CAMBRIDGE ADVANCED NATIONALS

CAMBRIDGE OCR

Sample assessment material

Cambridge Advanced National in

Applied Science

Cambridge OCR Level 3 Alternative Academic Qualification
Cambridge Advanced National in Applied Science

Certificate | H051
Extended Certificate | H151

F182: Investigating science

Version 5.0

ocr.org.uk/cambridge-advanced-nationals

Introduction

This is sample assessment material (SAM). It is an example Cambridge OCR-set assignment that we publish alongside a new specification to help illustrate the intended style and tasks of our set assignments.

We also produce two further specific resources to support you with using this SAM:

- An assessment story where we explain the research we have undertaken during the development of the qualification and how consultation with teachers, students and schools has helped shape our assessment approach.
- A student guide to NEA assignments in which we provide a summary for your students of key points about their Cambridge OCR-set assignments, including the importance of avoiding plagiarism.

Summary of updates

Section	Change	Version	Date
Throughout	New covering pages added.	5.0	June 2026
Task 1	Removal of the Teacher Authentication form requirement.		

Cambridge OCR-set Assignment

Sample Assessment Material

Cambridge OCR Level 3 Alternative Academic Qualification
Cambridge Advanced Nationals in Applied Science

Unit F182: Investigating science

Scenario Title: Scientific Investigation **Set A**

Valid for assessment from September 20XX to 20XX.
For use by students beginning the qualification in September 20XX.

This is a sample Cambridge 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 Cambridge OCR administrative codes linked to this unit are:

- unit entry code F182
- certification code H051/H151

The regulated qualification numbers linked to this unit are:

610/3947/0 610/3948/2

Duration

About:

- 20 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)

Contents

Information and instructions for Teachers

Using this assignment

The assignment provides three titles and a set of related tasks. Students are required to undertake a scientific investigation to explore one of these three titles with their own research question.

You can give this to students on or after 1 June 202X to help them understand it before they start using it for assessment. The dates for which students can use it for assessment are shown on the front cover.

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 unsupervised time allowed will be stated below and explained in the assessment guidance.

We have estimated that this assignment will take about 20 hours of supervised time and 5 hours of unsupervised time to complete. Students should need approximately:
- 5 hours to complete Task 1
- 6 hours to complete Task 2
- 5 hours to complete Task 3
- 4 hours to complete Task 4
- 5 hours to complete Task 5

You **must**:

- Use a Cambridge 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 5** 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 7** 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 7** 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 **Tasks 2, 3 and 5**. You **must** follow the guidance given when completing it.
- Question the student about the research completed, to be satisfied that the research was independently completed by the student.

You **must not**:

- Use live Cambridge 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 Cambridge OCR-set assignments or assessment criteria.

Information for delivering tasks

Task	Requirements
General	Students should have practised a variety of practical skills throughout Unit F182, in addition to the practical skills developed in Unit F180, to be able to select from the three titles. Only one title should be selected and explored by each student. Each student's investigation needs to be individual and unique from the rest of the cohort. Students may choose to explore similar research questions but, for example, investigate different dependent variables or use distinct methodologies.
Task 1	It is advised that teachers review the research question chosen by students to ensure that it meets the requirements of the assessment criteria and guidance. This full method must be checked by the teacher to ensure it is appropriate in terms of safety and for the circumstances of the centre. E.g. any chemicals or equipment chosen are safe for the student to use and that they are competent enough to use them to obtain sufficiently appropriate data for the investigation. The methodology will also need to ensure that the research question can be answered in an appropriate length of time.
Task 2	Appropriate control measures need to be clearly indicated and checked by the classroom teacher before any practical work is carried out.
Task 4	If students are unable to source secondary data due to the unique nature of the research question they have created, secondary data can be supplied by the centre to meet the requirements of **M7**.
Task 5	The defence of conclusions could be performed in front of peers or to a teacher. Students may find access to written notes, presentation slides or summary poster supportive in this task.

Pages 1-4 are for teachers only. Please do **not** give **Pages 1-4** to your students.

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

Tasks for students and assessment criteria

Unit F182: Investigating Science

Scenario Title: Scientific Investigation **Set A**

Valid for assessment from September 20XX to 20XX.
For use by students beginning the qualification in September 20XX.

Scenario

You will undertake a scientific investigation to explore **one** of the following titles with your own research question:

1. How vitamin C concentration varies in foods.

2. How the temperature affects the rate of a reaction.

3. How the surface a ball is dropped onto affects the bounce of the ball.

You must conduct your own investigation where you collect and analyse your own data.

Your investigation must focus on one independent variable that can be measured over a suitable range of values.

Task 1

Prepare for a scientific investigation

Topic Area 1 is assessed in this task.

The task is:

Prepare for your investigation.

Your evidence **must** include:

- A relevant section within your final investigation report.

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

Pass	Merit	Distinction
P1: Use research to **create** an appropriate research question from **one** of the given investigation titles. (PO4)	**M1: Explain** the scientific principles behind the investigation. (PO2)	**D1:** Use research to **explain** how the scientific principles behind the investigation relate to environmental, commercial, and industrial processes. (PO4)
P2: Construct a hypothesis, and a prediction. (PO2)		

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	• Teachers must discuss with students the research they completed independently to inform their research question, giving students the opportunity to say: o What research they completed o How they completed it o Why they used the research methods they did. • The research question must include one independent and one dependent variable, and an indication of how investigation will be performed (e.g. via titration, using gas syringe, colorimetry). • The data collected for both variables will need to be quantitative. • The research should include data that the student can use to help them create their research question, and to allow them to then make a comparison later on between this data and their collected data in **M7**. • The research element of this criterion does not need to be completed under supervised conditions.
M1	• Students must apply knowledge and understanding from Unit F180 to explain the scientific principles behind the investigation.
D1	• Students must explain how the scientific principles in **M1** and their research question in **P1** can relate to real world understanding or applications. Students must explain how the scientific principles behind the investigation relate to environmental, commercial, and/or industrial processes. • If any of environmental, commercial and/or industrial processes are not appropriate, students must explain why. • The research element of this criterion does not need to be completed under supervised conditions.

Advice:

- Remember to clearly reference any information used from books, websites or other sources to support your evidence.

Task 2

Plan the scientific investigation

Topic Area 1 is assessed in this task.

The task is:

Plan your investigation. This will include completing preliminary testing.

Your evidence **must** include:

- A Teacher Observation Record Form
- A relevant section within your final investigation report
- A risk assessment using the template provided.

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

Pass	Merit	Distinction
P3: Produce a plan for the full investigation which includes a method for the preliminary testing. (PO4)	**M2: Explain** the choice of equipment and variables for the full investigation. (PO2)	**D2: Justify** the plan using the data from the preliminary testing. (PO3)
	M3: Explain the choices for the preliminary testing aspect of your method. (PO2)	
P4: Use research to **complete** a risk assessment for your investigation. (PO4)		
P5: Present the outcomes of your preliminary testing. (PO4)		

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
P3	• Students must provide a step-by-step method that includes all of the equipment they wish to use, including sizes and quantities, personal protective equipment (PPE) as appropriate, and includes the number of repeats they will do. • There must be a separate section describing how the preliminary tests will be carried out. • They must state the control variables and account for how they will be controlled throughout the investigation. This could be in the form of a table.
P4	• The research element of this criterion does not need to be completed under supervised conditions.
P5	• A results table may be appropriate for most investigations, but qualitative descriptions are also suitable. • The teacher observation record form should comment on the independent collection of data from preliminary testing.
M2	• Students must consider how the equipment chosen will help with the collection of valid and high-quality data. • Students must explain why each variable (independent, dependent and control) was chosen for this investigation, and explain the range of value(s) they have decided to test.
M3	• Students must give reasons for the method and range of variables to be tested in the preliminary testing, and what information they expect to be useful for carrying out the full investigation.
D2	• Students must explain any decisions made about modifications to the original plan in relation to the preliminary testing. They must also account for any absence of modifications.

Advice:

- Following the completion of **Task 2**, your teacher will need to ensure that your planned investigation is safe and appropriate for you to do in your school laboratory.
- Remember to clearly reference any information used from books, websites or other sources to support your evidence.

Task 3

Collect and record results for the full investigation

Topic Area 2 is assessed in this task.

The task is:

Follow your method to collect and record results for the full investigation.

Your evidence **must** include:

- A Teacher Observation Record Form
- A relevant section within your final investigation report.

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

Pass	Merit	Distinction
P6: Complete the investigation by following your plan safely. (PO4)	**M4: Collect** data of sufficient quality to help answer the research question. (PO4)	
P7: Collect valid data following your plan. (PO4)		
P8: Record the data obtained in appropriate ways using correct conventions and units. (PO4)		

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
P6	• Students must follow their plan safely, including consideration of the control measures outlined in their risk assessment. • Students must be able to perform the task safely to achieve this criterion. Staff must intervene if safe working practices are not being followed but where this happens the criteria cannot be awarded. • The teacher observation record form should comment on the safe carrying out of the procedures.
P7	• Students must collect data about all of the variables discussed in the plan, i.e. also the control variables.
M4	• The teacher observation record form should comment on the skilful use of apparatus and the accuracy and precision of data collected.

Task 4

Process the data

Topic Areas 3 and 4 are assessed in this task.

The task is:

Process the data in full and propose conclusions based on the data obtained. You will also need to compare your data with appropriate secondary data.

Your evidence **must** include:

- A relevant section within your final investigation report.

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

Pass	Merit	Distinction
P9: Use standard mathematical skills to process data. (PO4)	**M5: Use** spreadsheets to appropriately process the data. (PO4)	**D3: Justify** the methods used to process and display data. (PO3)
P10: Use appropriate graphical representation(s) to display data. (PO4)		
	M6: Calculate percentage uncertainties for the investigation. (PO2)	**D4: Explain** the sources of error. (PO2)
P11: Write appropriate conclusions from the data obtained. (PO3)	**M7: Make** valid qualitative comparisons between primary and secondary data. (PO3)	

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
P9	• Students must use mathematical skills identified in the specification to process their data appropriately. • They must show at least one example of their full working out in the written evidence.
P10	• Appropriate trendlines and error bars should be included.
P11	• An analysis of the data is required to write appropriate conclusions. • A limited scientific explanation is required.
M5	• Students must use spreadsheet packages (e.g. Microsoft Excel) to calculate, for example, standard deviation. • Students can also use spreadsheets to help them process and represent data in **P9** and **P10**.
M6	• Students must calculate the percentage uncertainty on each piece of equipment used and the combined uncertainty for each repeat. • They must show their full working out in the written evidence.
M7	• Students must make a qualitative comparison between their collected data and one source of appropriate secondary data. • The secondary data should come from the research completed in **P1**.
D3	• Students must justify their methods for processing and displaying the data in their report, e.g. the type of graph used, any data they had identified as anomalous, positioning of lines of best fit, etc.
D4	• Students must account for any anomalous results or patterns in the data that do not appear to fit the hypothesis. • If there are no anomalous results, students must explain how they arrived at this decision. • This should be done qualitatively only.

Task 5

Present and review your investigation

Topic Areas 3 and 4 are assessed in this task.

The task is:

Present and review your investigation.

Your evidence **must** include:

- A Teacher Observation Record Form
- A relevant section within your final investigation report.

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

Pass	Merit	Distinction
P12: Explain the limitations of the data collected, including the method used to collect the data. (PO2)	**M8: Evaluate** the sources of information and secondary data. (PO3)	**D5: Justify** suggestions for any improvements that could be made. (PO3)
		D6: Assess the relevance of your investigation and data to environmental, commercial and industrial processes. (PO3)
P13: Present your conclusions. (PO4)		
P14: Defend your conclusions. (PO4)		

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
P12	• Students should also explain how well they were able to collect good quality data with the techniques and equipment chosen. • This should be supported by evidence collected during the investigation.
P13	• The research question should be presented, a brief explanation of the methods followed, and the data summarised. The extent to which the research question was answered should be justified. • This can be delivered to the assessor and/or peers.
P14	• The assessor should ask appropriate questions to enable the student to defend their investigation adequately. For example: o Were there any limitations that prevented the research question being answered in full? o Are you confident errors had little impact on your results? o Are your conclusions justified sufficiently by the data you collected? • The teacher observation record form should include the questions posed and comment on how well they were answered following the student's presentation in **P13**.
M8	• Students should include judgements on their confidence in the sources used throughout the investigation, e.g. those used to design the method, create the risk assessment, and the secondary data, with reference to reliability and validity.
D5	• Students should give valid reasons for improvements to the investigation that would improve the conclusion(s) or help answer the research question. • Processed data should be used to support any recommendations. • If no improvements can be recommended, then this needs to be explained using evidence from the investigation.
D6	• Students should provide reasons, based on the evidence collected during the investigation, about the relevance of conclusions made to environmental, commercial and industrial processes. • If any of environmental, commercial and/or industrial processes are not relevant, students must explain why.

Risk Assessment Template

Title of investigation	
Candidate Name	
Date Completed	

Hazardous chemical, procedure or equipment	Hazard	Risk	Control measures	Emergency measures
Example, ethanol (pure)	*Highly flammable*	*Both liquid and vapour can catch fire if exposed to naked flame or sparks*	*Keep lid on bottle, keep away from naked flame*	*Do not attempt to put out an ethanol fire with water. A foam extinguisher should be used or place a fire blanket or heatproof mat onto the flame.*

Include references for the sources of information used

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.

Cambridge OCR Level 3 Alternative Academic Qualification Cambridge Advanced Nationals in Applied Science (Certificate)/(Extended Certificate)

Unit number:	F182
Unit title:	Investigating science
Task number:	2
Task title:	Plan the scientific investigation

Student's name:	
Date the activity was completed:	

What extra evidence is attached to the form?	

The **teacher** fills in this section:

What Assessment Criterion does this activity relate to? This activity relates to assessment criterion **P5**. For P5, you must comment on the independent collection of data from preliminary testing.
How does the activity meet the requirements of the Assessment Criteria? You **must** describe: 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 ☐
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.

Cambridge OCR Level 3 Alternative Academic Qualification Cambridge Advanced Nationals in Applied Science (Certificate)/(Extended Certificate)

Unit number:	F182
Unit title:	Investigating science
Task number:	3
Task title:	Collect and record results for the full investigation

Student's name:	
Date the activity was completed:	

What extra evidence is attached to the form?	

The **teacher** fills in this section:

What Assessment Criteria does this activity relate to? This activity relates to assessment criteria **P6 and M4**. For P6, you must comment on the safe carrying out of the procedures for the full investigation. For M4, you must comment on the skilful use of apparatus and the accuracy and precision of data collected.
How does the activity meet the requirements of the Assessment Criteria? You **must** describe: 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 ☐
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 5

Use this form to record what is observed.
Read the **guidance notes** below the form **before** you complete the form.

Cambridge OCR Level 3 Alternative Academic Qualification Cambridge Advanced Nationals in Applied Science (Certificate)/(Extended Certificate)

Unit number:	F182
Unit title:	Investigating science
Task number:	5
Task title:	Present and review your investigation

Student's name:	
Date the activity was completed:	

What extra evidence is attached to the form?	

The **teacher** fills in this section:

What Assessment Criteria does this activity relate to? This activity relates to assessment criterion **P14**. For P14, you must comment on the questions posed to the student and comment on how well they were answered.
How does the activity meet the requirements of the Assessment Criteria? You **must** describe: 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 ☐
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.

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	• Change to make suitable for a new use or purpose
Analyse	• 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	• Offer a reasoned judgement of the standard or quality of situations or skills. The reasoned judgement is informed by relevant facts
Calculate	• Work out the numerical value. Show your working unless otherwise stated
Classify	• Arrange in categories according to shared qualities or characteristics
Compare	• Give an account of the similarities and differences between two or more items, situations or actions
Conclude	• Judge or decide something
Describe	• Give an account that includes the relevant characteristics, qualities or events
Discuss (how/whether/etc)	• Present, analyse and evaluate relevant points (for example, for/against an argument) to make a reasoned judgement
Evaluate	• Make a reasoned qualitative judgement considering different factors and using available knowledge/experience
Examine	• To look at, inspect, or scrutinise carefully, or in detail
Explain	• Give reasons for and/or causes of something • Make something clear by describing and/or giving information
Interpret	• Translate information into recognisable form • Convey one's understanding to others, e.g. in a performance
Investigate	• Inquire into (a situation or problem)
Justify	• Give valid reasons for offering an opinion or reaching a conclusion
Research	• Do detailed study in order to discover (new) information or reach a (new) understanding
Summarise	• 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.

Tell us what you think

Your feedback plays an important role in how we develop, market, support and resource qualifications now and into the future. We want you and your students to enjoy and get the best out of our qualifications and resources, but to do that we need your honest opinions to tell us whether we're on the right track or not.

You can email your thoughts to support@ocr.org.uk or visit our feedback page to learn more about how you can help us improve our qualifications.

Designing and testing in collaboration 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

---

Contact the team at:

01223 553998

ocr.org.uk

To stay up to date with all the relevant news about our qualifications, register for email updates at ocr.org.uk/updates

Visit our Online Support Centre at support.ocr.org.uk

Sign up for Teach Cambridge to access your planning, teaching and assessment support material.

CAMBRIDGE
UNIVERSITY PRESS & ASSESSMENT