Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2019

Double Award Science
Biology

Unit 7: Practical Skills
Booklet A
Foundation Tier

[GDW71]

TIME

1 hour.

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 **15**.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Follow all health and safety instructions.
You may use a ruler and a 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.

For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
5	
6	
7	
Total Marks	

BLANK PAGE

Investigating osmosis in potato cells

Examiner Only	
Marks	Remark

Instructions

You must wear safety glasses when carrying out the tasks.

1 Write the initial masses of the potato cylinders (recorded in Table 1 in your Confidential Candidate Set-up Instruction Sheet) in the column in Table 2 below with the heading 'Initial mass of potato cylinder/g'. [1]

2 **(a)** Remove the potato cylinder from beaker 1 and pat it dry with a paper towel.
Use a balance to weigh this potato cylinder.
This is the final mass of the potato cylinder.
Record this mass/g to one decimal place in the column in Table 2 with the heading 'Final mass of potato cylinder/g'.

(b) Repeat step 2 for each of the other three potato cylinders. [1]

3 Calculate the change in mass/g of each potato cylinder.
Complete Table 2 by writing the results in the column with the heading 'Change in mass of potato cylinder/g'.

Table 2

Beaker	Concentration of sucrose solution/%	Initial mass of potato cylinder/g	Final mass of potato cylinder/g	Change in mass of potato cylinder/g
1	0 (water)			
2	5			
3	10			
4	20			

[2]

Examiner Only	
Marks	Remark

4 **(a)** Give **one** safety precaution you should take when using the equipment in this experiment.

_____

_____ [1]

(b) Apart from the length of the potato cylinders, give **one** variable you controlled in this experiment.

_____

_____ [1]

5 **(a)** Write **your group's** results for the change in mass/g of the potato cylinders from Table 2, in the column in Table 3 below with the heading 'My group'.

(b) Collect **one** other set of results for the change in mass/g of the potato cylinders from **one** other group in your class.
Write their results in the column in Table 3 below with the heading 'Group 2'. [1]

Table 3

Concentration of sucrose solution/%	Change in mass of potato cylinder/g		
	My group	Group 2	Average
0 (water)			
5			
10			
20			

(c) Calculate the average change in mass/g of the potato cylinders in each concentration of sucrose solution.

Give your answers to one decimal place.

Show your working.

Write these results in the column in Table 3 opposite with the heading 'Average'.

[2]

6 Give **one** reason why average results are used.

_____

_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

7 **(a)** Use the average change in masses of the potato cylinders from Table 3 on page 4 to answer the following questions.

(i) Describe the change in mass/g of the potato cylinders after 24 hours in 0% sucrose solution (water).

_____ [1]

(ii) Give the term that describes the potato **cells** in the potato cylinders after 24 hours in 0% sucrose solution (water).

_____ [1]

(b) **(i)** Describe the change in mass/g of the potato cylinders after 24 hours in 20% sucrose solution.

_____ [1]

(ii) Use your knowledge of osmosis to explain the change in mass/g of the potato cylinders after 24 hours in 20% sucrose solution.

_____

_____

_____

_____ [2]

THIS IS THE END OF THE QUESTION PAPER

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will be happy to rectify any omissions of acknowledgement in future if notified.

Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2019

Double Award Science
Biology

Unit 7: Practical Skills

Confidential Candidate Set-Up Instruction Sheet

Foundation Tier

[GDW71]

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.

If you have to record any information on this 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 1 hour allocated for completing Booklet A.

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

Investigating osmosis in potato cells

Candidate set-up instructions

1 Label four beakers 1, 2, 3 and 4.
Write your group's initials on each of the four beakers.

2 Measure 100 cm^3 of 0% sucrose solution (water) using a measuring cylinder and pour it into beaker 1.
Measure 100 cm^3 of 5% sucrose solution using a measuring cylinder and pour it into beaker 2.
Measure 100 cm^3 of 10% sucrose solution using a measuring cylinder and pour it into beaker 3.
Measure 100 cm^3 of 20% sucrose solution using a measuring cylinder and pour it into beaker 4.

3 Cut four potato cylinders from a potato using a cork borer.

4 Cut off any potato skin from the ends of the potato cylinders using a knife.

5 Cut each potato cylinder to a length of 40 mm.

6 Use a balance to weigh the first potato cylinder.
This is the initial mass of the potato cylinder.
Record this mass/g to one decimal place in Table 1 below for beaker 1.
Place this potato cylinder into beaker 1.

7 Weigh the second potato cylinder. Record this mass/g to one decimal place in Table 1 for beaker 2. Place this potato cylinder into beaker 2.
Weigh the third potato cylinder. Record this mass/g to one decimal place in Table 1 for beaker 3. Place this potato cylinder into beaker 3.
Weigh the fourth potato cylinder. Record this mass/g to one decimal place in Table 1 for beaker 4. Place this potato cylinder into beaker 4.

8 Leave the potato cylinders in the beakers for 24 hours or for a time given to you by your teacher.

Table 1

Beaker	Concentration of sucrose solution/%	Initial mass of potato cylinder/g
1	0 (water)	
2	5	
3	10	
4	20	

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General Certificate of Secondary Education
2019

Double Award Science

Biology

Unit 7: Practical Skills

Booklet A

Foundation Tier

[GDW71]

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
- 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

Investigating Osmosis In Potato Cells

Apparatus and Materials for each class

- 0% sucrose solution (water)
- 5% sucrose solution
- 10% sucrose solution
- 20% sucrose solution
- Large white potatoes (to allow candidates to cut potato cylinders to a length of 40 mm)
- Knives
- Cork borers (recommended minimum diameter 14 mm)
- 250 cm^3 beakers (4 beakers per group)
- Measuring cylinders to measure 100 cm^3 of sucrose solution
- Rulers with mm scale
- Labels or marker
- White tile/boards (for cutting potatoes)
- Paper towels
- Balances
- Each candidate will need a calculator

Confidential Instructions

This practical will need to be set up the day before the practical assessment. The Confidential Candidate Set-up Instruction Sheets will be sent out to Centres at the beginning of December 2018.

Candidates will need to set up potato cylinders in sucrose solutions in advance of the day of the experimental procedure.

Time suggested for leaving cylinders is 24 hours. This may be changed as appropriate.

If cork borers are not available, pupils should cut potato chips of approximate dimensions 15 × 15 × 40 mm.