ICT/ Computer Science Department

KS4/KS5 LESSON PLAN

Topic / area of study: Python

Class: Year 10 Computer Science

Ability: Mixed ability.

Date & period: 10/11/2017 Lesson 4

Learning aim:

Pupils to refresh their basic knowledge on Python. Pupils to learn about data types and variables. Finally, put their knowledge into practice by completing an exercise that covers the concepts delivered in the lesson.

Learning objectives/Success criteria:

All pupils will:
Complete first three questions in recap.
Complete first two questions in exercise.
Know how to use the idle and understand data types.
Most pupils will:
Complete first four questions in recap.
Complete first three questions in exercise.
Have a good understanding of variables.
Some pupils will:
Complete all questions in recap.
Complete all questions in exercise.
Have an excellent understanding of variables.

Lesson starter / activate the learner

10 minutes

At the start, we will begin a quick recap including the register and time for pupils to log on to computers etc. The aim of the recap is to refresh the pupils with some basic syntax and functions in Python, as they would have touched upon this in year 9. The recap will use the Python shell that allows them to input commands and receive a response instantly. It is easier than a file, which would need to be saved and run. On [page 2] of the booklet, there is a recap section with five questions with space to write the answers. Therefore, the aim is that the pupils will use the shell to answer the questions and then write how they did it or provide code as the answer. Question 5 is difficult and I do not expect many to do this one since it requires a variable. The reason for this is to provide the more able pupils with a challenge. Also, to give a taster of what will be taught in the lesson. Now the pupils will have switched their brains on and ready to focus for the teaching part of the lesson. The teacher will be circling the room starting to analyse pupils on how fluent they are with computers and more specifically Python.

Main Activity

5 minutes = explaining data types

After the starter we will dive straight into the content, starting with data types. Questions will be asked such as “What is a data type?” before explaining a data type. This is to identify if there are any pupils with prior knowledge. If a pupil answers a question correctly, it will be acknowledged and praised appropriately. If the answer is correct but quiet then the pupil will be asked to repeat to the class in order to improve their communication skills. Data types will be taught with live coding examples on the smart board. After demonstrating two examples, a question will be posed similar to the examples requiring a pupil to take the teachers place and code. If there are no volunteers then a pupil is chosen by the teacher. We will also reference the work booklet on [page 3] as it identifies the five main data types with a definition and example for each.

10 minutes = explaining variables

Again, there will be questions asked to see if anyone knows what a variable is, try to identify pupils who completed question 5 of the recap as they should know what a variable is. Reference the work booklet on [page 3] as it has a section on variables with examples of Python code. Expand on this with live coding examples but this time the pupils will do all the coding. As each example is happening explain to the class what the pupil is doing for those who might be less able and do not understand fully. Lastly, a quick exercise that entails the teacher posing a situation towards pupils that returns a variable and then the pupil has to decide what data type it is. For example, if I posed a situation that returns a pupils age variable, what data type would it be? Integer! This will allow the teacher to gauge how much of the class understands data types and variables whilst improving their communication skills.

30 minutes = exercise

At this point in the lesson, pupils will be ready to put their knowledge into practice. The best way to learn programming is by practicing which is why it has a big portion of time compared to other sections. The teacher will quickly demonstrate how to open python and use the idle and reference [page 2] since it provides a bit of help for getting started with the idle. This will involve opening the application, showing how to create a file and running the program. Show [page 4] of the work booklet, which has the tasks written out. Explain that the example outputs are not exactly what pupils need their program to look like, it is only for clarification. Pupils will be expected and told to save each task a separate file inside a folder named ‘Exercise 1’ in order to check what extent pupils have successfully achieved the learning objectives. However, it will not be marked properly. The more able students should receive very little to no guidance and ask them to google their problems, as this skill is very useful especially for programmers.

Main Activity (continued)

For the less able students, more guidance should be provided and motivation/praise if necessary to keep them on track. For example, explaining how you program the product of two numbers in task 2. The MAT pupils will receive information for online resources that have been checked.
[1] Provides multiple tasks with solutions for each.
[2] Provides multiple tasks with an Python editor that offers minor support. However, a google account is required to sign in.
[3] Provides interactive lessons with solutions and explanations but requires an account to be made.
[4] Provides tutorials with live code from Python file and can be run into the shell. For the first lesson, there are no specific questions for extensions as there are not many more difficult questions without delving into other areas of programming. Therefore, the online resources will be provided with specific links and pupils will be encouraged to try them at home, as programming requires a lot of practice. At the end, make sure the class have saved their work.

Plenary

5 minutes

This section is to review the learning taken place in the lesson. Ask specific questions such as "How did you find variables in Python?". The pupils can answer with either thumbs up which indicates well understood, thumbs down which indicates didn't understand and thumbs sideways to indicate somewhere in between. This will give the teacher feedback in terms of the difficulty of the lesson and improve the pupils learning, as they are required to recall the knowledge from their brains. It may even help pupils who were finding something difficult. Finally, test as many pupils as possible with elements learnt in the lesson such as asking someone to assign a variable called name to a string as their name. However, do not cover the exercise directly as the solutions will be discussed at the start of next lesson. Dismiss the class.

Content of lesson to follow

Next lesson will cover string operations such as len() and upper(). User input will be covered as well as concatenation in print statements. Converting data types will be touched upon briefly. Then basic IF statements will be introduced followed by an exercise that will test their knowledge learnt in the lesson.

Essential/Key Skills covered

Digital Competence:
The ability to use the Python idle(creating files and running them).
Program and understand the five data types that are on [page 3] of the work booklet.
Program and understand variables.
Able to use certain built in Python functions and understand Python syntax.
Literacy: Recap requires writing the answer to five questions. Exercise 1 Q3 requires an answer in full sentences.
Numeracy: A few questions in the recap require calculations. Q2 requires knowledge of sum and product.
Curriculum Cymreig: Greetings and other commands in welsh, page numbers in the workbook have welsh next to the number.

Additional information

Describe how the lesson addresses the progress and learning of the following groups of pupils:

EAL (English as an additional language)

The lesson provides a lot of visuals as well as verbal. Teacher will provide more support to them by repeating the instructions once the class are doing something practical, as well as reading out the exercise questions. Lastly, the teacher will make a conscious effort to speak clearly and slower, using basic key phrases and words to allow EAL pupils to have a better chance of understanding. Suggest the pupil sitting at the front in order to have a better chance of understanding.

ALN (Additional Learning Needs)

Provide as much support as possible. The lesson is planned with lots of different ways of learning in the hope that it will be useful for all groups of pupils. There are many questions to interact and engage with pupils as well as an interactive exercise with variables. There are live examples to demonstrate visually as well as verbally. Also, the questions are designed to suit all pupils and slowly progress.

MAT (More, Able and Talented)

Teacher will push them more by not supporting as much, which will prepare them for later on in education. Very intuitive online resources can be provided to attempt in their own time or as extensions. Also, the last questions of recap and exercise are to push the MAT pupils.

Additional Notes

The only resources required are the work booklets for the children to follow and answer in as well as computers for the pupils to program on. Lastly, a projector and board will be needed in order to demonstrate examples.
In terms of health and safety, ensure the bags are under their tables before sitting at the computers in case pupils were to trip over a bag. Do not allow pupils to swing on their chairs and ensure the pupils do not put any liquids near the computers such as bottles of water. If a pupil is too close to the screen ask them to sit back a little.
The reason there is a recap instead of starting from the very beginning is because the digital competence framework 2017. It will mean a lot more schools are teaching Python in year 9.
To enforce curriculum cymreig greeting at the beginning of the lesson should be in welsh. Also try to reiterate other commands such as "dim siarad" when asking for quiet in the classroom.

[1] “w3resource”, Basic part 1, available at:
https://www.w3resource.com/python-exercises/python-basic-exercises.php
[2] “pyschools”, Variables and data types, available at:
http://www.pyschools.com/quiz/view_topic/s1
[3] “Code Academy”, Python interactive lessons, available at:
https://www.codecademy.com/learn/learn-python
[4] “learnpython”, Variables and types, available at:
http://learnpython.org/en/Variables_and_Types

Solutions for Exercise 1

Q1
```
message = "Computer Science is fun!"
print(message)
message = "Hello Python world!"
print(message)
```

Q2
```
x = 10
y = 34

print(x+y)
print(x*y)
```

Q3
```
x = 100
y = 350

print(x+y)

x = "100"
y = "350"

print(x+y)
```

Q4
```
name = "Dylan"
age = 21

print("My name is",name,"and my age is",age)
```