COMPUTING

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Version No.:	1	**Date:**	17th April 2024
Proposed Review Date	Spring 2025		

Purpose of Study

A high-quality computing education equips pupils to use computational thinking and 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. The core of computing 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, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology.

At Asby Endowed School, computing is central to our broad and balanced curriculum. Across all subjects, iPads are used consistently and responsibly; even in Key Stage 1, children are fluent on programs such as Showbie, Spelling Shed and Numbots. E-Safety is central to this and children are taught how to use technology responsibly in assemblies.

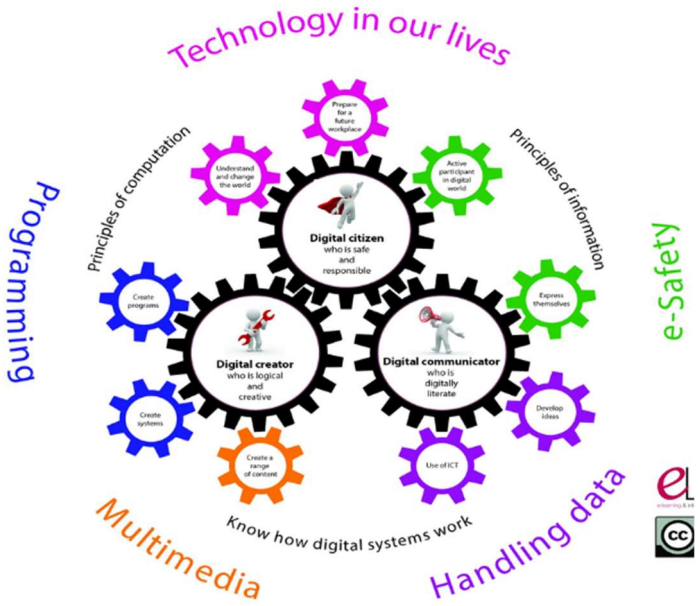
In Computing lessons, children are inspired through an exciting and relevant curriculum. Specifically, we teach children to:

- Understand and apply the fundamental principles of computer science, such as logic, algorithms and data;
- Analyse programs to problem-solve and de-bug;
- Use digital literacy to enhance language and communication;
- Enable pupils to take ownership of their data and the content they share.

Overall, we aim for children to be digitally literate. This is so the children can have the skills required for a future workplace, as well as being able to participate fully in a digital world.

Three strands:

- Computer Science: Algorithms and programming
- Information technology
- Digital Literacy



National Curriculum

- 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.

EYFS - Reception	Key Stage 1	Key Stage 2
Pupils should be taught to: **Personal, Social and Emotional Development** • Be confident to try new activities and show independence, resilience and perseverance in the face of challenge. • Explain the reasons for rules, know right from wrong and try to behave accordingly. **Expressive Arts and Design** • Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.	**Pupils should be taught to:** • understand what algorithms are; how they are implemented as programs on digital devices; and those programs execute by following precise and unambiguous instructions • create and debug simple programs • use logical reasoning to predict the behaviour of simple programs • use technology purposefully to create, organise, store, manipulate and retrieve digital content • recognise common uses of information technology beyond school • use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.	**Pupils should be taught to:** • design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts • use sequence, selection, and repetition in programs; work with variables and various forms of input and output • use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs • understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration • use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content • select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals,

		including collecting, analysing, evaluating and presenting data and information • use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Content

The contribution of computing to teaching in other curriculum areas

Technology is important to us at Asby. The children use their iPads in most lessons.

English - English is the 'lingua franca' of computing and children need to spell (or write) accurately in order to write programs and access technological resources.

Mathematics - Computing originated from mathematics and there is a huge amount of crossover between the two disciplines. In KS1, children use positional language and measurement when programming and, in KS2, children find coordinates and angles in Scratch as well as in maths lessons.

Personal, social and health education (PSHE) and citizenship - It is undeniable that we live in a globalised, technological world. Technology is already integrated into the lives of our children and it is vitally important that we help them to: recognise acceptable and unacceptable online behaviour; identify how to report concerns; and understand both the possibilities and dangers of using information technology.

Quality of Education

Intent

At our school we want pupils to be MASTERS of technology and not slaves to it. Technology is everywhere and will play a pivotal part in students' lives,. Therefore, we want to model and educate our pupils on how to use technology positively, responsibly and safely. We want our pupils to be creators not consumers and our broad curriculum encompassing computer science, information technology and digital literacy reflects this. We want our pupils to understand that there is always a choice with using technology and as a school we utilise technology (especially social media) to model positive use. We recognise that the best prevention for a lot of issues we currently see with technology/social media is through education. Building our knowledge in this subject will allow pupils to effectively demonstrate their learning through creative use of technology We recognise that technology can allow pupils to share their learning in creative ways. We also understand the accessibility opportunities technology can provide for our pupils. Our knowledge rich curriculum has to be balanced with the opportunity for pupils to apply their knowledge creatively which will in turn help our pupils become skilful computer scientists. We encourage staff to try and embed computing across the whole curriculum to make learning creative and accessible. We want our pupils to be fluent with a range of tools to best express their understanding and hope by Upper Key Stage 2, children have the independence and confidence to choose the best tool to fulfil the task and challenge set by teachers.

Implementation

Information Technology	Computer Science	Digital Literacy
Word Processing/Typing	Computational Thinking	Self Image and Identity
Data Handling	Programming	Online Relationships
Presentations, Web design and eBook	Computer Networks	Online Reputation
Animation		Online Bullying
Video Creation		Managing Online Information
Photography and Digital Art		Health, Wellbeing and Lifestyle
Augmented Reality and Virtual Reality		Privacy and Security
Sound		Copyright and Ownership

Impact

We encourage our children to enjoy and value the curriculum we deliver. We will constantly ask the WHY behind their learning and not just the HOW. We want learners to discuss, reflect and appreciate the impact computing has on their learning, development and well being. Finding the right balance with technology is key to an effective education and a healthy life-style. We feel the way we implement computing helps children realise the need for the right balance and one they can continue to build on in their next stage of education and beyond. We encourage regular discussions between staff and pupils to best embed and understand this. The way pupils showcase, share, celebrate and publish their work will best show the impact of our curriculum. We also look for evidence through reviewing pupil's knowledge and skills digitally through tools like Google Drive and Seesaw and observing learning regularly. Progress of our computing curriculum is demonstrated through outcomes and the record of coverage in the process of achieving these outcomes

Progression of Knowledge

Substantive knowledge in Computing is understanding how to use technology, how to be safe and knowing how to program. This is developed through deliberate practice and by children applying their knowledge of how to be computational thinkers. focuses on

Disciplinary knowledge in Computing is the use and interpretation of substantive knowledge in order to develop original digital content and programs.

A Reception Computer User	Year 1 Computer User	Year 2 Computer User	Year 3 Computer User
Personal, Social and Emotional Development • I know how to show resilience and perseverance in the face of a challenge. • I know and talk about the different factors that support my overall health and wellbeing. • I have sensible amounts of 'screen time'. **Physical Development** • I know how to develop my fine motor skills so that I know how to use a range of tools competently, safely and confidently. **Expressive Arts and Design** • I know how to explore, use and refine a variety of artistic effects to express my ideas and feelings. **Understanding of the World** • I know how to describe the	**Computer Science** • I know how to create a series of instructions. • I know how to plan a journey for a programmable toy. **Information Technology** <u>Data Handling</u> • I know how to collect data on a topic. • I know how to create a tally chart and pictogram to represent data. • I know how to create digital content. • I know how to save digital content. • I know how to retrieve digital content. • I know how to use a website. • I know how to use a camera. • I know how to record sound and play it back. **Digital Literacy** • I know how to save and retrieve my learning.	**Computer Science** • I use a range of instructions (e.g, directions, angles and turns). • I test and amend a set of instructions. • I find errors and amend (debug). • I know how to write a simple program and test it. • I predict what the outcome of a simple program will be (logical reasoning). • I understand that algorithms are used on digital devices. • I understand that programs require precise instructions. **Information Technology** <u>Data Handling</u> • I know how to sort objects using charts such as Venn diagrams and carroll diagrams. • I organise digital content. • I retrieve and manipulate digital content. • I know how to navigate the	**Computer Science** • I design a sequence of instructions. • I write programmes that accomplish specific goals. • I work with various forms of input. • I work with various forms of output. **Information Technology** <u>Data Handling</u> • I know how to create a branching database using closed questions. • I know how to start to input simple data on a spreadsheet. • I use a range of software for similar purposes. • I collect information. • I design and create content. • I present information. • I search for information on the web in different ways. • I manipulate and improve digital images. **Digital Literacy**

immediate school environment, including the technology that its used regularly. • I know that the technology we have now was not available in the past .	Showbie • I know how to use an iPad to take a photo. • I know how to use the iPad pen to complete work on Showbie • I know how to use the voice record function on Showbie. Word Processing (Office 365) • I type words correctly on a digital device. • I use the space bar to add spaces when typing. • I use backspace to delete words when typing. Presentations (Office 365) • With support, I know how to add text to a single slide and add an image using Clipart Communication • I know how to use the internet with adult support to communicate with people I know. E-Safety • I use technology safely. • I know that personal information needs to be kept private. Research • With supervision, I know how to use key words to search for information using a safe search engine (e.g., Kiddle	web to complete simple searches. **Digital Literacy** • I know how to use an iPad to access frequently-used apps at school (e.g., Numbots and Spelling Shed) Showbie • I know how to use an iPad to take a video. • I know how to join a classroom on Showbie, when given the class code. • I know how to use Showbie to upload a photo or a video to the correct folder. Word Processing (Office 365) • I know how to use the space bar only once when typing. • I know how to use caps lock for capital letters. Presentations (Office 365) • I know how to add text to a single slide and add an image using Clipart. Communication • I know how to use technology safely to communicate with people I know. E-Safety • I use technology safely. • I know where I know how to go for help if I am concerned.	• I know how to use an iPad to print off a piece of work. • I know how to use an iPad to access frequently-used apps at school (e.g., Numbots and Spelling Shed). • I understand what computing equities do and how they provide multiple services. • I discern where it is best to use technology. • I know how log-on to a Chrome Book. • I know how to type the @ symbol on a Chromebook (shift+”). • I know how to log-on to Office 365 using my school log-in. Showbie • I know how to use Showbie to record my voice, type and highlight Word Processing • I know how to edit the style and effect of my text and images • I know how to use cut, copy and paste to quickly duplicate and re-organise text. Presentations • I know how to create multiple slides as part of a slideshow • I know how to add appropriate animations to slides

	• With supervision, I know how to access teacher-defined websites using a website address.	• I know how technology is used in school and outside of school. <u>Research</u> • I know how to use key words to search for information using a safe search engine (e.g., Kiddle). • I know how to access teacher-defined websites using a website address..	<u>Communication</u> • I know how to use Outlook to write an email to a member of staff. <u>E-Safety</u> • I use technology respectfully and responsibly. • I know different ways I know how to get help if I am concerned. <u>Research</u> • I know how to use child-friendly search engines (e.g., Kiddle) to locate images. • I know how to search using a number of key words to answer a question. • I understand that not all search results are to be believed.

Year 4 Computer User	Year 5 Computer User	Year 6 Computer User
Computer Science • I experiment with variables to control models. • I give an on-screen robot specific instructions that take some from A to B. • I make an accurate prediction and explain why I believe something will happen (linked to programming). • I debug a programme. **Information Technology** <u>Data Handling</u> • I know how to confidently create a	**Computer Science** • I combine sequences of instructions and procedures to turn devices on and off. • I use technology to control an external device. • I design algorithms that use repetition and two-way selection. **Information Technology** <u>Data Handling</u> • I know how to create a branching database with a large data set • I know how to confidently represent	**Computer Science** • I design a solution by breaking a problem up. • I recognise that different solutions can exist for the same problem. • I use logical reasoning to detect errors in algorithms. • I use selection in programs. • I work with variables. • I know how to explain how an algorithm works. • I explore 'what if' questions by planning different scenarios for controlled devices. **Information Technology**

branching database using closed questions. • I know how to input simple data on a spreadsheet and represent it pictorially (e.g., pie charts). • I select a new software to accomplish given goals. • I collect and present data. • I produce and upload a podcast. **Digital Literacy** • I know how to confidently log-on to a Chromebook • I know how to confidently log-on to Office 365 • I know how to use an iPad to air drop an image or document to a peer <u>Showbie</u> • I know how to use Showbie fluently to type, draw, highlight and record • I know how to use the layering tool on Showbie to show and remove shared instructions. <u>Word Processing</u> • I know how to combine digital images from different sources. • I know how to confidently and regularly use text shortcuts e.g., cut, copy and paste • I know how to use font sizes appropriately for purpose and audience. <u>Presentations</u> • I know how to create multiple slides as part of a slideshow	inputted data using pictorial representations (e.g., pie charts, bar charts or line graphs). I understand which of these are appropriate for discrete and continuous data. • I know how to use simple formulae to solve calculations including =sum. • I analyse information. • I evaluate information. • I understand how search results are selected and ranked. • I edit a film. **Digital Literacy** <u>Showbie</u> • I know how to use all of the features on Showbie fluently and discuss the positives and negatives of each tool. <u>Word Processing</u> • I know how to apply other useful effects to my documents such as hyperlinks. • I know how to organise and re-organise text on screen to suit a purpose. <u>Presentations</u> • I know how to insert appropriate media (videos and music) to slides. • I know how to insert hyperlinks. <u>Communication</u> • I know how to write an email to a member of staff using formal vocabulary. • I know how to save an email in draft format and return to it at a later date	<u>Data Handling</u> • I know how to confidently create a branching database using a large data set. • I know how to justify my pictorial representations of data. • I know how to write spreadsheet formula to solve more challenging maths problems. • I know how to select, use and combine software on a range of digital devices. • I know how to use a range of technology for a specific project. **Digital Literacy** • I know how to confidently choose the best application to demonstrate my learning. <u>Showbie</u> • I know how to use the most effective tool on Showbie to complete a task. <u>Word Processing</u> • I know how to format images and text to suit a purpose. • I know how to publish documents and discuss the audience and purpose of my content. • I know how to use alternative software for presenting, including Pages. <u>Presentations</u> • I know how to insert appropriate media (videos and music) to slides. • I know how to insert hyperlinks. • I know how to understand and use the slideshow tab. • I know how to use alternative software for presenting, including Keynote .

• I know how to add appropriate animations to slides • I know how to understand and use transitions <u>Communication</u> • I know how to open and reply to an email from a known member of staff <u>E-Safety</u> • I know how to recognise accept able and unacceptable behaviour using technology <u>Research</u> • I know how to use child-friendly search engines (e.g., Kiddle) to locate an range of media (images, sounds and videos). • I know how to search using concise questions to answer a question. • I understand that not all search results are to be believed and I have strategies to determine accuracy.	to edit. <u>E-Safety</u> • I understand that you have to make choices when using technology and that not everything is true and safe. <u>Research</u> • I know how to use the internet for independent research. • I know how to question the source, authenticity and reliability of information found on the internet .	<u>Communication</u> • I know how to write an appropriate email to a member of staff. I know how to use appropriate grammatical structures, which reflect purpose and audience. • I know how to attach and save attachments to an email. <u>E-Safety</u> • I discussed the risks of online use of technology. • I know how to identify how to minimise risks. <u>Research</u> • I know how to use the internet for independent research. • I know how to use advanced searching techniques (e.g., using quotation marks to locate precise information or search within websites. • I know how to question the source, authenticity and reliability of information found on the internet.

Progression of Vocabulary

EYFS - Reception	Year 1	Year 2	Year 3
Instructions camera robot sequence share technology control Internet computer iPad keyboard printer save mouse	**Computer Science** Algorithm create command organised sequence software store programme **Information Technology** digital content devices computer network **Digital Literacy** Personal information WorldWideWeb	**Computer Science** Algorithm blocks command debug execute manipulate organised scripted sequence software Sprite store predict programme retrieve reverse engineer **Information Technology** data digital content devices network **Digital Literacy** passwords personal information private WorldWideWeb	**Computer Science** algorithm block language commands debug executes input output loops manipulate organised programme repetition scripted sequence simulation Sprite software store programme physical stamp repetition retrieve reverse engineer **Information Technology** data digital content devices network safe search mode technologies software **Digital Literacy** commands evaluating digital content password personal information private WorldWideWeb

Year 4	Year 5	Year 6
Computer Science algorithm block language command collaboration debug encrypted execute HTTP input output loops manipulate organised programme repetition scripted selection sequence simulation Sprite software store packets of data programme physical system repetition retrieve reverse engineer URL	**Computer Science** algorithm block language commands control collaboration debug decomposition encrypted execute HTTP input output loops manipulate organised programme repetitions scripted selection sequence simulation Sprite software store pockets of data programme physical system repetition retrieve reverse engineer URL variables	**Computer Science** algorithm block language commands control collaboration debug decomposition encrypted executes hardware HTTP input IP address output loops manipulate organised programme repetitions scripted selection sequence simulation Sprite software store packets of data programme physical system

Information Technology cached collecting data digital content digital devices network safe search mode search technologies server software **Digital Literacy** acceptable unacceptable behaviours commands evaluating digital content passwords personal information private WorldWideWeb	**Information Technology** cached collecting data digital content digital devices evaluating network safe search mode search technologies server software **Digital Literacy** unacceptable behaviours commands encryption evaluating digital content passwords personal information private WorldWideWeb	repetition retrieve reverse engineer URL variables **Information Technology** cached collecting data digital content digital devices evaluating network safe search mode search technologies server software **Digital Literacy** typical unacceptable behaviours command detect encryption evaluate in digital content password personal information private responsibility WorldWideWeb

Long Term Planning

EYFS/KS1 3-year cycle

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
A 2022 - 2023	Computing systems and networks – Technology Around Us	Creating media – Digital Photography	Programming – Moving a robot	Creating Media – Making Music	Data & Information – Grouping Data	Programming – Robot Algorithms
B 2023 - 2024	Computing systems and networks – IT Around Us	Creating Media – Digital Painting	Programming – Introduction to animation	Creating Media – Digital Writing	Data & Information - Pictograms	Programming – Introduction to quizzes
C 2024 - 2025	Word Processing	Presentational Skills	Programming – Scratch Junior	Using the Internet	Computer Art	Programming – Turtle Logo & Scratch
ESafety (Project Evolve)	*Connected World:* Self-image & Identity; Online Relationships & Reputation		*Connected World:* Online Bullying; Managing Online Information		*Connected World:* Health, Well-being & Lifestyle; Privacy & Security; Copyright & Ownership	

KS2 4-year cycle

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
A 2022 - 2023	Computing systems & networks – Connecting computers	Creating Media – Photo editing	Programming – Sequence in Music	Creating Media – Web page creation	Programming – Selection in quizzes	Data & Information – Branching Databases
B 2023 - 2024	Computing systems & networks – The Internet	Creating Media - Animation	Programming – Variables in Games	Creating Media – Video editing	Programming – Repetition in Games	Data & Information – Data Logging
C 2024 - 2025	Computing systems & networks – Sharing Information	Creating Media – Audio editing	Programming – Repetition in Shapes	Creating Media – 3D Modelling	Programming – Events & Actions	Data & Information – Flat-file databases
D 2025 - 2026	Computing systems & networks - Communication	Creating Media – Vector Drawing	Programming - Sensing	Creating Media – Desktop publishing	Programming – Selection in Physical Computing	Data & Information - Spreadsheets
ESafety (Project Evolve)	*Connected World:* Self-image & Identity; Online Relationships & Reputation		*Connected World:* Online Bullying; Managing Online Information		*Connected World:* Health, Well-being & Lifestyle; Privacy & Security; Copyright & Ownership	

DL – Digital Literacy is about the safe and responsible use of technology, including recognising its advantages for collaboration or communication.
IT – Information Technology is about the use of computers for functional purposes, such as collecting and presenting information, or using search technology.
CS – Computer Science is about understanding how computers and networks work.