



General Certificate of Secondary Education  
2019

Centre Number

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Candidate Number

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# Biology

Unit 3 Practical Skills

Booklet A

<b>MV18</b>
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Foundation Tier

[GBL31]

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## Time

2 hours, plus your additional time allowance.

## Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.

Answer **all** questions.

## Information for Candidates

The total mark for this paper is **30**.

Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

Follow all health and safety instructions.

You may use a ruler and calculator if required.

The apparatus and materials required to complete the task(s) are provided.

**You will have access to any data you recorded on the Confidential Candidate Set-up Instruction Sheet.**

**At the conclusion of this examination, attach your Confidential Candidate Set-up Instruction Sheet securely to this booklet with the treasury tag supplied.**

## Foundation Tier

**You must wear safety glasses when carrying out the tasks.**

### **Task 1: The effect of temperature on the respiration of yeast**

#### **Instructions**

- 1** Label each of four boiling tubes with a temperature (15°C, 30°C, 45°C and 60°C) and your initials.
- 2** Weigh 4g of sugar, 3g of yeast and add 100g of flour into a 250 cm<sup>3</sup> beaker.
- 3** Slowly add 120 cm<sup>3</sup> of water to the beaker containing the sugar, yeast and flour.  
Stir until the dough mixture is a **smooth** paste.
- 4** Use a syringe to add the dough mixture into each boiling tube until it reaches the 50 mm line marked on the tube.  
Be careful not to get the dough mixture on the sides of the boiling tube.
- 5** Place each boiling tube in the appropriate water bath and leave for 30 minutes.
- 6** After 30 minutes use a ruler to measure the height in millimetres of the dough in each boiling tube. Record each height in **Table 1** on the next page.

1 Complete **Table 1** below by:

(a) recording the height of the dough/mm after 30 minutes at each temperature. [1 mark]

(b) calculating the increase in the height of the dough/mm at each temperature. [2 marks]

**Table 1**

Temperature /°C	Height of dough/mm		Increase in height of dough/mm
	at start	after 30 minutes	
15 (Room temperature)	50		
30	50		
45	50		
60	50		

2 Complete **Table 2** below by:

- (a) transferring **your own results** for the increase in the height of dough/mm at each temperature from **Table 1** into **Table 2**. [1 mark]
- (b) recording **one other** set of results for the increase in height of dough/mm at each temperature from another group in the class. [1 mark]
- (c) calculating the average increase in the height of dough/mm at each temperature. [2 marks]

**Table 2**

Temperature /°C	Increase in height of dough/mm		
	Own results	Results of another group	Average
15 (Room temperature)			
30			
45			
60			

- 3 Name the independent variable and the dependent variable in this experiment. [1 mark for each]

Independent variable \_\_\_\_\_

Dependent variable \_\_\_\_\_

- 4 On the grid on page 7, use the results from **Table 2** to draw a line graph of the average increase in the height of the dough at each temperature.

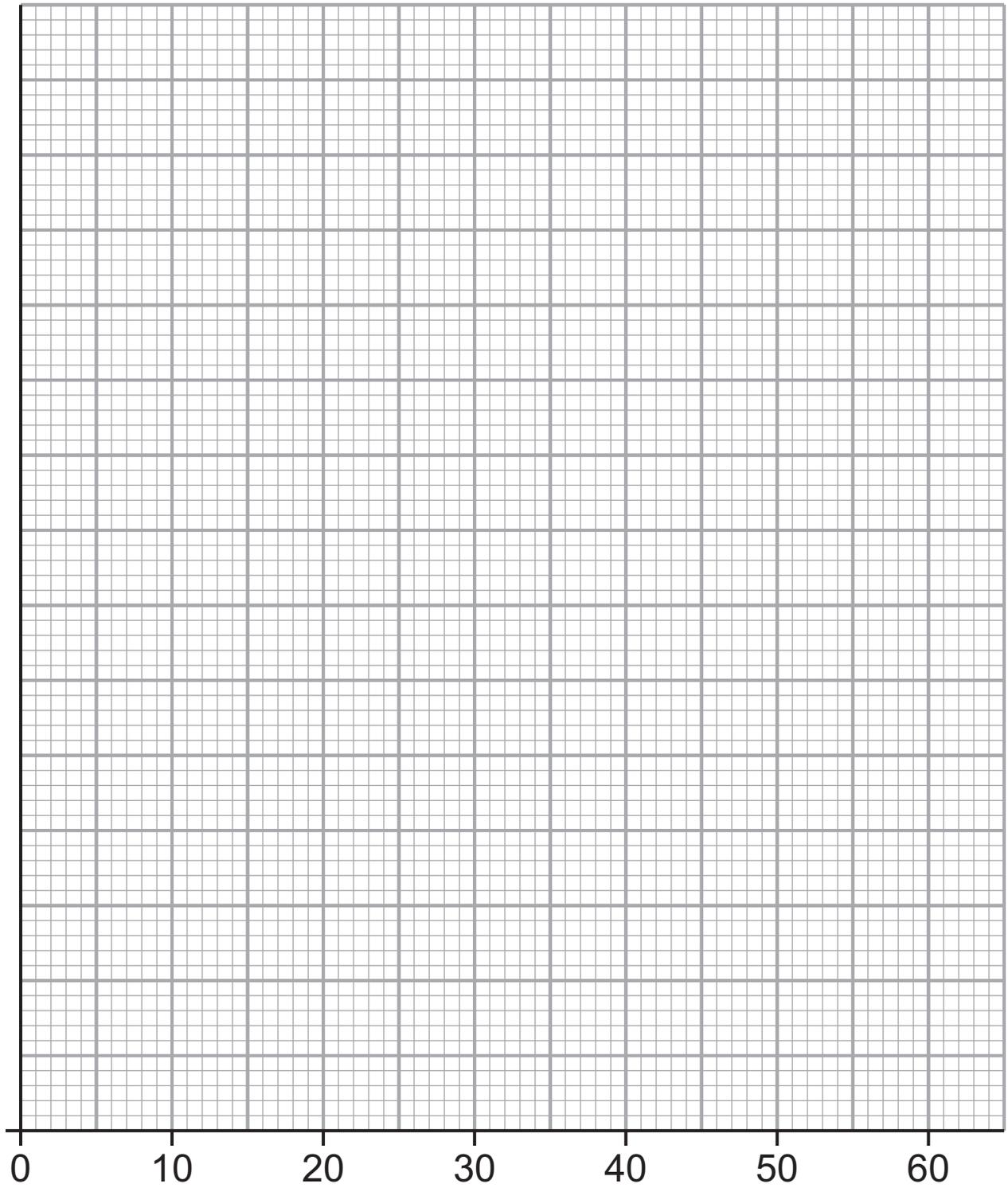
(a) Label the x-axis, including appropriate units. [1 mark]

(b) Label the y-axis, including appropriate units. [1 mark]

(c) Select an appropriate scale for the y-axis, which uses at least half of the grid. [1 mark]

(d) Plot the points accurately. [2 marks]

(e) Use a ruler to join the points with straight lines. [1 mark]



## Task 2: Transpiration

### Instructions

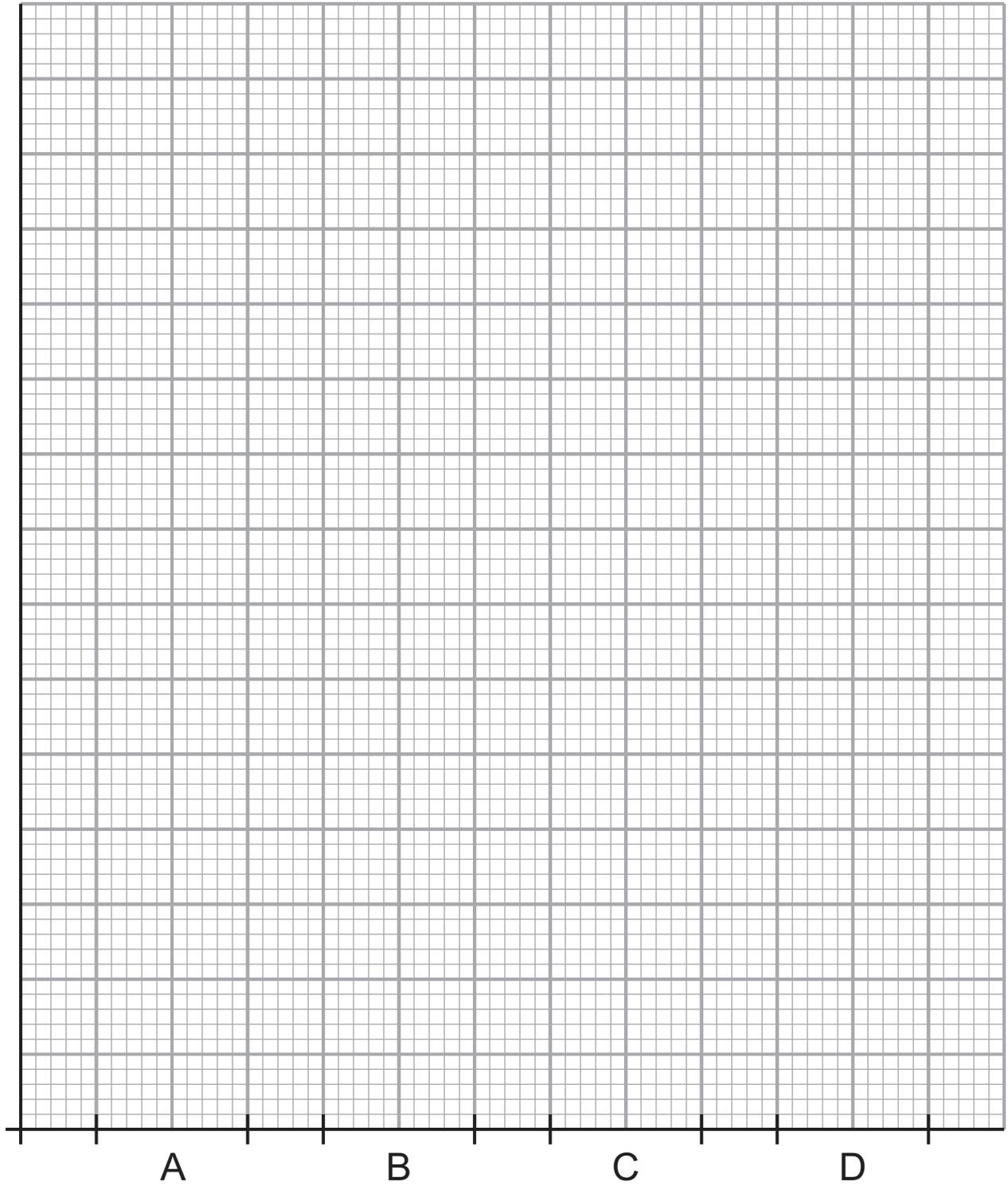
- 1 (a) Record which surface/surfaces of each leaf are covered with petroleum jelly from the table in the Confidential Candidate Set-up Instruction Sheet, to **Table 3** on page 9. Leaf **D** has been completed for you. [1 mark]
  
- (b) Transfer the results for the mass of each leaf/g at the start from the table in the Confidential Candidate Set-up Instruction Sheet, to **Table 3** below. [1 mark]
  
- 2 (a) Remove leaf **A** from the “washing line”. Remove the paper clip and reweigh the leaf.
  
- (b) Record the mass of leaf **A** after 24 hours in **Table 3**.
  
- (c) Repeat steps (a) and (b) for leaves **B**, **C** and **D** in turn. [1 mark]

- 3 Complete **Table 3** by calculating the change in mass of each leaf. [2 marks]

**Table 3**

Leaf	Surface covered by petroleum jelly	Mass of leaf/g		Change in mass of leaf/g
		at start	after 24 hours	
<b>A</b>				
<b>B</b>				
<b>C</b>				
<b>D</b>	Upper and lower			

- 4** On the grid on page 11 draw a bar chart of the change in mass of each leaf.
- (a)** Label the x-axis with the independent variable.  
[1 mark]
- (b)** Label the y-axis with the dependent variable and include appropriate units. [2 marks]
- (c)** Select an appropriate scale for the y-axis, which uses at least half of the grid. [1 mark]
- (d)** Plot the bars accurately. [2 marks]



5 Give the letter of the leaf which lost: [1 mark for each]

(a) **most** mass. \_\_\_\_\_

(b) **least** mass. \_\_\_\_\_

6 Give **two variables** which were controlled in this experiment. [1 mark for each]

1. \_\_\_\_\_

2. \_\_\_\_\_

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**THIS IS THE END OF THE QUESTION PAPER**

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For Examiner's use only	
Question Number	Marks
<b>Task 1</b>	
1	
2	
3	
4	
<b>Task 2</b>	
1	
2	
3	
4	
5	
6	
<b>Total Marks</b>	

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2019

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# Biology

Unit 3: Practical Skills

**MV18**

## Confidential Candidate Set-up Instruction Sheet

Foundation Tier

[GBL31]

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### Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

### Information for Candidates

This Set-up Instruction Sheet tells you how to set up the practical for Task 2 in Booklet A and any initial information you may have to record.

Task 1 does not require a Set-up Instruction Sheet.

If you have recorded any data on the Set-up Instruction Sheet, you will have access to this when completing Booklet A.

Any information recorded during the set-up of the practical is not assessed at this stage.

The time taken by you to set up this practical is not part of the 2 hours allocated for completing Booklet A.

This Set-up Instruction Sheet must be returned to your teacher at the end of the set-up.

## Task 2: Transpiration

Candidate Set-up Instructions:

1. Collect four similar sized leaves of the same species and label them **A**, **B**, **C** and **D**.
2. Leave both surfaces of leaf **A** uncovered.
3. Cover the upper surface of leaf **B** with petroleum jelly.
4. Cover the lower surface of leaf **C** with petroleum jelly.
5. Cover both surfaces of leaf **D** with petroleum jelly.
6. Weigh each leaf and record the masses/g in the table below.

Leaf	Mass of leaf at start/g
<b>A</b>	
<b>B</b>	
<b>C</b>	
<b>D</b>	

7. Use a paper clip to hang each leaf on a 'washing line' and leave for 24 hours.



*Rewarding Learning*

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2019**

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# **Biology**

**Unit 3: Practical Skills**

**Booklet A**

**Foundation Tier**

**[GBL31]**

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## **APPARATUS AND MATERIALS LIST AND CONFIDENTIAL INSTRUCTIONS**

It is the responsibility of the centre to ensure that appropriate risk assessments are carried out for all practical skills assessments.

## Confidential Instructions

### 1 Requirements for the practical assessment

Three copies of each of the Apparatus and Materials List and Confidential Instructions for the specifications entered by a centre will be delivered to centres at the beginning of November each year for the GCSE Science specifications based on estimated entries made in September for the Year 12 cohort who will be entering for the practical unit in the following summer series. These will be held securely by the Examinations Officer but can be accessed by the Head of Department immediately. The Head of Department can liaise with the relevant technician(s) to order and set up the apparatus and materials as appropriate but ensure the document is held securely when not in use.

All apparatus should be checked before the examination, and there should be an adequate supply of spare apparatus in case of breakages. The Apparatus and Materials List should be regarded as a minimum and there is no objection to candidates being supplied with more than the minimum amount of apparatus and materials. Upon request, a candidate may be given additional quantities of materials without penalty. No notification need be sent to CCEA.

Centres are responsible for providing their own apparatus and materials to conduct the assessments. Practical Skills Booklet A will be delivered to centres in hard copy in the December dispatch and should be held securely by the Examinations Officer until requested by the Head of Department. Booklet A can be completed by candidates from 2nd January until the first Friday in June each year.

For the practical unit (Separate Sciences: Unit 3; Double Award Science: Unit 7; Single Award Science: Unit 4) candidates must be entered at the same tier for all components within the unit. When Booklet A has been completed for a specification, the tier of entry for the practical unit can no longer be changed for each individual candidate.

**Please note: The Biology Practical Skills Assessments (Double Award Biology and GCSE Biology only) may have slightly different instructions to be followed when an extra practical set-up session is required. See section 8.**

### 2 Confidentiality

The instructions contained in this document are for the use of the Head of Department **and are strictly confidential**. Under no circumstances may information concerning apparatus or materials be given before the examination to a candidate or other unauthorised person.

**It is the responsibility of the centre to ensure that there should be no communication between candidates taking different sessions regarding the practical assessment both within the centre and with other centres.** The JCQ regulations on the use of social media (Information for Candidates – Social Media) must be explained to candidates in advance of completing Booklet A.

### 3 Health and Safety

Appropriate safety advice should be sought from CLEAPSS for the conduct of all practical tasks by the Head of Department when completing their Risk Assessment in advance of the practical sessions.

Clear instructions must be given by the Supervising Teacher to all candidates at the beginning of the examination concerning appropriate safety procedures and precautions. The Supervising Teacher is also advised to remind candidates that all materials in the examination must be treated with caution. **Only those tasks specified in Booklet A should be attempted. Candidates must not attempt any additional confirmatory tasks.** Anything spilled on the skin should be washed off immediately with plenty of water. The use of appropriate eye protection is essential. The Supervising Teacher is reminded that they may not assist candidates during the examination. However if, in the opinion of the Supervising Teacher, a candidate is about to do something which may endanger him/herself or others, the Supervising Teacher must intervene. A full written report must be sent to CCEA immediately by email to the appropriate Subject Officer.

### 4 JCQ Regulations

All JCQ instructions for conducting examinations should be followed for this practical examination including displaying JCQ posters with examination information in the laboratory and removal of mobile phones. Posters should be available from your Examinations Officer.

Students who really need to leave the examination room during the assessment should be supervised according to the JCQ regulations for external examination conduct.

### 5 Timetabling, accessing, trialling and storing Booklet A

The School Examinations Officer will receive hard copies of Booklet A based on estimated entries in the December dispatch. The Examinations Officer will hold these securely **at all times**. They will not be released to any other member of staff. However, the **Supervising Teacher** may request **one** copy of Booklet A **three working days** in advance of carrying out the practical assessment with their class in order to trial it to ensure that the materials work as they should, to plan their classroom management of the practical session and to carry out a risk assessment. This copy of Booklet A should be returned to the Examinations Officer for secure storage immediately after trialling and should not be photocopied. Teachers should keep a set of results (and repeats if necessary) from their teacher trial to give to candidates in the event of an emergency. In these circumstances, a report should be sent to the Subject Officer with specification responsibility by email who will decide if a special consideration application is applicable (All Double Award Science reports of special circumstances should be directed to Elaine Lennox and all Single Award Science reports should be directed to Gavin Gray).

On the day of the practical assessment, the Supervising Teacher will request the required number of copies of Booklet A for their class and these must be held securely until the practical session begins. After the practical session is complete, the booklets must be collected from the candidates by the Supervising Teacher, collated in order of Candidate Number (lowest to highest) and returned immediately to the Examinations Officer for secure storage until they are collected by CCEA on the first Friday in June each year to be marked externally.

## Completing Booklet A

- Multiple sessions are permitted to accommodate all candidates within the centre. Centres do not have to accommodate all their candidates to carry out the practical assessment on the same day. The Supervising Teacher can decide in which order the candidates should attempt the practical tasks and can manage the session to accommodate the resources available within the centre.
- A suitable laboratory must be reserved for the examination and kept locked throughout the period of preparation and clearance afterwards. Unauthorised persons not involved in the preparation for the examination must not be allowed to enter. Candidates must not be admitted until the specified time for commencement of the examination.
- All used and unused booklets must be returned to the Examinations Officer for secure storage immediately following the session. Unused booklets may be returned to the Head of Department after the first Friday in June each year.
- Foundation and Higher Tier candidates may carry out the practical assessment in the same room, but they may only work with others taking the same tier.

## 6 Invigilation

For invigilating the practical skills assessment, regulations and conditions set out in the most recent JCQ *Instructions for Conducting Examinations* should be adhered to.

An appropriate science teacher (Supervising Teacher) must be present with an invigilator during the assessment to ensure compliance with health and safety regulations and deal with any technical difficulties that may arise unexpectedly. An invigilator may be any adult in the employment of the school that is not the science teacher of the candidates, for example, this might be another teacher, science technician or teaching assistant. The invigilator should remain with the candidates for the full duration of the assessment and must have read the regulations around invigilating examinations as outlined in JCQ *Instructions for Conducting Examinations*.

The Supervising Teacher should ensure that candidates are supplied with a Booklet A for their correct tier of entry (Foundation Tier papers will be buff coloured and Higher Tier papers will be printed on white paper).

## 7 Controls for carrying out Booklet A

The practical assessment must be completed under a high level of control (as detailed in the respective specification). Teachers and invigilators must not offer direction or guidance to candidates where this would assist them in completing Booklet A.

The practical session for Booklet A is time limited to a maximum of one hour for each discipline of Double Award Science and a maximum of two hours for GCSE Biology, Chemistry and Physics and Single Award Science. All practical and written tasks with Booklet A must be completed in the same session on the same day.

Not all candidates or classes in a centre need to complete Booklet A at the same time. Candidates who are absent for the practical session may take it at a later date with another class completing the same practical skills assessment or should be accommodated individually by the centre.

Ideally candidates should work individually to carry out the practical tasks where this can be accommodated by centres. However, candidates are permitted to work collaboratively in groups of up to three when carrying out the practical tasks. If candidates are working in groups to complete the practical tasks, it is the Supervising Teacher's responsibility to inform candidates beforehand that each member of the group should participate in practical activity. For Health and Safety purposes, these candidates must be permitted to communicate to each other regarding the practical methodology. All candidates must work individually and independently to complete the written tasks in Booklet A.

Candidates may not have access to their laboratory notes, textbooks, wall displays or the internet at any time during the practical session. They are also not allowed access to dictionaries, spell checks and grammar facilities and should be informed of this beforehand.

**Candidates must not attempt a practical assessment Booklet A more than once.**

Drafting is not permitted under any circumstances and teachers must not give any feedback to candidates.

Candidates should be offered additional sheets of paper upon request that are supplied by CCEA for other external examinations.

## **8 Biology Practical Skills Assessment (Double Award Biology and GCSE Biology only)**

While the majority of Biology practicals will be able to be completed within the given time limit, there may be biological processes/reactions in some practical assessments which take longer than the time allocated to complete.

CCEA will provide candidates with a separate Practical Set-up Instruction Sheet specific to such a practical. This sheet will detail the set-up of the practical and any initial recording that candidates may have to carry out at the point of set-up. An example is available in the GCSE Biology Specimen Assessment Materials (SAMs) which can be found on the Biology microsite. Hard copies will be distributed to centres along with Booklet A based on estimated entries.

The Confidential Candidate Practical Set-up Instruction Sheets should be held in a **confidential and secure place** along with Booklet A by the Examinations Officer. It must not be photocopied. This sheet can be distributed to the Head of Department and Supervising Teachers on the same basis as Booklet A.

Where the Practical Set-up Instruction Sheet is required, one copy of it and one copy of Practical Skills Booklet A can be accessed by the Supervising Teacher from the Examinations Officer **three working days** in advance of the **practical set-up session** which has been planned for candidates, in order to trial the practical. After the practical trialling is complete, both documents must be returned to the Examinations Officer for secure storage.

The Confidential Candidate Practical Set-up Instruction Sheet should be given to the candidates at the beginning of the practical assessment set-up session, which is not time limited. This sheet will detail the set-up of the practical and any initial recording that candidates may have to carry out in advance of completing Booklet A. Any initial recording of data will not contribute to the final marks, nor will the time required for the practical set-up be included in the time allowed for the completion of Practical Skills Booklet A.

Candidates must return the Candidate Practical Set-up Instruction Sheet at the end of the practical set-up session to the Supervising Teacher who must return them to the Examinations Officer immediately for secure storage. The Examinations Officer should then release the Candidate Practical Set-up Instruction Sheets along with Practical Booklet A's to the Supervising Teacher just before the planned session for completing Booklet A. They must be returned to candidates at the beginning of the Practical Skills Assessment to support them in completing Booklet A.

At the end of the Practical Skills Assessment session, candidates must be directed to attach the Confidential Candidate Practical Set-up Instruction Sheet to the back of the completed Practical Skills Booklet A with a treasury tag provided by the Supervising Teacher (these will be supplied to centres by CCEA in the stationery dispatch). The Supervising Teacher should then ensure that the Booklets and attached sheets are arranged in order of Candidate Number (lowest to highest) and returned to the Examinations Officer immediately for secure storage until they are collected by CCEA.

## **9 Application for Special Consideration (SPC)**

Candidates are entitled to the same SPC arrangements in practical examinations as they are in theory examinations including extra time and a reader or scribe. Where the centre finds that a candidate/group of candidates may have been disadvantaged because apparatus or materials did not function as intended, the Supervising Teacher must send a confidential report to the Subject Officer by email detailing the issue and the Candidate Number(s) affected before the June collection date. The Supervising Teacher should liaise with the Examinations Officer regarding applying for SPC in advance of sitting Practical Booklet A.

- CCEA has developed the SPC Online Application to allow centres to submit applications for SPC.
- Please note – paper forms will no longer be accepted unless prior agreement has been approved through CCEA's Centre and Examiner Support Team. Enquiries should be forwarded to [specialconsideration@ccea.org.uk](mailto:specialconsideration@ccea.org.uk)
- Teachers are asked to contact their Examinations Officer, who will have access to the secure online application, for further details on how to submit an application for SPC online.
- The SPC application can be accessed from the Central Login portal on the CCEA website or by clicking the link below:  
<https://www.qualsadmin.org.uk/CentralisedLoginApplication/>

## 10 Contact Details

Should any queries arise regarding the trialling, conduct and content of Practical Booklet A, please direct your queries to CCEA on the following basis:

### **GCSE Biology and GCSE DAS Biology**

**Edith Finlay**

*Subject Officer for Biology and Agriculture*

Email: efinlay@ccea.org.uk

Tel. 028 90 261200 ext. 2267

### **GCSE Chemistry and GCSE DAS Chemistry**

**Elaine Lennox**

*Subject Officer for Chemistry and Double Award Science*

Email: elennox@ccea.org.uk

Tel. 028 90 261200 ext. 2320

### **GCSE Physics, GCSE DAS Physics and SAS**

**Gavin Gray**

*Subject Officer for Physics and Single Award Science*

Email: ggray@ccea.org.uk

Tel. 028 90 261200 ext. 2270

If your query is about the general administration of Booklet A, please direct your query to:

**Nuala Tierney**

*Specification Support Officer for the STEM Sector*

Email: ntierney@ccea.org.uk

Tel. 028 90 261200 ext. 2292

## Apparatus and materials (per group)

It is the responsibility of the centre to ensure that appropriate risk assessments are carried out for all practical skills assessments.

### Task 1: The effect of temperature on the respiration of yeast

- Safety glasses
- 4 boiling tubes – (approximately 150 mm × 24 mm) prepared with a line marked 50 mm from the base of the tube.
- 4g of sugar – white table sugar or caster sugar
- 3g of yeast – any baker's yeast available in a supermarket
- 100g of flour – plain flour
- Balance – minimum accuracy 0.1 g
- Water – 120 cm<sup>3</sup> at room temperature
- Measuring cylinder – 200 cm<sup>3</sup>/250 cm<sup>3</sup>
- Beaker – for mixing dough (at least 250 cm<sup>3</sup>)
- Stirring rod
- Ruler – mm scale
- Water bath or beakers as water baths at 15°C, (room temperature), 30°C, 45°C and 60°C. Set up **before candidates start the assessed task** so that temperatures are stable.
- 4 thermometers
- Waterproof marker/chinagraph pencil
- Syringe – 10 cm<sup>3</sup>/20 cm<sup>3</sup>
- Stopwatch/clock

### Confidential Instructions

Task 1 does not require any initial set-up by the candidates.

In the respiration experiment, candidates should be provided with boiling tubes with a line marked, using waterproof pen, 50 mm up from the bottom of the boiling tube.

It is suggested that centres may wish to prepare 250 cm<sup>3</sup> beakers with 100 g of flour already weighed. Candidates should be given the opportunity to weigh out the other dry materials.

## Task 2: Transpiration

- 4 (non-waxy) leaves of similar size from the same species, e.g. geranium, beech, ash leaflets
- String between 2 retort stands (washing line)
- Paper clips
- Vaseline / petroleum jelly
- Balance with accuracy of 0.01 g
- Paper towels
- Labels/paper for recording the letter of each leaf.

## Confidential Instructions

The transpiration experiment will need to be set up at least 24 hours in advance by the candidates. The Confidential Candidate Set-up Instruction Sheets will be sent out to centres at the beginning of December 2018.

In our trials, best results were obtained using non-waxy leaves such as geranium or ash leaflets which were left for 24 hours. For centres without access to balances weighing to two decimal places, feasible results may be obtained by using large leaves such as sycamore and leaving them for longer than 24 hours.

## Classroom management

Once the respiration experiment is set up it will take 30 minutes before results can be obtained. During this time, it is suggested that candidates record the results for the transpiration experiment.

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