

# Key Learning in Computing: Years 5 and 6

## Information Technology

### Programme of Study

- 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 search technologies effectively.

### Skills

#### Design, create, manage and manipulate digital content

- Select, use and combine internet services to create digital 'content' (inc. programs and systems).
- Demonstrate awareness of intended audience in work.
- Independently select the most appropriate ICT tools for intended purpose and audience.
- Routinely evaluate and improve work as part of the design process.
- Use a range of digital devices to produce digital 'content'.

#### Text and images

- Develop and use criteria to evaluate design and layout of a range of resources including web sites, pages on VLE, online resources and presentations.
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- Select suitable text, sounds and graphics from other electronic sources, and import into own work.
- Create an outline plan for a non-linear presentation; producing a diagram to demonstrate understanding how pages link and the need for clarity.
- Develop the use of hyperlinks to produce more effective, interactive, non-linear presentations.
- Use of hyperlinks to produce more effective, interactive, non-linear presentations.
- Develop consistency across a document - same style of font, colour, body text size, etc.
- Make effective use of transitions and animations in presentations. Consider their appropriateness and overall effect on the audience. Independently select, process and import images, video and sounds from a variety of sources to enhance work.
- Format and edit work to improve clarity and purpose using a range of tools, e.g. cut and paste, justify, tabs, insert and replace.
- Through peer and self assessment, evaluate presentations and make improvements.
- Make use of transitions and special effects in video editing software, understanding the effect on the audience.
- Export images, presentations and movies in formats appropriate for the purpose and use them in multimedia presentations.
- Plan and create a short animated sequence to communicate a specific idea, using a storyboard and timeline.
- Design and create a short animated sequence.

### Knowledge and Understanding

#### Design, create, manage and manipulate digital content

- Understand the importance of content and editing to produce digital content for specific audiences.
- Understand that many different devices can be used in isolation and sometimes together to produce digital 'content'.
- Understand that you can convert between different formats of files.

#### Text and images

- Understand the importance of evaluation and adaptation of individual features to enhance an overall presentation.
- Understand the potential of multimedia to inform or persuade and know how to integrate words, images and sounds imaginatively for different audiences and purposes.
- Recognise the features of good design in different printed and electronic texts, (e.g. a poster, website, presentation). Talk about design in the context of own work.
- Understand that images, sounds and text can be subject to copyright and abide by copyright rules
- Know that images (still and moving) can be used to enhance presentations or communicate ideas.
- Understand the differences between object based graphics packages and paint packages.
- Be aware when it is more appropriate to use an object based graphics package or a paint package.
- Discuss and evaluate own and others' images and movies, refining for given audience or task.
- Understand that computers can save digital images, graphics and movies in many different file formats and that some are better suited to certain purposes than others.
- Understand the need for caution when using the Internet to search for images and what to do if unsuitable images are found.
- Know how to take images appropriately and responsibly
- Understand the implications of copyright and apply this to work.
- Know how to select suitable software tools to accomplish specific goals and tasks

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Sound	Sound
<ul style="list-style-type: none"> <li>▪ Independently select and use a variety of devices to record musical and non-musical sounds.</li> <li>▪ Independently select, edit, manipulate and combine sound files from a range of sources to create a composition which could be broadcast for a specific purpose and audience, e.g. a soundbyte or podcast.</li> <li>▪ Upload and download projects to other devices and online space e.g. VLE, blog or website, collaborating and communicating with audiences in locations beyond school.</li> <li>▪ Create their own sounds and compositions to add to presentations, animations and films.</li> <li>▪ Use ICT to produce music or sound effects for a specific purpose, considering the impact on the audience, e.g. length, style, genre.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Be aware of different sound file formats, e.g., MP3, WAV; save and use appropriately.</li> <li>▪ Know when it is appropriate to use sound/music to communicate with an audience.</li> </ul>
Data handling	Data handling
<ul style="list-style-type: none"> <li>▪ Construct, refine and interpret bar charts, scatter graphs, line graphs and pie charts.</li> <li>▪ Discuss how IT enables you to search and sift through large amounts of different types of information and describe the advantages of using the tools</li> <li>▪ Design questions and perform complex searches using key words, to search a large pre-prepared database looking for relationships and patterns, e.g. data on the Internet; census data.</li> <li>▪ Check the reliability of the data; identify and correct inaccuracies.</li> <li>▪ Solve complex enquiries involving selecting, processing and presenting data; drawing conclusions, e.g. is there a relationship between minibeast habitat and diet?</li> <li>▪ Design a data capture form, e.g. a questionnaire or table to collect information to answer a specific question.</li> <li>▪ Search data according to more than one criterion.</li> <li>▪ Present data to a specified audience and display findings in other software, e.g. through presentation software.</li> <li>▪ 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.</li> <li>▪ Select and use the most appropriate method to organise present, analyse and interpret data.</li> <li>▪ Use a datalogger's settings to log data over a chosen time span (Science)</li> <li>▪ Use a range of sensors including in a variety of situations in the course of scientific investigations. (Science)</li> <li>▪ Use a datalogger to make and record accurate measurements or observations and produce graphical information to answer questions and solve simple problems. (Science)</li> <li>▪ Be able to design experiments which require use of dataloggers, recognising what measurements will be needed, how many repeats and the most appropriate means of recording data. (Science)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Recognise the need for accuracy when designing, entering and interrogating data and how this will affect the quality of information gained.</li> <li>▪ Recognise the consequences of using inaccurate data and relate to the outside world, e.g. police, doctors, banks, school databases. .</li> <li>▪ Understand which searches and graph types are relevant to a specific problem and types of information.</li> <li>▪ Understand that there are different types of data, e.g., numeric, alphabetic, date, alphanumeric, currency.</li> <li>▪ Understand the importance of presentation techniques aimed at a specific audience.</li> <li>▪ Understand the need for data protection and some of the rights of individuals over stored data and how it affects use and storage of data in the real world.</li> <li>▪ Know when to choose dataloggers as the most appropriate tool for capturing data for a particular purpose and explain /justify their choices. (Science)</li> <li>▪ Appreciate that use of technology can bring added accuracy to results but also that occasional anomalies may need moderation and further investigation. (Science)</li> </ul>

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Digital research - searching	Digital research - searching
<ul style="list-style-type: none"> <li>▪ Choose to use the internet when appropriate as a tool for independent research, e.g., gathering text, images, videos and sound as resources to use in their own work.</li> <li>▪ Use more advanced searching techniques (e.g. Boolean and relational operators).</li> <li>▪ Choose the most appropriate search engine for a task, e.g., image search, search within a specific site or searching the wider internet.</li> <li>▪ Be able to create and use folders within lists of book-marks or favourites to organise content.</li> <li>▪ Apply their knowledge of what to do and who to tell if they discover something inappropriate or offensive on a website, at home and in school.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Know and understand what to do and who to tell if they discover something inappropriate or offensive on a website, at home and in school.</li> <li>▪ Understand when and where the internet can be used as a research tool.</li> <li>▪ Understand that you should not publish other peoples' material on the Internet without their permission but you can hyperlink to their websites and acknowledge the source.</li> <li>▪ Know how Boolean and relational operators can be used in searching.</li> <li>▪ Understand that good online research involves processing information, and interpreting it for others rather than direct copying</li> </ul>

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### Digital Literacy

#### Programme of Study

- Be discerning in evaluating digital content.
- Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.
- Understand the opportunities computer networks offer for communication and collaboration.

#### Skills

##### Online safety

- Locate and respond appropriately to the terms and conditions on websites.
- Identify unsuitable posts (e.g. on blogs, a forum ...) pertaining to content and conduct.
- Identify inappropriate and unacceptable behavior when analysing resources such as videos, text-based scenarios and electronic communications.
- Continue to develop the skills to identify risks involved with contact, content and their own conduct whilst online.
- Use electronic communication and collaboration tools safely.

#### Knowledge and Understanding

##### Online safety

- Be aware that file sharing is usually illegal due to copyright laws and can also spread viruses.
- Know a range of ways to report concerns about content and contact.
- Know what a 'strong' password / understand the importance of keeping personal data secure.
- Understand what a digital footprint is.
- Know that resources and materials can be covered by copyright and downloading these materials is illegal.
- Understand that web users have to observe the terms and conditions of websites.
- Understand that electronic communication can be malicious or inappropriate and recognise when an attachment may be unsafe to open.
- Understand that social network or other online environments have security settings, which can be altered, to protect the user.
- Understand the need to respect privacy of other individuals, e.g., through using bcc function on an email, not uploading/using images or personal information without permission.
- Understand the benefits of developing a 'nickname' for online use where appropriate.
- Understand they have a right to be protected from inappropriate use of technology by others and the need to respect the rights of other users.
- Understand some malicious adults may use various techniques on the Internet to make contact, elicit personal information and 'groom' young children, e.g., fake profiles.
- Understand the risks involved in arranging to meet and subsequently meeting anybody from the online world in the offline world.
- Know that they should tell a trusted adult immediately if they are asked to meet anybody from the online world in the offline world.
- Know how to report any suspicions, e.g., through school's eSafety policies and procedures and the use of CEOP's 'report abuse' button, which links directly to the police.
- 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 that they should not publish other peoples' pictures/tag them without permission.
- Know that content, e.g., photographs and videos, put online are very difficult to remove
- Understand how their own inappropriate conduct can put them at risk whilst online

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Electronic communication and collaboration	Electronic communication and collaboration
<ul style="list-style-type: none"> <li>▪ Independently, and with regard for eSafety, select and use appropriate communication tools to solve problems by collaborating and communicating with others within and beyond school, e.g., email, discussion forums, blogs, wikis, text messages and other digital communication tools.</li> <li>▪ Make use of webcams and /or video conferencing, if appropriate and available, e.g., to exchange ideas and collaborate on projects with external providers, another class or school, or abroad.</li> <li>▪ Extend online publishing to a more global audience, e.g. creating and publishing web pages, blog and podcasting.</li> <li>▪ Evaluate the effectiveness of a variety of digital communication tools for communicating and collaborating.</li> </ul> <p><b>Example- e-mail</b></p> <ul style="list-style-type: none"> <li>▪ Add e-mail addresses to a class address book.</li> <li>▪ Create group or distribution lists of contacts from an address book.</li> <li>▪ Learn how to use the cc and bcc facilities when sending an e-mail and discuss when these should be used.</li> <li>▪ Send 'group' e-mails and be aware of the benefits and risks in 'replying to all'.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Understand the potential benefits and risks of digital communication and that methods will vary according to purpose.</li> <li>▪ Understanding of which tools are better for communicating or collaborating and those that can be used both.</li> <li>▪ Understand what open-source software is and the conditions of use when using it.</li> </ul>
Digital research - search	Digital research - search
<ul style="list-style-type: none"> <li>▪ Use strategies to verify the accuracy and reliability of information, distinguishing between fact and opinion, e.g. cross checking with different websites or books.</li> <li>▪ Identify whether a file has copyright restrictions and can be legally downloaded from the internet then used in their own work.</li> <li>▪ Use appropriate strategies for finding, critically evaluating, validating and verifying information, e.g., using different keywords, skim-reading to check relevance of information, cross checking with different websites or other non ICT resources.</li> <li>▪ Distinguish between fact and opinion and make informed choices about the sources of online information used to inform their work.</li> <li>▪ Apply their knowledge of the meaning of domain names and common website extensions, e.g., .co.uk, .com, .ac, .sch .org, .gov, .net, to support the validation process.</li> <li>▪ Develop skills to question where web content might originate from and understand that this gives clues to its authenticity and reliability, e.g., by looking at web address, author, contact us sections, linked pages.</li> <li>▪ Use acquired search skills to question where web content might originate from and understand that this gives clues to its authenticity and reliability, e.g., by looking at web address, author, contact us sections, linked pages.</li> <li>▪ Identify how copyright restrictions can affect how a file can be used in their own work, e.g., those produced under Creative Commons Licensing.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Understand when and where the internet can be used as a research tool.</li> <li>▪ Understand how search engines work and know that there are different search engines; some to search within sites, and some to search the wider Internet. Be aware that copying text directly from websites or non-digital resources is equivalent to stealing other people's work (plagiarism).</li> <li>▪ Understand the concept of copyright and how it applies to material they find/download and to their own work.</li> <li>▪ Understand the concept of plagiarism and the importance of acknowledging and referencing sources.</li> <li>▪ Understand that you should not publish other peoples' material on the Internet without their permission but you can hyperlink to their websites. <ul style="list-style-type: none"> <li>o Become aware that file sharing is usually illegal due to copyright laws and can also spread viruses.</li> <li>o Talk about validity, plausibility and appropriateness of information, especially on the internet.</li> <li>o Understand some of the potential dangers and impact of not validating information.</li> </ul> </li> <li>▪ Understand that good online research involves processing information, and interpreting it for others rather than direct copying.</li> </ul>

# Key Learning in Computing: Years 5 and 6

## Computer Science

### Programme of Study

- 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.
- Appreciate how results are selected and ranked.

Skills	Knowledge and Understanding
<h3>Programming</h3> <ul style="list-style-type: none"> <li>▪ Use repetition* and selection* in programs.</li> <li>▪ Use variables* in programs.</li> <li>▪ Design and create programs using decomposition.</li> <li>▪ Design programs to accomplish specific tasks or goals.</li> <li>▪ Use logical reasoning to develop systematic strategies that can be used to debug algorithms and programs.</li> <li>▪ Use procedures in programs..</li> <li>▪ Design, test and refine programs to control robots or floor turtles taking account of purpose and needs.</li> <li>▪ Use programming software to create simulations.</li> </ul>	<h3>Programming</h3> <ul style="list-style-type: none"> <li>▪ Know the meaning of the key terms:               <ul style="list-style-type: none"> <li>- selection.</li> <li>- variables.</li> <li>- decomposition.</li> </ul> </li> <li>▪ Know the meaning of logical reasoning.</li> <li>▪ Understand what a procedure is and why it is important in programs.</li> <li>▪ Know that programs can be represented in different formats including written and diagrammatic.</li> <li>▪ Understand the need for precision when creating sequences to ensure reliability.</li> <li>▪ Understand how experiences of programming / control relate to control systems in the real world.</li> <li>▪ Understand that there are often different ways to solve the same problem or task</li> <li>▪ Understand that programming software can create simple and complex simulations.</li> </ul>
<h3>Simulations and modelling/IT – Data handling</h3> <ul style="list-style-type: none"> <li>▪ Explore the effects of changing variables in models and simulations in order to solve a problem.</li> <li>▪ Make and test predictions.</li> <li>▪ Enter formulae into a pre-prepared spreadsheet - explore the effects of changing variables.</li> <li>▪ Develop simple spreadsheet models to investigate a real life problem.</li> <li>▪ Create simple spreadsheet models to investigate a real life problem.</li> <li>▪ Identify and enter the correct formulae into cells. Make predictions of the outcome of changing variables.</li> </ul>	<h3>Simulations and modelling/IT – Data handling</h3> <ul style="list-style-type: none"> <li>▪ Understand when and where it is appropriate to use a spreadsheet model or a simulation to support an investigation and explain their choices.</li> <li>▪ Understand that spreadsheets can automate functions, making it easier to test variables, e.g. when planning a budget you can change the number of items and see the changes to total cost.</li> <li>▪ Understand that spreadsheets can be used to explore mathematical models.</li> <li>▪ Understand the need for accuracy and frequent checking when entering formulae.</li> <li>▪ Understand the possible consequences of using inaccurate data or formulae.</li> </ul>
	<h3>Digital research - search</h3> <ul style="list-style-type: none"> <li>▪ Understand how search engines work and know that there are different search engines; some to search within sites, and some to search the wider Internet.</li> <li>▪ Understand what 'ranking' is when related to search engines</li> <li>▪ Understand the importance of keywords and 'linked' pages in the listing/ranking of websites.</li> </ul> <h3>Understand computer networks</h3> <ul style="list-style-type: none"> <li>▪ Understand the difference between the internet and the world wide web.</li> <li>▪ Understand that the Internet provides many different services.</li> <li>▪ Know about the key components of a network and how networks work.</li> <li>▪ Understand what an IP (Internet Protocol) address is.</li> </ul>