**LANGTOFT PRIMARY SCHOOL**

# Computing

### LEGAL FRAMEWORK

The computing programmes of study from the national curriculum form the roots of Langtoft Primary School's computing curriculum. From this national documentation, in conjunction with documentation from the National Centre for Computing Education (NCCE), our computing curriculum has been devised, developed and personalised to our school community, having evolved from our values, vision and mission statement.

Our computing curriculum is underpinned by the national curriculum aims for computing, ensuring 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.

### OUR INTENT FOR COMPUTING

Our computing curriculum embraces curiosity and enthusiasm. We intend to deliver a high-quality computing education enabling 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. At Langtoft, 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.

Our computing curriculum is based on the National Curriculum objectives and influenced by the resources and schemes of learning from Teach Computing and Barefoot Computing, which breaks down progression, vocabulary and key concepts of learning. It employs a range of pedagogical strategies, allowing children to achieve the expected standard and beyond. All pupils within a year group work on the same objectives. Work is set at an appropriate level, with pupils given support and challenge relative to their own developmental needs. Children are supported with devising their own questions and developing key skills of analysis, evaluation, problem-solving and responsibility.

The Teach Computing Curriculum has been written to support all pupils. Each lesson is sequenced so that it builds on the learning from the previous lesson, and where appropriate, activities are scaffolded so that <u>all pupils</u> can succeed and thrive. Scaffolded activities provide pupils with extra resources, such as visual prompts, to reach the same learning goals as the rest of the class. Exploratory tasks foster a deeper understanding of a concept, encouraging pupils to apply their learning in different contexts and make connections with other learning experiences and from a diverse range of knowledge, religion and cultures. The curriculum aims to equip young people with the knowledge, skills and understanding they need to thrive in the digital world of today and the future.

## 12 pedagogy principles

**Lead with concepts** Support pupils in the acquisition of knowledge, through the use of key concepts, terms, and vocabulary, providing opportunities to build a shared and consistent understanding. Glossaries, concept maps, and displays, along with regular recall and revision, can support this approach.

**Unplug, unpack, repack** Teach new concepts by first unpacking complex terms and ideas, exploring these ideas in unplugged and familiar contexts, then repacking this new understanding into the original concept. This approach (semantic waves) can help pupils develop a secure understanding of complex concepts.

**Work together** Encourage collaboration, specifically using pair programming and peer instruction, and also structured group tasks. Working together stimulates classroom dialogue, articulation of concepts, and development of shared understanding.

**Model everything** Model processes or practices — everything from debugging code to binary number conversions — using techniques such as worked examples and live coding. Modelling is particularly beneficial to novices, providing scaffolding that can be gradually taken away.

**Get hands-on** Use physical computing and making activities that offer tactile and sensory experiences to enhance learning. Combining electronics and programming with arts and crafts (especially through exploratory projects) provides pupils with a creative, engaging context to explore and apply computing concepts.

**Foster program comprehension** Use a variety of activities to consolidate knowledge and understanding of the function and structure of programs, including debugging, tracing, and Parson's Problems. Regular comprehension activities will help secure understanding and build connections with new knowledge.

**Create projects** Use project-based learning activities to provide pupils with the opportunity to apply and consolidate their knowledge and understanding. Design is an important, often overlooked aspect of computing. Pupils can consider how to develop an artefact for a particular user or function, and evaluate it against a set of criteria.

**Add variety** Provide activities with different levels of direction, scaffolding, and support that promote active learning, ranging from highly structured to more exploratory tasks. Adapting your instruction to suit different objectives will help keep all pupils engaged and encourage greater independence.

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**Make concrete** Bring abstract concepts to life with realworld, contextual examples and a focus on interdependencies with other curriculum subjects. This can be achieved through the use of unplugged activities, proposing analogies, storytelling around concepts, and finding examples of the concepts in pupils' lives.

**Challenge misconceptions** Use formative questioning to uncover misconceptions and adapt teaching to address them as they occur. Awareness of common misconceptions alongside discussion, concept mapping, peer instruction, or simple quizzes can help identify areas of confusion.

**Read and explore code first** When teaching programming, focus first on code 'reading' activities, before code writing. With both block-based and text-based programming, encourage pupils to review and interpret blocks of code. Research has shown that being able to read, trace, and explain code augments pupils' ability to write code.

**Structure lessons** Use supportive frameworks when planning lessons, such as PRIMM (Predict, Run, Investigate, Modify, Make) and Use-Modify-Create. These frameworks are based on research and ensure that differentiation can be built in at various stages of the lesson.

At Langtoft Primary School we aim for all children to:

- Be imaginative, creative and **ambitious** thinkers when creating media, designing and developing;
- Through spoken and written form, develop honest and **confident** analytical skills regarding their thoughts and preferences when designing, making and evaluating through data, programming and algorithms;
- Be able to explain how things work, and are **confident** when modelling their ideas through effective use of tools.
- Know how to and be in selecting appropriate tools and techniques for making a product, whilst following safe procedures;
- Have a developed knowledge, understanding and **consideration** of technological processes and products, manufacture and their contribution to society;
- See meaningful connection between computing, other subjects and the wider world;
- Be **independently** creative, yet value and **respect** collaborative teamwork **(Cooperation)** to reach a purpose through computer science and digital literacy;
- Have the skills to analyse problems; innovate new ideas and generate suitable solutions through data, programming and algorithms;
- Be **resilient** when facing challenges and adaptable in order to overcome them;
- Be reflective when evaluating existing products, as well as their own work.

Our computing curriculum is divided into **three concepts**. These concepts are **Computer science, Digital Literacy** and **Information Technology**.

Within our curriculum, The Teach Computing Curriculum uses the National Centre for Computing Education's computing taxonomy to ensure comprehensive coverage of the subject. **The units for key stages 1 and 2 are based on a spiral curriculum. This means that each of the themes is revisited regularly (at least once in each year group), and pupils revisit each theme through a new unit that consolidates and builds on prior**

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learning within that theme. This style of curriculum design reduces the amount of knowledge lost through forgetting, as topics are revisited yearly. It also ensures that connections are made even if different teachers are teaching the units within a theme in consecutive years.

**The national curriculum for computing aims to ensure all pupils:**

- **can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation (Computer science)**

- **can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems (Computer science)**

- **can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems (Information technology)**

- **are responsible, competent, confident and creative users of information and communication technology. (Digital literacy)**

## The Skills and Knowledge on which our Computing Curriculum is Built

All learning outcomes can be described through a high-level taxonomy of ten strands, ordered alphabetically as follows:

- ■ **Algorithms** — Be able to comprehend, design, create, and evaluate algorithms
- ■ **Computer networks** — Understand how networks can be used to retrieve and share information, and how they come with associated risks
- ■ **Computer systems** — Understand what a computer is, and how its constituent parts function together as a whole
- ■ **Creating media** — Select and create a range of media including text, images, sounds, and video
- ■ **Data and information** — Understand how data is stored, organised, and used to represent real-world artefacts and scenarios
- ■ **Design and development** — Understand the activities involved in planning, creating, and evaluating computing artefacts
- ■ **Effective use of tools** — Use software tools to support computing work
- ■ **Impact of technology** — Understand how individuals, systems, and society as a whole interact with computer systems
- ■ **Programming** — Create software to allow computers to solve problems
- ■ **Safety and security** — Understand risks when using technology, and how to protect individuals and systems

## These topics include computing as one of the focus areas:

| EYFS | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
|------|-----|-----|-----|-----|-----|-----|
| • All About Me<br>• Let's Celebrate<br>• Traditional Tales / Chinese New Year<br>• Superheroes / Spring<br>• Growing<br>• Minibeasts | • The UK (focus on London)<br>• Australia<br>• Toys<br>• The Human Body<br>• The Enchanted Woodland<br>• Animals | • Local area- Langtoft looking at houses.<br>• Explorers- Columbus & Armstrong<br>• Great Fire of London<br>• China / dragons<br>• Plants<br>• Animals- life cycles, habitats | • Stone Age<br>• Bronze Age to Iron Age<br>• Rainforest<br>• Animals, skeletons & nutrition<br>• Egyptians<br>• Forces & magnets | • Ancient Greeks<br>• North America<br>• Electricity<br>• Romans<br>• Habitats – environment<br>• The Tudors | • The Anglo-Saxons<br>• The Vikings<br>• Space<br>• The Victorians<br>• Coasts<br>• The Mayans | • WWII<br>• Mountains<br>• Crime and punishment<br>• Coasts (2002: Rivers)<br>• Electricity<br>• Evolution |

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|---|---|---|---|---|---|---|
| | | • Seaside & weather | | | | |

## Examples of Curriculum Intent

Dedicated STEM Week to explore computing, take part in enrichment experiences.

Planned STEM club for KS1 and KS2.

Children study a range of picture books throughout their time at school through visual Literacy often based on Online safety

Children are encouraged to read a selection of age-related non-fiction texts around the computing they are studying

Children take part in local and national competitions to inspire and encourage the use of computing.

Children use STEM ambassadors to engage with learning and improve their awareness of career opportunities in computing.

## Daily Implementation of Computing

- Computing is taught on a weekly basis in each year group, but is also delivered through activities designed to further enrich their understanding of Computing and provide cultural capital, such as our planned STEM week and Computing clubs (CAD and Coding).
- Knowledge Organisers: Children use Teach Computing learning graphs and add vocabulary and key questions during their learning journey.
- Subject specific vocabulary: Identified through knowledge organisers (learning graphs) and highlighted to the children at the beginning of and during lessons.
- EYFS: Reception children are given a secure grounding in the Prime Areas of Learning, ensuring they have a good foundation on which to build through the specific areas, including: Computational Thinking (Barefoot – Computing at School).
- Text: Children will have access to a growing variety of subject specific books, including non-fiction, as well as appreciating illustrations within their text-based learning.
- Teachers assess children's work in Computing by making formative and summative assessments throughout the school year. All pupils are encouraged to evaluate their own learning and to suggest ways to progress further.
- Teachers record the progress made by the children against the learning outcome for each unit: below expected for age, at expected. Teachers record this information on our bespoke assessment tracker against the learning objectives. These records also enable the teacher to make an annual assessment of progress for each child, and to pass this assessment information on to the child's next teacher at the end of the year.
- Progress in Computing is reported to parents.

## Impact

- Children will learn the skills they need to use at the beginning of a topic and are able to refer back to it.
- All children use technical vocabulary accurately and pupils are expected to know, apply and understand the matters, skills and processes specified.
- Children improve their enquiry skills and inquisitiveness about the world around them, and their impact through computing on the world.
- Children will become more confident in analysing their work and giving their opinion on their own and other projects.
- Children show competences in improving their resilience and perseverance by continually evaluating and improving their work.
- All children in school can speak confidently about their computing work and their skills
- Children are able to express their individuality and unique abilities with confidence.
- Children are respectful of their peers, communities and cultures.
- Children have a global awareness of computing within the lives of individuals, communities and cultures.

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| | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|---|---|
| **COMPUTING SYSTEMS AND NETWORKS** | **https://www.barefootcomputing.org/concept-approaches/computational-thinking-concepts-and-approaches**<br><br>**Tinkering -**<br>Playing and exploring<br>**Making**<br>Making things, checking and fixing things<br>**Collaboration**<br>Playing and working collaboratively<br>**Persevering**<br>Not giving up<br>**Logic**<br>Anticipating and explaining is logical reasoning<br>**Pattern**<br>Grouping things, comparing, spotting similarities and differences, working out rules<br>**Abstraction**<br>Naming and labelling, working out what is important, sticking to the main theme, ignoring what is not important, creating a summary<br>**Algorithms and Decomposition**<br>Responding to instructions, ordering things, sequencing things, introducing storylines, working out different ways to do things, breaking problems down into steps | **Technology around us**<br><br>To identify technology<br>To identify a computer and its main parts<br>To use a mouse in different ways<br>To use a keyboard to type<br>To use the keyboard to edit text<br>To create rules for using technology responsibly | **Information technology around us**<br><br>To recognise the uses and features of information technology<br>To identify information technology in the home<br>To identify information technology beyond school<br>To explain how information technology benefits us<br>To show how to use information technology safely<br>To recognise that choices are made when using information technology | **Connecting computers**<br><br>To explain how digital devices function<br>To identify input and output devices<br>To recognise how digital devices can change the way we work<br>To explain how a computer network can be used to share information<br>To explore how digital devices can be connected<br>To recognise the physical components of a network | **The internet**<br><br>To describe how networks physically connect to other networks<br>To recognise how networked devices make up the internet<br>To outline how websites can be shared via the World Wide Web<br>To describe how content can be added and accessed on the World Wide Web<br>To recognise how the content of the WWW is created by people<br>To evaluate the consequences of unreliable content | **Sharing information**<br><br>To explain that computers can be connected together to form systems<br>To recognise the role of computer systems in our lives<br>To recognise how information is transferred over the internet<br>To explain how sharing information online lets people in different places work together<br>To contribute to a shared project online<br>To evaluate different ways of working together online | **Communication**<br><br>To identify how to use a search engine<br>To describe how search engines select results<br>To describe how search engines select results<br>To explain how search results are ranked<br>To recognise why the order of results is important, and to whom<br>To recognise how we communicate using technology<br>To evaluate different methods of online communication |

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| VOCABULARY | | | | | | |
|---|---|---|---|---|---|---|
| Website<br>Internet<br>Keyboard<br>Mouse<br>Monitor<br>Touchscreen<br>Button<br>Swipe<br>Tap/click<br>Double tap/click<br>Open/close<br>Log in<br>Password | Technology<br><br>Computer, mouse/trackpad, keyboard, screen, click, drag<br><br>Computer mouse/trackpad, draw, click, double-click, click and drag<br><br>Input device, computer, keyboard, mouse<br><br>Shift, space bar, capital letter, full stop<br><br>Safely, responsibly, computer, technology | Information technology (IT), computer, barcode, scanner/scan | Digital device, input, output, process,<br><br>Program, Connection, network, network switch, server, wireless access point (WAP) | Internet, network, router, network security<br><br>Network switch, server, wireless access point (WAP), router<br><br>Website, web page, web address, router, routing, route tracing, browser<br><br>World Wide Web, internet, content, website, web page, links, files<br><br>Website, use, content, download, sharing, ownership, permission<br><br>Information, sharing, accurate, honest, content, adverts | System, connection, digital, input, process, output<br><br>System, connection, digital, input, process, output<br><br>Protocol, address, packet<br><br>Chat, explore, slide deck<br><br>Chat, explore<br><br>Reuse, remix, collaboration | Search, search engine, Google, Bing, Yahoo!, Swisscows, DuckDuckGo, refine<br><br>Index, crawler, bot,<br><br>Ranking, search engine optimisation, links, web crawlers, web crawler, content creator, selection, ranking<br><br>Communication, internet, public, private, one-way, two-way, one-to-one, one-to-many, SMS, email, WhatsApp, blog, YouTube, Twitter, BBC Newsround |

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| | EYFS | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|---|
| **CREATING MEDIA** | Creating https://www.barefootcomputing.org/concepts-and-approaches/creating | **Digital photography** To know what devices can be used to take photographs To use a digital device to take a photograph To describe what makes a good photograph To decide how photographs can be improved To use tools to change an image To recognise that images can be changed | Stop-frame animation To explain that animation is a sequence of drawings or photographs To relate animated movement with a sequence of images To plan an animation To identify the need to work consistently and carefully To review and improve an animation To evaluate the impact of adding other media to an animation | Audio editing To identify that sound can be digitally recorded To use a digital device to record sound To explain that a digital recording is stored as a file To explain that audio can be changed through editing To show that different types of audio can be combined and played together To evaluate editing choices made | Video editing To recognise video as moving pictures, which can include audio To identify digital devices that can record video To capture video using a digital device To recognise the features of an effective video To identify that video can be improved through reshooting and editing To consider the impact of the choices made when making and sharing a video | Web **page creation** To review an existing website and consider its structure To plan the features of a web page To consider the ownership and use of images (copyright) To recognise the need to preview pages To outline the need for a navigation path To recognise the implications of linking to content owned by other people |
| | | **Making music** To say how music can make us feel To identify that there are patterns in music To describe how music can be used in different ways To show how music is made from a series of notes To create music for a purpose To review and refine our computer work | **Desktop publishing** To recognise how text and images convey information To recognise that text and layout can be edited To choose appropriate page settings To add content to a desktop publishing publication To consider how different layouts can suit different purposes To consider the benefits of desktop publishing | Photo editing To explain that digital images can be changed To change the composition of an image To describe how images can be changed for different uses To make good choices when selecting different tools To recognise that not all images are real To evaluate how changes can improve an image | Vector drawing To identify that drawing tools can be used to produce different outcomes To create a vector drawing by combining shapes To use tools to achieve a desired effect To recognise that vector drawings consist of layers To group objects to make them easier to work with To evaluate my vector drawing | 3D modelling To use a computer to create and manipulate three-dimensional (3D) digital objects To compare working digitally with 2D and 3D graphics To construct a digital 3D model of a physical object To identify that physical objects can be broken down into a collection of 3D shapes To design a digital model by combining 3D objects To develop and improve a digital 3D model |
| | **Year 1** | | | | | |
| | **Digital painting** To describe what different freehand tools do To use the shape tool and the line tools To make careful choices when painting a digital picture To explain why I chose the tools I used To use a computer on my own to paint a picture To compare painting a picture on a computer and on paper **Digital writing** To use a computer to write To add and remove text on a computer To identify that the look of text can be changed on a computer To make careful choices when changing text To explain why I used the tools that I chose To compare writing on a computer with writing on paper | | | | | |

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| VOCABULARY | EYFS<br>Digital device<br>Camera<br>Photograph<br>Microphone<br>Speakers<br>Music Centre<br>Play<br>Record<br>Save<br><br>paint program, tool, paintbrush, erase, fill, undo<br>Piet Mondrian, primary colours, shape tools, line tool, fill tool, undo tool<br>Henri Matisse, shape tool, fill tool<br>Wassily Kandinsky, tools, feelings, colour, brush style<br>Georges Seurat, Pointillism, brush size<br>Pictures, painting, computers, like, prefer, dislike<br><br><br>Word processor, keyboard, keys, letters, Microsoft Word, Google Docs, numbers, space, backspace, text cursor, capital letters, toolbar, bold, italic, underline, mouse, cursor, select, font, toolbar, bold, italic, underline, keys, cursor, undo, font, toolbar, bold, italic, underline, keys, undo, backspace, toolbar, bold, italic, underline | Device, camera, photograph, capture, image, digital<br>Landscape, portrait, horizontal, vertical, field of view, narrow, wide, format<br>Framing, focal point, subject matter, field of view, format, compose<br>Natural lighting, artificial lighting, flash, focus, background, foreground<br>Editing, tools, colour, filter, images, Pixlr<br>Format, framing, lighting, focus, filter, changed, real<br><br>Music, planets, Mars, Venus, war, peace, quiet, loud, feelings, emotions<br>Pattern, rhythm, pulse<br>Neptune, pitch, tempo, rhythm, notes<br>Pattern, notes, instrument, tempo<br>Create, emotion, pitch, pulse/beat, tempo, instrument, rhythm, notes<br>Open, edit | Animation, flip book<br>Stop frame animation, frame, sequence, image, photograph, Setting, character, events, stop, onion skinning, consistency, Evaluation, animation, delete, frame, media, import, transition<br><br>Text, images, advantages, disadvantages, communicate, Font, font style, communicate, template, Landscape, portrait, orientation, placeholder, template<br>Desktop publishing, copy, paste, Layout, purpose<br>Desktop publishing, benefits | Audio, record, playback, microphone, speaker, headphones, input, output, sound, start, pause, stop, podcast, start, pause, save, file, edit, selection, file, edit, selection, open, mixing, time shift<br>Export, MP3, audio, editing, evaluate, feedback<br><br>Image, edit, arrange, select, digital, crop, undo, save<br>Image, search, save, copyright, composition, edit, save, pixels, crop, rotate, flip, adjustments, effects, colours, hue/saturation, sepia, save, version, illustrator, vignette, retouch, clone, recolour, magic wand, select, adjust, sharpen, brighten<br>Image, fake, real, composite, cut, copy, paste, alter, background, foreground, publication, elements, original, font style, shapes, border, layer | Video, audio, recording, storyboard, script, soundtrack, dialogue<br>Video, audio, recording, capture, zoom, storage, digital, tape<br>"Video, audio, AV (audiovisual), recording, save, videographer<br>Video techniques: Zoom, pan, tilt, angle "<br>Video, lighting, setting, YouTuber, content, light, audio/sound, camera angle, colour<br>Export, computer, Microsoft Movie Maker, split, trim/clip, edit, titles, end credits, timeline, transitions, audio, soundtrack, content, retake/reshoot (choose agreed language)<br>Video, special effects, title screen, end credits, export, constructive feedback<br><br>Vector, drawing tools, shapes, object, icons, toolbar<br>Vector drawing, object, move, resize, colour, rotate, duplicate/copy<br>Organise, zoom, select, rotate, object, alignment grid, resize, handles, consistency, modify<br>Layers, object, front, back, order<br>Copy, paste, group, ungroup, duplicate, object, vector drawing, reuse<br>Improvement, evaluate, alternatives, vector drawing | Website, web page, browser, media, Hypertext Markup Language (HTML), logo, layout, header, media, purpose<br>Copyright, fair use, home page, preview, evaluate, device, Google Sites, breadcrumb trail, navigation, hyperlink, subpage<br>Hyperlink, evaluate, website, web page, implication, external link, embed<br><br>2D, 3D, 3D object, 3D space, view, resize, colour, lift<br>Rotate, position, select, duplicate<br>Dimensions, placeholder, hole, group, ungroup , group, design<br>Modify, evaluate, improve |

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| | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|---|---|
| **DATA AND INFORMATION** | https://www.barefootcomputing.org/concepts-and-approaches/persevering<br><br>https://www.barefootcomputing.org/concepts-and-approaches/collaborating | **Grouping data**<br><br>To label objects<br>To identify that objects can be counted<br>To describe objects in different ways<br>To count objects with the same properties<br>To compare groups of objects<br>To answer questions about groups of objects | **Pictograms**<br><br>To recognise that we can count and compare objects using tally charts<br>To recognise that objects can be represented as pictures<br>To create a pictogram<br>To select objects by attribute and make comparisons<br>To recognise that people can be described by attributes<br>To explain that we can present information using a computer | **Branching databases**<br><br>To create questions with yes/no answers<br>To identify the object attributes needed to collect relevant data<br>To create a branching database<br>To identify objects using a branching database<br>To explain why it is helpful for a database to be well structured<br>To compare the information shown in a pictogram with a branching database | **Data logging**<br><br>To explain that data gathered over time can be used to answer questions<br>To use a digital device to collect data automatically<br>To explain that a data logger collects 'data points' from sensors over time<br>To use data collected over a long duration to find information<br>To identify the data needed to answer questions<br>To use collected data to answer questions | **Flat-file databases**<br><br>To use a form to record information<br>To compare paper and computer-based databases<br>To outline how grouping and then sorting data allows us to answer questions<br>To explain that tools can be used to select specific data<br>To explain that computer programs can be used to compare data visually<br>To apply my knowledge of a database to ask and answer real-world questions | **Spreadsheets**<br><br>To identify questions which can be answered using data<br>To explain that objects can be described using data<br>To explain that formula can be used to produce calculated data<br>To apply formulas to data, including duplicating<br>To create a spreadsheet to plan an event<br>To choose suitable ways to present data |
| **VOCABULARY** | Sort<br>Group<br>Pictogram<br>Numerals 1 to 20<br>Same<br>Different<br>Total<br>More than<br>Less than | Object, label, group, search, image<br>Group, object, label, image, property, label, colour, size, shape, value, label, colour, data set, more, less, most, fewest, data set, more, less, most, least, fewest, the same | More than, less than, most, least, organise, data, object, tally chart, votes, total<br>Pictogram, enter, data, tally chart, compare, more than, less than, objects, count<br>Tally chart, data, pictogram, explain, more, less, most, least, more common, least common<br>Attribute, group, same, different, object, more than/less than, most/least<br>Attribute, compare, tally chart, pictogram, more than, less than, most popular, least popular, conclusion, block diagram, most, least, common, sharing, data | Scratch, programming, blocks, commands, code, sprite, costume, stage, backdrop, motion, turn, point in direction, go to, glide, sequence, event, task, design, code, run the code, order, note, chord, design, algorithm, bug, debug | Data, table (layout)<br>Input device, sensor, data logger<br>Data logger, logging, data point, interval<br>Analyse, data set, import, export, logged, collection<br>Analyse, review, conclusion | Database, data, information, record, field, sort, order, group, field, record, sort, order, group, search, sort, order, value, search, criteria, record, field, graph, chart, axis, compare, filter, graph, chart, presentation | Spreadsheet, data, data heading, data set, cells, columns and rows<br>Data, data item, data set, object, spreadsheet application, format, common attribute<br>Formula, calculation, data, spreadsheet, input, output. cells, cell reference<br>Data, calculate, operation, formula, cell, range, duplicate, sigma<br>Propose, question, data set, data, organised, formula<br>Graph, chart, evaluate, results, comparison, questions, software, tools, data |

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| | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|---|---|
| **PROGRAMMING** | Tinkering https://www.barefootcomputing.org/concepts-and-approaches/tinkering<br><br>https://www.barefootcomputing.org/concepts-and-approaches/debugging<br><br>https://www.barefootcomputing.org/concepts-and-approaches/persevering<br><br>https://www.barefootcomputing.org/concepts-and-approaches/collaborating | **Moving a robot**<br><br>To explain what a given command will do<br>To act out a given word<br>To combine forwards and backwards commands to make a sequence<br>To combine four direction commands to make sequences<br>To plan a simple program<br>To find more than one solution to a problem<br><br>**Introduction to animation**<br><br>To choose a command for a given purpose<br>To show that a series of commands can be joined together<br>To identify the effect of changing a value<br>To explain that each sprite has its own instructions<br>To design the parts of a project<br>To use my algorithm to create a program | **Robot algorithms**<br><br>To describe a series of instructions as a sequence<br>To explain what happens when we change the order of instructions<br>To use logical reasoning to predict the outcome of a program (series of commands)<br>To explain that programming projects can have code and artwork<br>To design an algorithm<br>To create and debug a program that I have written<br><br>**Introduction to quizzes**<br>To explain that a sequence of commands has a start<br>To explain that a sequence of commands has an outcome<br>To create a program using a given design<br>To change a given design<br>To create a program using my own design<br>To decide how my project can be improved | **Sequence in music**<br><br>To explore a new programming environment<br>I can identify that each sprite is controlled by the commands I choose<br>To explain that a program has a start<br>To recognise that a sequence of commands can have an order<br>To change the appearance of my project<br>To create a project from a task description<br><br>**Events and actions**<br><br>To explain how a sprite moves in an existing project<br>To create a program to move a sprite in four directions<br>To adapt a program to a new context<br>To develop my program by adding features<br>To identify and fix bugs in a program<br>To design and create a maze-based challenge | **Repetition in shapes**<br><br>To identify that accuracy in programming is important<br>To create a program in a text-based language<br>To explain what 'repeat' means<br>To modify a count-controlled loop to produce a given outcome<br>To decompose a program into parts<br>To create a program that uses count-controlled loops to produce a given outcome<br><br>**Repetition in games**<br><br>To develop the use of count-controlled loops in a different programming environment<br>To explain that in programming there are infinite loops and count controlled loops<br>To develop a design which includes two or more loops which run at the same time<br>To modify an infinite loop in a given program<br>To design a project that includes repetition<br>To create a project that includes repetition | **Selection in physical computing**<br><br>To control a simple circuit connected to a computer<br>To write a program that includes count-controlled loops<br>To explain that a loop can stop when a condition is met, eg number of times<br>To conclude that a loop can be used to repeatedly check whether a condition has been met<br>To design a physical project that includes selection<br>To create a controllable system that includes selection<br><br>**Selection in games**<br><br>To explain how selection is used in computer programs<br>To relate that a conditional statement connects a condition to an outcome<br>To explain how selection directs the flow of a program<br>To design a program which uses selection<br>To create a program which uses selection<br>To evaluate my program | **Variables in games**<br><br>To define a 'variable' as something that is changeable<br>To explain why a variable is used in a program<br>To choose how to improve a game by using variables<br>To design a project that builds on a given example<br>To use my design to create a project<br>To evaluate my project<br><br>**Sensing**<br><br>To create a program to run on a controllable device<br>To explain that selection can control the flow of a program<br>To update a variable with a user input<br>To use a conditional statement to compare a variable to a value<br>To design a project that uses inputs and outputs on a controllable device<br>To develop a program to use inputs and outputs on a controllable device |

# LANGTOFT PRIMARY SCHOOL PROGRESSION OF KNOWLEDGE AND SKILLS IN COMPUTING

| VOCABULARY | | | | | | |
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| Instructions<br>Algorithm<br>Debug<br>Code<br>Program<br>Forward<br>Backward<br>Left turn<br>Right turn<br>Stop<br>Robot | Forwards, backwards, turn, clear, go, commands<br>Instructions, directions<br>Forwards, backwards, commands<br>Left, right, turn, commands<br>Plan, algorithm, program<br>Route, plan, program<br><br>ScratchJr, Bee-Bot, command, sprite, compare, programming, programming area<br>Block, joining, command, start block, run, program, programming area, background, delete, reset, algorithm, predict<br>Effect, change, value, block<br>Instructions, sprite, delete, program, algorithm<br>Sprite, background, appropriate, algorithm<br>Sprite, design, programming blocks, algorithm, programs | Instruction, sequence, clear, unambiguous, algorithm, program<br>Sequence, order, algorithm, commands<br>Sequence, prediction, program<br>Artwork, design, route, mat<br>Algorithm<br>Debugging, algorithm, program<br><br>Sequence, command, program, run, program, start<br>Sequence, command, outcome, predict, program, blocks<br>Sprite, algorithm, blocks, design, sequence, predict<br>Actions, sprite, project, blocks, design, sequence, modify, change<br>Design, algorithm, build, sequence, blocks, match<br>Compare, design, debug, program, features, evaluate | Attribute, value, questions, table, objects, branching database, database, equal, even, separate, questions, objects, structure, compare, order, organise, j2data, selecting, questions, pictogram, compare, information, decision tree<br><br>Motion, event, sprite, algorithm, logic<br>Move, resize, algorithm<br>Extension block, pen up, set up<br>Pen, design, event, action, algorithm<br>Debugging, errors, setup<br>Design, code, setup, test, debug, actions, events | Program, turtle, commands, code snippet<br>Algorithm, design, debug, Logo commands (see Glossary handout)<br>Pattern, repeat, repetition, count-controlled loop, algorithm, value<br>Repeat, repetition, count-controlled loop, trace, value<br>Repeat, count-controlled loop, decompose, procedure<br>Count-controlled loop, procedure, debug, program<br><br>Scratch, programming, sprite, blocks, code, loop, repeat, value<br>Block, repeat, forever, infinite loop, count-controlled loop, costume<br>Repetition, forever, infinite loop, count-controlled loop, animate, costume, event block, duplicate<br>Block, repeat, forever, infinite loop, modify, design<br>Infinite loop, count-controlled loop, repetition, design, sprite, algorithm<br>Repetition, design, algorithm, duplicate, debug, refine, evaluate | Microcontroller, Crumble controller, components, LED, Sparkle, crocodile clips, connect, battery box, program, repetition, infinite loop, output devices, motor, connect, battery box, program, repetition, count-controlled loop, switch, motor, LED, Sparkle, crocodile clips, connect, battery box, program, condition, true, false, input, output devices, selection, condition, action<br>Task, design, selection, repetition, condition, action, microcontroller, Crumble controller, output devices, motor, switch, battery box, algorithm, program, debug, evaluate<br><br>Selection, condition, true, false, count controlled loop, outcomes, conditional statement - the linking together of a condition and outcomes- algorithm, program, debug, question, answer, algorithm, program, debug<br>Task, design, algorithm, input, program, selection, condition, outcomes<br>Implement, design, algorithm, program, selection, condition, outcome, test, run, debug, test, setup, outcome, share, evaluate, constructive | Variable, change, name, value, set, design, event, algorithm, code<br>Task, design, artwork, program, project, code, test, debug<br>Improve, evaluate, share<br><br>Micro:bit, MakeCode, input, process, output, flashing, USB<br>Selection, condition, if… then… else, variable, random<br>Input, selection, condition, variable, sensing, accelerometer<br>Compass, direction, variable, navigation<br>Micro:bit, design, task, algorithm, variable, step counter<br>Plan, create, code, test, debug |

## Digital Literacy – Online Safety

| Self-image and Identity | I can recognise that I can say 'no' / 'please stop' / 'I'll tell' / 'I'll ask' to somebody who asks me to do something that makes me feel sad, embarrassed or upset.<br><br>I can explain how this could be either in real life or online. | I can recognise that there may be people online who could make me feel sad, embarrassed or upset.<br><br>If something happens that makes me feel sad, worried, uncomfortable or frightened I can give examples of when and how to speak to an adult I can trust. | I can explain how other people's identity online can be different to their identity in real life.<br><br>I can describe ways in which people might make themselves look different online.<br><br>I can give examples of issues online that might make me feel sad, worried, uncomfortable or frightened; I can give examples of how I might get help. | I can explain what is meant by the term 'identity'.<br><br>I can explain how I can represent myself in different ways online.<br><br>I can explain ways in which and why I might change my identity depending on what I am doing online (e.g. gaming; using an avatar; social media). | I can explain how my online identity can be different to the identity I present in 'real life'<br><br>Knowing this, I can describe the right decisions about how I interact with others and how others perceive me. | I can explain how identity online can be copied, modified or altered.<br><br>I can demonstrate responsible choices about my online identity, depending on context. | I can describe ways in which media can shape ideas about gender.<br>I can identify messages about gender roles and make judgements based on them.<br>I can challenge and explain why it is important to reject inappropriate messages about gender online.<br>I can describe issues online that might make me or others feel sad, worried, uncomfortable or frightened. I know and can give examples of how I might get help, both on and offline.<br>I can explain why I should keep asking until I get the help I need. |
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| Online relationships | I can recognise some ways in which the internet can be used to communicate.<br><br>I can give examples of how I (might) use technology to communicate with people I know. | I can use the internet with adult support to communicate with people I know.<br><br>I can explain why it is important to be considerate and kind to people online. | I can use the internet to communicate with people I don't know well (e.g. email a penpal in another school/ country).<br><br>I can give examples of how I might use technology to communicate with others I don't know well. | I can describe ways people who have similar likes and interests can get together online.<br>• I can give examples of technology-specific forms of communication (e.g. emojis, acronyms, text speak).<br>• I can explain some risks of communicating online with others I don't know well.<br>• I can explain how my and other people's feelings can be hurt by what is said or written online.<br>• I can explain why I should be careful who I trust online and what information I can trust them with. I can explain why I can take back my trust in someone or something if I feel nervous, uncomfortable or worried.<br>• I can explain what it means to 'know someone' online and why this might be different from knowing someone in real life. I can explain what is meant by 'trusting someone online'. I can explain why this is different from 'liking someone online'. | I can describe strategies for safe and fun experiences in a range of online social environments.<br><br>I can give examples of how to be respectful to others online. | I can explain that there are some people I communicate with online who may want to do me or my friends harm. I can recognise that this is not my/our fault.<br><br>I can make positive contributions and be part of online communities.<br><br>I can describe some of the communities in which I am involved and describe how I collaborate with others positively. | I can show I understand my responsibilities for the well-being of others in my online social group.<br><br>I can explain how impulsive and rash communications online may cause problems (e.g. flaming, content produced in live streaming).<br><br>I can demonstrate how I would support others (including those who are having difficulties) online.<br><br>I can demonstrate ways of reporting problems online for both myself and my friends. |

# LANGTOFT PRIMARY SCHOOL PROGRESSION OF KNOWLEDGE AND SKILLS IN COMPUTING

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| **Online reputation** | I can identify ways that I can put information on the internet. | I can recognise that information can stay online and could be copied.<br><br>I can describe what information I should not put online without asking a trusted adult first. | I can explain how information put online about me can last for a long time.<br><br>I know who to talk to if I think someone has made a mistake about putting something online. | I can search for information about myself online.<br><br>I can recognise I need to be careful before I share anything about myself or others online.<br><br>I know who I should ask if I am not sure if I should put something online. | I can describe how others can find out information about me by looking online.<br><br>I can explain ways that some of the information about me online could have been created, copied or shared by others. | I can search for information about an individual online and create a summary report of the information I find.<br><br>I can describe ways that information about people online can be used by others to make judgments about an individual. | I can explain how I am developing an online reputation which will allow other people to form an opinion of me.<br><br>I can describe some simple ways that help build a positive online reputation |
| **Online bullying** | I can describe ways that some people can be unkind online.<br><br>I can offer examples of how this can make others feel. | I can describe how to behave online in ways that do not upset others and can give examples. | I can give examples of bullying behaviour and how it could look online.<br><br>I understand how bullying can make someone feel.<br><br>I can talk about how someone can/would get help about being bullied online or offline. | I can explain what bullying is and can describe how people may bully others.<br><br>I can describe rules about how to behave online and how I follow them. | I can identify some online technologies where bullying might take place.<br><br>I can describe ways people can be bullied through a range of media (e.g. image, video, text, chat).<br><br>I can explain why I need to think carefully about how content I post might affect others, their feelings and how it may affect how others feel about them (their reputation). | I can recognise when someone is upset, hurt or angry online.<br>• I can describe how to get help for someone that is being bullied online and assess when I need to do or say something or tell someone.<br>• I can explain how to block abusive users.<br>• I can explain how I would report online bullying on the apps and platforms that I use.<br>• I can describe the helpline services who can support me and what I would say and do if I needed their help (e.g. Childline). | I can describe how to capture bullying content as evidence (e.g screen-grab, URL, profile) to share with others who can help me.<br><br>I can identify a range of ways to report concerns both in school and at home about online bullying. |

| Managing Online Information | | | | | | |
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| I can talk about how I can use the internet to find things out.<br><br>I can identify devices I could use to access information on the internet.<br><br>I can give simple examples of how to find information (e.g. search engine, voice activated searching). | I can use the internet to find things out.<br><br>I can use simple keywords in search engines<br><br>I can describe and demonstrate how to get help from a trusted adult or helpline if I find content that makes me feel sad, uncomfortable worried or frightened. | I can use keywords in search engines.<br><br>I can demonstrate how to navigate a simple webpage to get to information<br><br>I need (e.g. home, forward, back buttons; links, tabs and sections).<br><br>I can explain what voice activated searching is and how it might be used (e.g. Alexa, Google Now, Siri).<br><br>I can explain the difference between things that are imaginary, 'made up' or 'make believe' and things that are 'true' or 'real'.<br><br>I can explain why some information I find online may not be true. | I can use key phrases in search engines.<br><br>I can explain what autocomplete is and how to choose the best suggestion.<br><br>I can explain how the internet can be used to sell and buy things<br><br>I can explain the difference between a 'belief', an 'opinion' and a 'fact'. | I can analyse information and differentiate between 'opinions', 'beliefs' and 'facts'. I understand what criteria have to be met before something is a 'fact'.<br>• I can describe how I can search for information within a wide group of technologies (e.g. social media, image sites, video sites).<br>• I can describe some of the methods used to encourage people to buy things online (e.g. advertising offers; in-app purchases, pop-ups) and can recognise some of these when they appear online.<br>• I can explain that some people I 'meet online' (e.g. through social media) may be computer programmes pretending to be real people.<br>• can explain why lots of people sharing the same opinions or beliefs online does not make those opinions or beliefs true. | I can use different search technologies.<br>• I can evaluate digital content and can explain how I make choices from search results.<br>• I can explain key concepts including: data, information, fact, opinion belief, true, false, valid, reliable and evidence.<br>• I understand the difference between online mis-information (inaccurate information distributed by accident) and dis-information (inaccurate information deliberately distributed and intended to mislead). I can explain what is meant by 'being sceptical'.<br>• I can give examples of when and why it is important to be 'sceptical'. I can explain what is meant by a 'hoax'.<br>• I can explain why I need to think carefully before I forward anything online.<br>• I can explain why some information I find online may not be honest, accurate or legal.<br>• I can explain why information that is on a large number of sites may still be inaccurate | I can use search technologies effectively.<br>• I can explain how search engines work and how results are selected and ranked.<br>• I can demonstrate the strategies I would apply to be discerning in evaluating digital content.<br>• I can describe how some online information can be opinion and can offer examples.<br>• I can explain how and why some people may present 'opinions' as 'facts'. I can define the terms 'influence', 'manipulation' and 'persuasion' and explain how I might encounter these online (e.g. advertising and 'ad targeting').<br>• I can demonstrate strategies to enable me to analyse and evaluate the validity of 'facts' and I can explain why using these strategies are important.<br>• I can identify, flag and report inappropriate content. |

| | | | | | | or untrue. I can assess how this might happen (e.g. the sharing of misinformation either by accident or on purpose). | |
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| **Health, Wellbeing and Lifestyle** | I can identify rules that help keep us safe and healthy in and beyond the home when using technology.<br><br>I can give some simple examples. | I can explain rules to keep us safe when we are using technology both in and beyond the home.<br><br>I can give examples of some of these rules. | I can explain simple guidance for using technology in different environments and settings.<br><br>I can say how those rules/guides can help me. | I can explain why spending too much time using technology can sometimes have a negative impact on me; I can give some examples of activities where it is easy to spend a lot of time engaged (e.g. games, films, videos). | I can explain how using technology can distract me from other things I might do or should be doing.<br><br>I can identify times or situations when I might need to limit the amount of time I use technology.<br><br>I can suggest strategies to help me limit this time. | I can describe ways technology can affect healthy sleep and can describe some of the issues.<br><br>I can describe some strategies, tips or advice to promote healthy sleep with regards to technology | I can describe common systems that regulate age-related content (e.g. PEGI, BBFC, parental warnings) and describe their purpose.<br>• I can assess and action different strategies to limit the impact of technology on my health (e.g. nightshift mode, regular breaks, correct posture, sleep, diet and exercise).<br>• I can explain the importance of self-regulating my use of technology; I can demonstrate the strategies I use to do this (e.g. monitoring my time online, avoiding accidents ). |

| Privacy and security | I can identify some simple examples of my personal information (e.g. name, address, birthday, age, location).<br><br>I can describe the people I can trust and can share this with; I can explain why I can trust them. | I can recognise more detailed examples of information that is personal to me (e.g. where I live, my family's names, where I go to school).<br><br>I can explain why I should always ask a trusted adult before I share any information about myself online.<br><br>I can explain how passwords can be used to protect information and devices. | I can describe why other people's work belongs to them.<br><br>I can recognise that content on the internet may belong to other people. | I can give reasons why I should only share information with people I choose to and can trust.<br><br>I can explain that if I am not sure or I feel pressured, I should ask a trusted adult.<br><br>I understand and can give reasons why passwords are important.<br><br>I can describe simple strategies for creating and keeping passwords private.<br><br>I can describe how connected devices can collect and share my information with others. | I can explain what a strong password is.<br><br>I can describe strategies for keeping my personal information private, depending on context.<br><br>I can explain that others online can pretend to be me or other people, including my friends<br><br>I can suggest reasons why they might do this<br><br>I can explain how internet use can be monitored. | I can create and use strong and secure passwords.<br><br>I can explain how many free apps or services may read and share my private information (e.g. friends, contacts, likes, images, videos, voice, messages, geolocation) with others.<br><br>I can explain how and why some apps may request or take payment for additional content (e.g. in-app purchases) and explain why I should seek permission from a trusted adult before purchasing. | I use different passwords for a range of online services.<br>• I can describe effective strategies for managing those passwords (e.g. password managers, acronyms, stories).<br>• I know what to do if my password is lost or stolen.<br>• I can explain what app permissions are and can give some examples from the technology or services I use.<br>• I can describe simple ways to increase privacy on apps and services that provide privacy settings. I can describe ways in which some online content targets people to gain money or information illegally;<br>• I can describe strategies to help me identify such content (e.g. scams, phishing). |

# LANGTOFT PRIMARY SCHOOL PROGRESSION OF KNOWLEDGE AND SKILLS IN COMPUTING

| Copyright and Ownership | I know that work I create belongs to me. <br><br> I can name my work so that others know it belongs to me. | I can explain why work I create using technology belongs to me. <br><br> I can say why it belongs to me (e.g. 'it is my idea' or 'I designed it'). <br><br> I can save my work so that others know it belongs to me (e.g. filename, name on content). | I can describe why other people's work belongs to them. <br><br> I can recognise that content on the internet may belong to other people. | I can explain why copying someone else's work from the internet without permission can cause problems. <br><br> I can give examples of what those problems might be. | When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it. <br><br> I can give some simple examples. | I can assess and justify when it is acceptable to use the work of others. <br><br> I can give examples of content that is permitted to be reused. | I can demonstrate the use of search tools to find and access online content which can be reused by others. <br><br> I can demonstrate how to make references to and acknowledge sources I have used from the internet. |
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