Computing BJS	Year 3	Year 4	Year 5	Year 6
E safety	• protect personal info, passwords computing /pshe /esafety week • know how to report concerns (adult or report button) computing /pshe • age rating for games computing /pshe • time spent online computing /pshe • downloading files/ internet access and who to ask computing /pshe • positive comments on line /digital citizens computing /pshe/ esafety	• secure password, appropriate screen names computing /pshe • protect youself and friends from harm online, fake names and why computing /pshe • websites and reporting computing /pshe • sharing things online can be seen by everyone computing /pshe • appropriate aged games computing /pshe • why do you need to ask before downloading computing /pshe	• secure password, appropriate screen names – can explain computing /pshe • why protect personal info' computing /pshe • impact of posting online for you and others computing /pshe • explain the importance of communicating kindly ad respectfully computing /pshe • how to protect a computer device from harm computing /pshe/ esafety	• explain the consequences of sharing too many details online computing /pshe • explain the consequences of spending too much time online computing /pshe • explain the consequences to myself or others if not communicating kindly and respectfully computing /pshe

Computing systems and networks				
	• Explain how a computer network can be used to share information • Explore how digital devices can be connected • Recognise the physical components of a network • Explain how digital devices function • Identify input and output devices	• Describe how networks physically connect to other networks. • Recognise how networked devices make up the internet • describe how content can be added and accessed on the World WideWeb (WWW) • Recognise how content of the WWW is created and shared by people • Describe the current limitations of WWW media	• Explain that computers can be connected together to form systems • Recognise the role of computer systems in our lives • Recognise how information is transferred over the internet • Explain how sharing information online lets people in different places work together • Contribute to a shared project online • Evaluate different ways of working together online	• Explain the importance of internet addresses • Explain how data is transferred across the internet • Explain how sharing information online can help people work together • Evaluate different ways of working together online • Recognise how we communicate using technology • Evaluate different methods of online communication

Creating media				
	• Combine text and images to share a message • Consider how different layouts can suit different purposes. • Type with increased confidence and speed using age-appropriate punctuation • Use return to create paragraphs • Change orientation of text • Wrap text around an image • Recognise a document can be formatted with placeholders • Change orientationof images • Understand animation is a sequence of drawings or photographs • Relate animated movement with a sequence of images • Plan an animation • Review and improve an animation • Evaluate the impact of adding • other media to ananimation	• Use a computer to (further) manipulate images • Recognise images can be changed for different purposes • Use the most appropriate tool for a particular purpose • Consider the impact of changes made on the quality of the image • Press/tap buttons to start and stop recordings • Recognise recorded audio is stored as a file • Edit and alter recorded audio • Layer sounds • Save/export an audio file • Consider the results of editing choices made	• Recognise an image is comprised of separate objects • Add, remove, modify and combine objects to create graphical drawing on a computer • Recognise objects are layered • Recognise that objects can be modified in groups • Consider the impactof choices made • Identify the features of a good video • Plan a video production using a story board • Use a computer to make a video • Recognise a video can be improved through editing • Consider the impact of changes made on the quality of the video	• Create 3D graphical objects on a computer • Alter the view of a 3D space • Modify 3D objects • Combine 3D objects to create desired effect • Apply blank 3D objects as placeholders to create holes • Recognise components of a webpage layout • Create a webpage including text, images, hyperlink sand embedded content • Understand the need for a navigation path • Use cross-curricular opportunities to consolidate previous learning from Year 3 –Year 5

Data and information	• Identify object attributes needed to collect relevant data • Create a branching database • Identify objects using a branchingdatabase • Compare information shown in a pictogram with a branching database • Explain that data can be used to answer questions	• Collect data using a digital device • Recognise that a sensor can be used as an input device for data collection • Use a larger data set to find information • Use a computer program to sortdata by one attribute • Export information and present data in a table and a graph	• Use a form to collect information • Navigate a flat-file database • Apply knowledge of a database to ask and answer real-world questions • Design a structure for a flat-file database • Choose tools to select and analyse data to answer questions • Select an appropriate graph to visually compare data • Choose suitable ways to presentinformation	• Identify questions that can be answered using data • Create a spreadsheet for a purpose • Apply a formula that can be used to produce calculated data • Recognise data can be calculated using different operations • Evaluate results in comparison to the question asked • Choose suitable ways to presentsdata

Programming	• Create a sequence of commands using a block language to produce a given outcome • Debug errors to accomplish specific goal • Work with others to decompose a problem into smaller steps in planning a project • Explain the order (sequence) of commands can effect the outcome (same commands,different order -> same or different outcome) • Identify different sequences can achieve the same outcome • Explain simple, sequence-based algorithm independently • Use logical reasoning to detect errors in programs	• Plan a program using a block language which includes appropriate loops to produce a given outcome • Debug errors in increasingly complex programs to accomplish specific goal • Independently decompose a problem into smaller steps in planning a project • Identify patterns(repetition) in a sequence • Understand repetition in programming is also called looping • Identify a loop in a program • Understand, identify and justify when to use 'infinite' or 'count- controlled' loops • Explain the importance in instruction order in a loop • Explain an algorithm using sequence and repetition independently • Use logical reasoning to detect and correct errors in programs	• Plan a program which includes selection to produce a given outcome • Debug errors in increasingly complex programs to accomplish specific goal • Plan a solution to a problem using decomposition • Define that conditional statements (selection) are usedin computer programs • Explain a loop can stop when a condition is met (number of times orevent) • Explain a that program flow can branch according to a condition • Use a condition in an *if...then...* statement to produce a given outcome • Explain an algorithm using sequence, repetition and selection independently • Use logical reasoning to detect errors in increasingly complex programs	• Plan a program which includes variables to produce a given outcome • Debug errors in increasingly complex programs to accomplish specific goal • Solve problems using decomposition, tackling each part separately • Define 'variable'as something that is changeable • Explain that a variable has a name and a value • Identify a variable in an existing program • Use a variable in a conditional statement to control the flow ofa program • Clearly and concisely explain algorithms using sequence, repetition, selection and variables independently • Use logical reasoning to detecterrors in increasingly complex programs

		Autumn		Spring		Summer	
Year 3	**Events and actions in programs** This unit assumes that learners will have some prior experience of programming. The key stage 1 National Centre for Computing Education units focus on floor robots and ScratchJr, however experience of other languages or environments may also be useful. The Year 3 — Programming A unit introduces the Scratch programming environment and the concept of sequences.	**Stop-frame animation** This unit progresses students' knowledge and understanding of using digital devices to create media, exploring how they can create stop frame animations. Following this unit, learners will further develop their video editing skills in Year 5.	**Branching Databases** This unit progresses students' knowledge and understanding of presenting information. It builds on their knowledge of data and information from key stage 1. They continue to develop their understanding of attributes and begin to construct and interrogate branching databases as a means of displaying and retrieving information.	**Desktop publishing** This unit progresses learners' knowledge and understanding of using digital devices to combine text and images building on work from the following units; Digital Writing Year 1, Digital painting Year 1, and Digital Photography Year 2.	**Sequencing sounds** This unit assumes that learners will have some prior experience of programming; the KS1 NCCE units cover floor robots and ScratchJr. However, experience of other languages or environments may also be useful.	**Connecting computers** This unit progresses students' knowledge and understanding of technology by focussing on digital and non-digital devices, and introducing the concept of computers connected together as a network. Following this unit, learners will explore the internet as a network of networks.	
Year 4	**The internet** This unit progresses students' knowledge and understanding of networks in Year 3. In Year 5, they will continue to develop their knowledge and understanding of computing systems and online collaborative working.	**Audio editing** This unit progresses students' knowledge and understanding of creating media, by focusing on the recording and editing of sound to produce a podcast. Following this unit, learners will explore combining audio with video in the 'Video editing' unit in Year 5.	**Photo editing** Learners should have experience of making choices on a tablet/computer. They should be able to navigate within an application. This unit progresses students' skills through editing digital images and considering the impact that editing can have on an image. Learners will also consider how editing can be used appropriately for different scenarios, and create and evaluate 'fake' images, combining all of their new skills.	**Data logging** This unit progresses pupils' knowledge and understanding of data and how it can be collected over time to answer questions. The unit also introduces the idea of automatic data collection.	**Repetition in shapes** This unit progresses students' knowledge and understanding of programming. It progresses from the sequence of commands in a program to using count-controlled loops. Pupils will create algorithms and then implement those algorithms as code.	**Repetition in games** This unit assumes that learners will have some prior experience of programming. The KS1 NCCE units cover floor robots and ScratchJr, and Scratch is introduced in the Year 3 programming units. However, experience of other languages or environments may also be useful.	
Year 5	**Flat-file databases** This unit progresses learners' knowledge and understanding of why and how information might be stored in a database, and looks at how tools within a database can help us to answer questions about our data. It moves on to demonstrate how a database can help us display data visually, and how real-life databases can be used to help us solve problems. Finally, the learners create a presentation showing understanding and	**Vector drawing** This unit progresses students' knowledge and understanding of digital painting and has some links to desktop publishing in which learners used digital images. They are now creating the images that they could use in desktop publishing documents.	**Video editing** This unit progresses learners' knowledge and understanding of creating media by guiding them systematically through the process involved in creating a video. By the end of the unit, learners will have developed the skills required to plan, record, edit, and finalise a video.	**Sharing information** This unit progresses learners' knowledge and understanding of computing systems and online collaborative working.	**Selection in physical computing** This unit assumes that learners will have prior experience of programming using block-based construction (eg Scratch), understand the concepts of 'sequence' and 'repetition', and have some experience of using 'selection'. Ideally, learners will have completed 'Programming A – Selection in physical computing' before undertaking this unit, as this will provide them with the required knowledge of 'selection'.	**Selection in quizzes** This unit assumes that learners will have prior experience of programming using block-based construction (eg Scratch) and understand the concepts of sequence and repetition. The National Centre for Computing Education key stage 1 units focus on floor robots and ScratchJr, however, experience of other languages or environments may also be useful.	

	application of all the tools used within the unit.					
Year 6	Kodu programming	Introduction to spreadsheets This unit progresses students' knowledge and understanding of data, and teaches them how to organise and modify data within spreadsheets.	3D Modelling This unit progresses students' knowledge and understanding of creating 3D graphics using a computer. Prior to undertaking this unit, learners should have worked with 2D graphics applications.	Sensing This unit presumes that learners are already confident in their understanding of sequence, repetition and selection independently within programming. If learners are not yet ready for this, you may wish to revisit earlier programming units where these constructs are introduced.	Webpage creation This unit progresses students' knowledge and understanding of the following: digital writing, digital painting, desktop publishing, digital photography, photo editing, and vector drawing.	Variables in a game This unit assumes that pupils will have some prior experience of programming in Scratch. Specifically, they should be familiar with the programming constructs of sequence, repetition, and selection. These constructs are covered in the Year 3, 4, and 5 National Centre for Computing Education programming units respectively. Each year group includes at least one unit that focuses on Scratch.