

# Cranbrook Primary School- Progression in Computing



\*Please note that Online Safety is taught whenever possible. Teachers go over the online safety aspect for each unit...please look at the long term plan for more guidance. AT CPS, we teach and model **how to use technology safely and respectfully, keeping personal information private.**

\*All units allow children at CPS **to recognise common uses of information technology beyond school.**

## Computing

### 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
- create and debug simple programs
- use logical reasoning to predict the behaviour of simple programs
- use technology purposefully to create, organise, store, manipulate and retrieve digital content
- recognise common uses of information technology beyond school
- use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

### Key stage 2

Pupils should be taught to:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

## Computing Intent

At Cranbrook Primary School, our aim is to provide a high-quality, engaging and memorable computing education which equips all our pupils for future jobs (and those not thought of yet) in a high demand and niche sector. Our curriculum will teach and build on critical thinking skills based on coding and algorithms using different software and hardware. Computing is embedded across the curriculum within context to support and extend our pupil's knowledge and passion for the subject. Opportunities are created to collect data and gather research information within the topics taught. Through this they will gain a better understanding about the world around them and develop the concept of global citizenship through empathy and aspirations (widening horizons). Pupils will use various applications/programs to display and present their findings - supporting them to become more competent and confident communicators. They will learn how to safely engage with online content, discerning between reliable and unreliable sources. They will also understand what to do and who to talk to if they feel uncomfortable, or unsafe online.

# Cranbrook Primary School- Progression in Computing



## Computing in Nursery

|                               | All About Me/ that help us<br><b>Unit 1- We have confidence</b><br>(recording using iPads)  | Heroes<br><b>Unit 19- We are community members</b><br>(data handling and creating a digital poster/book)   | Join our Joyful Journey<br><b>Unit 5- We can drive</b><br>(photographs and props)  | Lets grow together<br><b>Unit 7- We can exercise</b><br>(data handing)   | Terrific Traditional Tales<br><b>Unit 13- We are digital readers</b><br>(reading digital texts)   | Hunting Magical animals<br><b>Unit 16- We can count</b><br>(moving a programmable toy)   |
|-------------------------------|---|--|--|--|---|--|
| <b>Revised EYFS Framework</b> | Personal, social and emotional development: self-confidence and self-awareness<br><br>The children have the confidence to speak in a familiar group. – EYFS goal  | Understanding the world: people and communities.<br><br>The children talk about past and present events in their own lives and in the lives of family members. They know about similarities and differences between themselves and others, and among families, communities and traditions. | Physical development: moving and handling<br><br>They negotiate space successfully when playing games with other children, adjusting speed or changing direction to avoid obstacles.   | Physical development: health and self-care<br><br>Children know that physical exercise makes an important contribution to keeping healthy.   | Literacy: reading<br><br>The children read and understand simple sentences. They also read some common and irregular words.   | Mathematics: number<br><br>Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number.  |
| <b>Skills</b>                 | <ul style="list-style-type: none"> <li>To use a piece of hardware to make a short recording.</li> <li>Taking a risk, engaging in new experiences, and learning by trial and error.</li> <li>To use and explore cameras and microphones.</li> <li>To record the whole body of a person.</li> </ul> | <ul style="list-style-type: none"> <li>To use the keyboard to type in letters for writing.</li> <li>To practice keyboard skills via online games (see Useful links can be located from SOW)</li> </ul> <p>*To play touch typing games.</p>   | <ul style="list-style-type: none"> <li>To take meaningful photos with a purpose.</li> <li>To enhance the surrounding of an area to make it more engaging.</li> <li>To create signs and symbols using various drawing software...Paint?</li> </ul>            | <ul style="list-style-type: none"> <li>To record a set of simple data created by children within the classroom.</li> <li>*template provided by teacher.</li> <li>To use various hardware Computer/laptop. IWB countdown timer/iPad timer app.</li> </ul> | <ul style="list-style-type: none"> <li>To use and explore the chosen hardware.</li> <li>To use fine motor skills... Early mouse/finger control activities</li> <li>To know how to open a folder and application.</li> </ul> | <ul style="list-style-type: none"> <li>To explore and play with a programmable toy, working out how to make it move.</li> <li>To use algorithms to make the toy move.</li> <li>To write simple algorithms (arrows) for a toy to follow.</li> </ul> |
| <b>Knowledge</b>              | <ul style="list-style-type: none"> <li>To understand how to record themselves speaking, to listen to the recording, reflect on how clear the recording is and re-record if necessary.</li> <li>To understand how technology is used beyond the school.</li> </ul>                                 | <ul style="list-style-type: none"> <li>To understand how to record and gather information using a video software</li> <li>To think about what is relevant information for a chosen topic.</li> <li>To begin to understand how to play a game safely.</li> </ul>                            | <ul style="list-style-type: none"> <li>To understand how some software can be used to create symbols and signs.</li> <li>To understand how to take a picture.</li> <li>To think about photo frame and capturing a part of the body-torso and head</li> </ul> | <ul style="list-style-type: none"> <li>To understand how to use/read a set of data</li> <li>To acknowledge the importance of recording data in a written way.</li> </ul>   | <ul style="list-style-type: none"> <li>To understand how technology is used beyond the school.</li> <li>To understand how a device can store and retrieve a piece of document/data.</li> </ul>                              | <ul style="list-style-type: none"> <li>To understand how a piece of hardware needs power to switch on.</li> <li>To acknowledge that a button can be used to switch a device on, or off.</li> </ul>   |
| <b>Vocabulary</b>             | Record/ sound/ record/ iPad/ hardware/ software/ algorithm/ team work   | Video/ record/ sound/ hardware/ software/ algorithm  | Signs/ symbols/ software/ pictures/ photo/ background/ surrounding/ props  | Data/ dataset/ information/ primary data/ secondary data/ algorithm  | Digital/ online safety/ hardware/ software/ upload/ download/ iPad/ laptop  | Instructions, step-by-step   |

# Cranbrook Primary School- Progression in Computing



## Computing in Reception

|                               | <b>MAGNIFICENT ME</b><br><b>Unit 9- We can listen</b><br>(communicate)<br><b>Unit 10- We can understand instructions</b><br>(following algorithms)   | <b>MAGNIFICENT ME</b><br><b>Unit 8: WE are healthy</b><br>(research and create digital healthy plate)<br><b>Unit 7- We can exercise</b><br>(data handling)   | <b>EARTH EXPLORERS</b><br><b>Unit 12- We are talkers</b><br>(Videoing and recording)<br><b>Unit 19- We are community members</b><br>(data handling and creating a digital poster/book)   | <b>EARTH EXPLORERS</b><br><b>Unit 18- We are shape makers</b><br><br>(create shapes using 2paint/ paint app)   | <b>AMAZING ANIMALS</b><br><b>Unit 1- We have confidence</b><br>(recording using iPads)  | <b>AMAZING ANIMALS</b><br><b>Unit 4- We have feelings</b><br>(photo and video presentation about feelings)   |
|-------------------------------|--|--|--|--|---|--|
| <b>Revised EYFS Framework</b> | Unit 9: Communication and language: listening and attention. The children listen attentively in a range of situations. They give their attention to what others say and respond appropriately while engaged in another activity<br><br>Unit 10: Communication and language. The children follow instructions involving several ideas or actions. They answer 'how' and 'why' questions about their experiences | Unit 8: Physical development: health and self-care Children know the importance for good health of physical exercise and a healthy diet, and talk about ways to keep healthy and safe.<br><br>Unit 7: Physical development: health and self-care Children know that physical exercise makes an important contribution to keeping healthy.                                | Unit 12- Communication and language: speaking The children use talk to organise, sequence and clarify thinking, ideas, feelings and events. They express themselves effectively, showing awareness of listeners' needs.<br><br>Unit 19- The children talk about past and present events in their own lives and in the lives of family members. They know about similarities and differences between themselves and others, and among families, communities and traditions. | Mathematics: shape, space and measure.<br><br>The children use everyday language to talk about size and position. They explore characteristics of everyday objects and shapes and use mathematical language to describe them.  | Personal, social and emotional development: self-confidence and self-awareness<br><br>The children have the confidence to speak in a familiar group. – EYFS goal  | Personal social and emotional development: managing feelings and behaviour Children talk about how they and others show feelings, talk about their own and others' behaviour.  |
| <b>Skills</b>                 | <ul style="list-style-type: none"> <li>Unit 9: To use and explore a piece of hardware such as: Walkie talkies/ telephone/radio.</li> <li>Unit 9: To take a photo of the environment.</li> <li>Unit 9: To look at video clips and discuss what is a video clip.</li> <li>Unit 10: To use switches and buttons to control things, both in the setting and at home- cause and effect.</li> </ul>                  | <ul style="list-style-type: none"> <li>Unit 8: To use different hardware such as: computers and laptops with headsets.</li> <li>Unit 8: To write words and labels on-screen</li> <li>Unit 7: To record a set of data created by children within the classroom.</li> <li>Unit 7: To use various hardware: Computer/laptop. IWB countdown timer/iPad timer app.</li> </ul> | <ul style="list-style-type: none"> <li>Unit 12: To explore and use video camera app to develop confidence in recording video clips</li> <li>Unit 12: To watch recorded video clips on the computer.</li> <li>Unit 19: To use the keyboard to type in letters for writing.</li> </ul>   | <ul style="list-style-type: none"> <li>To use and explore different types of hardware- laptops.</li> <li>To use software such as painting apps... or 2draw to create geometrical shapes to make animals, vehicles, monsters, etc.</li> <li>To use a mouse to draw a shape- improving fine motor skills.</li> </ul> | <ul style="list-style-type: none"> <li>To use a piece of hardware to make a short recording.</li> <li>Taking a risk, engaging in new experiences, and learning by trial and error.</li> <li>To use and explore cameras and microphones.</li> <li>To record the whole body of a person.</li> </ul> | <ul style="list-style-type: none"> <li>To use a camera independently and confidently.</li> <li>To create a video presentation about their feelings and emotions using a video app.</li> <li>To use an iPad (hardware) to make a short video presentation.</li> </ul> |
| <b>Knowledge</b>              | <ul style="list-style-type: none"> <li>Unit 9: To understand how technology/ devices can be used to capture <i>a moment</i>.</li> <li>Unit 9: To understand and express why technology and photos are important.</li> <li>Unit 9 and 10: To recognise that computing can be used beyond the school.</li> </ul>   | <ul style="list-style-type: none"> <li>Unit 8: To understand that the internet can be used to gather information about a topic.</li> <li>Unit 7: To understand how to use a set of data and record it in a written way</li> </ul> <p>*To understand how personal information should be kept private.</p>   | <ul style="list-style-type: none"> <li>Unit 12: To understand that devices can be used to store and download data/document.</li> <li>Unit 12: To understand the process of recording a video.</li> <li>Unit 19: To understand how to record and gather information using a video software</li> <li>Unit 19: To think about what is relevant information.</li> </ul>  | <ul style="list-style-type: none"> <li>To understand that a software can be used to create different types of shapes.</li> <li>To recognise that computing can be used within other subjects.</li> </ul>   | <ul style="list-style-type: none"> <li>To understand how to record themselves speaking, to listen to the recording, reflect on how clear the recording is and re-record if necessary.</li> <li>To understand how technology is used beyond the school.</li> </ul>                                 | <ul style="list-style-type: none"> <li>To understand how to record themselves speaking, to listen to the recording, reflect on how clear the recording is and re-record if necessary.</li> <li>To understand how technology is used beyond the school.</li> </ul>    |
| <b>Vocabulary</b>             | Unit 9: photos/ iPad/ hardware/ app/ video clip/ recording<br>Unit 10: instructions/ algorithms/ record/ software/ hardware/ team work/  | Unit 8: laptop/ headset/ screen (monitor)/ hardware/ search engine/ internet<br>Unit 7: Data/ dataset/ information/ primary data/ secondary data/ algorithm  | Unit 12: digital images/ camera/ keyboard/ hardware/ software/ touch typing/<br>Unit 19: video clips/ store/ data/ download/ upload/ data  | Paint/ 2draw/ shapes/ software/ hardware/ mouse/ touchscreen/ algorithm/ steps   | Record/ sound/ record/ iPad/ hardware/ software/ algorithm/ team work   | video clips/ store/ data/ download/ upload/ data/ video presentation/  |

## Year 1 Computing Milestone 1

|            | <u>1.1 We are Treasure Hunters</u><br>Solving problems using programmable toys  | <u>1.2 We are TV Chefs – video</u><br>Filming the steps of a recipe   | <u>1.3 We are digital artists</u><br>Creating work inspired by great artists   |
|------------|---|---|--|
| Skills     | <ul style="list-style-type: none"> <li>To develop and record sequences of instructions as an algorithm.</li> <li>To <b>program a robot</b> to follow their algorithm.</li> <li>To use logical reasoning to predict how their programs will work and determine behaviour of simple programs.</li> <li>To <b>create</b> and debug simple programs.</li> </ul>                               | <ul style="list-style-type: none"> <li>To break down a process into simple, clear steps (<b>an algorithm</b>)</li> <li>To use different features of a <b>video camera</b>.</li> <li>To use a video camera to <b>capture moving images</b>.</li> <li>To <b>edit</b> a video to include an <b>audio</b> commentary.</li> <li>To develop <b>collaboration skills</b>.</li> <li>To <b>discuss their work and think about how it could be improved</b>.</li> </ul> | <ul style="list-style-type: none"> <li>To <b>select and set brushes and colours</b>.</li> <li>To <b>create artwork</b> in a range of styles on iPads</li> <li>To use the <b>undo function</b> if they make mistakes, and to encourage experimentation.</li> <li>To use <b>multiple layers</b> in their art.</li> <li>To transform layers.</li> <li>To <b>paint on top of photographs</b>.</li> </ul> |
| Knowledge  | <ul style="list-style-type: none"> <li>To understand what <b>algorithms</b> are; how they are implemented as programs on <b>digital devices</b></li> <li>To understand that programs execute algorithms by <b>following precise and unambiguous instructions</b>.</li> <li>To know that a programmable robot can be controlled by inputting a <b>sequence of instructions</b>.</li> </ul> | <ul style="list-style-type: none"> <li>To understand what algorithms are and how they can be used in different aspects of <b>digital media</b>.</li> <li>To use technology purposefully to <b>create, organise, store, manipulate and retrieve digital content</b>.</li> <li>To <b>recognise common uses of information technology beyond school</b>.</li> </ul>  | <ul style="list-style-type: none"> <li>To increase knowledge on using technology purposefully <b>to create, organise, store, manipulate and retrieve digital content</b>.</li> <li>To <b>recognise common uses of information technology beyond school</b>.</li> </ul>   |
| Software   | <ul style="list-style-type: none"> <li><b>Blue-Bot app</b></li> </ul> <p>Alternatives:</p> <ul style="list-style-type: none"> <li>Programming interface for alternative toys</li> <li><b>Scratch Bee-Bot emulator</b></li> </ul>  | Camera and <b>iMovie apps</b> on the iPad   | <b>2simple</b> to draw or paint/ paint 3D  |
| Hardware   | <b>Blue-Bot</b> (programmable toy) or you can use bee-bots  | <b>iPads</b> , ideally with <b>tripods and clamps</b>   | Laptop/computer  |
| Vocabulary | algorithm/ bug/ computer/ debug/ program/ robot   | Abstraction/ algorithm/ audio/ decomposition/ edit/ frame/ narration/ storyboard/ video camera  | Analogue/ bitmap/digital/ effect/ layer/ pixel/ stylus/ transform/ undo/ zoom  |

## Year 2 Computing Milestone 1

|            | <u>2.1 We are Astronauts</u><br>Programming on screen using <i>ScratchJr</i>  | <u>2.2 We are Game Testers</u><br>Working out the rules for games  | <u>2.4 We are Researchers</u><br>Researching a topic  |
|------------|---|--|---|
| Skills     | <ul style="list-style-type: none"> <li>To plan a sequence of instructions to move sprites using <i>ScratchJr</i>.</li> <li>To <b>create, test and debug</b> programs for <b>sprites</b> using ScratchJr.</li> <li>To work with <b>input and output</b> using ScratchJr.</li> <li>To use repetition in their programs.</li> <li>To <b>design costumes for sprites</b>.</li> <li>To use logical reasoning to predict how their <b>programs will work and determine behaviour of simple programs</b>.</li> </ul> | <ul style="list-style-type: none"> <li>To observe and describe carefully what happens in computer games.</li> <li>To use logical reasoning to make predictions of what a program will do and <b>test these predictions</b>.</li> <li>To <b>think critically</b> about computer games and their use.</li> <li>To create <b>sequences of instructions</b> (algorithms) for a virtual robot.</li> <li>To <b>solve (debug)</b> a problem within a game.</li> </ul> | <ul style="list-style-type: none"> <li>To develop <b>collaboration skills</b> through working as part of a group.</li> <li>To develop <b>research skills</b> through searching for information on the Internet.</li> <li>To think through <b>privacy implications</b> of their use of <b>search engines</b>.</li> <li>To be more <b>discerning in evaluating</b> online information.</li> <li>To improve <b>note-taking skills</b> through the use of <b>mind mapping</b>.</li> <li>To <b>develop presentation</b> skills through creating and delivering a short multimedia presentation.</li> </ul> |
| Knowledge  | <ul style="list-style-type: none"> <li>To understand <b>what algorithms are; how they are implemented as programs on digital devices</b>.</li> <li>To understand that programs execute algorithms by <b>following precise and unambiguous instructions</b>.</li> </ul>  | <ul style="list-style-type: none"> <li>To understand what algorithms are; how they are implemented as programs on digital devices.</li> <li>To understand that programs execute algorithms by following precise and unambiguous instructions.</li> <li>To be aware of how to use <b>games safely</b> and in balance with other activities.</li> <li>To work out <b>strategies for playing a game well</b>.</li> </ul>  | <ul style="list-style-type: none"> <li>To know how to use <b>technology purposefully to create, organise, store, manipulate and retrieve digital content</b>.</li> <li>To <b>recognise common uses of information technology beyond school</b>.</li> <li>To understand how to use technology <b>safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns</b> about content or contact on the Internet or other online technologies.</li> </ul>  |
| Software   | <ul style="list-style-type: none"> <li><b>ScratchJr</b></li> <li>*Use blue-bots to recap algorithms (memory task)</li> </ul>  | <p>Main:</p> <ul style="list-style-type: none"> <li>Scratch</li> <li>FixTheFactory</li> </ul>  | <ul style="list-style-type: none"> <li><b>Popplet</b></li> <li><b>Google Slides</b></li> <li><b>Google custom</b></li> <li><b>Wikipedia</b></li> </ul>  |
| Hardware   | Laptop/desktop/Chromebook/ Computers/ ipad<br>*Blue-bots for memory task  | Laptop/desktop/Chromebook/ Computers/ iPads  | Laptop/desktop/Chromebook/ Computers/ iPads   |
| Vocabulary | abstraction/ algorithm/ bug/ code/ debug/ event/ input/output/ program/repetition/ scratch/ sprite  | Sprite / algorithm/ computational thinking/ input/ output/ patten recognition/ remix/ reption/ scratch/ source code  | Google/ google custom search/ mind map/ presentation. Search engine/ Wikipedia  |



## Year 3 Computing Milestone 2

|            | <u>3.1 We are Programmers</u><br>Programming an <b>animation</b> using <i>Scratch</i>   | <u>3.2 We are Bug Fixers</u><br>Finding and correcting bugs  | <u>3.3 We are Presenters</u><br><i>Videoring a presentation</i> against a <b>green screen</b>   |
|------------|---|--|---|
| Skills     | <ul style="list-style-type: none"> <li>To use <b>logical reasoning to detect and correct errors</b> in algorithms and programs.</li> <li>To plan and create an algorithm for an animated scene in the form of a Storyboard.</li> <li><b>To write a program using Scratch to create the animation, including characters, dialogue, costumes, backdrops and sound.</b></li> <li>To <b>review their animation programs and correct bugs</b> within their algorithm.</li> </ul> | <ul style="list-style-type: none"> <li>To <b>review and debug</b> given programs that accomplish specific goals using Scratch.</li> <li>To use <b>sequence, selection, and repetition in programs.</b></li> <li>To work with variables and various forms of input and output.</li> </ul> | <ul style="list-style-type: none"> <li>To develop their <b>web-based research skills.</b></li> <li>To <b>structure, prepare and deliver a talk about a given topic or subtopic studied in another curriculum area.</b></li> <li>To record a piece to camera.</li> <li>To <b>edit a movie using static images and green screen footage.</b></li> <li>To give <b>constructive, critical feedback</b> on recorded presentations</li> <li>To understand how to design and create a range of programs, systems and content that accomplish given goals, <b>including collecting, analysing, evaluating and presenting information</b></li> </ul> |
| Knowledge  | <ul style="list-style-type: none"> <li>To understand how to design, write and debug programs that accomplish specific goals.</li> <li>To understand how to solve problems by <b>decomposing algorithm</b> into smaller parts.</li> <li>To develop knowledge on how to use <b>sequence in programs; working with variables and various forms of output.</b></li> </ul>   | <ul style="list-style-type: none"> <li>To increase knowledge and understanding of Scratch</li> <li>To recognise a <b>number of common types of bugs in software.</b></li> <li>To understand how to solve problems by <b>decomposing algorithm</b> into smaller parts.</li> </ul>         | <ul style="list-style-type: none"> <li>To learn how to select, use and combine a variety of software (<b>including Internet services</b>) on a range of digital devices.</li> <li>To use technology <b>safely, respectfully and responsibly.</b></li> </ul>   |
| Software   | <ul style="list-style-type: none"> <li>Scratch</li> <li>*Use ScratchJr to recap algorithms (memory task)</li> </ul>   | <ul style="list-style-type: none"> <li>Scratch</li> </ul>  | <ul style="list-style-type: none"> <li>Popplet</li> <li>iMovie</li> </ul>   |
| Hardware   | Laptop/desktop/Chromebook/ Computers  | Laptop/desktop/Chromebook/ Computers   | iPad  |
| Vocabulary | Abstraction/ algorithm/ bug/ debug/ code/ debug/ decomposition/ motion/ sound/ decomposition  | Abstraction/ algorithm/ bug/ debug/ code/ debug/ decomposition/ input/ logical reasoning/ output/ parallel processing/program/ repetition/ scratch/ sequence/ sprite/ variable   | Camera roll/ colour value/ creative commons/ green screen/ pixel/ resolution/ rushes/ search engine   |

# Cranbrook Primary School- Progression in Computing



## Year 4 Computing Milestone 2

|            | <u>4.1 We are Software developers</u> Developing a <b>simple educational game</b>  | <u>4.6 We are Meteorologist</u> Presenting the weather   | <u>4.4 We are <i>bloggers</i></u> Sharing experiences and opinions  |
|------------|--|--|---|
| Skills     | <ul style="list-style-type: none"> <li>To design, write and debug programs that accomplish specific goals.</li> <li>To use <b>sequence, selection, and repetition</b> in programs.</li> <li>To work with variables and various forms of input and output.</li> <li>To use logical reasoning to explain how some simple algorithms work and to detect and debug errors in algorithms and programs.</li> <li>To develop an educational computer game using <b>selection and repetition</b>.</li> </ul> | <ul style="list-style-type: none"> <li>To use computer-based data logging to automate the recording of some weather data.</li> <li>To use <b>spreadsheets to create charts</b>.</li> <li>To analyse data, explore inconsistencies in data and make predictions.</li> <li>To practise using <b>presentation and video software</b>.</li> <li>To design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data.</li> </ul> | <ul style="list-style-type: none"> <li>To create a sequence of <b>blog posts</b> on a theme.</li> <li>To add additional media to their post- images</li> <li>To <b>comment on the posts</b> of others.</li> <li>To develop a critical, reflective view of a range of media, including text.</li> <li>To design and create a range of content that accomplish given goals.</li> </ul>  |
| Knowledge  | <ul style="list-style-type: none"> <li>To begin to develop an understanding for the <b>use of variables</b>.</li> <li>To recognise the importance of <b>user interface design</b>, including consideration of input and output.</li> </ul>   | <ul style="list-style-type: none"> <li>To understand <b>different measurement techniques/equipment</b> for weather.</li> <li>Work with variables and various forms of input and output.</li> <li>To use search technologies effectively, appreciate <b>how results are selected and ranked, and be discerning in evaluating digital content</b>.</li> <li>To select, use and combine a variety of software (including <b>Internet services</b>) on a range of digital devices.</li> </ul>                          | <ul style="list-style-type: none"> <li>To become familiar with blogs as a medium and a genre of writing.</li> <li>To understand <b>computer networks</b> including the Internet; how they can provide multiple services, such as the World Wide Web; and the opportunities they offer for communication and collaboration.</li> <li>To understand the use of a variety of software (<b>including Internet services</b>) on a range of digital devices.</li> </ul> |
| Software   | <ul style="list-style-type: none"> <li>Scratch</li> </ul>  | <ul style="list-style-type: none"> <li><b>Google Sheets and Google Slides</b></li> <li><b>Microsoft Excel &amp; Microsoft PowerPoint</b></li> </ul>  | <b>J2bloggy</b>   |
| Hardware   | Laptop/desktop/Chromebook/ Computers   | Laptop/desktop/Chromebook/ Computers/ data loggers   | Laptop/desktop/Chromebook/ Computers  |
| Vocabulary | algorithm/ bug/ debug/ input/ output/ repeat loop/ repetition/ scratch/ sequence/ sprite/ variable/ script/ decomposition  | Analogue/ data/ dataset/ digital/ field/ filter/ input/ interface/ record/ sensor/ table   | Creative commons/ hyperlinks/ hypertext mark-up language (HTML)/ Web server/ uniform resource locator (URL)/ web server   |



# Cranbrook Primary School- Progression in Computing



## Year 5 Computing Milestone 3

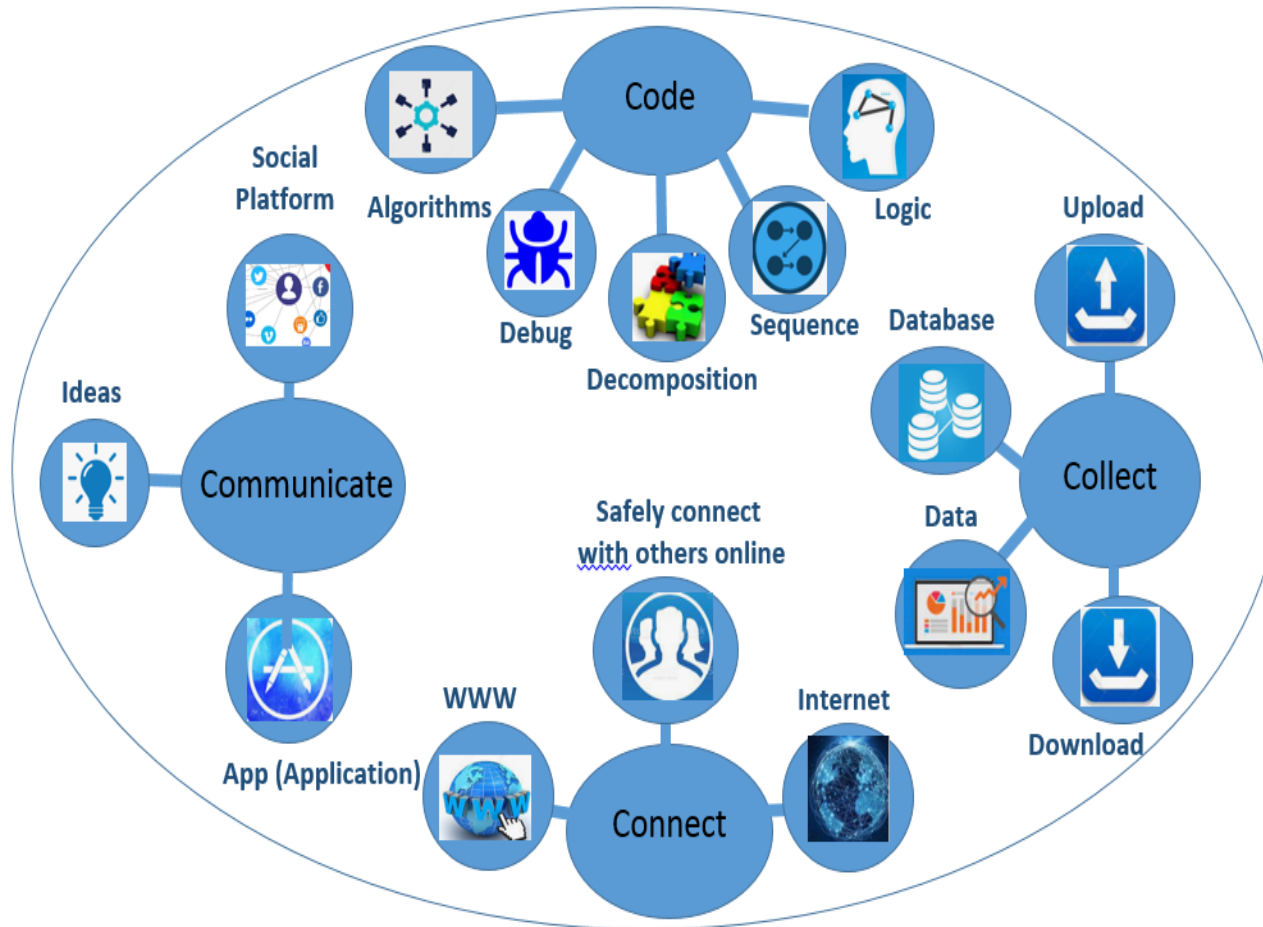
|            | <u>5.1 We are Game Developers</u><br>Developing an <i>interactive game</i>   | <u>5.2 We are Cryptographers</u><br>Cracking codes   | <u>5.3 We are Architects</u><br>Creating a virtual space  |
|------------|--|--|---|
| Skills     | <ul style="list-style-type: none"> <li>To create <b>original artwork (sprites and backgrounds)</b> and sound for a game</li> <li>To design and create a computer program for a computer game, which uses sequence, selection, repetition and variables</li> <li>To detect and correct errors in their computer game</li> <li>To use <b>iterative development techniques</b> (making and testing a series of small changes) to improve their game.</li> </ul> | <ul style="list-style-type: none"> <li>To be familiar with <b>semaphore and Morse Code.</b></li> <li>To understand the need for private information to be <b>encrypted.</b></li> <li>To <b>encrypt and decrypt messages</b> in simple ciphers.</li> <li>To appreciate the need to use <b>complex passwords</b> and to keep them secure.</li> <li>To have some understanding of how <b>encryption works on the Internet.</b></li> </ul> | <ul style="list-style-type: none"> <li>To develop <b>familiarity with a simple CAD (computer-aided design) tool.</b></li> <li>To develop spatial awareness by exploring.</li> <li>To create a <b>3-D virtual</b> environment using a software</li> <li>To develop <b>greater aesthetic awareness.</b></li> <li>To 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 information.</li> </ul> |
| Knowledge  | <ul style="list-style-type: none"> <li>To design, write and debug programs that</li> <li>accomplish specific goals, including controlling or simulating physical systems and solving problems by decomposing them into smaller parts.</li> <li>To widen their knowledge about the use of variables and various forms of input and output.</li> <li>To increase their knowledge on how some simple algorithms work.</li> </ul>                                | <ul style="list-style-type: none"> <li>To use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithm and programs.</li> <li>To understand computer network <b>including the Internet; how they can provide multiple services, such as the World Wide Web;</b> and the opportunities they offer for communication and collaboration.</li> </ul>                                     | <ul style="list-style-type: none"> <li>To use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.</li> <li>To understand the work of <b>architects, designers and engineers working in 3-D.</b></li> </ul>  |
| Software   | Scratch  | Scratch  | <b>SketchUp</b>   |
| Hardware   | Laptop/desktop/Chromebook/ Computers   | Laptop/desktop/Chromebook/ Computers   | Laptop/desktop/Chromebook/ Computers  |
| Vocabulary | Algorithm/ background/ bug/ code/ debug/ logical reasoning/ program/ scratch/ sprite/ script/ decomposition  | Cipher/ codes/ cryptanalysis/ decrypt/ encode/ decode/ encrypt/ message/ Morse code/ semaphore/ transmit   | Computer-aided design (CAD)/ creative commons/ photorealistic/ render   |

## Year 6 Computing Milestone 3

|                   | <u>6.2 We are computational thinkers</u><br>Mastering algorithms for searching, sorting and maths  | <u>6.5 We are advertisers</u><br>Creating a <i>short television advert</i>  | <u>6.1 We are toy makers</u><br><i>Coding and physical computing</i>  |
|-------------------|--|---|---|
| <b>Skills</b>     | <ul style="list-style-type: none"> <li>To use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</li> <li>To design, write and debug programs that accomplish specific goals.</li> <li>To use sequence, selection and repetition in programs.</li> <li>To work with variables and various forms of input and output.</li> </ul> | <ul style="list-style-type: none"> <li>To create storyboard an effective advert for a cause/topic.</li> <li>To work collaboratively to <b>shoot original footage and source additional content.</b></li> <li>To acknowledge <b>intellectual property rights.</b></li> <li>To work <b>collaboratively to edit</b> the assembled content to make an effective advert.</li> <li>To select, use and combine a variety of software (<b>including Internet services</b>) 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.</li> </ul> | <ul style="list-style-type: none"> <li>To <b>generate and evaluate designs</b> in response to a brief</li> <li>To plan a complex project by decomposing it into smaller parts</li> <li>To work with <b>physical components</b> of a system to design and <b>write a program for an embedded system</b></li> <li>To <b>use criteria to provide others with feedback</b> on their work.</li> <li>To use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</li> <li>To design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems.</li> <li>To use sequence, selection, and repetition in programs.</li> <li>To work with various forms of input and output.</li> </ul> |
| <b>Knowledge</b>  | <ul style="list-style-type: none"> <li>To understand how some key algorithms can be expressed as programs</li> <li>To understand that <b>some algorithms are more efficient than others for the same problem.</b></li> <li>To understand <b>common algorithms for searching and sorting a list.</b></li> </ul>   | <ul style="list-style-type: none"> <li>To use <b>search technologies effectively</b>, appreciate how results are selected and ranked, and be discerning in evaluating digital content.</li> <li>To <b>think critically about how video is used to promote a cause/topic.</b></li> </ul>   | <ul style="list-style-type: none"> <li>To understand how computers <b>use stored programs to connect input to output</b></li> <li>To consolidate knowledge about how <b>software works with hardware and vice versa.</b></li> </ul>   |
| <b>Software</b>   | <b>Google Maps</b><br>● Scratch  | iMovie or any recording and editing app   | <b>MakeCode</b>   |
| <b>Hardware</b>   | Laptop/desktop/Chromebook/ Computers   | iPAd or camera/ or tablet   | Laptop/desktop/Chromebook/ Computers<br><b>*Micro- bits- very important.</b>  |
| <b>Vocabulary</b> | Abstraction/ algorithm/ binary search/ decomposition/ graph/ greedy algorithm/ linear search/ quicksort/ search/ search algorithm/ selection sort/ sort  | Creative commons/ export/ final cut/ rough cut/ rushes/ storyboard  | Accelerometer/ Bluetooth/ controller/ decomposition/ edge connector/ embedded system/ input/ output/ interactive/ light emitted diode (LED)/ makecode/ simulator/ system  |

## Strengthen the schema with knowledge

Each threshold concept has its own facets of knowledge which help to strengthen the schema



### Definition of the Big Ideas (threshold Concepts):

#### **Code**

This concept involves developing an understanding of **instructions, logic and sequences**.

#### **Connect**

This concept involves developing an understanding of how to **safely connect with others** using different gaming and social media platforms.

#### **Communicate**

This concept involves using apps to **communicate one's ideas/opinions**.

#### **Collect**

This concept involves *developing an understanding of **databases and their uses***.

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## Knowledge categories explained:

| Code   | Connect   | Communicate  | Collect  |
|--|---|--|--|
| <ul style="list-style-type: none"> <li>• Algorithms- Creating steps and rules</li> <li>• Debug- Finding and fixing errors</li> <li>• Decomposition- Breaking the algorithm(s) into smaller parts</li> <li>• Sequence- Arranging for algorithms and programs in a particular order.</li> <li>• Logic- Predicting and analysing variable/outcomes and codes</li> </ul> | <ul style="list-style-type: none"> <li>• Safely connecting with others- To connect with other using different platforms using online safety guidance.</li> <li>• World Wide Web (WWW)- The <i>World Wide Web</i>—commonly referred to as <b>WWW, W3, or the Web</b>—is an interconnected system of public webpages accessible through the <u>Internet</u>. The Web is not the same as the Internet: the Web is one of many applications built on top of the Internet.</li> <li>• Internet- The Internet (or internet) is the global system of interconnected computer networks that uses the Internet protocol suite (TCP/IP) to communicate between networks and devices.</li> </ul> | <ul style="list-style-type: none"> <li>• Ideas – a formulated thought and/or opinion</li> <li>• Apps (applications) – an <b>app</b> is a type of software that allows you to <b>perform specific tasks</b>. Applications for desktop or laptop computers are sometimes called <b>desktop applications</b>, while those for mobile devices are called <b>mobile apps</b>.</li> <li>• A <b>social platform</b> is a web-based technology that enables the development, deployment and management of social media solutions and services. It provides the ability to create social media websites and services with complete social media network functionality.</li> </ul> | <ul style="list-style-type: none"> <li>• Database- A database is an <b>organised collection of structured information, or data</b>, typically stored electronically in a computer system. A database is usually controlled by a database management system (DBMS). Together, the data and the DBMS, along with the applications that are associated with them, are referred to as a database system, often shortened to just database.</li> <li>• Data- <b>structured set of numbers</b>, possibly representing digitised text, images, sound or video, which can be processed or transmitted by a computer; also used for numerical (quantitative) information.</li> <li>• Upload- <b>To transfer</b> (something, such as data or files) from a computer or other digital device to the memory of another device (such as a larger or remote computer) especially <b>via the Internet</b>.</li> <li>• Download- Downloading is the transmission of a file or <u>data</u> <b>from one computer to another</b> over a network, usually from a larger <u>server</u> to a user device. <i>Download</i> can refer to the general transfer of data or to transferring a specific file.</li> </ul> |

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## Online Safety for each unit-

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| <p>Year 1</p> | <p><b><u>We are Treasure Hunters</u></b><br/>Pupils learn to use simple programmable toys safely and sensibly, as well as showing respect for the work of their peers. Web access is supervised and safe practices are encouraged. Similarly, any filming is done with appropriate consent and assent.</p> | <p><b><u>We are TV Chefs – video</u></b><br/>Pupils learn how to use digital video cameras safely and to show respect to those they are filming, including recognising the need for consent and assent. The importance of not sharing videos more widely than is appropriate is considered, as is the need to exclude information that might identify individuals from video recordings. When using the web, pupils learn to turn off the screen (or turn over the tablet) and tell their teacher if they encounter material that concerns them. Pupils also start to learn about copyright, recognising that they own the copyright in their original work and that this cannot be published or copied without their permission.</p>   | <p><b><u>We are digital artists</u></b><br/>Pupils learn that that filters should be in place when searching for images on the web. Internet access is supervised and safe practices are encouraged. Pupils learn that they own the intellectual property in their work and their parents’ or carers’ consent is needed to publish this. The school may address this through a letter securing parental consent on a number of matters. Pupils learn that they should provide positive, constructive feedback to one another on their work, establishing from an early age the value of commenting positively on work in digital media.</p> |
| <p>Year 2</p> | <p><b><u>We are Astronauts</u></b><br/>Remind parents/carers about their responsibility to monitor their children’s use of technology and advise them to set sensible limits on the amount of screen time they have.</p>   | <p><b><u>We are Game Testers</u></b><br/>Although the games mentioned in this unit are appropriate for pupils in Year 2, there are concerns about the violent nature of some games. Choosing games wisely, including observing PEGI age restrictions and playing in moderation, are aspects of the safe and respectful use of technology that pupils learn about in this unit. The Scratch online community is generally a safe, well moderated space, but if pupils encounter content or comments which cause distress, make sure they know what to do: typically turn off the screen/ turn over the tablet over and let an adult know straight away. Content and comments on the Scratch site can be flagged as inappropriate to the moderators. This provides an opportunity to learn about where to go for help and support when they have concerns about content or contact.</p> | <p><b><u>We are Researchers</u></b><br/>Pupils learn about Internet filters and Safe search, and how to stay safe while researching online. They are encouraged to think about whether the information they read online is reliable, and develop some strategies for being able to check. They show respect for others’ ideas and intellectual property by using Creative Commons licensed images and crediting their sources.</p>  |

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| Year 3 | <p><b><u>We are Programmers</u></b></p> <p>Pupils need to consider copyright when sourcing images for their programs and uploading their own work to the Scratch community site. Searching for content for programs or viewing others' cartoons also offers an opportunity to develop safe search habits. Exploring online animation galleries may expose pupils to inappropriate content. Talk about what to do if they see something inappropriate – turn their iPads over (or turn screens off/close laptop lids) and tell a teacher/adult. If the pupils participate in the Scratch community, they need to think about what information they can share and how to participate positively in an online community, as well as obtaining parental permission.</p> | <p><b><u>We are Bug Fixers</u></b></p> <p>Pupils could consider the implications of bugs in software. Participating in the Scratch community would enable the pupils to help others with their projects as well as allowing them to receive help. If pupils participate in the Scratch community, they need to think about what information they can share and how to participate positively in an online community, as well as obtaining parental permission. If pupils upload screencasts of their solutions, make sure you take the usual precautions to protect their identity.</p> | <p><b><u>We are Presenters</u></b></p> <p>Pupils should know what to do if they encounter inappropriate images or other content while searching online. Pupils should respect the intellectual property of others. Show them how they can restrict their search to Creative Commons licensed content. In filming one another, the pupils need to ensure that the appropriate permission has been obtained, and that they act respectfully and responsibly when filming, editing and presenting their work. The pupils should think through the implications of videos being made available on the school network or more widely via the Internet. They should discuss why schools and other organisations have strict policies over filming.</p> |
| Year 4 | <p><b><u>We are Software developers</u></b></p> <p>Pupils need to consider copyright when sourcing images or media for their programs and/or uploading their own work to the Scratch community site. Searching for content for their programs or viewing others' games also offers an opportunity to develop safe search habits. If pupils participate in the Scratch community, they need to think about what information they can share and how to participate positively in an online community, as well as obtaining parental permission.</p>   | <p><b><u>We are Meteorologist</u></b></p> <p>Pupils consider the importance of obtaining and using accurate data for any information-processing work. If pupils film one another, they need to ensure appropriate permission is obtained and that recordings are made, edited and shown in safe, respectful and responsible ways. Pupils should think carefully about the implications of uploading their films to the school network or to the web</p>   | <p><b><u>We are bloggers</u></b></p> <p>Pupils write content for their own or a shared blog, thinking carefully about what can be appropriately shared online. They consider issues of copyright and digital footprint as well as what constitutes acceptable behaviour when commenting on others' blog posts. Pupils also think about the importance of creating high-quality, online content and become more discerning in evaluating content as they review others' blogs. If the pupils' blogs are publicly accessible, it is important that any comments are moderated by their teacher.</p>  |

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| <p>Year 5</p> | <p><b><u>We are Game Developers</u></b><br/>                 Pupils need to consider copyright when sourcing images or media for their games and uploading their own work to the Scratch community site. Searching for content for their games or viewing others' games also offers an opportunity to develop safe search habits. If the pupils participate in the Scratch community, they need to think about what information they can share and how to participate positively in an online community, as well as obtaining parental permission. Pupils might also consider some personal implications of playing games, perhaps including violent, costly or addictive computer games.</p> | <p><b><u>We are Cryptographers</u></b><br/>                 Pupils learn how information can be communicated in secret over open channels, including the internet, using cryptography. They learn about the public key system used to sign and encrypt content on the web and how they can check the security certificates of encrypted websites. They learn about the importance of password security for online identity and consider what makes a secure password.</p>  | <p><b><u>We are Architects</u></b><br/>                 Pupils should observe good practice when searching for and selecting digital content. If the pupils choose to locate their 3-D models geographically, they should avoid sharing private information. Pupils should think about copyright when adding content to their model or publishing images or videos of their model.</p>   |
| <p>Year 6</p> | <p><b><u>We are computational thinkers</u></b><br/>                 Pupils learn about some common algorithms, recognising that more efficient solutions to the same problem can reduce the impact of computation on energy and other resources. They remix code on Scratch or Snap! websites, as permitted by Creative Commons licences for the code they work with, in much the same way as they might modify open source software. Pupils who wish to register for accounts on these sites need to observe the associated terms and conditions, which typically require parental consent.</p>  | <p><b><u>We are toy makers</u></b><br/>                 Pupils need to think carefully about copyright in sourcing images and other media for their toy prototypes and presentations, or if uploading their own work to the Scratch community. If pupils do participate in the online Scratch community, they should think through how to do so in a safe and responsible manner, and should obtain consent from their parents or carers. If pupils link their programs to hardware, they need to take care to work safely with a range of tools and electronic equipment.</p> | <p><b><u>We are advertisers</u></b><br/>                 Pupils create short advertising videos. They learn the importance of observing school policy in relation to videoing, and the need to obtain consent. They think carefully about the implications of sharing content publicly on sites such as YouTube and consider how such publication would limit what they might include in their advert. They recognise the need to use video search platforms in restricted or education-specific modes and bring to mind what they should do if they encounter inappropriate content. They learn to respect the intellectual property rights of others, and the need to observe licence terms for any content they do not create themselves.</p> |