

What is a computer?

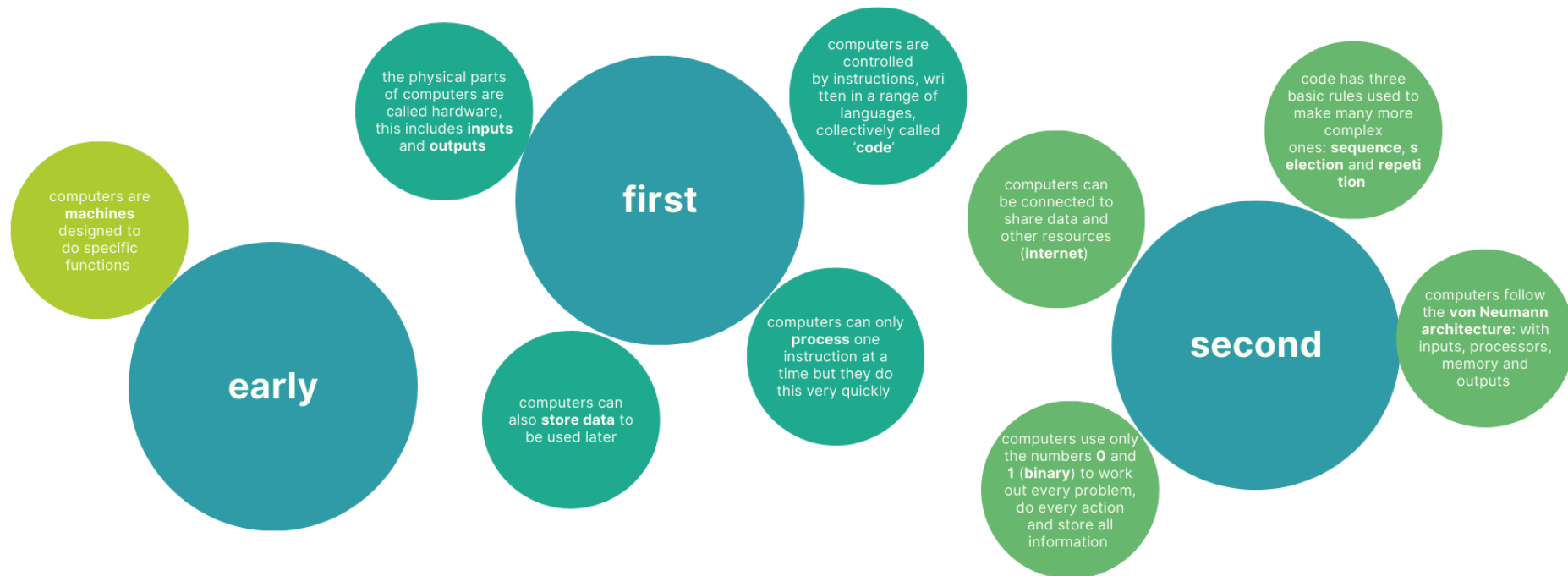
Examples of Planning for Computing in the Primary Sector

This document aims to provide a clear, concise and progressive example of planning for Computing in the primary sector. It includes an overview of the 'big ideas' in computing (diagram below) and where each idea might be taught, building on prior knowledge and skills from the last level. Each big idea has knowledge and skills identified to support teachers design learning intentions and links to information pages or online resources.



Primary Computing Planners

The Big Ideas



What is a computer? part 1 – Early

Hardware

Big idea	knowledge	Skills	Resources and references
Computers are machines designed to do specific functions	Computers have different parts called hardware	Identify hardware Explore loose parts	What is a computer system? – BBC Bitesize What is digital technology? – BBC Bitesize Ruby – make computer model
	Each computer is made to do a specific job, although some are multifunctional, like tablets , these are still designed to communicate or entertain – they can't fly and land planes or compute quantum mechanics	Identify computers in common appliances or daily uses, such as TVs, cars and the office	Ruby – computer safari
	Computers use electricity	Turn computers on and off	

What is a computer? part 2 – First

Hardware

Big idea	knowledge	Skills	Resources and references
<u>The physical parts of computers are called hardware, this includes inputs and outputs</u>	<p>Inputs are used by the user to control the computer and give it data, such as mouse, mic or camera</p> <p>Outputs are used by the computer to give data to the user, such as screen or speakers</p> <p>Some devices can appear to be inputs and outputs, such as touchscreens but these actually have different parts doing each job, ie the touch and the display</p>	Categorise different devices as inputs, outputs or storage	<p><u>What are input and output devices? (BBC Bitesize)</u></p> <p><u>Ruby – software or hardware/input or output</u></p> <p><u>Ruby – make computer model</u></p> <p><u>Investigate Tommy Flowers</u></p>
<u>Computers can also store data to be used later</u>	<p>Computers can store data using storage devices, such as hard disk drive (HDD) or static memory</p> <p>Stored data can be added, edited or deleted</p>	Practise saving and deleting data in storage	<u>How do digital devices store information? – BBC Bitesize</u>

Software

Big idea	knowledge	Skills	Resources and references
<p><u>Computers are controlled by instructions, written in a range of languages, collectively called 'code'</u></p>	<p>Computers use their own languages, collectively called code</p> <p>Someone who writes code is often called a programmer (they write programs (software) using code)</p>	<p>Explore different coding games, scratch jr, code.org</p> <p>Explore famous programmers or their games</p>	<p>What is a computer program? – BBC Bitesize</p> <p>Sequencing with Scrat #4 – Code.org</p>
<p><u>Computers can only process one instruction at a time</u> but they do this very quickly</p>	<p>Computers can only do (process) one thing at a time although they can do lots of 'one things' very fast</p> <p>They follow these instructions in sequence</p>	<p>Open Task Manager to see all the things Windows is currently doing (one at a time!)</p> <p>Create unplugged sequences, such as dances</p> <p>Play coding games to make sequences, such as scratch jr or code.org</p>	<p>How are computer programs constructed? – BBC Bitesize</p> <p>Will this code get the squirrel to the nut? (code.org)</p>

What is a computer? part 3 – Second

Hardware

Big idea	knowledge	Skills	Resources and references
<p>Computers follow the same von Neumann architecture – they have inputs, processors, memory and outputs</p>	<p>The processor (CPU – central processing unit) fetches instructions and executes (does) them, one at a time</p> <p>Memory is used to store temporary data, typically programs currently being used by the computer</p>		<p>Inputs and outputs – BBC Bitesize (opens page on processor)</p> <p>Memory: How is all our digital data stored? – BBC Bitesize</p> <p>Investigate Alan Turing</p>
<p>Computers use only the numbers 0 and 1 to work out every problem, do every action and store all information</p>	<p>Computers store and process all data using binary</p> <p>Binary is a number system only using 0 and 1</p> <p>Each digit stored in memory is called a 'bit'</p> <p><i>8 bits = 1 byte</i></p> <p><i>1 gb (most common storage measuring today) = 8,589,934,592 bits</i></p>	<p>Convert 8-digit (1 byte) place value numbers between binary and denary (decimal)</p>	<p>Investigate the binary number system</p> <p>Investigate the amount of storage used in common devices</p>

The internet

Big idea	knowledge	Skills	Resources and references
Computers can be connected to share data and other resources (internet)	Computers can be networked together to share data and resources The internet is the biggest and most commonly used network	Connect a device to the internet	Networks – BBC Bitesize The internet – BBC Bitesize https://www.barefootcomputing.org/resources/modelling-the-internet
	The internet relies on physical connections using cables.		A Journey To The Bottom Of The Internet (youtube.com) Thin underwater cables hold the internet. See a map of them all. (youtube.com)
	Learners might consider digital devices to be wireless (WiFi) but they are only able to send data a short distance using radio waves to either a router (computer) or transmitter (phone).		ruby – hiding in plain sight internet components
	Web browsers are often used to navigate the internet more easily	Identify the URL bar in a web browser	Investigate Time Berners Lee (web, URL and http)

Software

Big idea	knowledge	Skills	Resources and references
<p>Code has three basic rules used to make many more complex ones: sequence, selection and repetition</p>	<p>Computers process code one line at a time in sequence</p>	<p>Use code that includes a sequence</p>	<p>All about algorithms – BBC Bitesize Ruby – Dance Time</p> <p>Investigate Ada Lovelace - first program</p> <p>Investigate Grace Hopper - invented 'high-level' code that uses English language (easier to learn and use)</p>
	<p>Code can instruct the computer to repeat instructions</p>	<p>Use code that includes repetition</p>	<p>Repetition and selection – BBC Bitesize</p> <p>Start at level 7 – introduces the loop (repetition) block to repeat an action – why might this be useful? Programming with Angry Birds Express Course (code.org)</p> <p>Beating heart micro:bit (microbit.org) (loop forever)</p>
	<p>Selection is used in code to instruct the computer to make a decision using true/false (Boolean) logic</p> <p>In code the instructions used are: IF true THEN do x, or ELSE do y</p>	<p>Use code with an IF statement to make a decision based on an input with an output</p>	<p>Sunlight sensor micro:bit (microbit.org) (selection/conditional loop IF/ELSE)</p> <p>Rock, paper, scissors micro:bit (microbit.org) (selection/conditional loop IF/ELSE)</p>