

# ICT – Year 10 – API Medium Term Plan/SOW

**The Academy of St Francis of Assisi**

**Title : Programming in Python**

**Number of lessons in sequence**

**10 (including revision, assessment & improvements)**

**UNIT 1**

**Overarching Curricular Goals (Aims)** (What do you intend students know about and be able to do by the end of the topic, or scheme of learning. Critical knowledge needed to inform later learning and wider contexts.)

**By the end of this unit students will:**  
Pupils learnt Python programming as part of the Year 8 scheme of work. They learnt about the key principles of programming including sequence, selection and iteration. During this unit of work, these principles will be revisited, alongside the planning and implementation of these concepts in their own Python programs. They will also revisit key terminology such as variables and data types. In addition to this, pupils will learn new programming theory such as data structures in the form of arrays and reading, writing and saving to text files using Python code.

**Links to National Curriculum**

Use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems

**Links to & building upon prior learning Including KS2 if Yr7**

Pupils completed a unit of work in Year 7 and Year 8 which focussed on programming however this was with a different, simpler programming language which only had 15 key words to use. The same concepts will be revisited by this time, using a programming language that is used in industry, Python. This is still a text based programming language but gives pupil's the opportunity to be more independent without the use of predictive commands like in Small Basic.

Outcomes/  
Success Criteria

- Knowledge Learners will:
- Be able to identify key 'code ingredients' such as variables, data types, IF statements and loops within Python programs
  - Be able to compare two different programming languages and describe the similarities and differences
  - Be able to describe different types of programming errors and be able to explain why the errors occurred
- Skills: Learners will:
- Be able to embed the three main programming concepts into Python programming
  - Be able to link text files with Python code
  - Be able to identify different types of errors in their code and attempt to debug

**KS2 Link** - Use sequence, selection & iteration/ work with variables/ use logical reason to solve simple algorithms

**2/3 tier vocabulary.**

**Differentiation/Scaffolding/Support.**

**Stretch and challenge opportunities in class, enrichment and home learning.**

**Opportunities for wider reading/Listening/watching.**

See Knowledge Organiser

**Oracy:**

Also Add hyperlink to KO

**Knowledge Support:** Using the knowledge organiser to enable pupils to be able to link programming knowledge to the skills they are learning. Pupils to be encouraged to use KO when choosing the appropriate programming concept or data type when coding their own program. Pupils will also have their own CGP revision book that they can refer to for programming knowledge/ theory.

**Key Concept Support** – visualisation of key terms that are frequently used in programming. E.g. Variables – including activities where pupils have the opportunity to demonstrate their knowledge through the use of annotated diagrams.

**Reading support:** Encouraging pupils to become confident reading a chunk of code and being able to explain what will happen when it is run.

**Skills support:** Flash cards with adaptive programming code for pupils to use if they are struggling with the programming aspect of the unit. Include teacher demonstrations within lessons to model how to program to certain types of scenarios.

The most common areas of misconceptions during this unit is being able to recognise the basic programming constructs. Pupils will be given keyword tasks at the start of the unit which will be revisited throughout the unit in lessons. Once it is clear they understand the definitions of these, they will be shown how they used them in the programming unit last year and how to do it in a different programming language. This

More able pupils will be able to access more advanced programming skills such as nested IF statements and while loops. They will be able to create a program based on a more complex scenarios and amalgamate the different concepts into one program.

Less able pupils will be having sentence starter style programming starters with suggested.

**Scholarship:**

**Why is Python a good programming language for kids?**

**Careers – how Python can help children prepare for jobs other than computing.**  
<https://www.codecademy.com/blog/five-careers-where-coding-skills-will-help-your-kids-get-ahead>

**Python Programming for the Absolute Beginner** By Michael Dawson

**Hello World!** Programming Magazine subscription

- **Imitation Game** – Alan Turing breaking the WW2 codes using Enigma – links History of Computing unit from last year
- **Python Programming for the Absolute Beginner** By Michael Dawson
- **Podcast: Fetch Decode Explain**
- **Why is Python a good programming language for kids?**  
<https://codakid.com/5-reasons-python-programming-is-perfect-for-kids/>
- **Careers – how Python can help children prepare for jobs other than computing.**  
<https://www.codecademy.com/blog/five-careers-where-coding-skills-will-help-your-kids-get-ahead>
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way, they are able to link the knowledge of the concept to the skills of using the programming language.

**Stretch and Challenge** – Some pupils are going to understand Python programming more than others and will code solutions to problems quickly. These pupils will be given GCSE level programs to try and solve in Python code. If this seems to high level for the pupils, jumbled up code will be given as support. The pupil’s task will then be to unjumble it and write it in Python in the correct order. Pupils will then be asked to comment the code using key terminology and identifying key concepts

Unit Title	Sequence of learning Lesson title, theme, big question.	Key concepts/outcomes/knowledge and skills. (Variables, Selection, Sequence, Iteration, Data types, Pseudo Code, Flowcharts, )	Assessment/ including specific content/ knowledge/skills tested. Green=assess/Blue=improve	HWK. Add Hyperlink To be in books clearly marked	Furthering Cultural Capital. & Opportunities for reading	Recall of prior or future topics –	Lesson resources including or hyperlink to supporting websites/resources/books/texts & individual lessons. 5xT+L essentials to be included in individual lessons,
1	Introduction to Year 10 Computer Science/ Variables and Data Types	<b>Key Concepts/Knowledge/Skills</b> <ul style="list-style-type: none"> <li>- Pupils to recap the key programming concepts of sequence, selection and iteration; understanding what they mean and how they fit into the programming language they used in Year 7 and Year 8</li> <li>- Pupils to recap how variables fit into programming. They should be able to identify where they are in a piece of code and what they would store within a program</li> <li>- At this stage, pupils won’t be writing any of their own code but being able to recap, review and analyse</li> <li>-</li> </ul>		Learn keywords from KO	Research – what sort of industries still use Python programming?  Twitter Article – How Python is used in industry.	Recall of keywords from Year 7 & Year 8 Programming SOW specifically Sequence, Selection & Iteration	<b>Teacher PowerPoint</b>  <b>Student Resource</b>
2&3	Sequence, Selection and Iteration	<b>Key Concepts/Knowledge/Skills</b> <ul style="list-style-type: none"> <li>- Pupils will be able to understand the syntax rules Python follows so their code can run successfully</li> <li>- Pupils will be given a scenario and be able to write a simple program to demonstrate their knowledge of the 3 main concepts of programming.</li> <li>- Pupils will be able to draw an annotated diagram to show the process of how variables store values in a program and how they can be recalled</li> </ul>	Lesson 2 - Knowledge quiz based on keywords and definitions of key terminology pupils will need to know for the unit of work. Pupils will improve their work based on feedback and close any gaps in their knowledge.  Lesson 3 - Pupils will create an evidence portfolio to demonstrate their knowledge of Sequence, Selection, Iteration, Data Types and Variables with examples of code they have created.	Lesson 3 – To complete Programming Evidence Portfolio			<b>Teacher PowerPoint</b>  <b>Student Resource</b>

4&5	Data Structures – Arrays	<b>Key Concepts/Knowledge/Skills</b> <ul style="list-style-type: none"> <li>- Pupils will be able to define what an array is within a program</li> <li>- Pupils will be able to compare a one-dimensional array and a two-dimensional array and explain the use of each one within a program</li> <li>- Pupils will be able to create their own program and implement arrays in an appropriate way</li> </ul>	<b>Self-Assessment</b> – pupils will self-assess their code to ensure they have used the correct array	Past exam question on two-dimensional arrays			<b>Teacher PowerPoint</b>  <b>Student Resource</b>
5&6	Text Files in Programming	<b>Key Concepts/Knowledge/Skills</b> <ul style="list-style-type: none"> <li>- Pupils will be able to explain how to link a text file to a Python program</li> <li>- Pupils will be able to write their own code to read from a text file to a Python program</li> <li>- Pupils will be able to write their own code to write to an external text file from a Python program</li> <li>- Pupils will be able to embed code into their programs to ensure the text file is saved</li> </ul>	<b>Progress Check</b> – can pupils identify where key concepts have been used within a program? Can pupils explain what data would be stored in the variables used within a program?	Dual Coding: page 41 & 42 CGP book		Pupils covered sequence and selection and learnt how to embed the concepts into Microsoft Small Basic programming and Python in Year 7 and 8	<b>Teacher PowerPoint/Python Code</b>  <b>Student Resource</b>
7&8	Text File Consolidation Project	<b>Key Concepts/Knowledge/Skills</b> <ul style="list-style-type: none"> <li>- Pupils will be able to embed the knowledge they have learnt from this unit of work into a project</li> <li>- Pupils will be able to link their Python code up to an external text file where it can read, write and save to</li> <li>- Pupils will be able to justify the programming concepts they have used and if necessary, explain what data will be stored within them</li> </ul>	Knowledge Quiz	Dual Coding: page 43 CGP book / Revision	Python programmer in industry – Guest Speaker		<b>Teacher PowerPoint/Python Code</b>  <b>Student Resource</b>
9&10	Revision and Assessment	<b>Key Concepts/Knowledge/Skills</b> <ul style="list-style-type: none"> <li>- Pupils will consolidate their knowledge of sequence, selection and iteration and have to use their own judgement to decide which programming concept will need to be used based on a given scenario</li> <li>- Pupils will be able to independently be able to comment their code and give detailed annotations explaining how their code will execute</li> <li>- Pupils will be able to debug their program independently</li> </ul>	Knowledge Quiz  Peer Assessment – Error Spotting/Debugging Homework  Independent Python programming project combining the skills learnt over lessons into one project which is teacher assessed				<b>Teacher PowerPoint</b>  <b>Student Resource</b>