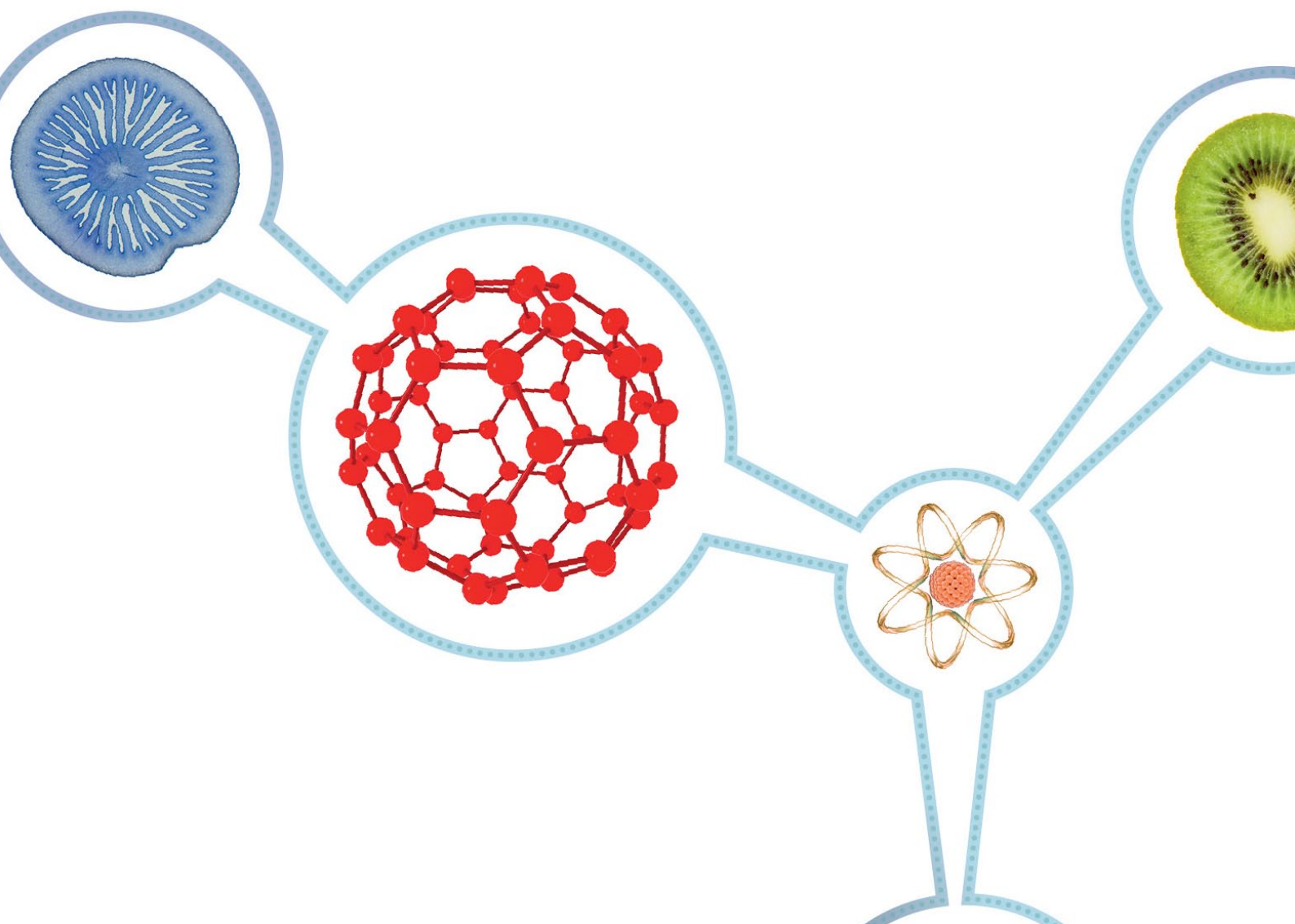


TWENTY FIRST CENTURY
SCIENCE SUITE

**Additional
Science A, Biology A,
Chemistry A and Physics A
GUIDE TO CONTROLLED
ASSESSMENT**

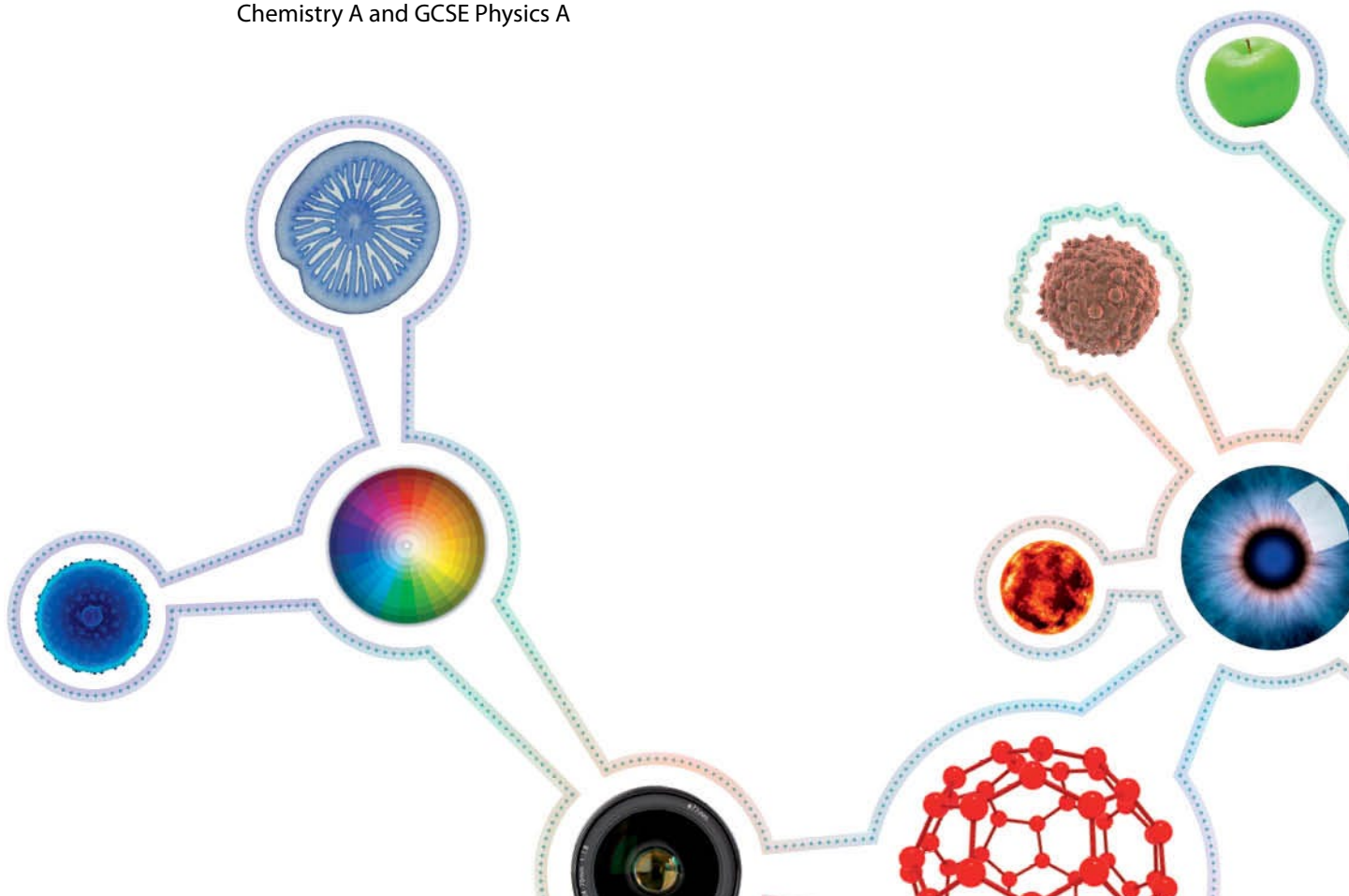
VERSION 1 SEPTEMBER 2012
www.gcse-science.com

This Guide provides information for teachers about how to manage controlled assessment. Some of the information is generic and applies to all GCSE subjects and some information provides subject specific guidance. It should be noted that this Guide plays a secondary role to the specification itself. All assessment is based on the specification, and it is this which defines what content and skills need to be covered in delivering the course. At all times, therefore, this Guide should be read in conjunction with the specification.



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SECTION A

INTRODUCTION

Controlled assessment is a new form of internal assessment. Following a review by QCA, controlled assessment has been introduced as part of nearly all new GCSEs, to replace coursework.

Controlled assessment provides candidates with opportunities to demonstrate skills that are difficult to assess in an examination environment while, at the same time, providing a degree of control appropriate to ensure reliability, authenticity and fairness in candidate assessment.

Levels of control are set and defined by Ofqual for each stage of a controlled assessment: task setting (high control), task taking (limited and high control) and task marking (medium control). For each stage, the level of control is set as high as possible for the skills assessed in order to ensure reliability and authenticity.

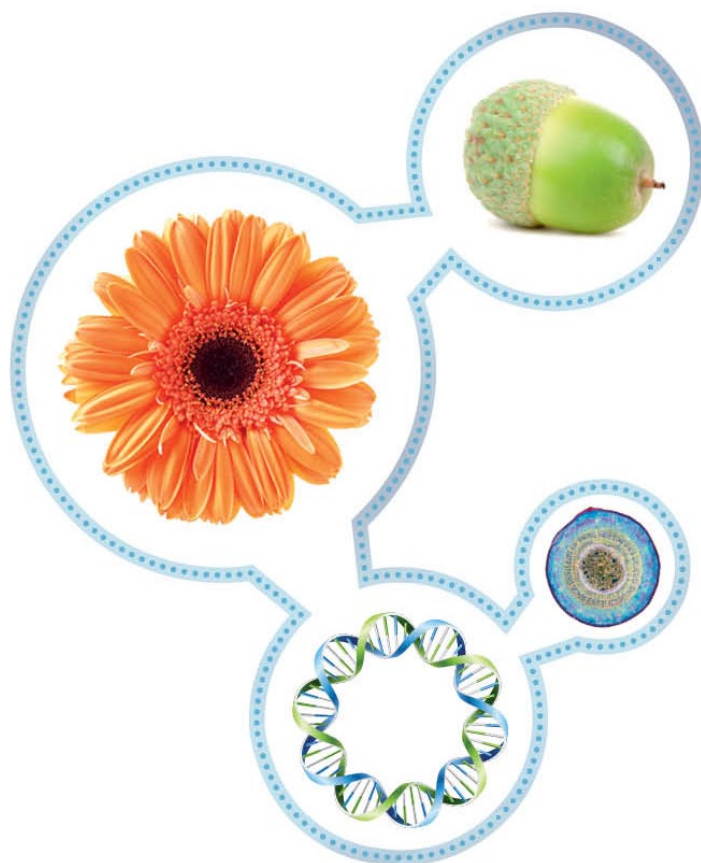
WHAT ARE THE LEVELS OF CONTROL?

Levels of control (high, medium and limited) define the environment within which each stage of a controlled assessment task is undertaken. This includes candidate supervision, teacher support, availability of resources, access to other materials, approximate timings and collaboration between candidates. QCA has produced guidance for each level of control, as follows:

- High control** - Candidates work independently under formal supervision. What teacher support is allowed is clearly indicated together with how this should be recorded. Resources available to candidates are specified and the use of materials from other sources is tightly prescribed. Approximate duration of the tasks is defined.
- Limited control** - Candidates complete work under limited supervision; this can include working away from the centre without direct supervision. Clear guidance on the requirements of the assessment, including the use of methods and materials from other sources, are clearly specified. Candidates may work with others but must provide an individual response. What teacher support is allowed is clearly indicated together with how this should be recorded. Guidance on appropriate time limits is given.
- Medium control** - Work is internally marked according to the marking criteria, and moderated by OCR.

THE WEIGHTING OF CONTROLLED ASSESSMENT

Weighting of controlled assessments is defined by the Ofqual subject criteria for GCSE Additional Science, Biology, Chemistry and Physics and is set at 25% of the total assessment.



SECTION B

SUMMARY OF CONTROLLED ASSESSMENT FOR GCSE TWENTY FIRST CENTURY ADDITIONAL SCIENCE A, BIOLOGY A, CHEMISTRY A AND PHYSICS A

The Twenty First Century Additional Science A, Biology A, Chemistry A and Physics A specifications are concept-led courses designed to meet the needs of candidates seeking a deeper understanding of basic scientific ideas. The courses focus on scientific explanations and models, and give candidates an insight into how scientists develop scientific understanding of ourselves and the world we inhabit. They provide an understanding of areas where scientific progress is most rapid, and of the interactions which lead to the response by society and individuals to new discoveries and ideas.

The controlled assessment tasks are intended to allow students to demonstrate their learning.

There is one task for the controlled assessment in Additional Science A, Biology A, Chemistry A and Physics A:

- **A Practical Investigation** of an issue in science. Investigations are central to the nature of science as an evidence-based activity and practical investigations provide an effective and valid assessment instrument for a course which is both a basis for further studies and for possible future careers in science.

Practical investigations draw together the skills of predicting and planning, and collecting, interpreting, evaluating and reviewing primary and secondary data within the context of

a whole investigation.

Each candidate must carry out a Practical Investigation. Although the tasks will be set by OCR, the tasks will be presented in a way which leaves some freedom for each centre to vary the approach slightly, to allow for candidates with a range of abilities and interests, and/or for differences in the materials, equipment and facilities that centres have.

The controlled assessment process consists of three stages:

STAGE 1: TASK SETTING (HIGH CONTROL)

All controlled assessment tasks are set by OCR. Each June, new controlled assessment tasks will be made available, two years ahead of the examination series in which they are to be submitted.

STAGE 2: TASK TAKING (LIMITED AND HIGH CONTROL)

controlled assessment tasks will take place in distinct phases, with time for research, planning and collection of data (primary and secondary), followed by analysis, evaluation and review.

During task taking, limited control (research and data collection) and high control (task setting, analysis and evaluation of findings) levels are applied. These are summarised below:

	Limited level of control	High level of control
Conditions under which the task is taken	Candidates can work without direct teacher supervision, and away from the centre.	Candidates must work under direct teacher supervision.
	Candidates can work in groups, but must provide an individual response.	Candidates must complete work independently.
Use of resources	Candidates can collaborate to collect information.	The use of information, including material from other sources, is controlled tightly.
Guidance permissible	Information specific to the task can be discussed with the class.	Any guidance given should be generic only.

Timings for carrying out the controlled assessment tasks are shown in this Guide and in the specification. Whilst approximate, these timings should be reasonably matched to the allocation of whole lessons. For example, allowing time at the start and end of lessons for setting up and tidying away, an allocation of four, 1-hour lessons could reasonably be matched to an approximate timing of 3 hours.

STAGE 3: TASK MARKING (MEDIUM CONTROL)

Tasks are marked internally and subject to internal standardisation by the centre. The tasks are then moderated externally by an OCR Moderator, in line with Code of Practice requirements.

THE PRACTICAL INVESTIGATION

The Practical Investigation task requires candidates to:

- develop hypotheses and plan practical ways to test them including risk assessment
- manage risks when carrying out practical work
- collect, process, analyse and interpret primary and secondary data including the use of appropriate technology to draw evidence-based conclusions
- review methodology to assess fitness for purpose
- review hypotheses in the light of outcomes.

Each year, OCR will provide a choice of Practical Investigation tasks. The support materials for these will encourage teachers to work with whole class groups to develop practical ways to test the chosen hypothesis.

Candidates will need to:

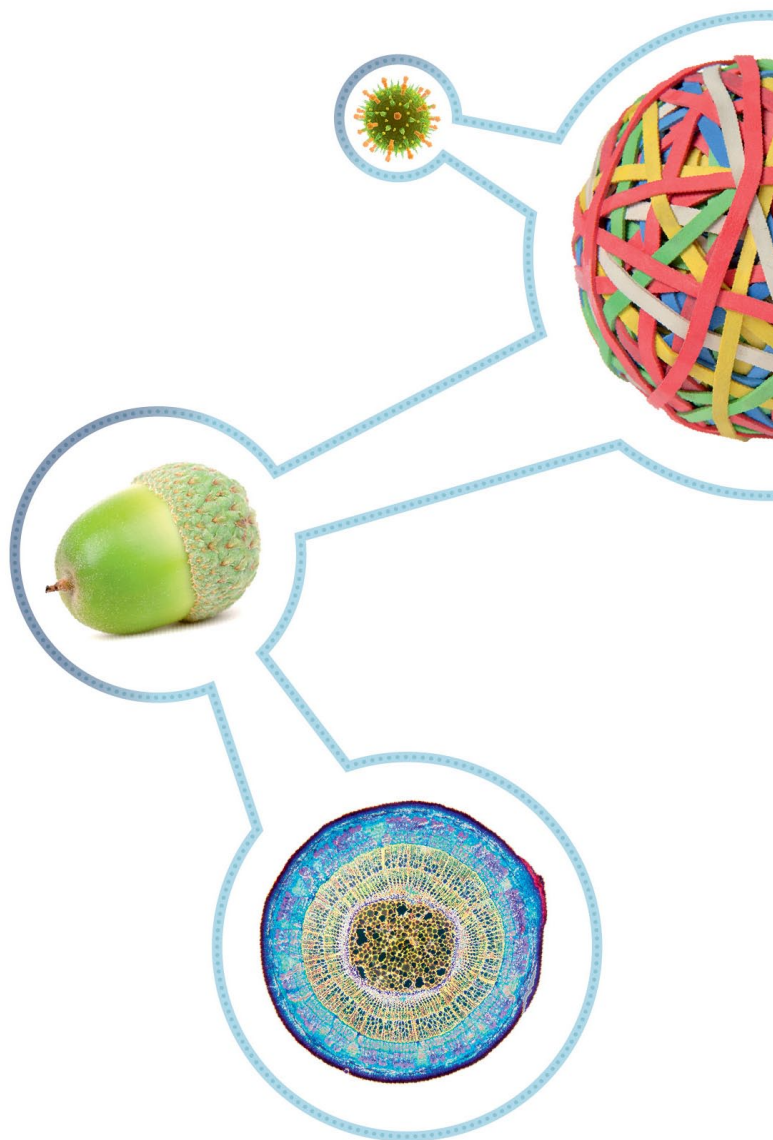
- record a risk assessment for the procedures they will use
- write a method for the procedures used
- record and present data collected
- draw evidence-based conclusions
- evaluate the quality of the data collected and review the effectiveness of their practical procedures
- relate their findings to the confidence they have in the hypothesis, and plan for further work.

Each Practical Investigation task assesses both scientific knowledge and understanding of the topic, and the ability to apply Ideas about Science (see Appendix B in the specification), in particular:

- IaS1: Data: their importance and limitations
- IaS2: Cause-effect explanations
- IaS3: Developing scientific explanations
- IaS5: Risk.

The time required to complete a Practical Investigation task will be approximately 4.5 - 6 hours. The final piece of work is produced in the centre under conditions of high control, which means that candidates work individually to complete their reports under direct teacher supervision. Teachers must be able to authenticate the work and there must be acknowledgement and referencing of any sources used.

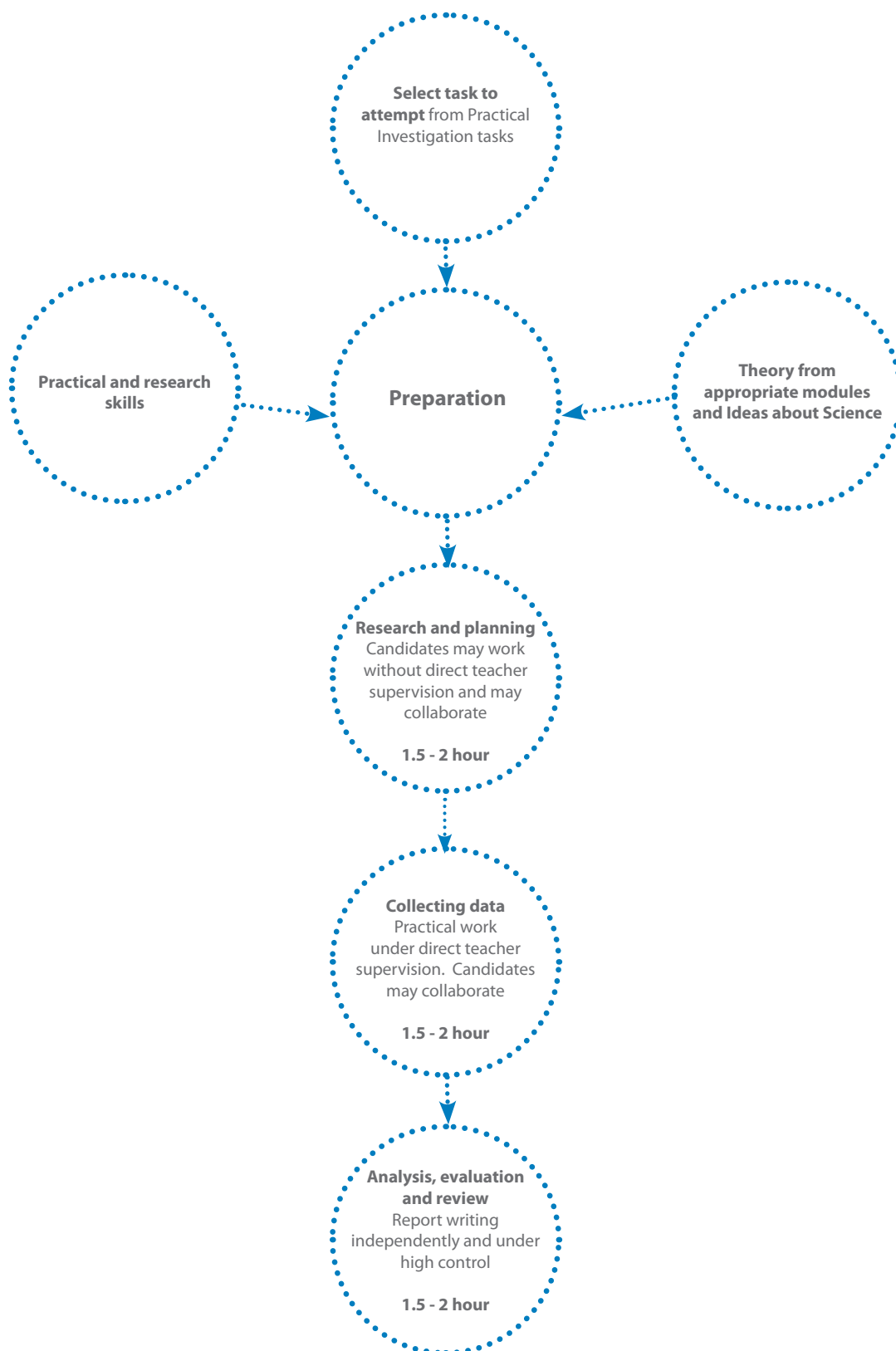
Each year, a choice of Practical Investigation tasks will be offered; at least two for each subject area of Biology [Modules B1 – B7], Chemistry [Modules C1 – C7] and Physics [Modules P1 – P7]. Within each subject area, one of the tasks will always be based on the Additional Science Modules B4 – B6, C4 – C6 and P4 – P6. Tasks will be made available two years ahead of the examination series in which they are to be submitted. It is not necessary for all candidates from a centre to carry out the same task.



SECTION C

GETTING READY FOR CONTROLLED ASSESSMENT

FLOW CHART SHOWING HOW TO RUN THE PRACTICAL INVESTIGATION FOR GCSE ADDITIONAL SCIENCE A, BIOLOGY A, CHEMISTRY A AND PHYSICS A



CHOICE OF CONTROLLED ASSESSMENT TASK

OCR will assume a high level of control in relation to the setting of tasks. The controlled assessment unit comprises one task - a Practical Investigation. At least six task titles will be available for the Practical Investigation, for submission in any given year. A minimum of two will correspond to each of Biology (Modules B1 – B7), Chemistry (Modules C1 – C7) and Physics (Modules P1 – P7).

These tasks have been designed to meet the full assessment requirements of the controlled assessment for GCSE Additional Science A, GCSE Biology A, GCSE Chemistry A and GCSE Physics A. Candidates will need to take part in a planned learning programme that covers the underpinning knowledge and skills.

Centres must choose from the task titles offered by OCR. The tasks will each be specific for submission in one year only. A candidate wishing to re-sit in a subsequent year will have to choose from the new task titles for that year.

The same OCR controlled assessment tasks must NOT be used as practice material and then as the actual live assessment material. Centres should devise their own practice material using the OCR specimen controlled assessment tasks as guidance, if they wish to do so.

WHEN AND HOW TO GIVE CONTROLLED ASSESSMENT TASKS TO CANDIDATES

Controlled assessment units are only available for assessment in the June examination series. Furthermore, each individual task is only valid for submission in a single examination series. This is clearly marked on the front cover of each task. Tasks submitted for assessment must be appropriate to the examination series in which they are entered. Tasks are not valid for submission in any other examination series.

Controlled assessment tasks will be available to download from OCR Interchange; teachers without direct access to Interchange should ask their Examinations Officer to download the task materials for them.

Controlled assessment tasks will be made available from Interchange in June, two years ahead of the valid submission date. This is to enable effective management of practical work preparation and Health and Safety requirements. However, this means that tasks will be simultaneously available for two examination series and care must be taken to ensure that the tasks valid for the required series of submission are selected.

It is the responsibility of the centre to ensure the correct task titles are used depending on when they plan to submit the candidates' work.

Controlled assessment tasks should be given to candidates at an appropriate time following the delivery of the relevant specification content and the teaching of the skills.



SECTION D**PREPARING AND MANAGING A PRACTICAL INVESTIGATION TASK****PREPARATION FOR THE PRACTICAL INVESTIGATION**

The controlled assessment materials for each Practical Investigation task comprise the following documents:

- Information for teachers
- Information for candidates (1)
- Information for candidates (2)

The 'Information for teachers' is confidential to teachers and it is not permitted for candidates to have access to this document. The document provides generic guidance on various aspects of the task, including preparation of candidates, as well as task specific guidance on the underpinning specification content and any specific assessment issues. It also includes a section for technicians and teachers identifying suggested apparatus for the tasks and any particular issues with carrying out the practical work.

The document 'Information for candidates (1)' provides an introduction to the topic of the investigation, placing the work into an appropriate wider context. It should be issued to candidates at the start of the task.

The document 'Information for candidates (2)' provides some secondary data for analysis. It should be issued to candidates only after completion of the collection of primary data by the candidate.

Each of the Practical Investigation tasks provided is related to the content of the GCSE Additional Science A, Biology A, Chemistry A or Physics A specifications, and may be based on any module within the specifications. At least one investigation, of those available for each examination, will be based on each of Modules B4 – B6, C4 – C6 and P4 – P6. The 'Information for teachers' for any particular task will identify the specific modules relevant to that task. This will enable teachers to plan the best time for candidates to undertake a particular Practical Investigation task, to ensure that candidates are familiar with the underlying science knowledge and understanding, including Ideas about Science (see Appendix B in the specifications).

The Practical Investigation task requires candidates to take part in an investigative task in which they develop a testable hypothesis and then collect first hand data and secondary data to test their hypothesis.

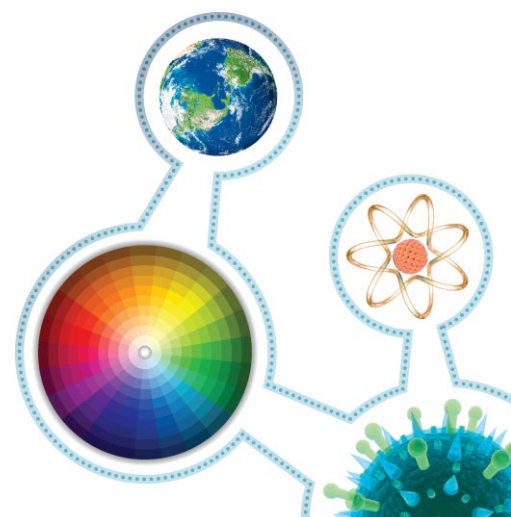
A scientific hypothesis is a tentative explanation of science-related observations, or some phenomenon or event.

Candidates are required to plan an experiment to test their hypothesis, and useful general preparation will involve

providing learning activities to:

- understand the word 'hypothesis'
- consider ways of testing hypotheses
- develop skills to find relevant sources of information, and evaluate the quality and relevance of these information sources
- develop skills in the selection of methods, equipment and techniques to carry out practical investigative work, and
- apply Ideas about Science, in particular (but not limited to):
 - IaS1: Data: their importance and limitations
 - IaS2: Cause-effect explanations
 - IaS3: Developing scientific explanations
 - IaS5: Risk.

More specific preparation will involve the teaching of the relevant science content (the teaching module concerned is indicated clearly in the Information for teachers), and scientific techniques and methods appropriate to work in this area.



RESEARCH AND PLANNING FOR THE PRACTICAL INVESTIGATION

(Approximate time: 1.5 - 2 hours)

This task requires candidates to take part in an investigative task in which they develop a hypothesis and then collect first hand and secondary data to test their hypothesis. The topic for the investigation is provided in the document 'Information for candidates (1)'.

The topic is based on underlying science that is accessible to candidates within the content of the appropriate GCSE specification (Additional Science A, Biology A, Chemistry A or Physics A). This science may, at times, be supplemented with specific additional material provided in the 'Information for teachers' or 'Information for candidates (1)'.

For example, a topic for the Practical Investigation could be the factors that affect the energy output of burning fossil fuels. In this case, supplementary information on the calculation of the energy required to heat water would be provided to candidates, as some might use this in their completion of the task at the required level.

During the research and planning phase, a **limited level of control** is required, and candidates are permitted to work in collaboration, although they will still need to be able to demonstrate an individual response. They can also work without direct teacher supervision and away from the centre, as required.

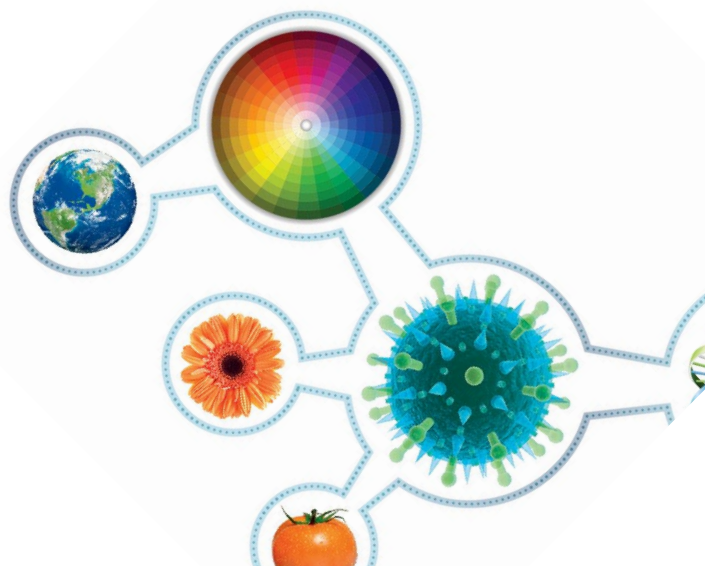
The teacher should introduce the topic and remind candidates of the contexts within which they have studied related content and ideas. This may include teacher-led class discussion of what factors could be varied, measured or controlled, and possible ways of doing this. Candidates should then develop their own hypothesis to be tested. Tasks are sufficiently open-ended to allow a variety of approaches.

The teacher can advise on how the task can be approached, resources and the key components that will contribute to the candidates' final piece of work. Candidates will then develop a plan to test the hypothesis, including a risk assessment.

It may be advisable to review the availability of secondary data, before embarking on a particular hypothesis.

If, at the end of this process, some candidates have not produced a method suitable for them to engage fully in the task, or intend to pursue a method that is impracticable or likely to be hazardous, they should be provided with one.

In these circumstances, any plan that the candidate has completed should be collected in and stored securely prior to issuing a plan to the candidate. The original plan can then be assessed and appropriate credit given for Strand S(b). If this is not possible, then the maximum mark awarded to a candidate provided with a method in Strand S(b) will be 1 or 2 marks. Candidates' work should be annotated to indicate what has happened.



COLLECTING DATA FOR THE PRACTICAL INVESTIGATION

(Approximate time: 1.5 - 2 hours)

During the collecting data phase, a **limited level of control** is required, and candidates are permitted to work in collaboration, but all candidates must be actively involved. Candidates also need to develop their own response in determining how best to collect and record data. Candidates will carry out practical work under direct teacher supervision.

A suitable work folder should be provided for each candidate, in which notes on their experimental methods, along with data collected and other information, may be kept, making it easier to check progress and see where information is coming from.

It should be noted that it is not permitted for candidates to base the collection of primary data solely on data from a demonstration or computer simulation.

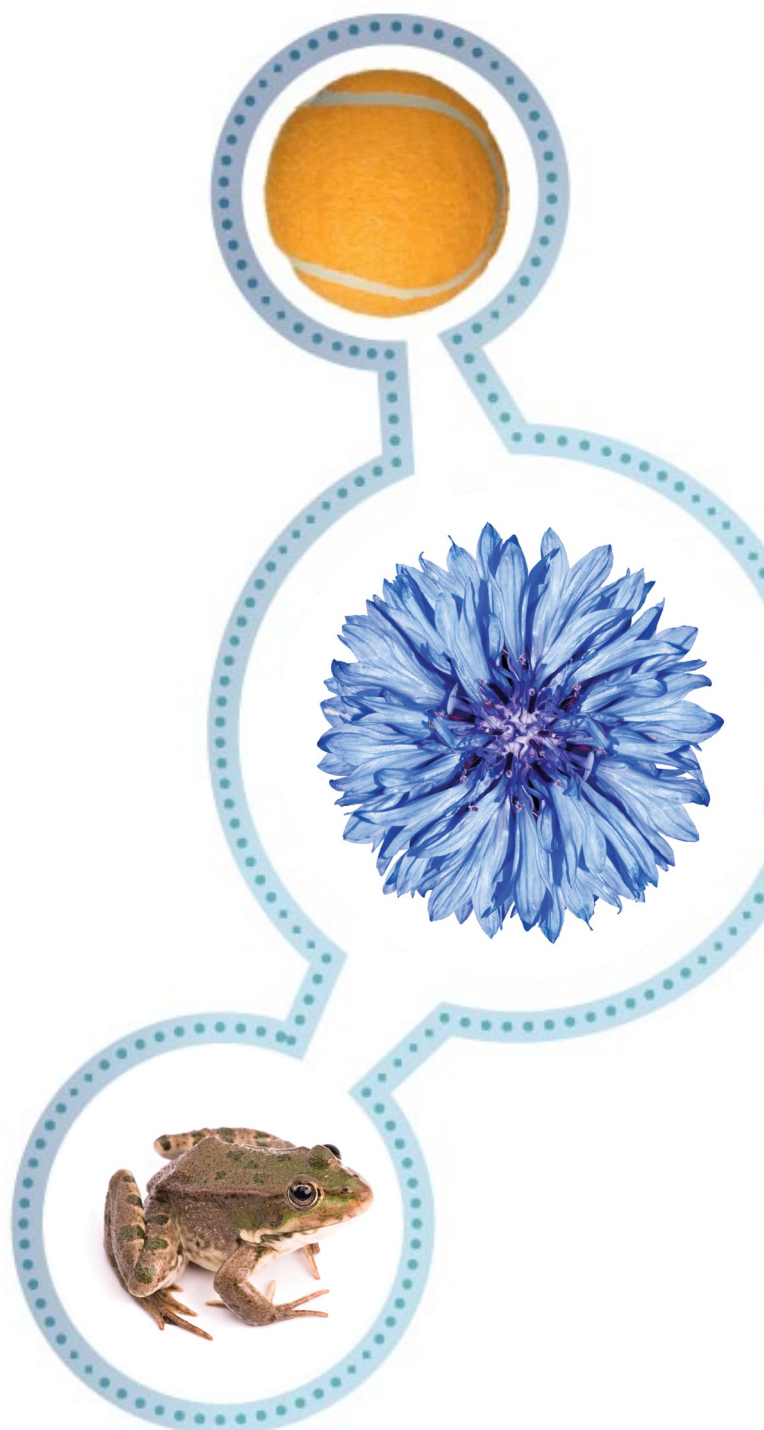
The collection of secondary data is also under a **limited level of control**. Secondary data may take many forms including: other candidates' results, computer simulations and published sources such as textbooks, journals and the internet.

It is essential that any secondary data is appropriately referenced, and candidates should learn how to reference information sources using one of the accepted conventions.

While, for scientific writing, the Harvard System is usually the preferred convention, candidates may find the use of the Vancouver System more conducive to their referencing of information sources, as it uses a numbering system sequential in the report.

	Harvard System	Vancouver System
referred to in text	text (author[s], year)	text [numbered reference – 1, 2, 3, etc]
cited in list of references	Author[s] (date). Title of book. Publisher. The references are listed in alphabetical order, according to the authors.	1. Author(s). Title of book. Publisher: Date. The references are listed in the order in which they are used.

Candidates should be encouraged to write out the URLs of websites in full. If it is not possible to indicate a date of publication of material on a website, then the date the website was accessed should be indicated in the list of references.



ANALYSIS, EVALUATION AND REVIEW FOR THE PRACTICAL INVESTIGATION

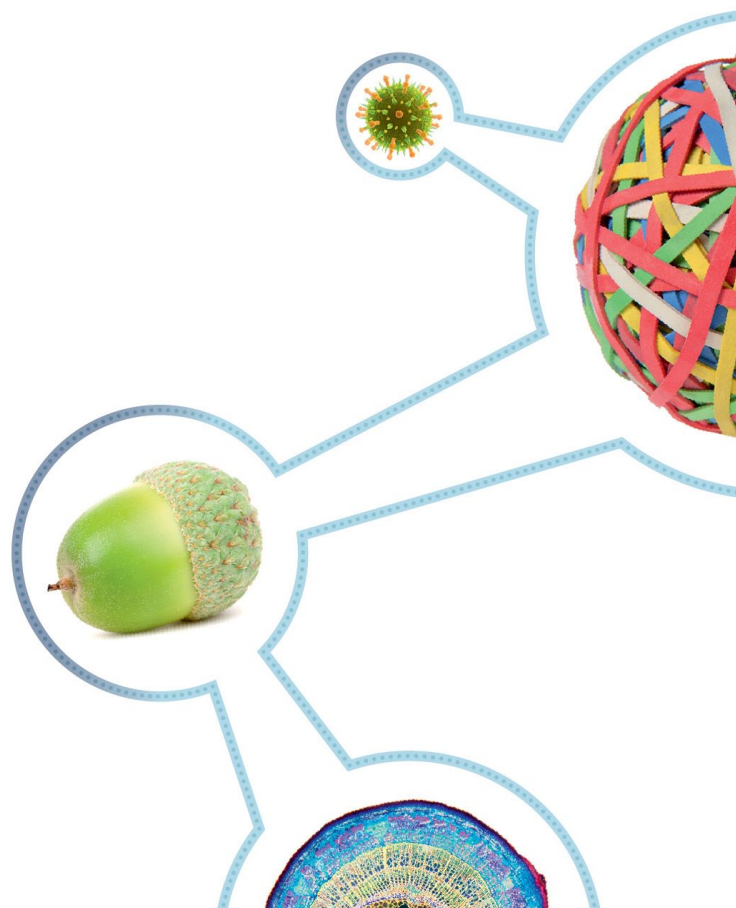
(Approximate time: 1.5 - 2 hours)

During the analysis, evaluation and review phase, a **high level of control** is required. Candidates should work individually, under direct teacher supervision, to complete their reports. Ideally, reports should include an introduction to the hypothesis which has been tested. At this stage, as at other stages, the candidates are allowed access to the Marking Criteria (see Appendix B), but can be given generic guidance only.

Candidates may incorporate into their reports descriptions of their hypothesis development, method, tables of results and graphs that have been prepared previously.

However, it is **not** permitted for candidates to make use of text that they have prepared themselves involving their own analysis, evaluation and review. Such sections must be written by candidates under conditions of **high control**, with reference to materials collected previously.

If report writing extends over more than one session, work (including partially completed reports and electronic data storage devices) must be collected in. In all cases, the teacher must be able to authenticate work submitted for assessment.



SECTION E

TEACHER GUIDANCE ON TASK MARKING

GENERIC GUIDANCE ON HOW TO MARK CONTROLLED ASSESSMENT TASKS

The starting points for marking the Practical Investigation tasks are the relevant Marking Criteria grids, found within Section 5 of the specifications. These contain level descriptors for the skills, knowledge and understanding that the candidate is required to demonstrate. OCR will provide separate exemplification of the application of the marking criteria through real or simulated candidate work, which will help to clarify the level of achievement the assessors should be looking for when awarding marks.

Furthermore, the document 'Information for teachers' will provide some specific pointers for individual tasks where particular issues are identified that require further clarification. However, these will be very limited in nature to ensure that candidates are credited for a range of approaches that satisfy the marking criteria, rather than having to follow a specific route.

Candidates' progress through the Practical Investigation task is assessed in five strands, each of which corresponds to a different type of performance by the candidate. Three of the five strands include two different aspects of the work.

Thus, marking is based on a total of eight aspects, each of which is shown as a different row in the grid of marking criteria. For each aspect, a hierarchical set of four marking criteria shows typical performance for candidates working at four different mark levels. This provides a level of response mark scheme where achievement is divided into four non-overlapping bands.

Award of marks in each row of the grid is based on the professional judgement of the teacher and is hierarchical. This means that each of the criteria is considered in turn, working up from the lowest band to the highest band that is fully matched by the candidate's performance. Once a band has been reached which is not fully matched by the work seen, no higher bands can be considered.

For all strands of the Practical Investigation, each aspect is marked on a scale of 0 – 8 marks, with each of the four bands covering a range of two marks: 1–2, 3–4, 5–6 and 7–8. Within each two-mark band, the higher mark is available where the performance fully matches the criterion for that mark band (and all preceding, lower mark bands). The lower mark is awarded where the candidate has partially, but not fully, matched this criterion and has exceeded the criteria in the preceding, lower mark bands.

Where there is no evidence of engagement with an aspect of the work, or if the response is not sufficient to merit award of one mark, a mark of zero is awarded for the aspect.

This method of marking can be used even where there is wide variation in performance between different aspects of the work. Weak performance on one aspect need not limit marks in other aspects.

In strand A of the Practical Investigation, two alternative routes to credit are provided. One row of criteria is used for investigations where the candidate uses graphical display or charts to reveal patterns in the data. The other row is used where the candidate has used statistical or algebraic methods to identify patterns. Only the row which gives the highest mark is counted. However, the requirements of the hierarchical mark scheme can be satisfied by crossing from one row to the next to demonstrate continuous progression through this strand.

The level awarded in each aspect is recorded on a marking grid, which also serves as a cover sheet if the work is called for moderation.

The total for the assessment is the sum of all the aspect marks, giving a maximum possible mark of 64.

INTERPRETATION OF THE CONTROLLED ASSESSMENT MARKING CRITERIA THE PRACTICAL INVESTIGATION TASK

Strand S: Strategy

Aspect S(a): Formulating a hypothesis or prediction (0 – 8 marks)

In this strand candidates review factors that might affect their results and use their scientific knowledge to develop a testable hypothesis and/or prediction.

Quality of written communication will be assessed in this strand, alongside the science content. The quality of written communication is based solely on the candidates' work for this strand, S(a).

In the 1-2 mark range, candidates will make a simple prediction, usually with no or very limited justification. There will be little use of scientific vocabulary, and frequent errors on spelling, punctuation and grammar are acceptable.

For 3-4 marks, candidates will use their previous experience or common sense to make a testable prediction. There will

be little reference to detailed scientific knowledge and understanding. Candidates will do this using some reference to science, and using some scientific terms. Spelling, punctuation and grammar may be of variable quality.

In the 5-6 mark range, candidates will develop a testable hypothesis based on consideration of the major factors involved in the topic and some scientific knowledge and understanding. The information will be organised effectively, and use specialist scientific terms appropriately. Spelling, punctuation and grammar will be sound.

For 7-8 marks, candidates will consider all the relevant factors and develop a testable hypothesis from which a quantitative prediction will be made. The candidate will make full and effective use of scientific terminology. The report will be comprehensive, relevant and logically sequenced, with few, if any, grammatical errors.

Note that to achieve 2, 4, 6 or 8 marks, the candidate has to fully satisfy the relevant descriptor on both science and Quality of Written Communication (QWC) within the relevant two-mark band. In instances where marks do not fall in the same two-mark band, centres should continue to carefully follow the procedure for applying the marking criteria. This requires that the highest band that is fully matched by the candidate's work is identified initially. To be fully matched, both the science and the QWC must be fully met in this marking band, and all preceding marking bands. Once the highest band that is fully matched is identified, consideration can then be given as to whether this descriptor is, in fact,

exceeded so that the next highest marking band is partially achieved. If this is the case, then the lower mark in the next marking band might be appropriate. Thus, for example, a candidate with a rather variable standard of spelling, punctuation and grammar who has used some scientific terms (matching QWC of level 3-4) and who has reviewed the major factors and used scientific knowledge to develop a hypothesis can still achieve a mark of 5 for this strand.

Aspect S(b): Design of techniques and choice of equipment (0 – 8 marks)

Candidates' choice of equipment and techniques will depend upon the contextualisation of the task by centres and the choice of hypothesis made by candidates.

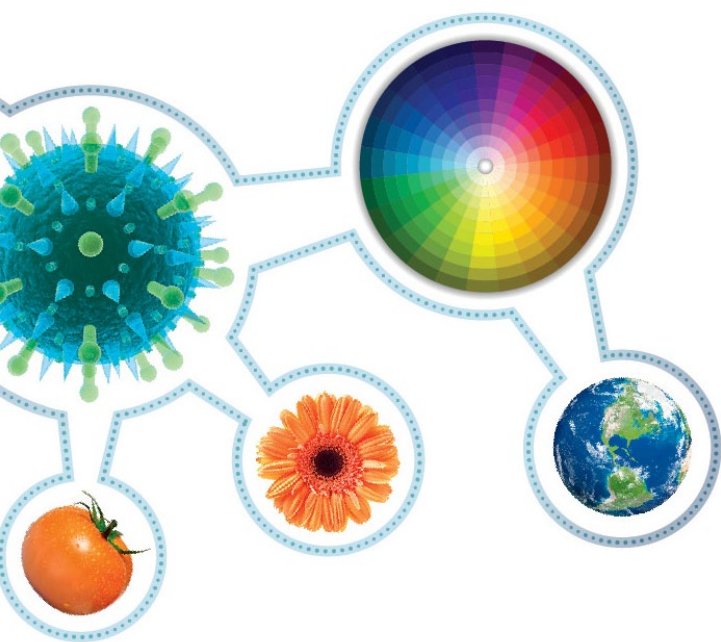
For 1-2 marks, the candidate will follow a given technique, but with poor accuracy and precision. These candidates will make a simple comment about taking care when handling equipment, chemicals or biological material, but without linking this to appropriate risks.

Candidates who have been provided with a method because they have failed to fully engage in the task, or have intended to pursue a method that is impracticable or likely to be hazardous, will be working at this level (or below) if there is no secure evidence of the candidate's own plan that can be assessed. However, if the candidate's own plan was collected in and stored securely prior to issuing a method, credit may be awarded as appropriate to the candidate based on the available evidence. In either of these situations, the centre should add the appropriate annotation to the candidate's report.

For 3-4 marks, candidates will choose and use basic equipment. They will show some understanding of the need for repeating measurements, but repeats made may be inadequate. These candidates will identify the hazards involved with the use of equipment, chemicals or biological material.

For 5-6 marks, candidates will choose and use techniques and equipment to collect an appropriate range of good quality data. They will explain the ranges chosen. Having identified significant risks, candidates working at this level will suggest some precautions to minimise these.

For 7-8 marks, candidates will justify their choice of method, equipment and range of values and will collect high quality data which is both precise and valid. Candidates will produce a 'full' and 'appropriate' Risk Assessment. A Risk Assessment that is full includes all the potential hazards, even if these are considered of minimal risk, and in the case of a chemistry-



based experiment, a consideration of products made as well as reactants. Ways in which risks are minimised should be fully identified.

An 'appropriate' Risk Assessment is one where a true assessment of the hazards and risks is made to the chemicals, material or equipment used. For example, the hazard and risk cited for an acid should correspond with the specific concentration being used.

Strand C: Range and quality of primary data (0 – 8 marks)

In Strand C candidates make decisions about the amount of data to be collected for the range of values and effective checking for reproducibility.

For 1-2 marks candidates will collect and record limited data, for example isolated data points, with no evidence of checking for repeatability. The data will generally be of low quality.

In the 3-4 mark range an adequate range of data will be collected and recorded, possibly with some errors in units or labelling of data and limited evidence of checking repeatability. The data will be of variable quality.

For 5-6 marks the data collected will be correctly recorded with correct units and labels. It will cover the range required to test the hypothesis and will show evidence of regular repeats or checks for repeatability. The data will generally be of good quality.

In the 7-8 mark range the data points tested are well chosen across the range, with regular repeats and appropriate handling of outliers (e.g. a further repeat of the outlier). Data is assessed for quality and repeats (or preliminary work) are used to adapt the range and number of data points to ensure data of high quality.

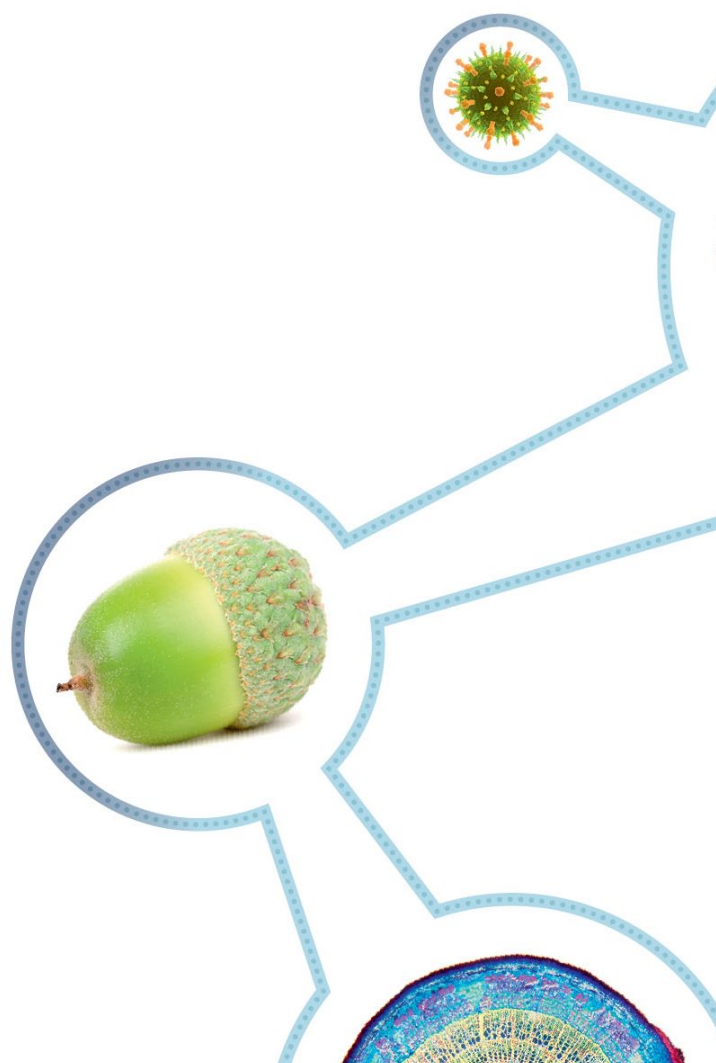
Strand A: Revealing patterns in data (0 – 8 marks)

In strand A, two alternative routes to credit are provided to allow access to a wider range of activities. The upper row of the marking criteria for Strand A relates to graphical display, and the lower row to a numerical or statistical analysis of the data.

For assessing the quality of **graphical display** the use of a spreadsheet package to draw graphs does not preclude the award of higher marks, as some skill is required to draw a graph of appropriate scientific validity. Hand-drawn graphs

and computer generated graphs are therefore assessed on exactly the same criteria. However, centres should note that graphs which are printed out at very small size, with incomplete labelling, or with only partial grids or no grid, cannot score 8 marks. Furthermore, graphs joined point-to-point, or with an inappropriate line of best fit, will score no more than 5 marks. To avoid this pitfall, it is suggested that centres advise candidates to add a line of best fit to their points electronically, or hand-draw their own line of best fit on the graph after it has been printed out.

Candidates working in the lower mark ranges will record and display data in simple bar charts or histograms. Note, however, that analysis of data from categoric independent variables can lend itself to statistical analysis, and may therefore be awarded marks in higher ranges along the alternative route of numerical or statistical analysis (see below).



Candidates working in the 3-4 mark range will draw line graphs, but at this level there will be some errors in scales, plotting, or in drawing a line of best fit.

Well-drawn line graphs, with appropriate lines of best fit, or more complex charts such as species distribution maps, can score up to 6 marks.

For 7-8 marks, candidates should indicate the spread of data on their graphs. This could include the addition of accurately drawn range bars or displaying data in scatter graphs. Alternatively, 7-8 marks can also be awarded for the inclusion of clear keys for plots of multiple data sets on common axes.

The alternative route is used to award credit for **numerical or statistical analysis of data**. At the 1-2 marks level, no calculations are expected, with the conclusions drawn in Strand R(b) based on the selection of individual results.

Simple calculations done correctly, e.g., the calculation of means, can be awarded 3-4 marks.

Mathematical comparisons of results will be made at the 5-6 mark level, while for 7-8 marks, candidates will describe inverse relationships, or carry out calculations of gradients of graphs, or statistical analyses. Statistical methods could include, but may not be limited to, the student's t-test for comparing the means calculated from sets of data, or the chi-squared test for comparing observed and predicted results. The use of statistical packages to make calculations, rather than carrying these out longhand, need not preclude the award of the highest marks, provided the exercise is carried out with understanding.

At 7-8 marks, statistical methods could also include the derivation and designation of quartiles and the construction of box and whisker plots on candidates' graphs to show the spread of data.

Where candidates have progressed through the marking criteria across both rows, the row that gives the highest mark is counted. However, the requirements of the hierarchical mark scheme can be satisfied by crossing from one row to the next. This can occur where analysis of results provides opportunities to address criteria for both graphical and statistical analysis, in a complementary fashion. The mark awarded should then be the highest that can be reached by counting across the two rows in a continuous route of progression. For example, a candidate that has drawn a good, scientific graph (route 1), but has failed to indicate the range of data used to produce the graph, may still enter the 7-8 mark band if they have calculated the gradient of the graph

(route 2).

Strand E: Evaluation

Aspect E(a): Evaluation of apparatus and procedures (0 – 8 marks)

In this strand, candidates consider any limitations imposed by the apparatus or techniques used in collecting their primary data and suggest improvements to the method.

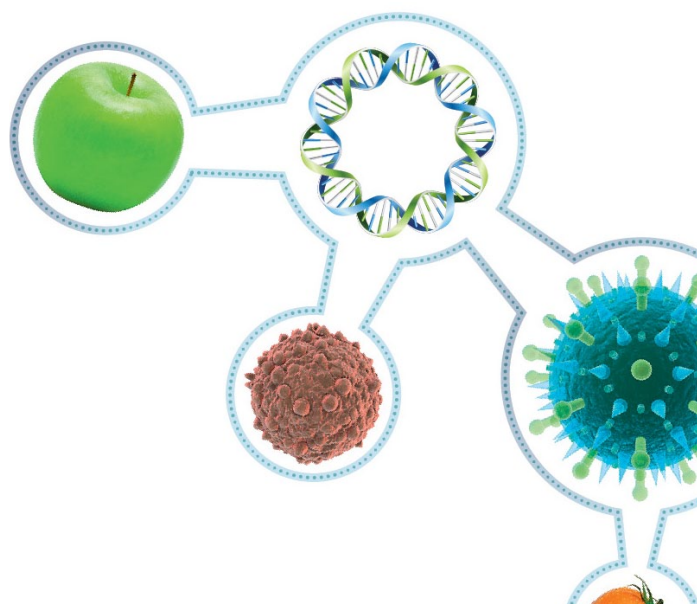
For 1-2 marks candidates will comment on the method of data collection.

In the 3-4 mark range the candidate will identify problems or limitations in the method that relate to the quality of the data obtained.

For 5-6 marks, appropriate improvements to the apparatus and method are suggested in outline or alternative approaches to collecting the data are suggested.

In the 7-8 mark range, candidates extend the improvements to the method or alternative approaches to collecting the data to give sufficient practical details to allow someone to carry out the improvements. They also provide a justification for each improvement or alternative given.

Note: It is possible, but unlikely, that a candidate's method provided data of sufficient quality such that no improvements were necessary, or that no improvements were feasible. In such cases, marks can still be awarded (as indicated in the criteria) by explaining and justifying why no improvements are needed or feasible.



Aspect E(b): Evaluation of primary data (0 – 8 marks)

In this strand, candidates should consider the spread of values in the data collected and awareness of limitations imposed by the apparatus and techniques.

At the 1-2 mark level candidates may state that their results are 'accurate' or repeatable (where a set of readings that they have collected shows good concordance between repeats) without referring to their data.

Candidates will identify outliers in their set of results, or on their graphs, or justify a claim that there are no outliers, at the 3-4 mark level.

For 5-6 marks, candidates will extend this by assessing the accuracy and repeatability of their results from the spread of data. They should indicate and describe how they can recognise an outlier resulting from a measurement or from

experimental error.

For 7-8 marks, variation in data should be considered in terms of its repeatability. At this level the spread of data and the presence of outliers should be linked to relevant limitations in procedures used, and/or linking these to measurement or experimental errors.

Strand R: Review**Aspect R(a): Collection and review of secondary data (0 – 8 marks)**

In this strand, candidates collect secondary data and consider this in relation to their own primary data.

At the 1-2 mark range, candidates will only use secondary data provided. They will make simple comments about the similarity or difference to their own primary data.

For 3-4 marks, candidates will collect secondary data from at least two sources, for example other candidates testing similar hypotheses and secondary data provided by OCR. They will give references for this data, but the references may be incomplete. Candidates will describe differences and similarities between the secondary data and their primary data, with detailed reference to the data.

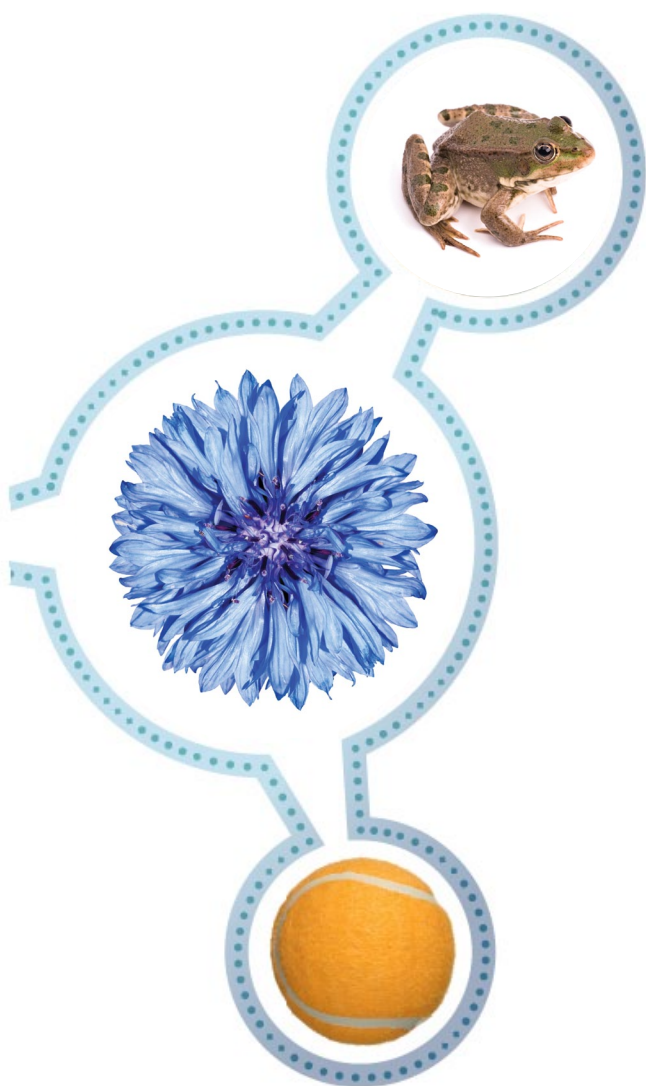
At the 5-6 mark range candidates should have collected a variety of secondary data, which may include results from other candidates testing similar hypotheses, secondary data provided by OCR and data from other sources. All sources should be fully referenced. Judgements should be made about how well the secondary data supports, extends and/or undermines the primary data. Any areas that would benefit from more data should be identified.

For 7-8 marks, in addition to the range of data collected for 5-6 marks, candidates will also comment on the levels of confidence that can be placed in the data by considering its source. The significance, in relation to the hypothesis, of any similarities and differences between secondary data sources and/or their primary data is considered.

Aspect R(b): Reviewing confidence in the hypothesis (0 – 8 marks)

Quality of written communication will be assessed in this strand, alongside the science content.

Candidates make an overall review of the evidence in relation to the underlying scientific theory and consider how well it supports the hypothesis, and what extra work might help to



improve confidence in the hypothesis (IaS2 and IaS3).

In the 1-2 mark range, it is likely that patterns, trends or correlations in data will be non-quantitative, and/or candidates will simply state that the hypothesis or prediction is supported (it is 'correct' or 'proven'). There will be little use of scientific vocabulary, and frequent errors in spelling, punctuation and grammar.

For 3-4 marks, candidates will discuss whether trends or correlations support the hypothesis or prediction. Candidates will do this using some reference to science, and using some scientific terms.

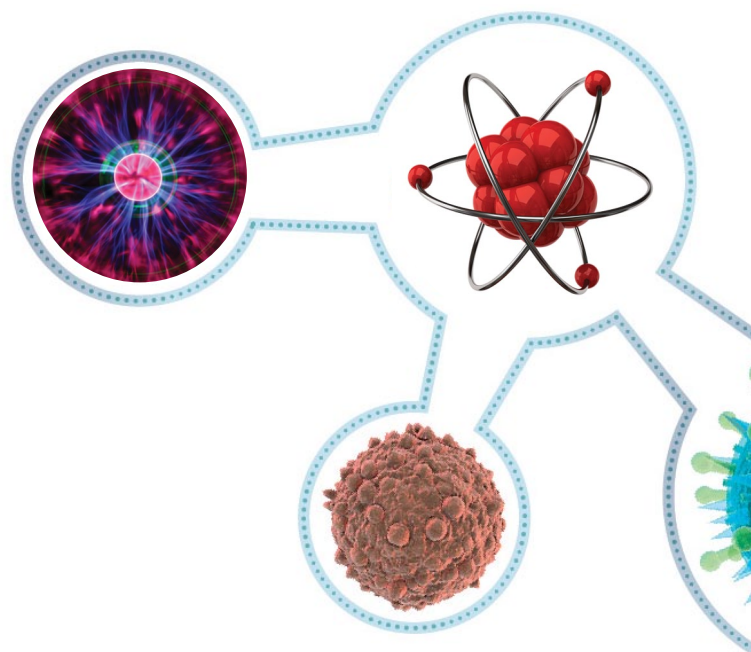
In the 5-6 mark range, candidates will explain the extent to which patterns in the data support the hypothesis. They will use relevant science to draw conclusions and may suggest how the hypothesis could be modified to better account for these. The report will be organised effectively, and use specialist scientific terms appropriately. Spelling, punctuation and grammar will be sound.

For 7-8 marks, candidates should suggest extra data that could be collected to improve confidence in their hypothesis. This may involve suggestions for parts of the range over which more data could be collected, or, on the basis of elaboration or modification of their hypothesis, the testing of other factors that might be involved. The candidate will make full and effective use of scientific terminology. The report will be comprehensive, relevant and logically sequenced, with few, if any, grammatical errors.

Note that to achieve 2, 4, 6 or 8 marks, the candidate has to fully satisfy the relevant descriptor on both science and any Quality of Written Communication (QWC) marks within the relevant two-mark band.

In many or most cases, levels of science and QWC will be assessed to be in the same two-mark band. In instances where marks do not fall in the same two-mark band, centres should continue to carefully follow the procedure for applying the marking criteria. This requires that the highest band that is fully matched by the candidate's work is identified initially. To be fully matched, both the science and the QWC must be fully met in this marking band, and all preceding marking bands. Once the highest band that is fully matched is identified, consideration can then be given as to whether this descriptor is, in fact, exceeded, so that the next highest marking band is partially achieved. If this is the case, then the lower mark in the next marking band might be appropriate. Thus, for example, a candidate with a rather variable standard of spelling, punctuation and grammar

who has used some scientific terms (matching QWC of level 3-4) who has explained the extent to which patterns in the data support the hypothesis, used relevant science to draw conclusions and suggested how the hypothesis could be modified can still achieve a mark of 5 for this strand.



SECTION F**SUBMITTING A CONTROLLED ASSESSMENT TASK****ANNOTATION OF CANDIDATE WORK**

The Code of Practice for GCSE Examinations requires teachers to show how the marks for internally assessed work have been awarded. One convenient way of meeting this requirement is by hand-written annotation on each candidate's work. At the least this should consist of a shorthand reference to the appropriate Aspect or Strand, with an indication of the mark level, at the appropriate point in the work where the award of the mark is evidenced, eg A(b)4 or F3. Annotations are particularly helpful where assessment decisions may not be immediately apparent, and in these cases a brief explanation will help moderators to support centre marks.

INTERNAL STANDARDISATION AND RECORDING OF MARKS

When marking work, it is important that internal moderation takes place within the centre to ensure that the same standards are being applied by all the members of staff. This should ensure that marks submitted from the centre form a single, coherent order of merit. If there are differences in the way in which the marking criteria have been applied by different teachers, this can lead to a significant violation of this order. As a result, moderators may require centres to re-mark the work of all candidates at short notice.

Centres should provide a brief report for moderators, outlining details of internal standardisation processes, with the requested sample of work.

Final marks awarded should be recorded on the cover sheet (Appendix E). This should be secured to the front of each piece of work using a treasury tag.

STORAGE OF SCRIPTS

When the task and its associated marking are complete the scripts should be stored securely. In addition to samples being requested during moderation, samples of work may also be required for Enquiries about Results.

AUTHENTICATION

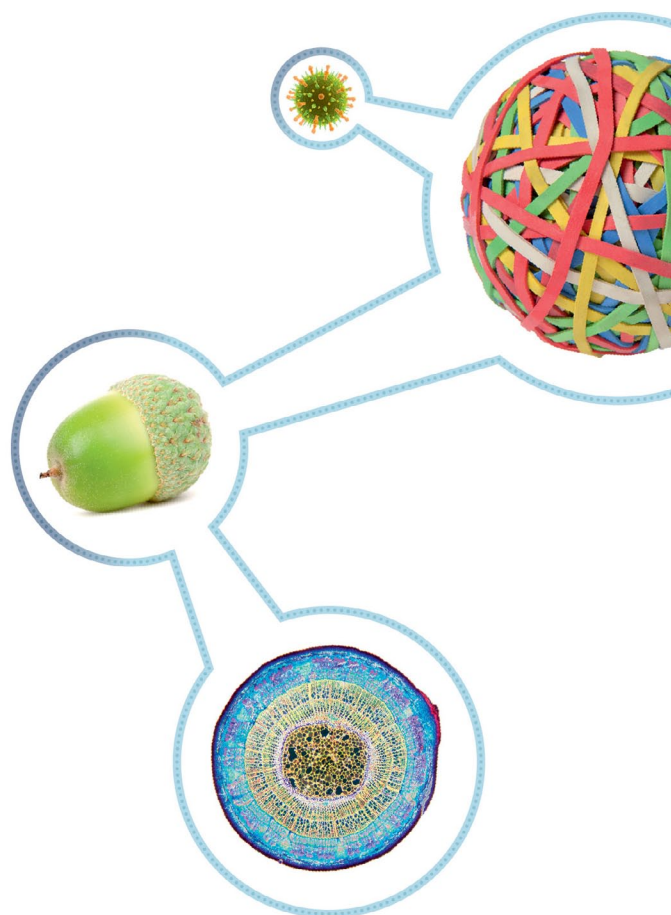
The Ofqual Code of Practice for the conduct of GCSE examinations requires that every teacher involved in the internal assessment of controlled assessment ensures that each piece of assessed work can be authenticated with confidence as being the work of the candidate who submits it. This is particularly important when candidates have undertaken some of their work not under the direct supervision of the teacher or have been working in groups.

A Student Authentication Form is available for use internally. Teachers must complete a Centre Authentication Form to confirm that all work submitted is that of the candidates.

A teacher may have some residual concerns about the extent to which the response does not represent the work of a particular candidate. For example, there may be evidence that too much help has been given or that a candidate has simply copied work directly from another candidate. In such circumstances, that piece of work should not be counted for assessment purposes and the candidate should undertake another controlled assessment task.

If teachers do discover cases of deliberate plagiarism this should be dealt with using the centre's own disciplinary procedures.

If malpractice is not discovered by the centre but is later suspected by a moderator then OCR's malpractice procedure will be implemented. If there has been malpractice then penalties will be applied to all candidates involved.



MODERATION

A sample of a centre's assessed controlled assessment tasks will be externally validated by a moderator appointed by OCR. The moderator will review a sample of the judgements made by the teachers at the centre to ensure that these are correctly aligned to common standards. The judgements made by the teachers will be adjusted, if necessary, to conform to the agreed standards.

Each teacher involved in the preparation of candidates is required to sign a Centre Authentication Form which must be included in the material sent to the moderator.

The marks awarded for the controlled assessment should be submitted to OCR by 15th May in the year for which the task is dated. A sample will be selected based on the number of candidates entered, but will be up to a maximum of 25 from each centre. The sample will be across the whole range of marks. Centres will need to send this sample to the moderator within a specified time period.

The internal standardisation of judgements made by all the teachers involved in the marking of candidates for the controlled assessment is vital. The marks awarded by a centre will form a single order of merit. The centre must provide evidence that steps have been taken to ensure that each of the teachers is using a common interpretation of the marking criteria.

If a moderator experiences difficulties in validating the judgements made on the initial sample of work requested from a centre, then additional samples may be required.

The candidates' work will be returned after moderation and detailed comments on the overall quality of the work submitted will be available to the centre at the time the results are issued.

CONTROLLED ASSESSMENT TASK SECURITY

It is the responsibility of the centre to ensure that downloaded controlled assessment task titles and candidates' scripts are stored securely. Any breach in security must be reported to OCR as soon as possible by submitting a written report (a blank report form is available on Interchange) from the Head of Centre to the OCR Quality and Standards Division detailing the circumstances, the candidates concerned and any action taken.

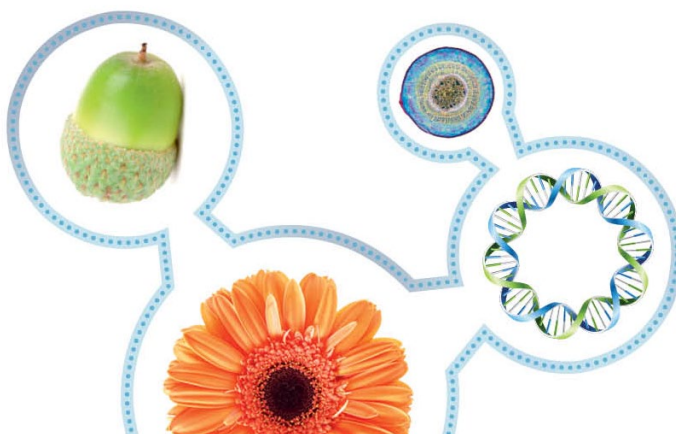
Candidates' scripts for all completed controlled assessment must be stored securely and be available for moderation.

Candidate absence at the time of assessment

If a candidate is absent from a centre when an assessment is carried out, the controlled assessment task may be set at an alternative time provided that the centre is satisfied that security has been maintained by keeping all materials secure.

Unexpected circumstances

If an unexpected problem (such as a fire alarm or other circumstance beyond the teacher's control) occurs while a controlled assessment task is taking place, the task may be resumed subsequently provided the teacher is satisfied that no candidate is likely to have been unfairly advantaged.



SECTION G**CANDIDATE GUIDELINES FOR CONTROLLED ASSESSMENT**

These guidelines can be provided to candidates for use during completion of the task.

THE CONTROLLED ASSESSMENT TASK

The task titles for this subject are set by OCR and changed every year.

Task taking**Research, planning and data collection**

Once you have been given the task title, you will have time to do the research and data collection and make notes which you will use later when you write up the task. Your teacher will tell you how much time you will have and will give you advice on how and where you will gather data and/or where you will find resources (for example the library or the internet).

Things to think about and remember:

- how will you approach the task – you can discuss this with your teacher
- make a plan of how you will spend the time you have for research/data collection. This way, you can make sure that you have time to cover everything you want to do. This plan may be useful to refer back to you when you are writing up the task
- make sure that you keep a record of where all the information you want to use comes from. This will allow you to include references in your report and a references list when you write up the task
- think about how you will use your research or the data that you have collected to respond to the task. It may be helpful to make a basic plan so that you can check you have all the information that you need
- make sure that you have all the information that you collected in your work folder since you will not have access to resources other than your notes when you write up the task.

During your research and data collection, you can talk to your teacher about the task and ask them for advice. You can also work with other candidates and share ideas about the task with them.

How much teacher support can I expect?

During your work for controlled assessment you must produce work and evidence independently. However, your teacher will be able to give you some advice, support, guidance and feedback before you start writing your report. The amount will vary depending upon the type of task you are doing.

You must make your own judgements and draw your own conclusions, but your teacher will:

- offer advice about how best to approach a task
- offer guidance on the way you work in groups so that you all have an opportunity to tackle your tasks
- offer advice to help your research if this is appropriate
- monitor your progress to make sure your work gets underway in a planned and timely manner
- help ensure that your work meets the specification requirements.

The support given by your teacher will be to make sure you understand what it is you have to do. Your teacher will not be allowed to provide model responses for you or work through your responses or outcomes in detail.

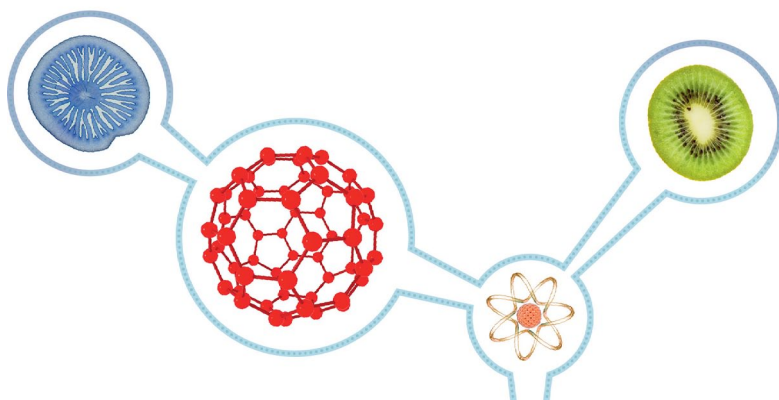
What can I expect in the supervised sessions?

This is where you will complete the task by analysing and evaluating the data that you have collected and the research that you have done. Depending on the type of task, this analysis and evaluation of findings may take a variety of forms. You will have already discussed with your teacher which format is suitable for the task that you are doing.

This part of the task has to be completed under controlled supervised conditions. This means that all of this stage of the task has to be completed within school time and supervised by your teacher or another invigilator.

Things to think about and remember:

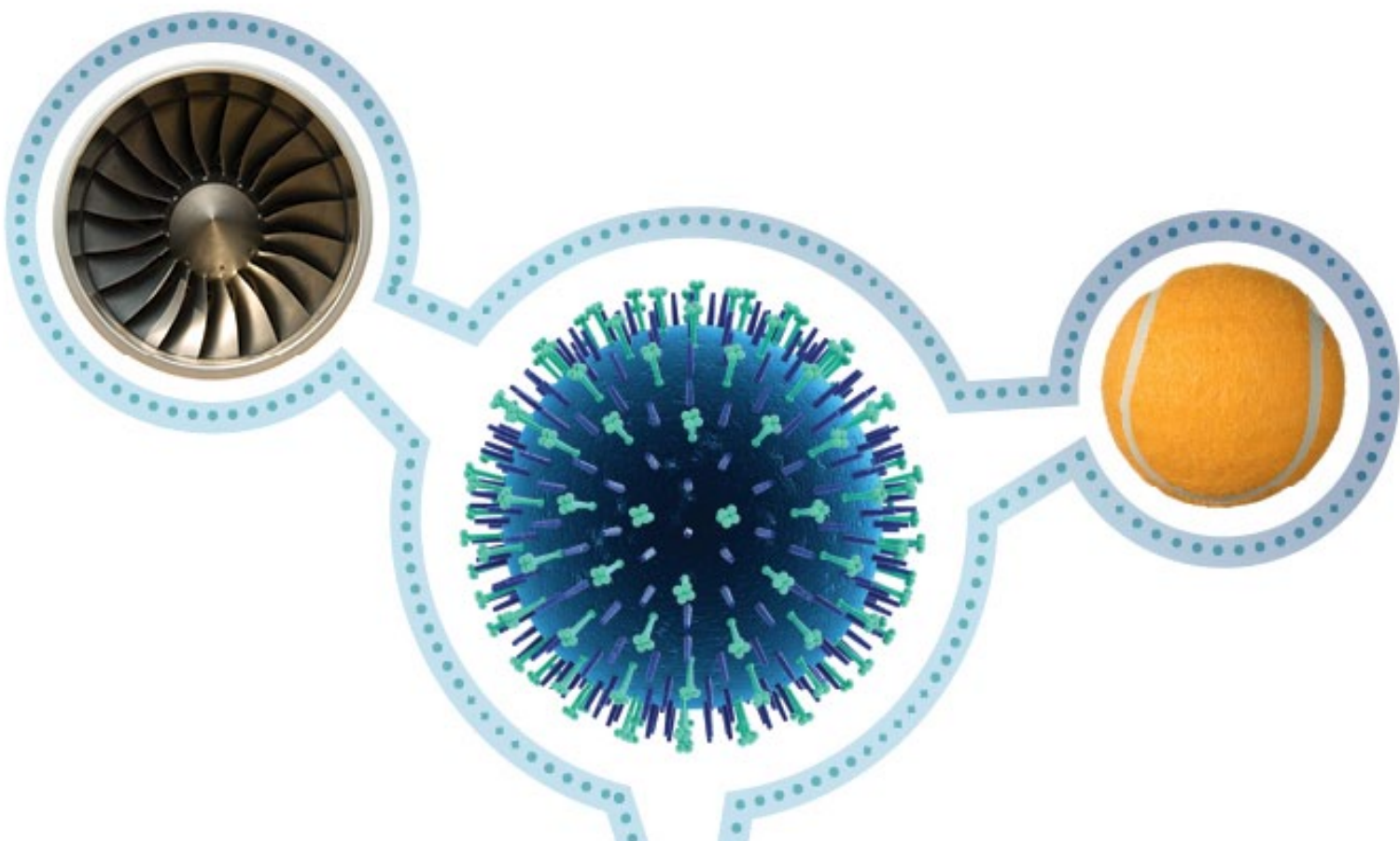
- you will be assessed on the report you produce when you write up the task
- make sure that you include all the relevant information from your notes
- the written report must be your own work
- if you quote from another source (for example a book or the internet) you must acknowledge this properly.



You will have access to all the notes that you made during the research and data collection period. You will not be allowed to take in a draft or final version of your analysis and evaluation however, as this part of the work needs to be completed under controlled conditions.

It may take more than one session to write up your findings. At the end of each session your teacher will collect in your work and your notes. They will give these back at the start of the next session.

It is a good idea to prepare a detailed plan of what you are going to do, with timings, so that you complete everything in the time available.



SECTION H

FREQUENTLY ASKED QUESTIONS

When and where can teachers and candidates access the Controlled assessment materials?

Controlled assessment tasks can only be accessed from OCR Interchange. Access to OCR Interchange for science teachers can be organised through the school's examinations officer.

New tasks are uploaded to Interchange in June of each year. The newly uploaded tasks will be for submission two years later. Tasks for submission in the coming year will have been there for a year already.

Candidates can only access the tasks through their teachers. This should only occur when the task is being started.

When can controlled assessments be taken?

The controlled assessment tasks should be submitted for the June series of the year clearly indicated on the front cover of the task. They can be taken at any time, convenient to the centre, after they appear on the OCR Interchange website. This should, of course, be synchronised with the teaching of the appropriate module. Furthermore, some tasks, for instance, fieldwork or work with plants, may also be seasonal.

Each controlled assessment task is allocated to a specific June examination series. Marks awarded for that assessment must be submitted to OCR before May 15th in that examination year; they are not valid in any other year. There are always controlled assessments for both the current year and the subsequent year available on interchange, so care must be taken to select one for the correct year.

How long is each controlled assessment task valid for?

Each controlled assessment task is valid for submission in one examination year only. However, once submitted the marks are available for aggregation in any future certification, subject to terminal requirements (within the shelf life of the specification).

A controlled assessment task can be completed at any time in the two years prior to the submission date. However, the marks can only be submitted in the assessment year stated on the front cover of the task.

There are always two years of tasks available on OCR Interchange.

Can candidates select which controlled assessment task to do?

There is nothing to prevent a centre allowing candidates to select the task from those available for the required examination series, although this may not be practicable for the majority of centres.

Different teaching groups within a centre could do different tasks.

When should I do the controlled assessment?

The timing of the controlled assessment is entirely up to the centre within the period between the release of a task on OCR Interchange and the examination series for which the task is valid. However, timings should take account of the need:

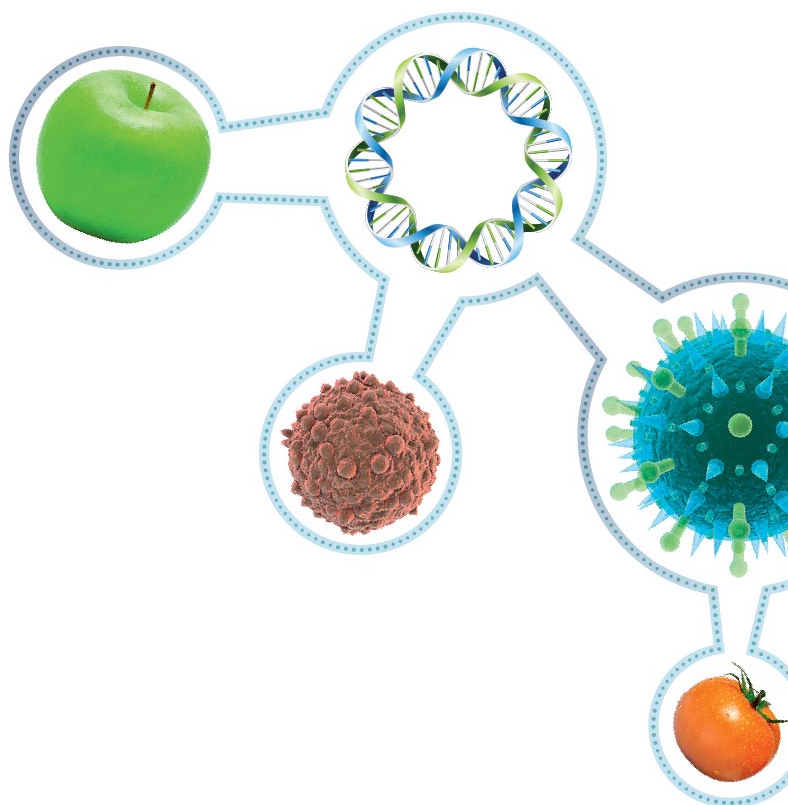
- for candidates to have studied the modules and Ideas about Science relevant to the controlled assessment task
- for candidates to have gained the necessary skills
- to allow enough time for marking and internal standardisation before the 15th May, which is the deadline for submission of centre marks to OCR.

Can any preparation work be done out of the classroom?

Yes, in the research and planning stages in conditions of limited control, at the discretion of the centre. Materials collected and added to work folders during this phase should be checked by the teacher.

Can any work for submission be done out of the classroom?

No part of the controlled assessment that is subject to high control can be worked on out of the classroom. This includes report writing, although referenced materials which are to be incorporated directly into the report such as diagrams and quotations can be collected in advance into candidates' folders.



Is there a minimum or maximum time that can be spent on the assessments?

Approximate times are provided for the different phases of the controlled assessment tasks and are indicated in Section 5 of the specification. These can be reasonably matched to the timings of whole lessons. For example, allowing time at the start and end of lessons for setting up and tidying away, an allocation of four, 1-hour lessons could reasonably be matched to an approximate timing of 3 hours.

Furthermore, the times indicated can be divided between lessons, as appropriate. The completion of a particular stage of the task need not involve consecutive lessons, and some time for reflection can be allowed in between.

If tasks take more than one session then work should be collected in and stored securely until re-issued for the next lesson.

Where can the Mark Schemes be accessed?

The Marking Criteria for the assessment of the candidate work are found in Section 5 of the specification, and are repeated in Appendices 1 and 2 of this Guide. These are generic criteria for the Case Study and Data Analysis.

Do controlled assessment tasks have to be completed under examination conditions?

It is not necessary to administer any part of the tasks under examination conditions. The analysis, evaluation and review stages of the controlled assessment task are, however, under a high level of control and must be under direct teacher supervision, whether in a classroom or laboratory, to prevent collusion between candidates. Research, planning and collection of data stages are under limited control.

It is not necessary for different groups of candidates working on the same controlled assessment tasks in one centre to carry these out all at the same time.

Can candidates attempt more than one task in the same year?

Where candidates perform badly on a particular task they can attempt a different task available in the same examination series, and the better mark can be submitted to OCR. The mark from only **one** completed task can be submitted per year. It is **not** permissible to combine strand marks from different tasks. It is never permitted for a candidate to attempt the same task again.

Who marks controlled assessment tasks?

The controlled assessment tasks are marked by the centre and internally standardised. Once marks are submitted to OCR, a sample of work is requested by OCR and sent for moderation.

If the assessment tasks change each year will I have to organise new practical work each year?

Yes. The tasks will change each year, and so it will not be possible to repeat the same practical year after year.

Is it possible for candidates to work together?

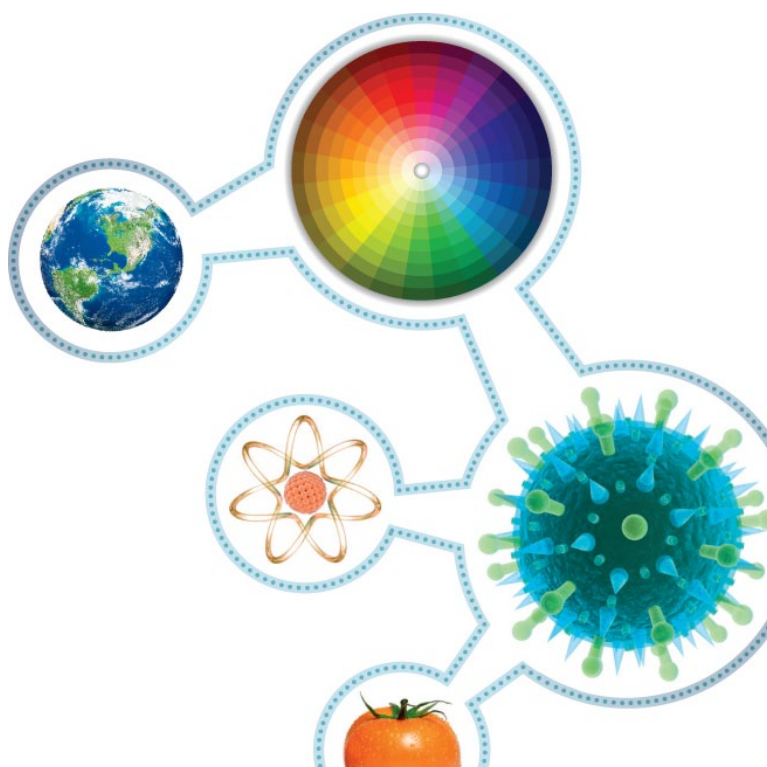
Candidates will be able to work together during any phase of a controlled assessment task that is subject to limited control. This includes research, planning and collection of primary data. However, each candidate will need to provide an individual response.

Can teachers provide resources for candidates to use?

Teachers, librarians and ICT staff can provide resources from which candidates can make selections, such as a library box, but the onus is on candidates working at higher levels to collect their own resources.

Can candidates be given a list of equipment to choose from?

Yes. Teachers may also display equipment for candidates to look at, but this should include a range of apparatus of varying suitability so that candidates can make meaningful choices.



Can candidates be given a method to work from?

If candidates intend to pursue a method that is impracticable, or likely to be hazardous, they can be issued with a method. In these circumstances the plan that candidates have completed should be collected in and stored securely prior to issuing a method. Candidates can then be credited for their initial plan in Strand D when the work is marked. If this is not possible, then the maximum mark the candidate can be awarded for Strand D will be 1 or 2 marks. In either of these circumstances, the candidate's work should be annotated to show what has happened.

What happens if a candidate is absent for the phase where they have to make choices about methods, techniques and equipment?

It is possible that this phase may extend over more than one lesson, so on their return, the candidate can engage in the process.

If the candidate is absent for longer than this, they may resume work at the appropriate stage. However, it may be preferable for them to carry out an alternative task on another occasion at the discretion of the centre.

Can a writing frame be issued to candidates?

Providing that writing frames are generic, and therefore appropriate for any task, these may be used. However, they must not prompt candidates to make decisions or present work in particular ways that are worthy of credit in their own right. Writing frames are likely to limit performance for higher attaining candidates.

Can candidates use ICT?

Yes, candidates can use ICT to compile their reports according to the guidelines indicated in this document. It is essential that candidates using ICT should have no unfair advantage over those opting to handwrite reports. Under conditions of high control, access to the internet and candidates' own network areas must be disabled. Candidates must not be able to access previously prepared work other than that specifically permitted and collected in earlier phases of the Controlled Assessment, eg tables of results, graphs, diagrams, quotations attributed to sources, and reference lists. All of these can also be used by candidates writing reports by hand and pasting directly into their reports.

Can candidates use computer software, such as Microsoft Excel, to draw graphs?

Yes. Such graphs will be marked on the same criteria as hand-drawn graphs and can therefore give access to full marks. However, if a candidate is to draw a graph of sufficient quality using such software, they will need to be very proficient in its use. Common pitfalls include reproducing the graph at an inappropriately small size, failing to include gridlines, plotting incorrect lines of best fit and omitting appropriate titles for the axes.

Can tasks be modified, either by teachers or candidates?

The Controlled Assessment tasks are set by OCR. This is under high control.

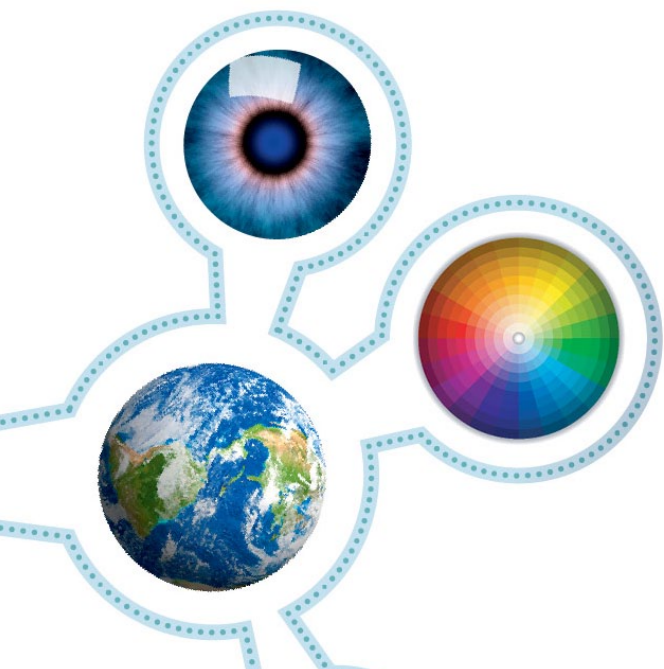
However, it is possible for tasks to be contextualised to take account of local circumstances and the interests and abilities of the candidates concerned. Nevertheless, the Controlled Assessment will still need to match both the marking criteria and the set tasks, and if there is any doubt concerning this, confirmation should be sought from OCR.

In addition, the nature of the Controlled Assessment tasks already provides scope for candidate choices.

Practical Investigation tasks are sufficiently open-ended to allow a variety of investigative approaches by the candidate, and to allow for candidates of different abilities and interests, or for differences in the materials, equipment and facilities at different centres.

Can we provide students with the marking criteria during their analysis, evaluation and review? Can we use 'student-speak' versions?

The OCR Marking Criteria can be provided during this period of high level of control.



If using centre-devised 'student-speak' marking criteria, the centre must ensure that these are a correct interpretation of the marking criteria, and do not give undue guidance to candidates.

All marking must be against the OCR marking criteria.

Can teachers give any feedback to students during Controlled Assessment phases under high level of control, eg analysis, evaluation and review stages?

Teachers may give generic, informal feedback while the task is being completed but may not give guidance specific to the task or indicate what candidates need to do to improve their work.

Does OCR provide definitions of scientific terms, such as 'accuracy' and 'precision', in its guidance?

An excellent overview of these, and other scientific terms, can be found in the publication:

ASE-Nuffield (2010). The Language of Measurement. Terminology used in school science investigations. ASE Nuffield.

A selection of definitions consistent with this publication is presented in Appendix D of this Guide.

Furthermore, OCR-endorsed publications by Oxford University Press and Collins give detailed sections on Controlled Assessment.

Can candidates start a Controlled Assessment task before Year 10?

Yes, there are no restrictions on the year in which Controlled Assessment tasks can be started. However, consideration will need to be given to the intended year of submission for the Controlled Assessment. This will affect which year's tasks you select. Furthermore, you will also need to ensure that candidates have been taught the appropriate module content and Ideas about Science, as well as having developed the necessary skills, before the candidates attempt the Controlled Assessment.

I have candidates with physical disabilities that make practical work impossible. Can these candidates be given teacher data?

Such candidates can either have an assistant to perform the experiments under their direction, or can use the data from another candidate. The use of teacher data is not allowed. If candidates use data from another candidate they will be unable to access the marks for this skill quality.

Can candidates have scribes or amanuenses if needed?

Yes, access arrangements are exactly the same as for written examinations.

Can candidates bring in a word-processed list of references from home?

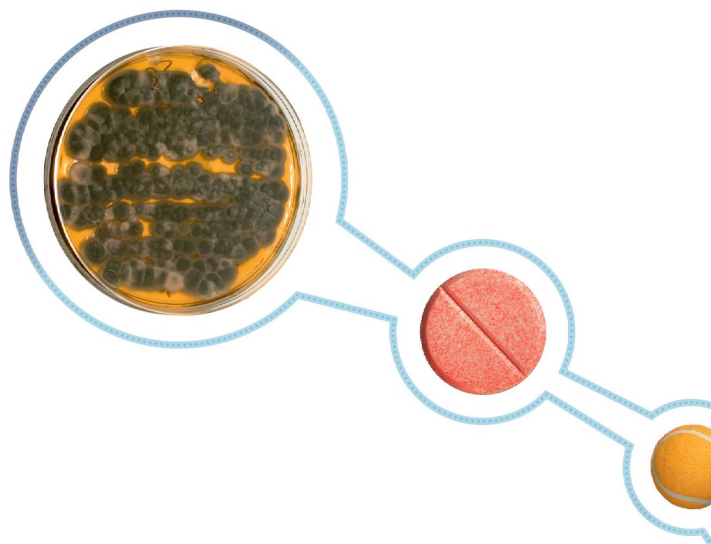
Yes, this is an example of the kind of material that can be produced under conditions of limited control and brought into the high control part of the assessment. What is not permitted is incorporation of prepared text covering analysis, evaluation or review into reports produced under high control.

Can candidates redraft their written reports?

No re-drafting of reports is permitted outside conditions of high control. However, while under direct teacher supervision candidates can continue to amend and edit the reports that they are writing. Teachers cannot provide specific feedback on candidates' drafts or indicate what improvements need to be made.

Can candidates share their results for the task?

Candidates are allowed to work together under conditions of limited control and this can include sharing primary data that they have collected. However, all candidates must make an individual response and therefore have contributed to collecting at least some of the data for themselves.



SECTION I

GUIDANCE ON DOWNLOADING CONTROLLED ASSESSMENT TASKS FROM INTERCHANGE

BEFORE YOU START

Controlled assessment materials are available to download from OCR Interchange.

In order to use OCR Interchange for the first time, you will need to register your centre by returning the Interchange Agreement. This can be downloaded from the OCR website at www.ocr.org.uk/interchange

In addition, you will need to be assigned the 'Tutor / Teacher' Interchange role to access controlled assessment materials. Your Interchange Centre Administrator can assign this for you, as follows:

- select 'Admin' in the left-hand menu
- select 'Manage centre users' from the pop-up menu that appears
- select the relevant username
- select the 'Roles' tab
- select the role of 'Tutor teacher' on the left-hand side of the screen
- click the '>' button to move the role across to the right-hand side of the screen
- click the 'User' tab
- click 'Add'.

Please note that it could take up to 20 minutes for the new role to take effect.

STEP 1 - LOG INTO INTERCHANGE

Click on the following link <https://interchange.ocr.org.uk>

Enter your log in details

OCR RECOGNISING ACHIEVEMENT **interchange** Help

Welcome

You can use Interchange to securely access candidate information and online services for all OCR qualifications, 24 hours a day.

New features will be added over the coming months. Please check the [OCR website](#) and your email for information.

Login

Login ID: (for centre users this will be your centre number)

Username:

Password: (case sensitive)

[Forgotten Your Password?](#)

New User

To sign up please complete and return the [OCR Interchange Agreement \(118kb\)](#) to receive your login details.

STEP 2 - PROCEED TO CONTROLLED ASSESSMENT TASKS

Click on 'Coursework and tests'

Click on 'Controlled assessment materials'

** If you are unable to see either of these menu items then it is likely that you do not have the 'Tutor / teacher' role assigned to you - please refer to the start of this section .

The screenshot shows the OCR Interchange homepage. At the top, there is a navigation bar with the OCR logo and 'interchange' text. Below this, there are links for 'Help' and 'Log out', and a 'Print page' button. The main content area is divided into several sections: 'Welcome to Interchange', 'What's new?' (with sub-sections for Support material, Tests, and Moderation), and 'Tell us what you think'. A left-hand navigation menu is visible, categorized by 'By task' and 'By qualification'.

STEP 3 – SEARCH FOR MATERIALS

You can search for materials by unit code. Enter the unit code and click on the 'search' button. Or, you can search for materials by subject information by selecting from the 'drop down' options. All available documents will be displayed below the search.

The screenshot shows the 'Controlled Assessment Materials' search page. It features a search form with the following fields: 'Unit Code (eg, F123)', 'Select qualification type' (dropdown menu), 'Select subject' (dropdown menu), and 'Select subject detail' (dropdown menu). A 'Search' button is located below the 'Unit Code' field. Below the search form, there is a list of search results for 'A266 - Controlled Assessment' and 'A266 - Resource Booklet'. A 'Page notes' section at the bottom provides instructions on how to extract files.

STEP 4 – OPEN MATERIALS

Click on the document link. The document will open in your browser.
Click on 'Save As' to save to a location of your choice.

STEP 5 – TROUBLESHOOTING

If you search for an invalid unit code, the following error message will be displayed.

The screenshot shows the OCR interchange website interface. The header includes the OCR logo and 'interchange' text, with 'RECOGNISING ACHIEVEMENT' below. Navigation links for 'Help' and 'Log out' are visible. The breadcrumb trail reads 'You are here: Home > Controlled assessment materials'. The main content area is titled 'Controlled Assessment Materials' and features a 'Notices' section. Below this, a message states: 'Use the drop-down menus below to select the controlled assessment material you require or search by unit code.' The search form includes a 'Unit Code (eg, F123)' field containing 'F062', which is highlighted in red with an error message: 'Invalid Unit Code entered'. To the right of the input field are three dropdown menus: 'Select qualification type: -Please Select-', 'Select subject: -Nothing to Select-', and 'Select subject detail: -Nothing to Select-'. A 'Search' button is located below the input field. A 'Page notes' section follows, containing information about zip extractors for Windows XP/Vista and Windows 95/98/2000/ME/NT.

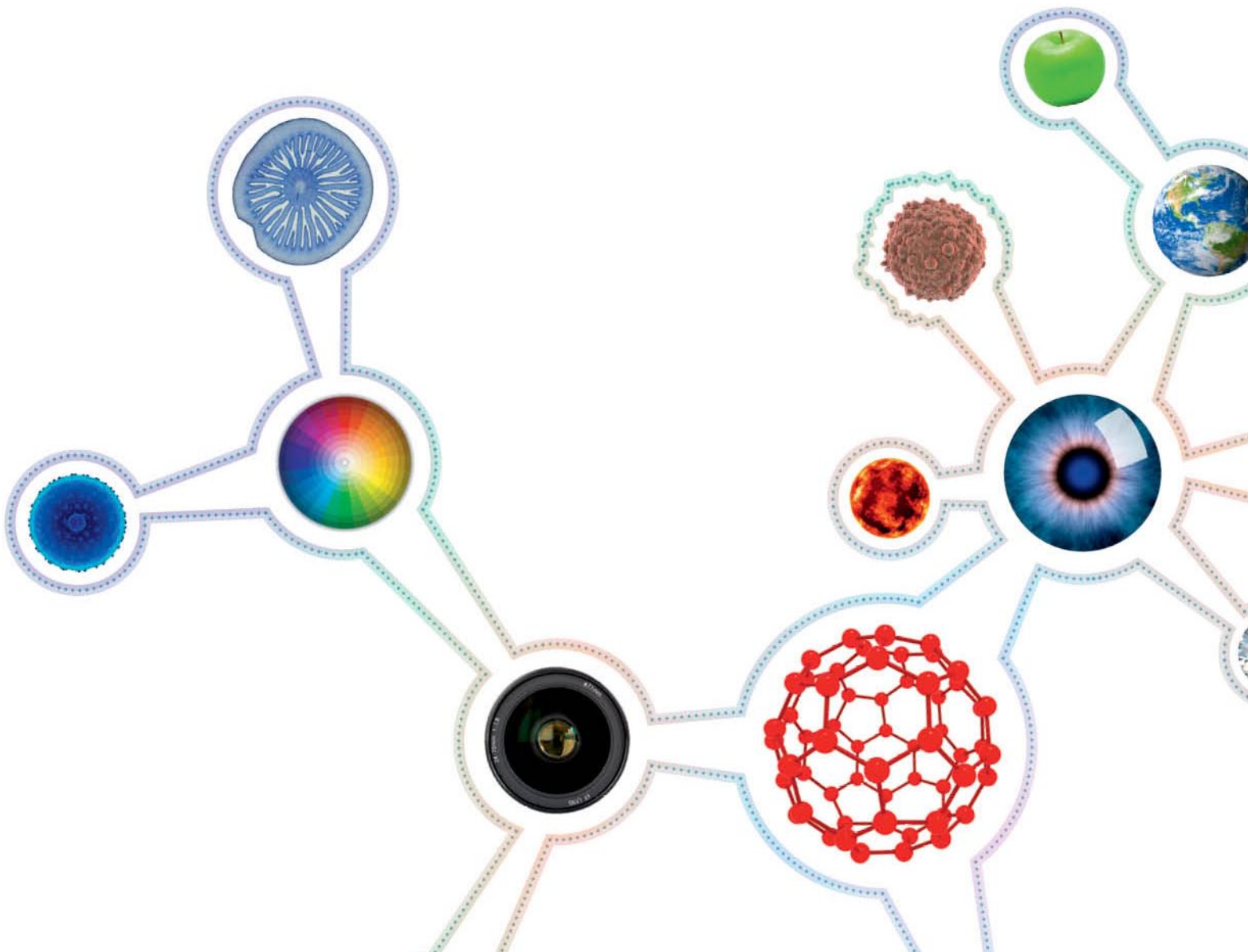
If you search for a valid unit code but there is no document currently available, the following message will be displayed.

The screenshot shows the same OCR interchange website interface. The search form now has 'A992' entered in the 'Unit Code (eg, F123)' field. The error message is gone. Below the search form, a yellow box displays the message: 'No document available. Please check the unit code.' The 'Page notes' section remains visible at the bottom of the main content area.

If you search via the 'drop down' menus but there is no document currently available, the following message will be displayed.

The screenshot shows the OCR Interchange website interface. At the top, the logo 'OCR interchange' is displayed with the tagline 'RECOGNISING ACHIEVEMENT'. Navigation links for 'Help' and 'Log out' are visible. Below the header, the breadcrumb trail reads 'You are here: Home » Controlled assessment materials'. The main content area is titled 'Controlled Assessment Materials' and features a 'Notices' section with a message: 'Controlled Assessment materials for GCSE specifications will be available to download from June 2009'. Below this, a search form is provided with the instruction: 'Use the drop-down menus below to select the controlled assessment material you require or search by unit code.' The search form includes a text input for 'Unit Code (eg, F123)', a 'Search' button, and three dropdown menus: 'Select qualification type' (set to 'GCSE'), 'Select subject' (set to 'Business and Communications'), and 'Select subject detail' (set to 'Developing Bus Comm Systems'). A yellow highlighted message box states: 'No document available. Please check the search details.' On the left side, there is a navigation menu with two sections: 'By task' (including Entires, Coursework and tests, e-assessment, Certification claims, Results, Post results, Centre information, Assessors, Search, Resources, Admin) and 'By qualification' (including GCE, GCSE, Principal Learning..., OCR Nationals, Functional Skills, Skills for Life, NVQ, Vocationally related, CLAIT and iPro). At the bottom, a 'Page notes' section provides information about zip extraction for Windows XP and Vista, and for older Windows versions (95, 98, 2000, ME, or NT). The footer contains links for 'Download Adobe Acrobat software', 'Accessibility', 'Terms of use', and '© 2000-2009 OCR'.

SECTION J
APPENDICES



APPENDIX A: MARKING CRITERIA FOR THE PRACTICAL INVESTIGATION**Extracted from the Specification for GCSE Additional Science A**

Marking criteria are to be applied hierarchically (see section 5.42 of the specification).

Strand/ Aspect	0	1 – 2 marks	3 – 4 marks	5 – 6 marks	7 – 8 marks	AOs
S a	*	Make a prediction to test, but without any justification. The response may be simplistic, with frequent errors of spelling, punctuation or grammar and have little or no use of scientific vocabulary.	Suggest a testable prediction and justify it by reference to common sense or previous experience. Some relevant scientific terms are used, but spelling, punctuation and grammar are of variable quality.	Consider major factors and refer to scientific knowledge to make a testable hypothesis about how one factor will affect the outcome. Information is effectively organised with generally sound spelling, punctuation and grammar. Specialist terms are used appropriately.	After consideration of all relevant factors, select one and propose a testable hypothesis and quantitative prediction about how it will affect the outcomes. The report is comprehensive, relevant and logically sequenced, with full and effective use of relevant scientific terminology. There are few, if any, grammatical errors.	AO1: 2 marks AO2: 4 marks AO3: 2 marks
S b	*	Follow a given technique, but with very limited precision or accuracy. Make an appropriate comment about safe working.	Select and use basic equipment to collect a limited amount of data. Correctly identify hazards associated with the procedures used.	Select and use techniques and equipment appropriate for the range of data required, and explain the ranges chosen. Identify any significant risks and suggest some precautions.	Justify the choice of equipment and technique to achieve data which is precise and valid. Complete a full and appropriate risk assessment, identifying ways of minimising risks associated with the work.	AO2: 4 marks AO3: 4 marks
C	*	Record a very limited amount of data (eg isolated individual data points with no clear pattern), covering only part of the range of relevant cases/situations, with no checking for repeatability. Data is generally of low quality.	Record an adequate amount or range of data, allowing some errors in units or labelling, and with little checking for repeatability. Data is of variable quality, with some operator error apparent.	Collect and correctly record data to cover the range of relevant cases/situations, with regular repeats or checks for repeatability. Data is of generally good quality.	Choose an appropriate range of values to test across the range, with regular repeats and appropriate handling of any outliers. Checks or preliminary work are included to confirm or adapt the range and number of measurements to ensure data of high quality.	AO1: 1 mark AO2: 3 marks AO3: 4 marks

Strand/ Aspect	0	1 – 2 marks	3 – 4 marks	5 – 6 marks	7 – 8 marks	AOs
A	*	Display limited numbers of results in tables, charts or graphs, using given axes and scales.	Construct simple charts or graphs to display data in an appropriate way, allowing some errors in scaling or plotting.	Correctly select scales and axes and plot data for a graph, including an appropriate line of best fit, or construct complex charts or diagrams eg species distribution maps.	Indicate the spread of data (eg through scatter graphs or range bars) or give clear keys for displays involving multiple data-sets.	AO3: 8 marks
		Select individual results as a basis for conclusions.	Carry out simple calculations eg correct calculation of averages from repeated readings.	Use mathematical comparisons between results to support a conclusion.	Use complex processing to reveal patterns in the data eg statistical methods, use of inverse relationships, or calculation of gradient of graphs.	
E a	*	Make relevant comments about problems encountered whilst collecting the data.	Describe the limitations imposed by the techniques and equipment used.	Suggest (in outline) improvements to apparatus or techniques, or alternative ways to collect the data; or explain why the method used gives data of sufficient quality to allow a conclusion.	Describe in detail improvements to the apparatus or techniques, or alternative ways to collect the data, and explain why they would be an improvement; or explain fully why no further improvement could reasonably be achieved.	AO3: 8 marks
E b	*	Make a claim for accuracy or repeatability, but without appropriate reference to the data.	Correctly identify individual results which are beyond the range of experimental error (are outliers), or justify a claim that there are no outliers.	Use the general pattern of results or degree of scatter between repeats as a basis for assessing accuracy and repeatability and explain how this assessment is made.	Consider critically the repeatability of the evidence, accounting for any outliers.	AO3: 8 marks
R a	*	Compare own experimental results with at least one piece of secondary data and make basic comments on similarities and/ or differences. Secondary data collected is limited in amount and not always relevant to the investigation.	Identify in detail similarities and differences between the secondary data and primary data. Secondary data collected is relevant to the investigation and sources are referenced, although these may be incomplete.	Describe and explain the extent to which the secondary data supports, extends and/ or undermines the primary data, and identify any areas of incompleteness. A range of relevant secondary data is collected from several fully referenced sources.	Assess the levels of confidence that can be placed on the available data, and explain the reasons for making these assessments. Comment on the importance of any similarities or differences.	AO1: 1 mark AO2: 1 mark AO3: 6 marks

Strand/ Aspect	0	1 – 2 marks	3 – 4 marks	5 – 6 marks	7 – 8 marks	AOs
R b	*	Correctly state whether or not the original prediction or hypothesis is supported, with reference only to common sense or previous experience. The response is simplistic, with frequent errors in spelling, punctuation or grammar and has little or no use of scientific vocabulary.	Comment on whether trends or correlations in the data support the prediction or hypothesis and suggest why by reference to appropriate science. Some relevant scientific terms are used correctly, but spelling, punctuation and grammar are of variable quality.	Explain the extent to which the hypothesis can account for the pattern(s) shown in the data. Use relevant science knowledge to conclude whether the hypothesis has been supported or to suggest how it should be modified to account for the data more completely. Information is organised effectively with generally sound spelling, punctuation and grammar. Specialist terms are used appropriately.	Give a detailed account of what extra data could be collected to increase confidence in the hypothesis. The report is comprehensive, relevant and logically sequenced, with full and effective use of relevant scientific terminology. There are few, if any, grammatical errors.	AO1: 2 marks AO3: 6 marks

* No response, or response not sufficient for award of 1 mark

APPENDIX B: ADVICE TO CENTRES ON PREPARATION OF SAMPLE FOR MODERATION

Centres are advised that before submitting marks to OCR they should:

- internally standardise the marking of all teachers involved
- check that all total marks are correct
- check that marks have been correctly transferred to the MS1 or electronic alternative (eg EDI or OCR Interchange).

The centre will receive an email request for the sample of candidates' work required by the moderator. It is therefore essential that centres ensure that OCR is updated if the contact email address (usually an email account that the examinations officer accesses) changes. Prior to submission of marks OCR will contact centres to confirm that the email address held for moderation purposes is correct; it is essential that centres respond to these requests for confirmation.

Work to be submitted as part of the moderation sample should be checked to ensure that annotation is sufficient, and that a correctly completed cover sheet has been attached to the front of each piece of work.

Treasury tags should be used for fastening the pages of coursework, including the cover sheet together. The use of plastic wallets is not considered suitable.

The sample, with the Centre Authentication Form, should be sent to the moderator by the date requested. Centres are advised to include details of how internal standardisation has been carried out. It is also helpful to include a contact email address for the Head of Science in case the moderator needs to clarify anything.

APPENDIX C: GLOSSARY OF TERMS

These definitions are consistent with *The Language of Measurement: Terminology used in school science investigations*, ASE (2010), ISBN 978 0 86357 424.

Term	Definition	Notes
accuracy	how close a reading is to the true value	a measurement result is considered accurate if it is judged to be close to the true value
anomaly (outlier)	value in a set of results that is judged not to be part of the inherent variation	a result which does not agree with other results in the data set eg result which lies well off the line of best fit
dependent variable	variable which is measured when ever there is a change in the independent variable	
independent variable	variable which is deliberately changed by the person in the planning of the experiment	
control variable	variables other than the independent and dependent variables which are kept the same	
precision	a quality denoting the closeness of agreement between (consistency, low variability of) measured values obtained by repeated measurements	how close the agreement is between measured values
range (of a variable)	the maximum and minimum values of the independent or dependent variables	
repeatability	precision obtained when measurement results are produced in one laboratory, by a single operator, using the same equipment under the same conditions, over a short timescale	
reproducibility	precision obtained when measurement results are produced by different laboratories (and therefore by different operators using different pieces of equipment)	
resolution	smallest change in the quantity being measured (input) of a measuring instrument that gives a perceptible change in the indication (output)	smallest change in a value that can be detected by an instrument
uncertainty	interval within which the true value can be expected to lie, with a given level of confidence or probability	the likelihood of a measurement falling close to the true value. A big range in the measurements of the dependent variable implies a high level of uncertainty. Use of range bars will help to show level of uncertainty.
validity (of experimental design)	suitability of the investigative procedure to answer the question being asked	
valid conclusion	a conclusion supported by valid data, obtained from an appropriate experimental design an based on sound reasoning	

APPENDIX D: COVER SHEET FOR CONTROLLED ASSESSMENT FOR GCSE ADDITIONAL SCIENCE A



GCSE

Additional Science A
OCR GCSE J242 Twenty First Century Additional Science A Unit A154
Coursework Cover Sheet for Practical Investigation

Examination Series: June

Centre No: Centre Name:

Candidate No: Candidate Name:

Put ticks in the boxes (one per row) to indicate the mark matched by the candidate's work for each aspect of performance.

Record the mark awarded for each strand and the final total mark for the Practical Investigation.

The Additional Notes are available for further record-keeping, including internal standardisation and comments, if required.

A completed copy of this form must be attached to the work of each candidate in the sample requested by the moderator.

Practical Investigation		Title:											
Centre Marks												Additional Notes	
Strand	Aspect	0	1	2	3	4	5	6	7	8	Mark		
S	a												
	b												
C													
A													
E	a												
	b												
R	a												
	b												
Mark for the Practical Investigation (Max = 64)											0		

APPENDIX D: COVER SHEET FOR CONTROLLED ASSESSMENT FOR GCSE BIOLOGY A



GCSE

Biology A
OCR GCSE J243 Twenty First Century Biology A Unit A164
Coursework Cover Sheet for Practical Investigation

Examination Series: **June**

Centre No: Centre Name:

Candidate No: Candidate Name:

Put ticks in the boxes (one per row) to indicate the mark matched by the candidate's work for each aspect of performance.

Record the mark awarded for each strand and the final total mark for the Practical Investigation.

The Additional Notes are available for further record-keeping, including internal standardisation and comments, if required.

A completed copy of this form must be attached to the work of each candidate in the sample requested by the moderator.

Practical Investigation		Title: <input style="width: 100%;" type="text"/>										
Centre Marks												Additional Notes
Strand	Aspect	0	1	2	3	4	5	6	7	8	Mark	
S	a											
	b											
C												
A												
E	a											
	b											
R	a											
	b											
Mark for the Practical Investigation (Max = 64)												0

APPENDIX D: COVER SHEET FOR CONTROLLED ASSESSMENT FOR GCSE CHEMISTRY A



GCSE

Chemistry A

**OCR GCSE J244 Twenty First Century Chemistry A Unit A174
Coursework Cover Sheet for Practical Investigation**

Examination Series: June Centre No: Centre Name: Candidate No: Candidate Name:

Put ticks in the boxes (one per row) to indicate the mark matched by the candidate's work for each aspect of performance.

Record the mark awarded for each strand and the final total mark for the Practical Investigation.

The Additional Notes are available for further record-keeping, including internal standardisation and comments, if required.

A completed copy of this form must be attached to the work of each candidate in the sample requested by the moderator.

Practical Investigation		Title: <input style="width: 90%; height: 15px;" type="text"/>											
Centre Marks												Additional Notes	
Strand	Aspect	0	1	2	3	4	5	6	7	8	Mark		
S	a												
	b												
C													
A													
E	a												
	b												
R	a												
	b												
Mark for the Practical Investigation (Max = 64)												0	

APPENDIX D: COVER SHEET FOR CONTROLLED ASSESSMENT FOR GCSE PHYSICS A



GCSE

Physics A
OCR GCSE J245 Twenty First Century Physics A Unit A184
Coursework Cover Sheet for Practical Investigation

Examination Series: June

Centre No: Centre Name:

Candidate No: Candidate Name:

Put ticks in the boxes (one per row) to indicate the mark matched by the candidate's work for each aspect of performance.

Record the mark awarded for each strand and the final total mark for the Practical Investigation.

The Additional Notes are available for further record-keeping, including internal standardisation and comments, if required.

A completed copy of this form must be attached to the work of each candidate in the sample requested by the moderator.

Practical Investigation		Title: <input style="width: 100%;" type="text"/>											
Centre Marks												Additional Notes	
Strand	Aspect	0	1	2	3	4	5	6	7	8	Mark		
S	a												
	b												
C													
A													
E	a												
	b												
R	a												
	b												
Mark for the Practical Investigation (Max = 64)												0	

