Year 5 – Systems and searching

Unit introduction

Learners develop their understanding of computer systems and how information is transferred between systems and devices. Learners consider small-scale systems as well as large-scale systems. They explain the input, output, and process aspects of a variety of different real-world systems. Learners discover how information is found on the World Wide Web, through learning how search engines work (including how they select and rank results) and what influences searching, and through comparing different search engines.

Software and Hardware requirements

Pupils will need access to the internet and a search engine.

If you've adapted this unit to better suit your school, please share your adapted resources with fellow teachers in the STEM community. Alternatively, if this unit isn't quite right for your school, why not see if an adapted version which better suits has already been shared?

Overview of lessons

Lesson	Brief overview	Learning objectives
1 Systems	Learners are introduced to the concept of a system. They begin to understand that components can work together to perform a task. Finally, learners explore how digital systems can work and learn about physical and electronic connections.	To explain that computers can be connected together to form systems • I can explain that systems are built using a number of parts

		• I can describe the input, process, and output of a digital system • I can explain that computer systems communicate with other devices
2 Computer systems and us	Learners consider how larger computer systems work. They see how devices and processes are connected, and reflect on how computer systems can help them.	To recognise the role of computer systems in our lives • I can identify tasks that are managed by computer systems • I can identify the human elements of a computer system • I can explain the benefits of a given computer system • I can explain how to keep my personal information safe online
3 Searching the web	Learners are introduced to a range of search engines. They are given the opportunity to explain how to search, before they write and test instructions. Next, they learn that searches do not always return the results that someone is looking for, and refine their searches accordingly. Finally, learners are introduced to the two most common methods of searching: using a search engine and using the address bar.	To identify how to use a search engine • I can make use of a web search to find specific information • I can refine my web search • I can compare results from different search engines • I can explain why I should search trustworthy websites and not share any personal information online.
4 Selecting search results	Learners gain an understanding of why search engines are necessary to help them find things on the World Wide Web. They conduct their own searches and break down, in detail, the steps needed to find things on the web. Learners then emulate web crawlers to create an index of their own classroom. Finally, they consider why some searches return more results than others.	To describe how search engines select results • I can explain why we need tools to find things online • I can recognise the role of web crawlers in creating an index

		• I can relate a search term to the search engine's index
5 How search results are ranked	Learners take part in an unplugged activity to find out about how a webpage's content can influence where it is ranked in search results. In groups, learners create paper-based webpages on a topic that they are familiar with. They then discover how their webpages would rank when searching for keywords relating to their content.	To explain how search results are ranked • I can order a list by rank • I can explain that a search engine follows rules to rank results • I can give examples of criteria used by search engines to rank results
6 How are searches influenced?	Learners explore how someone performing a web search can influence the results that are returned, and how content creators can optimise their sites for searching. They also explore some of the limitations of searching and discuss what cannot be searched.	To recognise why the order of results is important, and to whom • I can describe some of the ways that search results can be influenced • I can recognise some of the limitations of search engines • I can explain how search engines make money

Subject knowledge and CPD opportunities

You will need be aware that digital systems are used in a wide range of public contexts and should be familiar with the concept of a computerised locker (which allows customers to collect parcels they have ordered online). You will need an awareness of internet searching and an understanding of the search engines introduced in the lessons. Basic searching skills are required, such as an understanding of how to refine search terms to get more relevant results and the fact there are two ways to conduct a web search: from within a search engine and using the address bar (omnibox). You will need to know how search engines use web crawlers to create an index of the World Wide Web. There is a useful guide here: https://www.bbc.co.uk/bitesize/topics/z7wtb9q/articles/ztbjq6f You will need to be aware that search engines use ranking to determine the order in which search results are displayed and that search engine optimisation (SEO) is applied to websites to help them rank as highly as possible. You should consider the impact that searchers, search engines, and webpage creators have on the effectiveness of a search:

- Searchers: the search term, the links that they click on, the location of the searcher, the choice of search engine, and the settings that they have chosen
- Search engines: the rules that their web crawlers follow to create an index, adverts and sponsored results, and the settings available
- Webpage creators: the terms, text, and images used; and the links in and out of a page

Continual Professional Development

Enhance your subject knowledge to teach this unit through the following free CPD:

- Getting started in Year 5 – short course
- Introduction to primary computing remote or face to face
- Teaching computing systems and networks to 5- to 11-year-olds

Teach primary computing certificate

To further enhance your subject knowledge, enrol on the teach primary computing certificate. This will support you to develop your knowledge and skills in primary computing and gain the confidence to teach great lessons, all whilst earning a nationally recognised certificate!

Progression

This unit progresses learners' knowledge and understanding of computing systems.

This unit progresses students' knowledge and understanding of the internet from that developed in the Year 4 The Internet unit In Year 6, they will continue to develop their knowledge and understanding of the internet, looking at how data is transferred and how the internet facilitates communication and collaboration online.

Common Misconceptions

Learners may have the misconception that a system is just a single device, however it is an interconnected set of components that work together to perform a function. They should understand the difference between the internet and the World Wide Web from year 3, however if they still have the misconception that these are the same thing, this will need to be explained. The internet is a global network of interconnected computers, while the World Wide Web is a collection of information accessed via the internet using web browsers.

When looking at searching, leaners may have the misconception that search engines search the entire internet in real-time for their search. This is not the case. Search engines index the internet and retrieve information from their indexed database, they are not searching live. They may believe that search engines are just looking for words in documents, however in reality searching involves much more, considering relevance, keywords, links, and many other factors. Learners may have the misconception that the first result is always the best, or most relevant, however the first result is based on the search engine's ranking criteria, which may not always align with the user's need.

When conducting searches, learners may have the misconception that using more keywords always leads to better search results. Although using relevant and specific keywords improves search accuracy, overloading with too many keywords can sometimes lead to less relevant results.

Curriculum links

Computing

- 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

Education for a Connected World links

Managing Online Information

- I can explain the benefits and limitations of using different types of search technologies e.g. voice-activation search engine. I can explain how some technology can limit the information I am presented with.

Privacy and Security

- I can explain what a strong password is and demonstrate how to create one

Relationships Education, Relationships and Sex Education (RSE) and Health Education

Internet safety and Harms

- Pupils should know how to be a discerning consumer of information online, including that from search engines, is ranked, selected and targeted

Assessment

Formative assessment

Assessment opportunities are detailed in each lesson plan. The learning objectives and success criteria are introduced in the slide decks at the beginning of each lesson and then reviewed at the end. Learners are invited to assess how well they feel they have met the learning objective using thumbs up, thumbs sideways, or thumbs down.

Summative assessment

Please see the summative assessment document of multiple-choice questions for this unit. This can be downloaded as a paper copy, with answers, or in a digital format to be shared.

Resources are updated regularly — the latest version is available at: ncce.io/tcc.

Attribution statement

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The original version can be made available on request via info@teachcomputing.org.