



# Knowledge Progression



## Year 5 Computing

	Computational Thinking TERM:	Computers & Hardware TERM:	Digital Literacy & eSafety TERM:
<b>Key Vocabulary</b>	Loop, Systematic, Tinker, Variable, Commands, Code, Debug, Error, Live loop, Program language, Sonic Pi, Binary code, Sequence, Encode, Transmission, Stop-motion character, Design, Frame, Animation, Load, Reset, Polling, Decomposing, Repeat, Variables, Format, Melody, Tempo, Timbre, Pitch, Rhythm,	Emulator, Micro: bit, Pedometer, Network, Memory computer, Operating system, RGB, Wireless, Device, USB, RAM, ROM, Bluetooth.	Catfishing, Cyberbullying, Exclusion, Fake profile, Online safety, Password, Personal information, Phishing, Trickery, Trolling, .hex file, .zip file, Bluetooth, Data leak, Data privacy, Index, False information, Keywords, Page rank, Search engine, TASK, Web crawler, Website, WWW, Data, Data transmission, Input, Numerical data, Output, Radio signal, Computer simulation, Binary image, Bit, Bit pattern, CAD, Compression file, CPU, Digital image, JPEG, Pixels, Zoetrope, Thaumotrope, Flip book, ASCII, Boolean, Hexadecimal.
<b>Previous knowledge/ Learning</b>	<p><b>In Year 4, our pupils learnt to:</b></p> <p><b>C1</b> - Know that HTML stands for Hypertext mark-up language and that style.CSS controls master styles for a website.</p> <p><b>C2</b> - Know that we measure units in pixels.</p> <p><b>C3</b> - Edit text and images using HTML, understanding the role of words, letters, spaces, symbols (&lt;p&gt; = paragraph, &lt;h1&gt; = heading, &lt;img&gt; etc.), capital letters and punctuation marks.</p> <p><b>C4</b> - Solve unplugged problems by decomposing them into smaller parts and identify patterns. They also incorporate variables (ask blocks, join blocks, conditional statements) to make code more efficient.</p> <p><b>C5</b> - Use decomposition to understand the purpose of a script of code and understand that websites can be altered by exploring the code underneath (HTML).</p> <p><b>C6</b> - Use abstraction to identify key elements when completing both plugged and unplugged activities.</p> <p><b>C7</b> - Create algorithms for a specific purpose and use a systematic approach to debugging by understanding position and orientation, applying their understanding of co-ordinates to locate objects and sprites in Scratch.</p>	<p><b>In Year 4, our pupils learnt to:</b></p> <p><b>C8</b> - Consolidate their knowledge of the key components within a network.</p> <p><b>C9</b> - Understand what a sensor is and how to record sensor data</p> <p><b>C10</b> - Use videos and photographs for a range of purposes. They will use green screens (editing, lighting, chroma key, filming angles) to create weather forecasts.</p> <p><b>C11</b> - Understand that devices are created to detect dangerous weather and provide early warnings.</p>	<p><b>In Year 4, our pupils learn to:</b></p> <p><b>C12</b> - Use Google online software for documents, presentations and forms, and understand that software can be used to work collaboratively online and understand conditional formatting.</p> <p><b>C13</b> - Build a web page and create content, adding hyperlinks, pages and embedding videos and images.</p> <p><b>C14</b> - Recognise what appropriate behaviour is when working collaboratively with others online and recognise that some information on the internet is false and that some sources are more trustworthy than others.</p> <p><b>C15</b> - Use spreadsheets to record weather data.</p>
<b>N.C. Objectives</b>	<ul style="list-style-type: none"> <li>➤ Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.</li> <li>➤ Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.</li> <li>➤ Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</li> </ul>	<ul style="list-style-type: none"> <li>➤ 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.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content</li> <li>➤ 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</li> <li>➤ Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</li> </ul>
<b>Resources / Websites</b>	Blank A4 paper Whiteboards and pens Tablets/cameras Objects to use as sets and characters: Lego, cardboard boxes, plastic mini figures etc.	Headphone splitters (if pupils are sharing laptops) Laptops, desktops or tablets Squared or graph paper	Optional: start to collect large cardboard boxes to be used as 'background sets' Options: BBC micro:bits and battery packs Optional: USB cables Headphones

Cycle 1:	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Kapow:	Stop Motion Animation	Micro: bit	Sonic Pi	Search Engines	Mars Rover 1	Mars Rover 2



# Powerful Knowledge



## Year 5 Computing

Key Knowledge – what do we want our children to know before they leave our phase? How will we get them there? How is that personalised to Tranmere?

### Computational Thinking

#### POWERFUL KNOWLEDGE

Our children will:

- C1 - Decompose an animation into a series of images.
- C2 - Decompose information to plan a code for a program.
- C3 - Use a range of programming commands to amend code within a live scenario through Sonic Pi utilising live loops.
- C4 - Use repetition within a program, writing more complex algorithms for a purpose, beginning to use nested loops (loops within loops) through Sonic Pi.
- C5 - Recognise that computers transfer data in binary (ASC II) and understand simple binary addition.

#### HOW DOES THIS LOOK AT TRANMERE?

1. Children use binary to work out calculations and send messages to each other, recognising that binary uses the computer language ASC II to represent characters.
2. Children learn about the Mars Rover and the importance of binary code due to the vast distances involved in sending information.
3. Children begin to explore and tinker with the software: Sonic Pi, combining their musical knowledge (pitch, rhythm, tempo, timbre) with their developing programming skills to create different sounds, beats and melodies building up to a live battle of the bands performance that uses Ruby code loops, line loops and debugging.
4. Through the Mars Rover project and associated games, children learn to read up to 8 binary characters and carry out binary calculations.

### Computers & Hardware

#### POWERFUL KNOWLEDGE

Our children will:

- C6 - Learn that external devices can be programmed by a separate computer (Micro:bit).
- C7 - Understand the difference between RAM and ROM.

#### HOW DOES THIS LOOK AT TRANMERE?

1. Children are introduced to BBC micro:bit and what it does whilst decomposing code. They use the micro:bit to create an LED matrix animation polling program, pedometer and scoreboard (for a rock, paper, scissors tournament).
2. Children learn that the more random-access memory (RAM) a computer has, the more instructions it can carry out in a row by experimenting with a robot, identifying the interaction between ROM, RAM and CPU.

### Digital Literacy & eSafety

#### POWERFUL KNOWLEDGE

Our children will:

- C8 - Understand how the data for digital images can be compressed (scaling, cropping, JPEG) and how bit patterns represent images as pixels. Binary is essential for this.
- C9 - Use video editing software to create stop-motion animation films of 24 frames/second. They know how to upload photos, keep a camera in focus and can use: repetition, duplications, title pages, effects and frame removals.
- C10 - Understand how data is collected and what a search engine is, and about copyright infringement. Furthermore, they understand page ranking and indexing.
- C11 - Understand how to use 3D design software package TinkerCAD including dragging, dropping, zooming, resizing and highlighting multiple shapes.

#### HOW DOES THIS LOOK AT TRANMERE?

1. Children explore original types of animation including the flip book, thaumatrope and zoetrope.
2. Taking inspiration from Wallace and Gromit (or the end of Box Trolls), children learn how to edit still images, before creating and editing a stop motion animation.
3. They learn that pixels are the smallest element of a digital image and how compression works on basic level by studying NASA images of Mars.
4. Children are challenged to find information about the Tudors as fast as they can, before learning how to filter information for validity, infringements and reliability.
5. Children design a new tyre for the Mars Rover using TinkerCAD software.