

Variables and constants

Teacher's Notes

Lesson Plan

Length	60 mins	Specification Link	2.1.7/jk	Variables and constants
Learning objective		<ul style="list-style-type: none"> Define the terms variable and constant as used in an imperative language Use variables and constants Identify and use variables, operators, inputs, outputs and assignments 		
Time (min)	Activity	Further Notes		
5	<p>Use the following discussion to explain what variables, constants and identifiers are.</p> <ul style="list-style-type: none"> Ask the students how their teachers keep track of them and know who they are dealing with when checking homework, marking tests and exams, writing reports etc. These are their characteristics or properties e.g. <pre>First_Name = Fred Surname = Smith Age = 15 Year = 10 Tutor_Group = 10WA</pre> Fred, Smith, 15, 10, 10WA are values associated with them and help to describe them. But without knowing that '15' is their age or '10' is their year group they would be meaningless – someone could incorrectly assume they were aged 10 and in year 15. So each of these values needs an identifier to say what it is about. Ask the students which values will stay the same or constant throughout their school career – first name, universal student number, (surname could be iffy). Ask which will change or be variable throughout their school career – age, year group, tutor group. <p>Explain to students that, when programming we often need to keep track of the value of something, so we create a variable to hold that value.</p>	<p>E.g. First name, surname, school admission number, school year, tutor group, universal pupil number. (could have a list of these to show to the particular class)</p>		
5	Watch the set of videos.			
5	<p>Check students' understanding of the videos by asking for definitions of key terms such as:</p> <ul style="list-style-type: none"> What is a variable? What is a constant? What is an identifier? 	<p>A quantity capable of assuming any of a set of values.</p> <p>A quantity that never changes.</p> <p>A label or name representing a variable or constant.</p>		



Time (min)	Activity	Further Notes
5	<p>Explain that in programs you often have to keep track of several values of different things. It is important therefore to give each value a name to help us remember what it does. This name is called an identifier.</p> <p>Explain that identifiers should be long enough to easily tell what they store, yet short enough to type easily and not make code cumbersome.</p> <p>Good identifiers:</p> <ul style="list-style-type: none"> • Keep them short (around 8-20 characters) • Avoid over-abbreviation (e.g. counter not ctr which could mean centre, control, contrast or contract!) • Be consistent! If you used dogX, be sure to use dogY, not dog_y, yDog or dogsYCoord. However, if you're editing someone else's code, be sure to follow their naming conventions, even if they differ from your usual style. 	
10	<p>Worksheet 1</p> <p>Pupils complete the task individually.</p>	
10	<p>Pupils work their way through the interactive activity.</p>	<p>Teacher can use this opportunity to circulate amongst the students and assess their understanding; to support them if they are struggling and extend them if they are of a higher ability.</p>
10	<p>Worksheet 2</p> <p>Pupils answer the exam style questions individually.</p>	<p>Further exam style practice questions.</p>
10	<p>Homework</p> <p>Students to write a short piece of code that asks for two numbers, adds them together and outputs the answer.</p> <p>Plenary</p> <p>In pairs, explain to your partner one thing that you have understood really well. Then ask them a question about one thing you would like an answer to. Can you answer your partner's question?</p>	<p>The homework enables the pupils to further practise identifying variables, constants and operators.</p> <p>The plenary allows pupils to share their understanding with each other and solve each other's' queries. If there is time then this can be extended so that if one partner is unable to answer the question then the question is extended to other groups or the whole class.</p>

WORKSHEET 1 ANSWERS

1. Locate the variables, constants and operators in this Python code. Underline constants with a straight line, variables with a zigzag underline and circle the operators. Draw a box around the equals sign of any assignments.

```
teenager.py - /Users/jkershaw/Documents/Reference/Coding/Python/teenager.py
BABY = 1
TODDLER = 2
CHILD = 12
TEENAGER = 19
OLD = 30

name = input("What is your name? ")
age = input("How old are you? ")
age = int(age) # make sure age is an INteger (whole number)

print("You were a baby", age - BABY, "years ago.")
print("You were a toddler", age - TODDLER, "years ago.")

if age > CHILD:
    print("You were a child", age - CHILD, "years ago.")

if age > TEENAGER:
    print("You were a teenager", age - TEENAGER, "years ago.")

if age > OLD:
    print("You are very old!")
```



WORKSHEET 2 ANSWERS

1

(a) (i) State the names of the constant and the variables [2]

Constant: Pi

Variables: WheelSize, Circumference

(ii) Explain one difference between a constant and a variable [2]

Constants are defined ONCE and never change, variables can hold different values throughout the execution of the program.

(b) The data size of WheelSize is integer and the data type of Circumference is real number. Explain the difference between an integer and a real number. [2]

Integers are whole numbers, positive or negative (e.g. 7, -5, 0, 2345) whilst real (or 'floating point') numbers can have both an integer part and an optional decimal part (e.g. -27.84, 0, 14.0, 1673.90, 0.413).