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Computing Year A Learning Overview

Nursery Rather than a scheme with set lessons, the early years resources are designed to integrate into the day-to-day routine and continuous provision, with opportunities for using Computing as part of the Early Years curriculum to support children in working towards early learning goals.					
Nursery	**Computing Systems and Networks** *(Continuous Learning)*	**Programming** *(Continuous Learning)*	**Data and Information** *(Continuous Learning)*	**Creating Media**	**Safety & Security** *(Continuous Learning)*
Vocab	Computer, click, drag, button, log in, log out, app, double click, keyboard, laptop, mouse, iPad, tablet, telephone, mobile phone, CD, DVD player, remote control.	Control, move, forward, backward, turn, pull, push, wind, lift, press, twist.	sort, sequence, order	Type, paint, record, photograph, speaker, sound, headphones, camera, television, video, tools, draw, select, delete, choose, change.	Safety, e-safety, online, internet, website, rules, trust, feelings, happy, worried, program, game, app.
Key Skills	**Technology Around Us** ▪ Talk about different kinds of information such as pictures and words. ▪ Control and move objects on a screen. ▪ Use and operate simple technological devices in everyday life. ▪ Talk about and use 'make believe' technology in play.	**Programming** ▪ Use a Bee-Bot and make it move. ▪ Choose which buttons to press to give instructions to a Beebot. ▪ Choose buttons to control other programmable toys. ▪ Choose instructions to control applications to play games.	**Sorting** ▪ Sort objects into groups ▪ Arrange objects in height order ▪ Put objects in the correct order (sequence)	**Pictures and Sounds** ▪ Use technology to draw pictures on a computer/ tablet device. ▪ Use technology to record sounds and listen back to them. ▪ Use technology to take photographs or videos to record images and events.	▪ Learn safety rules for technological devices, programs and applications. ▪ Stay on the program that an adult has chosen. ▪ Be kind to my friends when I use the computer. ▪ Only an adult can select a website / program / App to use that is age appropriate. ▪ Tell an adult if I get a worried feeling when I am online.
Resources	▪ Technological toys, e.g. iron, microwave, telephone, computer.	▪ Beebots ▪ Floor maps ▪ Programmable toys ▪ Tablet apps and games	▪ Toys, figures, Lego, pencils, buckets ▪ Sorting Game	▪ 2Paint a Picture ▪ Simple City ▪ Doodle Buddy App	▪ Website browsers ▪ Online games ▪ Tablet apps and games

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Reception

Rather than a scheme with set lessons, the early years resources are designed to integrate into the day-to-day routine and continuous provision, with opportunities for using Computing as part of the Early Years curriculum to support children in working towards early learning goals.

Reception	Computing Systems and Networks *(Continuous Learning)*	Programming *(Continuous Learning)*	Data and Information *(Continuous Learning)*	Creating Media *(Continuous Learning)*	Safety & Security *(Continuous Learning)*
Vocab	Computer, click, drag, drop, button, log in, log out, app, double click, keyboard, laptop, mouse, iPad, tablet, phone, CD, DVD player, remote control, eBook	Control, move, forward, backward, turn, pull, push, wind, lift, press, twist, algorithm, sequence, repeat, blocks, debug	sort, sequence, order, pattern, repeat	Type, paint, record, photograph, speaker, sound, headphones, camera, television, video, tools, draw, select, delete, choose, change.	Safety, e-safety, online, internet, website, rules, trust, feelings, happy, worried, program, game, app.
Key Skills	**Technology Around Us** ▪ Talk about different kinds of information such as pictures and words. ▪ Control and move objects on a screen. ▪ Use and operate simple technological devices in everyday life. ▪ Talk about and use 'make believe' technology in play.	**Programming** ▪ Use a Bee-Bot and make it move. ▪ Choose which buttons to press to give instructions to a Beebot. ▪ Choose buttons to control other programmable toys. ▪ Choose instructions to control applications to play games. ▪ Follow algorithms ▪ Drag and drop objects using a mouse or touch screen ▪ Create an algorithm ▪ Debug an algorithm	**Sorting** ▪ Sort objects into groups ▪ Arrange objects in height order ▪ Put objects in the correct order (sequence) **Patterns** ▪ Make simple patterns ▪ Spot repeating patterns ▪ Identify the next object in a pattern	**Pictures and Sounds** ▪ Use technology to draw pictures on a computer/ tablet device. ▪ Use technology to record sounds and listen back to them. ▪ Use technology to take photographs or videos to record images and events. ▪ Change and 'tinker' with a picture or sound effect	▪ Learn safety rules for technological devices, programs and applications. ▪ Stay on the program that an adult has chosen. ▪ Be kind to my friends when I use the computer. ▪ Only an adult can select a website / program / App to use that is age appropriate. ▪ Tell an adult if I get a worried feeling when I am online. ▪ Know what to do if they feel uncomfortable when they see something on the internet.
Resources	▪ Technological toys, e.g. iron, microwave, telephone, computer. eBooks	▪ Beebots ▪ Floor maps ▪ Programmable toys ▪ Tablet apps and games ▪ Algorithm cards	▪ Toys, figures, Lego, pencils, buckets ▪ Sorting Game	▪ 2Paint a Picture ▪ Simple City ▪ Doodle Buddy App ▪ Artwork by Mondrion ▪ Song Maker app	▪ Website browsers ▪ Online games ▪ Tablet apps and games ▪ Emotion cards

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KS1	**Computing Systems and Networks: Technology Around Us**	
CYCLE ~ A *red italic text = key learning points	**Prior Vocabulary:** Computer, click, drag, button, log in, log out, app, double click, keyboard, laptop, mouse, iPad, tablet, telephone, mobile phone, CD, DVD player, remote control. **Key vocabulary:** Technology, purpose, help, object, typing, keyboard, write, words, letters, numbers, screen, mouse, skill.	
	Enquiry questions (sequenced): ▪ How does technology help us in different ways? ▪ What are the main parts of a desktop computer or laptop? ▪ What purpose does a computer "mouse" have? ▪ What purpose does a computer "keyboard" have? ▪ How can a computer help with editing? ▪ Why do we have [safety] rules for using computers?	
	By the end of this unit, pupils will know (substantive knowledge) ▪ Identify technology as something that helps us. ▪ Locate examples of technology in the classroom. ▪ Identify a computer and its main parts. ▪ Know rules for using technology safely and give examples. ▪ *Recognise common uses of information technology beyond school*	**By the end of this unit, pupils will be able to (procedural and disciplinary knowledge)** ▪ Use a mouse in different ways to open a program, click and drag objects and create a picture. ▪ Use a keyboard to type on a computer. ▪ Use a keyboard to edit text. ▪ *Use technology purposefully to create, organise, store, manipulate and retrieve digital content* ▪ *Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies*

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KS1	**Creating Media: Digital Painting** *(Linked to other subject)*	
CYCLE ~ A **red italic text = key learning points*	**Prior Vocabulary:** paint, record, photograph, camera, tools, draw, select, delete, choose, change. **Key vocabulary:** digital, program, line, shape, fill, undo, paintbrush, pencil, erase, shape, brush styles, brush sizes, spray can, choice, compare, *Artist, Piet Mondrian, Henri Matisse, primary colours,*	
	Enquiry questions (sequenced): ▪ How can we paint using computers? ▪ Why did you choose that? ▪ Which tools are useful and why? ▪ Can you spot the differences between a painting on a computer or on paper? ▪ Do you prefer painting on a computer or on paper?	
	By the end of this unit, pupils will know (substantive knowledge) ▪ Describe what different digital tools do ▪ Make careful choices when painting a digital picture ▪ Explain why they chose the tools they used ▪ Which digital tools are helpful and why ▪ Create a picture in the style of an artist ▪ Compare a picture on a computer and on paper and give their preference ▪ About the work of a range of artists, craft makers and designers, e.g. Wassily Kandinsky	**By the end of this unit, pupils will be able to (procedural and disciplinary knowledge)** ▪ Use the shape and line tools ▪ Make marks on a screen and explain which tools were used ▪ Use the paint tools to draw a picture ▪ Change the colour and size of their brush ▪ *Use technology purposefully to create, organise, store, manipulate and retrieve digital content*

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KS1	Data and Information: Grouping Data	
CYCLE ~ A *red italic text = key learning points	**Prior Vocabulary:** Safety, online, internet, website, rules, trust, feelings, happy, worried, program, game, app. **Key vocabulary:** Label, Match, Group, Count, Describe, Object, Compare, Question, Answer, Search, Data, Information, Operation, Application, Pictogram, Collect, 'data set', *Present, Property, Attribute, Computer, Task, Input, Image,*	
	Enquiry questions (sequenced): ▪ How have these objects been grouped? ▪ What similar properties do these objects have? ▪ How many objects are in each group? ▪ How does the computer know how many objects there are?	
	By the end of this unit, pupils will know (substantive knowledge) ▪ Objects can be counted ▪ Objects can be grouped in more than one way	**By the end of this unit, pupils will be able to (procedural and disciplinary knowledge)** ▪ Label objects and describe them ▪ Identify and match a group of objects according to their properties ▪ Find objects with similar properties ▪ Record how many objects are in a group ▪ Record how objects are grouped Answer questions about data and groups of objects ▪ *Use technology purposefully to create, organise, store, manipulate and retrieve digital content* ▪ *Recognise common uses of information technology beyond school* ▪ *Use technology safely and respectfully*

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KS1	Programming: Programming Animations	
CYCLE ~ A *red italic text = key learning points	**Prior Vocabulary:** Control, move, forward, backward, turn, pull, push, wind, lift, press, twist, algorithm, sequence, repeat, blocks, debug **Key vocabulary:** Computer, Program, Algorithm, Clear, Precise, Order, Instruction, Digital device, Predict, Code, Running the code, *Compare, Tool, Join, Block, Change, Sprite, Program design, Task, Project, Design,*	
	Enquiry questions (sequenced): ▪ How can you move a character in the program? ▪ What will happen when this program is run? ▪ How can you change the program? ▪ What else can you change in the program? ▪ Can you run a program for more than one sprite?	
	By the end of this unit, pupils will know (substantive knowledge) *[facts]* ▪ Compare different programming tools ▪ Predict what will happen in a program if a value is changed ▪ *Understand what algorithms are, how they are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructions* ▪ *Use logical reasoning to predict the behaviour of simple programs* ▪ *Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies*	**By the end of this unit, pupils will be able to (procedural and disciplinary knowledge)** *[skills]* ▪ Choose a command to move a sprite ▪ Use a series of commands joined together ▪ Run a program of a series of commands ▪ Program more than one sprite to move in different ways ▪ Use an algorithm to create a program, adding and deleting actions ▪ Test programs that have been created. ▪ *Create and debug simple programs* ▪ *Use technology purposefully to create, organise, store, manipulate and retrieve digital content*

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LKS2	Computing Systems and Networks: Connecting Computers	
CYCLE ~ A *red italic text = key learning points	**Prior Vocabulary:** Device, information technology (IT), computer, PC, laptop, tablet, device, scanner, barcode, printer, smart, speaker, till, bank card, chip and PIN, card reader, traffic light, crossing button, crossing signal, Connected World, online safety **Key vocabulary:** Digital, non-digital, device, processing, function, on/off, input, output, Input Process Output (IPO), mouse, keyboard, information, computer, network, switch, server, wireless, access point, router, printer, copier, connect	
	Enquiry questions (sequenced): ▪ How does a digital device work? ▪ What parts make up a digital device? ▪ How do digital devices help us? ▪ How are people connected? ▪ How are computers connected? ▪ What does our school network look like?	
	By the end of this unit, pupils will know (substantive knowledge) ▪ Explain how digital devices function, e.g. accepting inputs, producing outputs ▪ Classify input and output devices ▪ Describe a simple process ▪ Recognise how digital devices can change the way that we work ▪ Recognise similarities and differences between using digital devices and non-digital devices ▪ Explain how a computer can be used to share information ▪ Explain how messages are passed through multiple connections ▪ Explore how digital devices can be connected, e.g. a number of devices on a network, a switch, a server and a wireless network ▪ Recognise the physical components of a network ▪ *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*	**By the end of this unit, pupils will be able to (procedural and disciplinary knowledge)** ▪ Follow a process of functions ▪ Design a digital device ▪ *Use sequence, selection, and repetition in programs; work with variables and various forms of input and output* ▪ *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*

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LKS2	**Creating Media: Desktop Publishing** *(Linked to other subject)*	
CYCLE ~ A *red italic text = key learning points	**Prior Vocabulary:** desktop, publishing, online safety, words, pictures, edit, **Key vocabulary:** information, present, page, purpose, format, text, image, communicate, message, software, change, font size, colour, style, template, search, content *letters, postcards, posters,*	
	Enquiry questions (sequenced): ▪ Can you edit it? ▪ Can you add content? ▪ Why use desktop publishing?	
	By the end of this unit, pupils will know (substantive knowledge) ▪ Recognise how text and images convey information. ▪ Consider how different layouts can suit different purposes ▪ Consider the benefits of desktop publishing and how it is used in the real world	**By the end of this unit, pupils will be able to (procedural and disciplinary knowledge)** ▪ Edit the text and layout ▪ Choose appropriate page settings ▪ Add content to a desktop publishing publication ▪ *Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content* ▪ *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*

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LKS2	Programming: Sequencing Sounds	
CYCLE ~ A *red italic text = key learning points	**Prior Vocabulary:** program, algorithm, clear, precise, order, instruction, digital device, code, create, run the code, evaluate, change, outcome, same, different, **Key vocabulary:** Sprite, sequence, command, program, language, order, design, task, design, code, running the code, instrument	
	Enquiry questions (sequenced): ▪ What objects can you name in this program? ▪ What will happen if you follow this sequence of commands? ▪ Can you combine sounds and commands? ▪ What choices can you make in your design? ▪ Can you run an algorithm of code?	
	By the end of this unit, pupils will know (substantive knowledge) ▪ Explain that objects in Scratch have attributes (linked to) ▪ Explain that the objects in any project will respond exactly to the code ▪ Explain what a sequence is ▪ Identify and name the objects needed for their project ▪ *Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs*	**By the end of this unit, pupils will be able to (procedural and disciplinary knowledge)** ▪ Identify objects in a Scratch project (sprites, backdrops) ▪ Create a program following a design ▪ Create a sequence of connected commands ▪ Combine sounds and commands ▪ Change and make design choices for their artwork ▪ Implement an algorithm as code ▪ *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* ▪ *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*

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LKS2	**Data and Information: Branching Databases**	
CYCLE ~ A *red italic text = key learning points	**Prior Vocabulary:** Label, Match, Group, Count, Describe, Object, Compare, Question, Answer, Search, Data, Information, Operation, Application, Present, Property, Attribute, Pictogram, Computer, Task, Input, Image, Collect, 'data set' **Key vocabulary:** Branching, database, organise, yes/no, true/false, question, binary tree, branch, *Attribute, name, value, property, group, online, tool, navigate, identifier*	
	Enquiry questions (sequenced): ▪ What is the difference between yes/no and open ended questions? ▪ What are attributes? ▪ What is a branching database? ▪ What would you use a branching database for in the real-world?	
	By the end of this unit, pupils will know (substantive knowledge) ▪ Explain why it is helpful for a database to be well structured ▪ Explain that questions need to be ordered carefully to split objects into similarly sized groups ▪ Suggest real-world uses for branching databases	**By the end of this unit, pupils will be able to (procedural and disciplinary knowledge)** ▪ Make up a yes/no question about a collection of objects ▪ Create two groups of objects separated by one attribute ▪ Identify attributes needed to collect data about an object ▪ Arrange objects in a tree structure ▪ Create a branching database ▪ Create a physical version of a branching database ▪ Independently create an identification tool ▪ *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*

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UKS2	Computing Systems and Networks: Sharing Information	
CYCLE ~ A *red italic text = key learning points	**Prior Vocabulary:** Network, internet, secure, World Wide Web, website, explore, content, access, add, create, evaluate, reliable, false, consequence, connect, sharing **Key vocabulary:** Computer systems, transfer, device, small-scale system, large-scale system, input, output, process, online, project, transfer, share	
	Enquiry questions (sequenced): ▪ How do computer systems help us? ▪ What rules should we use for the internet? ▪ When is it acceptable to use the work of others? ▪ What content is permitted to be re-used?	
	By the end of this unit, pupils will know (substantive knowledge) ▪ Explain computers can be connected together to form systems ▪ Describe a computer system features inputs, processes, and outputs ▪ Explain computer systems communicate with other devices ▪ Recognise roles of computer systems in our lives ▪ Recognise how information is transferred over the internet ▪ Explain networked digital devices have unique addresses ▪ Explain sharing information online lets people in different places work together ▪ Recognise connected digital devices can allow us to access shared files stored online ▪ *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*	**By the end of this unit, pupils will be able to (procedural and disciplinary knowledge)** ▪ Send information over the internet in different ways ▪ Contribute to a shared project online ▪ Suggest strategies to ensure successful group work ▪ Compare working online with working offline ▪ Identify different ways of working together online ▪ *Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content* ▪ *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*

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UKS2	Programming: Selection in Physical Computing	
CYCLE ~ A *red italic text = key learning points	**Prior Vocabulary:** Program, repetition, loop, create, plan, modify, test, command, shape, pattern, language, turtle, screen, letters, repeat, model, demonstrate **Key vocabulary:** Microcontroller, connect, components, LEDs, motor, algorithms, input device, output device, push switch, design, fairground carousel, incorporate, operation, combine	
	Enquiry questions (sequenced): ▪ How could you make the LED flash continuously? ▪ What is a count controlled loop? ▪ What condition could be used to stop a repeating light pattern? ▪ Why do you need to test an algorithm?	
	By the end of this unit, pupils will know (substantive knowledge) ▪ Explain why you used an infinite loop ▪ Decide which output devices you control with a count controlled loop ▪ Explain a loop can stop when a condition is met, e.g. no. of times ▪ Explain a condition being met can start an action ▪ Identify a condition and an action in a project ▪ Design a physical project which includes selection ▪ Write an algorithm to control lights and a motor ▪ Test and debug the project ▪ *Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts* ▪ *Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs*	**By the end of this unit, pupils will be able to (procedural and disciplinary knowledge)** ▪ Build a simple circuit to connect a microcontroller to a computer ▪ Program a microcontroller to light an LED ▪ Write a program that includes count-controlled loops ▪ Connect more than one output device to a microcontroller ▪ Program a microcontroller to respond to an input ▪ *Use sequence, selection, and repetition in programs; work with variables and various forms of input and output* ▪ *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*

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UKS2	Data and Information: Flat-file Databases	
CYCLE ~ A *red italic text = key learning points	**Prior Vocabulary:** Data, collect, computer, input, device, data points, data sets, logging, intervals, review, analyse, questions, answers **Key vocabulary:** Flat-file database, organise, records, tools, answer, question, graphs, charts, problems, solutions, present, paper-based, search, compare, visual	
	Enquiry questions (sequenced): ▪ What is a database? ▪ Which is the best way to store and sort records? ▪ What other fields could be used in the database? ▪ Why do we use computer databases? ▪ How does 'and' / 'or' help as a search tool?	
	By the end of this unit, pupils will know (substantive knowledge) ▪ Explain how information can be recorded ▪ Compare paper and computer-based databases ▪ Explain what a 'field' and a 'record' is in a database ▪ Choose which field to sort data by to answer a given question ▪ Apply knowledge of a database to ask and answer real-world questions ▪ Explain that tools can be used to select data to answer questions ▪ *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*	**By the end of this unit, pupils will be able to (procedural and disciplinary knowledge)** ▪ Use a form to record information ▪ Create multiple questions about the same field ▪ Order, sort, and group my data cards ▪ Navigate a flat-file database to compare different views of information ▪ *Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content*

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UKS2	**Creating Media: Vector Drawing** *(Linked to other subject)*	
CYCLE ~ A *red italic text = key learning points	**Prior Vocabulary:** Digital, image, change, edit, save, resave, reuse, shape, draw, tool, create, evaluate, effectiveness, choice **Key vocabulary:** Vector, layer, explore, group, duplicate, software, effective, manipulate, design	
	Enquiry questions (sequenced): ▪ What are vector drawings? ▪ How can you manipulate images/objects? ▪ What tools did you use? ▪ What techniques create realistic effects that can be found in nature?	
	By the end of this unit, pupils will know (substantive knowledge) ▪ Recognise that vector drawings are made using shapes ▪ Identify the main drawing tools ▪ Discuss how a vector drawing is different from paper-based drawings ▪ Explain how alignment grids and resize handles can be used to improve consistency ▪ Recognise that vector drawings consist of layers ▪ Evaluate and suggest improvements to a vector drawing	**By the end of this unit, pupils will be able to (procedural and disciplinary knowledge)** ▪ Create a vector drawing by combining shapes ▪ Move, resize, and rotate objects I have duplicated ▪ Use the zoom tool to add detail to my drawings ▪ Modify objects to create different effects ▪ Change the order of layers in a vector drawing ▪ Group objects to make them easier to work with ▪ *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*