

1. Printing text and creating variables

A

Press  and create an `Empty Script`. Type in these commands and run them :

```
print 'Hello world.'  
print '\n'  
print 'I am learning Python.'
```

What does the `print` command do?

What does printing `\n` do?

What happens if you make a mistake in your commands?

Key vocabulary

Program – A task which is completed by following a sequence of commands.

Run - Carrying out the commands in a program. Also known as execute.

1. Printing text and creating variables

B

Press  and create an `Empty Script`. Type in these commands and run them :

```
forename = raw_input('What is your forename? ')
print 'Hello', forename
```

Edit and
improve:

- Type these commands underneath which add a variable to store a **surname** when the user is asked and then prints the user's full name on the screen:

```
surname = raw_input('What is your surname? ')
print 'Hello', forename, surname, '!'
```

Key vocabulary

Variable – A value that can be stored and used in a program.

2. Calculations and random numbers

A

Press  and create an `Empty Script`. Type in these commands and run them :

```
print 100 + 10
```

Is the calculation still solved if you use a negative number or a decimal number?

Edit and improve:

- Change the commands to do a different calculation, such as a: take away `-`, multiplication `*` or division `/`.

e.g.

```
print 50 / 5
```

Key vocabulary

Testing - Trying out a program to check if it works as expected.

Debugging - Finding and correcting mistakes in a program's source code.

2. Calculations and random numbers

B

Press  and create an `Empty Script`. Type in these commands and run them :

```
import random
number = random.randrange(10, 20, 1)
print number
```

What does the `.randrange` command do?

Edit and improve:

- Change the number `10` to a smaller number and the number `20` to a bigger number to see what effect this has on the program.
- Add some commands to do calculations with the random number. e.g.

```
print number + 10
```

3. Number variables and commenting

A

Press  and create an `Empty Script`. Type in these commands and run them :

```
number = int(raw_input('Type a whole number: '))
answer = number * 8
print number, 'multiplied by 8 is', answer
```

What happens if you type in a decimal number instead of an `integer`?

Edit and
improve:

- Add commands so the answer to an addition is printed as well. You will need to use another variable called `answer2`:

```
answer2 = number + 6
print number, 'add 6 is', answer2
```

3. Number variables and commenting

B

Add these commands on a new line in your program and run them ▶ :

```
# This is a comment.
```

Does text on a line starting with a hash then a space (#) do anything when the program is run?

Edit and improve:

- Type some comments at the end of some lines in your program to explain what they do.

Key vocabulary

Comments – Notes in a program's code which explain what commands do to remind you. They are not run.

4. Conditional (if) statements

A

Press  and create an [Empty Script](#). Type in these commands and run them :

```
answer = raw_input( 'Do cats bark? ' )
if answer == 'no':
    print 'Correct'
else:
    print 'Wrong'
```

What does this program do?

Why do you think two equals signs are used and not just one?

Edit and improve:

- Change the question being asked (and the answer too, if needed).

Key vocabulary

IF statement – Decides which commands to run depending on whether certain things (conditions) are true or false.

4. Conditional (if) statements

B

Press  and create an `Empty Script`. Type in these commands and run them :

```
mark = int(raw_input('Score: '))
if mark > 80:
    print 'Outstanding'
elif mark > 40:
    print 'Great'
else:
    print 'Good'
```

What does this program do?

*What does the **elif** command let you do?*

Edit and improve:

- Add another **elif** command between 80 and 40 so that a score of more than 60 is rated as **'Super'**.

Programming challenge:

Create a program that asks a maths calculation and prints if the user answers it right or wrong. *Can you change one of the numbers in it to a random number?*

5. Lists

A

Press  and create an `Empty Script`. Type in these commands and run them :

```
import random

colours = ['red', 'green']
animals = ['lions', 'bears']

print 'My rainbow zoo has:'

colour = random.choice(colours)
animal = random.choice(animals)
print colour, animal
```

What does this program do?

What is the purpose of a list?

Key vocabulary

List – A set of values

**Edit and
improve:**

- Put more items in the lists to make the rainbow zoo more fun!

5. Lists

B

Press  and create an `Empty Script`. Type in these commands and run them :

```
vehicles = ['bus', 'car', 'train']

print vehicles[0]
print vehicles[1]
print vehicles[2]

vehicles.append('plane')
print vehicles

vehicles.pop(2)
vehicles.insert(2, 'boat')
print vehicles

vehicles.remove('car')
print(vehicles)
```

*Can you see what the:
.append, .pop,
.insert and .remove
commands do?*

Programming challenge:

Create a new list to store some **names**. Add commands to: `.append`, `.pop`, `.insert` and `.remove` names. Find out what the `.sort()` command does.

6. Functions

Press  and create an `Empty Script`. Type in these commands and run them :

```
import random

def cointoss():
    options = ['heads', 'tails']
    result = random.choice(options)
    print result
```

```
cointoss()
cointoss()
cointoss()
cointoss()
cointoss()
```

*What does this program do?
Why is better to call the function
five times than to copy all of its
commands five times?*

Key vocabulary

Function – A sub-program which is placed at the start of a bigger program and can be called (run) later using its name.

Edit and improve:

- Change the program so it shows the results of rolling a six-sided dice instead. You don't need to put `' '` around the options because they are numbers.

7. Iteration (looping)

A

Press  and create an `Empty Script`. Type in these commands and run them :

```
for i in range(4):  
    print 'Hello world.'
```

*What happens if you change **4** to a different number?*

Key vocabulary

Iteration – A way of repeating or looping commands multiple times.

B

Press  and create an `Empty Script`. Type in these commands and run them :

```
for i in  
range(1, 11):  
    print (i * 10)
```

*What happens if you change **1** and **11** to different numbers?*

7. Iteration (looping)

C

Press  and create an `Empty Script`. Type in these commands and run them :

```
password = 'fish'
guess = ''

while (password != guess):
    guess = raw_input('Enter password: ')
    if password == guess:
        print 'Correct'
    else:
        print 'Try again'
```

*If = means 'equal to',
what does != mean?*

*What does a while
loop do?*

Programming challenge:

Create a program in which the computer sets the password as a random `integer` from 1 to 100 and user has to correctly guess it.

```
import random

password = random.randrange(10,20,1)
guess = ''

while (password != guess):
    guess = int(raw_input('Enter passw
```

8. Parameters and validation

A

Press  and create an `Empty Script`. Type in these commands and run them :

```
def spell(word):  
    for i in range(0, len(word)):  
        print(word[i])  
  
spell('said')  
spell('because')
```

Key vocabulary

Parameter – A way of passing a value from the main program to a function when it is called (run).

Edit and improve:

- Add `print len(word)` above the `for` command. *What does it do?*
- Change the main program at the bottom so you can type any word in to pass to the function:

```
word = raw_input('Type a word: ')  
spell(word)
```

8. Parameters and validation

B

Press  and create an `Empty Script`. Type in these commands and run them :

```
def validation():
    number = 0
    while True:
        try:
            number = int(raw_input('Type a whole number: '))
        except ValueError:
            print 'Not a whole number!'
        else:
            return(number)

x = validation()
```

What is the purpose of this function?

How could it be useful?

Key vocabulary

Validation – Automatic checking by a computer to ensure that an entered value is sensible.

Programming challenge:

Create a program that uses the validation function. For example, to type in a whole number to do a calculation or to compare with another number using an IF ELSE statement.