|  |  |
| --- | --- |
| **Year 4 – Autumn – What did is more precious: Water or Gold*** Create an input and output using symbols rather than numbers
* Convert symbols to numbers

CS4 IT4 | **Key vocabulary:**Input: information added into a program / algorithm by the userOutput: information displayed to the user by the program / algorithmSymbols: ways of representing information pictoriallyCounting: adding up and downPlace value: maths link Ones, Tens etc.Processing: inputs being fed into a program before being outputtedFormulae: Another word for commands mostly used in spreadsheets |
| **Objective and Success Criteria**  | **Coverage** | **Key Questions**  | **Children should be able to** | **Resources** |
| To understand inputs and outputs  | * Understand that information is fed into a computer (INPUT)
* Understand that the computer converts the information into language it can understand
* Understand that a computer processes that information
* Understand that computers convert the information to a format humans can understand
* Understand that computers then return information to the user (output)
 | Why do we need inputs and outputs?What does a computer do with the inputs? | * Create non-digital inputs and outputs, using themselves as computers e.g. paper computer, sign language, dance commands etc.
* Convert inputs to a different output
 | YouTube sign language videosAdditional information – Egyptian numbersAdditional information – Sign language |
| To use inputs and outputs | * Identify what information needs processing by the computer
* Identify the information the user needs to INPUT into the program
* Create a system for inputting the information
* Add commands to the program to process the information
* Create a system for displaying the OUTPUT in a format that is legible to the reader
 | How are we going to input the information?What needs to happen to the inputted information?How are we going to display the output so the reader can understand it? | * Create inputs using images and counting buttons
* Create formulae (code) to process the information
* Create an output in numeral form
 |
| To evaluate the program | * Decide if the program can recognise inputs, process them and display outputs that are legible to the reader
* Identify tests to ensure program runs correctly
* Identify any errors in processing the information correctly
* Identify problems with the user interface
* Suggest improvements to a later version
 | Is the program accurate?Does it allow us to process the information?Can the reader understand the output?Could it be improved? | * Identify the place values in a binary block
* Identify the numbers to add together and find the value of the block
* Break numbers into place values and add 0 or 1 to a binary block to represent a number
 |
| E-SafetySkill: How to recognise techniques for persuasionHarm: Persuasive design | * Discuss how online videos may contain adverts for products
* Discuss how to recognise when a video is trying to persuade you to do or buy something
* Discuss what to do if the children feel someone is trying to persuade them
 | Are you being shown a product that can be purchased?Are you being shown someone’s opinion? | * Identify when attempts are being made to persuade them
* Understand how to respond to these attempts
 |
| **Assessment Questions**Can you create an input function?Can you create a program to process the information?Can you create an output function? |

|  |  |
| --- | --- |
| **Year 4 – Spring – What did the Romans do for me?*** Create a playable game for a user
* Create loops of commands within algorithms
* Debug the algorithm
 | **Key vocabulary:**Algorithm: a collection of commands to achieve a given goalCommands: parts of an algorithm that have a specific purposeLoop function: a command that allows other commands or algorithms to be repeated Variable: a function that allows a user to input information to be used by an algorithmNavigate: to move in specific directionsEfficiency: how much processing power needs to be used to run the algorithmDebug: to identify code that does not achieve a given goal and adapt it |
| **Objective and Success Criteria**  | **Coverage** | **Key Questions**  | **Children should be able to** | **Resources** |
| To understand what a loop function is | * Recap what an algorithm and commands are
* Discuss and practically model repeated commands e.g. rather than saying walk forward a step 10 times you say walk forward 10 steps.
* Explore how this is more efficient in coding as there is less code needed
* Model and explore simple loop functions using non-digital methods
 | What is an algorithm and what are commands?Why do we need to use loops in code? | * Explain why we use loops in coding
* Create simple non-digital loop functions
 | KUBO robotsRoman roads maps (teacher made) |
| To understand what a variable is | * Discuss how we knew to walk forward 10 steps with the loop
* Understand this is because the variable of number of steps was set to 10, but it could have been set to any number
* Discuss how computers use variables to allow users to input the number of times they want something looped
* Model and explore variables using simple KUBO programs
 | Why do we use variables in code?How does a variable affect the running code? | * Explain the purpose of a variable
* Create an add a variable to KUBO
 |
| To create a program with loops and a variable | * Explain to the chn that they are going to create a program where a KUBO needs to navigate Roman roads across Britain
* Explore how we could use loops and variables to traverse the road rather than needing lots of commands
 | How are you going to improve the efficiency of your code using loops? | * Add loop functions to a program
* Use variables in the program
 |
| To debug a program | * Identify which commands are not working as intended
* Identify the relevant section of code and evaluate it
* Alter the code and test it
 | How is it not working?Which code do you need to adapt?How are you going to adapt it? | * Identify where the code is not achieving the given aim
* Identify the code that is at fault
* Adapt the code and retest
 |  |
| **Assessment Questions**How can you use a loop function to improve efficiency in your code?How can you use a variable to allow a user to input information for your algorithm to use? |

|  |  |
| --- | --- |
| **Year 4 – Summer – What makes Britain’s coasts great?*** Understand how information is send over the internet
* Learn about devices used in networks

CS3 DL3 | **Key vocabulary:**Packets: pieces of data pertaining to an instructionIP address: Internet Protocol address – the address of a computer or server on the internetSwitch: connects to a network to direct packets to their destinationsServer: a computer that manages centralised resourcesRequests: information asked for via packets send on the internet |
| **Objective and Success Criteria**  | **Coverage** | **Key Questions**  | **Children should be able to** | **Resources** |
| * Understand information is sent in packets
 | * Explore the concept of packets of information to send around the internet
* Explore what is contained within a packet (IP addresses, information on how to put them back together and request)
* Explore IP addresses (link to binary in year 3)
 | What is a packet of information?What is their purpose?What is an IP address? | * Explain what is contained within a packet of information and why they are used
* Explain the purpose of an IP address
 | [BBC Bitesize - how the internet works](https://www.bbc.co.uk/bitesize/topics/z7wtb9q/articles/z3tbgk7)[IP Addresses](https://computer.howstuffworks.com/internet/basics/what-is-an-ip-address.htm)[Example of lesson](Resources/Summer%20-%20sending%20packets.docx) |
| * Understand how requests are made to web pages
 | * Explore how the packets of information are sent across the internet
* Explore the role of switches and routers
* Explore how computers and servers are able to send information across the internet using these packets
 | What is the purpose of a switch and router?How are packets used to send requests across the internet? | * Explain how switches and routers are used to direct packets of information
* Explain how packets are directed and used by computers
 |
| * Create non-digital packet delivery using addresses
 | * Use knowledge of packets, routers, switches and IP addresses to create a paper based internet connection.
* This could link to areas around the country that are being covered in the curriculum
* See this resource
 | How are you going to send the information?How do you know how to direct the packets? | * Transport packets of information around the classroom to other children using IP addresses
* Put the packets of information together to assemble the request
 |
| **Assessment Questions**How are requests send across the internet?How does information get to the correct computer? |