COMPUTING@BALCARRAS

SUBJECT	YEAR	TERM
COMPUTER SCIENCE	**9**	**1**

TOPIC
PYTHON GUI

CONTENT (INTENT)

PRIOR LEARNING (TOPIC) Pupils are expected to have had some previous experience of Python programming, including basic inputs and outputs, converting inputs to numbers using the **int()** function, selection (**if**-**elif**-**else** statements) and **while** loops. This unit follows on from the Year 8 topic –Python Next Steps.

The unit is subdivided into six learning hours spread across six lessons. This unit assumes that pupils already have some prior experience in Python or a similar language, and the first lesson has a series of tasks designed to revisit the basic skills already covered. Pupils create a Graphical User Interface (GUI) for a calculator and build on the skills and knowledge from Year 8 to code a working calculator. This introduces them to the use of sub-programs and why they are so important in coding. Procedures and functions with parameters are further covered to help pupils understand the concept and benefits of modular programming. Pupils' will code using an online IDE (Repl.it.com) and send a link as evidence of correct code and running, for assessment purposes.

FUTURE LEARNING (TOPIC): GCSE Computer Science – Algorithms and Programming

IMPLEMENTATION	
KNOWLEDGE	SKILLS

At the end of this Unit all pupils should be able to:
- Use data types correctly and convert between them when necessary
- Write programs that use a loop to repeat a section of code
- Write programs that use lists (known as 'arrays' in some languages)
- Create and call a function or procedure
- Find and debug syntax errors
- Look at a given section of code and describe its function

Most pupils will be able to:
- Select the most suitable type of loop (for or while) for a given problem
- Use counters correctly in conjunction with for loops
- Create a list and append or change elements of the list
- Explain the advantages of functions and procedures for reusable sections of program code

Some pupils will be able to:
- Use loops to populate, interrogate and print lists, using a counter as an index to an array element
- Devise their own functions and procedures to create a modular program
- Create a program that is easy to use, caters for user input errors, has explicit error messages telling the user what the correct form of entry is and produces output with suitable headings or explanation

Learning Skills:
Synthesis: Pupils will bring ideas together and create solutions to staying safe online
Problem solving: when deciding how to solve a problem and why?

Life Skills:
Collaboration: on complex moral and ethical issues in computing
Resilience: when debugging code in a text-based language

IT Skills:
Software: Using integrated development environments (IDEs) to code programs

Literacy Skills:
Digital literacy: Coding using text-based languages
Vocabulary: Learning new vocab and learning how it links to other subjects (variable and integer)

IMPACT

Pupils will write and run a program each lesson using an online IDE and submit the link to the code via the VLE. Work will be marked via the VLE using a 9-1 grading system, along with feedback on how to improve and extend their skills. A final topic assessment will be a MQC set on the VLE.

New Computing at Schools (CAS) Attainment Targets (partially covered in this Unit)
- Use two or more programming languages, one of which is textual, to solve a variety of computational problems; make appropriate use of data structures; design and develop modular programs that use procedures and functions
- Understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem.

HOW CAN PARENTS HELP AT HOME?

Showing an interest in the topic is always the biggest help, as well as ensuring they are completing their homework to the highest effort standard. If lessons are missed, the VLE can be used to catch up with content. Pupils can practice their Python skills at home using websites such as replit.com and w3schools.com. Parents can always join in and learn how to code too.

HELPFUL READING/FURTHER DISCUSSION

READING

CGP KS3 Computing Complete Revision & Practice
Hodder Compute-IT: Student's Book 1 - Computing for KS3
Magazines Direct - The Python Book (10th Edition)
PGOnline – Learning to Code in Python

Websites:
- BBC Bitesize (Intro to Programming): https://www.bbc.co.uk/bitesize/guides/zts8d2p/revision/1
- Website used for coding: https://replit.com
- Website used for tutorials: https://www.w3schools.com/python/default.asp
- Website to help theory: https://www.bbc.co.uk/bitesize/topics/zhy39j6

VOCABULARY

Integrated development, IDLE, interactive mode, local/global variables, string, syntax, assignment statement, augmented assignment operator, data type, integer, float, round, BIDMAS, selection, iteration, syntax error, logic error, debug, binary search, function, procedure, return, graphical user interface

CAREERS	EXTRA SKILLS
• Applications developer	• Communication
• Big data engineer	• Teamwork
• Cyber security analyst	• Leadership
• Data scientist	• Problem-solving
• Database administrator	• Time management
• Forensic computer analyst	• Organisation
• Game designer	• Report Writing
• Games developer	• Software Skills
• Information systems manager	**PROGRESSION**
• IT consultant	• Online tutorials
• Network engineer	• GCHQ competitions
• Software engineer	• Coding clubs
• Systems analyst	• GCSE Computer Science
• UX designer	• A-level Computer Science
• Web designer	• University/Apprenticeship
• Web developer	• Work experience