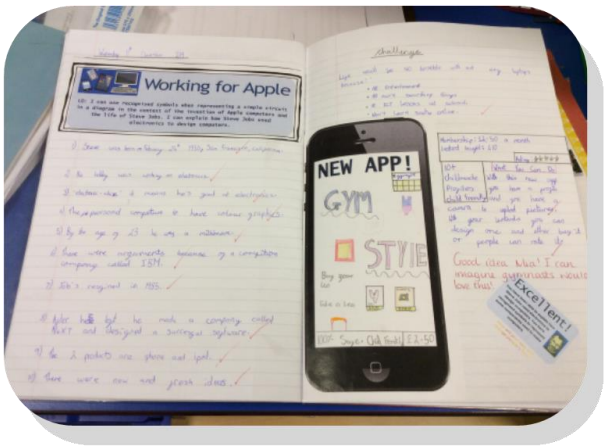
Computing hardware and software being utilised to enhance the learning outcomes of our children, across the curriculum.

Clear progression in technical skills.

A learning buzz as children engage in programming, instruct floor robots, green screen technology, augmented reality software, 3D game design and delivering online safety presentations.







*1 - **Impact***

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Digital devices unplugged

Lesson 1: How does a digital device work?

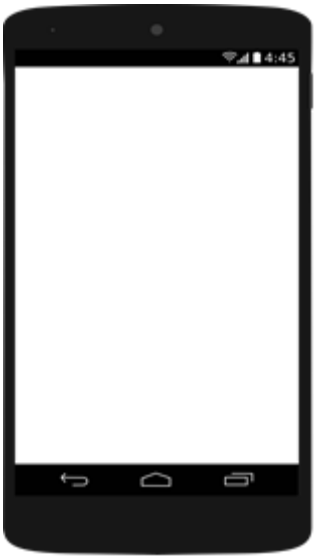
To explain how digital devices function

- I can explain that digital devices accept inputs
- I can explain that digital devices produce outputs
- I can follow a process

What do these things have in common?

All of these things either are digital devices or use digital devices inside them to make them work.

Sort these items into two groups


4:45

Why did you sort them that way?

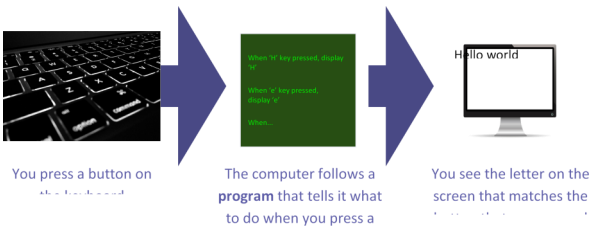
They could be sorted like this...

Digital devices must have an input, a process, and an output

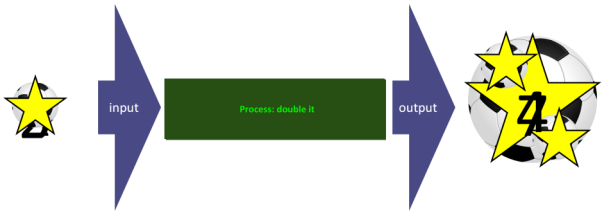
Input

Process

Output

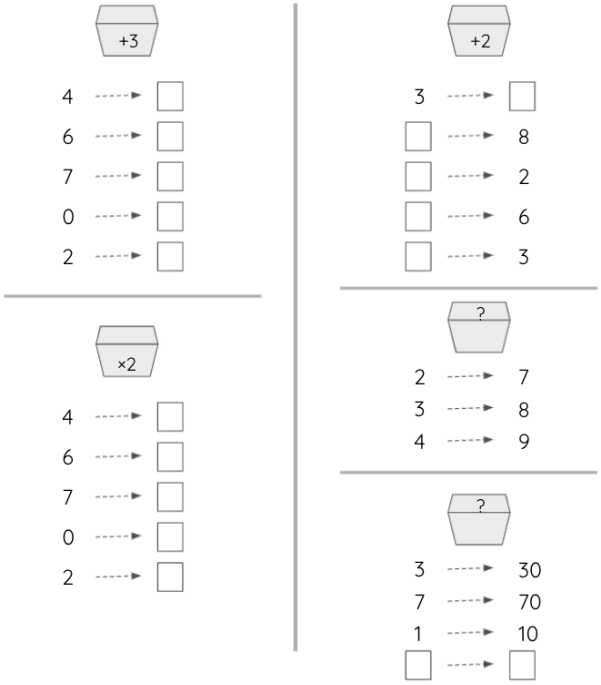


2 - 'Input, process, output' machine



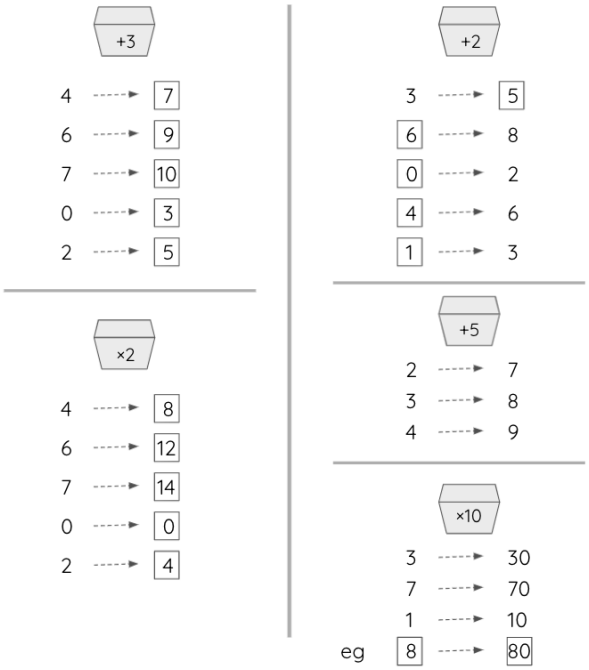
Input, process, output

Can you find the inputs, processes, and outputs for the machines on the sheet?

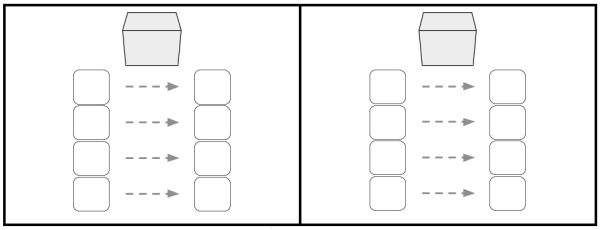


Input, process, output – Answers

Did you find the different inputs, processes, and outputs?

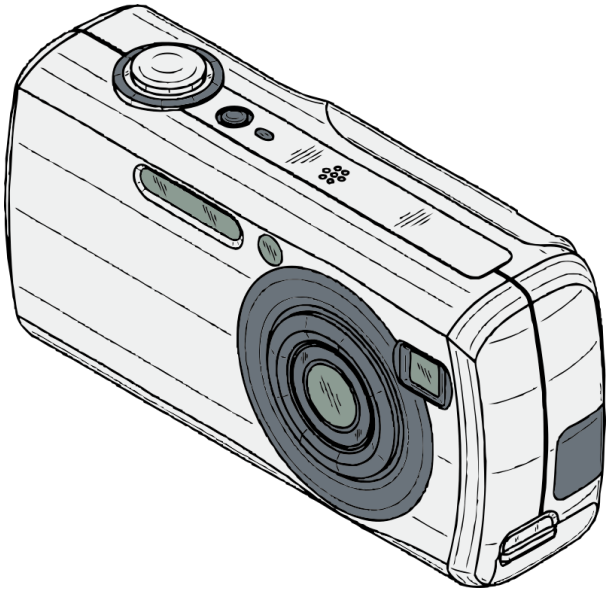


Create your own 'input, process, output' machine



What have you learnt?

- What is this digital device?
- What does it do?
- What is the input?
- What is the process?
- What is the output?



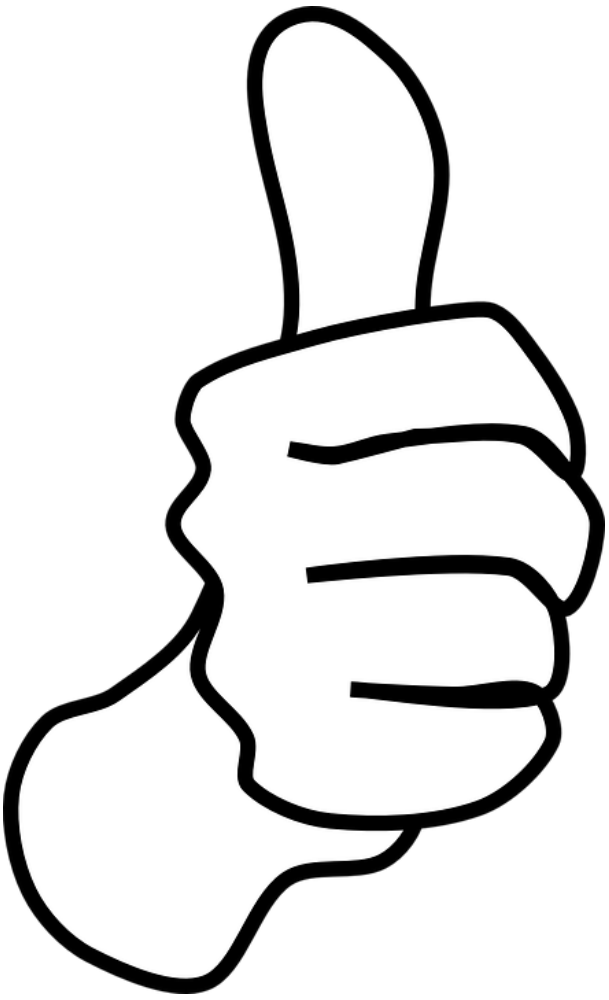
How confident are you? (1–3)

- I can explain that digital devices accept inputs
- I can explain that digital devices produce outputs
- I can follow a process

3 – Very confident

2 – Unsure

1 – Not confident



Next lesson

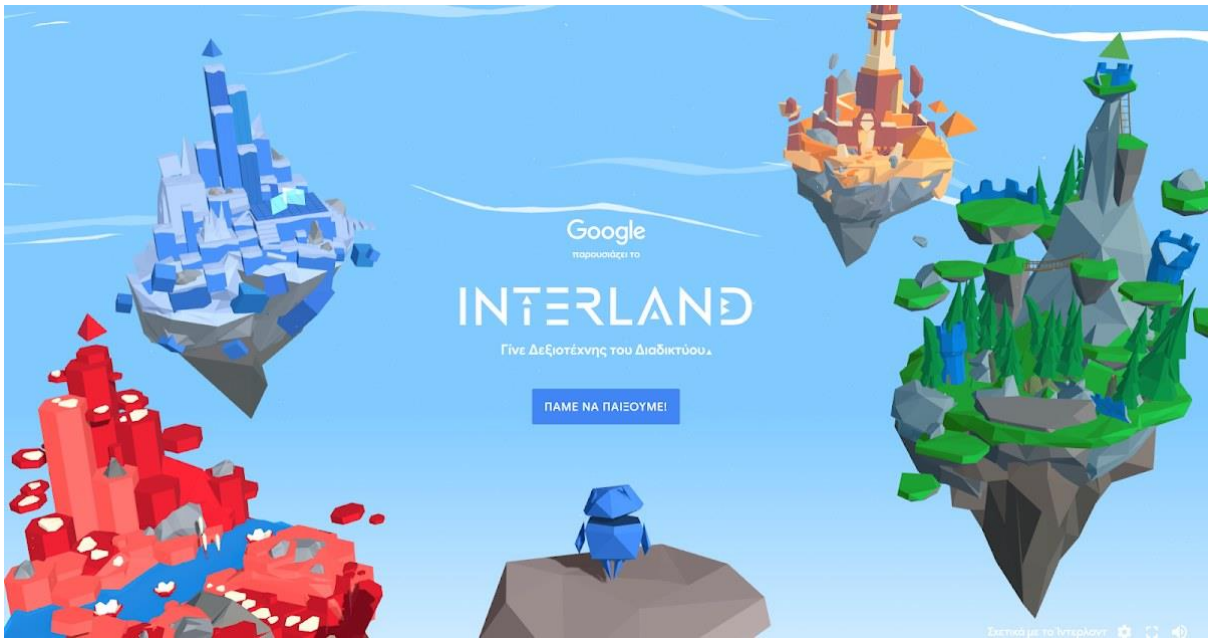
In this lesson, you...

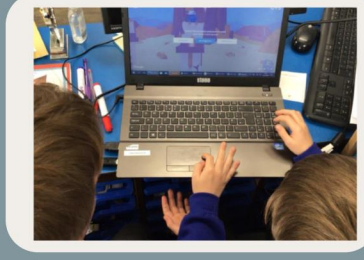
Used an ‘input, process, output’ machine and invented your own processes

Next lesson, you will…

Look at devices with different inputs and outputs and design your own digital device

Computing Y4 INTERLAND

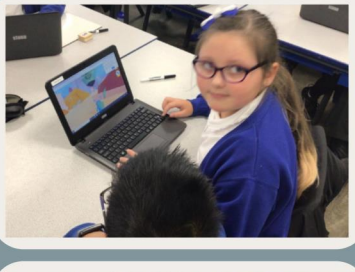




L.O: I can set effective passwords and understand their importance in internet safety

In computing, Year 4 learnt about the importance of setting effective passwords. We learnt that to make our passwords stronger, we should look to include numbers and a mix of capital and lower case letters.

To do this, we played INTERLAND. A fun, but important game that taught us how to create such passwords and what happens if we don't.



Progression of Skills

St John Bosco Computing Skills Progression Reception – Yr6

Computing is split into 5 different categories: E-Safety, Programming, Multimedia, Technology in Our Lives and Data Handling. Below is the progression of skills that children should learn from Reception until they leave us in Year 6.

E-Safety				
Reception	**Year 1**	**Year 2**	**Year 3 and Year 4**	**Year 5 and Year 6**
Talk about good & bad choices in real life e.g. taking turns, saying kind things, helping others, telling an adult if something upsets you	Understand they need to follow certain rules to remain safe when visiting places online	Stay safe online by choosing websites that are good for them to visit & not inappropriate sites	Agree sensible e-safety rules for the classroom	Agree sensible e-safety rules for the classroom
Play appropriate educational games on the Internet	Begin to understand that if you creative something you own it	Explore what cyber-bullying means & what to do when they encounter it	Choose a secure password for age-appropriate websites	Discuss their own personal use of the Internet and choices they make Discuss how to protect devices from virus threats
Talk about good and bad choices when using websites – being kind, telling a grown up if something upsets us & keeping ourselves safe by keeping information private	Learn that many websites ask for information that is private & discuss how to responsibly handle such requests	Know that if they put information online it leaves a digital footprint or "trail" & they need to manage it so it's not hurtful	Discuss what actions could be taken if they are uncomfortable or upset online e.g. Report Abuse button	Discuss the importance of keeping an adult informed about what you're doing online, and how to report concerns
	Explore how email can be used to communicate with real people within their schools, families & communities	Understand that keyword searching is an effective way to locate online information & how to select keywords to produce the best search results	Talk about what games they enjoying playing and what good choices are when playing games e.g. content, screen time	Explore using the safe and responsible use of online communication tools e.g. blogs, messaging
	Learn that directory sites with alphabetical listings offer one way to find things on the Internet	Discuss criteria for rating informational websites e.g what makes a site more trustworthy / user-friendly?	Use a class blog to share information and talk about who can see it, and how to communicate safely and respectfully	

		Realise that not all websites are equally good sources of information	Comment and provide positive feedback on the work of classmates in school or online, or the work of others online	

Programming						
Reception	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Help adults operate equipment around the school, independently operating simple equipment	Physically follow & give each other instructions to move around	Physically follow and give each other forward, backward & turn (right-angle) instructions	Plan & enter a sequence of instructions on a robot specifying distance & turn to achieve specific outcomes, debug the sequence where necessary	Create & edit procedures typing logo commands including pen up, pen down & changing the trail of the turtle	Explore procedures using repeat to achieve solutions to problems with Logo & a floor robot	Record in some detail the steps (the algorithm) that are required to achieve an outcome & refer to this when programming
Use simple software to make things happen	Explore outcomes when buttons are pressed in sequences on a robot	Articulate an algorithm to achieve a purpose	Test & improve / debug programmed sequences.	Use sensors to 'trigger' an action such as a Scratch sprite speaking or reversing if it touches and object on the screen.	Talk about procedures as parts of a program	Predict the outputs for the steps in an algorithm
Press buttons on a floor robot and talk about the movements	Begin to use software to create movement & patterns on a screen	Plan and enter a sequence of instructions to achieve an algorithm, with a robot specifying distance & turn and drawing a trail	Begin to type logo commands to achieve outcomes.	Solve open-ended problems with a floor robot, Logo & other software using efficient procedures to create shapes & letters	Refine procedures to improve efficiency	Increase confidence in the process to plan, program, test & review a program

Explore options and make choices with toys, software and websites	Begin to identify an algorithm to achieve a specific purpose	Explore outcomes when giving instructions in a simple Logo program	Explore outcomes when giving sequences of instructions in Logo software	Experience a variety of resources to extend knowledge & understanding of programming.	Use a variable to replace number of sides in a regular shape	Write a program which follows an algorithm to solve a problem for a floor robot or other model
	Execute a program on a floor robot to achieve an algorithm	Watch a Logo program execute & debug any problems	Use repeat to achieve solutions to tasks	Create an algorithm & a program that will use a simple selection command for a game	Explore instructions to control software or hardware with an input & using if… then… commands	Write a program which follows an algorithm to achieve a planned outcome for appropriate programming software
	Use the word debug to correct any mistakes when programming a floor robot	Predict what will happen & test results	Solve open-ended problems with a floor robot & Logo including creating simple regular polygons, making sounds & planning movements such as a dance	Begin to correct errors (debug) as they program devices & actions on screen, & identify bugs in programs written by others	Explore a computer model to control a physical system	Control on screen mimics & physical devices using one or more input & predict the outputs
	Begin to predict what will happen for a short sequence of instructions in a program	Talk about similarities & differences between floor robots and logo on screen	Create an algorithm to tell a joke or a simple story	Use an algorithm to sequence more complex programming into order	Change inputs on a model to achieve different outputs	Understand how sensors can be used to measure input in order to activate a procedure or sequence & talk about applications in society
			Sequence pre-written lines of programming into order	Link the use of algorithms to solve problems to work in Maths, Science & DT.	Refine & extend a program	Create variables to provide a score/trigger an action in a game

			Talk about algorithms planned by others & identify any problems & the expected outcome		Identify difficulties & articulate a solution for errors in a program	Link errors in a program to problems in the original algorithm
					Group commands as a procedure to achieve a specific outcome within a program	
					Write down the steps required (an algorithm) to achieve the outcome that is wanted and refer to this when programming.	

Multimedia						
Reception	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Use a mouse to rearrange objects and pictures on a screen	Record their own voices and play back to an audience	Use an increasing variety of tools and effects in paint programs and talk about their choices	Explore & begin to evaluate the use of multimedia to enhance communication	Explore how multimedia can create atmosphere & appeal to different audiences	Select an appropriate ICT or online tool to create and share ideas.	Identify the purpose for selecting an appropriate online tool
Recognise text, images and sound when using ICT	Use a video or stills camera to record an activity	Use templates to make electronic books individually and in pairs	Create & begin to edit presentation documents & text, experimenting with fonts, size, colour, alignment for emphasis & effect	Be confident in creating & modifying text & presentation documents to achieve a specific purpose	Explore the effects of multimedia (photos, video, sound) in a presentation or video and show how they can be modified	Discuss audience, atmosphere and structure of a presentation or video

Use a camera or sound recorder to collect photos or sound	Create sounds and simple music phrases using ICT tools	Explore the effects of sound and music in animation and video	Use a range of effects in art programs including brush sizes, repeats, reflections	Use art programs & online tools to modify photos for a specific purpose using a range of effects	Develop skills using transitions and hyperlinks to enhance the stricture of presentations	Collect information and media from a range of sources (considering copyright issues) into a presentation for a specific audience
Use paint programs to create pictures	Add text and images to a template document using an image & word bank	Create own documents, adding text and images	Explore the use of video, animation & green screening	Explore the use of video, animation, & green screening for a specific audience	Use a wide range of effects in art programs and online tools, discussing the choices made and their effectiveness	Use sound, images, text, transitions, hyperlinks and HTML code effectively in presentations
Begin to use a keyboard see programming	Use index fingers (left and right hand) on a keyboard to build words &sentences	Use keyboard to enter text (index fingers left & right hand)	Use ICT tools to create musical phrases	Use ICT tools to create music phrases for a specific purpose	Know how to use text and video editing tools in programs to refine their work	Store presentations and videos online where they can be accessed by themselves and shared with others
Develop an interest in ICT by using age appropriate websites or programs	Know when & how to use the SPACE BAR (thumbs) to make spaces between words	Know when and how to use the RETURN/ ENTER key. Use SHIFT & CAPS LOCK to enter capital letters. Use DELETE & BACKSPACE buttons to correct text. Create sentences, SAVE & edit later	Amend text & save changes.	Use a keyboard effectively, including the use of keyboard shortcuts	Use online tools to create and share presentations and films	Evaluate the effectiveness of their own work and the work of others
			Use individual fingers to input text & use SHIFT key to type characters	Use font sizes & effects such as bullet points appropriately		

			Amend text by highlighting & using SELECT/ DELETE & COPY/ PASTE	Know how to use a spell check		
			Look at own work & consider how it can be improved for effectiveness	Look at their own, and a friend's work & provide feedback that is constructive & specific		

Technology in Our Lives						
Reception	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Recognise purposes for using technology in school and at home	Recognise uses of technology in their homes and in their community	Begin to understand there are a variety of sources of information and begin to recognise the differences	Save work on the school network, on the Internet and on individual devices	Talk about the school network & the different resources they can access, including the Internet	Identify different parts of computing devices.	Describe different services provided by the Internet & how information moves around the Internet
Understand that things they create belong to them and can be shared with others using technology	Understand that there are online tools that can help them create and communicate	Begin to understand what the Internet is and the purposes that it is used for	Talk about the parts of a computer	Frame questions & identify key words to search for information on the Internet	Identify different parts of the Internet	Describe different parts of a computing device & how it connects to the Internet. Connect a computing device to a keyboard, mouse or printer
Recognise that they can use the Internet to play and learn		Understand the different types of content on websites and that some things may not be true or accurate	Use appropriate tools to collaborate on-line	Consider reliability of information & ways it may influence you	Choose appropriate tools for communication and collaboration and use them responsibly	Identify appropriate forms of online communication for different audiences.

			Use appropriate tools to communicate on-line	Check who the owner is before copying photos, clipart or text	Use effective strategies to search with appropriate search engines	Use search engines as part of an effective research strategy
			Use simple search tools and find appropriate websites		Talk about the different elements on web pages	Describe how search results are selected & ranked
			Talk about the owner of information online		Find out who the information presented on a webpage belongs to.	Acknowledge who resources belong to that they have found on the internet

Data Handling						
Reception	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Collect information as photos or sound files	Take photographs, video and record sound to record learning experiences	Take and save photographs, video & record sound to capture learning	Find out information from a pre-prepared database, asking straightforward questions	Plan and create a database to answer questions	Collect and record information using spreadsheets and databases	Use the whole data process – generate, process, interpret, store, and present information – realising the need for accuracy and checking plausibility
Use a simple pictogram or set of photos to count and organise information	Look at how data is representing digitally	Use microscopes or other devices to capture and save magnified images	Contribute towards a database	Identify different types of data	Carry out complex searches (e.g. using and/or; $\leq$ / $\geq$)	Select appropriate data tool
	Contribute to and interpret a pictogram	Ask questions and consider how they will collect information	Construct and use a branching database	Ask questions carrying out simple searches on a database	Solve problems and present answers using data tools	Identify and present results

		Collect data, generate graphs and charts to find answers	Record data in a variety of ways	Identify inaccurate data	Analyse information and question data	Interrogate a database, refining searches to provide answers to questions
		Save & retrieve the data to show to others	Present data for others	Present data in appropriate format for an audience	Identify poor quality data.	Plan investigations using the outcomes from a data logger to show findings
		Create paper/ object decision trees & explore a branching database	Use a data logger to monitor changes and talk about the outcomes seen	Use a data logger to record and compare individual readings.	Select appropriate use of a data logger for an investigation and interpret the findings	
		Investigate different types of digital data e.g. online encyclopaedias				