Birley Spa Primary Academy
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COMPUTING CURRICULUM

Knowledge and Skills Progression Map

A glossary of key computing vocabulary can be found by clicking here (Ctrl + Click)

Ctrl + Click on hyperlinks throughout this document to view helpful resources and further explanations

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Computing Curriculum Knowledge and Skills Progression Map

National Curriculum Requirements

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

KS1

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

KS2

Pupils should be taught to:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems.
- 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, 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
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour.

Computing National Curriculum Strands

Digital Literacy		Information Technology	Computer Science	E-safety
What is a Computer?	Presenting Information & Multimedia	Data	Programming & Algorithms	

Each aspect (key knowledge and skill) of the school computing curriculum is colour coded to show progression within and across year groups.

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School Context:

At Birley Spa Primary Academy, pupils will use technology in a range of contexts to aid in their learning of key computing skills and knowledge as well as enhancing skills and knowledge in other areas of the curriculum. All pupils are challenged to apply computer systems and technology to solve real world problems and to create digital and physical content.

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Each year group (Y1 – Y6) will teach the following computer topics as dictated by the computing scheme of work:

Year	Strand 0 Key Skills	Strand 1 Communicating: Text and Images	Strand 2 Communicating: Multimedia	Strand 3 Understanding & Sharing Data	Strand 4 Programming A	Strand 5 Programming B
1	What is a Computer?; Mouse & Keyboard Skills; Logging on; Opening & saving work; Organising files; Searching for information	1.1 How do I use the school computer independently?	2.1 How do I record sounds and pictures?	3.1 How do I present data using pictures?	*Algorithms; Programs; Sequence*	
					4.1 What is an algorithm?	5.1 What is a program?
2		1.2 How do I use a computer as a writer?	2.2 How do I create a multimedia story?	3.2 What is a branching database?	*Algorithms; Programs; Debugging*	
					4.2 How do I improve my algorithms?	5.2 How do I improve my programs?
3		1.3 What makes a good poster?	2.3 How do I use a computer as a musician?	3.3 How do we use databases to find out information?	*Sequence; Repetition; Input*	
					4.3 How do I use repetition in programs?	5.3 How do I use forever loops in programs?
4		1.4 How do I use a computer as an artist?	2.4 What makes an excellent multimedia story?	3.4 How is data shared online?	*Decomposition, Selection*	
					4.4 How do I write efficient programs?	5.4 How do I use selection in a program?
5		1.5 How do we collaborate online?	2.5 How do I create a radio advert?	3.5 How do I find and share data safely and responsibly?	*Inputs and Outputs; Variables*	
					4.5 How do I program physical systems?	5.5 How do I use variables in programs?
6		1.6 How do I use a computer to present information effectively	2.6 What makes an excellent film?	3.6 Why do we use spreadsheets?	*Variables; Operators*	
					4.6 How do I build complex physical systems?	5.6 How do I design complex programs?

This progression document also contains ten units organised into the following areas, to map to the Early Learning Goals. Note that although Technology is not included in the reformed ELGs, EYFS will cover this area to prepare young people for their lives in an increasingly digital world:

A	Technology
A1 - What is a Computer? A2 - We Control Technology A3 - Tinkering: Bee-Bots	

B	Communication and Language
C	Personal, Social and Emotional Development
D	Physical Development
E	Literacy
F	Mathematics
G	Understanding the World
H	Expressive Arts and Design

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EYFS

A) Technology	B) Communication & Language	C) Personal, Social & Emotional Development	D) Physical Development
A1 – What is a Computer? • Explore technology. • Use different digital devices. • Recognise that you can access content on a digital device. • Use a mouse, touchscreen or appropriate access device to target and select options • on screen. • Recognise a selection of digital devices. • Recognise the basic parts of a computer, e.g. mouse, screen, keyboard. • - Select a digital device to fulfil a specific task, e.g. to take a photo. **A2 – We Control Technology** • Explore technology. • Use different digital devices. • Repeat an action with technology to trigger a specific outcome. • Recognise the success or failure of an action. • Follow simple instructions to control a digital device.	**1) Listening, Attention & Understanding** **2) Speaking** • Explore technology. • Use technology to explore and access digital content. • Operate a digital device with support to fulfil a task. • Create simple digital content, e.g. record audio. • Follow simple instructions to control a digital device.	**3) Self-regulation** **4) Managing Self** 5) **Building Relationships** • Explore technology. • Repeat an action with technology to trigger a specific outcome. • Recognise the success or failure of an action. • Follow simple instructions to control a digital device. • Are aware that some online content is inappropriate. • Are aware that information can be public or private. • Know to tell an appropriate adult if they see something on the computer that upsets them.	**6) Gross Motor Skills** 7) **Fine Motor Skills** • Use a mouse, touchscreen or appropriate access device to target and select options on screen

• - Recognise that we control computers. **A3 – Tinkering with Programmable Bots** • Explore technology. • Repeat an action with technology to trigger a specific outcome. • Recognise the success or failure of an action. • Follow simple instructions to control a digital device. • Recognise that we control computers. • Input a short sequence of instructions to control a device			
E) Literacy	**F) Mathematics**	**G) Understanding the World**	**H) Expressive Arts & Design**
8) Comprehension **9) Word Reading** **10) Writing** • Explore technology. • Use technology to explore and access digital content. • Operate a digital device with support to fulfil a task. • Create simple digital content, e.g. record audio. • Follow simple instructions to control a digital device	**11) Number** **12) Numerical Patterns** • Explore technology. • Use technology to explore and access digital content. • Answer basic questions about information displayed in images e.g. more or less. • Operate a digital device with support to fulfil a task. • Create simple digital content, e.g. digital art. • Choose media to convey information, e.g. image for a poster.	**13) Past and Present** **14) People, Culture and Communities** **15) The Natural World** • Explore technology. • Use technology to explore and access digital content. • Operate a digital device with support to fulfil a task. • Create simple digital content, e.g. digital art. • Choose media to convey information, e.g. image for a poster	**16) Creating with Materials** **17) Being imaginative and Creative** • Explore technology. • Use technology to explore and access digital content. • Operate a digital device with support to fulfil a task. • Create simple digital content, e.g. digital art. • - Choose media to convey information, e.g. image for a poster.

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Year 1

Digital Literacy		Information Technology	Computer Science
What is a Computer?	**Presenting Information & Multimedia**	**Data**	**Programming & Algorithms**
• Recognise a range of digital devices. • Select a digital device to fulfil a specific task, e.g. to take a photo. • Name a range of digital devices, e.g. laptop, phone, games console. • Log on to the school computer / unlock the school tablet with support. • Identify the basic parts of a computer, e.g. mouse, keyboard, screen. • Use a suitable access device (mouse, keyboard, touchscreen, switch) to access and control an activity on a computer. • Open key applications independently. • Save and open files with support. • Add an image to a document from a given folder/source with support.	• Create digital content, e.g. digital art. • Choose media from a selection (e.g. images, video, sound) to present information on a topic. • Recognise that you can find out information from a website • Recognise that you can edit digital content to change its appearance. • Select basic tools/options to change the appearance of digital content, e.g. filter on an image / font / size of paintbrush. • Combine media with support to present information, e.g. text and images	• Recognise different forms of digital content, i.e. text, image, video and audio. • Collect simple data (e.g. likes/dislikes) on a topic • Present simple data using images, e.g. number of animals • Recognise charts and pictograms, and why we use them. • Explain information shown in a simple chart or pictogram • Modify simple charts/pictograms, e.g. add title, item or labels. • Identify the key features of a chart or pictogram. • Collect data on a topic (eye colour, pets etc.) and present in a pictogram or chart	• Recognise that computers don't have a brain • Explain that we control computers by giving them instructions. • Create a simple program e.g. to control a floor robot • Create a simple algorithm • Predict the outcome of a simple algorithm or program. • Explain what an algorithm is – a sequence of instructions to make something happen. • Recognise that the order of instructions in an algorithm is important. • Debug an error in a simple algorithm or program e.g. for a floor robot. What is an algorithm? 
E-safety and Key Skills			
• Use a simple password when logging on, where relevant. • Explain why we use passwords. • Recognise examples of personal information e.g. name, image.		• Know who to tell if concerned about content or contact online. • Recognise that digital content belongs to the person who created it. • Talk about their use of technology at home.	

Cross Curriculum Links:

Autumn Term:	Spring Term:	Summer Term:
Literacy: Publish writing on word processing software. **Art:** Create self-portraits using digital paint software	**Literacy:** Create a 'cook book' using book creator app (i.e: list of instructions to make a ginger bread man)	**Art/Literacy (hook):** Missing Toy poster

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Year 2

Digital Literacy		Information Technology	Computer Science
What is a Computer?	**Presenting Information & Multimedia**	**Data**	**Programming & Algorithms**
• Recognise what a computer is (input > process > output). • Recognise that a range of digital devices contain computers, e.g. phone, games console, smart speaker • Explain what the basic parts of a computer are used for • Identify and use input devices, e.g. mouse, keyboard; and output devices, e.g. speakers, screen • Open key applications independently • Save and open files to/from a given folder. • Add an image to a document from a given folder/source • Resize an image in a document • Highlight text and use arrow keys. • Capture media independently (e.g. take photos, record audio).	• Create simple digital content for a purpose, e.g. digital art • Recognise that we can use technology to record and playback audio or take and view photographs. • Apply edits to digital content to achieve a particular effect, e.g. emphasise part of a text • Present ideas and information by combining media, e.g. text and images. • Explain that you can search for information on the internet. • Plan out digital content, e.g. a simple sketch or storyboard. • Identify the common features of digital content, e.g. title, images • Recognise that we can use different types of media to convey information, e.g. text, image, audio, video.	• Identify different forms of digital content, i.e. text, image, video and audio. • Recognise charts, pictograms and branching databases, and why we use them • Identify an object using a branching database • Create a branching database using pre-prepared images and questions • Identify the features of a good question in a branching database • Independently plan out and create a branching database • Evaluate a given branching database and suggest improvements	• Explain that computers have no intelligence and we have to program them to do things • Create a program with multiple steps e.g. to control a floor robot • Predict the outcome of an algorithm or program with multiple steps • Recognise that the instructions in an algorithm need to be clear and unambiguous • Identify and correct errors in a given algorithm or program, and recognise the term debugging • Explain what an algorithm is, and that when inputted on a computer it is called a program • Plan out a program by creating an algorithm, and evaluate its success. What is an algorithm? 

E-Safety

- Remember a simple password to log onto the computer or a website.
- Identify rules for acceptable use of technology in school
- Recognise what personal information is and the need to keep it private
- Recognise that spending a lot of time in front of a screen can be unhealthy
- Recognise that some information found online may not be true

Cross Curriculum Links		
Autumn Term: Geography: Use digital maps (i.e: google maps) to locate key locations	**Spring Term:** PE: Use digital devices to record gymnastic routines in order to evaluate and improve.	**Summer Term:** Maths: use software applications to create basic charts (tally, bar etc.) to present information.

Year 3

Digital Literacy		Information Technology	Computer Science
What is a Computer?	**Presenting Information & Multimedia**	**Data**	**Programming & Algorithms**
• Describe what a computer is (input > process > output). • Describe what a computer is (input > process > output). • Know where to save and open files (e.g. in shared folder). • Save files with appropriate names. • Use a keyboard effectively to type in text • Use left-, right- and double-click on the mouse. • Add an image to a document from the internet. • Resize and move an image in a document. • Use a search engine to find simple information • Recognise that school computers are connected	• Present ideas and information by combining media independently, e.g. text and images • Design and create simple digital content for a purpose/audience, e.g. poster • Edit digital content to improve it, e.g. resize text. • Identify the features of a good piece of digital content • Explain why we use technology to create digital content • Recognise why we use different types of media to convey information, e.g. text, image, audio, video	• Recognise charts, pictograms and databases; and why we use them. • Present information using a suitable chart • Explore a record card database to find out information • Use filters in a database to find out specific information • Name the key parts of a database, e.g. record, field, search. • Answer questions about information in a database • Name some benefits of using a computer to create charts and databases. • Recognise that search engines store information in databases`	• Predict the outcome of a block or text-based program (Scratch/Logo). • Successfully modify an existing program, e.g. change background, number of times things happen • Identify repeated steps in a program or algorithm • Create examples of algorithms containing count-controlled loops • Use a count-controlled loop (e.g. repeat 3 times) to make a program more efficient • Recognise that we can create an algorithm to help plan out a program. • Recognise a forever loop in a program or algorithm • Use a forever loop in a program to keep something happening • Identify errors in a block or text-based program and correct them • Recognise that different inputs can be used to control a program
E-Safety			

• Explain why we need to keep our password safe. • Recognise that digital content belongs to the person who first created it, but we can give permission for others to use it.	• Recognise when to share personal information and when not to • Recognise that some people lie about who they are online • Are aware that games and films have age ratings

Cross Curriculum Links

Autumn Term:	**Spring Term:**	**Summer Term:**
Literacy: create a basic fact file including images from the internet	Maths: use of logo programming language to draw 2D shapes	Science: Record data from an experiment using a data base program (Excel)

Year 4

Digital Literacy		Information Technology	Computer Science
What is a Computer?	**Presenting Information & Multimedia**	**Data**	**Programming & Algorithms**
• Recognise that you can organise files using folders • Explain what a good file name would look like • Delete and move files • Use key parts of a keyboard effectively, e.g. shift, arrow keys, delete). • Know how to copy and paste text or images in a document • Crop an image and apply simple filters • Use a search engine to find specific information • Recognise that school computers are connected together on a network	• Collect, organise and present information using a range of media • Design and create digital content for a specific purpose, e.g. poster, animation • Edit digital content to improve it according to feedback • Identify the features of a good piece of digital content and apply these in own design • Explain the benefits of using technology to present information • Know where to find copyright-free content, e.g. creative commons images • Collaborate with peers using online tools, e.g. blogs, Google Drive, Office 365, if available	• Draw conclusions from information stored in a database, chart or table • Design a questionnaire and collect a range of data on a theme • Choose appropriate formats to present data to convey information • Recognise that school computers are connected together on a network • Recognise that the Internet is made up of computers and other digital devices connected together all around the world • Know that you use a web browser to access information stored on the internet • Appreciate that you need to use specific software to work with video, images, audio etc.	• Create a program using a range of events/inputs to control what happens • Recognise that we can decompose a problem into smaller parts to help solve it • Explain when to use forever loops and count-controlled loops, and use them in programs • Recognise selection in a program or algorithm • Use selection in algorithms in programs to alter what happens when a condition changes, e.g. if…then… • Design a program for a purpose. Decompose into parts and create an algorithm for each one • Recognise common mistakes in programs and how to correct them
E-Safety			

• Remember and use an individual password • Recognise what kinds of websites are trustworthy sources of information	• Recognise the benefits and risks of different apps and websites • Recognise that the media can portray groups of people differently • Can rate a game or film they have made and explain their rating

Cross Curriculum Links

Autumn Term:	**Spring Term:**	**Summer Term:**
Literacy: Publish a piece of writing, with a range of digital content using word processing software.	Topic/Literacy: Publish persuasive leaflet for The Deep using Book Maker app or similar	Science: Create a simple electricity circuit on Scratch using variables, loops, if/else statements etc.

Year 5

Digital Literacy		Information Technology	Computer Science
What is a Computer?	**Presenting Information & Multimedia**	**Data**	**Programming & Algorithms**
• Type using fingers on both hands • Use common keyboard shortcuts, e.g. ctrl C (copy), ctrl V (paste). • Explain what makes a strong password • Use folders to organise files • Know how to mute and unmute audio on a computer or tablet • Recognise that there is more than one search engine, and they may produce different results • Use a search engine effectively to find information and images • Know how to search for an application on a computer/tablet	• Identify and use appropriate hardware and software to fulfil a specific task • Remix and edit a range of existing and their own media to create content • Consider the audience when designing and creating digital content • Recognise the benefits of using technology to collaborate with others • Identify success criteria for creating digital content for a given purpose and audience	• Explain the difference between data and information • Appreciate that different programs work with different types of data, e.g. text, number, video • Explain the difference between the Internet and the World Wide Web • Know the difference between a search engine and a web browser • Explain the basics of how search engines work, and that different search engines may give different results • Perform complex searches for information using advanced settings in search engines	• Name a range of sensors in physical systems • Recognise that different solutions may exist for the same problem • Predict what will happen in a program or algorithm when the input changes (e.g. sensor, data or event) • Use two-way selection in programs and algorithms, i.e. *if…then…else…* • Recognise variables in a program, and what they do. • Create programs including repeat until loops • Create and use simple variables, e.g. to keep score • Evaluate a program and make improvements to the code or design accordingly.

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E-safety

• Know where to find copyright free images and audio, and why this is important • Critically evaluate websites for reliability of information and authenticity.	• Demonstrate responsible use of a online services, and know a range of ways to report concerns.

Cross Curriculum Links:

Autumn Term:	**Spring Term:**	**Summer Term:**
Topic: Use search engines to research relevant information.	Literacy: Publish a written diary online as a blog	Science: Use Scratch to create a model of gravity acting upon an object

Year 6

Digital Literacy		Information Technology	Computer Science
What is a Computer?	**Presenting Information & Multimedia**	**Data**	**Programming & Algorithms**
• Type efficiently using both hands • Use a range of keyboard shortcuts • Recognise that different devices may have different operating systems • Organise files effectively using folders and files names. • Use the advanced search tools when using a search engine to find specific information and images • Explain the basic function of an operating system.	• Select, combine and remix a range of media to create original content. • Consider all steps of the design process when creating content (e.g. identify problem, plan, create, evaluate, share.) • Identify the most effective tools to present information for a specific purpose. • Explain the benefits of using technology to collaborate with others.	• Recognise what a spreadsheet is and what it is used for • Explain the difference between physical, mobile and wireless networks. • Use simple formulae in a spreadsheet to find out information from a set of data • Collect data for a purpose and plan out a spreadsheet to present it effectively, using relevant formulae.	• Design and program a physical computing system that uses sensors • Recognise and use procedures (sub-routines) in programs • Plan out a program in detail, including task, algorithm, code and execution level • Explain common errors in programs and explain how to fix them. • Use nested selection statements in a program or algorithm effectively. • Combine a variable with relational operators (< = >) to determine when

• Recognise common file types and extensions e.g. jpeg, png, doc, wav • Recognise a range of Internet services e.g. email, VOIP (e.g. Skype, FaceTime), World Wide Web, and what they do.	• Evaluate existing digital content in terms of effectiveness and design.	• Produce graphs from data in a spreadsheet to answer a question • Analyse and evaluate data and information in a spreadsheet, chart or database. • Recognise that poor quality data leads to unreliable results.	a program changes, e.g. if score > 5, say "well done". • Recognise key concepts (sequence, selection, repetition and variables) in a range of languages and contexts

E-Safety

• Explain what makes a strong password and why this is important at school and in the wider world • Explain how algorithms are used to track online activities with a view to targeting advertising and information.	• Know that there are laws around the purchase of games; the production, sending and storage of images; what is written online; and around online gambling.

Cross Curriculum Links

Autumn Term:	**Spring Term:**	**Summer Term:**
Literacy: publish a poem using word processing software incorporating other media elements	Science: Create a working model showing how blood travels through the body using Powerpoint	Art: Create a digital piece of artwork inspired by famous artists and styles.