Spotlighted unit
Details on a specific unit of work at the school.

Level	8	Title / theme	B4 Computing (Integrated Studies – STEM stream)

Summary / intention	Students learn about digital systems by creating a 4bit computer, using its component parts.

Strands addressed ☒ Digital Systems   ☒ Data and information   ☐ Creating digital solutions

Session	Activity summary	Learning intention	Success criteria	Key resources
1	Introduction to B4	Introduction to history of computers and number systems	• Student can explain how the development of computers has changed since the Eniac computer, and explain briefly how there are a wide variety of counting systems	youtu.be/k4oGI_dNaPc youtu.be/cZH0YnFpjwU youtu.be/UixU1oRW64Q
2	Introduction to the B4 kit and components	Students go through the kit and identify the components and their use.	• Student can identify each component in the kit.	Lesson plans pages 8 -15
3	Introduction to Binary Numbers, using B4 components	Students use the program counter to learn binary numbers, Student test their understanding of binary to do a "trick" with their family.	Students build a simple computer using program counter and the digital display. • They can convert base 10 numbers to binary and visa-versa	Lesson plans pages 18 – 21 www.mathmaniacs.org/lessons/01-binary/Magic_Trick/

4	Adding and subtracting Binary numbers using B4 components	Students use the B4 component to build a computer that will add and subtract binary numbers.	• Students use the B4 components to add and subtract binary numbers. They can also do this by hand, using the compliment method.	Lesson plans pages 22 – 27
5	Introduction to ASCII Code	Students complete activities looking at ascii code and create an ASCII code keychain of their initials.	• Students can express their initials in ACSII code.	www.ssww.com/blog/steam-activity-for-kids-create-a-binary-code-keychain/
6	Looking at short term and long-term memory	Students connect the B4 components to show how short term and long-term memory work in computers.	• Students build a simple computer to show short term, use of the latch to hold the value and long memory. They can program the numbers 1-15 into the B4 computer.	Lesson plans pages 27 – 35
7	Giving direction to data and infinite loops.	Students connect the B4 components to show how the 2-1 selector works to direct the data, why this is important when we try and add more than 2 numbers.	• Students use the components to build a computer to add 3 numbers – they use a flow chart to follow the data direction, and find it creates an infinite loop.	Lesson plans pages 36 – 47
8	Adding in a latch to "hold" data, to add 3 numbers	Students connect the B4 components to show how the latch can be used to stop infinite loops and add 3 numbers	• Students use the components to build a computer to add 3 numbers – they use a flow chart to explain the data direction, and their computer successfully adds 3 numbers	Lesson plans pages 48 – 52

9	Programming the B4 using all B4 components.	Students now have an understanding of how each component works so putting them all together to program the B4 to add and subtract numbers	• Students use the components to program the B4.	Lesson plans pages 53 – 72
10	Using the Arduino module to automatically program the B4	Student now swap out program counter for the Arduino module and use Arduino software to program the B4	• Students use Arduino module and software to program the B4 to add and subtract values	Lesson plans pages 73 – 86