# Computing

**Intent**

At Laureate our values are that children REACH (Respect, Enjoy, Aspire, Communicate and be Healthy) these values will be demonstrated by students within each lesson, including computing.

# Computing

# Why is Computing important?

Through our computing curriculum at Laureate we aim for our pupils to have the knowledge they need to thrive and flourish in the 21st century global community. We want to give them experiences of a world beyond Laureate.

We want the use of technology to support learning across the entire curriculum and to ensure that our curriculum is accessible to every child. Not only do we want them to be digitally literate, competent end-users of technology but through our computer lessons we want them to develop their computational thinking skills

# Computing

## Aims of the Computing Curriculum

### Aims of the Computing Curriculum

The national curriculum for Computing aims to ensure that all pupils:

- Understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation

- analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems

- evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems

- become responsible, competent, confident and creative users of information and communication technology.

Our Computing curriculum allows children to create digital work through a range of hardware and software. There is focus on:

- Computational thinking (abstraction, decomposition, pattern recognition and algorithms)

- E-safety

- Digital literacy

- Computers and hardware

# Computing

At Laureate we use the KeyChain Computing Scheme of Work which is a fully resourced computing scheme that:

- Has units which have been developed by the NCCE. They are updated regularly and resources can be accessed from the Teach Computing website

- Supports our teachers to deliver exciting lessons to pupils

- Saves our teachers valuable planning time

- Helps teachers to develop their subject knowledge

- Will be updated to reflect any changes in the National Curriculum

# Computing

**Early Years:**

The Early years framework does not explicitly mention Computing, however there are strands of the framework with statements which are prerequisite skills for computing within the national curriculum. This means that the Reception curriculum provides children with the opportunity to use and discover technology they will use in Key Stage One and start their journey to be digital citizens.

| Computing | | | |
|---|---|---|---|
| Three and Four-Year-Olds | Personal, Social and Emotional Development | | • Increasingly follow rules, understanding why they are important. |
| | Physical Development | | • Match their developing physical skills to tasks and activities in the setting. |
| | Understanding the World | | • Explore how things work. |
| Reception | Personal, Social and Emotional Development | | • Show resilience and perseverance in the face of a challenge. |
| | Physical Development | | • Develop their small motor skills so that they can use a range of tools competently, safely and confidently.<br>• Know and talk about the different factors that support their overall health and wellbeing:<br>-sensible amounts of 'screen time'. |
| | Expressive Arts and Design | | • Explore, use and refine a variety of artistic effects to express their ideas and feelings. |
| ELG | Personal, Social and Emotional Development | Managing Self | • Be confident to try new activities and show independence, resilience and perseverance in the face of challenge.<br>• Explain the reasons for rules, know right from wrong and try to behave accordingly. |
| | Expressive Arts and Design | Creating with Materials | • Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. |

# Computing

## Key Stage 1:

Keychain **COMPUTING**
Opening the lock to learning

| | | | | | | |
|---|---|---|---|---|---|---|
| Year 1 | 1a E-safety Think you know Being safe online | 1b Coding Code.org | 1c Digital Literacy Digital writing | 1d Digital Literacy Digital Painting | 1e Digital Literacy Systems and Networks | 1f Coding Unplugged Collecting Objects Bee bots |
| Year 2 | 2a E-safety Think you know Being safe online | 2b Coding Code.org | 2c Digital Literacy Digital Photography | 2d Digital Literacy Making Music | 2e Digital Literacy Systems and Networks | 2f Coding Scratch basics |

# Computing

## Lower Key Stage 2:

**Keychain COMPUTING**
*Opening the lock to learning*

**Intent**

| | | | | | | |
|---|---|---|---|---|---|---|
| Year 3 | 3a E-safety Think you know | 3b Coding Code.org | 3c Digital Literacy Desktop Publishing | 3d Digital Literacy Animations | 3e Digital Literacy Computer Systems and Networks | 3f Coding Understanding loops |
| Year 4 | 4a E-safety and Computer networks How the internet works | 4b Coding Code.org | 4c Digital Literacy Audio Editing | 4d Coding Scratch Conversations linked to History | 4e Digital Literacy Photo Editing | 4f Coding Scratch Animated logo Sprites costumes |

# Computing

# Upper Key Stage 2:



| | | | | | |
|---|---|---|---|---|---|
| Year 5 | 5a E-safety and networks Kara and the crew Staying safe online | 5b Coding Code.org | 5c Digital Literacy Video Editing | 5d Coding Kodu - New worlds | 5e Digital Literacy Computer Systems and Networks | 5f Coding Scratch Maths Quiz Questions and user input |
| Year 6 | 6a E-safety and networks | 6b Coding Code.org | 6c Coding Unplugged Binary Sorting Algorithms | 6d Digital Literacy Creating ebooks | 6e Digital Literacy 3D modelling | 6f Coding Scratch Car Game If statements variables |

Intent

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# Spaced Retrieval Practice Approach

At Laureate Primary Academy, Computing is taught through KeyChain Computing lesson plans and resources. The modules enable pupils to study in depth key computational understanding, digital skills and vocabulary. Each module aims to activate and build upon prior learning, including from EYFS, to ensure better cognition and retention. Each module is carefully sequenced to enable pupils to purposefully layer learning from previous sessions to facilitate the acquisition and retention of key knowledge. Individual modules and lessons build on knowledge that has previously been taught. Outcomes are revisited either later in the year or in the following year as part of a spaced retrieval practice method to ensure pupils retain key knowledge and information

# Content and Sequence: Year 1

**Intent**

| Technology Around Us | Creating media – Digital Painting | Creating Media – Digital Writing | Grouping Data | Programming A – Moving a Robot | Programming B – Introduction to Animation |
|---|---|---|---|---|---|
| Learners will develop their understanding of technology and how it can help them in their everyday lives. They will start to become familiar with the different components of a computer by developing their keyboard and mouse skills. Learners will also consider how to use technology responsibly. Note: This lesson has been planned using desktop computers and the (free) program paintz.app, however, it can be taught with laptops. If you are using laptops for this unit, consider spending more time practising and discussing the trackpad. | During this unit, learners develop their understanding of a range of tools used for digital painting. They then use these tools to create their own digital paintings, while gaining inspiration from a range of artists' work. The unit concludes with learners considering their preferences when painting with and without the use of digital devices. | During this unit, learners will develop their understanding of the various aspects of using a computer to create and manipulate text. Learners will become more familiar with using a keyboard and mouse to enter and remove text. Learners will also consider how to change the look of their text, and will be able to justify their reasoning in making these changes. Finally, learners will consider the differences between using a computer to create text, and writing text on paper. They will be able to explain which method they prefer and explain their reasoning for choosing this. | This unit introduces pupils to data and information. Labelling, grouping, and searching are important aspects of data and information. Searching is a common operation in many applications, and requires an understanding that to search data, it must have labels. This unit of work focuses on assigning data (images) with different labels in order to demonstrate how computers are able to group and present data. | This unit introduces learners to early programming concepts. Learners will explore using individual commands, both with other learners and as part of a computer program. They will identify what each floor robot command does and use that knowledge to start predicting the outcome of programs. The unit is paced to ensure time is spent on all aspects of programming and builds knowledge in a structured manner. Learners are also introduced to the early stages of program design through the introduction of algorithms. | This unit introduces learners to on screen programming through ScratchJr. Learners will explore the way a project looks by investigating sprites and backgrounds. They will use programming blocks to use, modify and create programs. Learners are also introduced to the early stages of program design through the introduction of algorithms. |

# Content and Sequence: Year 2

**Intent**

| Information Technology Around Us | Creating media – Digital Photography | Creating Media – Making Music | Pictogram | Programming A – Robot Algorithms | Programming B – Introduction to Quizzes |
|---|---|---|---|---|---|
| In this unit, learners will look at information technology at school and beyond, in settings such as shops, hospitals, and libraries. Learners will investigate how information technology improves our world, and they will learn about using information technology responsibly | Through the lessons in this unit, learners will learn to recognise that different devices can be used to capture photographs and will gain experience capturing, editing, and improving photos. Finally, they will use this knowledge to recognise that images they see may not be real.. | In this unit, learners will be using a computer to create music. They will listen to a variety of pieces of music and consider how music can make them think and feel. Learners will compare creating music digitally and non-digitally. Learners will look at patterns and purposefully create music. | This unit introduces the learners to the term 'data'. Learners will begin to understand what data means and how this can be collected in the form of a tally chart. They will learn the term 'attribute' and use this to help them organise data. They will then progress onto presenting data in the form of pictograms and finally block diagrams. Learners will use the data presented to answer questions. | This unit develops pupils' understanding of instructions in sequences and the use of logical reasoning to predict outcomes. Pupils will use given commands in different orders to investigate how the order affects the outcome. Pupils will also learn about design in programming. They will develop artwork and test it for use in a program. They will design algorithms and then test those algorithms as programs and debug them.. | This unit initially recaps on learning from the Year 1 Scratch Junior unit 'Programming B - Introduction to animation' Learners begin to understand that sequences of commands have an outcome and make predictions based on their learning. They use and modify designs to create their own quiz questions in ScratchJr and realise these designs in ScratchJr using blocks of code. Finally, learners evaluate their work and make improvements to their programming projects.. |

# Content and Sequence: Year 3

| Systems and Network – Connecting Computers | Creating Media - Animation | Creating Media – Desktop Publishing | Branching databases | Programming A - Sequence of Music | Programming B – Events and Actions |
|---|---|---|---|---|---|
| During this unit, learners develop their understanding of digital devices, with an initial focus on inputs, processes, and outputs. They also compare digital and non-digital devices. Following this, learners are introduced to computer networks, including devices that make up a network's infrastructure, such as wireless access points and switches. The unit concludes with learners discovering the benefits of connecting devices. | During this unit, learners will use a range of techniques to create a stop frame animation using tablets. Next, they will apply those skills to create a story-based animation. This unit will conclude with learners adding other types of media to their animation, such as music and text. | IDuring this unit, learners will become familiar with the terms 'text' and 'images' and understand that they can be used to communicate messages. They will use desktop publishing software and consider careful choices of font size, colour and type to edit and improve premade documents. Learners will be introduced to the terms 'templates', 'orientation', and 'placeholders' and begin to understand how these can support them in making their own template for a magazine front cover. They will start to add text and images to create their own pieces of work using desktop publishing software. Learners will look at a range of page layouts thinking carefully about the purpose of these and evaluate how | During this unit, learners will develop their understanding of what a branching database is and how to create one. They will gain an understanding of what attributes are and how to use them to sort groups of objects by using yes/no questions. The learners will create physical and on-screen branching databases. Finally, they will evaluate the effectiveness of branching databases and will decide what types of data should be presented as a branching database. | This unit explores the concept of sequencing in programming through Scratch. It begins with an introduction to the programming environment, which will be new to most learners. They will be introduced to a selection of motion, sound, and event blocks which they will use to create their own programs, featuring sequences. The final project is to make a representation of a piano. The unit is paced to focus on all aspects of sequences, and make sure that knowledge is built in a structured manner. Learners also apply stages of program design through this unit. | This unit explores the links between events and actions, whilst consolidating prior learning relating to sequencing. Learners will begin by moving a sprite in four directions (up, down, left and right). They will then explore movement within the context of a maze, using design to choose an appropriately sized sprite. This unit also introduces programming extensions, through the use of pen blocks. Learners are given the opportunity to draw lines with sprites and change the size and colour of lines. The unit concludes with learners designing and coding their own maze tracing program. |

**Intent**

# Content and Sequence: Year 4

**Intent**

| The Internet | Creating Media – Audio Editing | Photo Editing | Data Logging | Programming A – Repetition of Shapes | Programming B – Repetition in Games |
|---|---|---|---|---|---|
| During this unit learners will apply their knowledge and understanding of networks, to appreciate the internet as a network of networks which need to be kept secure. They will learn that the World Wide Web is part of the internet, and be given opportunities to explore the World Wide Web for themselves to learn about who owns content and what they can access, add, and create. Finally they will evaluate online content to decide how honest, accurate, or reliable it is, and understand the consequences of false information. | In this unit, learners will initially examine devices capable of recording digital audio, which will include identifying the input device (microphone) and output devices (speaker or headphones) if available. Learners will discuss the ownership of digital audio and the copyright implications of duplicating the work of others. In order to record audio themselves, learners will use Audacity to produce a podcast, which will include editing their work, adding multiple tracks, and opening and saving the audio files. Finally, learners will evaluate their work and give feedback to their peers | In this unit, learners will develop their understanding of how digital images can be changed and edited, and how they can then be resaved and reused. They will consider the impact that editing images can have, and evaluate the effectiveness of their choices. | In this unit, pupils will consider how and why data is collected over time. Pupils will consider the senses that humans use to experience the environment and how computers can use special input devices called sensors to monitor the environment. Pupils will collect data as well as access data captured over long periods of time. They will look at data points, data sets, and logging intervals. Pupils will spend time using a computer to review and analyse data. Towards the end of the unit, pupils will pose questions and then use data loggers to automatically collect the data needed to answer those questions. | This unit is the first of the two programming units in Year 4, and looks at repetition and loops within programming. Pupils will create programs by planning, modifying, and testing commands to create shapes and patterns. They will use Logo, a text-based programming language. | This unit explores the concept of repetition in programming using the Scratch environment. It begins with a Scratch activity similar to that carried out in Logo in Programming unit A, where learners can discover similarities between two environments. Learners look at the difference between count-controlled and infinite loops, and use their knowledge to modify existing animations and games using repetition. Their final project is to design and create a game which uses repetition, applying stages of programming design throughout |

# Content and Sequence: Year 5

| Sharing Information | Creating Media – Vector Drawing | Creating Media | Data Logging | Programming A – Repetition of Shapes | Programming B – Repetition in Games |
|---|---|---|---|---|---|
| In this unit, learners will develop their understanding of computer systems and how information is transferred between systems and devices.  Learners will consider small-scale systems as well as large-scale systems. They will explain the input, output, and process aspects of a variety of different real-world systems. Learners will also take part in a collaborative online project with other class members and develop their skills in working together online | In this unit learners will find out that vector images are made up of shapes. They will learn how to use the different drawing tools and how images are created in layers. They will explore the ways in which images can be grouped and duplicated to support them in creating more complex pieces of work. This unit is planned using the Google Drawings app other alternative pieces of software are available. | This unit gives learners the opportunity to learn how to create short videos in groups. As they progress through this unit, they will be exposed to topic-based language and develop the skills of capturing, editing, and manipulating video. Active learning is encouraged through guided questions and by working in small groups to investigate the use of devices and software. Learners are guided with step-by-step support to take their idea from conception to completion. At the teacher's discretion, the use of green screen can be incorporated into this unit. At the conclusion of the unit, learners have the opportunity to reflect on and assess their progress in creating a video. | In this unit, pupils will consider how and why data is collected over time. Pupils will consider the senses that humans use to experience the environment and how computers can use special input devices called sensors to monitor the environment. Pupils will collect data as well as access data captured over long periods of time. They will look at data points, data sets, and logging intervals. Pupils will spend time using a computer to review and analyse data. Towards the end of the unit, pupils will pose questions and then use data loggers to automatically collect the data needed to answer those questions | This unit is the first of the two programming units in Year 4, and looks at repetition and loops within programming. Pupils will create programs by planning, modifying, and testing commands to create shapes and patterns. They will use Logo, a text-based programming language. | This unit explores the concept of repetition in programming using the Scratch environment. It begins with a Scratch activity similar to that carried out in Logo in Programming unit A, where learners can discover similarities between two environments. Learners look at the difference between count-controlled and infinite loops, and use their knowledge to modify existing animations and games using repetition. Their final project is to design and create a game which uses repetition, applying stages of programming design throughout. |

# Content and Sequence: Year 6

**Intent**

| Communication | Creating Media – 3D modelling | Web page creating | Data and Information - Spreadsheets | Programming A – Variables in Games | Programming B – Sensing |
|---|---|---|---|---|---|
| In this unit, the class will learn about the World Wide Web as a communication tool. First, they will learn how we find information on the World Wide Web, through learning how search engines work (including how they select and rank results) and what influences searching, and through comparing different search engines. They will then investigate different methods of communication, before focusing on internet-based communication. Finally, they will evaluate which methods of internet communication to use for particular purposes. | In this unit, the class will learn about the World Wide Web as a communication tool. First, they will learn how we find information on the World Wide Web, through learning how search engines work (including how they select and rank results) and what influences searching, and through comparing different search engines. They will then investigate different methods of communication, before focusing on internet-based communication. Finally, they will evaluate which methods of internet communication to use for particular purposes. | This unit introduces learners to the creation of websites for a chosen purpose. Learners identify what makes a good web page and use this information to design and evaluate their own website using Google Sites. Throughout the process learners pay specific attention to copyright and fair use of media, the aesthetics of the site, and navigation paths. | This unit introduces the learners to spreadsheets. Learners are supported in organising data into columns and rows to create their own data set. They are taught the importance of formatting data to support calculations. Learners are introduced to formulas and begin to understand how these can be used to produce calculated data. They are taught how to apply formulas which include a range of cells and apply formulas to multiple cells by duplicating them. Learners use spreadsheets to plan an event and answer questions. Finally learners create graphs and charts and evaluate their results in comparison to questions asked. | This unit explores the concept of variables in programming through games in Scratch. First, pupils will learn what variables are, and relate them to real-world examples of values that can be set and changed. Pupils will then use variables to create a simulation of a scoreboard. In Lessons 2, 3, and 5, which follow the Use-Modify-Create model, pupils will experiment with variables in an existing project, then modify them, then they will create their own project. In Lesson 4, pupils will focus on design. Finally, in Lesson 6, pupils will apply their knowledge of variables and design to improve their game in Scratch. | This unit is the final KS2 programming unit and brings together elements of all the four programming constructs: sequence from year 3, repetition from year 4, selection from year 5 and variables, introduced in year 6, programming A. It offers learners the opportunity to use all of these constructs in a different, but still familiar environment whilst also utilising a physical device - the micro:bit. The unit begins with a simple program which learners build in and test in the programming environment before transferring it to their micro:bit. Learners then take on three new projects in lessons 2, 3 and 4, with each lesson adding more depth. |

# Computing

## Implementation

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# Modular Approach – Knowledge

**Outline scheme of work**

The units in each year group can be taught in any order except for the 2 programming units, where A must be delivered before B.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Technology around us | Digital painting | Digital writing | Grouping data | Moving robots | Animation |
| 2 | IT around us | Digital photography | Making music | Pictograms | Algorithms | Quizzes |
| 3 | Connecting computers | Animations | Desktop publishing | Branching databases | Sequences | Events and actions |
| 4 | The internet | Audio editing | Photo editing | Data logging | Repetition | Repetition in games |
| 5 | Sharing Information | Vector drawing | Video editing | Databases | Selection | Selection in quizzes |
| 6 | Communication | 3D modelling | Web pages | Spreadsheets | Variables | Sensing |

# Computing and the Curriculum

A range of hardware and software are regularly planned into lessons in other areas of the curriculum. Laptops, interactive whiteboards and lightboards are integrated into learning and we are thrilled to introduce iPads more regularly from the Spring term. Frequently used software tools include Microsoft Excel, PowerPoint and Word as well as now familiar video conferencing software such as Teams and Zoom.

Quizzes can be used for elicitation, recall and consolidation both in the wider curriculum through the use of Socrative and within reading levels through Accelerated Reader.

Every child from Year 2 to Year 6 has a Times Tables Rockstars account that they can access at home and school to practice their times tables on any device. There are weekly battles among classes to constantly encourage use. All of the above serve to create a cohort of digitally literate children growing up with technology.

KeyChain Computing introduces a variety of software tools such as Paintz, Scratch, Scratch Jnr and Turtle Academy which can then be revisited across year groups. Teachers have opportunities to plan in wider Computing skills in cross-curricular coverage using any of the above tools or r
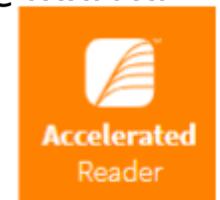
# Cross Curricular links

Many subjects offer an interesting context for learning and applying Computing skills, here are just a few examples:

**Maths**
Pattern recognition, problem solving, data handling, the list goes on!

**English**
Instructional writing goes incredibly well with the teaching of algorithms. Working out how to break something down into steps, gives you the skills you need to write a successful algorithm.

**Science**
The collection and organisation of data play a strong part in both Science and Computing and the subjects really complement one another. Not to mention the process of predicting, testing and reviewing in both subjects.

**D&T**
The NC says that children should "apply their understanding of computing to program, monitor and control their products."
This allows pupils to see their computing skills come to life and the use of micro:bits (Y5 Kapow topic) really come into their own!

**Art**
Not only can pupils apply their Computing skills to create digital art, they can also explore the idea of abstraction; the removal of unnecessary detail, to view things in their simplest form.

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# Computing

# Impact

# Impact

## Computing in EYFS





Challenge 1 - Put these pictures in the correct order to make a jam sandwich
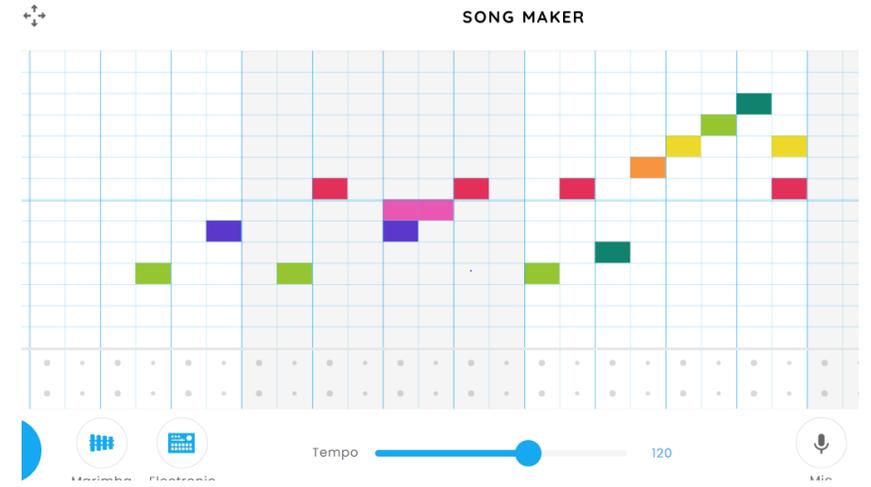


Song Maker – exploring and creating our own music



Early programming - Sequencing events and instructions

# Computing at Laurea[te]





Simple programming skills using a Code – A Pillar and Beebots; inputting algorithms into robots to make them
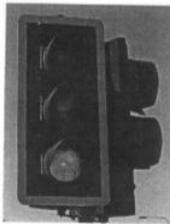
Year 2
Network/
Systems
Internet safety,
how can we
keep ourselves
safe?

# Computing at Laureate

**Impact**



**Activity 2**

### What can you create?

- Think of an object in the classroom which could be labelled

- Think about what shapes you will need to use to draw it

- Create a vector illustration that could be added to a label around the classroom
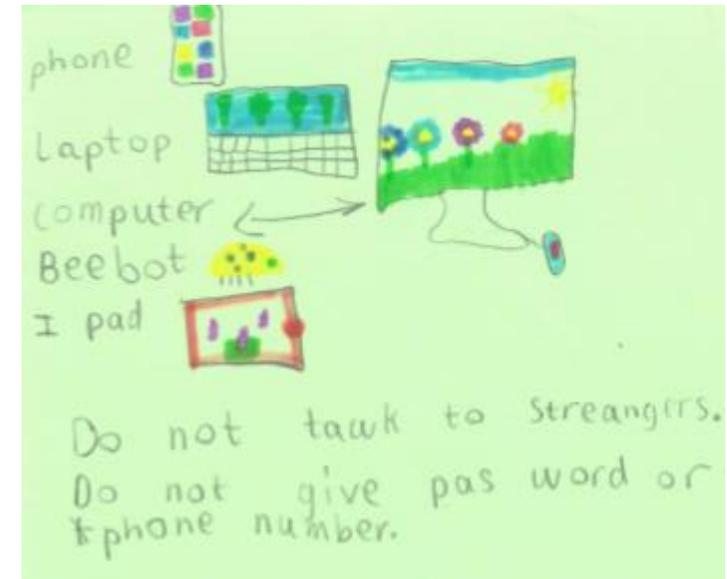
All of these things either are digital devices or use digital devices inside to make them work.

**Activity 2**

### Writing algorithms for squares

Write your algorithm on your activity sheet. Decide whether to annotate the diagram or write the algorithm as a list under the shape.

1. Mark the start position and direction.
2. Include the directions and their lengths, and any turns and degrees needed.
3. Number the instructions.

### Writing algorithms

Write the algorithm for a square, either by using an annotated drawing, or by writing a list of instructions under the shape. Remember to:

- Mark a start position and direction
- Number your steps
- Include values for line lengths and degrees for turns

Scratch projects using Repeat and Forever loops. Children also changed sprites, backgrounds and used variations of event blocks.

## Ongoing Teacher Assessment

Teachers assess pupils throughout each session using the grids below to monitor pupils and inform planning for subsequent sessions. Pupils who are identified as needing support will be supported the following session as appropriate. Pupils working at above expected standard will also be identified and challenged appropriately to extend their learning. Most feedback is verbal and liv

# Computing Subject Monitoring

**Impact**

Subject Leaders use iAbacus as a tool for developing their subject, as seen in this example: