Computing Curriculum

Structure of this document

Section 1. NC statements

Have a quick look at the NC statements for your key stage. They are colour coded according to the three strands of the NC (Programming, Computer Science and Digital Literacy).

Section 2. Gareth Webb – skills statements

Skills developed through the teaching of the strands of the NC, showing progression from EYFS to UKS2. Colour coded according to which part of the NC they refer to.

Section 3. National Computing Centre knowledge statements

Knowledge that will be delivered by teaching Computing at primary level, using the National Centre for Computing Education's resources. Organised to show knowledge progression from Y1-Y6.

1. Primary Computing – National Curriculum statements

EYFS

Statements set out in the EYFS curriculum for the Area of Learning Technology:

30-50 months
Knows how to operate simple equipment, e.g. turns on CD player and uses remote control.
•Shows an interest in technological toys with knobs or pulleys, or real objects such as cameras or mobile phones.
•Shows skill in making toys work by pressing parts or lifting flaps to achieve effects such as sound, movements or new images.
•Knows that information can be retrieved from computers

40-60 months
•Completes a simple program on a computer.
•Uses ICT hardware to interact with age-appropriate computer software.

Early Learning Goal: Children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes.

Key stage 1
Pupils should be taught to:
Computer Science
 • 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

IT
 • use technology purposefully to create, organise, store, manipulate and retrieve digital content

Digital Literacy
 • 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 2

Pupils should be taught to:

Computer Science
- 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

IT
- 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

Digital Literacy
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Overview of how subject knowledge statements match with curriculum areas:

Computer Science	Digital Literacy	Information Technology		
Programming and Theory	**E-Safety & Research**	**Communication**	**Data**	**Multimedia**
Programming	Research	Word processing	Graphs	Creating images
Simulations	E-safety	Presentations	Databases	Photography
Computer Theory		Online collaboration	Spreadsheets	Animation
				Video
				Audio

2. Computing curriculum – SKILLS

Gareth Webb skills progression statements are shown below. They are colour coded in accordance with the NC objectives.

Data logging has been completely removed as this is covered by the science curriculum across all year groups.

Computing	FS	Year 1	Year 2	Year 3/4	Year 4/5	Year 5/6
Text and multimedia	1.1 Recognise text, images and sound when using ICT. 1.2 Use a mouse to rearrange objects and pictures on a screen	1.1 Work with others and with support to contribute to a digital class resource which includes text, graphic and sound.	1.1 Generate their own work, (with help where appropriate with multimedia) combining text, graphics and sound. Save, retrieve and edit their work.	1.1 Record and present information integrating a range of appropriate media combining text and graphics in printable form and sound and video for on-screen presentations which include hyperlinks. Begin to show an awareness of the intended audience and seek feed-back.	1.a Use advanced skills in word processing/ DTP software such as tabs, appropriate text formatting, line spacing etc appropriately to create quality presentations appropriate for a known audience.	1.1 Multimedia work shows restrained use of effects that help to convey meaning rather than impress.
Digital Images (photos, paint, animation)	2.1 I can use simple software to make things happen	2.1 Use a range of simple tools in a paint package / image manipulation software to create / modify a picture.	2.1 Use a range of tools in a paint package / image manipulation software to create / modify a picture to communicate an idea.	2.1 Manipulate digital images using a range of tools in appropriate software to convey a specific mood or idea.	2.a Make a short film / animation from images (still and / or moving) that they have sourced, captured or created.	2.1 Use images that they have sourced / captured / manipulated as part of a bigger project (eg presentation or document).

			2.2 Create a simple animation to tell a story.			
Sound and music (inc sound recorders	3.1 Use a camera or sound recorder to collect photos or sound	3.1 Chose suitable sounds from a bank to express their ideas. 3.2 Record short speech.	3.1 Compose music from icons. 3.2 Produce a simple presentation incorporating sounds the children have captured, or created.	3.1 Create a simple podcast, selecting and importing already existing music and sound effects as well as recording their own.	3.a Create multiple track compositions that contain a variety of sounds.	3.1 Create and share more sophisticated podcasts and consider the effect that their podcasts will have on the audience.
Electronic Communication	4.1 Help adults operate equipment around the school and independently operate simple equipment	4.1 Contribute ideas to a class email to another class / school etc	4.1 Work collaboratively by email to share and request information of another class or story character.	4.1 Begin to understand the need to abide by school e-safety rules.	4.a Share ICT work they have done electronically by email, VLE, or uploading to authorised sites. - Where possible seek and respond to feedback.	4.1 Abide by school rules for e-safety.
Research and E Safety	5.1 Play age appropriate games on the internet 5.2 Talk about good and bad choices in real	5.1 As a class exercise children explore information from a variety of sources (electronic, paper based, observations of the	5.1 Children use a search engine to find specific relevant information to use in a presentation for a topic.	5.1 Using another curriculum area as a starting point, children ask their own questions then use ICT sources to find answers, making use of search engines, an	5.a Make use of copy and paste, beginning to understand the purpose of copyright regulations and the need to repurpose	5.1 Independently and with due regard for safety, search the internet using a variety of techniques to find a range of information and resources on a specific topic.

	life e.g. taking turns, saying kind things, helping others, telling an adult if something upsets you	world around them, etc.). 5.2 They show an awareness of different forms of information.	5.2 They save and retrieve their work.	index, menu, hyperlinks as appropriate. Children use the information or resources they have found. 5.2 Children talk about using ICT to find information / resources noting any frustrations and showing an emerging understanding of internet safety	information for a particular audience. 5.b They show an understanding that not all information on the internet is accurate. 5.c Develop a growing awareness of how to stay safe when using the internet (in school and at home) and that they abide by the school's internet safety policy.	5.2 Use appropriate methods to validate information and check for bias and accuracy. 5.3 Repurpose and make appropriate use of selected resources for a given audiences, acknowledging material used where appropriate.
Control (algorithms)	6.1 Press specific buttons on a floor robot and talk about the movement	6.1 Control simple everyday devices to make them produce different outcomes.	6.1 Control a device, on and off screen, making predictions about the effect their programming will have. 6.2 Children can plan ahead.	6.1 Children are able to type a short sequence of instructions and to plan ahead when programming devices on and off screen.	6.a Engage in Logo based problem solving activities that require children to write procedures etc. and to predict, test and modify. 6.b Use control software to control devices (using output commands) or to simulate this on screen. Predict, test and refine their programming	6.1 Independently create sequences of commands to control devices in response to sensing (i.e. use inputs as well as outputs). 6.2 Design, build, test, evaluate and modify the system; ensuring that it is fit for purpose.

Handling information (databases and graphs	7.1 Use a simple pictogram or set of photos to count and organise information.	7.1 As a class or individually with support, children use a simple pictogram or painting program to develop simple graphical awareness / one to one correspondence.	7.1 Use a graphing package to collect, organise and classify data, selecting appropriate tools to create a graph and answer questions. 7.2 Enter information into a simple branching database, database or word processor and use it to answer questions. 7.3 They save, retrieve and edit their work.	7.1 Children use a simple database (the structure of which has been set up for them) to enter and save and save information on a given subject. 7.2 They follow straight forward lines of enquiry to search their data for their own purposes. 7.3 They talk about their experiences of using ICT to process data compared with other methods.	7.a Children work as a class or group to create a data collection sheet and use it to setup a straight forward database to answer questions. 7.b Enter information and interrogate it (by searching, sorting, graphing etc). 7.c Begin to reflect on how useful the collected data and their interrogation was and whether or not their questions were answered.	7.1 Independently solve a problem by planning and carrying out data collection, by organising and analysing data involving complex searches using a database, and by drawing conclusions and presenting findings. 7.2 The need for accuracy is demonstrated and strategies for spotting implausible data are evident. 7.3 Children should be able to talk about issues relating to data protection and the need for data security in the world at large (eg health, police databases).
Modelling and simulations (spreadsheets, adventure	8.1 Use simple software to make things happen	8.1 Make simple choices to control a simple simulation program.	8.1 Children are able to play an adventure game and use a simple simulation,	8.1 Use models and simulations to find things out and solve problems. Recognise that simulations are	8.a Set up and use a spreadsheet model to explore patterns and relationships. Make predictions. -	8.1 Set up and use their own spreadsheet, which contains formulae to investigate

games and simulations)			making choices and observing the results. 8.2 Their conversation shows they understand that computers are good at replicating real life events and allowing them to explore contexts that are otherwise not possible.	useful in widening experience beyond the classroom. 8.2 Make simple use of a spreadsheet to store data and produce graphs.	Know how to enter simple formulae to assist this process.	mathematical models. Ask "what if …" questions and change variable in their model. 8.2 Understand the need for accuracy when creating formulae and check regularly for mistakes, by questioning results. 8.3 Relate their use of spreadsheets to model situations to the wider world.
Understanding Technologies (individual technologies)	9.1 Develop an interest in ICT by using age appropriate websites or programs	9.1 Show an awareness of the range of devices and tools they encounter in everyday life.	9.1 Show an awareness of a range of inputs to a computer (IWB, mouse touch screen, microphone, keyboard, etc	9.1 Begin to show discernment in their use of computing devices and tools for a particular purpose and explain why their choice was made	9.a Make choices about the devices and tools they use for specific purposes and explain them in relation to the context. Begin to show an awareness of specific tools used in working life.	9.1 Evaluate the tools available to them including any that are unfamiliar or new and use them to solve problems. 9.2 Demonstrate an awareness of the appropriateness of outcomes depending on choices regarding tools and devices.

Understanding Technologies (networks)	10.1 Explore options and make choices with toys, software and websites	10.1 Show an awareness that what they create on a computer or tablet device can be shown to others via another device (e.g. printer, projector, Apple TV	10.1 Begin to show an awareness that computers can be linked to share resources	10.1 Show an understanding that their password is the key to accessing a personalised set of resources and files (e.g. My Documents). 10.2 Show an awareness of where passwords are critical in everyday use (e.g. parents accessing bank details)	10.a Show an understanding of the school network and how it links computers to resources in school and beyond. 10.b Compare this with other networks they may encounter at home or in the wider world (e.g. banks)	10.1 Show an understanding of how filtering and monitoring tools affect their use of the school network and Internet and compare this with their experience of access outside school.
Understanding Technologies (the internet)			11.1 Use websites and demonstrate an awareness of how to manage their journey around them (e.g. using the back/forward button, hyperlinks	11.1 Use websites and demonstrate an awareness of how to manage their journey around them (e.g. using the back/forward button, hyperlinks	11.a Perform a search using different search engines and check the results against each other, explaining why they might be different. 11.b Show an awareness of the need for accuracy in spelling and syntax to search effectively.	11.1 Use collaborative tools and e-mail showing a sensitivity for this type of remote collaboration and communication

3. Computing Curriculum - knowledge and subject delivery

The National Centre for Computing Education (NCCE) has developed a set of free teaching resources to cover all aspects of the computing curriculum. Each year group has its own set of resources, split into 6 discrete topics (some of these are still in development).

Lesson plans, topic overviews and powerpoints can all be found here: https://teachcomputing.org/resources. You will need to create a log in (this is free).

Each NCCE topic (usually) covers more than one area of the national curriculum (CS/IT/DL). The NCCE topics have been grouped to show progression (numbers in brackets are mapped to Gareth Webb's skills progression) as follows:

Computing	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
TOPIC 1 Computing technology	Technology Around Us	Information Technology Around Us	Connecting Computers	The Internet	Sharing Information	Communication
Knowledge	- Know how technology can help them (5.1, 5.2, 10.1 - Become familiar with different components of a computer (6.1, 8.1, 9.1,	- Explore how IT benefits society in places such as shops, libraries and hospitals (5.1, 5.2, 11.1) - Know how to use technology responsibly and make smart choices (4.1, 5.1, 5.2, 9.1, 10.1, 11.1)	- Understand inputs, processes and outputs (6.1, 8.1, 8.2, 9.1, 10.1, 10.2) - Compare digital and non-digital devices (2.1, 3.1, 9.1) - Know how routers and switches work within computer networks (9.1)	- Appreciate the internet as a network of networks that need to be kept secure (10.1, 10.2, 4.a, 9.a, 10.a, 10.b) - Understand the world wide web, who owns the content and what they can access, add and create (11.1, 4.a, 5.a, 5.b, 5.c, 10.a, 10.b, 11.a, 11.b) - Understand the consequences of false information (5.1, 5.a, 5.b, 5.c)	- Understand how information is transferred between systems and devices (2.1, 3.1, 4.1, 6.1, 6.2, 9.1, 9.2, 1.a, 2.a, 4.a, 6.a, 6.b, 9.a, 10.a, 10.b) - Recognise small scale and large scale systems (6.1, 6.2, 7.1, 7.2, 7.3, 5.a, 5.b, 5.c, 6.a, 6.b, 10.a, 10.b) - Explain input, process and output aspects of real world systems (6.1, 6.2, 7.1, 7.2, 7.3, 8.1, 8.2, 8.3, 9.1, 9.2, 10.1, 11.1, 6.a, 6.b, 7.a, 7.b, 7.c, 8.a, 9.a, 10.a, 10.b)	- Investigate different methods of communication and understand the world wide web as a communication tool (3.1, 4.1, 5.1, 10.1) - Know how search engines work and what influences searching (4.1, 5.1, 5.2, 5.3, 10.1)

TOPIC 2 Graphic design	Digital Painting	Digital Photography	Desktop Publishing	Audio Editing	Vector Drawing	3D Modelling
Knowledge	- Explore the world of digital art and the creative tools that exist (1.1, 2.1, 7.1 - Create paintings using inspiration from other artists (1.1, 2.1, 7.1	- Recognise that different devices can be used to capture photographs (1.1, 2.1, 2.2, - Know how to capture, edit and improve photos (1.1, 2.1, 2.2, - Know that the images they see may not always be real (5.1, 5.2, 10.1, 11.1)	- Understand how text and images can be used to communicate messages (1.1, 2.1) - Use desktop processing software to edit text and images to improve documents (1.1, 2.1) - Understand the terms templates, orientation and placeholders (1.1, 2.1) - Explore how desktop publishing is used in the real world (1.1, 2.1)	- Examine devices capable of recording digital audio (3.1, 3.a) - Understand digital ownership and the copyright implications of duplicating the work of others (1.1, 2.1, 3.1, 1.a, 2.a, 3.a, 4.a) - Record audio themselves to produce a podcast	- Know that vector images are made up of shapes (1.1, 2.1, 9.1, 9.2, 1.a, 9.a) - Know that different drawing tools can be used to create images in layers (1.1, 2.1, 9.1, 9.2, 1.a, 9.a)	-Examine differences between 2D and 3D shapes. 1.1, 2.1, 5.1, 5.3 - Make accurate 3D models of physical objects - Group 3D objects 1.1, 2.1, 5.3
TOPIC 3 Multimedia	Digital Writing	Making Music	Stop Frame Animation	Photo Editing	Video Editing	Web Page Creation
Knowledge	- Create text and use tools to change its size, colour etc. (1.1, 4.1, - Explore the differences between writing on paper and a computer to create text	- Explore how music makes them think and feel (1.1, 3.1, 3.2, - Make music with both percussion instruments and digital tools (1.1, 3.1, 3.2)	- Create stop frame animation using tablets (1.1, 2.1) - Add media to the animations such as music and text (1.1, 2.1)	- Know that digital images can be edited, saved and reused (2.1, 5.1, 2.a) - Understand the impact that editing images can have (2.1)	- Understand topic based language linked to creating and editing video (1.1, 9.1, 9.2, 2.a, 9.a) - Know the features of effective video creation	- What makes a good web page (1.1, 5.2, 5.3) - Copyright and fair use of media, aesthetics and navigation (1.1, 2.1, 3.1, 5.1, 5.2, 5.3, 11.1)

	(1.1, 4.1, 5.1, 5.2)	- Create different rhythms and tunes using the movement of animals for inspiration (1.1, 3.1, 3.2)			(1.1, 9.1, 9.2, 9.a)	
TOPIC 4 Programming	Programming – moving a robot	Programming – Robot algorithms	Programming A – Sequence in music. Programming B - Events and actions (detail tbc	In development	In development	In development
Knowledge	- Early programming concepts, - Using individual commands - Program design & algorithms 6.1, 8.1	- Giving instructions in sequences - Predict outcomes - Debug programs 6.1, 8.1	- Introduction to Scratch -Motion, Sound and Event blocks 6.1			
TOPIC 5 Databases and spreadsheets	In development	Pictograms	In development	In development	Flat File databases	In development
Knowledge		- Understand data, - Tally charts and pictograms, - Block diagrams. (7.1, 5.2)			- How a flat-file database can be used to organise data in records - use tools within a database to order and answer questions (7a, b, c, 8a, 5a)	