



## COMPUTER SCIENCE w/I.T.

### Year 7- 'I can' statements

(from "Teach Computing" Topics & LO's Summarised By Steve Carter, HOD)

#### **Unit 1- Collaborating online respectfully**

- COL 1- I can create a memorable and secure password for an account on the school
- COL 2- I can remember the rules of the computing lab
- COL 3- I can find personal documents and common applications
- COL 4- I can recognise a respectful email and send an effective email and send it to the correct recipients
- COL 5- I can describe how to communicate with peers online plus plan effective presentations for a given audience
- COL 6- I can describe cyberbullying, explain the effects of cyberbullying and know who you are talking to online

#### **Unit 2- Networks**

- NET 1- I can define what a computer network is and explain how data is transmitted between computers across networks
- NET 2- I can define 'protocol' and provide examples of non-networking protocols
- NET 3- I can list examples of the hardware necessary for connecting devices to networks
- NET 4- I can compare wired to wireless connections and list examples of specific technologies currently used to implement such connections
- NET 5- I can define 'bandwidth', using the appropriate units for measuring the rate at which data is transmitted, and discuss familiar examples where bandwidth is important
- NET 6- I can define what the internet is and explain how data travels between computers across the internet
- NET 7- I can describe key words such as 'protocols', 'packets', and 'addressing'
- NET 8- I can explain the difference between the internet, its services, and the World Wide Web



- NET 9- I can explain the term ‘connectivity’ as the capacity for connected devices (‘Internet of Things’) to collect and share information about me with or without my knowledge (including microphones, cameras, and geolocation)
- NET 10- I can describe how internet-connected devices can affect me
- NET 11- I can describe components (servers, browsers, pages, HTTP and HTTPS protocols, etc.) and how they work together

### **Unit 3- Digital Literacy and Using Software For A Purpose**

- DL 1- I can select the most appropriate software to use to complete a task
- DL 2- I can Identify and apply the key features of a word processor
- DL 3- I can apply and evaluate formatting techniques to understand why we format documents
- DL 4- I can select appropriate images for a given context
- DL 5- I can demonstrate an understanding of licensing issues involving online content by applying appropriate Creative Commons licences
- DL 6- I can demonstrate the ability to credit the original source of an image
- DL 7- I can critique digital content for credibility and identify whether or not a source is credible
- DL 8- I can apply referencing techniques and understand the concept of plagiarism
- DL 9- I can evaluate online sources for use in my own work
- DL 10- I can construct and organise the content of the blog based on credible sources
- DL 11- I can apply referencing techniques that credit authors appropriately
- DL 12- I can design the layout of the content to make it suitable for the audience

### **Unit 4- Programming 1**

- PR 1- I can compare how humans and computers understand instructions (understand and carry out)
- PR 2- I can define a sequence as instructions performed in order, with each executed in turn
- PR 3- I can predict the outcome of a simple sequence, use a sequence with variables and modify it
- PR 4- I can define a variable as a name that refers to data being stored by the computer



- PR 5- I can recognise that computers follow the control flow of input/process/output
- PR 6- I can trace the values of variables within a sequence
- PR 7- I can define a condition as an expression that will be evaluated as either true or false
- PR 8- I can use and identify what a selection is and where selection statements can be used
- PR 9- I can create conditions that use comparison operators (>,<=) and logic operators (and/or/not)
- PR 10- I can identify where selection statements can be used in a program that include comparison and logical operators
- PR 11- I can describe the need for iteration and also what it is
- PR 12- I can identify where count-controlled iteration can be used in a program
- PR 13- I can implement count-controlled iteration in a program
- PR 14- I can detect and correct errors in a program (debugging)
- PR 15- I can independently design and apply programming constructs to solve a problem (subroutine, selection, count-controlled iteration, operators, and variables)

## Unit 5- Programming 2

- PR+ 1- I can define a subroutine as a group of instructions that will run when called by the main program or other subroutines
- PR+ 2- I can define decomposition as breaking a problem down into smaller, more manageable sub problems
- PR+ 3- I can identify how subroutines can be used for decomposition
- PR+ 4- I can identify and implement where condition-controlled iteration can be used in a program
- PR+ 5- Evaluate which type of iteration is required in a program
- PR+ 6- Define a list as a collection of related elements that are referred to by a single name
- PR+ 7- Describe the need for lists, identify when lists can be used in a program and use a use a list
- PR+ 8- Decompose a larger problem into smaller sub problems
- PR+ 9- Apply appropriate constructs to solve a problem
- Unit 5- Spreadsheets and Data
- SPR 1- I can identify columns, rows, cells, and cell references in spreadsheet software
- SPR 2- I can use formatting techniques and use the autofill tool to replicate cell data in a spreadsheet
- SPR 3- I can use basic formulas with cell references to perform calculations in a spreadsheet (+, -, \*, /)



- SPR 4- I can explain the difference between data and information
- SPR 5- I can explain the difference between primary and secondary sources of data
- SPR 6- I can collect and analyse data
- SPR 7- Use the functions SUM, COUNTA, MAX, and MIN in a spreadsheet
- SPR 8- Use the functions AVERAGE, COUNTIF, and IF in a spreadsheet
- SPR 9- I can create appropriate charts in a spreadsheet
- SPR 10- I can use a spreadsheet to sort and filter data plus use conditional formatting

## Year 8- 'I can' statements

### Unit 1-Web Development

- WB1- I can describe, use and modify HTML
- WB2- I can display images within a web page
- WB3- I can apply HTML tags to construct a web page structure from a provided design
- WB4- I can use and describe what CSS is and its benefits
- WB5- I can use and describe what a search engine is and how they 'crawl' through the world wide web and how they select and rank results
- WB6- I can analyse how search engines select and rank results when searches are made
- WB7- I can discuss the impact of search technologies and the issues that arise by the way they function and the way they are used
- WB8- I can create hyperlinks to allow users to navigate between multiple web pages
- WB9- I can discuss issues of safety and security from a technological perspective
- WB10- I can discuss the impact of networking technologies and services

### Unit 2- Data Representation

- DAT 1- I can list and know that representations are used to store, communicate, and process information
- DAT 2- I can provide examples of how different representations are appropriate for different tasks
- DAT 3- I can recall that characters can be represented as sequences of symbols and list examples of character coding schemes
- DAT 4- I can provide examples of how symbols are carried on physical media
- DAT 5- I can explain what binary digits (bits) are, in terms of familiar symbols such as digits or letters



- DAT 6- I can measure the size or length of a sequence of bits as the number of binary digits that it contains
- DAT 7- I can describe how numbers are represented and I can convert a decimal number to binary and vice versa
- DAT 8- I can convert between different units and multiples of representation size
- DAT 9- I can provide examples of the different ways that binary digits are physically represented in digital devices

### **Unit 3 Mobile App**

- MOB 1- I can implement and customise GUI elements to meet the needs of the user
- MOB 2- I can recognise that events can control the flow of a program
- MOB 3- I can use user input and variables in an event-driven programming environment
- MOB 4- I can develop a partially complete application to include additional functionality
- MOB 5- I can identify and fix common coding errors
- MOB 6- I can pass the value of a variable into an object
- MOB 7- I can establish user needs when completing a creative project
- MOB 8- I can apply decomposition to break down a large problem into more manageable steps
- MOB 9- I can use user input, sequences and variables in a block-based programming language
- MOB 10- I can reflect and react to user feedback and evaluate the success of the programming project
- MOB 11- I can use a block-based programming language to include sequencing and selection

### **Unit 3 Design Vector Graphics**

- VEC 1- I can draw basic shapes (rectangle, ellipse, polygon, star) with different properties (fill and stroke, shape-specific attributes)
- VEC 2- I can manipulate individual objects (select, move, resize, rotate, duplicate, flip, z-order)
- VEC 3- I can manipulate groups of objects (select, group/ungroup, align, distribute)
- VEC 4- I can combine paths by applying operations (union, difference, intersection)
- VEC 5- I can convert objects to paths and draw more paths
- VEC 6- I can edit path nodes
- VEC 7- I can combine multiple tools and techniques to create a vector graphic design



- VEC 8- I can explain what vector graphics are
- VEC 9- I can provide examples where using vector graphics would be appropriate.
- VEC 10- I can peer assess another pair's project work
- VEC 11- I can improve your own project work based on feedback
- 

## **Unit 4 computing systems**

- CS 1- I can explain the difference between a general-purpose computing system and a purpose-built device
- CS 2- I can recall that a program is a sequence of instructions that specify operations that are to be performed on data
- CS 3- I can describe and analyse the function of the hardware components used in computing systems and how they work together in order to execute programs
- CS 4- I can I can recall that all computing systems, regardless of form, have a similar structure ('architecture')
- CS 5- I can define what an operating system is, and recall its role in controlling program execution
- CS 6- I can describe the not, and, and or logical operators, and how they are used to form logical expressions
- CS 7- I can use logic gates to construct logic circuits, and associate these with logical operators and expressions
- CS 8- I can recall that, since hardware is built out of logic circuits, data and instructions alike need to be represented using binary digits
- CS 9- I can provide broad definitions and examples of 'artificial intelligence' and 'machine learning'
- CS 10- I can describe the steps involved in training machines to perform tasks (gathering data, training, testing)
- CS 11- I can describe how machine learning differs from traditional programming
- CS 12- I can associate the use of artificial intelligence with moral dilemmas

## **Unit 5 Programming (Python)**

- PR 1- I can describe what algorithms and programs are and how they differ
- PR 2- I can recall that a program written in a programming language needs to be translated in order to be executed by a machine
- PR 3- I can write simple Python programs that display messages, assign values to variables, and receive keyboard input
- PR 4- I can locate and correct common syntax errors



- PR 5- I can describe the semantics of assignment statements
- PR 6- I can use simple arithmetic expressions in assignment statements to calculate values
- PR 7- I can receive input from the keyboard and convert it to a numerical value
- PR 8- I can use relational operators to form logical expressions
- PR 9- I can use binary selection (if, else statements) to control the flow of program execution
- PR 10- I can generate and use random integers
- PR 11- I can use multi-branch selection (if, elif, else statements) to control the flow of program execution
- PR 12- I can describe and use how iteration (while statements) controls the flow of program execution
- PR 13- I can use variables as counters in iterative programs
- PR 14- I can combine iteration and selection to control the flow of program execution
- PR 15- I can use Boolean variables as flags

## Year 9- 'I can' statements

### Topic 1- Programming (Sequences)

- PR1-Write programs that display messages, receive keyboard input, and use simple arithmetic expressions in assignment statements
- PR1-Use selection (if-elif-else statements) to control the flow of program execution
- PR1-Create lists and access individual list items
- PR2-Perform common operations on lists or individual items
- PR3-Use iteration (while statements) to control the flow of program execution
- PR3-Perform common operations on strings or individual characters
- PR4-Use iteration (for statements) to iterate over list items
- PR4-Perform common operations on lists or strings
- PR5-Use iteration (for loops) to iterate over lists and strings
- PR5-Use variables to keep track of counts and sums
- PR6-Combine key programming language features to develop solutions to meaningful problems





## Topic 2- Data Science

- DATA1-Define data science
- DATA1-Explain how visualising data can help identify patterns and trends in order to help us gain insights
- DATA1-Use an appropriate software tool to visualise data sets and look for patterns or trends
- DATA2-Recognise examples of where large data sets are used in daily life
- DATA2-Select criteria and use data set to investigate predictions
- DATA2-Evaluate findings to support arguments for or against a prediction
- DATA3-Define the terms 'correlation' and 'outliers' in relation to data trends
- DATA3-Solve a problem by implementing steps of the investigative cycle on a data set
- DATA3-Use findings to support a recommendation
- DATA4-Identify the steps of the investigative cycle
- DATA4-Identify the data needed to answer a question defined by the learner
- DATA4-Create a data capture form
- DATA5-Describe the need for data cleansing
- DATA5-Apply data cleansing techniques to a data set
- DATA6-Visualise a data set
- DATA6-Analyse visualisations to identify patterns, trends, and outliers
- DATA6-Draw conclusions and report findings

## Topic 3- Representation

- REP1-Describe how digital images are composed of individual elements
- REP1-Recall that the colour of each picture element is represented using a sequence of binary digits
- REP1-Define key terms such as 'pixels', 'resolution', and 'colour depth'





- REP1-Describe how an image can be represented as a sequence of bits
- REP2-Describe how colour can be represented as a mixture of red, green, and blue, with a sequence of bits representing each colour's intensity
- REP2-Compute the representation size of a digital image, by multiplying resolution (number of pixels) with colour depth (number of bits used to represent the colour of individual pixels)
- REP2-Describe the trade-off between representation size and perceived quality for digital images
- REP3-Perform basic image editing tasks using appropriate software and combine them in order to solve more complex problems requiring image manipulation
- REP3-Explain how the manipulation of digital images amounts to arithmetic operations on their digital representation
- REP3-Describe and assess the creative benefits and ethical drawbacks of digital manipulation (Education for a Connected World)
- REP4-Recall that sound is a wave
- REP4-Explain the function of microphones and speakers as components that capture and generate sound
- REP4-Define key terms such as 'sample', 'sampling frequency/rate', 'sample size'
- REP4-Describe how sounds are represented as sequences of bits
- REP5-Calculate representation size for a given digital sound, given its attributes
- REP5-Explain how attributes such as sampling frequency and sample size affect characteristics such as representation size and perceived quality, and the trade-offs involved
- REP5-Perform basic sound editing tasks using appropriate software and combine them in order to solve more complex problems requiring sound manipulation
- REP6-Recall that bitmap images and pulse code sound are not the only binary representations of images and sound available
- REP6-Define 'compression', and describe why it is necessary

## Topic 4- Security



- SECURITY1-Critique online services in relation to data privacy
- SECURITY1-Identify what happens to data entered online
- SECURITY1-Explain the need for the Data Protection Act
- SECURITY2-Recognise how human errors pose security risks to data
- SECURITY2-Implement strategies to minimise the risk of data being compromised through human error
- SECURITY3-Define hacking in the context of cyber security
- SECURITY3-Explain how a DDoS attack can impact users of online services
- SECURITY3-Identify strategies to reduce the chance of a brute force attack being successful
- SECURITY3-Explain the need for the Computer Misuse Act
- SECURITY4-List the common malware threats
- SECURITY4-Examine how different types of malware causes problems for computer systems
- SECURITY4-Question how malicious bots can have an impact on societal issues
- SECURITY5-Compare security threats against probability and the potential impact to organisations
- SECURITY5-Explain how networks can be protected from common security threats
- SECURITY6-Identify the most effective methods to prevent cyberattacks

## **Topic 5- Programming (Microbit)**

- PR21-Describe what the micro:bit is
- PR21-List the micro:bit's input and output devices
- PR21-Use a development environment to write, execute, and debug a Python program for the micro:bit
- PR22-Write programs that use the micro:bit's built-in input and output devices



- PR23-Write programs that use GPIO pins to generate output and receive input
- PR23-Write programs that communicate with other devices by sending and receiving messages wirelessly
- PR24-Design a physical computing artifact purposefully, keeping in mind the problem at hand, the needs of the audience involved, and the available resources
- PR24-Decompose the functionality of a physical computing system into simpler features
- PR26-Implement a physical computing project, while following, revising, and refining the project plan