

Lower Key Stage 2 – Accuracy Counts – Theme Guide

Children discuss computer networks including the internet and the services it offers. They explore how search engines work and what influences results, evaluating search engines and using sources. They learn about the threat from computer viruses, develop understanding of intellectual property and relate this to their own content. They use spreadsheet software to create graphs and to explore number patterns.

Learning objectives for the term

- To understand the internet is a global system of linked computer networks hosting many services. **5**
- To know identifying key words is central to research. *Write their own version of the text.*
- To know the World Wide Web is an internet service accessed by web browsers and searched using search engines.
- To understand that search engines locate information on the World Wide Web rapidly, but rank it when providing results **5**
- To understand that digital searches results can be inaccurate, biased, unsafe, irrelevant and may differ from one search engine to another. *Use more than one search engine, comparing results.* **5**
- To understand the malware and computer viruses are programs which can harm your device or steal your information. **5**
- To understand works are the creator's own intellectual property. **5**
- To understand electronic data is held about us on the internet. **5**
- To understand that spreadsheets have a specific structure which enables us to locate and enter data and create tables and graphs.
- To understand spreadsheets allow us to explore number and number patterns.

On-going Learning Objectives

- To review and evaluate their work, discussing the choices they have made and checking for accuracy.*
- To understand essential eSafety rules and to know what to do in the event of an incident or concern at home or school.* **5**
- To recognise acceptable/unacceptable behaviour when using technology* **5**
- Use appropriate file-naming conventions and understandable folder structure to save, organise and retrieve their work.*

Vocabulary – See Glossary for definitions (for terms in blue)

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| <ul style="list-style-type: none"> • <i>Internet,</i> • <i>world wide web,</i> • <i>URL,</i> • <i>hyperlink,</i> • <i>browser,</i> • <i>search engine,</i> | <ul style="list-style-type: none"> • <i>intellectual property,</i> • <i>copyright,</i> • <i>spreadsheet,</i> • <i>formula,</i> • <i>virus, malware,</i> • <i>Creative Commons</i> |
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Possible resources for this theme (further resources are suggested with the explanatory notes below. Note that these are examples and not formal recommendations.)


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| <p>Digital writing tools</p> <ul style="list-style-type: none"> • Microsoft® Word • Clicker 7 • 2Write (as part of 2Simple Purple Mash) • JIT5 Write (as part of J2E) • 2Publish (as part of 2Simple Purple Mash) • Book Creator (app for iPad®, Android®, Windows®) • Google Docs (as part of G-Suite for Education) | <p>Spreadsheets</p> <ul style="list-style-type: none"> • Microsoft Excel • Google Sheets (as part of G-Suite for Education) • 2Calculate (as part of 2Simple Purple Mash) • Textease Spreadsheet <p>Different Search Engines</p> <ul style="list-style-type: none"> • See [Links to search engines for children] available from downloads area. |
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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.

Free Barefoot Computing activities to support this theme.	
<ul style="list-style-type: none"> • Modelling the Internet. Link Pupils learn about difference between Internet and WWW, and how web pages are viewed. • Network Hunt Activity. Link Pupils hunt around school to find and map locations for network connected devices. • Selecting Search Results Activity. Link Children learn about how search engines work and how they use web crawlers to index the World Wide Web. 	<p><i>Barefoot Computing</i> provides freely available resources to support teachers in delivering the computer science aspects of the 2014 Primary National Curriculum for Computing.</p> <p>Free registration with the <i>Barefoot Computing</i> website is required to view and download these resources. To register, visit: http://barefootcas.org.uk</p> <p>References to these resources and the accompanying links are provided with permission from <i>Barefoot Computing</i>.</p>

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)
<p>To understand the internet is a global system of linked computer networks hosting many services. </p> <ul style="list-style-type: none"> • Discuss the difference between the 'www' and the 'internet'. Whilst we frequently interchange these, they are not the same thing. The internet is a system of connected computer networks, upon which many services can run. The www is one such service. It is a vast system of pages/document connected together by links (hyperlinks.) Other systems include email, instant messaging, cloud storage, video-conferencing, music streaming etc. • See the ready-made Powerpoint available in the online area [<i>What can we do on the Internet?</i>] • Pupils should understand that the information we can find on the www is stored on different computers all over the world. • Thought-shower / mind map / present the pros and cons of some internet services, including the www, drawing attention to concerns over privacy, sharing, lack of control of what we share etc. • Research the history of the World Wide Web; assess how it has changed the way we find information. • Possible sites to explore when researching history of www: <ul style="list-style-type: none"> ○ http://webfoundation.org/about/vision/history-of-the-web/ ○ http://www.bbc.co.uk/webwise/guides/how-the-web-works • Think about what life would have been like before the internet. How did people find information / communicate

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<p>etc. How has the internet (esp. the www) changed the world?</p> <ul style="list-style-type: none"> • See the free activity from Barefoot Computing (links above): <ul style="list-style-type: none"> ○ Modelling the Internet Activity ○ Network Hunt Activity
<p>To know that identifying key words is central to research.. <i>Write their own version of the text.</i></p>
<ul style="list-style-type: none"> • Link to English • Key words are essential to digital (and non-digital) research, helping us summarise texts. • Practise finding key words in sentences and short paragraphs. Highlight keywords in digital word-based texts and use to summarise the texts. • Link to grammar and note key words are usually nouns, verb and adjectives, and not conjunctions, articles etc. • How much of a sentence or short paragraph could you understand from <u>only</u> its key words? • Pupils write research questions for a topic they are learning about, and then identify the key words within the questions, which they could use in online research. • Some children may be able to re-write a text in summary, based on the key words they have identified in the original text.
<p>To know the World Wide Web is an internet service accessed by web browsers and searched using search engines.</p>
<ul style="list-style-type: none"> • The World Wide Web is an internet service using hyperlinks to connect many millions of websites, each with its own unique address (Uniform Resource Locator or URL), which is accessed by web browsers and searched using search engines. • Highlight that the software used to access the www is called a <i>browser</i>. What browsers do we use in school? (E.g. you may use <i>Internet Explorer™</i> on PCs/laptops but <i>Safari™</i> on iPads and <i>Chrome®</i> on Chromebooks.) • How do we navigate the www and move from one page to another? (Pupils learn the word <i>hyperlink</i>.) • Talk about search engines and how there are many different ones. • Understand that search engines respond quickly by using web crawler programs to index each web page and its key words. See the accompanying PowerPoint file [<i>How a Search Engine Works</i>] • For an understanding of how search engines work, try this BBC link: http://www.bbc.co.uk/guides/ztbjq6f • Talk about the fact that each website and webpage has its own address. Where can we see this address? What is the address of the school website? What about your favourite website? • See the accompanying Powerpoint® file [<i>Learning about website addresses</i>] • Use an unplugged activity to show how a search engine retrieves results from websites (for example by children acting as researcher, search engine, web crawler and web sites). For an unplugged search-engines activity, see this link to 'Modelling a Search Engine' by Graham Hastings [CC by-sa Graham Hastings]: http://bit.ly/1R84bSk • See the free activity from Barefoot Computing (links above): <ul style="list-style-type: none"> ○ Selecting Search Results Activity.
<p>To understand that search engines locate information on the World Wide Web rapidly, but rank it when providing results. 📄 <i>Use more than one search engine, comparing results.</i></p>
<ul style="list-style-type: none"> • Different search engines may produce different search results. • Talk to the pupils about results ranking – which website appears at the top of the list and why? • Note that often the results at the top of the list are sponsored and we have to go down the page a little to find the actual search results. • The way a search engine ranks its results may vary between different engines, and will involve different factors. One of the main ones is the amount of other sites that link to a website. A site that many other sites link to will be seen as a better site than one that has few links pointing towards it. • Try running the same search in some different search engines and noting whether the results are the same. • See accompanying list of search engines aimed at children's use: [<i>Links to search engines for children.</i>] • Children could recommend search engines suitable for younger children to use. • See the free activity from Barefoot Computing (links above): <ul style="list-style-type: none"> ○ Selecting Search Results Activity.
<p>To understand that digital searches results can be inaccurate, biased, unsafe, irrelevant and may differ from one search engine to another. 📄</p>
<ul style="list-style-type: none"> • Children should learn to check results, distinguishing between fact and opinion, use a range of digital research approaches effectively and discuss how we can check that results are accurate, including; <ul style="list-style-type: none"> ○ compare default and advanced search tools within a search engine ○ use keyword/keyword string searches or menus and navigation bars as appropriate


- consider whether the source is from a well-known organisation or a private individual.
- asking an adult we trust to help us verify the content
- Choosing two or three different search engines, examine and compare the features offered. Do they have advanced search options or no functionality beyond putting words into the main search field?
- Show advanced search in a popular search engine and discuss the advantages of using this.
- Show pupils some basic search syntax such as: "" (inverted commas around phrase so that the exact phrase is searched for.) - (minus, so that the word which follows the sign is omitted from the search) etc.
- Having previously checked these searches on the engine(s) you are choosing to use, ask the pupils to search for information on a topic you are covering.
- Pupils discuss with peers whether they think the results are accurate and why.
- Pupils use a suitable digital tool to create a list of web-based resources to support the topic, choosing the sites carefully, considering their quality and the audience that will use the list.
- For an online activity around this topic, try the Cybercafé from Thinkuknow.com.
http://www.thinkuknow.co.uk/8_10/cybercafe/Cyber-Cafe-Base/ (Use the *Fast Menu* and choose *Web Browsing*.)

To understand the malware and computer viruses are programs which can harm your device or steal your information. 

- What is a (non-computer) virus?
- What is malware? What is a computer virus? How do computer viruses get spread? For an explanation of computer viruses and malware, try this *BBC Bytesize* link: <http://www.bbc.co.uk/guides/zcmbgk7>
- We want children to understand that malware is term to describe computer programs that can harm your device or steal your information. Computer viruses (a type of malware) are programs which can replicate themselves, spreading automatically, often damaging computer systems.
- How can we avoid malware / viruses? What should we do if we are not sure whether an email, link, game etc. is safe to click on, open or use? Discuss the need to be cautious when downloading files or attachments on any computer, including phones and tablets.
- Away from the computer, children can work with a learning partner to create an algorithm in the form of a diagram, which outlines a safe protective process to follow when accessing resources online or opening attachments.

To understand works are the creator's own intellectual property. 

- We want children to understand that unique works and materials created by ourselves and others (for example a picture or a story) are normally the creator's own intellectual property.
- Talk about ownership. Who owns the work we do in school? If you take a photograph, who owns it? If you wrote a poem or story, whose poem or story is it?
- See glossary for a definition of intellectual property.
- Make sure children are familiar with the word *copyright* (see glossary for a definition) and the copyright symbol ©. What could happen if we disregard copyright?
- Introduce *Creative Commons* through which creators can allow their work to be shared by others, providing certain conditions are met.
- If you were to share some of your work for others to use, what conditions would you want them to follow?
- Show some of the *Creative Commons* symbols and discuss their meaning. For example: 
- Using the search skills from above, research a topic and think about the words, sounds, images and video we might find. Who do you think owns these things? Are we just allowed to download photos, videos or sound and use them in our work? Is it OK to just copy/paste words from other people's work into our work?
- Pupils write up their research, crediting the sites they found the information from (but not copying the information word for word.) They should credit both digital and non-digital sources.
- Use a suitable educational images website to add images to their work, and credit these to show where the images were sourced. See accompanying list of image websites: [[Links to sources of free images.](#)]

To understand that electronic data is held about us on the internet. 

- Referring back to what we learned about the www, and the list of cons we might have made, think about what information may exist about us online and how this information gets there.
- What is personal information? What information should we not share online? What do we do if we are not sure about whether it is safe to share some information or if someone online is asking us for it?
- Children should understand that we need to check our online profiles regularly and do all we can to keep our data secure.

- Some Internet safety websites you might consider using include:
 - Thinkuknow. E.g. http://www.thinkuknow.co.uk/8_10/cybercafe/Cyber-Cafe-Base/
 - Childnet. E.g. <http://www.childnet.com/young-people/primary>
 - Internet Matters. E.g. <http://www.internetmatters.org/schools/primary/#tab-1431596075-1-91>
- Carry out some research using selected internet safety websites, and work with a partner to build a set of simple rules for keeping safe online both inside and outside school.
- They could present these in a poster or something which can be displayed. Perhaps make a display near the computers in your classroom, school entrance area or in the computing suite.
- Remind children that many online services have age limits (usually 13) and be aware that when discussing this children may admit to having social network profiles on services for which they are under age (eg Snapchat or Instagram.) Discuss with your SLT what action should be taken if this happens, in accordance with your school policies.

To understand that spreadsheets have a specific structure which enables us to locate and enter data and create tables and graphs.


- A first introduction to spreadsheets.
- Before using spreadsheets for data and graphs, allow children to become familiar with the environment through activities such as drawing flags or the pixel art activity in the *Bringing Images to Life* theme. See the accompanying sheet: [*Using spreadsheets to create pixel art.*]
- Try making the spreadsheet environment more user-friendly for children by enlarging the fonts and cell size.
- Practice identifying cells by their coordinates.
- Pre-prepare some spreadsheets for pupils to explore. For example, create a ‘magic graph’ by entering a column of numbers and making a graph from it. Then delete the column of numbers and save the spreadsheet. When children enter numbers into the column, the graph will ‘magically’ begin to appear.
- Pupils add some real investigation data into a spreadsheet using both numbers and words to identify them. For example, use a sound-meter app to record the volume levels in different parts of the school, and use these values in a spreadsheet to display the data.
- Pupils use the data to create graphs, and explore changing the graph types. Discuss which type of graph they think is most appropriate for the purpose.
- Try to make any spreadsheet activities relate to real purposes and use real data.
- Use the graphs created to analyse the information and draw conclusions. E.g. the noisiest area of the school is...


To understand that spreadsheets allow us to explore number and number patterns.

- Show children how the operators differ slightly in spreadsheets from those we would normally use. For divide we use / and for multiply we use * (asterisk.)
- Show that by entering calculations into a cell, using these operators, the answer is produced in the same cell. Once the answer is shown, we have to select the cell and look in the formula bar to see the original numbers and operators we used.
- Teach children to use ‘fill’ so numbers, words or patterns can be copied down columns or across rows.
- Show how we use cell references to create formulae. Practice creating simple spreadsheets to carry out calculations using formulae.
- A good activity is to create a ‘times tables machine’ so that children can quickly produce any times table, to help their learning.

On-going Learning Objectives

To review and evaluate their work, discussing the choices they have made and checking for accuracy.

To understand essential eSafety rules and to know what to do in the event of an incident or concern at home or school 

To recognise acceptable and unacceptable behaviour when using technology 

Use appropriate file-naming conventions and understandable folder structure to save, organise and retrieve their work.

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

- > Carry out some research related to a curriculum topic, ideally designing their own research questions and identifying key words. The research should include numerical data.
- > Present the information they have found, including using a spreadsheet to produce appropriate supporting graphs.
- > Evaluate their work and consider how it could be improved further.

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?

- Provide the topic for children to research, which will include some numeric data, for example statistics, which they will enter into a spreadsheet. Allow time for pupils to write the questions they will ask in order to carry out the research, and also identify the key words within the questions. They should then use the key words in their online research.
- Pupils use a spreadsheet to create suitable graphs for the data they found during the research above. They could present the research findings using a program of their choice and copy/paste the graph into it, if that is supported. Alternatively they could present the information in written form with printed graphs included in their work.

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