

Computing Handbook



Intent - What is the purpose of our Computing curriculum?

At Tranmere Park, we teach a broad and balanced computing curriculum which inspires all pupils to fulfil their potential, becoming active participants in an increasingly digital world. Our aim is to equip children to use computational thinking and creativity to understand and change the world. At the core of our computing curriculum are three key strands of learning, in which pupils are taught the principles of computer science, computer hardware and digital literacy (including internet safety). We intend for our children to develop their knowledge and skills in these strands to progress confidently through the curriculum, reflecting the understanding necessary to bolster their cultural capital and seize opportunities beyond school and in the future workplace.

Our Children will:

- Largely progress through the curriculum at the same pace and differentiation will be achieved by emphasising a deep knowledge through individual support and intervention.
- Be intrinsically motivated – they are eager to build on their existing skills and understanding.
- Be resilient to mistakes and persevere when faced with a challenge; they are able to problem solve and find a variety of solutions.
- Possess highly positive attitudes towards the subject and will be aspirational in their goals.
- Understand the integral role technology plays in their lives and be able to talk meaningfully about what they are learning.
- Have a concrete understanding of how to stay safe online and know what to do if they find inappropriate material.
- Ask inquisitive questions, pose ideas and eagerly tackle tricky problems related to computer science.

Our Teachers will:

- Provide a progressive and challenging curriculum which is sequenced to ensure that new and personalised knowledge is taught in each lesson.
- Identify gaps in understanding and swiftly overcome these with precise teaching.
- Provide a rich curriculum taught through a variety of themes which inspires pupils to engage with technology beyond school.
- Provide opportunities for our children to: think logically, structure their work in a systematic way, pursue a line of enquiry and to work collaboratively thus fostering an awareness of, and an enthusiasm for computing as a life skill.
- Teach from a high-quality scheme of work, supporting and developing their own subject knowledge.
- Teach our pupils how to analyse problems in computational terms and allow for repeated practical experience of writing

- Understand and apply the essential concepts of Computer Science, including: logic, algorithms and data representation.
- Communicate ideas well, utilising appliances and devices throughout all areas of the curriculum.

computer programs in order to solve such problems.

- Teach our children to evaluate and apply information technology analytically to solve problems.

Implementation – How do we do it?

Computing, when taught well, prepares children for life in the present and the future. providing our children with the skills of: reading, writing and analysing code, utilising software and technology and understanding computation systems and logical thinking preparing them for future employment.

We build pupils' awareness to the risks which they may be exposed, so that they have confidence and understanding to seek advice and to deal with any risks in an appropriate manner, thus enjoying the benefits that technology can provide us with safely, successfully.

To ensure coverage, Computing is timetabled and blocked, ensuring that the children depth in their knowledge and skills. The powerful knowledge expected at the end of is mapped carefully and progressively through school allowing a balanced coverage. For this progression below:

Year 1

Children are taught to:

- Use computers purposefully, learning how to login and navigate around a computer develop their mouse skills, learn how to drag, drop, click and control their cursor
- Programme Bee-Bots and to relate algorithms, decomposition and debugging to contexts.
- Use a range of editing tools.
- Identify data and the different ways that it can be represented.
- Develop their computational skills through sequencing and debugging a set of instructions.

Year 2

Children are taught to:

- Identify and learn how inputs and outputs work, and how computers are used in the real world.
- Word process and learn how to stay safe online as well as developing their typing skills.
- Use keyboard shortcuts, as well as simple editing tools within a word processor such as bold, italics, underline and font colour as well as how to import images.
- Use the app 'ScratchJr,' to explore what 'blocks' do by carrying out an informative cycle of predict > test > review.
- Decompose information.

Year 3

Children are taught to:

- Identify how devices communicate and how information is shared, whilst deepening their understanding by exploring examples of real-world networks.
- Explore the internet and learn how data is transferred around the world, and how to interact with different websites.
- Send emails with attachments and be responsible digital citizens by thinking about the contents of what they send.
- Identify cyberbullying and how to avoid being unkind online.
- Build on their use of the App 'ScratchJr' in Year 2, to use the more advanced code blocks based application, carrying out an informative cycle of predict > test > review, and use repetition or 'loops'.
- Develop their digital video skills.

Year 4

Children are taught to:

- Use variables in code scripts.
- Develop their research, word processing, and collaborative working skills whilst exploring how web pages and web sites are created, exploring how to change layouts, embed images and videos and link between pages.
- Become familiar with HTML tags, changing HTML and CSS code to alter images and text, 'remixing' a website's text and images.
- Use a range of collaborative tools including Google Docs, Slides, Forms and Sheets.
- Use the four skill areas needed to solve problems effectively: abstraction, algorithm design, decomposition and pattern recognition.

Year 5

Children are taught to:

- Write, design, film and edit stop motion animations for younger children to educate about the potential dangers associated with online content.
- Create algorithms and programs that are used in the real world.
- Use key words and phrases, to identify inaccurate information, how PageRank works as well as how to credit sources appropriately.
- Understand how messages can be sent using binary, calculate binary addition and represent binary as text.
- Examine one of the most useful types of data - images - and learn how to reduce size so that it can be sent quickly.

Year 6

Children are taught to:

- Understand the history of code breaking and password hacking.
- Understand how computers have evolved from being larger than a room to fitting in the palm of your hand.
- Use the programming language 'Python'
- Create loops and nested loops to make their code more efficient, while becoming familiar with this text-based programming language.
- Identify how barcodes and QR codes work.
- Understand how infrared waves are used for the transmission of data while recording the uses of RFID, as well as gathering, analysing and evaluating data collected from data collection points.
- Explore the potential dangers of big data.

[Impact - What knowledge and skills are obtained?](#)

At Tranmere Park, every pupil will:

- Be given equal opportunities to fulfil their potential, irrespective of ethnicity, culture, class, gender or special educational needs.
- Complete each key stage with high proficiency in each aspect of Computing.
- Believe that they are good at Computing and will have the resilience required to take part in all elements of the Computing curriculum.
- Develop their understanding and skills in Computing, creating a range of digital content and programmes.
- Become confident, competent and safe users of modern technology.

- Be equipped with experiences that have fully prepared them for Secondary School, further education and the future workplace.

Further to the above, our Curriculum, at Tranmere Park, is designed to ensure that each and every child achieves or demonstrates the following:

The Tranmere Park Way					
<i>Be Yourself</i>		<i>Be Your Best</i>		<i>Be Team Tranmere</i>	
Our children will learn to like who they are; they respect themselves and live their lives in their own way, regardless of the opinions of others.		Our children 'give it everything they have got' to achieve their full potential across the curriculum.		Our children are a part of a community and have respect for the resources and people in it and that surround it.	
Our Learning Values and Behaviours					
<i>Self-Manager</i>	<i>Effective Participant</i>	<i>Independent Enquirer</i>	<i>Team Worker</i>	<i>Resourceful Thinker</i>	<i>Reflective Learner</i>
Our children set their own goals and manage their own time, motivation and concentration.	Our children participate in lessons and persuade and encourage others to do so.	Our children set goals for their research with clear success criteria.	Our children understand that we are stronger together and implement this.	Our children are problem-solvers who can adapt to new or difficult situations.	Our children critically analyse their work ensuring future improvements.

Assessment @ Tranmere Park

- Short-term assessment aims to assess the children's learning informally on a lesson by lesson basis and is key to our curriculum. This includes:
 - observations of groups/individuals
 - analysis of whole class
 - oral assessment
 - feedback using success criteria to support and analyse progress within a lesson.
- Medium-term assessments are completed at the end of a half-term and individual progress are recorded in assessment files as working towards (WTS), working at (EXS) or working above the nationally expected standard for the unit taught.
 - Staff are supported in their judgements of WTS, EXS and GDS by the assessment framework from the Kapow Primary Computing Scheme of Work.
- Long-term assessments assess our children against national expectations. These are used to provide extra information about individual children's attainment and progress so that the teacher can report to the next teacher and the child's parent.
- Data will be used by SLT to brief the governing body, the staff and the LEA on overall progress towards the school's end of year targets. Computing data is recorded (working below/above the nationally expected standard) through O-Track at the end of the academic year.

Monitoring @ Tranmere Park

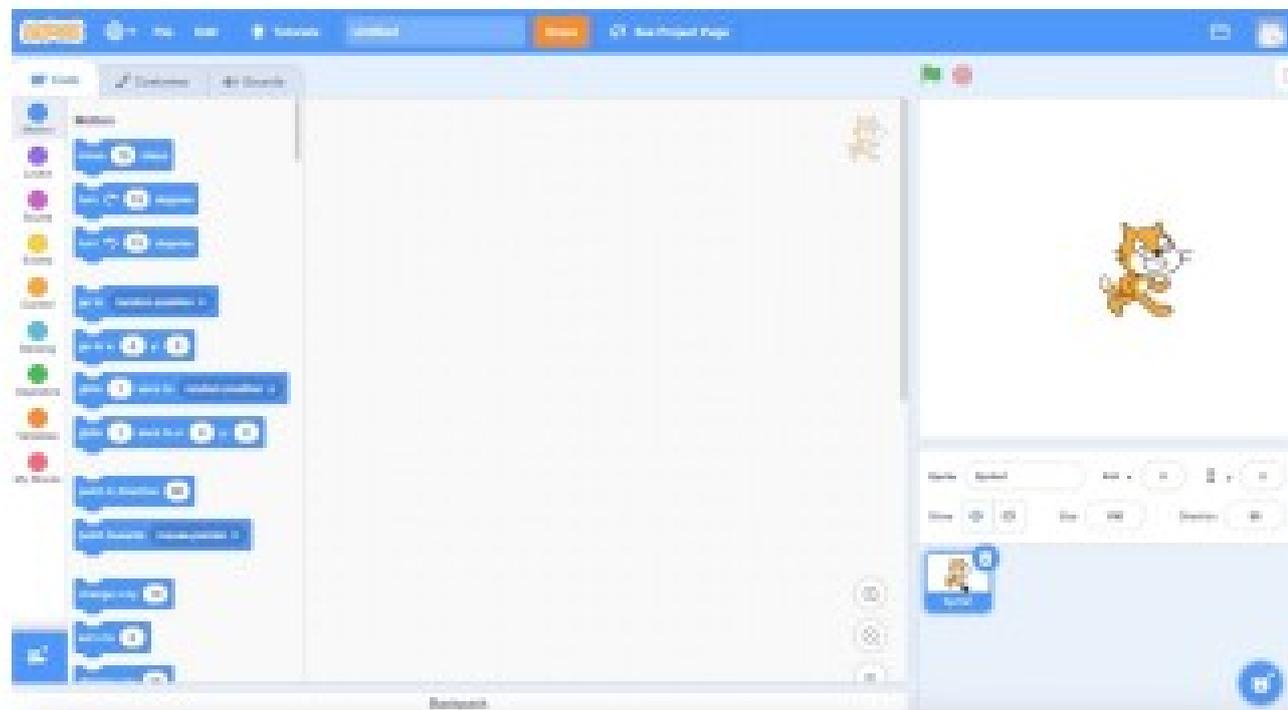
- There is an ongoing cycle of subject monitoring at Tranmere Park.
- The subject leader is allocated a block of time during the academic year to monitor the subject across the phases linked to the whole school development priorities. This focuses on computing specific teaching and learning with reference to how we teach Computing. This may include:

- classroom observations
- pupil/staff interviews
- scrutinising children's work

- Results of the monitoring process inform the subject leader's action plan.
- As part of the subject leader's monitoring cycle, an example of WTS, EXS and understanding for each phase is captured through the use of Knowledge Cards. These examples are kept on the subject display board in the Computing Suite (see example below).

Year 3 - Programming: Scratch

Use this image to answer the following questions:



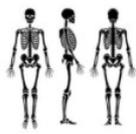
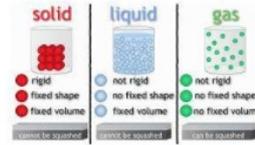
1 What does the image show?

2 What does one of the different sections/windows allow you to do?

3 What can you create with this program? Give some examples.

Guidelines for Teaching @ Tranmere Park

Computing follows a two-year rolling cycle using the Kapow Primary scheme of work. Teachers follow the long-term plan (see example below), to teach one hour of Computing per week through a variety of engaging topics. All teachers and support staff (teaching) have login details and access to the online scheme.

LONG-TERM PLANS at Tranmere Park YEAR 3 AND 4 during Cycle 2						
Subject Area	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Science	Animals including Humans  Children will learn how the human body functions and what it needs to survive. Observations and measurements of the human skeleton will be taken as well as identifying producers, predators and prey in the animal kingdom. S1 - S5		States of matter  Children will observe and classify a range of solids, liquids and gases through practical activities before progressing to observe more complex states such as non-Newtonian fluids. S8 - S10		Light  Children will become physicists, investigating (with a range of materials) how shadows are created, before performing a shadow puppet show. S14 - S17	Electricity  Children will become electrical engineers, investigating which materials can be used in the construction of circuits and the real world application of devices such as switches (pressure switch for a burglar alarm). S6 - S9
Computing	Year 3: Networks and the Internet Undertake a network safari and understand how information is sent in packets. C6, C7, C8, C9, C10.	Year 3: Emailing Create a Gmail and attach files, learn about CC and BCC and the spotting of fake emails. C11, C15.	Year 3: Journey inside a computer Learn about inputs and outputs whilst building a paper computer. Explore RAM, CPU, CPU, infinite loops and ROM. C6, C7.	Year 4: Collaborative Learning The children will use google suite to share documents using conditional formatting. C8, C14.	Year 3: Completion Cards Database Understand fields, records and data. Explore the purpose of databases and how to use filtering. C12, C13.	Year 4: Investigating Weather The children will understand forecasting, will use sensors to gather data and will use a green screen to create their own weather forecast. C9, C10, C11, C14, C15.
Physical Education	Year 3 Outdoor - Tag Rugby - Year 3 and 4 Year 4 Outdoor - Leeds School Swimming Framework Indoor - Real PE - Year 3 and 4 - Units 3 and 4 PE7, PE8, PE9 PE16, PE20	Year 3 Outdoor - Football - Year 3 and 4 Year 4 Outdoor - Leeds School Swimming Framework Indoor - Real PE - Year 3 and 4 - Units 3 and 4 PE7, PE8, PE9 PE18, PE20	Year 3 Outdoor - Tennis - Year 3 and 4 Year 4 Outdoor - Leeds School Swimming Framework Indoor - Gymnastics - Year 3 - Unit 1 and 2 PE5, PE9, PE10, PE11, PE12, PE16, PE20	Year 3 Outdoor - Cricket - Year 3 and 4 Year 4 Outdoor - Leeds School Swimming Framework Indoor - Real PE - Year 3 and 4 - Unit 5 PE7, PE8, PE9 PE16, PE20	Year 3 Outdoor - Netball - Year 3 and 4 Year 4 Outdoor - Leeds School Swimming Framework Indoor - Gymnastics - Year 4 - Unit 1 and 2 PE7, PE8, PE9 PE18, PE19, PE20	Year 3 Outdoor - Athletics - Year 3 and 4 Year 4 Outdoor - Leeds School Swimming Framework Indoor - Real PE - Year 3 and 4 - Unit 6 PE1, PE2, PE4, PE5, PE6 PE18, PE20
Modern Foreign Languages	La France/Je me présente/ Les vêtements Children will role play being a French person and discuss items of clothing. M1, M2, M13, M14, M15	Les Salutations/ Les Dinosaures Children will learn how to greet each other and write simple sentences to describe a dinosaur. M1, M11, M16, M17, M18, M19	Quelle est la Date? Children will learn how to record the date and celebration days in French. M1, M11, M20, M21, M22, M23, M24	Les Couleurs Children will use listening skills to produce a multicoloured piece of elephant art. M1, M11, M25, M26, M27, M28, M29	Fruits Children will learn the names of fruit in French before recording their own story. M1, M11, M30, M31, M32, M33, M34	Une Histoire Revisitée Children will listen to traditional stories and pick out key vocabulary and family members. Children will also consolidate previous unit learning. M1, M11, M35, M36

At the beginning of each topic, pupils are introduced to the technical vocabulary and knowledge required to be successful through the use of unit-specific knowledge organisers (see example below).

Programming - Scratch

Animation	Bringing concepts to life through 2D or 3D moving pictures or photographs, for example cartoons.
Application	A computer program.
Code	A set of instructions written in programming language, to tell a computer what to do.
Code block	A visual representation for a section of code that performs a certain job. They can be snapped together to build a program.
Debug	To remove and repair the error or mistake in computer code.
Decompose	To break something down into smaller chunks.
Interface	The menus, buttons and other functions which makes a computer program or website intuitive to humans.
Loop	A repeated sequence of instructions.
Predict	To make an educated guess, as to what might happen or occur as the result of something in the future.
Program	A series of code that instructs the computer to perform specific tasks.
Remixing code	Altering code that already exists.
Repetition code	To create loops in your program, to make it more efficient.
Review	To look at something in detail and give constructive feedback if it requires improvement.
Sprite	Visual objects that can be moved or perform an action through code, for example: move forwards by one step.
Tinker	To explore and play with something to discover the key functions.

Scratch code blocks colour key:

Motion
Sound
Control
Operators
My Blocks

Looks
Events
Sensing
Variables

Key facts

Scratch is a coding program, that lets you build interactive games and animations.



Did you know? In Scratch, you can:

Choose a sprite

Paint your own sprite

Generate a random (surprise!) sprite

Upload a sprite

Each lesson comprises a learning objective, success criteria, detailed lesson slides, teacher support video, detailed digital/printable resources and support for children working below the expected standard and extension for those working above (see Kapow Primary example lesson online).

<https://www.kapowprimary.com/subjects/computing/key-stage-1/year-1/getting-started/lesson-1-logging-in/>

Through teaching the scheme, pupils leave Tranmere Park equipped with the Powerful Knowledge and Skills described in the Computing Knowledge Progression (see example below).

Powerful Knowledge			
Year 4 Computing			
	Computational Thinking	Computers & Hardware	Digital Literacy & eSafety
<p>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?</p>	<p>POWERFUL KNOWLEDGE Our children will:</p> <p>C1 - Know that HTML stands for Hypertext mark-up language and that style.CSS controls master styles for a website. C2 - Know that we measure units in pixels. C3 - Edit text and images using HTML, understanding the role of words, letters, spaces, symbols (<p> = paragraph, <h1> = heading, etc.), capital letters and punctuation marks. C4 - 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. C5 - Use decomposition to understand the purpose of a script of code and understand that websites can be altered by exploring the code underneath (HTML). C6 - Use abstraction to identify key elements when completing both plugged and unplugged activities. C7 - 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>HOW DOES THIS LOOK AT TRANMERE?</p> <ol style="list-style-type: none"> Children identify the purpose of a code by writing the script for a times table quiz. They include variables based on the answers to make the quiz responsive to either correct or incorrect answers. Children learn that HTML (completing a HTML treasure hunt to discover tags) is a mark-up language which defines how a website is displayed. They learn how to edit HTML to create their own posters and learn how HTML is used to define the layout of a website (and edit it themselves), creating their own storyboards. Children learn about the four pillars of computational thinking: abstraction, algorithm design, decomposition and pattern recognition through a variety of unplugged and plugged activities. Pupils create their own game in Scratch to test their understanding of computational thinking. They will create a timestables, a bug hunt and pattern recognition game. 	<p>POWERFUL KNOWLEDGE Our children will:</p> <p>C8 - Consolidate their knowledge of the key components within a network. C9 - Understand what a sensor is and how to record sensor data C10 - Use videos and photographs for a range of purposes. They will use green screens (editing, lighting, chroma key, filming angles) to create weather forecasts. C11 - Understand that devices are created to detect dangerous weather and provide early warnings.</p> <p>HOW DOES THIS LOOK AT TRANMERE?</p> <ol style="list-style-type: none"> Children design a weather station which gathers and records sensor data. Children set up and present their own video weather forecast, effectively using green screen technology, editing, filming angles and lighting to improve the finished report. 	<p>POWERFUL KNOWLEDGE Our children will:</p> <p>C12 - Use Google online software for documents, presentations and forms, and understand that software can be used to work collaboratively online and understand conditional formatting. C13 - Build a web page and create content, adding hyperlinks, pages and embedding videos and images. C14 - 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. C15 - Use spreadsheets to record weather data.</p> <p>HOW DOES THIS LOOK AT TRANMERE?</p> <ol style="list-style-type: none"> Children edit their latest piece of writing on a Google doc to allow collaborative feedback. Children create a survey using Google forms and then analyse the results using conditional formatting on Google sheets. Children create a set of class rules for working collaboratively to share documents using Google Forms, Docs and Slides. Children are introduced to Google Sites and are challenged to 'linker' with it to create a simple web page. Children then create a book review web page and, building on the skills developed through the activity, progress to create their own web page with their own content. Children learn to: <ul style="list-style-type: none"> ➢ adapt a live website ➢ understand the issue of 'fake news' ➢ understand the reliability of the internet ➢ create their own 'fake news' stories by hacking the code of a website. Children learn how weather forecasts are made and use search engines to find data, recording and sharing the information in Google Spreadsheets.

Main Resources for Computing

Digital resources such as worksheets/websites/apps are listed in the knowledge progression documents.

Key Stage 1

- 16 iPads
- Beebots
- Shared access to 16 laptops
- Shared access to 16 desktops (Computing Suite)

Lower Key Stage 2

- 16 iPads
- Shared access to 16 laptops
- Shared access to 16 desktops (Computing Suite)

Upper Key Stage 2

- 32 iPads
- Shared access to 16 laptops
- Shared access to 16 desktops (Computing Suite)
- 16 Micro:bit computers

