TGMS COMPUTING PROGRESSION OF KNOWLEDGE & SKILLS

National Curriculum Objectives

By the end of KS2 pupil 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.

National Curriculum	Year 3	Year 4	Year 5	Year 6

Computer Science	**Computer systems and networks**	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	• Explain how a computer network can be used to share information • Explore how digital devices can be connected • Recognise the physical components of a network • Explain how digital devices function Identify input and output devices	• Describe how networks physically connect to other networks • Recognise how networked devices make up the internet • describe how content can be added and accessed on the World Wide Web • Recognise how the content of the WWW is created and shared by people. • Describe the current limitations of World Wide Web media	• Explain that computers can be connected to form systems • Recognise the role of computer systems in our lives • Recognise how information is transferred over the internet • Explain how sharing information online lets people in different places work together • Contribute to a shared project online • Evaluate different ways of working together online	• Continue to develop online searching skills to enhance online communication and collaboration
Computer Science	**Programming**	Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems	● Create a sequence of commands using a **block language** to produce a given outcome ● Debug errors to accomplish specific goal	● Plan a program using a **block language** which includes appropriate loops to produce a given outcome. ● Debug errors in increasingly complex programs to accomplish specific goal	● Plan a program which includes selection to produce a given outcome ● Debug errors in increasingly complex programs to accomplish specific goal	● Plan a program which includes variables to produce a given outcome ● Debug errors in increasingly complex programs to accomplish specific goal

Computer Science	**Programming**	Solve problems by decomposing them into smaller parts	• Work with others to decompose a problem into smaller steps in planning a project	• Independently decompose a problem into smaller steps in planning a project	• Plan a solution to a problem using decomposition	• Solve problems using decomposition, tackling each part separately
		Use sequence, selection, and repetition in programs; work with variables and various forms of input and output	• Explain the order (**sequence**) of commands can effect the outcome (same commands, different order -> same or different outcome) • Identify different **sequences** can achieve the same outcome	• Identify patterns (**repetition)** in a **sequence** • Understand repetition in programming is also called looping • Identify a loop in a program • Understand, identify and justify when to use 'infinite' or 'count-controlled' loops • Explain the importance in instruction order in a loop	• Define that conditional statements (**selection**) are used in computer programs • Explain a loop can stop when a condition is met (number of times or event) • Explain a that program flow can branch according to a condition • Use a condition in an *if…then…* statement to produce a given outcome	• Define 'variable' as something that is changeable • Explain that a variable has a name and a value • Identify a variable in an existing program • Use a variable in a conditional statement to control the flow of a program

Computer Science	**Programming**	Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	• Explain simple, sequence-based algorithm independently • Use logical reasoning to detect errors in programs	• Explain an algorithm using sequence and repetition independently • Use logical reasoning to detect and correct errors in programs	• Explain an algorithm using sequence, repetition and selection independently • Use logical reasoning to detect errors in increasingly complex programs	• Clearly and concisely explain algorithms using sequence, repetition, selection and variables independently • Use logical reasoning to detect errors in increasingly complex programs
National Curriculum			**Year 3**	**Year 4**	**Year 5**	**Year 6**
Information Technology	Digital Research	Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content	• Search for information in a single site Understand that search engines select pages according to keywords found in the content	• Use a standard search engine to find information Understand that search engines rank pages according to relevance.	• Use filters to make more effective use of a standard search engine Understand that search engines use a cached copy of the crawled web to select and rank results	• Use of a range of search engines appropriate to finding information that is required • Understand that search engines rank pages based on the number and quality of in-bound links

Information Technology	Digital Media (Word processing, Web design)	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	• Combine text and images to share a message • Consider how different layouts can suit different purposes • Type with increased confidence and speed using age-appropriate punctuation • Use return to create paragraphs • Change orientation of text • Wrap text around an image Recognise a document can be formatted with placeholders	Use cross-curricular opportunities to consolidate previous learning from Year 3	Use cross-curricular opportunities to consolidate previous learning from Year Year 3 and 4	• Recognise components of a webpage layout • Create a webpage including text, images, hyperlinks and embedded content Understand the need for a navigation path

Information Technology	Digital Media (Images, Digital art, AR & VR)		• Change orientation of images	• Use a computer to (further) manipulate images • Recognise images can be changed for different purposes • Use the most appropriate tool for a particular purpose Consider the impact of changes made on the quality of the image	• Recognise an image is comprised of separate objects • Add, remove, modify and combine objects to create graphical drawing on a computer • Recognise objects are layered • Recognise that objects can be modified in groups Consider the impact of choices made	• Create 3D graphical objects on a computer • Alter the view of a 3D space • Modify 3D objects • Combine 3D objects to create desired effect • Apply blank 3D objects as placeholders to create holes
Information Technology	Digital Media (Animation, Audio & Video)		• Understand animation is a sequence of drawings or photographs • Relate animated movement with a sequence of images • Plan an animation • Review and improve an animation • Evaluate the impact of adding other media to an animation	• Press/tap buttons to start and stop recordings • Recognise recorded audio is stored as a file • Edit and alter recorded audio • Layer sounds • Save/export an audio file Consider the results of editing choices made	• Identify the features of a good video • Plan a video production using a story board • Use a computer to make a video • Recognise a video can be improved through editing Consider the impact of changes made on the quality of the video	• Use cross-curricular opportunities to consolidate previous learning from Year 3 – Year 5

Information Technology	Data Handling	Collecting, analysing, evaluating, and presenting data and information	• Identify object attributes needed to collect relevant data • Create a branching database • Identify objects using a branching database • Compare information shown in a pictogram with a branching database • Explain that data can be used to answer questions	• Collect data using a digital device • Recognise that a sensor can be used as an input device for data collection • Use a larger data set to find information • Use a computer program to sort data by one attribute • Export information and present data in a table and a graph	• Use a form to collect information • Navigate a flat-file database • Apply knowledge of a database to ask and answer real-world questions • Design a structure for a flat-file database • Choose tools to select and analyse data to answer questions • Select an appropriate graph to visually compare data • Choose suitable ways to present information	• Identify questions that can be answered using data • Create a spreadsheet for a purpose • Apply a formula that can be used to produce calculated data • Recognise data can be calculated using different operations • Evaluate results in comparison to the question asked • Choose suitable ways to presents data

National Curriculum			Year 3	Year 4	Year 5	Year 6
Digital Literacy	Self-image and identity	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact	• I can explain what is meant by the term 'identity'. • I can explain how I can represent myself in different ways online. • I can explain ways in which and why I might change my identity depending on what I am doing online (e.g. gaming; using an avatar; social media).	• I can explain how my online identity can be different to the identity I present in 'real life' • Knowing this, I can describe the right decisions about how I interact with others and how others perceive me.	• I can explain how identity online can be copied, modified or altered. • I can demonstrate responsible choices about my online identity, depending on context.	• I can describe ways in which media can shape ideas about gender. • I can identify messages about gender roles and make judgements based on them. • I can challenge and explain why it is important to reject inappropriate messages about gender online. • I can describe issues online that might make me or others feel sad, worried, uncomfortable or frightened. I know and can give examples of how I might get help, both on and offline. • I can explain why I should keep asking until I get the help I need.

Digital Literacy	**Online Relationships**		• I can describe ways people who have similar likes and interests can get together online. • I can give examples of technology-specific forms of communication (e.g. emojis, acronyms, text speak). • I can explain some risks of communicating online with others I don't know well. • I can explain how my and other people's feelings can be hurt by what is said or written online. • I can explain why I should be careful who I trust online and what information I can trust them with. I can explain why I can take back my trust in someone or something if I feel nervous, uncomfortable or worried. • I can explain what it means to 'know someone' online and why this might be different from knowing someone in real life. I can explain what is meant by 'trusting someone online'.	• I can describe strategies for safe and fun experiences in a range of online social environments • I can give examples of how to be respectful to others online.	• I can explain that there are some people I communicate with online who may want to do me or my friends harm. I can recognise that this is not my/our fault. • I can make positive contributions and be part of online communities. • I can describe some of the communities in which I am involved and describe how I collaborate with others positively	• I can show I understand my responsibilities for the well-being of others in my online social group. • I can explain how impulsive and rash communications online may cause problems (e.g. flaming, content produced in live streaming). • I can demonstrate how I would support others (including those who are having difficulties) online. • I can demonstrate ways of reporting problems online for both myself and my friends.

			I can explain why this is different from 'liking someone online'.			
Digital Literacy	**Online Reputation**		• I can search for information about myself online. • I can recognise I need to be careful before I share anything about myself or others online. • I know who I should ask if I am not sure if I should put something online.	• I can describe how others can find out information about me by looking online. • I can explain ways that some of the information about me online could have been created, copied or shared by others.	• I can search for information about an individual online and create a summary report of the information I find. • I can describe ways that information about people online can be used by others to make judgments about an individual.	• I can explain how I am developing an online reputation which will allow other people to form an opinion of me. • I can describe some simple ways that help build a positive online reputation

Digital Literacy	**Online Bullying**		• I can explain what bullying is and can describe how people may bully others. • I can describe rules about how to behave online and how I follow them.	• I can identify some online technologies where bullying might take place. • I can describe ways people can be bullied through a range of media (e.g. image, video, text, chat). • I can explain why I need to think carefully about how content I post might affect others, their feelings and how it may affect how others feel about them (their reputation).	• I can recognise when someone is upset, hurt or angry online. • I can describe how to get help for someone that is being bullied online and assess when I need to do or say something or tell someone. • I can explain how to block abusive users. • I can explain how I would report online bullying on the apps and platforms that I use. • I can describe the helpline services who can support me and what I would say and do if I needed their help (e.g. Childline).	• I can describe how to capture bullying content as evidence (e.g screen-grab, URL, profile) to share with others who can help me. • I can identify a range of ways to report concerns both in school and at home about online bullying.

Digital Literacy	**Managing online information**		• I can use key phrases in search engines. • I can explain what autocomplete is and how to choose the best suggestion. • I can explain how the internet can be used to sell and buy things • I can explain the difference between a 'belief', an 'opinion' and a 'fact'.	• I can analyse information and differentiate between 'opinions', 'beliefs' and 'facts'. I understand what criteria have to be met before something is a 'fact'. • I can describe how I can search for information within a wide group of technologies (e.g. social media, image sites, video sites). • I can describe some of the methods used to encourage people to buy things online (e.g. advertising offers; in-app purchases, pop-ups) and can recognise some of these when they appear online. • I can explain that some people I 'meet online' (e.g. through social media) may be computer programmes pretending to be real people. • I can explain why lots of people sharing the same opinions or beliefs online does not make	• I can use different search technologies. • I can evaluate digital content and can explain how I make choices from search results. • I can explain key concepts including: data, information, fact, opinion belief, true, false, valid, reliable and evidence. • I understand the difference between online mis-information (inaccurate information distributed by accident) and dis-information (inaccurate information deliberately distributed and intended to mislead). I can explain what is meant by 'being sceptical'. • I can give examples of when and why it is important to be 'sceptical'. I can explain what is meant by a 'hoax'. • I can explain why I need to think carefully before I forward anything online. • I can explain why some information I find online may not be honest, accurate or legal. • I can explain why information that is on a	• I can use search technologies effectively. • I can explain how search engines work and how results are selected and ranked. • I can demonstrate the strategies I would apply to be discerning in evaluating digital content. • I can describe how some online information can be opinion and can offer examples. • I can explain how and why some people may present 'opinions' as 'facts'. I can define the terms 'influence', 'manipulation' and 'persuasion' and explain how I might encounter these online (e.g. advertising and 'ad targeting'). • I can demonstrate strategies to enable me to analyse and evaluate the validity of 'facts' and I can explain why using these strategies are important. • I can identify, flag and report inappropriate content.

				those opinions or beliefs true.	large number of sites may still be inaccurate or untrue. I can assess how this might happen (e.g. the sharing of misinformation either by accident or on purpose).	
Digital Literacy	**Health wellbeing and lifestyle**		• I can explain why spending too much time using technology can sometimes have a negative impact on me; I can give some examples of activities where it is easy to spend a lot of time engaged (e.g. games, films, videos).	• I can explain how using technology can distract me from other things I might do or should be doing. • I can identify times or situations when I might need to limit the amount of time I use technology. • I can suggest strategies to help me limit this time.	• I can describe ways technology can affect healthy sleep and can describe some of the issues. • I can describe some strategies, tips or advice to promote healthy sleep with regards to technology	• I can describe common systems that regulate age-related content (e.g. PEGI, BBFC, parental warnings) and describe their purpose. • I can assess and action different strategies to limit the impact of technology on my health (e.g. nightshift mode, regular breaks, correct posture, sleep, diet and exercise). • I can explain the importance of self-regulating my use of technology; I can demonstrate the strategies I use to do this (e.g. monitoring my time online, avoiding accidents).

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

Digital Literacy	**Copyright and ownership**		• I can explain why copying someone else's work from the internet without permission can cause problems. • I can give examples of what those problems might be.	• When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it. • I can give some simple examples.	• I can assess and justify when it is acceptable to use the work of others. • I can give examples of content that is permitted to be reused.	• I can demonstrate the use of search tools to find and access online content which can be reused by others. • I can demonstrate how to make references to and acknowledge sources I have used from the internet