Name: _____ Class: _____

Lesson 1: Programming Fundamentals — Teacher answers

Date: _____ **Learning objective:** I am learning to use variables, constants, operators, inputs, outputs and assignment, and recognise sequence, selection and iteration.

Starter — What can you remember? (5 min)

1. What is abstraction? **Removing unnecessary detail to focus on what is important**	**2.** Which search algorithm needs sorted data? **Binary search**
3. Name the flowchart symbol for input/output. **Parallelogram**	**4.** Which sort splits a list into single items? **Merge sort**

Section 1: Developing — Use variables, constants, I/O and assignment (8 min)

Task 1 — Spot the building blocks

1. Look at the program. Write the line or name for each one.

```
const VAT = 0.2
price = float(input("Enter the price"))
total = price + price * VAT
print("Total: " + str(total))
```

Find…	Answer
A constant	**VAT**
A variable	**price (or total)**
An input	**Line 2 — input("Enter the price")**
An output	**Line 4 — print(...)**
An assignment	**Line 3 — total = price + price * VAT**

Section 2: Securing — Use arithmetic, comparison and Boolean operators (12 min)

Task 2 — Work out the operators

2. Work out the value of each expression.

Expression	Value
17 MOD 5	**2**
17 DIV 5	**3**
2 ^ 4	**16**
(5 > 3) AND (2 == 4)	**False**
NOT (4 < 1)	**True**

3. Write a condition that is True when the variable num is even. Use MOD.

Answer: num MOD 2 == 0

Section 3: Mastering — Trace sequence, selection and iteration (12 min)

Task 3 — Trace and name the construct

4. What is output by this program?

```
x = 1
while x < 20
   x = x * 3
endwhile
print(x)
```

Answer: 27 (x goes 1 → 3 → 9 → 27)

5. What is output by this program?

```
total = 0
for i = 1 to 4
   total = total + i
next i
print(total)
```

Answer: 10 (0 + 1 + 2 + 3 + 4)

6. Name the construct used in each line of code.

Code	Construct
if age >= 13 then	**Selection**
for i = 0 to 9	**Iteration (count-controlled)**
do … until answer == "yes"	**Iteration (condition-controlled)**
print("Hi") then print("Bye")	**Sequence**

Exit ticket (3 min)

1. What is 9 MOD 4? **1**	**2.** Name the two types of iteration. **Count-controlled and condition-controlled**	**3.** Why use a constant? **Its value cannot change by mistake and it is easy to update in one place**
Finished early? In Python, ask for a password until it is right (a while loop), then print how many tries it took.		

How confident do I feel? Colour one box for each skill.

Level	Skill	Red	Amber	Green
Developing	Use variables, constants, I/O and assignment			
Securing	Use arithmetic, comparison and Boolean operators			
Mastering	Trace sequence, selection and iteration			