St Paschal Baylon Catholic Primary School
Following In The Footsteps Of Christ

Computing Long Term and Medium Term Plans – Year Five

	Reception	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Autumn	Awesome Autumn	**Programming** MGL*	**CM** Digital Photography *PE – Self-Image*		**CSN** The Internet *PE – Online Rep´*		**D & I** Spreadsheets *PE – Online Info*
	Winter Warmers	**D & I** Grouping Data *PE – Priv & Sec´*	**Programming** MGL*	**CM** Desktop Publishing *PE – Copyright*		**CSN** Sharing Info´ *PE – Online Rel´*	
Spring	Spring Time		**D & I** Pictograms *PE – Priv & Sec´*	**Programming** MGL*	**CM** Photo Editing *PE – Copyright* *Self-Image*		**CSN** Communication *PE – Online Rep´*
		CSN Technology Around Us *PE – Well-Being*		**D & I** Branching Databases *PE – Online Info´*	**Programming** MGL*	**CM** Vector Drawing *PE - Copyright*	
Summer	Summer Fun		**CSN** IT Around Us *PE – Well-Being*		**D & I** Data Logging *PE – Online Info´*	**Programming** MGL*	**CM** Web Page Creation *PE – Copyright* *Online Rel´*
		CM Digital Writing *PE – Self-Image*		**CSN** Connecting Computers *PE – Priv & Sec´*		**D & I** Flat-file Databases *PE – Online Info´*	**Programming** MGL*
Ongoing Skills		Project Evolve – Safer Internet Day Software & Keyboard/Tablet Skills					

Autumn 2: Year 5 – CSN - Sharing information

Unit introduction

In this unit, learners will develop their understanding of computer systems and how information is transferred between systems and devices. Learners will consider small-scale systems as well as large-scale systems. They will explain the input, output, and process aspects of a variety of different real-world systems. Learners will also take part in a collaborative online project with other class members and develop their skills in working together online.

Overview of lessons

Lesson	Brief overview	Learning objectives
1 Systems ncce.io/csn5-1-p	This lesson introduces learners to the concept of a system. Learners will develop their understanding of components working together to make a whole. They will outline how digital systems might work and the physical and electronic connections that exist.	To explain that computers can be connected together to form systems • I can explain that systems are built using a number of parts • I can describe that a computer system features inputs, processes, and outputs • I can explain that computer systems communicate with other devices
2 Computer systems and us ncce.io/csn5-2-p	In this lesson, learners will consider how larger computer systems work. Learners will consider how devices and processes are connected. They will also reflect on how computer systems can help us.	To recognise the role of computer systems in our lives • I can identify tasks that are managed by computer systems • I can identify the human elements of a computer system

		• I can explain the benefits of a given computer system
3 Transferring information ncce.io/csn5-3-p	This lesson introduces the idea that parts of a computer system are not always in the same place or country. Instead, those parts of a system must transfer information using the internet. This lesson builds on the introduction to the internet in the Year 4 'What is the internet?' unit, adding awareness of IP addresses and the rules (protocols) that computers have for communicating with one another.	To recognise how information is transferred over the internet • I can recognise that data is transferred using agreed methods • I can explain that networked digital devices have unique addresses • I can explain that data is transferred over networks in packets
4 Working together ncce.io/csn5-4-p	In this lesson, learners will consider how people can work together when they are not in the same location. They will discuss ways of working and start a collaborative online project. The online activity assumes that learners can make simple slides including text and images. If your learners are unsure how to do this, you may wish to spend some time on the Year 3 'Desktop publishing' unit before this lesson.	To explain how sharing information online lets people in different places work together • I can recognise that connected digital devices can allow us to access shared files stored online • I can send information over the internet in different ways • I can explain that the internet allows different media to be shared
5 Better working together ncce.io/csn5-5-p	In this lesson, learners will reflect on how they worked together in the previous lesson and how their working together might be improved. Learners will work together on an unplugged activity and	To contribute to a shared project online • I can suggest strategies to ensure successful group work • I can make thoughtful suggestions on my

	use that experience to develop their own ideas of good collective working practices.	group's work • I can compare working online with working offline
6 Shared working ncce.io/csn5-6-p	In the previous two lessons, learners worked together online on a shared project. This lesson introduces another approach to online working: reusing and modifying work done by someone else. (Using someone else's work needs to be done within the bounds of copyright and with the relevant permissions.) This lesson uses the Scratch programming tool, which allows learners to use other people's work.	To evaluate different ways of working together online • I can identify different ways of working together online • I can recognise that working together on the internet can be public or private • I can explain how the internet enables effective collaboration

Progression

This unit progresses learners' knowledge and understanding of computing systems and online collaborative working.

Learning graph (ncce.io/csn5-lg)

Curriculum links

National curriculum links

- **Design**, write and debug programs that accomplish specific goals, including **controlling or simulating physical systems**; solve problems by decomposing them into smaller parts
- **Understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration**

- Select, **use and combine a variety of software (including internet services)** on a range of digital devices to design and create a range of programs, systems and content **that accomplish given goals**, including collecting, analysing, evaluating and presenting data and information
- Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact

Education for a Connected World links

- I can assess and justify when it is acceptable to use the work of others
- I can give examples of content that is permitted to be reused

Assessment

Summative assessment

- Summative assessment (ncce.io/csn5-saq)

Subject knowledge

Enhance your subject knowledge to teach this unit through the following training opportunities.

Online training courses

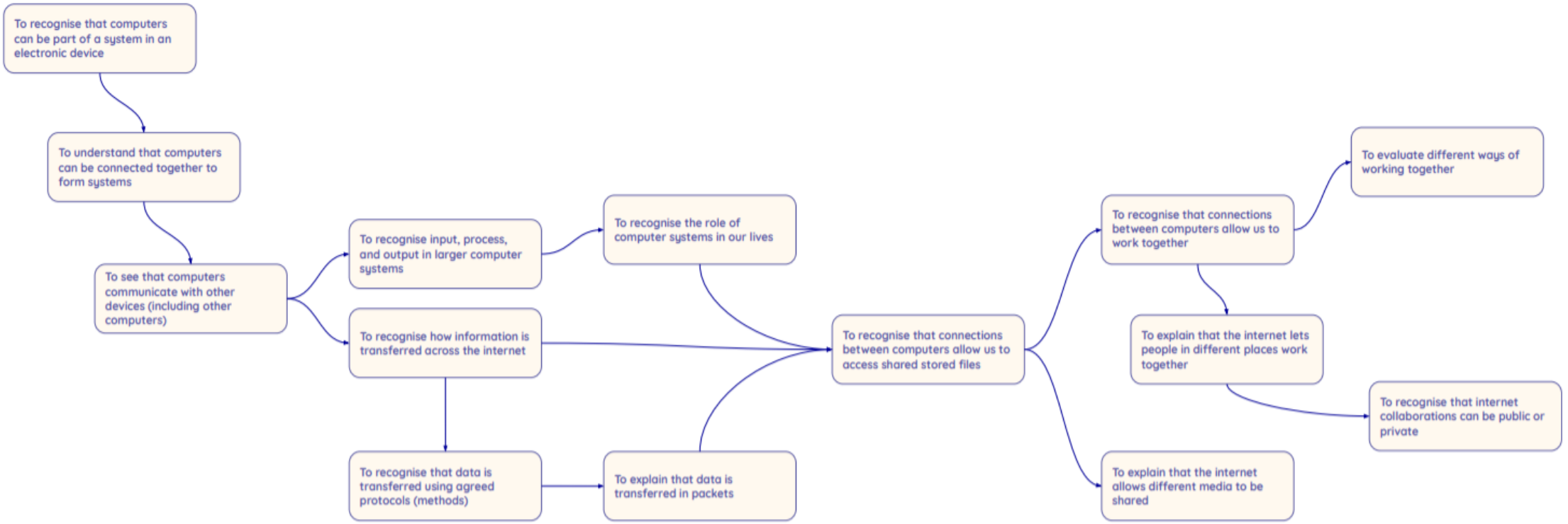
- Raspberry Pi Foundation online training courses

Face-to-face courses

National Centre for Computing Education face-to-face training courses

National Centre for Computing Education

Learning graph
Year 5 – Sharing information



Spring 2: Year 5 – Creating Media - Vector drawing

Unit introduction

In this unit learners will find out that vector images are made up of shapes. They will learn how to use the different drawing tools and how images are created in layers. They will explore the ways in which images can be grouped and duplicated to support them in creating more complex pieces of work. This unit is planned using the Google Drawings app other alternative pieces of software are available.

Overview of lessons

Lesson	Brief overview	Learning objectives
1 The drawing tools	In this lesson learners will be introduced to vector drawings and begin to have an understanding that they are made up of simple shapes and lines. Learners will use the main drawing tools within a software package. This unit is written assuming the use of Google Drawings (docs.google.com/drawings/) but other packages such as Microsoft Publisher, or Microsoft PowerPoint can be used if preferred. Learners will discuss how vector drawings differ from paper-based drawings.	To identify that drawing tools can be used to produce different outcomes • I can recognise that vector drawings are made using shapes • I can identify the main drawing tools • I can discuss how a vector drawing is different from paper-based drawings

2 Create a vector drawing	During this lesson learners will begin to identify the shapes that are used to make vector drawings. They will be able to explain that each element of a vector drawing is called an **object**. Learners will create their own vector drawing by moving, resizing, rotating, and changing the colours of a selection of objects. They will also learn how to duplicate the objects to save time.	To create a vector drawing by combining shapes • I can identify the shapes used to make a vector drawing • I can explain that each element added to a vector drawing is an object • I can move, resize, and rotate objects I have duplicated
3 Being effective	During this lesson learners will continue to increase the complexity of their vector drawings by using the zoom tool to help them add detail. They will begin to understand how grids and resize handles can be used to improve consistency in their drawings and use tools to modify objects, creating different effects.	To use tools to achieve a desired effect • I can use the zoom tool to help me add detail to my drawings • I can explain how alignment grids and resize handles can be used to improve consistency • I can modify objects to create different effects
4 Layers and objects	During this lesson learners will gain an understanding of layers and how they are used in vector drawings. They will learn that each object is built on a new layer and that these layers can be moved forward and backward to create effective vector drawings.	To recognise that vector drawings consist of layers • I can identify that each added object creates a new layer in the drawing • I can identify which objects are in the front layer or in the back layer of a drawing

		• I can change the order of layers in a vector drawing
5 Manipulating objects	During this lesson learners will be taught how to duplicate multiple objects. They will learn how to group objects to make them easier to work with, how to copy and paste these images, and then make simple alterations.	To group objects to make them easier to work with • I can copy part of a drawing by duplicating several objects • I can group to create a single object • I can reuse a group of objects to further develop my vector drawing
6 Get designing	During this lesson learners will understand how digital images can be made from shapes or pixels. They will suggest and implement improvements to vector drawings and complete the unit by creating their own labels for the classroom using the skills they have learned.	To evaluate my vector drawing • I create alternatives to vector drawings • I can suggest improvements to a vector drawing • I can apply what I have learned about vector drawings

Progression

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.

Please see the learning graph for this unit for more information about progression.

Curriculum links

National curriculum links

- Select, use, and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems, and content that accomplish given goals, including collecting, analysing, evaluating, and presenting data and information.

Education for a Connected World links

Copyright and ownership

- I can explain why copying someone else's work from the internet without permission can cause problems.

Assessment

Formative assessment

Assessment opportunities are detailed in each lesson plan. The learning objective and success criteria are introduced in the slide deck at the beginning of each lesson and then reviewed at the end. Learners are invited to assess how well they feel they have met the learning objective using thumbs up, thumbs sideways, or thumbs down.

Summative assessment

- Learners are invited to assess how well their videos met the objectives of the unit. Please see the assessment rubric document for this unit.

Subject knowledge

This is supported in the slides for each lesson:

Lesson 1: Teachers will need an understanding of the tools available in the chosen software such as shape and line drawing tools: undo, redo, select, fill, and delete.

Lesson 2: Teachers would benefit from knowing that vector drawings are created using shapes and that each shape used is called an object. It would be helpful to know how to move, resize, rotate, duplicate, and change the colour of objects within Google Drawings.

Lesson 3: Teachers would benefit from an understanding of the tools within Google Drawings, including the ability to add colour effects to shapes and lines. Sharing Google Drawing files with the learners will be required for this lesson.

Lesson 4: Teachers need to understand that each added object creates a new layer in the drawing. It would help to know how to move shapes to a different layer using 'bring to front' or 'send to back'.

Lesson 5: Teachers would benefit from understanding that objects can be grouped. Knowing how to group objects and copy/paste or duplicate them using keyboard commands would be an advantage.

Lesson 6: Teachers would benefit from an understanding of how digital images can be made, either using shapes or pixels. It would be an advantage for teachers to have an understanding of the drawing tools available in Google Drawings to support learners in showcasing their skills in this lesson.

Enhance your subject knowledge to teach this unit through the following training opportunities:

Online training courses

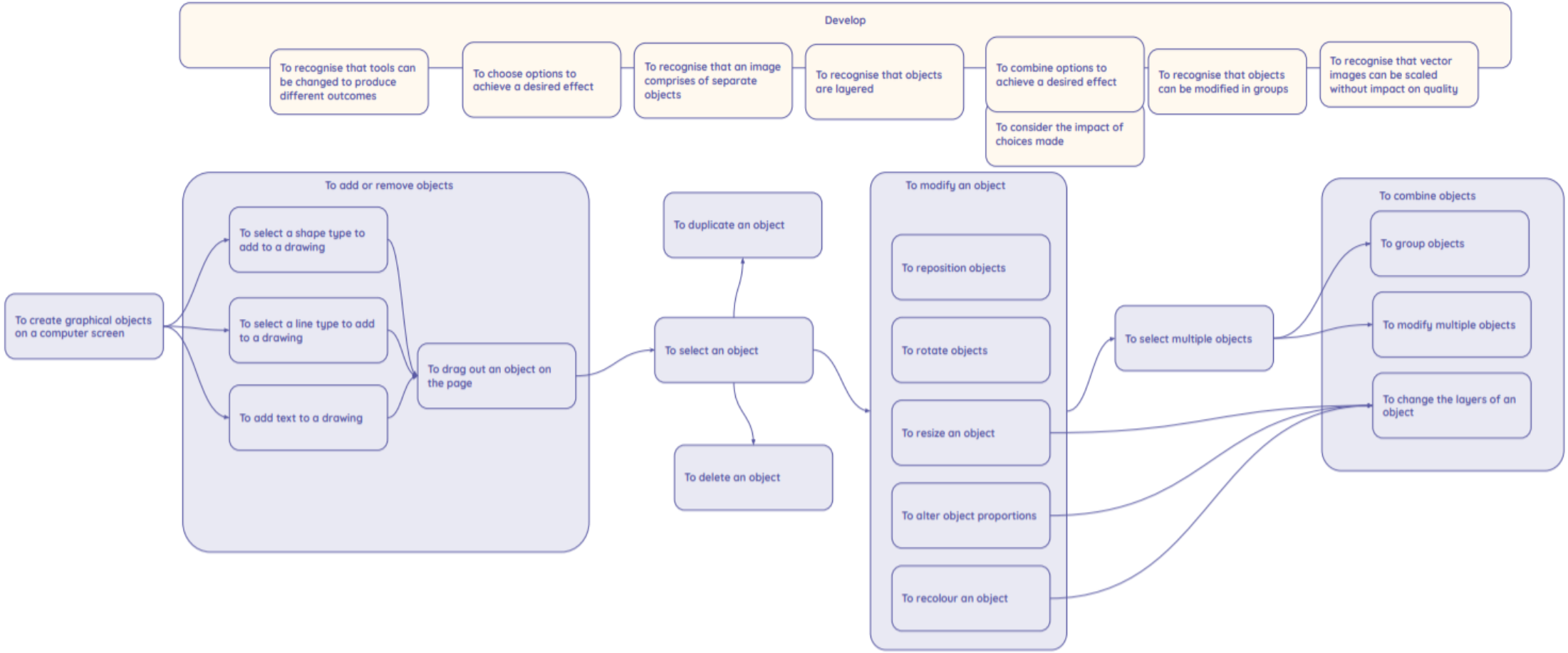
- Raspberry Pi Foundation online training courses

Face-to-face courses

National Centre for Computing Education face-to-face training courses

National Centre for Computing Education

Learning graph
Year 5 – Vector drawing



Vector drawing assessment rubric

Team:		Teacher:		Date:	

Aspect of vector drawing	Emerging [1]	Meets expectations [2]	Exceeds expectations [3]	Score
Drawing objects (shapes and lines)	• Able to add and remove objects to create a drawing	• Able to add and remove objects to create a drawing with some detail	• Add and remove objects purposefully	
Modifying objects (position, size, colour effects, proportion, and rotation)	• Able to modify the objects to create a drawing	• Able to modify the objects in order to achieve desired effects to create a drawing with some detail	• Objects are appropriately modified by size, colour, proportion, and rotation, where necessary	
Combining objects (layers and groups)	• Combine a simple range of objects and some layers to create a drawing	• Combine a range of objects, apply layers and groups to draw a whole image with some detail	• Combine a large range of different objects; be able to apply and justify the use of layers and groups	

Teacher feedback	
Learner response to feedback	

Summer 1 - MGL UNIT: Year 5 – Programming – Selection in physical computing

Unit introduction

In this unit, learners will use physical computing to explore the concept of selection in programming through the use of the Crumble programming environment. Learners will be introduced to a microcontroller (Crumble controller) and learn how to connect and program components (including output devices — LEDs and motors) through the application of their existing programming knowledge. Learners will be introduced to conditions as a means of controlling the flow of actions, and explore how these can be used in algorithms and programs through the use of an input device (push switch). Learners will make use of their knowledge of repetition and conditions when introduced to the concept of selection (through the 'if... then...' structure) and write algorithms and programs that utilise this concept. To conclude the unit, learners will design and make a working model of a fairground carousel that will incorporate their understanding of how the microcontroller and its components are connected, and how selection can be used to control the operation of the model. Throughout this unit, pupils will apply the stages of programming design.

Overview of lessons

Lesson	**Brief overview**	**Learning objectives**
1 Connecting Crumbles	In this lesson, learners will become familiar with the Crumble controller, some of its associated components, and the programming environment used to control it. They will explore how the items connect together to create a complete circuit, and how to construct programs that turn an LED on and off and set its colour. Learners will apply their understanding of repetition by identifying how their programs can be modified to make an LED flash continuously.	To control a simple circuit connected to a computer • I can build a simple circuit to connect a microcontroller to a computer • I can program a microcontroller to light an LED

		• I can explain why I used an infinite loop
2 Combining output devices	In this lesson, learners will develop their knowledge of a Crumble controller further by connecting additional devices (another Sparkle and a motor) to the controller, and they will construct programs to control more than one of these. They will design sequences of actions for these output devices. They will then apply their understanding of repetition by using count-controlled loops when implementing their design as a program.	To write a program that includes count-controlled loops • I can connect more than one output device to a microcontroller • I can design sequences for given output devices • I can decide which output devices I control with a count-controlled loop
3 Controlling with conditions	In this lesson, learners will be introduced to conditions, and how they can be used in algorithms and programs to control their flow. They will identify conditions in statements, stating if they are true or false, and learn how they can be used to start and stop a set of actions. Learners will be introduced to a Crumble switch, and learn how it can provide the Crumble controller with an input that can be used as a condition. They will explore how to write programs that use an input as a condition, and use this knowledge to write a program that uses a condition to stop a repeating light pattern.	To explain that a loop can stop when a condition is met, eg number of times • I can explain that a condition is something that can be either true or false (eg whether a value is more than 10, or whether a button has been pressed) • I can experiment with a 'do until' loop • I can program a microcontroller to respond to an input

4 Starting with selection	In this lesson, learners will develop their understanding of how the flow of actions in algorithms and programs can be controlled by conditions. They will be introduced to selection, and learn to represent conditions and actions using the 'if… then…' structure. They will apply their understanding by using selection in an algorithm created to meet the requirements of a task. They will discover that infinite repetition is required when programming input devices to repeatedly check if a condition has been met.	To conclude that a loop can be used to repeatedly check whether a condition has been met • I can explain that a condition being met can start an action • I can identify a condition and an action in my project • I can use selection (an 'if… then…' statement) to direct the flow of a program
5 Drawing designs	In this lesson, learners will apply their understanding of microcontrollers, output devices, and selection when designing a project to meet the requirements of a given task. To ensure their understanding, they will identify how selection might be used in real-world situations, then they will consider how they can apply this knowledge when designing their project. They will produce detailed drawings to show how their model will be made and how they will connect the microcontroller to its components.	To design a physical project that includes selection • I can identify a condition to start an action (real world) • I can describe what my project will do (the task) • I can create a detailed drawing of my project
6 Writing and testing algorithms	In this final lesson of the unit, learners will build on the designs that they developed in Lesson 5 by creating an algorithm to meet the requirements of the given task. They will identify how they are going to use selection before writing	To create a controllable system that includes selection

	their algorithm. They will then move into the code level to test their algorithm by implementing it as a program, running it, identifying any bugs, and returning to the algorithm to debug it where necessary. Finally, to conclude the unit, they will evaluate their algorithms and other areas of their designs.	• I can write an algorithm to control lights and a motor • I can use selection to produce an intended outcome • I can test and debug my project

Progression

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.

See the learning graph for this unit for more information about progression.

Curriculum links

Computing

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

Science – Electricity (Year 4)

- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers

Assessment

Formative assessment

Assessment opportunities are detailed in each lesson plan. The learning objective and success criteria are introduced in the slide deck at the beginning of each lesson and then reviewed at the end. Learners are invited to assess how well they feel they have met the learning objective using thumbs up, thumbs sideways, or thumbs down.

Summative assessment

See the assessment rubric to support summative assessment for this unit.

Resources

The unit has been designed to make use of the components provided in the Crumble starter kit, which are as follows:

- 1 Crumble controller
- 12 crocodile leads
- 2 Sparkles (A Sparkle is an RGB LED — red, green, blue light-emitting diode. The D connector allows the Crumble to use an electronic signal to control the Sparkle. The signal sets the colour and brightness of the LED.)
- 1 push switch suitable for Crumble
- 1 light sensor suitable for Crumble
- 1 buzzer suitable for Crumble
- 1 micro USB cable
- 1 switched battery box suitable for Crumble

Unless stated otherwise in the individual lesson plan, learners will need access to these resources (preferably one kit per pair) in each lesson. In Lessons 2, 5, and 6, learners will also need to use motors (this is also indicated in the individual lesson plans).

Learners will also need access to devices capable of running the Crumble software. This is currently available for Microsoft Windows (XP SP3 or newer) and macOS (10.6 and above). Download the software from redfernelectronics.co.uk/crumble-software.

Subject knowledge

This unit focuses on physical computing that allows learners to control real-life events through the construction of programs. When learners undertake physical computing, they write programs that control real-world objects, like LEDs and motors, using a computer. The tangible effect of seeing the commands that they entered into a computer being carried out on a physical item, rather than on screen, can be highly motivational for learners. Physical computing also offers the opportunity to take a more project-based approach to learning, and allows learners to make choices about the purpose, design, and program of their product.

Throughout this unit, there are opportunities to demonstrate a concept within the Crumble programming software or play a video. Pedagogically, it is more beneficial to demonstrate the concepts to learners, as it allows for easier questioning and understanding. We recommend that you use the videos to see what to demonstrate, then show learners with a live demonstration, however, videos are provided on the slides if you wish to use them instead.

For this unit, you will need experience of constructing programs using the Crumble programming software (see the 'Resources' section at the end of this document). It uses the same drag-and-drop style as Scratch. You will need to write programs that turn LEDs (Sparkles) on and off, change LED colours, spin motors, use push switches as inputs, and combine a number of these peripherals. Additionally, you will be connecting the Crumble controller with battery packs, Sparkles, motors, and push switches. For further support on using Crumbles, see the Crumble 'Getting Started' guide at redfernelectronics.co.uk/crumble-getting-started.

Levels of abstraction

When programming, there are four levels that can help describe a project (known as 'levels of abstraction'). Research suggests that this structure can support learners in understanding how to create a program and how it works:

- Task — this is what is needed
- Design — this is what it should do
- Code — this is how it is done
- Running the code — this is what it does

Spending time at the 'Task' and 'Design' levels before engaging in writing code aids learners in assessing the 'do-ability' of their programs and reduces a learner's cognitive load during programming. Learners will move between the different levels throughout the unit, and this is highlighted within each lesson plan.

Repetition

You will need to know that repetition is used in programming to give the same instruction or set of instructions several times. Repetition uses loops as the means to give these instructions. This unit makes use of two types of loops: infinite and count-controlled. These have been defined below.

Infinite loop

An infinite loop is a loop that commands the instruction/set of instructions to repeat forever. When an infinite loop is used in a program, there is no way of ending the program, as the command(s) within the loop will be repeated endlessly. For this reason, infinite loops should only be used when writing a program that is intended to run forever. The exception to this is when using selection in physical computing, as you will see throughout this unit.

Count-controlled loop

A count-controlled loop is a form of repetition in which a set of commands are carried out a specific number of times. Count-controlled loops should only be used when it is known how many times a set of commands need to be repeated.

Condition-controlled loop

A condition-controlled loop is a form of repetition in which a set of commands stop being carried out when a condition is met. The condition could be anything from when 'score' in a game reaches a certain value to when a key on a keyboard has been pressed.

Conditions

Conditions are statements that need to be met for a set of actions to be carried out. They can be used in algorithms and programs to control the flow of actions. When a condition is met, it is referred to as 'true' and when it is not met, it is referred to as 'false'. You will need to be able to identify and use conditions in algorithms in the form of statements to both start and stop sets of action. Additionally, you will need to understand that conditions can be used in loops, and when they are, that the set of actions in the loop will be carried out repeatedly until the condition is true, for example, 'until button A is pressed'.

Selection

When designing programs, there are often points where a decision must be made. BBC Bitesize defines selection as:

> Selection – a decision within a computer program when the program decides to move on based on the results of an event (source: BBC Bitesize)

These decisions are known as selection, and are implemented in programming using if statements. Selection is used to control the flow of actions in algorithms and programs by checking if a condition (see above) has been met. If it has been met, the identified actions will be carried out. When selection is

used in programs, loops (see above) have to be used to instruct the device to check the condition repeatedly. Without using loops, the condition would only be checked once. In the Crumble programming software, selection is implemented through the if... then... command block.

In addition to the above, you will also need to understand that programs are an implementation of an algorithm, and that when the program does not produce the required output, the algorithm should be debugged. This should then be implemented in the program.

Enhance your subject knowledge to teach this unit through the following training opportunities:

Online training courses

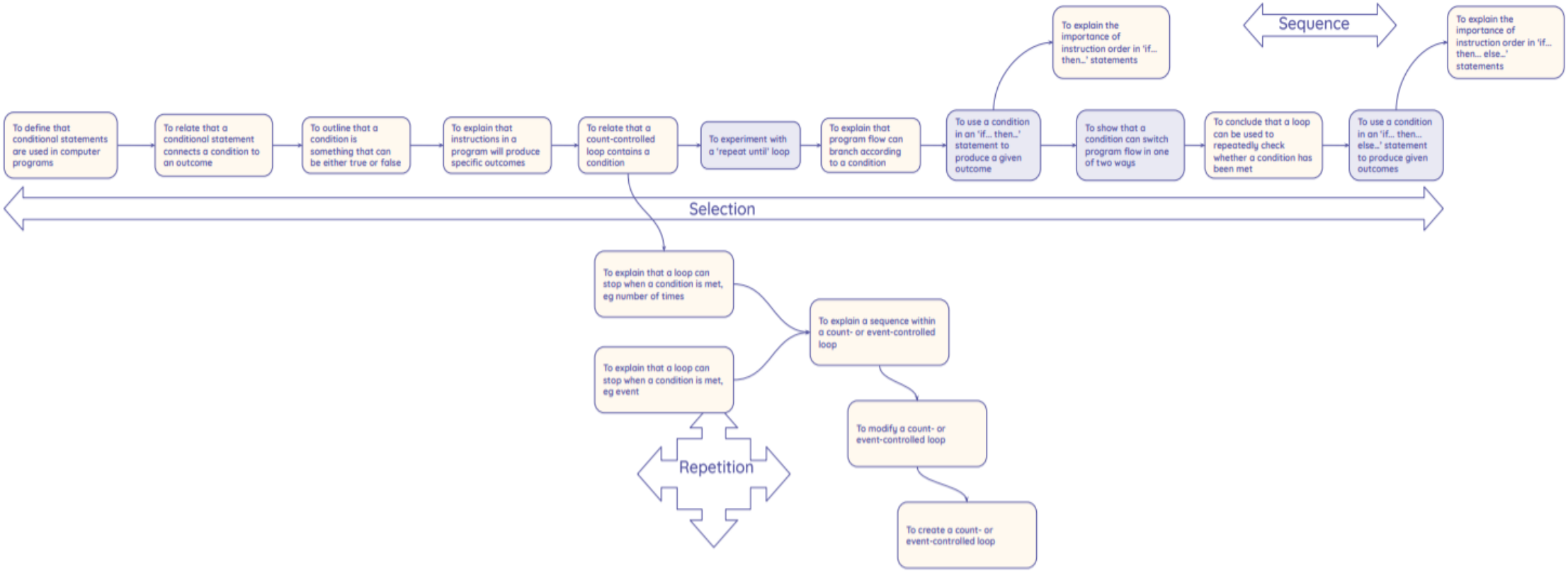
- Raspberry Pi Foundation online training courses

Face-to-face courses

National Centre for Computing Education face-to-face training courses

National Centre for Computing Education

Learning graph
Year 5 – Selection in physical computing



Selection in physical computing assessment rubric

Learner:		Teacher:		Date:	

	Emerging [1]	Expected [2]	Exceeding [3]	Score
Task	• Describe the model that will be made in the task	• Describe the requirements of the task, including the use of selection	• Explain how selection could be used to meet the requirements of the task	
Design	• Identify components to be used in their electrical circuit • Build a model that reflects the task • Write an algorithm to control output devices	• Construct a wiring diagram showing how components will be connected • Build a model that supports the hardware that will be used • Write an algorithm that uses selection to control a sequence using output devices	• Construct a wiring diagram detailing the pads to be used on each component • Build a model informed by the limitations of the hardware (eg not placing LEDs on the rotating disc) • Explain how conditions and loops have been used in the algorithm to create a selection statement	
Code	• Choose from a scaffolded set of blocks • Identify where the program goes wrong	• Combine appropriate blocks to implement their algorithm • Suggest a strategy to fix the code when it is not working	• Explain why they have chosen to implement their algorithm in that way • Explain to others the bug that was found and how it was fixed	
Running the	• Run their code on the device • Identify which elements of the	• Test their code using the device • Evaluate how successfully they	• Discuss the limitations of reviewing the code while running it	

code	task have been achieved	met the task	• Identify how their project could be enhanced	

Teacher feedback	
Learner response to feedback	

Summer 2: Year 5 – Data & Information - Flat-file databases

Unit introduction

This unit looks at how a flat-file database can be used to organise data in records. Pupils use tools within a database to order and answer questions about data. They create graphs and charts from their data to help solve problems. They use a real-life database to answer a question, and present their work to others.

Overview of lessons

Lesson	**Brief overview**	**Learning objectives**
1. Creating a paper-based database	In the first lesson, pupils create a paper version of a record card database. Using a card template, they create a data set, with each pupil creating eight to ten cards linked to a theme, eg animals. They complete records for each of the animals in their database and then physically sort the cards to answer questions about the data.	To use a form to record information • I can create multiple questions about the same field • I can explain how information can be recorded • I can order, sort, and group my data cards
2. Computer databases	In this lesson, pupils use a computer-based database to examine how data can be recorded and viewed. They learn that a database consists of 'records', and that each record contains 'fields'. In addition, they will order records in different ways and compare this database to the paper database they created in lesson 1.	To compare paper and computer-based databases • I can navigate a flat-file database to compare different views of information

		• I can explain what a ‘field’ and a ‘record’ is in a database • I can choose which field to sort data by to answer a given question
3. Using a database	In this lesson, pupils investigate how records can be grouped, using both the paper record cards created in lesson 1 and a computer based database from J2E. They use ‘grouping’ and ‘sorting’ to answer questions about the data.	To outline how grouping and then sorting data allows us to answer questions • I can explain how information can be grouped • I can group information to answer questions • I can combine grouping and sorting to answer more specific questions
4. Using search tools	In this lesson, pupils develop their search techniques to answer questions about the data. They use advanced techniques to search for more than one field, and practise doing this through both unplugged methods (without using computers), and using a computer database.	To explain that tools can be used to select specific data • I can choose which field and value are required to answer a given question • I can outline how ‘AND’ and ‘OR’ can be used to refine data selection • I can choose multiple criteria to answer a given question
5. Comparing data visually	In this lesson, pupils consider what makes a useful chart, and how charts can be used to compare data. They create charts from their data in order to answer questions about it.	To explain that computer programs can be used to compare data visually • I can select an appropriate chart to visually compare data • I can refine a chart by selecting a

		particular filter • I can explain the benefits of using a computer to create graphs
6. Databases in real life	The final lesson requires pupils to use a real-life database to ask questions and find answers in the context of a flight search based on set parameters. They take on the role of a travel agent and present their findings, showing how they arrived at their chosen options. Presentations may be given between groups of pupils, or by each group to the whole class, depending on the time available.	To apply my knowledge of a database to ask and answer real-world questions • I can ask questions that will need more than one field to answer • I can refine a search in a real-world context • I can present my findings to a group

Progression

This unit progresses pupils' 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 pupils create a presentation showing understanding and application of all the tools used within the unit.

Please see the learning graph for this unit for more information about progression.

Curriculum links

National curriculum links

- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems, and content that accomplish given goals, including collecting, analysing, evaluating, and presenting data and information

Assessment

Summative assessment

- Please see the assessment question and answer documents for this unit.

Subject knowledge

Teachers will need to know that a flat-file database is a collection of data organised in a single table. The term ‘database’ means ‘a collection of organised data that is stored on a computer’. Databases allow people to search and sort large quantities of data to find information. Data can be letters, words, numbers, dates, images, sounds etc. In addition, teachers will need to be familiar with the basic structure of a database, and the concept of ‘grouping’ and ‘sorting’ data records based on different fields. For example, grouping objects by colour, or sorting into alphabetical order.

A database is composed of ‘records’, which are sets of data on a particular object. Records are formed from one or more ‘fields’ of data. A field is one specific piece of data in a database record. For example, a record all about a country could have fields such as ‘country name’ and ‘country population’. The value within the record is the ‘answer’ to each field, eg Mexico is the value in the ‘country name’ field and ‘126.2 million’ is the value in the ‘country population’ field.

Teachers will also need to be aware that all objects have attributes. An attribute includes its ‘name’ and a ‘value’. For example, a ball will have a ‘colour’, which might be ‘red’. ‘Colour’ is the attribute ‘name’, ‘red’ is the attribute ‘value’. In a flat-file database the attribute names become the fields when the data about the object is stored as a record. The values of the attributes become the values that are saved in the database fields.

Teachers will need to be familiar with using j2data sample databases. Support with navigating the databases can be found at http://www.j2e.com/help/videos/datags4. Knowledge of how to carry out a flight search using https://www.expedia.co.uk/Flights, and the ability to screenshot flight details from a web browser, would also be beneficial.

Enhance your subject knowledge to teach this unit through the following training opportunities:

Online training courses

- Raspberry Pi Foundation online training courses

Face-to-face courses

National Centre for Computing Education face-to-face training courses

National Centre for Computing Education

Learning graph
Year 5 – Databases