Lower Key Stage 2 – *Authoring* – Theme Guide

Children investigate computing storage capacities and ways of saving data. They develop understanding of the school network and operating systems. They use varied resources to create digital content, creating and manipulating images and words. They select and use software to create non-linear content for specific audiences and objectives.

Learning objectives for the term
To understand that computer systems store data as bytes and we use this unit to specify size.
To understand that computer networks have a structure which we can use to save and share digital resources.
To understand that we can store data on computers in remote locations, which we can refer to as the cloud.
To understand that there are different operating systems used by our computing devices. *Compare two operating systems noting their difference and similarities.*
To understand word processing software often includes digital tools to improve clarity, accuracy and efficiency.
To understand that digital objects can be inserted and controlled in word-based texts.
To explore how images can rapidly increase document size.
To understand that multimedia texts are effective in communicating ideas to specific audiences.
To know that non-linear multimedia texts can be organised to include audience control over how the content is accessed. *Use safe web tools to design an online multimedia text.*
On-Going Learning Objectives
To review and evaluate their work, discussing the choices they have made and checking for accuracy.
Use appropriate file-naming conventions and understandable folder structure to save, organise and retrieve their work.
To understand essential eSafety rules and to know what to do in the event of an incident or concern at home or school.
To know that some digital resources may not be appropriate. Understand what to do if such materials are accessed.

Vocabulary – see Glossary for definitions (for terms in blue)	
multimedia, *hotspots,* *hyperlinks,* *digital,*	*operating systems,* *GUI (pronounced 'gooey')* *Cloud,* *copyright*

Possible resources for this theme (further resources are suggested with the explanatory notes below. Note that these are examples and not formal recommendations.)	
Writing tools: • 2Write (as part of 2Simple Purple Mash) • Microsoft Word • Google Docs (as part of G-Suite for Education) • Clicker 7 • J2Write (as part of J2E) • Textease	**Software to create non-linear multimedia texts:** • Powerpoint • Google Slides (as part of G-Suite for Education) • Clicker 7 • Microsoft Photostory 3 • Book Creator (iPad / Chrome app) • Textease • J2E5 (as part of J2E)

Please note that with any online platform it is essential that you review the privacy policy and terms and conditions of the service. The school is responsible for the protection of data it holds and compliance with current data protection legislation. Always assess both the data protection and safety of the service you are considering using, and ensure any necessary permissions are in place before using with pupils.

Primary Computing Scheme online materials that are referenced in this guide can be accessed from:
http://www.hertsforlearning.co.uk/user/login

You will need to be logged into your school account and have a current subscription to the Primary Computing Scheme to gain access. The materials can be accessed from the *My Resources* link at the top/right of the screen, once you are logged in.

Key learning objectives **(some objectives might be used for more than one lesson)**
To understand that computer systems store data in units called bytes and we use this to specify size.
• Use notepad to show that one byte is the amount of storage used by one character of text. Save a notepad document with one character of text and look at its properties to show it will be 1 byte in size. Add more characters of text to the document, re-save it and look at how the file size has increased. Note how spaces count as a character and so will add to the file size. • A file might be 50,000 bytes, expressed as 50 kilobytes or 50kb. Review other capacities such as 1 megabyte (1 million bytes), 1 gigabyte (1 thousand kilobytes) and 1 terabyte (1 thousand gigabytes). • Research what comes next (1000 terabytes is a petabyte.) • See the video guide: [*Understanding file sizes and units of storage capacity*.] • If possible, show some old storage devices and talk about their storage capacities. E.g. a 3 ½ inch floppy disk held 1.44 megabytes of data (less than one digital photograph from a fairly standard phone or camera these days.) • Pupils could make a digital book, presentation or timeline of portable storage devices (E.g. cassette, 5 ¼ inch floppy disk, 3 ½ inch floppy disk, SD cards and USB Drives.) • Show some images of older computers, mainframe computers etc. How do they compare to the computing devices we use today? • Discuss why modern files might take up more storage than files in the past. (E.g. photographs are better quality now.) • What are the advantages and disadvantages of portable media? Consider the risks of data loss and ask what we might do to protect our data (E.g. we should back-up data we cannot afford to lose. We can encrypt files and storage devices so that they can only be opened with a password, preventing unauthorised access.)
To understand that computer networks have a structure, which we can use to save and share digital resources.
• Depending on your school network, show the shared drive(s) on the network and compare to the pupils' own folders if available. How are they different? (Pupils' folders are usually only visible to the owner.) Why do we use network drives? What are the advantages / disadvantages of shared drives? • How does the folder system at school differ from that at home? • How should we name our files so that we can find them again easily? Agree on a class naming convention for pupils' own work so that they can easily identify and retrieve their files easily. Pupils practise organising their work, creating folders, moving files into different folders etc. using the system in your school. (This may be, for example, a Windows network or G-Suite for Education.) • We want children to become familiar with commonly found file extensions, so that as their digital literacy increases they can recognise a file 'type' by its extension. See the glossary for a list of commonly used file extensions. To do this, draw attention to the 3 or 4 character file extensions used by the files we commonly use in school. (If the file extension is invisible, it can be found by right-clicking on a file and selecting *properties*. • Consider making a display of common file types to go near the classroom computers or in the computing suite. • Match common file types to the software which may be used to handle the file. See the accompanying Powerpoint quiz on file types: [*File extensions quiz*] (E.g. .docx might be word processor, .jpg might be a graphics program etc.)
To understand that we can store data on computers in remote locations, which we can refer to as the cloud.
• We want children to understand that it is possible to save files to computers that are not in our home or school, or 'remotely', and access them on different computers and portable devices, wherever we are. We refer to this storage space as the 'cloud'. • Discuss the advantages and disadvantages of storing information in the cloud. • The advantages are that as long we have an internet connection, we can always access our files and there's no risk of losing the portable medium, leaving it at home or having it stolen. Cloud storage is also usually quite cheap.

- The disadvantages are that we may be dependent on an internet connection to access the files, and there may be concerns about privacy and what happens to the data we store in the cloud.

To understand that there are different operating systems used by our computing devices. *Compare two operating systems noting their difference and similarities.*

- What is an *operating system*? (See glossary.)
- For example many school computers use a Windows® operating system, iPads® and iPhones® use iOS™ and Apple Macs® use OS-X®. Chromebooks use the Chrome O/S operating system.
- What is a GUI? (Graphical User Interface.) Why do we have them?
- How did people operate computers before we had GUIs?
- If possible show some images of old operating systems such as DOS, Acorn MOS (from BBC computers) Windows® 3.1 etc.
- If possible, ask the school technician to launch a DOS prompt on a computer to show the class the sort of environment that computer users had to use before we had GUIs.
- Compare the similarities and differences between operating systems available to you in school, e.g Windows™, Chrome O/S and iOS™.
- Discuss how different operating systems may be made by entirely different companies for very different systems, and interoperability may be an issue. Sometimes it can be difficult to move files from a device that uses one operating system to another that uses a different system.

To understand that word processing software often includes digital tools to improve clarity, accuracy and efficiency.

- Here we are developing the pupils' digital literacy through familiarity with using word processing tools.
- In at least two applications, use and compare the effectiveness of the following tools:
  - text formatting
  - find and replace tool
  - borders and shading
  - bullets and numbering tables and text boxes
  - spell and grammar check
  - thesaurus
  - hyperlinks (for example to websites and other places in the document)
- Children should become familiar with the vocabulary of word processing tools, and be able to locate and use the main ones in different software.
- You might compare writing tools such as Microsoft® Word, Google Docs (when used as part of G-Suite for Education,) Clicker, 2Write and iPad® apps such as Pages or Book Creator.

To understand that digital objects can be inserted and controlled in word-based texts.

- By 'digital objects' we refer to images, text boxes, word art, screen captures etc.
- Children explore more advanced features of word processing applications, and how external objects such as images can be inserted and manipulated.
- Use the tools below in different software applications, to control, format and organise digital objects:
  - resizing
  - rotation and flipping
  - cropping
  - text flow and layout
  - grouping
  - layering/ordering
- Again, explore different pieces of software rather than just one, to give children a broader experience and develop transferable skills.
- Create a simple file in a word processing tool so that you can view the file size (it is probably easiest to do this on a desktop/laptop computer.) Then add an image, preferably an appropriate photograph, save the file and look again at the file size. What has happened to it? Why?
- Think about the potential disadvantages of having very large files.
  - They use a lot of storage space, which ultimately costs money.
  - They are slower to send.
  - They are harder and slower to send electronically. Email often limits the size of your messages, and if you were sending a large file from a smartphone it might use of more of the data allowance and cost more money.
- How could we make the files smaller? (E.g. explore the effect of reducing the image size.)

To understand that multimedia texts are effective in communicating ideas to specific audiences.
• What do we mean by multimedia? (See glossary.) • Consider the four types of media we can use (text, still images, video and sound) and the advantages and disadvantages of each, thinking about accessibility and usability. • How might different forms of media enhance a text? What might the disadvantages be? • Provide access to some websites, apps, presentations etc. for the children to critically evaluate in terms of their usability, accessibility etc. (E.g. websites such as DKFindout (http://www.dkfindout.com) are particularly media rich with a comprehensive search functionality.) • Evaluate a range of digital multimedia texts (web pages, presentations), reviewing the options for audience access (index, contents, hotspots, hyperlinks, search, readability etc.) and considering their effectiveness in communicating the message or idea. • Children should become familiar with the vocabulary associated with navigating digital texts. • Pupils explain which of the texts explored they found most easy to understand, to navigate etc.
To know that non-linear multimedia texts can be organised to include audience control over how the content is accessed. *Use safe web tools to design an online multimedia text.*
• Pupils plan and create the digital text for a specific audience, and have the opportunity to include different types of media, and should credit the sources accordingly. The text should have a navigation system so that the user can jump from one page to another rather than moving through the content in a given order. This is usually achieved through hyperlinks within the document. • Review with a partner, considering improvements and developments. • Link to a topic or other subject area, or create a project based on content in this computing theme, for example the history of portable storage. • Teach children how to make hyperlinks between pages in the software you have chosen to use. This might be, for example, Microsoft® Powerpoint™, Textease Studio, Book Creator app or a safe online environment if the school subscribes to one of these. • Note: If this theme is being taught before the ***Accuracy Counts*** theme, it will be necessary to cover the concepts of copyright and ownership around the use of media. See the ***Accuracy Counts*** planning guide. Pupils should not download and use any media unless you know if is from a copyright-friendly source. • See accompanying sheet for sources of images and sounds. [*Links to sources of free images / sounds and music*] • Pupils explore each other's digital texts, commenting on effectiveness, usability etc.
On-going Learning Objectives
To review and evaluate their work, discussing the choices they have made and checking for accuracy.
Use appropriate file-naming conventions and understandable folder structure to save, organise and retrieve their work.
To understand essential eSafety rules and to know what to do in the event of an incident or concern at home or school.
To know that some digital resources may not be appropriate. Understand what to do if such materials are accessed.

Suggested independent task – any open-ended activity (2-3 sessions) enabling the children to demonstrate their computing capability around the knowledge and understanding provided in the term
➢ Plan a non-linear multimedia text for a specific purpose. Choose an appropriate application and create the text. ➢ Demonstrate an understanding of copyright and ownership. ➢ Share their work with others and make improvements in the light of their discussions. ➢ Evaluate their completed task and comment on their choice of application. Other considerations: Does the task provide for children to work at different levels? Is there support available for children to select if they wish? Are there opportunities for the children to review and develop their work? Is there an opportunity for the children to evaluate the finished task?

- Pupils should create a digital text linked to learning in another topic or subject area, considering who the text is aimed at.
- They should choose an appropriate tool to make their texts, as above, and include a navigation system. Therefore the text will probably include a few pages unless a web based tool is used, where pupils could hyperlink to different parts of a single web page.
- Media used in the text should be credited if applicable, and pupils should indicate where the media was sourced.
- Pupils should 'test' their digital text on a peer and comment on each other's work in terms of usability.
- Pupils should evaluate their work, explaining how they were able to make the text non-linear, and their opinion of the software they used.

Please note there is an example medium term plan for this theme, donated by a Hertfordshire school, available to download from the online area.