Long Term Plans: Computing

Threshold concepts

Online risks and digital footprints TC1	Data representation TC2	System Architecture TC3	Computational Thinking TC4	Programming TC5
Functions and formulas TC6	Principles of animation TC7	Algorithms TC8	Laws and ethics TC9	Design Principles TC10
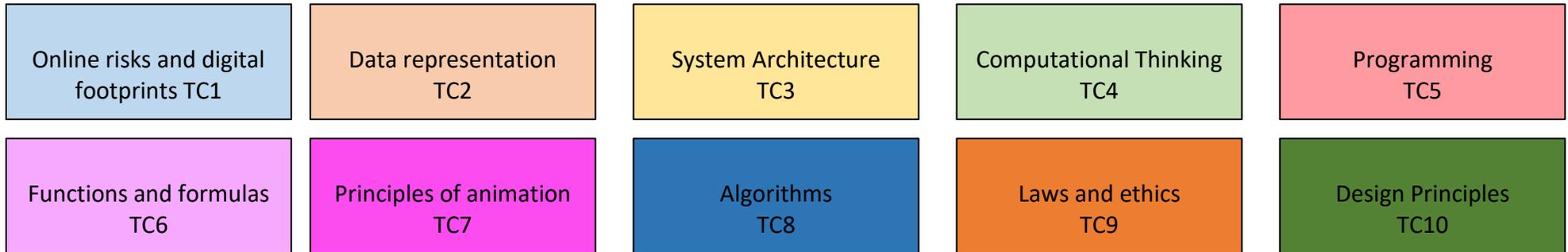
Within our curriculum design, we have carefully considered how to sequence and interleave the threshold concepts within our subjects so that students are able to build and develop secure schema over time. The table below shows how we have mapped our threshold concepts throughout our Computing curriculum.

Year 7

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
	TC1	TC1	TC1, TC9	TC1, TC9	TC1, TC9	TC1	TC1	TC1, TC9	TC1, TC9	TC1, TC9	TC1	TC1	TC1, TC9
Cycle 1: [E-Safety]	We are going to learn the process of logging in, accessing files, saving their work, and opening software.	Safe and Reliable Web Searching Techniques: How to Effectively Navigate the Web?	What are the Data Protection Act and Computer Misuse Act? How they protect personal information in the digital age?	What are the effects cyberbullying? What are the stereotypes associated with cyber bullying?	What is a digital footprint and how does it affects our online presence? What are the impacts of leaving a positive/negative digital footprint?	Phishing and Spam Identifying and Preventing Phishing and Spam	Understand threats to a network What are the different types of malware? How can malware be prevented?	C1 Assessment	C1 assessment feedback Whole class feedback	Location aware applications How is sharing your location a risk? Social implications of apps that track	Grooming and exploitation How to spot online abuse and how it can be reduced?	Online safety continued the dangers of social media/sexting Data and planning day	Cycle 1 Intervention

Cycle 2: [Computer Systems and Computational Thinking]

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 1
	TC3	TC3	TC2, TC3	TC3	TC3	TC3	TC2, TC3	TC3,TC9	TC4, TC8	TC8	TC4, TC8	TC4, TC8	TC2, 3,4,8,9
	What are computer systems What components make up a computer system?	What are the different types of computers The history of computers overtime, the evolution of technology	Storage and memory What is RAM and ROM? What are storage devices Units if data for storage	Input and output devices Understand the difference between input and output devices How do they play a role in innovative technologies	The CPU Fetch, decode, execute cycle How do clock speed and cores impact a computer?	Software and the operating system. Explain Software Application Software Systems Software Assessed piece note AGR to agree	Boolean Logic What is logic- Logics operators, logic gates and logic circuits How is hardware built out of logic circuits	Artificial intelligence and machine learning What are the moral dilemmas associated with artificial intelligence?	What is computational thinking? Abstraction Decomposition Pattern recognition Algorithms	Using flowcharts to represent algorithms Introduce Input Output Process Decision	How to spot errors in an algorithm How to fix errors in an algorithm Evaluate an algorithm and provide feedback to improve	What are the programming constructs, sequence, selection and iteration Apply the constructs to an algorithm	Cycle 2 Intervention

Cycle 3: [Programming Kodu]

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
	TC4, TC5,TC8	TC4, TC5,TC8, TC10	TC4, TC5,TC8	TC5	TC4, TC5,TC8	TC4, TC5			TC4, TC5,TC8	TC4, TC5,TC8, TC10	TC4, TC5,TC8, TC10	TC4, TC5,TC8, TC10	TC4,5,8,10
	How Programs work Understand that a computer program requires a precise series of instructions to operate correctly	Create basic landscape features using Kodu Apply a range of techniques to a landscape	Create navigations and paths Program characters to move and to interact with game objects	Add Clones and creatables to a game Understand the advantages of using clones and creatables	Sequence and selection Program sequence and selection into a game	Sequence and selection The selection concept of pages in Kodu can be used in order to code different behaviours	C1 Assessment	C1 assessment feedback Whole class feedback	Game Depth and complexity Use more advanced techniques such as scoring, health and sound.	Create a game Build landscape, characters, objects	Create a game Program using sequence and selection Apply cloning and creatables to your game	Create a game Add advanced techniques to a game	Cycle 3 Intervention

Year 8

Cycle 1: [Cyber Security]

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
	TC1, TC3	TC1, TC9	*TC1*	*TC1*	TC1, TC9	TC1, TC9	*TC1*	TC1, TC9	*TC1*	TC1, TC9	TC1, TC9		TC1, TC3, TC9
	What is a network? LAN/WAN /Topologies What are advantages and disadvantages of networks?	You and your data What are the consequences of data theft? The DPA act	What is social Engineering? Shouldering Phishing Pharming Name Generator attacks	What is Social Engineering? What are the methods of social engineering and how can they be prevented?	What is Hacking? Ethical vs unethical hacking Hacking techniques	What is the computer misuse act? What are the consequences of breaking the act? Assessed piece low stakes quiz	What are the common malware threats? What impact do they have?	What are the common malware threats? Continued - Trojans and bots	How to protect against attacks? Compare security threats against probability and potential impact to organisations	How to protect against attacks? Continued- Identify the most effective methods of preventing cyberattacks	What is a Network is a security policy? Identify the content in an acceptable use policy	**Data and planning day**	**Cycle 1 Intervention**

Cycle 2: [Spreadsheet Modelling]

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
	TC3, TC6	TC6	TC6	TC6	TC6	TC6			TC6, TC10	TC6, TC10	TC6	TC1	
	Introduction to spreadsheets Spreadsheet layout and uses	Analyse a client brief and create a spreadsheet for a client Apply formatting techniques to a spreadsheet	What are the different data types? Apply the correct data types to a spreadsheet model	Formulas + * - \ Functions Autosum Apply functions and formulas to a spreadsheet model	Functions Min, Max, Average, Range Apply functions to a spreadsheet model	Cell referencing Absolute and relative How to protect formulas and functions in a spreadsheet?	**C2 Assessment**	**C2 assessment feedback** **Whole class feedback**	How is data displayed in a spreadsheet? Graphs, charts etc.	Analyse your graphs, charts, outgoings and finance. Draw conclusions from your data	Produce a report which fully analyses your spreadsheet model, provides recommendations and draws conclusions.	E-Safety? Link with PDS to agree topic	**Cycle 2 Intervention**

Cycle 3: [Python Programming]

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
	TC5	TC2, TC5	TC4, TC5	TC5, TC8	TC5, TC8	TC5, TC8			TC2, TC5	TC5	TC5, TC8		
	Introduction to Python What is a program? What is a variable?	The importance of data types (Float, Integer, String, Boolean)	Demonstrate selection in a program e.g. IF Use different comparison operators e.g. >=	Writing algorithms in pseudocode How to write an algorithm in pseudocode using words such as PRINT, DISPLAY, INPUT etc	Iteration What is the purpose of the while loop?	Python practice Create a program	C3 Assessment	C3 assessment feedback **Whole class feedback**	Identify the correct data types used in various python programs. Explain what casting is and correctly illustrate it within a python program.	Debugging How errors are created whilst programming? How syntax errors are corrected using python programs?	Selection Create a program using selection, variables and the correct data types	E-Safety? Link with PDS to agree topic	**Cycle 3 Intervention**

Year 9

Cycle 1: [Data Representation Binary]

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
	TC2,TC3	TC2,TC3	TC2,TC3	TC2,TC3	TC2,TC3	TC2,TC3		TC2,TC3	TC2,TC3	TC2,TC3	TC2,TC3		TC2,TC3
	What is binary? What is denary? How does binary represent data and text	How to convert binary to a decimal using the 8 bit numbering system	How to convert binary to denary What are the units of data?	How to add binary? What are overflow errors?	What is Hexadecimal and why do computers use it? How is binary and denary converted to a 2 digit hex number	How to convert between different units of data? multiples of representation size	C1 assessments	How are digital images converted to binary? Types of image compression	C1 assessment feedback **Whole class feedback and low stakes quiz**	How is binary represented in sound? Digital and analogue	How is binary converted to characters? What is ASCII?	Data and planning day E-Safety? Link with PDS to agree topic	**C1 Intervention**

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 1
Cycle 2: User Interface Design	**TC3, TC10**	**TC3, TC10**	**TC10**	**TC3, TC10**	**TC10**	**TC10**	**TC10**	**TC10**		**TC10**	**TC10**		
	What are the different types of user interface?	What hardware and software needed to build a user interface?	Design principles and accessibility needs. How do they impact the design of a UI?	Create a project proposal that considers Target audience Requirements Constraints Timescales	Plan a user interface for a client using planning techniques Moodboard Storyboard Assessed piece	Plan a user interface for a client using planning techniques Moodboard Storyboard x 4 for a client	Design a user interface prototype Pages 1 and 2	Design a user interface Pages 3 and 4	Whole class feedback assessed piece (UI project)	Review user interface against client brief and make amendments	Review your user interface. Consider the strengths and weaknesses of the interface against: • user requirements • ease of use • design principles used • accessibility features.	Data and planning day E-Safety E-Safety? Link with PDS to agree topic	**C2 Intervention**

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 3: [Animation]	**TC7**	**TC3, TC7**	**TC7**	**TC7**	**TC7**	**TC7**	**TC7**		**TC10**	**TC7**	**TC7**		
	What is animation? How has animation changed overtime e.g 2D to 3D	How to use animation software and the key animation tools	What is frame-by-frame animation? What are the advantages and disadvantages of using frame by frame animation	What is tweening? Create a classic tween	What is shape tweening? Create an animation with a shape tween	How is text animated and manipulated? Explain the different editing techniques	What are layers? Explain, using advantages, the importance of layers Apply layers to your animation	**C3 Assessments**	What is a storyboard? Create a storyboard combining a number of elements e.g. scene, colour, skills used etc.	Create an animation That uses a range of techniques Whole class feedback C3 assessment	Create an animation That uses a range of techniques	Data and planning day E-Safety	**C3 Intervention**

Year 10

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1: Component 1 Exploring User Interfaces DIT]	TC3	TC3	TC3,TC9	TC10	TC10	TC10	TC3, TC10	TC10	TC3, TC10	TC3, TC10	TC9	TC3, TC10	TC3, TC10
	What is a user interface?	What are the features of a user interface? What factors affect the choice of interface?	What hardware and software is needed for a user interface? What are the audience needs?	Why are design principles important? **CA practice** Project planning techniques Create a report for a client	**CA practice** Task 2 Create a GANTT Chart and Moodboard Design a storyboard	**CA practice** Practice prototype build Practice user interface review	Controlled assessment Task 1A Project Proposal Task 1B GANTT Chart	Controlled assessment Task 1B GANTT Task 2 Create a story board using design principles	Controlled assessment Task 2 Create a story board using design principles Task 3 Initial design page 1 of prototype	Controlled assessment Task 3 Initial design page 2, 3 and 4 prototype	Review your user interface. Consider the strengths and weaknesses of the interface against: • user requirements • ease of use • design principles used • accessibility features.	**Moderation and feedback**	**Cycle 1 Intervention**

Cycle 2: [Component 3 Topic A Modern Technologies]

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
	TC3	TC3	TC3	TC3	TC3, TC9	TC3,TC9	TC3,TC9	TC3,TC9	TC3	TC3,TC9	TC3,TC9	TC3,TC9	TC3, TC9
	What are ad hoc networks? Advantages and disadvantages of ad hoc networks?	Features and uses of cloud storage: access rights synchronisation availability (24/7) scalability	Features and uses of cloud computing: online applications consistency of version between users (features, file types) single shared instance of a file Collaboration tools/features.	Features of cloud and traditional systems – (Device synchronisation, online/offline working, notifications) Implications for organisations when choosing cloud technologies	Types of modern Teams world teams multicultural inclusivity (facilitation of member's needs) 24/7/365 flexibility How do modern teams communicate with stakeholders?	Assessment preparation	**C2 Assessment** **Whole class feedback**	How modern technologies aid inclusivity and accessibility Positive and negative impacts of modern technologies on organisations	E-commerce, mobile commerce Distributed and dispersed data How teams collaborate	Retrieval	Retrieval	**Data and planning** **C3 Intervention**	**C2 Intervention**

Cycle 3: Component 3 Topic B Cyber Security]

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
	TC1	TC1	TC1	TC1, TC9	TC1	TC1, TC9	TC1, TC9	TC1, TC3 TC9	TC1, TC9	TC1, TC9	TC1	TC1, TC3 TC9	TC1, TC3, TC9
	Why systems are attacked? fun/challenge industrial espionage or financial gain personal attack disruption data/information theft.	External Threats to a network, hacking, malware etc.	Internal threats to a network e.g. internet downloads, data leaks etc. Assessed piece exam topics A and B	Impact of security breach: data loss damage to public image financial loss reduction in productivity downtime legal action	Prevention Methods to threats to data User access restrictions e.g. two factor authentication, biometrics etc. Data level protection e.g. firewalls, antivirus	Finding weaknesses and improving system security ethical hacking penetration testing analyse system data/behaviours	Assessment preparation	**C3 Assessments** **Whole class feedback**	Defining security parameters: password policy acceptable software/installation usage policy Parameters for device hardening.	Disaster recovery policy: who is responsible for what dos and don'ts for staff backup process timeline for data recovery	Actions taken after an attack: Investigate Respond Manage Recover Analyse	**Data and planning** **C3 Intervention**	**C3 Intervention**

Year 11

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
	TC2	**TC2**	**TC2**	**TC2**	**TC2, TC6, TC10**	**TC2, TC6, TC10**	**TC2, TC6, TC10**	**TC2, TC6, TC10**	**TC2, TC6, TC10**	**TC2, TC6, TC10**	**TC2, TC6, TC10**	**TC2, TC6, TC10**	**TC2, TC6, TC10**
Cycle 1: [Component 2 Colleting data controlled assessment]	Understand how data is collected What are the characteristics of data and information	How is data represented e.g table, graph etc. How is data suitable for processing- validation and verification	Data collection methods and the quality of data. What is primary and secondary data? What are the features of data?	How different types of data are used by organisations for data modelling. understand the different threats that face individuals who have data stored about them.	Understand how data can be imported from an external source. Using data manipulation methods e.g. functions and formulas. Assessed piece exam topics A and B	Use a dashboard to select and display information summaries based on a given data set. use a dataset and dashboard to present findings and draw conclusions	Task 1 Controlled assessment Produce a report What are the strengths and weaknesses of data collection methods?	Task 1 Controlled assessment Report continued How can data be collection be improved? What are the threats when collecting data?	Task 2a Data Manipulation Methods Complete the imported dataset sheet. Format the sheet	Task 2b Data Manipulation Methods Analyse your worksheet Apply a range of functions to your worksheet	Task 2C Create a data dashboard You need to use a range of appropriate presentation techniques to display the information in the Dashboard such as tables, charts and graphs	Task 3a Effectiveness of the dashboard Present your findings in a report and include any conclusions you can make based on these findings.	Task 3b How presentation affects understanding Produce a report on the presentation methods and features used in the dataset and dashboard to display the summaries and information, and how they could be improved

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
	TC1,TC9	TC1,TC9	TC1,TC9	TC1,TC9	TC1,TC9	TC1,TC9	TC4,TC8		TC4,TC8	TC4,TC8			
Cycle 2: [Component 3 wider implications.]	Consider the responsible use of digital systems, including how systems and services share and exchange data as well as the environmental considerations of increased use.	The importance of providing equal access to services and information: What is net neutrality and how it impacts on organisations.	What are the legal, ethical and privacy issues when using digital systems?	What is the purpose of an acceptable use policy	Data protection principles Use of the internet	The criminal use of a computer system e.g. hacking, malware What is the importance of intellectual property	Understand how organisations use different forms of notation to explain systems, data and information: -data flow diagrams -flowcharts -system diagrams o tables o written information.	Assessed piece exam topics A, B and C	Be able to interpret information presented using different forms of notation in a range of contexts.	Be able to present knowledge and understanding using different forms of notations: -data flow diagrams - information flow diagrams o flowcharts	Exam preparation Bespoke intervention	Exam preparation Bespoke intervention	Exam preparation Bespoke intervention