

ICT & COMPUTING

Year 7 Schemes of Work

Term 2

Module 2 - Introduction to Computing

About this Module	Learning Outcomes/Success Criteria (WILF) :
<p>In this module, students will learn the history of computers; practical study of components that make up a computer; inputs, processing and outputs; data and binary; bits, bytes and megabytes.</p> <p>Pupils learn to think like a computer scientist and understand how computers process data.</p>	<p>All: Must be able to understand the verb 'to compute' can be applied to any mathematical calculation; be able to name the main components of a computer; understand that all computation requires some form of input, a process and produces an output; be able to write a simple algorithm to draw a square; be able to write an assembly language program to add two numbers</p> <p>Most should be able to explain the functions of the main components of a computer and how they work together as a system; be able to write an algorithm to draw most of the 2D geometrical shapes using iteration; be able to write an assembly language program to perform multiple mathematical operations</p> <p>Some could be able to identify more complex functions involving multiple function machine operations ; be able to describe complex components like RAM and ROM; be able to write algorithms using iteration efficiently; be able to explore and create a range of assembly language programs</p>

Where the unit fits in:	Cross- curricular Links:
<p>Computing <i>Understand the hardware and software components that make up a computer and how they communicate with one another.</i></p> <p>Data and Data representation</p> <p>Programming and development <i>Create programs that implement algorithms to achieve given goals</i></p> <p>Hardware and Processing <i>Understand that computers have no intelligence and can do nothing unless a program is executed. Understand how programs specify the function of a general purpose computer.</i></p>	<p>Literacy : <i>Learn a range of vocabulary</i></p> <p>Maths <i>Learn simple binary arithmetic and function machines Addition, multiplication, algebra</i></p> <p>History <i>The history of electronic computing</i></p> <p>Science <i>Electrical circuits and circuit components</i></p> <p>Design and Technology <i>Technical understanding of mechanical and electronic devices</i></p> <p>SMSC: Spiritual – <i>Apply concentration and intelligence, pupils become much more aware of their strengths and weaknesses while creating programs.</i> Moral – <i>Listening to others and working as a class. Pupil learn to use technology safely and not misuse computers</i> Social - <i>Learn about how the components of computers come together to make the whole system work, hence understand how individuals can contribute when working as a team.</i> Cultural – <i>To be aware of the information age we live in. Looks at the needs of people their solution serves.</i></p>

Module	Date	Topic	Teaching Activities	Learning Objectives	Resources
2	03/11/2015	<p>Under the hood of a Computer</p> <p>History of Computing</p>	<ul style="list-style-type: none"> • Provide a brief outline of the history of computing and electronic computer • Introduce students to the components that make up a computer by a practical study • Ask students to research the functions of the component parts • Introduce the terms hardware and software and the different types of software. 	<p>Students will be able to ...</p> <ul style="list-style-type: none"> • Understand the function and purpose of a computer • Understand that there are many ways to compute and that the modern computer was developed to carry out computations at an enormous speed • Identify the timeline of computers • Define the term hardware and software • Identify different types of software 	<p>http://www.docstoc.com/docs/7805995/History-of-Computers---PowerPoint-4</p> <p>www.tutorialspoint.com/computer_fundamentals/index.htm</p> <p>PowerPoint Presentation</p>
	05/11/2015	Code Breakers	<ul style="list-style-type: none"> • Recap of previous lesson • Offer students a general definition of what a code is. • Tell the story of code breaking at Bletchley Park during the second World War • Ask students to research on Enigma and Lorenz Cipher machines • Introduce to students the concept of decimal and binary number systems 	<p>Students will be able to ...</p> <ul style="list-style-type: none"> • Identify the first electronic computer • Gain a basic understanding of the role of Colossus in World War II • Gain a basic understanding of how made use of valves, rewiring and paper tape • Understand there are different number systems, decimal and binary • Convert decimal numbers to binary numbers 	<p>www.bbc.co.uk/history/places/bletchley_park</p> <p>http://csunplugged.org/sites/default/files/activity_pdfs_full/unplugged-01-binary_numbers.pdf</p> <p>PowerPoint presentation</p>

Module	Date	Topic	Teaching Activities	Learning Objectives	Resources
					<i>Homework</i> Complete worksheet on history of Computers
	10/11/2015	Bits and Bytes	<ul style="list-style-type: none"> • Introduce the term Morse Code and how this method uses electrical signals to send messages • Introduce bits, byte and megabytes and their conversion • Get students to do an activity in class to understand how computers process data. • Explain how a circuit semaphore works 	<p>Students will be able to ...</p> <ul style="list-style-type: none"> • Know that data is stored in computers in units called bytes • Understand that a byte is made up of 8 bits • Understand that digital data is represented by on/off values or 1/0 • Identify the relationship between bits, bytes, kilobytes and megabytes. 	<p>PowerPoint presentation</p> <p>https://www.nsa.gov/kids/games/gameMorse.swf</p> <p>https://www.youtube.com/watch?v=5bZjilPNwQc</p>

Module	Date	Topic	Teaching Activities	Learning Objectives	Resources
	12/11/2015	Binary and Decimal Number Systems	<p>Introduce binary numbers to students and explain how data in a computer is stored in binary.</p> <p>Explain how binary digits are converted into information</p> <p>Show students how to count in decimal and binary</p> <p>Explain how to convert binary to decimal and decimal to binary</p>	<p>Students will be able to ...</p> <p>Know that data in a computer is stored in binary</p> <p>Know the values of each bit of an 8 digit binary string</p> <p>Convert a decimal number into binary and vice versa</p>	<p>PowerPoint presentation</p> <p>Worksheets</p> <p>Student handouts</p> <hr/> <p>Homework: Complete worksheet on bits and bytes</p>

Module	Date	Topic	Teaching Activities	Learning Objectives	Resources
	17/11/2015	Shapes, patterns and algorithms	<p>Reinforce the concepts of regular shapes and their key features</p> <p>Discuss the concepts of repeating patterns</p> <p>Explain what an algorithm is and how they are implemented on digital devices</p>	<p>Students will be able to ...</p> <p>Know and understand the basic features of regular shapes.</p> <p>Define shapes by their key features</p> <p>Identify patterns how these define relationship between objects</p> <p>Understand what algorithms are</p>	PowerPoint Presentation, worksheets
	19/11/2015	Drawing and manipulating shapes	<p>Explain how an algorithm can be used to draw a simple shape such as a square</p> <p>Explain the concept of decomposition and discuss the need for identifying the problem appropriately before beginning to write instructions.</p> <p>Introduce the term iteration and how it can be used to simplify algorithms</p>	<p>Students will be able to ...</p> <p>Know how to write algorithms to create basic geometrical shapes</p> <p>Understand the concept of decomposition</p> <p>Use iteration in simple algorithms, understanding why this is important</p> <p>Recognise and correct errors in algorithms(debug)</p> <p>Understand how algorithms can be translated into programming language</p>	<p>PowerPoint presentation</p> <p>Scratch</p> <p>Student handout</p> <hr/> <p>Homework</p> <p>Draw Van Doesburg style artwork and write an algorithm to enable a computer to draw that design</p>

Module	Date	Topic	Teaching Activities	Learning Objectives	Resources
	24/11/2015	Foundations of computing	<p>Revisit the history of computing PowerPoint to refresh the student's memory on the history of computing.</p> <p>Introduce key stages in the development of computers</p> <p>Display images and discuss the contribution made by each machine and how each stage brought the development of programmable computer closer.</p> <p>Introduce the generations of computers from 1946 to present</p>	<p>Students will be able to ...</p> <p>Identify key stages and figures from the history of the development of computers</p> <p>Understand that computers only do what they are programmed to do</p> <p>Appreciate the key developments that led to the modern computing device</p> <p>Draw a timeline showing the development of computers between 1800-2000 by illustrating the timeline with suitable texts and images</p>	<p>PowerPoint Presentation on history of computing</p> <p>Student Handouts</p>
	26/11/2015	Programming the machine	<p>Introduce the terms machine and assembly languages.</p> <p>Explain the correlation between one another</p> <p>Make students aware of the fact that assembly language is a little more than a short-cut to writing program in binary as it can get very ambiguous when written in binary.</p> <p>Introduce the different instructions used to write an assembly language program.</p> <p>Explain why variables are used in writing programs</p>	<p>Students will be able to ...</p> <p>Write a simple assembly language program, including input, output and halt.</p> <p>Design and create an algorithm for a program to add two numbers in assembly language</p>	<p>PowerPoint presentation</p> <p>www.gcsecomputing.org.uk/lmc/lmc.html</p> <p>www.yorku.ca/sychen/research/LMC</p> <p>Homework</p> <p>Write an algorithm and an assembly language program to calculate $a+b-c$ where $a=7$, $b=10$ and $c=6$.</p>

Module	Date	Topic	Teaching Activities	Learning Objectives	Resources
	01/12/2015	Formal Assessment	<i>Perform a formal assessment on Introduction to computing</i>	<p>Students will be able to ...</p> <ul style="list-style-type: none"> • <i>Exhibit their knowledge on history of computing, components of a computer system, algorithms and assembly language programs.</i> 	<i>Assessment Papers</i>
	03/12/2015	Feedback Time	<i>Assessment Feedback</i>	<i>To respond to feedback on assessment</i>	

Module 3 – Data Handling and Searching

About this Module	Learning Outcomes/Success Criteria (WILF) :
In this module students will learn how to create, store, search and manipulate data using a database management system. The primary focus of this module to familiarise students how to set up database, import data into a database and use mathematical operators to search for data in a database.	<p>All students will be able to understand what a database is and set up a database; be able to discuss the advantages and disadvantages of paper and computerised databases; be able to know what data types are; be able to perform basic operations like store and search and sort data</p> <p>Most students will be able to choose the correct data types for specific data items; be able to use logical and mathematical operators to search for data in a database; be able to create forms and add amend and delete database records using a form;</p> <p>Some students will be able to perform complex database searches; be able to modify and re-design a database form</p>

Where the unit fits in:	Cross- curricular Links:
<p>Data and Data representation Recognise the different types of data, and understand that data can be structured in tables to make it useful. Appreciate that programs can work with different types of data. Perform more complex search to analyse and retrieve data</p> <p>Information Technology Use software to collect, analyse and evaluate data.</p>	<p><u>Literacy :</u> <i>Learn a range of vocabulary</i></p> <p><u>Maths:</u> <i>Usage of mathematical operators</i></p> <p><u>SMSC:</u> <i>Spiritual – Limitations of technology – Advantages and disadvantages of databases</i> <i>Moral – Listening to others and working as a class. Use of data and the moral issues surrounding it</i> <i>Social – Risks of data security and ways to prevent those</i> <i>Cultural – To be aware of the information age we live in. take into consideration the audience and purpose when creating databases.</i></p>

Module	Date	Topic	Teaching Activities	Learning Objectives	Resources
3	08/12/2015	Introduction to databases	<p><i>Explain why databases are used to store data</i></p> <p><i>Discuss the advantages and disadvantages of computerised and paper based database systems</i></p> <p><i>Explain the need to have different data types</i></p> <p><i>Introduce important keyword like field, record and table.</i></p>	<p><i>Students will be able to ...</i></p> <p><i>Understand what a database is</i></p> <p><i>Know some of the keywords associated with databases</i></p> <p><i>Discuss the advantages and disadvantages of paper and computerised databases</i></p> <p><i>Choose correct data types for specific items of data</i></p>	<p>http://www.ictlounge.com/html/year_8/databases_main.htm</p> <p>PowerPoint presentation</p> <p>Student handout</p>
	10/12/2015	Creating databases	<p><i>Demonstrate how to set up a database by creating tables where records are stored.</i></p> <p><i>Show students how to create fields, and assign primary key.</i></p> <p><i>Explain how to add an combo box and the need for adding validation rules</i></p>	<p><i>Students will be able to ...</i></p> <p><i>Understand how to set up a database by using fields, data types and validation rules</i></p> <p><i>Know how to import data into a database</i></p> <p><i>Create a database from scratch by following a list of instructions</i></p> <p><i>Add validation rules</i></p>	<p>http://www.ictlounge.com/html/year_8/databases_main.htm</p> <p>http://www.teach-ict.net/software/access_2007/access_2007.htm</p> <p>PowerPoint presentation</p> <p>Student handout</p>

Module	Date	Topic	Teaching Activities	Learning Objectives	Resources
					<i>Homework</i> Complete the worksheet paper vs computer databases
	15/12/2015	Database forms	<p>Explain the need to create database forms and demonstrate how to create forms.</p> <p>Show the students how to change layout, colours and add images etc., to the forms.</p> <p>Demonstrate how to use a form to navigate through the database and add and delete new records</p>	<p>Students will be able to ...</p> <p>Understand what a database form is</p> <p>Create a database form</p> <p>Know how to add, amend and delete database records using a form</p> <p>Re-design a database form.</p>	<p>http://www.ictlounge.com/html/year_8/databases_main.htm</p> <p>PowerPoint presentation</p> <p>Student handout</p>

Module	Date	Topic	Teaching Activities	Learning Objectives	Resources
	17/12/2015	Searching	<p>Introduce the term query and explain how queries can be used to search information from a database based on a particular criteria.</p> <p>Make students aware of the fact that data can be searched based on a single criteria or a number of criterion.</p> <p>Describe simple and complex queries and their usage.</p> <p>Explain the need to use a wide range of mathematical and logical operators in order to perform an effective search</p>	<p>Students will be able to ...</p> <p>Understand that computer databases are much quicker to search than paper databases.</p> <p>Use queries to extract information based on a certain criteria</p> <p>Know how to perform simple database searches</p> <p>Use logical and mathematical operators to perform complex database searches.</p>	<p>http://www.ictlounge.com/html/year_8/databases_main.htm</p> <p>http://www.teach-ict.net/software/access_2007/access_2007.htm</p> <p>PowerPoint presentation</p> <p>Student handout</p> <p>Homework</p> <p>Complete the homework sheet on keywords.</p>