



Year 7 Standards - COMPUTER SCIENCE

Knowledge/skills	Working towards SWGS Standard for end of Year 7	Working at SWGS Standard for end of Year 7	Working beyond SWGS Standard for end of Year 7
Computer Science (to include areas such as theory and concepts, programming using a range of languages, computer systems, and machine learning and AI)	Computer Systems This unit takes learners on a tour through the different layers of computing systems: from programs and the operating system, to the physical components that store and execute these programs, to the fundamental binary building blocks that these components consist of. The aim is to provide a concise overview of how computing systems operate, conveying the essentials and abstracting away the technical details that might confuse or put off learners.		
	- Recall that a general-purpose computing system is a device for executing programs - Describe the function of the hardware components used in computing systems - Define what an operating system is, and recall its role in controlling program execution - Describe the NOT, AND, and OR logical operators, and how they are used to form logical expressions	- Recall that a program is a sequence of instructions that specify operations that are to be performed on data - Describe how the hardware components used in computing systems work together in order to execute programs - Recall that all computing systems, regardless of form, have a similar structure ('architecture') - Use logic gates to construct logic circuits, and associate these with logical operators and expressions - Recall that, since hardware is built out of logic circuits, data and instructions alike need to be represented using binary digits	- Explain the difference between a general-purpose computing system and a purpose-built device - Analyse how the hardware components used in computing systems work together in order to execute programs - Describe how hardware is built out of increasingly complex logic circuits



AI (Artificial Intelligence)

Students will experience a variety of real-world AI applications as well as considering the social and ethical implications of AI developments. Students will have the opportunity to delve deeper and explore machine learning models and the engines that make them work. Students will be able to take part in practical activities, in which they will create their own machine learning models using the free web-based tool [Machine Learning for Kids](#) and take a project from start to finish by going through the stages of the AI project lifecycle.

- Describe the difference between 'data-driven' and 'rule-based' approaches to application development
- Define machine learning's relationship to artificial intelligence
- Describe the impact of data on the accuracy of a machine learning (ML) model
- Use a machine learning tool to import data and train a model

- Name examples of AI applications
- Outline some benefits and issues of using AI applications
- Name the three common approaches to machine learning
- Explain the need for both training and test data
- Describe how decision trees are used to build a classification ML model
- Explain why ML is used to create decision trees
- Describe the stages of the AI project lifecycle
- Produce a model card to explain an ML model

- Describe how classification can be solved using supervised learning
- Explain how bias can influence the predictions generated by an ML model
- Describe how training data changes an ML model
- Test and examine the accuracy of an ML model
- Evaluate an ML model



Python Programming

This unit introduces learners to text-based programming with Python. The lessons form a journey that starts with simple programs involving input and output, and gradually moves on through arithmetic operations, randomness, selection, and iteration. Emphasis is placed on tackling common misconceptions and elucidating the mechanics of program execution.

A range of pedagogical tools is employed throughout the unit, with the most prominent being pair programming, live coding, and worked examples.

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| <ul style="list-style-type: none">• Write simple Python programs that display messages, assign values to variables, and receive keyboard input• Locate and correct common syntax errors• Use relational operators to form logical expressions• Use binary selection (if, else statements) to control the flow of program execution | <ul style="list-style-type: none">• Describe what algorithms and programs are and how they differ• Recall that a program written in a programming language needs to be translated in order to be executed by a machine• Describe the semantics of assignment statements• Use simple arithmetic expressions in assignment statements to calculate values• Receive input from the keyboard and convert it to a numerical value• Use multi-branch selection (if, elif, else statements) to control the flow of program execution• Describe how iteration (while statements) controls the flow of program execution• Use iteration (while loops) to control the flow of program execution• Use variables as counters in iterative programs | <ul style="list-style-type: none">• Generate and use random integers• Combine iteration and selection to control the flow of program execution |
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Use of Information Communication Technology (use of application software)	Modelling data with spreadsheets (MS Excel) The spreadsheet unit for Year 7 takes learners from having very little knowledge of spreadsheets to being able to confidently model data with a spreadsheet. The unit uses engaging activities to progress learners from using basic formulas to writing their own COUNTIF statements. This unit will give learners a good set of skills that they can use in computing lessons and in other subject areas.		
	• Identify columns, rows, cells, and cell references in spreadsheet software • Use basic formulas with cell references to perform calculations in a spreadsheet (+, -, *, /) • Collect data • Create appropriate charts in a spreadsheet • Use the functions SUM, COUNTA, MAX, and MIN in a spreadsheet	• Use formatting techniques in a spreadsheet • Use the autofill tool to replicate cell data • Explain the difference between data and information • Analyse data • Use a spreadsheet to sort and filter data • Use the functions AVERAGE, COUNTIF, and IF in a spreadsheet	• Explain the difference between primary and secondary sources of data • Use conditional formatting in a spreadsheet • Apply all of the spreadsheet skills covered in this unit



Digital Literacy (to include areas such as being a safe and responsible digital citizen)	Digital Literacy: In this unit, learners will evaluate the online world and their own internet activity for safety concerns and equip themselves with tools for protecting their online identities. As most learners will already have some form of online presence and familiarity with online spaces, the purpose of this course is for them to start thinking more critically about how they, and others, conduct themselves online. Learners will also be asked to discuss key debates around the online world, such as the extent of their right to privacy, and which powers should be granted to organisations and states. As much as possible, learners should be encouraged to develop their own ideas and opinions in order to become engaged citizens when it comes to online rights. In addition to learners understanding the context of online safety and the potential dangers they are at risk of, a key takeaway of this course is a repository of practical, risk-reducing steps that learners can implement online.		
	• Create a secure password for the SWGS network • Understand the school network structure and how/where to save schoolwork. • Discuss the main safety concerns of being online • Reflect on online activity from a safety perspective • Define online reputation and discuss what it is made up of • Explain how data is collected on and how it is used • Discuss ways in which data might be stolen • Define terms 'phishing' and 'malware' • Identify ways to protect one's data online • Define the term 'fake news' and discuss the quantity of fake news available online • Discuss how we decide what content should be illegal	• Discuss techniques on how to build a positive online reputation • Discuss the ways in which one's online reputation might be under threat and how to defend it • Discuss the ethics of big data use • Discuss which rights are believed to be upheld • Investigate the legal rights to privacy within the UK • Evaluate what data created online is valuable, and to whom • Discuss examples of disinformation spread online • Identify why fake news exists and who creates it • Discuss ways of identifying fake news and other forms of disinformation • Describe the UK laws governing online content • Discuss why policing online spaces can be difficult	• Define the terms 'big data' and 'data analytics' • Investigate the stakeholders who use big data and why • Debate whether the right to privacy is important, why this might be the case, and if the right to privacy is in tension with any other rights • Explain why some content online can be potentially harmful • Debate the right to access information in the context of safety concerns online already discussed in this unit



		• Demonstrate how to report illegal online content Discover different technologies used to access and share information online • Reflect on how big data and other tools help to target • Discuss the impact this might have on different people's online experiences and the potential disadvantages of living in an online bubble	
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