Surname	Centre Number	Candidate Number
First name(s)		0

GCSE

S24-3400U30-1C

MONDAY, 8 JANUARY – FRIDAY, 9 FEBRUARY 2024

BIOLOGY – Unit 3 (3400U30)

PRACTICAL ASSESSMENT

INVESTIGATING THE EFFECT OF SWEATING ON THE RATE OF COOLING

SECTION A

1 hour

For Examiner's use only		
	Maximum Mark	Mark Awarded
Section A	6	

3400U301C
01

ADDITIONAL MATERIALS

A calculator.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

The total number of marks available for this section of the task is 6.

The number of marks is given in brackets at the end of each question or part-question.

This task is in 2 sections, **A** and **B**. You will complete Section **A** in one lesson and Section **B** in the next science lesson.

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Introduction

Your task is to investigate the effect of sweating on the rate of cooling.
When you 'paint' water onto a boiling tube wrapped in newspaper, you can model the action of sweating.
The rate of cooling during sweating can be measured and compared to a dry boiling tube.

Apparatus Required

The following apparatus is required for each group: (each group should consist of no more than three candidates).

eye protection
1 × 100 cm^3 measuring cylinder
2 × boiling tube (each covered in five layers of newspaper) in a boiling tube rack
1 × small beaker of cold water
1 × 250 cm^3 beaker of hot water
1 × thermometer
1 × medium sized paint brush
1 × stopwatch
1 × tray

Access to:
kettle
paper towels

Read the method and answer questions 1.(a) and 1.(b) before carrying out the experiment and recording your results.

Method

1. Wear eye protection.
2. Place the boiling tube rack in the tray.
3. Use the measuring cylinder to measure 40 cm^3 of water at 55–60 °C.
4. Transfer this water into one of the boiling tubes.
5. Record the starting temperature of the water in the boiling tube.
6. Start the stopwatch. Record the temperature of the water in the tube every minute for 5 minutes. This represents the 'dry' tube.
7. Use the measuring cylinder to measure another 40 cm^3 of water at 55–60 °C.
8. Transfer this water into the second boiling tube.
9. Record the starting temperature of the water in this boiling tube.
10. Start the stopwatch. Use the paintbrush to add water from the small beaker to the outside of the boiling tube.
11. Record the temperature of the water every minute for 5 minutes whilst continually adding water with the paintbrush. This represents the 'sweating' tube.

Examiner only

SECTION A

Answer **all** questions.

1. (a) State a hypothesis for this experiment. [1]

.....

.....

(b) Complete the risk assessment below for this experiment. [1]

HAZARD	RISK	CONTROL MEASURE
Hot water can scald		

You may record raw results in the space below.

Examiner only

(c) (i) Present your results in a table. Include all of your results. [3]

(ii) Calculate the change in temperature from the start to the end of the experiment for **each** tube. [1]

'dry' tube temperature change = ... °C

'sweating' tube temperature change = ... °C

END OF PAPER

6

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

Examiner only

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