Sonning Church of England Primary School
Curriculum Milestones: Computing

Introduction

Milestones are designed to provide focus for progression points throughout a child's journey through the school. Early Years Foundation Stage is also included in this document to highlight the links between Early Years and the National Curriculum. For Years 1 to 6, teachers refer to the National Curriculum at all planning stages.

Milestones: Early Years Foundation Stage

There are separate plans for EYFS which outline the topics covered and highlight cross-curricular links (including within the National Curriculum). Below is an explanation of how the subject links with the Areas of Learning in EYFS.

Area of Learning: **Personal, Social and Emotional Development**	
Nurseries (3/4 y/o)	• Remember rules without needing an adult to remind them.
Reception (4/5 y/o)	• Show resilience and perseverance in the face of a challenge. • Know and talk about the different factors that support their overall health and wellbeing: sensible amounts of 'screen time'.
End of Reception: ELG	Managing Self • 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.

Area of Learning: **Physical Development**	
Nurseries (3/4 y/o)	• Match their developing physical skills to tasks and activities in the setting.
Reception (4/5 y/o)	• Develop their small motor skills so that they can use a range of tools competently, safely and confidently.
End of Reception: ELG	

Area of Learning: **Understanding the World**	
Nurseries (3/4 y/o)	• Explore how things work.

Area of Learning: **Expressive Arts and Design**	
Nurseries (3/4 y/o)	
Reception (4/5 y/o)	• Explore, use and refine a variety of artistic effects to express their ideas and feelings.
End of Reception: ELG	Creating with Materials • Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.

Milestones: Years 1 to 6 (National Curriculum)

As previously stated, we follow the National Curriculum. Using the National Curriculum as our core document, we have created milestone objectives for Key Stage 1 (KS1), Lower Key Stage 2 (KS2) and Upper Key Stage 2 (KS2) based on our own curriculum needs and research from a range of sources.

Online safety (and online usage)	
EYFS	**Skills** a) Identify some simple devices that are connected to 'the internet' (either wired or wireless). b) With support, log in and out of devices safely. **Knowledge** a) Recognise that a range of technology is used for different purposes. b) Know that you should tell a trusted adult if you feel unsafe or worried online. c) Know that people you do not know on the internet (online) are strangers and are not always who they say they are.
KS1	**KS1 Computing National Curriculum** Children can, by the end of Year 2, meet the following statements in this concept area: **Skills** a) Search and download appropriate images from the internet safely. b) Recognise how actions on the internet can affect others. **Knowledge** a) Understand that we are connected to others when using the internet. b) Understand what online information is. c) Recognise common uses of information technology, including beyond school. d) Understand some of the ways we can use the internet. e) When using the internet to search for images, learn what to do if they come across something online that worries them or makes them feel uncomfortable. f) Understand how to interact safely with others online. g) Recognise what a digital footprint is and how to be careful about what we post. h) Know that 'sharing online means giving something specific to someone else via the internet and 'posting' online means placing information on the internet. i) Know that to stay safe online it is important to keep personal information safe.
LKS2	**KS2 Computing National Curriculum** Children can, by the end of Year 4, meet the following statements in this concept area: **Skills** a) Log in and out of an account (e.g. Teams). b) Compose/reply to an email, and add attachments. c) Be able to create a strong password. d) Identify whether information is safe or unsafe to be shared online. e) Analyse (at a simple level and using strategies taught) information to check if something they read online is true. f) Recognise that some sources are more trustworthy than others and identify what some of the checks for the reliability of a source are.

g) Identify sources of advertising online (including personalised ads).

Knowledge

a) Know that privacy settings limit who can access your important personal information (such as your name, age, gender etc.).
b) Understand why some results come before others when searching on a browser.
c) Use key words to increase specificity in a search for information on the internet.
d) Understand that information found by searching the internet is not all grounded in fact and that information shared online can include facts, beliefs and opinions.
e) Understand the purpose of emails and collaborative tools, as well as how they can be dangerous.
f) Reflect on the positives and negatives of time spent online and identify respectful and disrespectful online behaviour.
g) Learn what to do if they experience bullying online.
h) Recognise how social media platforms are used to interact and how to stay safe on these platforms, including the benefits and drawbacks of these services.
i) Know that there are age restrictions on many apps and websites.
j) Learn to be respectful of others when sharing online and ask for their permission before sharing content.

UKS2	**KS2 Computing National Curriculum** Children can, by the end of Year 6, meet the following statements in this concept area: Skills a) Learn how to use search engines effectively to find information, focussing on keyword searches and evaluating search returns. b) Learn strategies to create a positive online reputation. c) Learn strategies to capture evidence of online bullying in order to seek help. Knowledge a) Understand how search engines work. b) Learn about the Internet of Things and how it has led to 'big data'. c) Learn how 'big data' can be used to solve a problem or improve efficiency. d) Understand the positive and negative impacts of sharing online. e) Understand the importance of secure passwords and how to create them. f) Recognise that updated software can help to prevent data corruption and hacking. g) Know some common online scamming / phishing methods.

Computing systems and networks	
EYFS	Skills a) Use a mouse to click and move items. b) Recognise/identify devices that are connected to the internet. Knowledge a) Understand what a computer keyboard is and recognising some letters and numbers. b) Know that a mouse can be used to click, drag and create simple drawings. c) Know that, to use many electronic devices, you need to log in to it and then log out at the end of your session. d) Know that different types of technology can be found at home and in school. e) Know that you can take simple photographs with a camera, tablet or similar.

KS1	**KS1 Computing National Curriculum**
	Children can, by the end of Year 2, meet the following statements in this concept area:
	Skills a) Develop control of the mouse through dragging, clicking and resizing of images to create different effects. b) Develop some accuracy and speed with typing. c) Navigate our school SharePoint with increasing accuracy, independence and understanding.
	Knowledge a) To know that buttons are a form of input that give a computer an instruction about what to do (output). b) Know that buttons cause effects and that technology follows instructions. c) Know that computers can link and 'work together'.
LKS2	**KS2 Computing National Curriculum**
	Children can, by the end of Year 4, meet the following statements in this concept area:
	Skills a) Use an appropriate device to accurately (and with purpose) record a planned instruction. b) Identify the key components within a network and their purpose, including whether they are wired or wireless. c) Navigate our school network effectively, accurately and independently.
	Knowledge d) Understand the purpose of routers. e) Understanding that data collectors (e.g. weather stations) use sensors to gather and record data. f) Understand how some elements of a computer work together (e.g. hard drive, memory and processor). g) Understand that websites and videos are files that are shared from one computer to another. h) Understand and explain, in simple terms, how data is transferred. i) Learn that messages can be sent by binary code, reading binary up to eight characters and carrying out binary calculations. j) Understand how bit patterns represent images as pixels. k) Understand that computer networks provide multiple services.
UKS2	**KS2 Computing National Curriculum**
	Children can, by the end of Year 6, meet the following statements in this concept area:
	Skills a) Use and create readable codes (e.g. QR code). b) Use an appropriate device to accurately (and with purpose) record a planned piece, and edit this piece for effect to produce a final cut.
	Knowledge a) Understand the 'fetch, decode, execute' cycle. b) Understand, in simple terms, how a QR code or RFID works.

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c) Know the basic history of computers and digital technology devices.
d) Recognise how the size of RAM affects the processing of data, and how data on a hard drive affects speed of processing.
e) Understand how corruption can happen within data during transfer (for example when downloading, installing, copying and updating files).
f) Understand that external devices can be controlled by a separate computer.

Programming	

EYFS	Skills
	    a) Follow instructions as part of practical games and activities.
	    b) Learn to give simple instructions.
	    c) Experiment with programming (with adult assistance) a Bee-Bot to give simple commands.
	    d) Debug (supported by an adult) when Bee-Bot instructions (or other) do not work as expected.
	
	Knowledge
	    a) Begin to develop an understanding of what it means to debug something when things go wrong (understand why a set of instructions may have gone wrong).
	    b) Understand that instructions are the commands that technology follows.
	    c) Understand that it is important for instructions to be in the right order.

KS1	**KS1 Computing National Curriculum**
	
	Children can, by the end of Year 2, meet the following statements in this concept area:
	
	Skills
	    a) Use decomposition and sequencing to solve unplugged challenges (Year 1).
	    b) Use decomposition in a game/activity to predict the algorithms used to create it (Year 1).
	    c) Follow more complex instructions (Year 1).
	    d) Assemble simple instructions/a simple algorithm (including, in year 2, loops). This includes programming a device to follow a planned route.
	    e) Debug planned instructions (or other) do not work as expected.
	    f) Use programming language to explain how a Bee-Bot (or comparative device) works (Year 2).
	    g) Use an algorithm to write a basic computer program (Year 2).
	    h) Use loop blocks when programming to repeat an instruction more than once (Year 2).
	
	Knowledge
	    a) Know that decomposition means breaking a problem down into smaller parts.
	    b) Know that sequencing is putting things into a logical or planned order based on a criteria.
	    c) Know what an algorithm is (when instructions are put in an exact order).
	    d) Know that programs execute by following precise instructions.

LKS2	**KS2 Computing National Curriculum**
	
	Children can, by the end of Year 4, meet the following statements in this concept area:
	
	Skills
	    a) Using decomposition to explore the code behind an animation (including debugging theirs and others' work, in Year 4).
	    b) Use decomposition to understand the purpose of a script of code.

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	c) Use abstraction to identify the important parts when completing both plugged and unplugged activities. d) Code a simple game. e) Incorporate variables to make code more efficient, in simple terms. f) Use simple loops to improve programming. Knowledge a) Understand how decomposition is used in programming. b) Understand that you can remix and adapt existing code. c) Understand that a variable is a value that can change (depending on conditions) and know that you can create them in Scratch. d) Know what a conditional statement is in programming. e) Know that combining computational thinking skills (sequence, abstraction, decomposition etc) can help you to solve a problem. f) Understand that pattern recognition means identifying patterns to help them work out how the code works.
UKS2	**KS2 Computing National Curriculum** Children can, by the end of Year 6, meet the following statements in this concept area: Skills a) Decompose a program into an algorithm with limited support. b) Write more complex algorithms for a purpose. c) Program with limited support, debugging and seeking ways to make the code more efficient (with purpose). d) Use and adapt nested loops. e) Predict and evaluate code to understand its purpose, adapting it if necessary. f) Know how to adapt code. Knowledge a) Understand that using loops can make the process of writing music simpler and more effective. b) To know that a Micro:bit is a programmable device. c) To know that Micro:bit uses a block coding language similar to Scratch. d) Know that there are text-based programming languages such as Logo and Python. e) Know that nested loops are loops inside of loops.

Creating media	
EYFS	Skills a) Use a simple online paint tool to create digital art. b) Operate a camera, regardless of outcome product (either on tablet, digital camera or similar). Knowledge a) Understand that holding the camera still is important to take a good picture.
KS1	**KS1 Computing National Curriculum** Children can, by the end of Year 2, meet the following statements in this concept area: Skills a) Use a basic range of tools within graphic editing software.

	b) Take and edit photographs (in simple terms).
	c) Operate a camera to take a photo or video. Have some consideration of the outcome, including retaking to improve the media.
	d) Develop word processing skills, including altering text, copying and pasting and using keyboard shortcuts.
	e) Develop some skills in using shortcuts to cut and paste (CTRL+C and CTRL+V), using Word.
	f) Make text a different style, size and colour.
	g) Create and label images.
	Knowledge
	a) Understand that holding the camera still and considering angles and light are important to take good pictures.
	b) Know that you can edit, crop and filter photographs.
	c) Know that different types of camera shots can make photos or videos look more effective.
	d) Know that software can be used to edit photos and videos.
LKS2	**KS2 Computing National Curriculum**
	Children can, by the end of Year 4, meet the following statements in this concept area:
	Skills
	a) Develop further proficiency in typing.
	b) Use a range of shortcuts and tasks when using word processors or similar.
	c) Manipulate text and images to some degree when creating digital artefacts (using Word and PowerPoint).
	d) Take photographs and recording video to tell a story.
	e) Use software to edit and enhance their video adding music, sounds and text on screen with transitions, in simple terms.
	f) Build a web page and creating content for it.
	g) Use software to work collaboratively with others.
	Knowledge
	a) Know that software can be used to edit photos and videos and that transitions and text can be added to a video.
	b) Know that a website is a collection of pages that are all connected.
	c) Know that websites usually have a homepage and subpages as well as clickable links to new pages, called hyperlinks.
UKS2	**KS2 Computing National Curriculum**
	Children can, by the end of Year 6, meet the following statements in this concept area:
	Skills
	a) Use a range of software (e.g. Word, PowerPoint and Publisher) to produce pieces.
	b) Use search and word processing skills to create a presentation.
	c) Use video editing software to animate.
	d) Identify ways to improve and edit programs, videos, images etc.
	e) Use 3D design software package and produce a 3D item.
	f) Create a website with embedded links and multiple pages.
	Knowledge

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a) Understand that stop motion animation is an animation filmed one frame at a time using models, and with tiny changes between each photograph.
b) Know that decomposition of an idea is important when creating stop-motion animations.
c) Know that editing is an important feature of making and improving a stop motion animation.

Data handling	
EYFS	Skills a) Represent data through sorting and categorising objects in unplugged scenarios. b) Represent data through physical pictograms. c) Explore branch databases through physical games. Knowledge a) Know that data can be used to help computers become more effective. b) Know that sorting objects into various categories can help you locate information. c) Know that using yes/no questions to find an answer is a branching database. d) Know that a pictogram is a way of showing information.
KS1	**KS1 Computing National Curriculum** Children can, by the end of Year 2, meet the following statements in this concept area: Skills a) Use representations to answer questions about data. b) Use software to explore and create pictograms and branching databases. c) Collect and input data into a simple spreadsheet (Year 2). Knowledge a) Understand that technology can be used to represent data in different ways: pictograms, tables, pie charts, bar charts, block graphs etc. b) Understand that a branching database is a way of classifying a group of objects. c) Understand that you can enter simple data into a spreadsheet. d) Understand what steps you need to take to create an algorithm.
LKS2	**KS2 Computing National Curriculum** Children can, by the end of Year 4, meet the following statements in this concept area: Skills a) Create and interpret charts and graphs to understand data. b) Record data in a spreadsheet independently. c) Sort data in a spreadsheet to compare. d) Design a device which gathers and records sensor data. Knowledge a) Know that computers can use different forms of input to sense the world around them so that they can record and respond to data. This is called 'sensor data'. b) Know that a weather machine is an automated machine that responds to sensor data. c) Understand that weather forecasters use specific language, expression and pre-prepared scripts to help create weather forecast films. d) Know the difference between mobile data and WiFi
UKS2	**KS2 Computing National Curriculum**

Children can, by the end of Year 6, meet the following statements in this concept area:

Skills
a) Create formulas and sorting data within spreadsheets.
b) Gather and analyse data in real time.
c) Sort data in a spreadsheet to compare using the 'sort by…' option.

Knowledge
d) Understand how data might be used to tell us more about a location.
e) Understand how barcodes, QR codes and RFID work to gather data.
f) Know what numbers using binary code look like and be able to identify how messages can be sent in this format.
g) Understand that RAM is Random Access Memory and acts as the computer's working memory.
h) Know that infrared waves are a way of transmitting data, and that Radio Frequency Identification (RFID) is a more private way of transmitting data.
i) Know that data is often encrypted so that even if it is stolen it is not useful to the thief.