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# Computing Long Term Plan and Progression of Skills and Knowledge

## Structure:

The framework for the new Computing curriculum has been broken into three strands:

| Computer Science | Digital Literacy & E-safety | Information Technology |
|---|---|---|
| The study of the principles of and use of computers. | Understanding how we use information and communication technologies to find, evaluate, create, and communicate information. | Understand how we use computers for storing, retrieving, and sending information. |

## Computing Programme of Study

| | |
|---|---|
| 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. |
| Aims | The national curriculum for computing aims to ensure that all pupils:<br>• can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems<br>• can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems<br>• are responsible, competent, confident and creative users of information and communication technology. |

| | |
|---|---|
| Subject content – by the end of Key Stage 1 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<br>• create and debug simple programs<br>• use logical reasoning to predict the behaviour of simple programs<br>• use technology purposefully to create, organise, store, manipulate and retrieve digital content<br>• recognise common uses of information technology beyond school<br>• 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. |
| Subject content – by the end of Key Stage 2 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<br>• use sequence, selection, and repetition in programs; work with variables and various forms of input and output<br>• use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs<br>• 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<br>• use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content<br>• 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<br>• use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact. |

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**E-safety Progression across the school:**

E-safety is taught across the school as discrete lessons, as part of e-safety focused days and within other topics such as learning about usernames and passwords. The children's understanding of e-safety is built upon as they move through the school, giving them a broad and balanced understanding of how they can keep themselves and others safe online in an ever-changing digital world.

| **Nursery** | **Reception** | **End of EYFS Expectations (Taken from the 'Help for Early Years Providers' on education.gov.uk)** |
|---|---|---|
| I can turn on a tablet.<br>I know what a password is. | I can use technology safely.<br>I know how to turn a device or tablet on and off.<br>I know what it means to feel safe. | I am aware of what safe use of technology looks like.<br>I can use apps to develop my skills<br>I know to tell an adult if I ever feel unsafe. |
| **Year 1** | **Year 2** | **End of key stage 1 National Curriculum expectations** |
| I can keep my password private.<br>I can tell you what personal information is.<br>I can tell an adult when I see something unexpected or worrying online.<br>I can talk about why it's important to be kind and polite<br>I can recognise an age appropriate website.<br>I can agree and follow sensible e-Safety rules. | I can explain why I need to keep my password and personal information private.<br>I can describe the things that happen online that I must tell an adult about<br>I can talk about why I should go online for a short amount of time.<br>I can talk about why it is important to be kind and polite online and in real life.<br>I know that not everyone is who they say they are on the Internet and can explain why. | I can use technology safely and respectfully, keeping personal information private.<br><br>I can identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies. |
| **Year 3** | **Year 4** | **End of key stage 2 NC expectations** |
| I can talk about what makes a secure password and why they are important.<br>I can protect my personal information when I do different things online.<br>I can use the safety features of websites as well as reporting concerns to an adult<br>I can recognise websites and games appropriate for my age (age restrictions). | I can choose a secure password when I am using a website.<br>I can talk about the ways I can protect myself and my friends from harm online.<br>I can use the safety features of websites as well as reporting concerns to an adult.<br>I know that anything I post online can be seen by others. | I can use technology safely, respectfully and responsibly.<br><br>I can recognise acceptable/unacceptable behaviour<br><br>I can identify a range of ways to report concerns about content and contact |

| | | |
|---|---|---|
| I can make good choices about how long I spend online.<br>I ask an adult before downloading files and games from the Internet.<br>I can post positive comments online (online bullying and trolls) | I can choose websites and games that are appropriate for my age.<br>I can help my friends make good choices about the time they spend online.<br>I can talk about why I need to ask a trusted adult before downloading files and games from the Internet.<br>I comment positively and respectfully online. | |
| **Year 5** | **Year 6** | |
| I protect my password and other personal information.<br>I can explain why I need to protect myself and my friends and the best ways to do this, including reporting concerns to an adult.<br>I know that anything I post online can be seen, used and may affect others.<br>I can talk about the dangers of spending too long online or playing a game.<br>I can explain the importance of communicating kindly and respectfully.<br>I can discuss the importance of choosing an age-appropriate website or game.<br>I can explain why I need to protect my computer or device from harm.<br>I know which resources on the Internet I can download and use. | I can protect my password and other personal information<br>I can explain the consequences of sharing too much about myself online.<br>I support my friends to protect themselves and make good choices online, including reporting concerns to an adult.<br>I can explain the consequences of spending too much time online or on a game.<br>I can explain the consequences to myself and others of not communicating kindly and respectfully.<br>I protect my computer or device from harm on the Internet. | |
| **What this looks like** | | |
| E-safety in PSHE Lessons<br>Reinforcing safety on devices during each session<br>Newsletter information for parents and children<br>Being aware of the devices and apps our pupils are using<br>Making parents and staff aware when a new ‘trend’ or concern is raised regarding safety online.<br>E-safety day 2024 | | |

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# EYFS Framework 2021: Computing

| Nursery/ Reception | End of EYFS | Year 1 Expectations: |
|---|---|---|
| **Digital Literacy**<br>Digital cameras to own their learning.<br>Creating videos for expressing worries, care and feelings.<br>Fine motor control e.g. using a mouse to control the curser, typing on a keyboard – writing their name.<br>Use painting and graphic applications to develop mouse skills and creative outcomes.<br>Voice recorders and microphones in a tablet device enable children to discuss relationships without directly needing to.<br>**Information Technology**<br>Technology in the environment within role play – both broken and working devices.<br>Electronic toys – remote controlled cars, walkie talkies, interactive pets etc.<br>Allowing children to tinker, play and discover a new device.<br>**Computer Science**<br>Giving instructions – precise and unambiguous e.g. a sandwich making robot that needs clear, step by step instructions.<br>Emphasis on correct vocabulary<br>*Be careful to ensure the activities have a purpose. While fun engaging activities are great, ensure the focus is computing with a math's element*<br><br>EYFS Story links:<br>Chicken clicking<br>Goldilocks – a hashtag cautionary tale<br>Smartie the penguin<br>Troll Stinks | ELG: Know some similarities and differences between things in the past and now, drawing on their experiences and what has been read in class.<br>ELG: Use a range of small tools. E.g. mouse, keyboard<br>ELG: Create unambiguous rules for a game and give instructions<br>ELG: Express ideas and feelings about their experiences using full sentences (using technology tools such as voice recorders and video)<br>ELG: Set and work towards simple goals e.g. controlling a Bee Bot.<br>ELG: Be confident to try new activities and show independence, resilience and perseverance in the face of challenge.<br>ELG: Invent, adapt and recount narrative e.g. a set of instructions. Perform songs, rhymes, poems and stories with others (use a device to record e.g. camera, video recorder)<br>ELG: Explore and represent patterns e.g. repeating patterns on a painting application.<br>ELG: Anticipate key events e.g. how a device might move when given an unambiguous instruction | Building on EYFS expectations, pupil will be:<br><br>Following instructions with friends as well as using Beebots to write code and predict or debug an algorithm.<br><br>Collect, sort and present data in a range of ways. Talk about what the data shows and what you have found out.<br><br>Using technology to create and present my ideas. Be creative with my ideas and use different technology tools.<br><br>Recognising ways, we use technology in class, home and community. Using links to websites and identify benefits of using technology.<br><br>Year 1 will cover and extend upon the aspects covered in EYFS. |

| What this looks like |
|---|
| • Using beebots to explore movement and direction, left, right, up, down.<br>• Use simple software apps such a paint to manipulate and create images<br>• Introduction of non-digital algorithms such as following a set of simple instructions<br>• Producing mats for Bee Bots to move around on or in a specific shape<br>• Controlling devices to practise left and right |

| Resources | Curriculum Links |
|---|---|
| • Beebots/ chargers/ mats<br>• Broken or non-working computer parts/ devices<br>• Simple software e.g. paint<br>• Video cameras/ voice recorders/ cameras/ iPads<br>• Keyboard to 'type' on | Communication and Language – speaking instructions<br>Understanding the World – technology in our homes<br>Number – Prepositions, directional language |

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## KS1: Computer Science

| Year 1 | Year 2 | Where next: Year 3 |
|---|---|---|
| I can give instructions to my friend and follow their instructions to move around.<br>I can describe what happens when I press buttons on a robot.<br>I can press the buttons in the correct order to make my robot do what I want.<br>I can describe what actions I will need to do to make something happen and begin to use the word algorithm.<br>I can begin to predict what will happen for a short sequence of instructions.<br>I can begin to use software/apps to create movement and patterns on a screen.<br>I can use the word debug when I correct mistakes when I program. | I can give instructions to my friend (using forward, backward and turn) and physically follow their instructions.<br>I can tell you the order I need to do things to make something happen and talk about this as an algorithm.<br>I can program a robot or software to do a particular task.<br>I can look at my friend's program and tell you what will happen (PREDICT)<br>I can use programming software to make objects move.<br>I can watch a program execute and spot where it goes wrong so that I can debug it. | I can break an open-ended problem up into smaller parts.<br>I can put programming commands into a sequence to achieve a specific outcome. (Bee bots, scratch etc)<br>I keep testing my program and can recognize when I need to debug it.<br>I can use repeat commands.<br>I can describe the algorithm I will need for a simple task.<br>I can detect a problem in an algorithm which could result in unsuccessful programming. |

**What this looks like**

- Using Bee-Bot on floor mat to ensure can enter commands to follow route, plan and follow own route – Bee Bot challenges
- Reinforce with software and apps – use more than one piece of software / app
- Describe how non-digital algorithms be used, e.g. a set of instructions in maths or literacy for a specific purpose
- Knowledge of algorithm and terminology: An algorithm is a set of instructions to achieve a goal; algorithms can be carried out by humans and computers; there may be more than one algorithm for a task, but efficient algorithms are the best.

| Resources | Curriculum Links |
|---|---|
| **Hardware**: Bee-Bot<br>**Software**: Bee-Bot, 2simple 2go,<br>**Online**: scratch jnr<br>**Apps**: Bee-Bot, On line tools - Daisy the dinosaur, Scratch Jr<br>**Other resources**: Teach Computing Units KS1 | Geography – maps, plan a route<br>Maths – positional language, directional language<br>Literacy – writing and following instructions, storytelling – the map of a story |

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## KS1: Digital Literacy and E-Safety

| Year 1 | Year 2 | Year 3 |
|---|---|---|
| I can tell you what personal information is.<br>I can tell an adult when I see something unexpected or worrying online.<br>I can talk about why it is important to be kind and polite.<br>I can recognise an age appropriate website.<br>I can agree and follow sensible e-Safety rules.<br>I can recognise ways in which we use technology in the classroom and at home<br>I can keep my password private.<br>I can use the keyboard or a word bank on my device to enter text. | I can explain why I need to keep my password and personal information private.<br>I can describe the things that happen online that I must tell an adult about.<br>I can talk about why I should go online for a short amount of time.<br>I can talk about why it is important to be kind and polite online and in real life.<br>I know that not everyone is who they say they are on the Internet.<br>I can tell you why we use technology in the classroom and at home<br>I can identify benefits of using technology including finding information, creating and communicating.<br>I am starting to understand that other people have created the information I use.<br>I can use the keyboard on my device to add, delete and space text for others to read. | I can talk about what makes a secure password and why they are important including how they protect personal info.<br>I can use the safety features of websites as well as reporting concerns to an adult.<br>I can recognise websites and games appropriate for my age. (Age restrictions)<br>I can make good choices about how long I spend online.<br>I ask an adult before downloading files and games from the Internet.<br>I can post positive comments online. (Online bullying and trolls)<br>I think about whether I can use images that I find online in my own work.<br>I can retrieve work on the internet, school network or my own device. |

**What this looks like**

- Sort objects / items into groups by given and own criteria
- Collect a set of data – as class / group / individual and present as a simple graph
- Talk about the graph and what it shows

| Resources | Curriculum Links |
|---|---|
| **Software**: Microsoft applications e.g. PowerPoint<br>**Online:** Paint, 2Paint<br>**Other resources**: Teach Computing Units KS1 | Maths – pictograms, sorting into sets e.g. shapes, creating bar charts<br>Science – using digital microscopes<br>Geography – creating a branching data base, gathering information on rain. |

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## KS1: Information Technology

**Computing programme of study** – by the end of KS1 pupils should be taught to:

- use technology purposefully to create, organise, store, manipulate and retrieve digital content
- recognise common uses of information technology beyond school

| Year 1 | Year 2 | Year 3 |
|---|---|---|
| I can save information in a specific place and retrieve it again.<br>I can use technology to collect information, including photos, video and sound<br>I can use links and search engines to find information.<br>I can use technology to sort data, create and present my ideas. | I can save and open files on the device I use.<br>I can make and save a chart or graph using the data I collect. I can then talk about the data in the chart or graph.<br>I am starting to understand a branching database.<br>I can use links and search engines to find information.<br>I talk about the different ways I use technology to collect information, including a camera, microscope or sound recorder.<br>I can use technology to organise and present my ideas in different ways – bar chart, pictogram, poster | I can use appropriate keyboard commands to amend text on my device, including making use of a spellchecker.<br>I can search a ready-made database to answer questions.<br>I can talk about how to organise data, collect data and add to a data base. (Branching database, use a data logger etc)<br>I can use search tools to find and use an appropriate website.<br>I can talk about the parts of a computer.<br>I can tell you ways to communicate with others online and know how to share my work.<br>I can describe the World Wide Web as the part of the Internet that contains websites. |

### What this looks like

Pupils use word processing software to write letters, stories, poems

- Be able to edit work, not just start again
- Save work and retrieve

| Resources | Curriculum Links |
|---|---|
| **Software**: Purple Mash 2Publish, 2Publish+, 2create a story, Clicker 5<br>**Online**: Purple Mash online<br>**Other resources**: Teach Computing Units KS1 | Various topic links<br>Literacy – stories, filming performances of stories or poems<br>History – uses of technology in everyday life |

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## KS2: Computer Science

**Computing programme of study** – by the end of KS2 pupils should be taught to:

- design, write and debug programs that accomplish specific goals.
- use sequence, selection and repetition in programs; work with variables and various forms of input and output.

| Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|
| I can break an open-ended problem up into smaller parts.<br>I can put programming commands into a sequence to achieve a specific outcome (Bee-Bots, Scratch etc)<br>I keep testing my program and can recognise when I need to debug it.<br>I can use repeat commands.<br>I can describe the algorithm I will need for a simple task (could be as simple as making a jam sandwich).<br>I can detect a problem in an algorithm which could result in unsuccessful programming. | I can use logical thinking to solve an open-ended problem by breaking it up into smaller parts.<br>I can use an efficient procedure to simplify a program.<br>I can use a sensor to detect a change which can select an action within my program.<br>I know that I need to keep testing my program while I am putting it together.<br>I can use a variety of tools to create a program.<br>I can recognise an error in a program and debug it.<br>I recognise that an algorithm will help me to sequence more complex programs.<br>I recognise that using algorithms will also help solve problems in other learning such as Maths, Science and Design and Technology. | I can decompose a problem into smaller parts to design an algorithm for a specific outcome and use this to write a program.<br>I can refine a procedure using repeat commands to improve a program<br>I can use a variable to increase programming possibilities.<br>I can change an input to a program to achieve a different output.<br>I can use 'if' and 'then' commands to select an action.<br>I can talk about how a computer model can provide information about a physical system.<br>I can use logical reasoning to detect and debug mistakes in a program.<br>I use logical thinking, imagination and creativity to extend a program | I can deconstruct a problem into smaller steps, recognising similarities to solutions used before.<br>I can explain and program each of the steps in my algorithm.<br>I can evaluate the effectiveness and efficiency of my algorithm while I continually test the programming of that algorithm.<br>I can recognise when I need to use a variable to achieve a required output<br>I can use a variable and operators to stop a program.<br>I can use different inputs (including sensors) to control a device or onscreen action and predict what will happen.<br>I can use logical reasoning to detect and correct errors in a algorithms and programs |

**What this looks like**

- Investigate existing programs, evaluating them and consider how they could be improved
- Design and write a program / game / animation for a given purpose including specific programming features

| Resources | Curriculum Links |
|---|---|
| **Software**: Scratch/ scratch jnr<br>**Apps**: Purple Mash 2__ app, BeeBot, Blue Bot<br>**Online**: Scratch2, Scratch Jnr.<br>**Other resources** Teach Computing Units KS2 | Animation could be linked with Science concept<br>Link with Literacy<br>Programming links to DT project<br>Data – Maths – branching databases for example |

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## KS2: Information Technology

**Computing programme of study** – by the end of KS2 pupils should be taught to:
select, use and combine a variety of software to create content including collecting, analysing, evaluating and presenting data and information.

| Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|
| I can talk about the different ways data can be organised.<br>I can search a ready-made database to answer questions.<br>I can collect data to help me answer a question.<br>I can add to a database.<br>I can make a branching database (https://www.twinkl.co.uk/resource/blank-branching-sorting-table-activity-t2-m-254691 ).<br>I can use a data logger to monitor changes and can talk about the information collected. | I can organise data in different ways<br>I can collect data and discuss and identify where it could be inaccurate.<br>I can plan, create and search a database to answer questions.<br>I can choose the best way to present my data to my friends.<br>I can use a data logger to record information and share my readings with my friends. | I can use a spreadsheet and database to collect and record data.<br>I can choose an appropriate tool to help me collect data.<br>I can present data in an appropriate way.<br><br>I can search a database using different operators to refine my search.<br>I can talk about mistakes in data and suggest how it could be checked. | I can plan the process needed to investigate the world around me.<br>I can select the most effective tool to collect data for my investigation.<br>I can check the data I collect for accuracy and plausibility.<br>I can interpret the data I collect.<br>I can present the data I collect in an appropriate way.<br>I can use the skills I have developed to interrogate a database. |

**What this looks like**

Present sets of data in different graphical forms, discussing and evaluating which layout is best

- Discuss appropriate use of layouts for discrete and continuous data
- Ask and answer questions relating to graphs – discuss the purpose of graphs
- Share graphs via document, sharing findings from graph to show understanding
- Start to explore spreadsheets by using existing ones to see how they can be changed and used
- Add text and numbers and insert simple formulae
- Test formulae by changing numbers in cells – does the result change too?
- Format text within a spreadsheet – link to formatting text in other software

| Resources | Curriculum Links |
|---|---|
| **Software**: Starting graph, Excel, Clicker 5, Microsoft Software, Purple Mash<br>**Apps**: Numbers, 2Graph.<br>**Other resources**: Teach Computing Units KS2 | Maths – graphs, formulae for solving problems, finding area of shapes<br>Science – graphs to display results from experiments |

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## KS2: Digital Literacy and E-safety

**Computing programme of study** – by the end of KS2 pupils should be taught to:

- understand the opportunities the internet offers for communication and collaboration.
- use technology safely, respectfully and responsibly; recognise acceptable / unacceptable behaviour; identify a range of ways to report concerns about content and contact.

| Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|
| I can create different effects with different technology tools.<br>I can combine a mixture of text, graphics and sound to share my ideas and learning.<br>I can use appropriate keyboard commands to amend text on my device, including making use of a spellchecker<br>I can evaluate my work and improve its effectiveness.<br>I can use an appropriate tool to share my work online | I can use photos, video and sound to create an atmosphere when presenting to different audiences.<br>I can explore new media to extend what I can achieve. (explore beyond what has been taught in an app or software to go beyond the given task)<br>I can use appropriate keyboard commands to amend text on my device, including making use of a spellchecker to write and review my work.<br>I can change the appearance of text and evaluate my work to improve its effectiveness.<br>I can create, modify and present documents for a particular purpose.<br>I can give constructive feedback to my peers to help them improve their work and refine my own work.<br>I can use an appropriate tool to share my work online and present | I can use text, photo, sound and video editing tools to refine my work.<br>I can use the skills I have already developed to create content using unfamiliar technology.<br>I can select, use and combine the appropriate technology tools to create effects that will have an impact on others.<br>I can select an appropriate online or offline tool to create and share ideas.<br>I can review and improve my own work and support others to improve their work. | I can talk about audience, atmosphere and structure when planning a particular outcome.<br>I can confidently identify the potential of unfamiliar technology to increase my creativity.<br>I can combine a range of media, recognising the contribution of each to achieve a particular outcome.<br>I can tell you why I select a particular online tool for a specific purpose.<br>I can be digitally discerning when evaluating the effectiveness of my own work and the work of others. |

### What this looks like

Produce documents and presentations with increasing competence, incorporating different layouts and effects as appropriate, showing an awareness of audience:

- Produce newspaper / leaflet
- Create documents and presentations to share information with others – for a purpose
- Share information with link class in another school to find out about a different locality
- Contribute to a class / school blog
- Be aware of safety issues relating to online collaboration
- Explain why using avatar and online name is advisable

| Resources | Curriculum Links |
|---|---|
| **Software**: Word, 2publish+, Publisher, 2create, PowerPoint<br>**Online:** www.prezi.com, www.wordle.net (use with caution as some inappropriate content), Skooville, ThinkUKnow, ChildNet<br>**Apps**: Pages, Keynote, Prezi<br>**Other resources**: Teach Computing Units KS2 | History – presentation showing key aspects learnt<br>Geography – documents / presentation telling their partner school about local area<br>Literacy – newspapers and leaflets |