# SUBJECT CONCEPT PLANS

## COMPUTING

## DATA AND INFORMATION

Small Steps

# MILESTONE 1

Key Stage 1

| Grouping Data |
|---|
| -I can describe objects using labels<br>- I can identify the label for a group of objects<br>- I can match objects to groups |
| -I can count a group of objects<br>- I can count objects<br>- I can group objects |
| -I can describe an object<br>- I can describe a property of an object<br>- I can find objects with similar properties |
| -I can count how many objects share a property<br>- I can group objects in more than one way<br>- I can group similar objects |
| -I can choose how to group objects<br>- I can describe groups of objects<br>- I can record how many objects are in a group |
| -I can compare groups of objects<br>- I can decide how to group objects to answer a question<br>- I can record and share what I have found |

| Pictograms |
|---|
| -I can compare totals in a tally chart<br>- I can record data in a tally chart<br>- I can represent a tally count as a total |
| -I can enter data onto a computer<br>- I can use a computer to view data in a different format<br>- I can use pictograms to answer simple questions about objects |
| -I can explain what the pictogram shows<br>- I can organise data in a tally chart<br>- I can use a tally chart to create a pictogram |
| -I can answer 'more than'/'less than' and 'most/least' questions about an attribute<br>- I can create a pictogram to arrange objects by an attribute<br>- I can tally objects using a common attribute |
| -I can choose a suitable attribute to compare people<br>- I can collect the data I need<br>- I can create a pictogram and draw conclusions from it |
| -I can give simple examples of why information should not be shared<br>- I can share what I have found out using a computer<br>- I can use a computer program to present information in different ways |


# SUBJECT CONCEPT PLANS

## COMPUTING

## DATA AND INFORMATION

Small Steps


# MILESTONE 2

Lower Key Stage 2

| Branching |
|---|
| -I can create two groups of objects separated by one attribute<br>- I can investigate questions with yes/no answers<br>- I can make up a yes/no question about a collection of objects |
| -I can arrange objects into a tree structure<br>- I can create a group of objects within an existing group<br>- I can select an attribute to separate objects into groups |
| -I can group objects using my own yes/no questions<br>- I can select objects to arrange in a branching database<br>- I can test my branching database to see if it works |
| -I can compare two branching database structures<br>- I can create yes/no questions using given attributes<br>- I can explain that questions need to be ordered carefully to split objects into similarly sized groups |
| -I can create a physical version of a branching database<br>- I can create questions that will enable objects to be uniquely identified<br>- I can independently create questions to use in a branching database |
| -I can create a branching database that reflects my plan<br>- I can suggest real-world uses for branching databases<br>- I can work with a partner to test my identification tool |

| Data Logging |
|---|
| -I can choose a data set to answer a given question<br>- I can identify data that can be gathered over time<br>- I can suggest questions that can be answered using a given data set |
| -I can explain what data can be collected using sensors<br>- I can identify that data from sensors can be recorded<br>- I can use data from a sensor to answer a given question |
| -I can identify the intervals used to collect data<br>- I can recognise that a data logger collects data at given points<br>- I can talk about the data that I have captured |
| -I can explain that there are different ways to view data<br>- I can sort data to find information<br>- I can view data at different levels of detail |
| -I can plan how to collect data using a data logger<br>- I can propose a question that can be answered using logged data<br>- I can use a data logger to collect data |
| -I can draw conclusions from the data that I have collected<br>- I can explain the benefits of using a data logger<br>- I can interpret data that has been collected using a data logger |

# SUBJECT CONCEPT PLANS

## COMPUTING

## DATA AND INFORMATION

Small Steps

# MILESTONE 3

Upper Key Stage 2

| Flat-file Databases |
| --- |
| -I can create a database using cards<br>- I can explain how information can be recorded<br>- I can order, sort, and group my data cards |
| -I can choose which field to sort data by to answer a given question<br>- I can explain what a field and a record is in a database<br>- I can navigate a flat-file database to compare different views of information |
| -I can combine grouping and sorting to answer specific questions<br>- I can explain that data can be grouped using chosen values<br>- I can group information using a database |
| -I can choose multiple criteria to answer a given question<br>- I can choose which field and value are required to answer a given question<br>- I can outline how ‘AND’ and ‘OR’ can be used to refine data selection |
| -I can explain the benefits of using a computer to create charts<br>- I can refine a chart by selecting a particular filter<br>- I can select an appropriate chart to visually compare data |
| -I can ask questions that will need more than one field to answer<br>- I can present my findings to a group<br>- I can refine a search in a real-world context |

| Spreadsheets |
| --- |
| -I can collect data<br>- I can enter data into a spreadsheet<br>- I can suggest how to structure my data |
| -I can apply an appropriate format to a cell<br>- I can choose an appropriate format for a cell<br>- I can explain what an item of data is |
| -I can construct a formula in a spreadsheet<br>- I can explain which data types can be used in calculations<br>- I can identify that changing inputs changes output |
| -I can apply a formula to multiple cells by duplicating it<br>- I can calculate data using different operations<br>- I can create a formula which includes a range of cells |
| -I can apply a formula to calculate the data I need to answer questions<br>- I can explain why data should be organised<br>- I can use a spreadsheet to answer questions |
| -I can produce a chart<br>- I can suggest when to use a table or chart<br>- I can use a chart to show the answer to questions |

# SUBJECT CONCEPT PLANS

## COMPUTING

## CREATING MEDIA

Small Steps

# MILESTONE 1

Key Stage 1

| Digital Writing |
| --- |
| -I can identify and find keys on a keyboard<br>- I can open a word processor<br>- I can recognise keys on a keyboard |
| -I can enter text into a computer<br>- I can use backspace to remove text<br>- I can use letter, number, and space keys |
| -I can explain what the keys that I have learnt about already do<br>- I can identify the toolbar and use bold, italic, and underline<br>- I can type capital letters |
| -I can change the font<br>- I can select all of the text by clicking and dragging<br>- I can select a word by double-clicking |
| -I can decide if my changes have improved my writing<br>- I can say what tool I used to change the text<br>- I can use ‘undo’ to remove changes |
| -I can explain the differences between typing and writing<br>- I can make changes to text on a computer<br>- I can say why I prefer typing or writing |

| Digital Photography |
| --- |
| -I can explain what I did to capture a digital photo<br>- I can recognise what devices can be used to take photographs<br>- I can talk about how to take a photograph |
| -I can explain the process of taking a good photograph<br>- I can explain why a photo looks better in portrait or landscape format<br>- I can take photos in both landscape and portrait format |
| -I can discuss how to take a good photograph<br>- I can identify what is wrong with a photograph<br>- I can improve a photograph by retaking it |
| -I can experiment with different light sources<br>- I can explain why a picture may be unclear<br>- I can explore the effect that light has on a photo |
| -I can explain my choices<br>- I can recognise that images can be changed<br>- I can use a tool to achieve a desired effect |
| -I can apply a range of photography skills to capture a photo<br>- I can identify which photos are real and which have been changed<br>- I can recognise which photos have been changed |

# SUBJECT CONCEPT PLANS

## COMPUTING

## CREATING MEDIA

Small Steps

## MILESTONE 2

Lower Key Stage 2

| Desktop Publishing |
| --- |
| -I can explain the difference between text and images<br>- I can identify the advantages and disadvantages of using text and images<br>- I can recognise that text and images can communicate messages clearly |
| -I can change font style, size, and colours for a given purpose<br>- I can edit text<br>- I can explain that text can be changed to communicate more clearly |
| -I can create a template for a particular purpose<br>- I can define the term 'page orientation'<br>- I can recognise placeholders and say why they are important |
| -I can choose the best locations for my content<br>- I can make changes to content after I've added it<br>- I can paste text and images to create a magazine cover |
| -I can choose a suitable layout for a given purpose<br>- I can identify different layouts<br>- I can match a layout to a purpose |
| -I can compare work made on desktop publishing to work created by hand<br>- I can identify the uses of desktop publishing in the real world<br>- I can say why desktop publishing might be helpful |

| Audio Production |
| --- |
| -I can explain that the person who records the sound can say who is allowed to use it<br>- I can identify the input and output devices used to record and play sound<br>- I can use a computer to record audio |
| -I can discuss what sounds can be added to a podcast<br>- I can inspect the soundwave view to know where to trim my recording<br>- I can re-record my voice to improve my recording |
| -I can explain how sounds can be combined to make a podcast more engaging<br>- I can plan appropriate content for a podcast<br>- I can save my project so the different parts remain editable |
| -I can improve my voice recordings<br>- I can record content following my plan<br>- I can review the quality of my recordings |
| -I can arrange multiple sounds to create the effect I want<br>- I can explain the difference between saving a project and exporting an audio file<br>- I can open my project to continue working on it |
| -I can choose appropriate edits to improve my podcast<br>- I can listen to an audio recording to identify its strengths<br>- I can suggest improvements to an audio recording |


# SUBJECT CONCEPT PLANS

## COMPUTING

## CREATING MEDIA

Small Steps


## MILESTONE 3

Upper Key Stage 2

| Video Production |
| --- |
| -I can compare features in different videos<br>- I can explain that video is a visual media format<br>- I can identify features of videos |
| -I can experiment with different camera angles<br>- I can identify and find features on a digital video recording device<br>- I can make use of a microphone |
| -I can capture video using a range of filming techniques<br>- I can review how effective my video is<br>- I can suggest filming techniques for a given purpose |
| -I can create and save video content<br>- I can decide which filming techniques I will use<br>- I can outline the scenes of my video |
| -I can explain how to improve a video by reshooting and editing<br>- I can select the correct tools to make edits to my video<br>- I can store, retrieve, and export my recording to a computer |
| -I can evaluate my video and share my opinions<br>- I can make edits to my video and improve the final outcome<br>- I can recognise that my choices when making a video will impact on the quality of the final outcome |

| Web-page Creation |
| --- |
| -I can discuss the different types of media used on websites<br>- I can explore a website<br>- I know that websites are written in HTML |
| -I can draw a web page layout that suits my purpose<br>- I can recognise the common features of a web page<br>- I can suggest media to include on my page |
| -I can describe what is meant by the term 'fair use'<br>- I can find copyright-free images<br>- I can say why I should use copyright-free images |
| -I can add content to my own web page<br>- I can evaluate what my web page looks like on different devices and suggest/make edits<br>- I can preview what my web page looks like |
| -I can describe why navigation paths are useful<br>- I can explain what a navigation path is<br>- I can make multiple web pages and link them using hyperlinks |
| -I can create hyperlinks to link to other people's work<br>- I can evaluate the user experience of a website<br>- I can explain the implication of linking to content owned by others |

# SUBJECT CONCEPT PLANS

## COMPUTING

## PROGRAMMING

Small Steps

## MILESTONE 1

Key Stage 1

| Moving a Robot |
| --- |
| -I can match a command to an outcome<br>- I can predict the outcome of a command on a device<br>- I can run a command on a device |
| -I can follow an instruction<br>- I can give directions<br>- I can recall words that can be acted out |
| -I can compare forwards and backwards movements<br>- I can predict the outcome of a sequence involving forwards and backwards commands<br>- I can start a sequence from the same place |
| -I can compare left and right turns<br>- I can experiment with turn and move commands to move a robot<br>- I can predict the outcome of a sequence involving up to four commands |
| -I can choose the order of commands in a sequence<br>- I can debug my program<br>- I can explain what my program should do |
| -I can identify several possible solutions<br>- I can plan two programs<br>- I can use two different programs to get to the same place |

| Programming Annotations |
| --- |
| -I can compare different programming tools<br>- I can find which commands to move a sprite<br>- I can use commands to move a sprite |
| -I can run my program<br>- I can use a Start block in a program<br>- I can use more than one block by joining them together |
| -I can change the value<br>- I can find blocks that have numbers<br>- I can say what happens when I change a value |
| -I can add blocks to each of my sprites<br>- I can delete a sprite<br>- I can show that a project can include more than one sprite |
| -I can choose appropriate artwork for my project<br>- I can create an algorithm for each sprite<br>- I can decide how each sprite will move |
| -I can add programming blocks based on my algorithm<br>- I can test the programs I have created<br>- I can use sprites that match my design |

| Robot Algorithms |
| --- |
| -I can choose a series of words that can be enacted as a sequence<br>- I can follow instructions given by someone else<br>- I can give clear instructions |
| -I can show the difference in outcomes between two sequences that consist of the same commands<br>- I can use an algorithm to program a sequence on a floor robot<br>- I can use the same instructions to create different algorithms |
| -I can compare my prediction to the program outcome<br>- I can follow a sequence<br>- I can predict the outcome of a sequence |
| -I can explain the choices I made for my mat design<br>- I can identify different routes around my mat<br>- I can test my mat to make sure that it is usable |
| -I can create an algorithm to meet my goal<br>- I can explain what my algorithm should achieve<br>- I can use my algorithm to create a program |
| -I can plan algorithms for different parts of a task<br>- I can put together the different parts of my program<br>- I can test and debug each part of the program |

| Programming Quizzes |
| --- |
| -I can identify that a program needs to be started<br>- I can identify the start of a sequence<br>- I can show how to run my program |
| -I can change the outcome of a sequence of commands<br>- I can match two sequences with the same outcome<br>- I can predict the outcome of a sequence of commands |
| -I can build the sequences of blocks I need<br>- I can decide which blocks to use to meet the design<br>- I can work out the actions of a sprite in an algorithm |
| -I can choose backgrounds for the design<br>- I can choose characters for the design<br>- I can create a program based on the new design |
| -I can build sequences of blocks to match my design<br>- I can choose the images for my own design<br>- I can create an algorithm |
| -I can compare my project to my design<br>- I can debug my program<br>- I can improve my project by adding features |


# SUBJECT CONCEPT PLANS

## COMPUTING

## PROGRAMMING

Small Steps

## MILESTONE 1

Key Stage 1

# SUBJECT CONCEPT PLANS

## COMPUTING

### PROGRAMMING

Small Steps

## MILESTONE 2

Lower Key Stage 2

| Sequencing Sounds |
| --- |
| -I can explain that objects in Scratch have attributes (linked to)<br>- I can identify the objects in a Scratch project (sprites, backdrops)<br>- I can recognise that commands in Scratch are represented as blocks |
| -I can choose a word which describes an on-screen action for my plan<br>- I can create a program following a design<br>- I can identify that each sprite is controlled by the commands I choose |
| -I can create a sequence of connected commands<br>- I can explain that the objects in my project will respond exactly to the code<br>- I can start a program in different ways |
| -I can combine sound commands<br>- I can explain what a sequence is<br>- I can order notes into a sequence |
| -I can build a sequence of commands<br>- I can decide the actions for each sprite in a program<br>- I can make design choices for my artwork |
| -I can identify and name the objects I will need for a project<br>- I can implement my algorithm as code<br>- I can relate a task description to a design |

| Events and Actions in Programs |
| --- |
| -I can choose which keys to use for actions and explain my choices<br>- I can explain the relationship between an event and an action<br>- I can identify a way to improve a program |
| -I can choose a character for my project<br>- I can choose a suitable size for a character in a maze<br>- I can program movement |
| -I can choose blocks to set up my program<br>- I can consider the real world when making design choices<br>- I can use a programming extension |
| -I can build more sequences of commands to make my design work<br>- I can choose suitable keys to turn on additional features<br>- I can identify additional features (from a given set of blocks) |
| -I can match a piece of code to an outcome<br>- I can modify a program using a design<br>- I can test a program against a given design |
| -I can evaluate my project<br>- I can implement my design<br>- I can make design choices and justify them |

| Repetition in Shapes |
| --- |
| -I can create a code snippet for a given purpose<br>- I can explain the effect of changing a value of a command<br>- I can program a computer by typing commands |
| -I can test my algorithm in a text-based language<br>- I can use a template to create a design for my program<br>- I can write an algorithm to produce a given outcome |
| -I can identify everyday tasks that include repetition as part of a sequence, eg brushing teeth, dance moves<br>- I can identify patterns in a sequence<br>- I can use a count-controlled loop to produce a given outcome |
| -I can choose which values to change in a loop<br>- I can identify the effect of changing the number of times a task is repeated<br>- I can predict the outcome of a program containing a count-controlled loop |
| -I can explain that a computer can repeatedly call a procedure<br>- I can identify ‘chunks’ of actions in the real world<br>- I can use a procedure in a program |
| -I can design a program that includes count-controlled loops<br>- I can develop my program by debugging it<br>- I can make use of my design to write a program |

| Repetition in Games |
| --- |
| -I can list an everyday task as a set of instructions including repetition<br>- I can modify a snippet of code to create a given outcome<br>- I can predict the outcome of a snippet of code |
| -I can choose when to use a count-controlled and an infinite loop<br>- I can modify loops to produce a given outcome<br>- I can recognise that some programming languages enable more than one process to be run at once |
| -I can choose which action will be repeated for each object<br>- I can evaluate the effectiveness of the repeated sequences used in my program<br>- I can explain what the outcome of the repeated action should be |
| -I can explain the effect of my changes<br>- I can identify which parts of a loop can be changed<br>- I can re-use existing code snippets on new sprites |
| -I can develop my own design explaining what my project will do<br>- I can evaluate the use of repetition in a project<br>- I can select key parts of a given project to use in my own design |
| -I can build a program that follows my design<br>- I can evaluate the steps I followed when building my project<br>- I can refine the algorithm in my design |


SUBJECT CONCEPT PLANS

COMPUTING

PROGRAMMING

Small Steps

MILESTONE 2

Lower Key Stage 2

# SUBJECT CONCEPT PLANS

## COMPUTING

### PROGRAMMING

Small Steps

## MILESTONE 3

Upper Key Stage 2

| Selection in Physical Computing |
| --- |
| -I can create a simple circuit and connect it to a microcontroller<br>- I can explain what an infinite loop does<br>- I can program a microcontroller to make an LED switch on |
| -I can connect more than one output component to a microcontroller<br>- I can design sequences that use count-controlled loops<br>- I can use a count-controlled loop to control outputs |
| -I can design a conditional loop<br>- I can explain that a condition is either true or false<br>- I can program a microcontroller to respond to an input |
| -I can explain that a condition being met can start an action<br>- I can identify a condition and an action in my project<br>- I can use selection (an 'if…then…' statement) to direct the flow of a program |
| -I can create a detailed drawing of my project<br>- I can describe what my project will do<br>- I can identify a real-world example of a condition starting an action |
| -I can test and debug my project<br>- I can use selection to produce an intended outcome<br>- I can write an algorithm that describes what my model will do |

| Selection in Quizzes |
| --- |
| -I can identify conditions in a program<br>- I can modify a condition in a program<br>- I can recall how conditions are used in selection |
| -I can create a program with different outcomes using selection<br>- I can identify the condition and outcomes in an 'if... then… else...' statement<br>- I can use selection in an infinite loop to check a condition |
| -I can design the flow of a program which contains 'if… then… else…'<br>- I can explain that program flow can branch according to a condition<br>- I can show that a condition can direct program flow in one of two ways |
| -I can identify the outcome of user input in an algorithm<br>- I can outline a given task<br>- I can use a design format to outline my project |
| -I can implement my algorithm to create the first section of my program<br>- I can share my program with others<br>- I can test my program |
| -I can extend my program further<br>- I can identify the setup code I need in my program<br>- I can identify ways the program could be improved |

# SUBJECT CONCEPT PLANS

## COMPUTING

### COMPUTER SYSTEMS + NETWORKS

Small Steps

## MILESTONE 1

Key Stage 1

| Technology Around Us |
| --- |
| -I can explain how these technology examples help us<br>- I can explain technology as something that helps us<br>- I can locate examples of technology in the classroom |
| -I can name the main parts of a computer<br>- I can switch on and log into a computer<br>- I can use a mouse to click and drag |
| -I can click and drag to make objects on a screen<br>- I can use a mouse to create a picture<br>- I can use a mouse to open a program |
| -I can save my work to a file<br>- I can say what a keyboard is for<br>- I can type my name on a computer |
| -I can delete letters<br>- I can open my work from a file<br>- I can use the arrow keys to move the cursor |
| -I can discuss how we benefit from these rules<br>- I can give examples of some of these rules<br>- I can identify rules to keep us safe and healthy when we are using technology in and beyond the home |

| IT Around Us |
| --- |
| -I can describe some uses of computers<br>- I can identify examples of computers<br>- I can identify that a computer is a part of IT |
| -I can identify examples of IT<br>- I can identify that some IT can be used in more than one way<br>- I can sort school IT by what it's used for |
| -I can find examples of information technology<br>- I can sort IT by where it is found<br>- I can talk about uses of information technology |
| -I can demonstrate how IT devices work together<br>- I can recognise common types of technology<br>- I can say why we use IT |
| -I can list different uses of information technology<br>- I can say how rules can help keep me safe<br>- I can talk about different rules for using IT |
| -I can explain the need to use IT in different ways<br>- I can identify the choices that I make when using IT<br>- I can use IT for different types of activities |

# SUBJECT CONCEPT PLANS

## COMPUTING

## COMPUTER SYSTEMS + NETWORKS

Small Steps

# MILESTONE 2

Lower Key Stage 2

| Connecting Computers |
| --- |
| -I can explain that digital devices accept inputs<br>- I can explain that digital devices produce outputs<br>- I can follow a process |
| -I can classify input and output devices<br>- I can describe a simple process<br>- I can design a digital device |
| -I can explain how I use digital devices for different activities<br>- I can recognise similarities between using digital devices and non-digital tools<br>- I can suggest differences between using digital devices and non-digital tools |
| -I can discuss why we need a network switch<br>- I can explain how messages are passed through multiple connections<br>- I can recognise different connections |
| -I can demonstrate how information can be passed between devices<br>- I can explain the role of a switch, server, and wireless access point in a network<br>- I can recognise that a computer network is made up of a number of devices |
| -I can identify how devices in a network are connected together<br>- I can identify networked devices around me<br>- I can identify the benefits of computer networks |

| The Internet |
| --- |
| -I can demonstrate how information is shared across the internet<br>- I can describe the internet as a network of networks<br>- I can discuss why a network needs protecting |
| -I can describe networked devices and how they connect<br>- I can explain that the internet is used to provide many services<br>- I can recognise that the World Wide Web contains websites and web pages |
| -I can describe how to access websites on the WWW<br>- I can describe where websites are stored when uploaded to the WWW<br>- I can explain the types of media that can be shared on the WWW |
| -I can explain that internet services can be used to create content online<br>- I can explain what media can be found on websites<br>- I can recognise that I can add content to the WWW |
| -I can explain that there are rules to protect content<br>- I can explain that websites and their content are created by people<br>- I can suggest who owns the content on websites |
| -I can explain that not everything on the World Wide Web is true<br>- I can explain why I need to think carefully before I share or reshare content<br>- I can explain why some information I find online may not be honest, accurate, or legal |


# SUBJECT CONCEPT PLANS

## COMPUTING

## COMPUTER SYSTEMS + NETWORKS

Small Steps


# MILESTONE 3

Upper Key Stage 2

| Systems and Searches |
| --- |
| -I can describe that a computer system features inputs, processes, and outputs<br>- I can explain that computer systems communicate with other devices<br>- I can explain that systems are built using a number of parts |
| -I can explain the benefits of a given computer system<br>- I can identify tasks that are managed by computer systems<br>- I can identify the human elements of a computer system |
| -I can compare results from different search engines<br>- I can make use of a web search to find specific information<br>- I can refine my web search |
| -I can explain why we need tools to find things online<br>- I can recognise the role of web crawlers in creating an index<br>- I can relate a search term to the search engine's index |
| -I can explain that a search engine follows rules to rank results<br>- I can give examples of criteria used by search engines to rank results<br>- I can order a list by rank |
| -I can describe some of the ways that search results can be influenced<br>- I can explain how search engines make money<br>- I can recognise some of the limitations of search engines |

| Communication and Collaboration |
| --- |
| -I can describe how computers use addresses to access websites<br>- I can explain that internet devices have addresses<br>- I can recognise that data is transferred using agreed methods |
| -I can explain that all data transferred over the internet is in packets<br>- I can explain that data is transferred over networks in packets<br>- I can identify and explain the main parts of a data packet |
| -I can explain that the internet allows different media to be shared<br>- I can recognise how to access shared files stored online<br>- I can send information over the internet in different ways |
| -I can explain how the internet enables effective collaboration<br>- I can identify different ways of working together online<br>- I can recognise that working together on the internet can be public or private |
| -I can choose methods of communication to suit particular purposes<br>- I can explain the different ways in which people communicate<br>- I can identify that there are a variety of ways to communicate over the internet |
| -I can compare different methods of communicating on the internet<br>- I can decide when I should and should not share information online<br>- I can explain that communication on the internet may not be private |