Key Learning in Computing: Years 3 and 4

Computing

Information Technology	
Programme of Study	
▪ Use search technologies effectively. ▪ Use and combine a variety of software to accomplish given goals. ▪ Collect and present information. ▪ Design and create content. ▪ Collect and present data. ▪ Use search technologies effectively. ▪ Use and combine internet services. ▪ Analyse and evaluate information.	
Skills	**Knowledge and Understanding**
Design, create, manage and manipulate digital content	**Design, create, manage and manipulate digital content**
Text and images	**Text and images**
▪ Use different font sizes, colours and effects to communicate meaning for a given audience. ▪ Use various layouts, formatting, graphics and illustrations for different purposes or audiences. ▪ Use various software tools to complete a project, problem or task. ▪ Use page setup to select different page sizes and orientations. ▪ Use cut, copy and paste to refine and re-order content. ▪ Combine and use various software tools to complete a project, problem or task. ▪ Use appropriate editing tools to ensure their work is clear and error free, e.g. spell checker, thesaurus, find and replace. ▪ Select and import sounds from other sources, e.g. own recordings, sound effects and music. ▪ Select and import graphics from digital cameras, graphics packages and other sources and prepare for use, e.g. cropping, resizing and editing. ▪ Use and combine internet services such as those that provide images, sounds, 3D representations and graphic software. ▪ Recognise and use key layout and design features, e.g., text boxes, columns and borders. ▪ Insert and edit simple tables. ▪ Create a range of hyperlinks and produce a non-linear, interactive presentation. ▪ Recognise intended audience and suggest improvements to make their work more relevant to that audience.	▪ Recognise the features of good page design and multimedia presentations. ▪ Consider how design features meet the needs of the audience e.g. poster, news paper, menu, instructions. ▪ Understand that some tasks and problems require a variety of software tools to accomplish them. ▪ Understands what is meant by Internet services. ▪ Understand that evaluation and improvement are vital parts of the design process and that ICT allows changes to be made quickly and efficiently. ▪ Demonstrate this through editing their work. ▪ Has an awareness of Internet services. ▪ Recognise that IT can automate manual processes e.g. find and replace and understand the advantages and disadvantages of this. ▪ Compare and contrast the impact of using different sounds, words and images from a variety of electronic sources. ▪ Develop an increasing sense of audience and talk. ▪ Understand that images, 3D representations, sounds and text can be subject to copyright and abide by copyright rules when creating a presentation. ▪ Understand that presentations and projects need to be analysed and evaluated and suitable changes suggested to improve it.

• Through self and peer assessment, analyse and evaluate presentations and projects so that suitable improvements can be added to work.	• Understand that internet services such as those that provide images, sounds, 3D representations and graphic software can be used to achieve specific goals and tasks.

Images, video and animation – graphics (drawing and painting)	
• Acquire, store and retrieve images from cameras, scanners and the internet for a purpose. • Select specific areas of an image, copy and paste to make repeating patterns. • Be able to resize various elements in a graphics or paint package. • Use various tools in paint packages or photomanipulation software to edit/change an image, e.g. applying different special effects. • Use the 'print screen' function to capture images. • Explore the use of graphics and paint packages to design and plan an idea.	

Images, video and animation – digital photographs, video and animation	Images, video and animation – digital photographs, video and animation
• Use a range of devices to capture still and moving images for a purpose. These could include digital cameras, video cameras, iPads, microscopes and webcams. • Discuss and evaluate the quality of their own and others' captured images and make decisions whether to keep, delete or change them. • Independently download and save images and video onto a computer. • Independently upload images and movies from digital cameras and other devices to a computer and save in a relevant location. • Be able to 'resize' images (pixels, resolution, aspect ratio and dimensions). • Be able to use basic tools in a software package to change images according to purpose. • Import music, stills or video into video editing software for a specific project. • Arrange, trim and cut clips to create a short film that conveys meaning. • Add simple titles, credits and special effects, e.g .transitions. • Storyboard, then use captured images to create a short animated sequence which communicates a specific idea.	• Understand that a digital image can be captured from different devices and it can be stored and developed. • Begin to understand how images from different sources (stills, video, graphics, animation) are used to enhance a presentation or communicate an idea. • Begin to understand the meaning of 'resizing' i.e. the differences between pixel size, resolution and image dimensions and the need to maintain aspect ratios. • Understand that planning is a vital part of the design process. • Understand that evaluation and improvement are vital parts of the design process and ICT allows changes to be made quickly and efficiently. • Understand the need for caution when using the Internet to search for images and what to do if they find unsuitable images (See school's Acceptable Use Policy/AUP). • Know how to take images appropriately and responsibly (See school's Acceptable Use Policy/AUP). • Understand that copyright exists on most digital images and video about the impact of choices and decisions in their work. • Understand that images, sounds and text can be subject to copyright and abide by copyright rules when creating a presentation.

Sound	Sound
• Use a variety of devices and software to select, playback and record voice and other sounds. • Locate and use sound files from online sources, e.g. Audio Networks, and other multimedia resources. • Select, import and edit existing sound files in sound editing software, e.g., Audacity.	• Talk about software which allows the creation and manipulation of sound and music. Understand that many types of sounds can be combined in editing software. • Understand how sound can be used in multimodal texts to create meaning and provide effects.

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• Use editing tools to refine and improve outcomes and performances. • Use recorded sound files in other software applications. • Be able to share sound recordings with a wider audience. • Use music software to experiment with capturing, repeating and sequencing sound patterns. • Use ICT to create and perform sounds or music that would otherwise not be possible in a live situation, e.g., editing a multi–part piece.	• Understand that copyright exists on most recorded music.

Data handling	Data handling
• Create frequency diagrams and graphs to answer questions. • Create and use a branching database to organise and analyse information to answer questions. • Begin to identify what data should be collected to answer a specific question. • Collect data and enter it into a database under appropriate field headings. • Use a database to answer straightforward questions by searching, matching and ordering the contents of a single field. • Based on the data collected, children should raise their own questions and translate them into search criteria that can be used to find answers to specific questions. • Compare different charts and graphs, e.g., in tables, frequency diagrams, pictograms, bar charts, databases or spreadsheets and understand that different ones are used for different purposes. • Select and use the most appropriate method to organise and present data. • Use dataloggers to capture, record and analyse data continuously over time, including sound, temperature and light. (Science) • Use a data logger to 'snap shot' a series of related but separate readings in the course of an appropriate investigation. (Science)	• Understand that there are different types of data. • Understand the need to structure information properly in a database. • Know, understand and use the vocabulary: file, record, field, sort and search. • Recognise similarities and differences between ICT and paper–based systems. • Talk about the advantages of using IT to sort, interrogate and classify information quickly. • Understand that effective yes / no questions are key to organising data efficiently in a branching database. • Understand that there are different types of data, e.g. numeric, alphabetic, date, alphanumeric. • Know that ICT can enable the creation of a variety of tables and graphs for different purposes. • Understand some graphs and charts are more appropriate and easier to read than others. • Begin to make choices about how to present data to solve a specific problem. • Understand that dataloggers can be used to sense external and physical changes and subsequently collect data in a range of simple investigations. (Science) • Understand that data can be collected more efficiently by a datalogging device compared with manual methods. (Science) • Know that datalogging devices can be pre-programmed to collect data for a given time and on different triggers and remotely for a long period of time. (Science).
Digital research – searching	**Digital research – searching**
• Use a range of child friendly search engines to locate different media, e.g. text, images or sound. • Evaluate different search engines and explain their choices in using these for different opurposes. • Develop specific key questions and key words to search for information e.g., a question such as 'Where could we go on holiday?' would become a search for 'holiday destinations'. • Consider the effectiveness of key questions on search results and refine where necessary. • Use strategies to verify the accuracy and reliability of information, distinguishing between fact and opinion, e.g. cross checking with different websites or books.	• Talk about and describe the process of finding specific information, noting any difficulties during the process and how these were overcome • Understand that information found as a result of a search can vary in relevance. • Begin to recognise that anyone can author on the internet and sometimes web content is inaccurate or even offensive. • Understand that provision is made in schools to filter

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- Use appropriate tools to save and retrieve accessed information, e.g. through the use of favourites, history, copy/paste and save as.
- Identify and cancel unwanted advertising, pop-ups and potentially malicious downloads by using the task manager function and NOT through buttons on the pop-up window, or the cross in the right hand corner.
- Know how to temporarily allow useful pop-ups from a website.
- Develop use of more advanced searching techniques, e.g., searching for a phrase using quotation marks to locate precise information.
- Choose the most appropriate search engine for a task, e.g., image search, search within a specific site or searching the wider internet.

- Begin to understand the concept of copyright, e.g. what images, videos or sounds are legal and safe to use in their own work.
- Begin to understand the need to acknowledge sources of information.
- Understand when and where the internet can be used as a research tool.
- Know that Boolean search 'operators' can effect web searches

Digital Literacy

Programme of Study	
- Use technology responsibly. - Identify a range of ways to report concerns about contact. - Identify a range of ways to report concerns about content. - Recognise acceptable/unacceptable behaviour. - Understand the opportunities computer networks offer for communication.	
Skills	Knowledge and Understanding
Online safety	Online safety
- Use technology responsibly. - To create appropriate passwords. - Keep passwords and personal data safe. - Recognise acceptable behaviour. - Recognise unacceptable behaviour. - Be able to create a 'secure' password, e.g. combination of letters, symbols and numbers in accordance with the school's eSafety policies and procedures /AUP. - Know what to do and who to tell if they discover something inappropriate or offensive on a website, at home and in school.	- Know how to use technology responsibly. - Understand that online actions can impact on other people. - Understand the need to keep personal information and passwords private in order to protect themselves when communicating online. - Know how to respond if asked for personal details or in the event of receiving unpleasant communications, e.g. saving the message and showing to a trusted adult –according to the school's eSafety policies and procedures /AUP. - Understand the risks posed by the internet relating to contact e.g. bullying, grooming. - Know a range of ways to report concerns about contact. - Understand the risks posed by the internet relating to content e.g. violent and biased websites. - Know a range of ways to report concerns about content. - Understand the school's acceptable use policy.

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Computing

- Understand what acceptable online behaviour is.
- Understand what unacceptable online behaviour is.
- Recognise that cyber bullying is unacceptable and will be sanctioned according to the school's eSafety policies and procedures /AUP.
- Know how to report an incident of cyber bullying if and when it occurs, according to the school's eSafety policies and procedures /AUP.
- Understand the risks involved in arranging to meet and subsequently meeting anybody from the online world in the offline world.
- Know what images are suitable to include in an online profile and ensure that appropriate permissions have been obtained, e.g. copyright or asking friends before uploading their images.
- Understand the need for certain rules of conduct particularly when using live forms of communication, e.g. chats and forums in the school's VLE, taking turns to speak when video conferencing.
- Know the school's rules for keeping safe online and be able to apply these beyond school.

Electronic communication	Electronic communication
- Use a range of digital tools to communicate, e.g. contributing to chats and/or discussion forums, in school's VLE, blog or text messages, making purposeful contributions to respond to another pupil's question or comment. - Investigate the different styles of language, layout and format of different electronic communications and how these vary depending on the audience. - Continue to use webcams and /or video conferencing as a class, if appropriate and available, e.g. with external providers, another class or school, or abroad as part of a wider topic. - Begin to publish their work to a wider audience, e.g. using VLE or podcasting tools. **Example – email** - Log on to an email account, open emails, create and send appropriate replies. - Forward an e-mail. - Save an e-mail in draft format and then return and edit prior to sending. - Attach different files to emails, e.g. text document, sound file or image. - Open and save attachments to an appropriate place. - Select an email recipient from a class address book.	- Understand that computer networks can be used for communication. - Understand the opportunities computer networks offer for communication. - Know a range of ways that computer networks can be used for communication. - Understand that some emails and other forms of electronic communications may be malicious or inappropriate and recognise when an attachment may be unsafe to open. - Recognise the effect that content in their communications may have on others. - Respect the ideas and communications of others they encounter online. - Discuss the differences between online communication tools used in school and those used internet content, recognising this is possibly not the case on computers used at home at home, e.g., those 'blocked' through the school's filtering.

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Computer Science	
Programme of Study	
• Work with various forms of input and output. • Design and create programs that accomplish specific goals. • Control or simulate physical systems. • Use logical reasoning to detect and correct errors in programs. Use sequence, repetition* and selection* in programs (*next to a phrase or word e.g. **repetition** denotes a progression within that concept.)	
Skills	**Knowledge and Understanding**
Programming	**Programming**
• Write programs that accomplish specific goals. • Read what a sequence in a program does. • Work with various forms of input. • Work with various forms of output. • Use logical reasoning to predict outputs. • Design programs, showing skills needed to plan and implement a task/problem that accomplish specific goals. • Design programs showing appropriate planning and implementing skills. • Create programs that implement algorithms to achieve specific goals. • Debug programs that accomplish specific goals through self and peer assessment. • Use sequence, repetition and selection in programs. • Plan, test and evaluate programs that solve specific problems using a screen turtle or other programmable devices. • Use sequences of commands to control physical devices using outputs. • Demonstrate and develop a sense of audience when appropriate. • Use and debug programs to control physical devices Note real or screen simulations could be used. • Use logical reasoning to detect and correct errors in programs.	• Understand how to plan and write programs that accomplish specific goals. • Know a range of input devices and how they can be used. • Know a range of output devices and how they can be used. • Know the difference between an input and an output. • Understand that computers can collect data from various inputs. • Know what debugging is and how it can be used to achieve specific goals. • Understand that planning is a vital part of designing programs. • Understand that evaluation is a vital part of the design process. • Understand what the terms sequence, repetition and selection mean and know how to use them in programs. • Understand how to control physical devices. • Be aware that everyday devices use sensors and outputs, e.g. automatic doors, traffic lights, intruder alarms. • Understand how to use logical reasoning to detect errors in programs. • Understand how to use logical reasoning to correct errors in programs. • Understand that computers can collect data from various inputs.
Simulations and modelling	**Simulations and modelling**
• Explore the effects of changing variables in models and simulations, asking 'What if?' questions. • Make and test predictions.	• Understand how computer simulations can represent real or imaginary situations and how these can help in the wider world. • Understand how computer simulations and spread–sheet models allow changes to be made quickly

- Use a pre-prepared spreadsheet to record data to answer questions and produce graphs.
- Use a pre-prepared spreadsheet to explore simple number patterns, e.g. multiples.
- Change the contents of cells in a pre-prepared spreadsheet and explore the consequences.

and easily in comparison with real life situations.
- Understand that changes made to one element of a spreadsheet can impact on other calculations