

Sample question paper and mark scheme

DRAFT

LEVEL 3 CAMBRIDGE ADVANCED NATIONAL (AAQ) IN

APPLIED SCIENCE

Extended Certificate H151

For first teaching in 2025

F185: Forensic biology

Introduction

This is Sample Assessment Material (SAM). It is an example set assignment that we publish alongside a new specification to help illustrate the intended style and structure of our set assignments.

During the lifetime of the qualification, updates to the set assignment template may happen. We always recommend you look at the most recent set of past set assignments where available.

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Designed and tested with teachers and students



Helping young people develop an [ethical view of the world](#)



Equality, diversity, inclusion and belonging (EDIB) are [part of everything we do](#)

Summary of updates

Date	Version	Page number	Summary of change
July 2023	1 DRAFT	All	Creation of document

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- are respectful and considerate
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- challenge prejudicial views and unconscious biases
- promote a safe and supportive approach to learning
- are accessible and fair, creating positive experiences for all
- provide opportunities for everyone to perform at their best
- are contemporary, relevant and equip everyone to live and thrive in a global, diverse world
- create a shared sense of identity in a modern mixed society with one humanity.

To learn more, including our work on accessibility in our assessment materials, visit our [People and planet page](#).

OCR-set Assignment

Sample Assessment Material

OCR Level 3 Cambridge Advanced National (AAQ) in Applied Science
(Extended Certificate)

F185: Forensic biology

Scenario Title: Who took the tomatoes?

This is a sample OCR-set assignment which should only be used for practice.

This assignment **must not** be used for live assessment of students.

The live assignments will be available on our secure website, 'Teach Cambridge'.

The OCR administrative codes linked to this unit are:

- unit entry code F185
- certification code H151

The regulated qualification number linked to this unit is:

TBC

Duration

About:

- 18 hours of supervised time (GLH)
(work that **must** be completed under teacher supervised conditions)
- 5 hours of unsupervised time
(work that students can complete independently without teacher supervision)

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Information and instructions for Teachers

Using this assignment

This assignment provides a scenario and set of related tasks that reflect how people working in forensic biology positions would develop skills of investigation, analysis, independent research and working collaboratively with colleagues in a team.

The assignment:

- Is written so that students have the opportunity to meet the requirements of all assessment criteria for the unit.
- Will tell students if their evidence must be in a specific format. If the task does not specify a format, students can choose the format to use.
- **Must** be completed under teacher supervision. Any exceptions to this will be stated in the assessment guidance.

You **must**:

- Use an OCR-set assignment for summative assessment of students.
- Familiarise yourself with the assessment criteria and assessment guidance for the tasks. These are given at the end of each student task. They are also with the unit content in **Section 4** of the Specification. Assessment guidance is only given where additional information is needed. There might not be assessment guidance for each criterion.
- Make sure students understand that the assessment criteria and assessment guidance tell them in detail what they need to do in each task.
- Read and understand **all** the rules and guidance in **Section 6** of the Specification **before** your students start the set assignments.
- Make sure that your students complete the tasks and that you assess the tasks fully in line with the rules and guidance in **Section 6** of the Specification.
- Give your students the Applied Science **Student guide to NEA assignments** **before** they start the assignments.
- Complete the **Teacher Observation Record** for **Task 2** and **Task 3**. You **must** follow the guidance given when completing it.

You **must not**:

- Use live OCR-set assignments for practice or formative assessment. This sample assessment material **can** be used for practice or formative assessment.
- Use this sample assessment material for live assessment of students.
- Allow group work for **any** task in this assignment.
- Change any part of the OCR-set assignments or assessment criteria.

Information for delivering tasks

Task	Requirements
General	The full plan must be checked by the teacher to ensure it is appropriate in terms of safety and for the circumstances of the centre. Appropriate control measures need to be clearly indicated and checked by the classroom teacher before any practical work is carried out.
1, 2 & 3	See accompanying 'Teacher/Technician Advice' for guidance specific to this scenario.

Pages 1-5 are for teachers only. Please do **not** give **Pages 1-5** to your students.

You can give **any** or **all** of the pages **that follow** to your students.

Sample

Tasks for students and assessment criteria

Unit F185: Forensic Biology

Scenario Title: Who took the tomatoes?

Scenario

Sam grows prize tomatoes in a greenhouse. Sam finds that the greenhouse has been broken into. The tomato plants have been damaged and many are missing. Blood is on broken plant pots and broken glass. A half-eaten tomato is on the greenhouse floor. Hairs, fibres, fingerprints and footprints are found in the greenhouse.

Sam has suspicions about three possible suspects.

The police collect evidence from the three suspects and Sam.

Suspect A also grows prize tomatoes. Suspect A has their right hand bandaged. Suspect A's greenhouse is full of tomato plants.

- The police obtain the following evidence from Suspect A: hairs, fibres, fingerprints, teeth marks, a cultured soil sample from a shoe, a shoe print, and tomatoes from suspect A's greenhouse.

Suspect B had an argument at the beginning of the week with Sam. Sam's dog had gone into Suspect B's garden and dug up newly planted strawberries. Police note there are scratches on Suspect B's hand, which Suspect B said were caused by Sam's dog. Suspect B also has a large basket of tomatoes in their kitchen. Suspect B said that the tomatoes were bought from the local greengrocer.

- The police collect the following evidence from Suspect B: hair, fibres, fingerprints, teeth marks, a cultured soil sample from a shoe, a shoe print, and tomatoes from suspect B's kitchen.

Suspect C has a history of antisocial behaviour. Back gardens and sheds have been damaged in the neighbourhood. Suspect C is linked to this damage. Police note that Suspect C is wearing a ripped jumper with red stains down the front.

- The police collect the following evidence from Suspect C: hair, fibres, fingerprints, teeth marks, a cultured soil sample from a shoe, a shoe print, and the ripped jumper.

The police collect the following evidence from Sam: hair, fibres, fingerprints, teeth marks, cultured soil sample from shoe, and shoe prints.

It is your job as a forensic biologist, to:

- Plan the crime scene investigation (Sam's greenhouse) and evidence analysis
- Investigate the crime scene and collect the evidence from Sam's greenhouse
- Analyse the evidence obtained from the greenhouse, and the evidence collected from the suspects and Sam
- Present the results and interpret the evidence.

Task 1

Plan the crime scene investigation and evidence analysis

Topic Areas 1, 2, 3 and 4 are assessed in this task.

The task is:

Explain the biological disciplines needed to investigate the crime scene.

Produce a working plan:

- To preserve the crime scene and collect the evidence
- To analyse the evidence from the scenario.

Your evidence **must** include:

- Written evidence
- A risk assessment using the risk assessment template

Use the assessment criteria below to tell you what you need to do in more detail.

Pass	Merit	Distinction
P1: Explain which potential forensic biology disciplines could aid the investigation.		
P2: Create a plan to preserve the crime scene and collect the evidence.	M1: Explain the choice of preservation and collection methods.	
P3: Create a plan to analyse the evidence from the scenario.	M2: Explain the choice of analytical techniques.	
P4: Complete a risk assessment for the crime scene investigation and evidence analysis.		

Assessment Guidance

This assessment guidance gives you information to meet the assessment criteria. There might not be additional assessment guidance for each criterion. It is only given where it is needed. You must read this guidance before you complete your evidence.

Assessment Criteria	Assessment guidance
P1	<ul style="list-style-type: none"> Students must recognise the potential evidence likely to be obtained from the crime scene, and the evidence collected from the individuals, identify the forensic biology disciplines required for the investigation, and then explain how each of the disciplines could aid the investigation.
P2	<ul style="list-style-type: none"> Students must show how they intend to preserve the crime scene through site restriction, notes and visual evidence and a suitable search pattern. Students must show how they will collect the evidence from the crime scene through the recovery of trace materials, together with the ways the evidence is packaged, labelled, stored, and transported.
P3	<ul style="list-style-type: none"> The evidence from the scenario is the evidence collected by the police from the individuals in the scenario.
M1	<ul style="list-style-type: none"> The focus of the explanation should only be on why the particular preservation, and collection methods chosen are appropriate based on the initial photographic or video evidence provided by the centre.
M2	<ul style="list-style-type: none"> The focus of the explanation should only be on why the particular analytical methods chosen are appropriate based on the initial photographic or video evidence provided by the centre.

Advice:

- Following the completion of **Task 1**, your teacher will need to ensure that your planned investigation is appropriate in terms of safety and for the circumstances of the centre.

Task 2

Investigate the crime scene and collect evidence

Topic Area 3 is assessed in this task.

The task is:

Use suitable methods and equipment to preserve, record and document the crime scene.

Your evidence **must** include:

- Suitable written and visual evidence demonstrating:
 - How the crime scene was preserved
 - How the collection of evidence was done
 - How the evidence was recorded, packaged, labelled and stored.
- Teacher Observation Record Form

Use the assessment criteria below to tell you what you need to do in more detail.

Pass	Merit	Distinction
P5: Preserve the crime scene.	M3: Explain the suitability of the preservation, and collection methods performed.	
P6: Use appropriate techniques to collect evidence from the crime scene.		

Assessment Guidance

This assessment guidance gives you information to meet the assessment criteria. There might not be additional assessment guidance for each criterion. It is only given where it is needed. You must read this guidance before you complete your evidence.

Assessment Criteria	Assessment guidance
P5	<ul style="list-style-type: none"> • Students should follow their plan created in P2 to preserve the crime scene. • Students should also record and document the crime scene to provide evidence of the preservation, including the location and condition of the biological evidence.
P6	<ul style="list-style-type: none"> • Students should follow their plan created in P2 to collect evidence from the crime scene. • The teacher observation record should indicate how safely students preserved and collected evidence from the crime scene. • The appropriate techniques include recovering, recording, packaging, labelling, and storing evidence from the crime scene.
M3	<ul style="list-style-type: none"> • This is an extension of P5. • Students must explain how suitable their methods of crime scene preservation and evidence collection were from their plan in P2 in achieving minimal contamination and disturbance of all the physical evidence. • Students must also include any adaptations that were required to their plan to preserve the crime scene and collect the evidence.

Task 3

Analyse the evidence

Topic Areas 2 and 4 are assessed in this task.

The task is:

Select and perform appropriate tests for the evidence obtained from the crime scene, and evidence collected from the suspects and the victim(s).

Your evidence **must** include:

- Written evidence
- A teacher observation record form

Use the assessment criteria below to tell you what you need to do in more detail.

Pass	Merit	Distinction
P7: Select appropriate techniques for the evidence.	M4: Explain how the integrity of the evidence is maintained.	D1: Justify the choice of techniques for the evidence.
P8: Perform observational analysis safely and skilfully.		D2: Evaluate the effectiveness of the risk assessment.
P9: Perform microbiological analysis safely and skilfully.		
P10: Record results of the analysis in suitable formats.		

Assessment Guidance

This assessment guidance gives you information to meet the assessment criteria. There might not be additional assessment guidance for each criterion. It is only given where it is needed. You must read this guidance before you complete your evidence.

Assessment Criteria	Assessment guidance
P7	<ul style="list-style-type: none"> Students must select appropriate observational and microbiological analytical techniques for the evidence obtained from the crime scene and for the evidence collected from the individuals.
P8	<ul style="list-style-type: none"> The teacher observation record form should comment on the safe and skilful use of observational analytical techniques performed by the student.
P9	<ul style="list-style-type: none"> The teacher observation record form should comment on the safe and skilful use of microbiological analytical techniques performed by the student.
P10	<ul style="list-style-type: none"> Formats could include tables and written descriptions with annotated sketches and photographs.
M4	<ul style="list-style-type: none"> Students must explain how the integrity of the evidence is maintained through the chain of evidence.
D1	<ul style="list-style-type: none"> This is an extension of P7. Students should use their understanding of the unit content to provide valid scientific reasoning for the choice of tests. Additional research is not required.
D2	<ul style="list-style-type: none"> Students must evaluate the effectiveness of the risk assessment in terms of how well the risk assessment protected them from physical, biological and chemical hazards.

Task 4

Review the evidence

Topic Area 4 is assessed in this task.

The task is:

Use the processed evidence to make a reasoned judgment about which individual(s) most closely matches each piece of evidence from the crime scene.

Your evidence **must** include:

- Written evidence

Use the assessment criteria below to tell you what you need to do in more detail.

Pass	Merit	Distinction
P11: Assess which individual(s) most closely matches each piece of evidence from the crime scene.	M5: Discuss the validity and the limitations of the analytical techniques conducted.	D3: Assess the relative importance of the results from the analytical techniques to the investigation.
	M6: Suggest appropriate improvements to the investigation.	D4: Discuss the effectiveness of the collection of evidence.
		D5: Justify improvements to increase confidence in the conclusions.

Assessment Guidance

This assessment guidance gives you information to meet the assessment criteria. There might not be additional assessment guidance for each criterion. It is only given where it is needed. You must read this guidance before you complete your evidence.

Assessment Criteria	Assessment guidance
M5	<ul style="list-style-type: none"> • Consideration should be given to the likelihood of false positives, the size and condition of each piece of evidence, the quality of preservation and storage methods prior to testing, and equipment used.
M6	<ul style="list-style-type: none"> • They should reflect on their approaches to Tasks 2 and 3 and consider the way contamination risks could be reduced, chain of evidence correctly maintained, and analysis of evidence improved.
D3	<ul style="list-style-type: none"> • This is an extension of P11. • Consideration should be given to the type of evidence: generic (class evidence) or unique (individual evidence) and the relative importance of each type of evidence.
D4	<ul style="list-style-type: none"> • Following the student's analysis from Task 3, students should make a reasoned judgment about: <ul style="list-style-type: none"> ○ the effectiveness of the recovery of trace materials, ○ the effectiveness of the preservation and storage of evidence to prevent contamination and degradation.
D5	<ul style="list-style-type: none"> • Students should consider which suggestions in M6 would improve confidence in the conclusions made in P11.

Teacher Observation Record Form for Task 2

Use this form to record what is observed.

Read the **guidance notes** below the form **before** you complete the form.

OCR Level 3 Cambridge Advanced National (AAQ) in Applied Science (Extended Certificate)

Unit number:	F185
Unit title:	Forensic biology
Task number:	2
Task title:	Investigate the crime scene and collect evidence

Student's name:	
Date the activity was completed:	

What extra evidence is attached to the form?	
--	--

The **teacher** fills in this section:

<p>What Assessment Criteria does this activity relate to?</p> <p>This activity relates to assessment criterion P6. For P6, you must comment on how safely students preserved, and collected evidence from the crime scenes.</p>	
<p>How does the activity meet the requirements of the Assessment Criteria?</p> <p>You must describe:</p> <ol style="list-style-type: none"> 1. what the student did 2. how it relates to the relevant Assessment Criteria 	
Teacher's name:	
Teacher's signature:	
Date:	

The **student** fills in this section:

I agree with my teacher's description of how I completed this activity		Yes <input type="checkbox"/>
Use this space to make any extra comments.		
Student's signature:		
Date:		

Guidance notes

Both the teacher **and** the student are responsible for completing this form.

The **teacher must**:

- use the form to describe in detail what they observed the student doing.
- give contextualised details of what the student did and how this relates to the Assessment Criteria.
- say how well the activity was completed in relation to the Assessment Criteria with reasons.
- share what they have written with the student and offer the opportunity to discuss if the student disagrees with what is written.
- reach agreement with the student before the work is submitted for moderation.
- sign and date the form as evidence of agreement.

The **student must**:

- reach agreement with the teacher before the work is submitted for moderation.
- use the form to show that they agree with the teacher's record of the activity observed.
- sign and date the form as evidence of agreement.

The form **must**:

- be accompanied by extra evidence, as required by the task.
- provide evidence that is individual to the student.

The form **must not**:

- contain a simple repeat of the Assessment Criteria.
- contain just a list of skills.
- be completed by anyone other than the teacher observing the activity and the student completing the activity.
- be written by the student for the teacher to sign.
- be used to evidence achievement of a whole unit or task in isolation.

Teacher Observation Record Form for Task 3

Use this form to record what is observed.

Read the **guidance notes** below the form **before** you complete the form.

OCR Level 3 Cambridge Advanced National (AAQ) in Applied Science (Extended Certificate)

Unit number:	F185
Unit title:	Forensic biology
Task number:	3
Task title:	Analyse the evidence

Student's name:	
Date the activity was completed:	

What extra evidence is attached to the form?	
--	--

The **teacher** fills in this section:

<p>What Assessment Criteria does this activity relate to?</p> <p>This activity relates to assessment criteria P8 and P9. For P8, you must comment on the safe and skilful use of observational analytical techniques performed by the student. For P9, you must comment on the safe and skilful use of microbiological analytical techniques performed by the student.</p>	
<p>How does the activity meet the requirements of the Assessment Criteria?</p> <p>You must describe:</p> <ol style="list-style-type: none"> 1. what the student did 2. how it relates to the relevant Assessment Criteria 	
Teacher's name:	
Teacher's signature:	
Date:	

The **student** fills in this section:

I agree with my teacher's description of how I completed this activity		Yes <input type="checkbox"/>
Use this space to make any extra comments.		
Student's signature:		
Date:		

Guidance notes

Both the teacher **and** the student are responsible for completing this form.

The **teacher must**:

- use the form to describe in detail what they observed the student doing.
- give contextualised details of what the student did and how this relates to the Assessment Criteria.
- say how well the activity was completed in relation to the Assessment Criteria with reasons.
- share what they have written with the student and offer the opportunity to discuss if the student disagrees with what is written.
- reach agreement with the student before the work is submitted for moderation.
- sign and date the form as evidence of agreement.

The **student must**:

- reach agreement with the teacher before the work is submitted for moderation.
- use the form to show that they agree with the teacher's record of the activity observed.
- sign and date the form as evidence of agreement.

The form **must**:

- be accompanied by extra evidence, as required by the task.
- provide evidence that is individual to the student.

The form **must not**:

- contain a simple repeat of the Assessment Criteria.
- contain just a list of skills.
- be completed by anyone other than the teacher observing the activity and the student completing the activity.
- be written by the student for the teacher to sign.
- be used to evidence achievement of a whole unit or task in isolation.

Risk assessment template

Name:	
Date of assessment:	

Crime scene investigation

Activity	Hazards	Risks	Control measures	Emergency measures

Evidence analysis

Activity	Hazards	Risks	Control measures	Emergency measures

NEA Command Words

The table below shows the command words that may be used in the NEA assignments and/or assessment criteria.

Command Word	Meaning
Adapt	<ul style="list-style-type: none"> Change to make suitable for a new use or purpose
Analyse	<ul style="list-style-type: none"> Separate or break down information into parts and identify their characteristics or elements Explain the different elements of a topic or argument and make reasoned comments Explain the impacts of actions using a logical chain of reasoning
Assess	<ul style="list-style-type: none"> Offer a reasoned judgement of the standard or quality of situations or skills. The reasoned judgement is informed by relevant facts
Calculate	<ul style="list-style-type: none"> Work out the numerical value. Show your working unless otherwise stated
Classify	<ul style="list-style-type: none"> Arrange in categories according to shared qualities or characteristics
Compare	<ul style="list-style-type: none"> Give an account of the similarities and differences between two or more items, situations or actions
Conclude	<ul style="list-style-type: none"> Judge or decide something
Describe	<ul style="list-style-type: none"> Give an account that includes the relevant characteristics, qualities or events
Discuss (how/whether/etc)	<ul style="list-style-type: none"> Present, analyse and evaluate relevant points (for example, for/against an argument) to make a reasoned judgement
Evaluate	<ul style="list-style-type: none"> Make a reasoned qualitative judgement considering different factors and using available knowledge/experience
Examine	<ul style="list-style-type: none"> To look at, inspect, or scrutinise carefully, or in detail
Explain	<ul style="list-style-type: none"> Give reasons for and/or causes of something Make something clear by describing and/or giving information
Interpret	<ul style="list-style-type: none"> Translate information into recognisable form Convey one's understanding to others, e.g. in a performance
Investigate	<ul style="list-style-type: none"> Inquire into (a situation or problem)
Justify	<ul style="list-style-type: none"> Give valid reasons for offering an opinion or reaching a conclusion
Research	<ul style="list-style-type: none"> Do detailed study in order to discover (new) information or reach a (new) understanding
Summarise	<ul style="list-style-type: none"> Express the most important facts or ideas about something in a short and clear form

We might also use other command words but these will be:

- commonly used words whose meaning will be made clear from the context in which they are used
- subject specific words drawn from the unit content.

Teacher/Technician Advice

OCR Level 3 Cambridge Advanced National (AAQ) in Applied Science (Extended Certificate)

Unit F185: Forensic biology

Scenario Title: Scientific Investigation Set A

Crime scene

Multiple crime scenes could be set up in a single classroom. Students should be working independently in the crime scenes.

Technicians will need to reset the crime scene(s) as appropriate; this will be dependent upon class size and number of crime scenes set up.

Students will need to be provided with detailed photos and/or video evidence of the staged 'crime scene' prior to beginning Task 1.

The scenario has a greenhouse as the main crime scene. The perpetrator of the crime should be one of the suspects.

Evidence that should be present in the greenhouse mock up:

- Hair
- Fibres
- Fingerprints
- Shoe prints - paper prints, plaster casts or imprints in a tray of soil
- Tomatoes on the vine or tomato plants (including a tomato with tooth prints)
- Blood – animal blood is readily available or “mock blood” could be used but blood-smear microscope slides would need to be made available on request
- Soil

There should be enough material for each student to collect and preserve a set of biological evidence from the crime scene.

Students will require:

- Crime scene tape – to secure the crime scene.
- Gloves
- Eye protection
- Shoe covers
- Overalls
- Hair coverings
- Masks
- Photo evidence rulers and scales (could be made rather than bought)
- Photo evidence ID cards (could also be made) each student would need a set, numbers 1 to 20 on the cards
- Paper

- Evidence bags – paper and resealable plastic, with chain of evidence labels on them (can be bought or made up).
- Sample tubes and polypots
- Spatulas for scraping any dried blood
- Cotton swabs/buds
- Distilled water or ethanol to collect smear of “blood” samples
- Brushes and aluminium powder for lifting fingerprints.
- Magnifying glass/loupe.
- Forceps.
- Lifting tape for hair, fibres, fingerprints.
- Scissors
- Luminol/LMG for presumptive blood tests.
- Teat pipettes

Students will need to also have access to photographic equipment to collect a visual record of the evidence and the “crime scene”.

Evidence from suspects

In the interest of time constraints, technicians will “collect and preserve” the evidence collected from the ‘police’. Students will analyse this evidence.

Some evidence could be used by more than one student, e.g. cultured samples.

Evidence should be presented to students in evidence bags, thereby demonstrating preservation. Evidence from hair, fibres, fingerprints, teeth, shoeprints and possibly microorganisms from soil are likely to direct the student to one suspect.

Fingerprints will be taken from the “suspects” using inkpads, rollers and fingerprint cards.

Teeth marks can be collected by impressions on polystyrene plates. Photographic evidence of bitten tomato may be useful, depending on how long the crime scene has been left out for.

Analysis of evidence

Students will require:

- Light microscopes
- Glass slides
- Cover slips
- Forceps for obtaining samples from the suspect evidence bags
- Teat pipettes for obtaining samples from the suspect evidence containers.
- Access to stains such as Methylene blue
- Filter paper
- Magnifying glasses and/or loupes.
- Stereomicroscopes
- Sterile nutrient agar plates – one per student
- Bunsen burner
- Heat proof Mat
- Spatula
- Chinagraph pencil or permanent marker
- Tape

- Bactericide
- Waste disposal bags
- Paper towels

N.B. Centres should conduct their own school-level risk assessment. Equipment is not totally descriptive and will be led by individual student plans

Technician time approximately 15 hours

Sample

Examine *with us*

- Build confidence supporting your students with assessment
- Enhance subject knowledge
- Great for professional development











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