

Scheme of Learning: Year 8 Computing

Topic Sequence:

1	2	3	4	5	6
Computer Systems	Representation	Developing for the Web	Intro to Python	Heroes of Computing	Mobile App

Topic Overview:

This unit introduces learners to text-based programming with Python. The lessons form a journey that starts with simple programs involving input and output, and gradually moves on through arithmetic operations, randomness, selection, and iteration. Emphasis is placed on tackling common misconceptions and elucidating the mechanics of program execution.

A range of pedagogical tools is employed throughout the unit, with the most prominent being pair programming, live coding, and worked examples.

Links:

Year 7 Scratch Programming 1 and 2, Year 8 Mobile App Development, GCSE Computing Unit1 Computer Thinking and Unit 6 Programming

Lesson Sequence:

Lesson 1: First steps - In this introductory lesson, learners will write and execute their first programs in Python. They will go through the basics of displaying messages, assigning values to variables, and receiving input from the keyboard.

Lesson 2: Crunching numbers - In the previous lesson, learners were introduced to displaying messages, assigning values to variables, and receiving input from the keyboard. This lesson will help them gain a deeper understanding of assignments, and explicitly address some of the common misconceptions around the semantics of assignment statements.

Lesson 3: At a crossroads - This lesson introduces selection and randomness. These are two features that will allow learners to develop programs with a very diverse range of behaviours. Learners will revisit some of the programs that they have encountered in previous lessons and extend them into more versatile programs that use selection.

Lesson 4: More branches - This lesson progresses to multi-branch selection, then introduces while, the general-purpose iterative structure available in Python. Learners will explore problems that will allow them to deepen their comprehension of when and how selection should be used. For example, they will build programs that check the weather conditions where they are living and display appropriate responses. They will also be introduced to iteration, making sure that they understand the mechanics of how it works, before they go on to build their own iterative programs in the next lesson.

Lesson 5: Round and round - In the first part of this lesson, learners will be introduced to counting. Counters are important, as they are the simplest example of variables that are used to compute results iteratively, with each new value accumulated over the previous ones. In the second part of the lesson, learners will apply the skills and knowledge that they have developed to create a times tables practice game. It is an example that naturally combines iteration and selection, while also being useful

Lesson 6: Putting it all together - In this final lesson of the unit, learners will apply and consolidate what they've learnt by extending the number guessing game that they developed previously into an iterative version that allows them multiple guesses.

National curriculum links

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
 - use two or more programming languages, at least one of which is textual, to solve a variety of computational problems
- understand several key algorithms that reflect computational thinking; use logical reasoning to compare the utility of alternative algorithms for the same problem
- understand how instructions are stored and executed within a computer system
- design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems

Sequence of Lessons:

1	First steps
2	Crunching numbers
3	At a crossroads
4	More branches
5	Round and round
6	Putting it all together

Topic Resources:

Knowledge Map:	8.4 Python Programming	Any other Resources:	Thonny (python)
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Assessment:

Knowledge:	25 Multiple Choice Questions
Application of Knowledge:	Learners make a number guessing game

Supportive Reading:

Python Basics	Key Stage 3 Python The Basics CSNewbs
KS3 Computing Complete Revision & Practice - CGP	Chapter 6 & 7 Available from: KS3 Computing Complete Revision & Practice CGP Books