Northaw CE Primary School

The Northaw Curriculum

Computing

If only a few years remain until the Year of Jubilee, they are to compute that and pay for their redemption accordingly.

Leviticus 25:52
New International Version

At Northaw, we aim to follow the statutory national curriculum, guidance on relationships and health education, and framework for the early years foundation stage, and the Church of England statement of entitlement through The Northaw Curriculum, which comprises all learning and other experiences, the hidden curriculum, that we plan for our pupils. Programmes of study are enhanced by added value, learning sequences and progression frameworks.

At Northaw, we see pupils as discoverers, exploring subjects. The core subjects are English, mathematics and science. The other foundation subjects are art and design, computing, design and technology, languages (French), geography, history, music; personal, social, health and economic education (including relationships education), physical education and religious education. They build on the areas of learning and development in the early years foundation stage. The prime areas are communication and language, physical development, and personal, social and emotional development. The specific areas are literacy, mathematics, understanding the world, and expressive arts and design.

At Northaw, we are committed to providing an ambitious, inclusive, broad and balanced curriculum rooted in Christian values that endows every child with the knowledge and cultural capital, skills, understanding and vocabulary to fulfil their potential while nurturing well-being, and prepares them for citizenship, future learning and employment, and lifelong faith. Equally designed to meet the needs of pupils whose attainment is significantly above the expected standard, the particularly disadvantaged and those with SEND, our curriculum is demanding, setting suitable challenges and overcoming would-be barriers to achieve the best possible outcomes consistently for all. Building on our Christian vision, The Northaw Curriculum affords space for a deepening spiritual awareness, the development of moral attitudes and a strengthened sense of community. Coherently sequenced, our curriculum frees teachers to deliver clear, engaging lessons, adapted when necessary to address both gaps and misconceptions, and promote appropriate discussion in environments focused on pupils who produce high-quality work and are supported to retain content and acquire mastery. Phonics and reading are prioritised, allowing pupils to access the full education offer; opportunities to develop fluency in mathematics and English across the curriculum bolstered by enhanced learning powers (the 6Rs) lead to success in life. Integrated with our curriculum, daily acts of collective worship are occasions for personal reflection, communal growth and further exploration of life's big questions, sitting alongside academic progress.

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 a level suitable for the future workplace and as active participants in a digital world.

Added value

At Northaw, we promote computing as central to preparing for tomorrow's world while not shying away from openly discussing the inherent dangers of devices. We have customised a scheme of work based on the curriculum from Teach Computing. Pupils have access to both laptops and tablets, and they are used in other subjects. Teachers should not make assumptions about pupils' prior knowledge within digital literacy, and have access to high-quality computing CPD to develop and maintain their subject knowledge. We participate in Safer Internet Day. Ofsted's research review series has informed our practice in this area.

Aims

The Northaw 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.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Subject content

Key stage 1 – years 1 and 2

Key stage 1 programme of study

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.

Key stage 1 learning sequence

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year A	Computing systems and networks		Creating media		Programming A	
	Technology around us	IT around us	Digital painting	Digital photography	Moving a robot	Robot algorithms
Year B	Data and information		Creating media		Programming B	
	Grouping data	Pictograms	Digital writing	Digital music	Programming animations	Programming quizzes

Computing is timetabled for at least 45 minutes every week. Paper-based tasks are retained in folders. Summative assessment is completed at the end of each year with pupils categorised as either working below the expected standard (PRE), working towards the expected standard (WTS), working at the expected standard (EXS) or working at greater depth within the expected standard (GDS) for their year group.

Key stage 1 progression framework

<u>Year A</u>

Computing systems and networks

- Recognising technology in school and using it responsibly.

- Identifying IT and how its responsible use improves our world in school and beyond.

Creating media

- Choosing appropriate tools in a program to create art, and making comparisons with working non-digitally.
- Capturing and changing digital photographs for different purposes.

Programming A

- Writing short algorithms and programs for floor robots, and predicting outcomes
- Creating and debugging programs, and using logical reasoning to make predictions

Year B

Data and information

- Exploring object labels, then using them to sort and group objects by properties.
- Collecting data in tally charts and using attributes to organise and present data on a computer.

Creating media

- Using a computer to create and format text, before comparing to writing non-digitally.
- Using a computer as a tool to explore rhythms and melodies, before creating a musical composition.

Programming B

- Designing and programming the movement of a character on screen to tell stories.
- Designing algorithms and programs that use events to trigger sequences of code to make an interactive quiz.

Key stage 2 – years 3 to 6

Key stage 2 programme of study

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.

Lower key stage 2 learning sequence

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year A	Computing systems and networks		Creating media		Programming A	
	Connecting computers	The internet	Stop-frame animation	Audio production	Sequencing sounds	Repetition in shapes
Year B	Data and information		Creating media		Programming B	
	Branching databases	Data logging	Desktop publishing	Photo editing	Events and actions in programs	Repetition in games

Computing is timetabled for at least 45 minutes every week. Paper-based tasks are retained in folders. Summative assessment is completed at the end of each year with pupils categorised as either working below the expected standard (PRE), working towards the expected standard (WTS), working at the expected standard (EXS) or working at greater depth within the expected standard (GDS) for their year group.

Lower key stage 2 progression framework

<u>Year A</u>

Computing systems and networks

- Identifying that digital devices have inputs, processes, and outputs, and how devices can be connected to make networks.

- Recognising the internet as a network of networks including the WWW, and why we should evaluate online content.

Creating media

- Capturing and editing digital still images to produce a stop-frame animation that tells a story.
- Capturing and editing audio to produce a podcast, ensuring that copyright is considered.

Programming A

- Creating sequences in a block-based programming language to make music.
- Using a text-based programming language to explore count-controlled loops when drawing shapes.

Year B

Data and information

- Building and using branching databases to group objects using yes/no questions.
- Recognising how and why data is collected over time, before using data loggers to carry out an investigation.

Creating media

- Creating documents by modifying text, images, and page layouts for a specified purpose.
- Manipulating digital images, and reflecting on the impact of changes and whether the required purpose is fulfilled.

Programming B

- Writing algorithms and programs that use a range of events to trigger sequences of actions.
- Using a block-based programming language to explore count-controlled and infinite loops when creating a game.

Upper key stage 2 learning sequence

<table>
<tr><th></th><th>Autumn 1</th><th>Autumn 2</th><th>Spring 1</th><th>Spring 2</th><th>Summer 1</th><th>Summer 2</th></tr>
<tr><td rowspan="2">Year A</td><td colspan="2">Computing systems and networks</td><td colspan="2">Creating media</td><td colspan="2">Programming A</td></tr>
<tr><td>Systems and searching</td><td>Communication and collaboration</td><td>Video production</td><td>Web page creation</td><td>Selection in physical computing</td><td>Variables in games</td></tr>
<tr><td rowspan="2">Year B</td><td colspan="2">Data and information</td><td colspan="2">Creating media</td><td colspan="2">Programming B</td></tr>
<tr><td>Flat-file databases</td><td>Introduction to spreadsheets</td><td>Introduction to vector graphics</td><td>3D modelling</td><td>Selection in quizzes</td><td>Sensing movement</td></tr>
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Upper key stage 2 progression framework

Year A

Computing systems and networks

- Recognising IT systems around us and how they allow us to search the internet.
- Identifying and exploring how data is transferred and information is shared online.

Creating media

- Planning, capturing, and editing video to produce a short film.
- Designing and creating webpages, giving consideration to copyright, aesthetics, and navigation.

Programming A

- Exploring conditions and selection using a programmable microcontroller.
- Exploring variables when designing and coding a game.

Year B

Data and information

- Using a database to order data and create charts to answer questions.
- Answering questions by using spreadsheets to organise and calculate data.

Creating media

- Creating images in a drawing program by using layers and groups of objects.
- Planning, developing, and evaluating 3D computer models of physical objects.

Programming B

- Exploring selection in programming to design and code an interactive quiz.
- Designing and coding a project that captures inputs from a physical device.