

KS2 and KS3 Computing Resources for Schools



# Teaching Coding Concepts Using Python



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This photocopyable resource has been produced to provide KS3 students with exciting and engaging opportunities to learn coding concepts using the Python programming language.

The resource covers the programming aspect of the computing national curriculum including:

- 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
- Can use two or more programming languages, at least one of which is textual, to solve a variety of computational problems
- Can make appropriate use of data structures [for example, lists, tables or arrays]
- Can design and develop modular programs that use procedures or functions

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## What is Python?

Python is a widely used high-level, general-purpose, programming language. It is designed to be easy to read, and it is written to allow programmers to express concepts in as fewer lines of code as possible. A set of instructions called an algorithm can be written in Python.



Python is a snake – but it's also a programming language

## Sequences

### What is a sequence?

Simple algorithms are often sequences of instructions. Each step happens in a sequence, one step after another. It is important that the sequence is in the correct order otherwise strange things can happen.

For example this sequence helps you to cross the road safely.

Step	Instructions for safely crossing the road
1	<b>First find the safest place to cross</b>
2	<b>Stop just before you get the kerb</b>
3	<b>Look all around for traffic and listen</b>
4	<b>If traffic is coming, let it pass</b>
5	<b>When it is safe, go straight across the road – do not run</b>

## Now it's your turn to code!

1. Open **Python 3** – You can use this online version:

<https://repl.it/languages/python3> or you can use the version of Python that has been installed on your network or home computer.

2. Type these instructions into Python:

```
print("First find the safest place to cross")
print("Stop just before you get the kerb")
print("Look all around for traffic and listen")
print("If traffic is coming, let it pass")
print("When it is safe, go straight across the road – do not run")
```

3. Save the program and then run it.

4. What happens when you run the program?

5. Type these instructions into Python:

```
import time
print("First find the safest place to cross")
time.sleep(1)
print("Stop just before you get the kerb")
time.sleep(1)
print("Look all around for traffic and listen")
time.sleep(1)
print("If traffic is coming, let it pass")
time.sleep(1)
print("When it is safe, go straight across the road – do not run")
```

This program is a **sequence** as each instruction takes place after the instruction before.

6. Save the program and then run it.
7. What happens when you run the program?

8. This program uses a module called **Time**. What does time.sleep(1) do?

9. Change the time.sleep statements to time.sleep(2). What happens when you run the program?