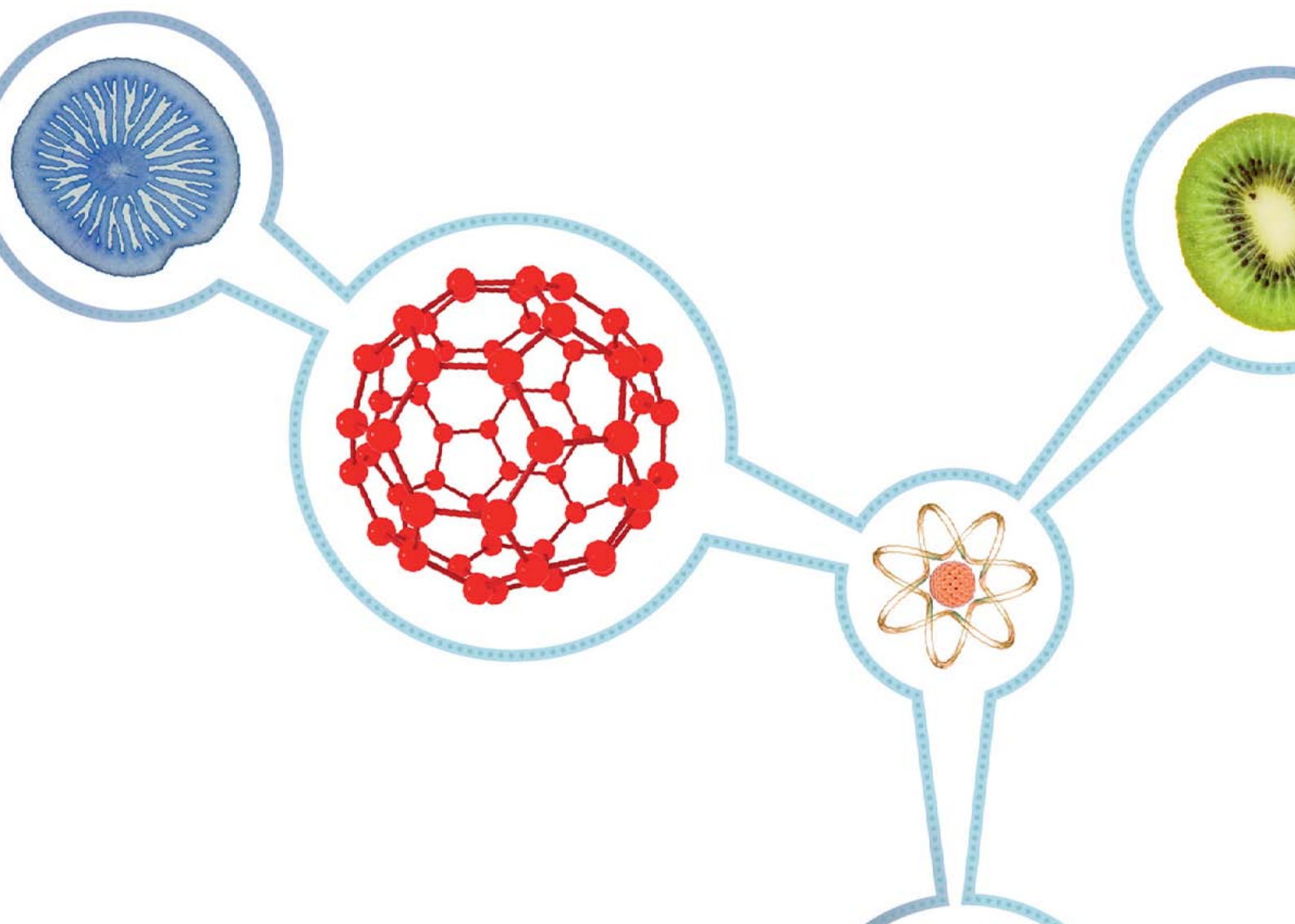


GATEWAY SCIENCE SUITE

**GUIDE TO
CONTROLLED
ASSESSMENT**

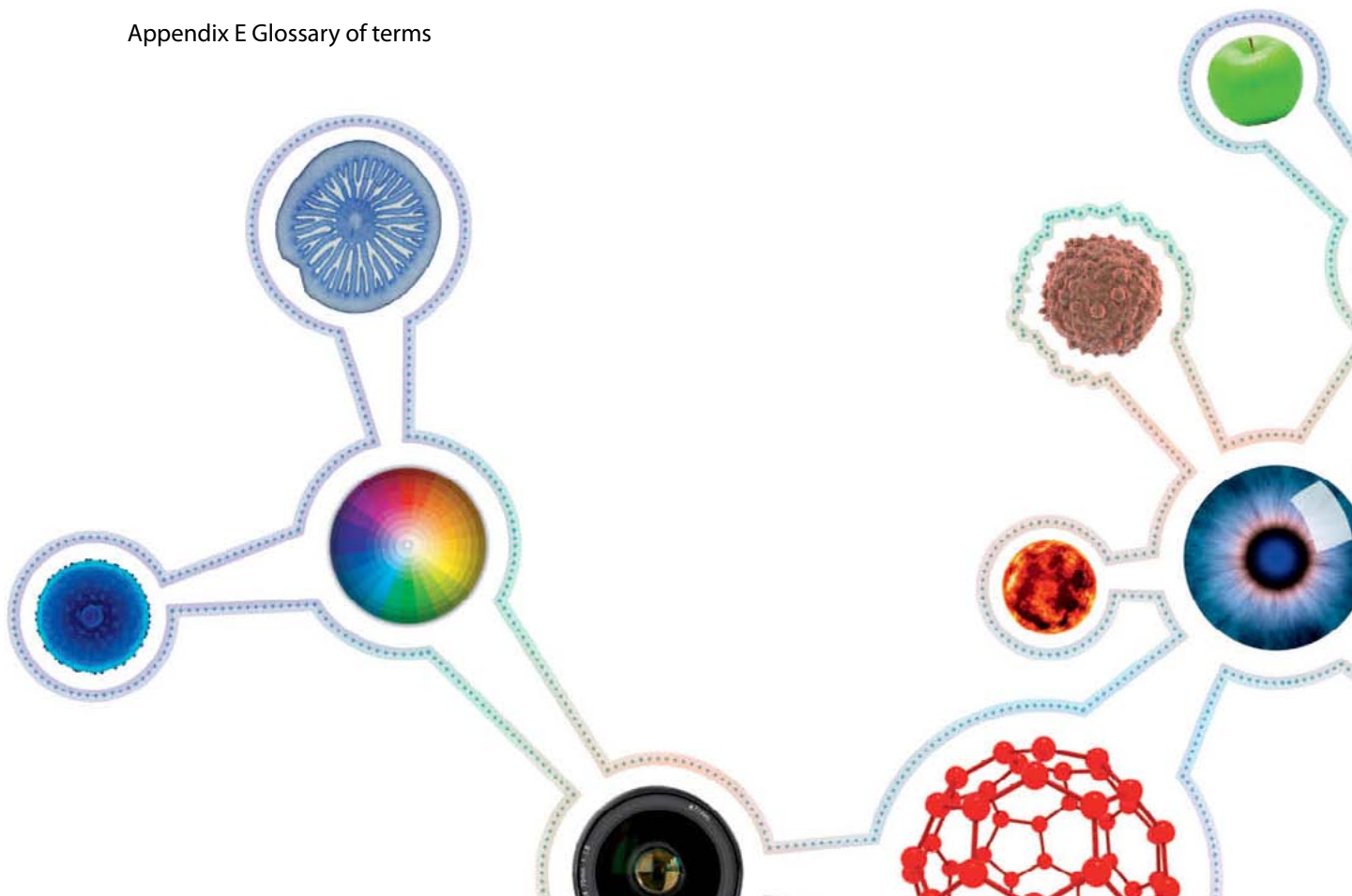
VERSION 1 JULY 2011

This Guide provides detailed information for teachers about how to manage controlled assessment. Some of the information applies to all GCSE subjects and some information provides subject specific guidance. It is important to make the point that this Guide plays a secondary role to the Specification itself. The Specification is the document on which assessment is based and specifies what content and skills need to be covered in delivering the course. At all times, therefore, this teacher support should be read in conjunction with the Specification. If clarification on a particular point is sought then that clarification should be found in the Specification itself.



INDEX

Section A	Introduction
Section B	Introduction to Gateway controlled assessment tasks
Section C	Controlled assessment overview
Section D	Preparing for a controlled assessment task
Section E	Managing a controlled assessment task
Section F	Assessing a controlled assessment task
Section G	Submitting a controlled assessment task
Section H	Candidate guidelines to controlled assessment
Section I	Frequently asked questions
Section J	Guidance on downloading controlled assessment tasks from Interchange
Section K	Appendices
	Appendix A Marking Criteria for Science
	Appendix B Marking Criteria for Additional Science and Separates
	Appendix C Science Skills
	Appendix D Advice to centres on preparation of sample for moderation
	Appendix E Glossary of terms



SECTION A

INTRODUCTION

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

Control levels are set for each of the controlled assessment processes: task setting, task taking and task marking. For each stage, the level of control will ensure reliability and authenticity, and make assessments more manageable for teachers and candidates.

The levels of control for controlled assessment in GCSE Sciences are as follows:

STAGE 1: TASK SETTING

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

Detailed guidance on how the task will be carried out is provided in this Handbook. Controlled assessment tasks will take place in distinct parts, with time for research, planning and collection of information/data, followed by time for analysis, evaluation and review. Parts of the task will be undertaken with different levels of control.

Recommended timings for carrying out the controlled assessment tasks are given in this Handbook. Note that the times for research, planning and data collection are for guidance only and the times for analysis and evaluation are approximate times for the duration of that part of the task.

STAGE 3: TASK MARKING

Tasks are marked internally and subject to internal verification by the centre. The tasks are moderated externally by an OCR moderator.

The meaning of 'control' for teachers

In supervising the controlled assessment tasks the levels of control are defined as follows:

- High level of control – the candidate must be supervised at all times. Use of resources and interaction with other candidates is tightly prescribed.
- Limited level of control – requirements are clearly specified, but some work may be completed without direct supervision and may include group work.

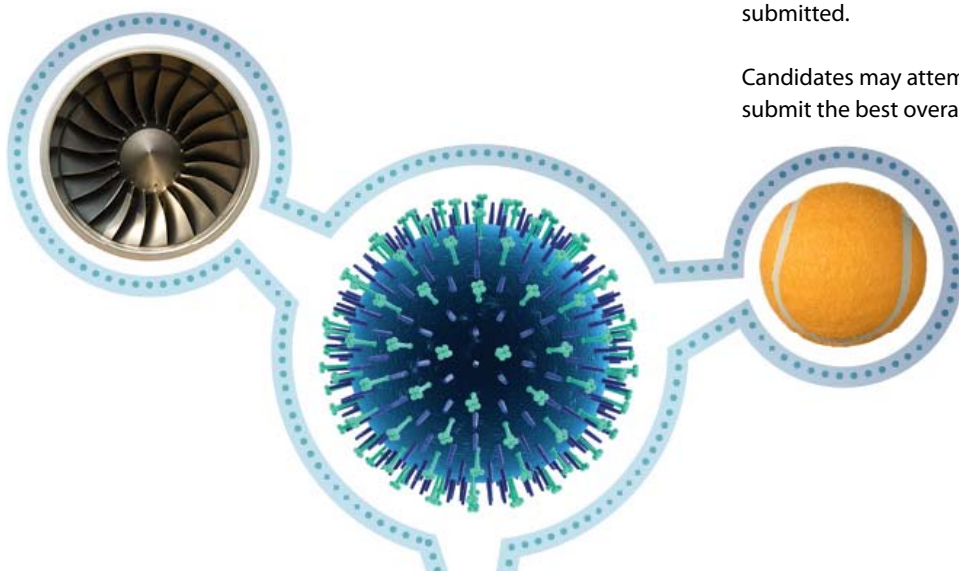
THE WEIGHTING OF CONTROLLED ASSESSMENT

Weighting of controlled assessments is defined by Ofqual subject criteria, and for the Gateway Science suite will be 25% of the total assessment for each GCSE. Each task is marked out of 48.

THE NUMBER OF TASKS REQUIRED

Candidates are only required to submit one task. Each task is divided into three parts and all three parts of the same task must be submitted.

Candidates may attempt as many tasks as the centre allows and submit the best overall mark.



SECTION B

INTRODUCTION TO GATEWAY CONTROLLED ASSESSMENT TASKS

A controlled assessment task consists of three parts. The task is centred on a particular idea, linked to the specification content, which follows through from Part 1 to Part 3. The parts should be taken in the order 1, 2 and 3.

Part 1 requires candidates to research and collect secondary data.

Part 2 requires candidates to plan an investigation to test a hypothesis and then to use their plan to collect primary data. Additional Science and the Separate Sciences require candidates to develop the hypothesis they will test.

Part 3 requires candidates to process, analyse and evaluate their primary and secondary data and draw conclusions.

Together these three parts enable candidates to demonstrate their scientific investigative skills and their knowledge and understanding of science and scientific process.

WHEN TASKS WILL BE AVAILABLE

Tasks will be uploaded to Interchange in June two years before the submission date for that task.

Tasks can be submitted in the June series only.

Centres may use the task with their candidates at any time between its release and submission for moderation (15th May in the year specified).

WHICH MODULES APPLY TO TASKS FOR DIFFERENT SPECIFICATIONS

The table below summarises the number of tasks available for each June assessment series and the modules on which they will be based.

Specification	Tasks available	Source modules
SCIENCE	1 Biology task 1 Chemistry task 1 Physics task	B1 or B2 C1 or C2 P1 or P2
ADDITIONAL SCIENCE	1 Biology task 1 Chemistry task 1 Physics task	B3 or B4 C3 or C4 P3 or P4
BIOLOGY	Additional Science Biology task (above) 1 Biology task	B3 or B4 B1 to B6
CHEMISTRY	Additional Science Chemistry task (above) 1 Chemistry task	C3 or C4 C1 to C6
PHYSICS	Additional Science Physics task (above) 1 Physics task	P3 or P4 P1 to P6

For Science there will be three tasks available in each series, one each from Biology, Chemistry and Physics.

Likewise, for Additional Science there will be three tasks available, one each from Biology, Chemistry and Physics.

For each of the Separate Sciences there will be two tasks available. One will be the appropriate task from Additional Science and the other will be specifically for that subject.

Science tasks **cannot** be used for Additional Science or the Separate Sciences.

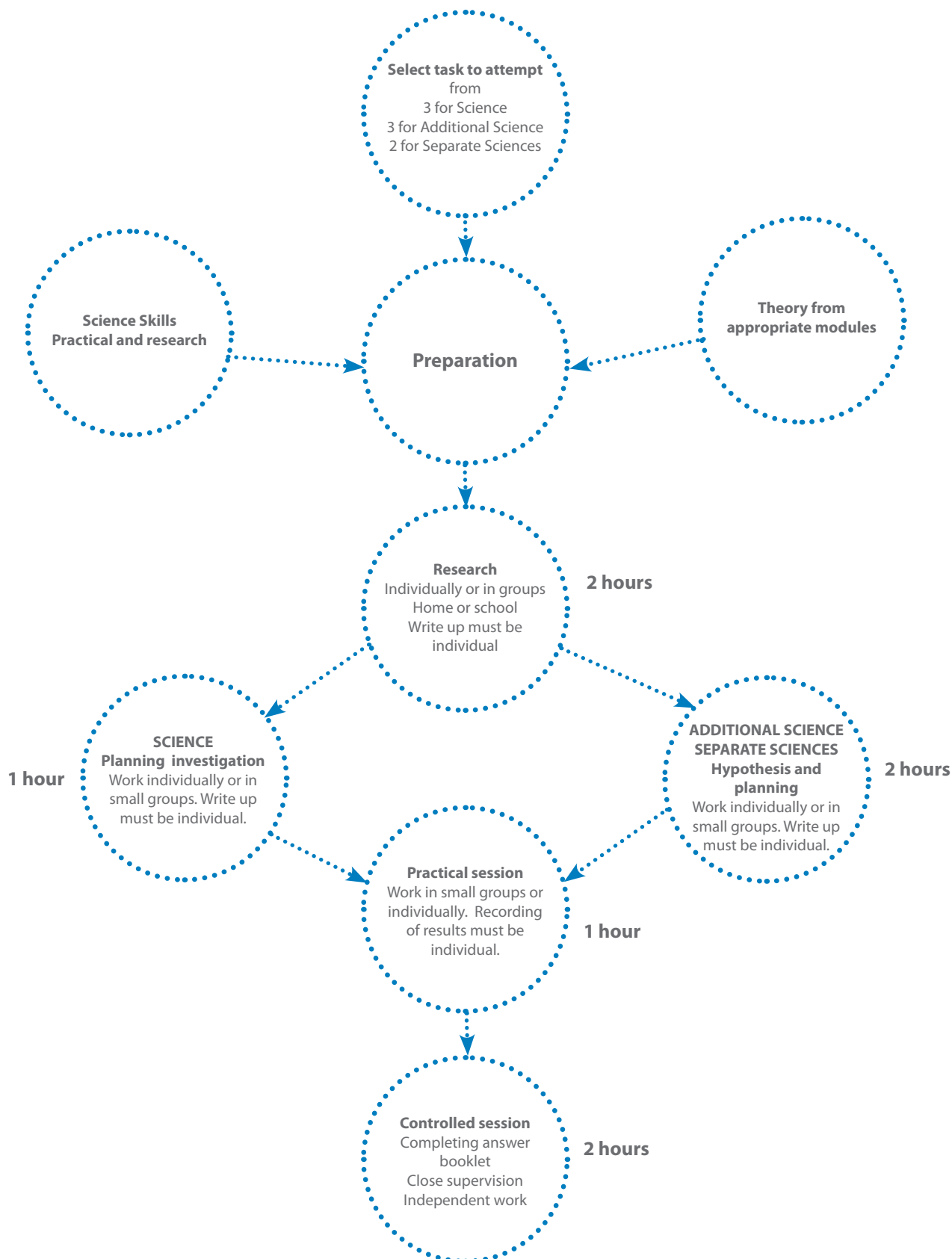
Tasks from Additional Science or the Separate Sciences **cannot** be used for Science.

The Separate Science tasks based on modules 1, 2, 5 and 6 can be used for Additional Science.

SECTION C

CONTROLLED ASSESSMENT OVERVIEW

FLOW CHART SHOWING HOW TO RUN A CONTROLLED ASSESSMENT



CHOICE OF CONTROLLED ASSESSMENT TASK

OCR will assume a high level of control in relation to the setting of tasks. Three task titles will be available for Science and Additional Science. Two task titles will be available for each of the three Separate Sciences.

These tasks have been designed to meet the full assessment requirements of the unit. Candidates will need to take part in a planned learning programme that covers the underpinning knowledge and skills of the unit.

For each task, centres must choose from the task titles offered by OCR. The tasks will be changed each year. A candidate wishing to resit 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 may devise their own practice material, using the OCR specimen controlled assessment tasks as guidance.

WHEN AND HOW TO GIVE CONTROLLED ASSESSMENT TASKS TO CANDIDATES

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

Controlled assessment task titles for the next two years will be available from Interchange. This is to enable effective management of practical work preparation and Health and Safety requirements.

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.

CONTROLLED ASSESSMENT TASK OUTLINE

The task is divided into three parts. **All parts of the same task must be submitted.** The parts of the task must be completed in order, but there could be a gap in lessons between each part. This will permit any absentees to catch up. However, the length of time between each part should not be excessive as there is a theme running through the task and candidates need results from Parts 1 and 2 to complete Part 3. Candidates are not permitted to redraft any of their work.

PART 1 RESEARCH AND COLLECTING SECONDARY DATA

Candidates are required to plan and carry out research. The research stimulus is supplied to candidates as a handout. They can carry out the research in class or as a homework activity. The results of their research are then required for Parts 2 and 3.

Candidates individually write up their research under supervised conditions. They should record all the sources used for research with full references.

All work should be recorded on loose-leaf paper, and may be hand written or word processed. Candidates' work should be collected in at the end of this part of the task and stored in preparation for Parts 2 and 3.

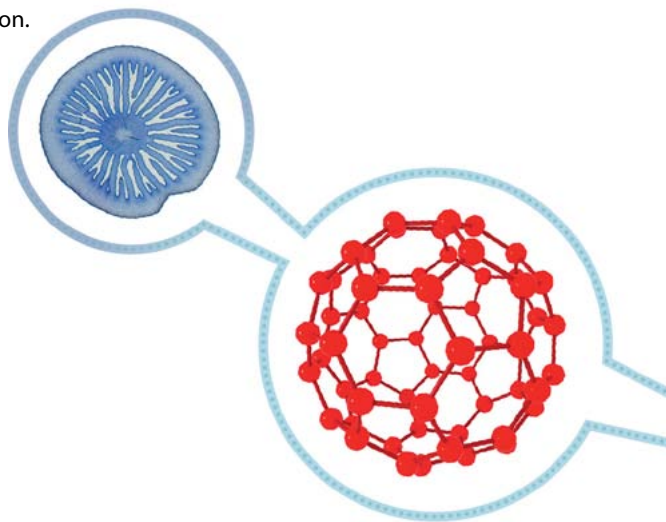
Part 1 should take about 2 hours.

PART 2 PLANNING AND COLLECTING PRIMARY DATA

Candidates are required to plan and carry out an investigation to test a hypothesis and to collect primary data. The Part 2 stimulus material provides the candidates with the hypothesis to be tested. They should be given their information and work from Part 1. They may work individually, in pairs or in small groups during the planning and experimental stage. However, each candidate must individually write up their plan, produce their own results table and record the results of the experiment. Candidates collect data from the experiment and record their data and observations appropriately. All work should be recorded on loose-leaf paper, and may be hand written or word processed. All the candidates' work should be collected in at the end of Part 2 and stored in preparation for Part 3.

Part 2 should take about 2 hours for GCSE Science tasks: one hour for planning and one hour for the investigation.

Part 2 should take about 3 hours for GCSE Additional Science and Separate Science tasks: two hours for planning and one hour for the investigation.



PART 3 ANALYSIS AND EVALUATION

Candidates are then required to independently process, analyse, interpret and evaluate their own and secondary data. This part of the task must be carried out under supervised conditions.

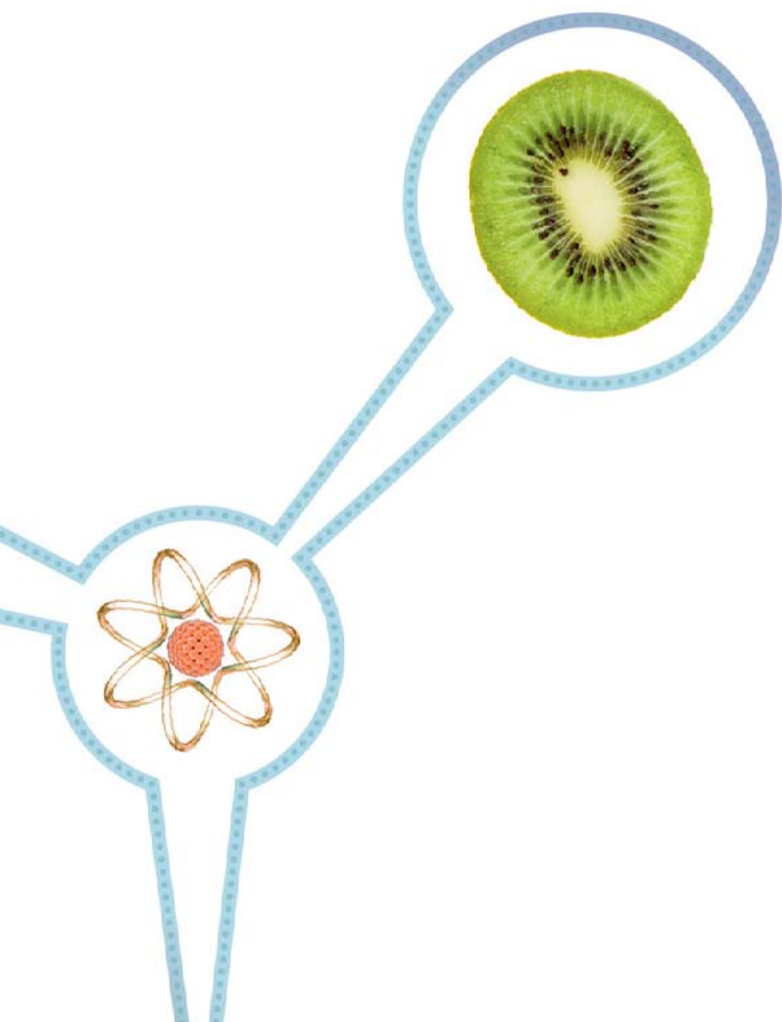
They will require their own work from Parts 1 and 2. They will be required to comment on risks involved and how they managed those risks. Questions in an answer booklet will guide the candidates throughout this process. All answers should be recorded in the answer booklet. A conclusion will be drawn based on the data. Part 3 should take approximately two hours.

On completion of the task all work should be collected in, collated and securely attached to the Part 3 answer booklet.

OVERVIEW OF MARKING THE TASK

The work is assessed using the marking criteria in the Specification. This process is covered in much more detail in section F.

- Work should be marked using the **Marking Criteria in the Specification**.
- The Additional Guidance is **not** a mark scheme but merely a guide to the level of answer expected.
- Marking is not hierarchical but should be done on a '**best fit**' basis.
- Eight qualities are assessed, each marked out of six marks.
- Marks are awarded as 0, 1-2 marks, 3-4 marks, 5-6 marks.
- **Research** will be assessed partly from the written account produced by the candidate in Part 1 and partly from the candidate's answers in Part 3.
- **Planning** is assessed from the written plan produced by the candidate. The **hypothesis** in Additional Science and the Separate Sciences is also assessed from the written plan.
- **Collecting data** is assessed from the record of results produced by the candidate.
- **Managing risk** is assessed from the written plan in Part 2, Part 3 and by observation during the practical session.
- **Processing data** is assessed from the candidate's results and answers in Part 3, mainly in question 1.
- **Analysing and interpreting** is usually assessed from the answers to questions 2 and 3 in Part 3.
- **Evaluating** is usually assessed from the answer to question 4 in Part 3.
- **Justifying a conclusion** is usually assessed from the answer to questions 5 and 6 in Part 3.
- Quality of Written Communication (**QWC**) will be assessed as part of **Planning** and **Evaluating**.



SECTION D**PREPARING FOR A CONTROLLED ASSESSMENT****SELECTING A CONTROLLED ASSESSMENT TASK**

In selecting an appropriate task you will wish to take into account:

- the nature of the practical task
- the module/s upon which it is based
- the time when you wish to use it.

Your choice of controlled assessment could be influenced by:

- the subject it is from
- the nature of the practical work involved.

In Science and Additional Science you have a choice of subject and your subject expertise may influence your decision.

The nature of the practical task may need to be taken into account because of:

- availability of resources
- the practical skills of your candidates
- your perception of how well your candidates might cope with a particular task.

It is important to consider the module on which the task is based, as the content needs to be covered prior to candidates taking the task. Tasks can also be incorporated into the teaching of the module.

Tasks are usually based on a particular module but sometimes knowledge of parts of a different module is also required. Information will be provided in the Teacher Guidance for the specific task.

Remember that tasks can only be submitted in the assessment year stated on the front cover of the task. A completed assessment task must be marked and submitted for moderation by May 15th in the year stated on the front of the assessment. There are always two sets of tasks available on Interchange. One set for the current assessment year and one for the following year. Which set you choose from will depend on when you wish to submit the work for moderation.

It is not advisable to undertake the controlled assessment too early in the course as there will not have been time to adequately prepare your candidates.

PREPARING CANDIDATES

In preparing candidates for a controlled assessment the following are important:

- teaching the science which needs to be understood for successful completion of the task
- developing the skills necessary for the task's completion.

The section entitled Preparing for the assessment on page 2 of the Teacher Guidance booklet, downloaded as part of the task, gives details of which module/s and which particular items of the module/s the candidates need to understand. It also gives details of any mathematical formulae the candidates may need to use. It is important that a candidate's understanding of these areas is as thorough as possible.

In addition, candidates should have had practice in the skills needed to undertake all the parts of the controlled assessment.

These skills are listed in Appendix 3 Science Skills.

The Science Skills table links the skills which students should develop to items in the modules of the Specification.

It is important that students are given practice in these skills if they are to perform well in the controlled assessment.

The layout of the Science Skills pages is similar to the layout of the material in the Specification for each module, with columns for low demand, standard demand and higher demand. The first column lists the items which provide opportunities for the development of that skill.

Below are listed some possible activities linked to each of the skills in the Science Skills table (see Appendix C).

C1c. - Research how different pollutants enter the atmosphere.

P1d. - Research the dangers of mobile phone use.

B1e. - Create a hypothesis to explain why smokers have a shorter life span on average.

C1g. - Design an experiment to find which of a range of solvents is best for dissolving nail varnish.

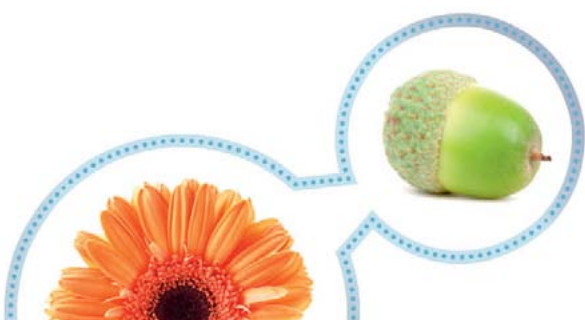
P1a. - Design an experiment to compare the heat capacities or latent heats of fusion of different substances.

B1f. - Conduct an experiment to discover the variation in temperature along the length of a limb.

B1d. - Test the range of vision or binocular vision and discuss weaknesses of the method.

C2b. - Investigate the thermal decomposition of carbonates and the resulting change in mass.

P2a. - Investigate factors affecting the output of a solar cell and formulate a conclusion.



During the preparation stages the teacher should introduce the topic and remind candidates of the contexts within which they have studied related content and ideas. The wording of the stimulus sheets may be explained to candidates.

Candidates may be given access to the generic marking criteria only. Photocopying the relevant pages from the specification would be the best way of obtaining the marking criteria for candidates.

It is expected that candidates are familiar with what is required of them before undertaking a task:

- they should have the style of the parts of the task explained to them
- practice researching
- practice planning - candidates will be expected to justify their choice of equipment in their plan
- develop hypotheses (Additional and Separate Sciences) - a scientific hypothesis is a tentative explanation of science-related observations, or some phenomenon or event

The hypothesis has the form

STATEMENT-----because-----REASON.

The statement is usually a statement of a scientific observation. The reason is a possible (but not necessarily correct) explanation for the observation.

Examples:

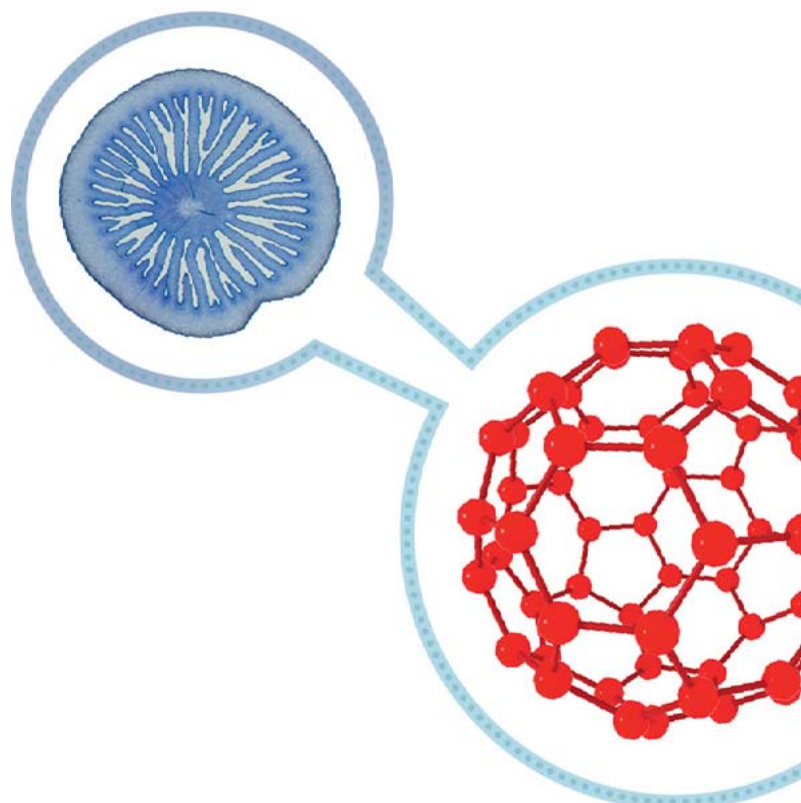
Biological washing powder works better at low temperatures because the enzyme in it is denatured at high temperatures.

Plants wilt more quickly in sunny and windy weather because more water is lost from their leaves.

Cars parked at the seaside rust more quickly because the salt in the sea spray increases rusting.

- carry out risk assessments
- have the questions in the Part 3 booklet explained to them
- evaluating data and method
- processing data
- what is meant by a trend and pattern
- drawing conclusions.

Candidates should have the opportunity to practice a controlled assessment task before completing one for submission. This should include teacher feedback after marking the practice task.



SECTION E

MANAGING A CONTROLLED ASSESSMENT TASK

PART 1 RESEARCH

Part 1 of each controlled assessment involves research. Candidates are provided with an A4 Part 1 stimulus sheet which introduces the theme of the controlled assessment task. A copy of the stimulus is included in the Teacher Guidance.

This sheet provides information as to what ideas and topics they need to concentrate on during their research. Candidates should ensure that, as a minimum, they find out about these topics and ideas.

Candidates are expected to research textbooks, the Internet and other sources to find secondary data which will help them in Parts 2 and 3. For some candidates, access to resources for research may be difficult. In these cases a wide range of sources, including a list of URLs, may be provided to candidates in a library box from which they have to select materials for use. Candidates must have a sufficient range of materials to make decisions about which sources are relevant.

Research can be done in school or as a homework task. Candidates may work individually or in small groups to undertake the research. This part of the task is under limited control.

In a supervised session candidates will individually write up their research to provide notes which address the issues on the stimulus sheet. These notes should be brief and not a lengthy report. The written notes of their research must be their own work, not a 'combined effort', as they will be used for assessment. Candidates can hand write or word process their research notes. However, a hard copy of their notes is required for the subsequent parts of the task and for submission for marking.

Candidates must include full references for all sources used. For Internet sources this should be the full URL. For textbooks and other publications this should be a minimum of title, author and page number. Referencing may be in the form of a bibliography or the source noted in full at the appropriate section of the notes.

Candidates opting to produce hand written reports can copy textual and visual material collected, either by hand, or by cutting out and sticking material into their notes.

Candidates opting to produce word processed reports can copy and paste textual and visual material into their reports electronically. Writing frames are not permitted.

The research work (their notes and copies of web pages/ photocopies of book pages or articles) is for use when answering some of the questions in Part 3. It should be collected in and stored securely until it is needed by candidates in Parts 2 and 3.

Candidates may be given access to the generic marking criteria only. Candidate access to the Additional Guidance is strictly prohibited. Two hours is the expected time allocation for this part of the task. If write-ups extend over more than one session, work must be collected in. In all cases, the teacher must be able to authenticate work submitted for assessment.

PART 2 PLANNING - SCIENCE

In Part 2 of the controlled assessment the candidate is supplied with the A4 Part 2 stimulus material, which is also found on page 4 of the Teacher Guidance booklet.

This stimulus material sets out a scenario based on the same general topic as the research done in Part 1. It concludes with the presentation of a hypothesis.

The candidate must plan an investigation to verify (or otherwise) this hypothesis.

Candidates may work together in groups (maximum of three) to decide on a strategy as planning is limited control, but the written plan must be entirely the candidate's own work. They will also need to develop their own response in determining how best to collect and record data.

The teacher in charge of the supervised session should be able to certify the plan is the candidate's own work.

At the end of the session, work should be collected in and stored securely until needed in the practical session.

It is expected that this part of the task will take about one hour.

The following points need to be considered when conducting this session:

- planning skills should have been covered before the task is attempted (see appendix 3)
- it is a good idea to display a selection of the equipment available for the candidates to look at and choose from. There should be more than is strictly needed e.g. more than one size of measuring cylinder, a range of flasks, tubes and beakers. This could be supplemented by a list of materials available.
- on page 5 of the Teacher Guidance booklet there is a list of the choices that the candidate will need to make. Candidates should not be given any instruction or assistance in making these choices
- candidates can be informed of maximum values to use where these are a safety or resource issue but teachers should not explain why these values have been given

- candidates are expected to include a risk assessment as part of their plan. Hazcards could be made available to candidates.
- candidates are only allowed the stimulus material, their research notes and copies of research in this session. Textbooks and exercise books are not permitted
- candidates may be given access to the generic Marking Criteria. Access to the Additional Guidance is strictly prohibited.
- the plan may be hand written or word processed but writing frames are not allowed
- if computers or laptops are used, internet access must be disabled
- candidates may try out procedures which they intend to use in their planned investigation during this session. Candidates may use these trials to inform their plans.
- candidates will need to draw up a results table during the writing up of their plan
- redrafting of the plan is not permitted.

This section of Part 2 is expected to take about one hour.

PART 2 PLANNING - ADDITIONAL SCIENCE AND SEPARATE SCIENCES

There is one key difference in the planning exercise for Additional and Separate Sciences: candidates have to produce their own hypothesis. The stimulus material sets out a scenario, gives a statement of an observation, and then asks the candidate to provide their own explanation in the form of a hypothesis.

The hypotheses given in the controlled assessments for Science give a suitable structure for this hypothesis, but other forms of words linking an observation with an explanation are acceptable.

Candidates may work together in groups (maximum of three) to discuss a possible hypothesis and decide on a strategy to test the hypothesis, as planning is limited control. However recording the hypothesis, and the plan to test it, must be entirely the candidate's own work.

Apart from this, the requirements are identical to those for Science. It is expected that the task will take a little longer than the hour expected for Science: the guidance for time allocation is between 1.5 hours to two hours.

PART 2 PRACTICAL SESSION

The second section of Part 2 is where the candidates carry out the practical work which they have planned in the previous session. This session is limited control.

Teachers should check the plan for any risks involved before the candidates are allowed to proceed. If the plan is unsafe the candidates in this group should be given the plan of another group. They will be marked on the basis of their original plan – see section F.

Candidates may suggest a plan which is scientifically sound and feasible but the centre is unable to provide the resources. In this case, the plan of another group should be given to the candidate/s. The candidate's own plan should be marked against the criteria – see section F.

It is not permitted for teachers to provide their own plan for candidates to use.

Candidates should be given back their plan and their research from Part 1 for this session.

Candidates may work either individually or in small groups. Three should be the maximum size allowed although two is preferable.

Candidates are permitted to make changes to their plan during the practical work. Any changes should be recorded as amendments to the plan, with reasons, and attached. The original plan must be submitted.

Only such supervision as is necessary to ensure safe working is required and no guidance should be given on how to improve their planned procedures.

Teachers may intervene in the following situations:

- where a candidate is behaving unsafely
- the procedure is likely to involve a significant risk.

If intervention is necessary, it is important to annotate the candidate's work.

Each candidate needs to make their own record of results and observations. This part of the task should not be a combined effort as it is assessed.

Note: It is not permitted for candidates to base their collection of results on data from a demonstration, or from secondary data.

Teachers should be able to certify that the record of results and observations is the candidate's own unaided work.



At the end of the session, the Part 1 research and Part 2 plan and record of results should be collected in and stored securely for use in Part 3.

Part 3 often requires candidates to compare their results with those of other groups in the class. It is a good idea either to photocopy some suitable results or to write some on a white board before the commencement of Part 3.

Teacher results should not be used.

If candidates are unable to collect any results they should be given the results of another group. In circumstances when this is necessary it is important to annotate the candidate's work. In these circumstances the candidates will not gain marks for collecting data.

If candidates are able to collect only partial results they should be given the results of another group. In these circumstances the mark for collecting data should be limited to 2 marks and the candidate's work annotated accordingly.

The practical session for Part 2 is expected to take about one hour.

PART 3 THE CONTROLLED SESSION (ANALYSIS AND EVALUATION)

This part of the task is under high control.

Candidates should work independently under supervision.

Each candidate requires:

- the Part 3 answer booklet
- their research notes from Part 1, together with the stimulus material from that part
- their plan (and hypothesis where appropriate) from Part 2, together with the stimulus material from that part
- their record of results and observations from the Part 2 practical session
- access to graph paper – A4 2mm is recommended
- access to a calculator
- candidates may be given access to the generic Marking Criteria. Access to the Additional Guidance **is strictly prohibited**.
- in some tasks candidates require the results from another group of candidates as secondary data. The teacher should photocopy or display a set of results for the candidates to use.

The only other materials permitted are those that are allowed in examinations e.g. a Periodic Table and a Physics formula sheet.

Textbooks, exercise books, student notes or revision notes are strictly forbidden.

Teachers need to check the Part 3 answer booklet before issuing it to the candidates as in some tasks they are required to provide another group's results as secondary data.

Answers to the questions in the answer booklet may be hand written or word processed. However, if computers/laptops are used access to the internet and the student's personal areas must be disabled.

Part 3 should take approximately two hours and candidates should be informed of this time as a guide to the sort of detail expected in the answers. If more than one lesson is required, then all work must be collected in and stored securely and given out again in the next lesson for completion.

If the spaces allowed in the booklet prove too small, additional sheets may be used. These, together with any graphs drawn, should be attached to the booklet.

Teachers are not permitted to give any specific feedback during this session.

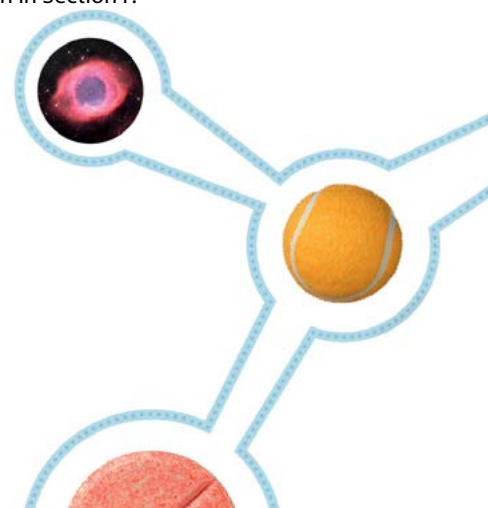
Redrafting of work is forbidden.

At the end of this session all written work should be collected:

- Part 1 research notes
- Part 2 plan (hypothesis if appropriate)
- Part 2 results
- Part 3 answer booklet
- graph paper and any extra lined paper.

All should be joined together securely for marking. After marking, work should be stored securely until needed.

Guidance on marking is given in Section F.



SECTION F

MARKING THE CONTROLLED ASSESSMENT TASK

The purpose of this section is to give guidance on using the marking criteria to award marks for candidates' work.

The marking criteria are in the Specification and a copy is included in the Teacher Guidance supplied for each task.

GENERAL POINTS

The Additional Guidance is not a mark scheme. Its purpose is to give examples of the level expected in the answers for that particular task.

Only the Marking Criteria should be used in marking. The Additional Guidance only gives some of the possible creditworthy responses. Using the guidance as a mark scheme could, therefore, disadvantage candidates.

In addition moderators will use the Marking Criteria as the only guide to the accuracy of marking.

Marking should be positive, rewarding achievement rather than penalising failure or omissions. The award of marks must be directly related to the Marking Criteria.

Those familiar with the old Gateway Specification will be used to using criteria which were hierarchical (each level had to be met in full before the next level could be accessed).

In this specification marking is by best fit; the level descriptor which most closely matches the candidate's performance will inform the decision as to what mark to award.

Teachers use their professional judgement in selecting the band descriptor that best describes the work of the candidate.

Only one mark per Skill Quality will be entered. These will be recorded on the front of the Part 3 candidate answer booklet. The final mark for the candidate for the controlled assessment unit is out of a total of 48 and is found by totalling the marks for each of the Skill Qualities.

WHERE TO FIND THE EVIDENCE

The marking criteria are linked to specific parts of the controlled assessment task.

Research: the research notes for Part 1 and the answers to questions 6 and sometimes 3 in Part 3.

Planning: the plan and amendments made to the plan.

Collecting Data: the results table and loose-leaf answers to question 1 in Part 3.

Managing Risk: the written plan for Part 2, by observation during the practical task and question 4 in Part 3.

Processing data: the results table, loose-leaf graphs produced in answer to question 1 in Part 3 and possibly the plan in Part 2.

Analysing and interpreting data: the answers to questions 2 and 3, and possibly 6, in Part 3.

Evaluating: the answer to question 4 in Part 3.

Justifying a conclusion: the answers to questions 5 and 6 in Part 3.

N.B. Marks can also be awarded from evidence found in the answers to other questions.

GUIDANCE ON THE USE OF THE MARKING CRITERIA FOR EACH SKILL QUALITY

RESEARCHING

There are two places where evidence for this skill is to be found.

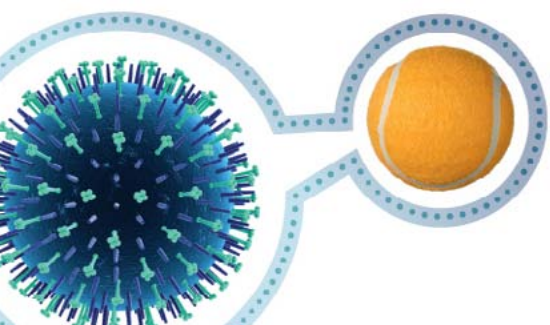
The statement in the 1-2 mark section reads "Some information collected and used..." Evidence for the collection will be found in the candidate's notes made in the write-up session in Part 1 after carrying out the research. Attention should be given to:

- the number of sources used
- whether they are identified by references
- whether the references are complete (e.g. full URLs)

Evidence for the use of sources and for the selection of sources appropriate for the task will be found in the answers given in Part 3. Question 6 and sometimes question 3 give opportunities to demonstrate these aspects of the skill.

PLANNING [QWC]

This skill considers the quality of the written plan and the quality of the written communication.



Differentiation is chiefly by the amount of detail in the plan and the detail required at each level is clearly stated in the marking criteria.

Modifications made to the plan are given credit at the higher marks. It may be that, if the candidate has trialled some part or parts of the investigation, there is evidence of modification in the plan itself. Candidates may make modifications during the practical session. They should have recorded any changes to their plan but also submitted their original plan. When marks are given for modifications the plan should be annotated appropriately.

Quality of written communication also needs to be taken into consideration in deciding on the final mark.

In many cases, perhaps most, the quality of the plan will match the quality of written English. However, if it does not, marks would have to be adjusted appropriately according to the principles of best fit. An excellent plan written poorly could not be given full marks. An annotation explaining the mark given in such cases would be helpful to the moderator in supporting the centre's decision.

COLLECTING DATA

Marking is based on the candidate's recording rather than observation by the teacher of the candidate collecting results. The distinction between the different mark levels is clear from the criteria.

It is important to bear in mind the 'official' meanings of accuracy and precision.

- accuracy = how close a reading is to the true value
- precision = how close repeated values are to each other

If candidates are unable to collect any results they should be given the results of another group. In circumstances where this is necessary, it is important to annotate the candidate's work. In these circumstances, the candidates will not gain marks for collecting data.

If candidates are able to collect only partial results they should be given the results of another group. In these circumstances, the mark for collecting data should be limited to two marks and the candidate's work annotated accordingly.

If a candidate is unable to draw up their own results table, they may be given one by the teacher. In this case the candidate is limited to one mark.

MANAGING RISK

There are two aspects to this skill:

- the assessment of risk in the written plan produced in Part 2
- working safely and coping successfully with the risks during the practical session.

The first is assessed from the plan, the second by observation during the practical session and the candidate's answer to question 4 in Part 3.

Remember that marking is by best fit, not hierarchical. If there is a mismatch between the two aspects of the skill, an annotation will again be useful to the moderator, whose job it is to support the centre's decisions where possible.

PROCESSING DATA

This skill has two aspects: mathematical techniques and graphical techniques.

The criteria for two marks state "...data presented as simple charts or graphs...use of one simple mathematical technique." Thus, both a graph/chart and the use of mathematical technique/s are required.

The descriptions of the level of graph required at the different mark boundaries are well described in the criteria. In order to help with decisions, some examples are given at the end of this section.

The mathematical techniques required vary in complexity according to the marks being awarded. They range from something as simple as addition or subtraction of values at the two mark level, to correct averaging at the four mark level, to more complex techniques for the higher marks.

Below are listed techniques which might be expected at each level. Their appropriateness will vary from task to task.

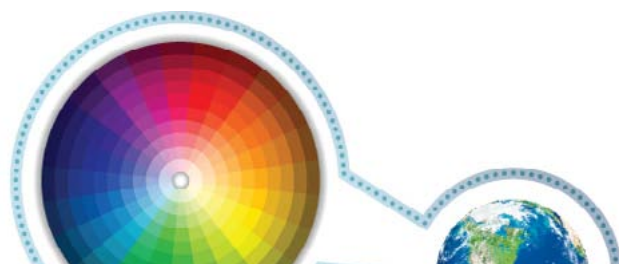
1-2 marks: one of: simple arithmetic, finding a mean (some errors allowed), correct rounding of values.

3-4 marks: more than one of: the items listed above, correct calculation of mean, percentage error, percentage yield, substitution in an equation, calculation of surface area of a simple shape.

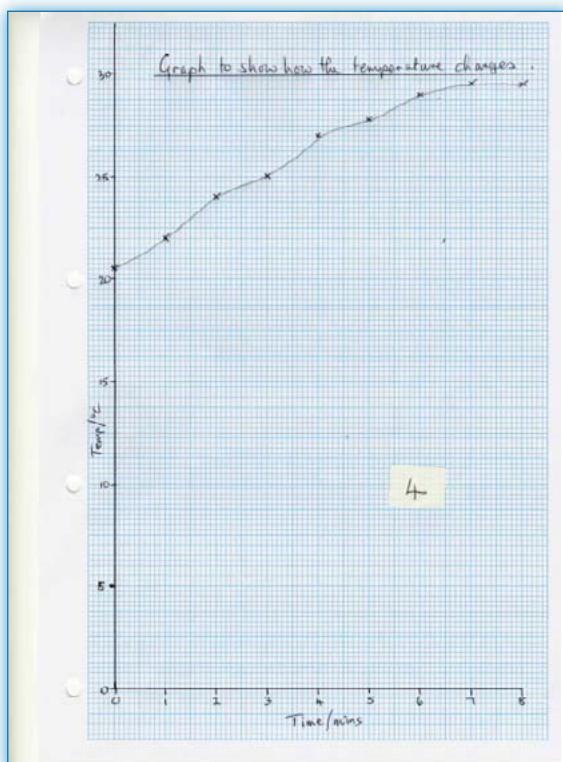
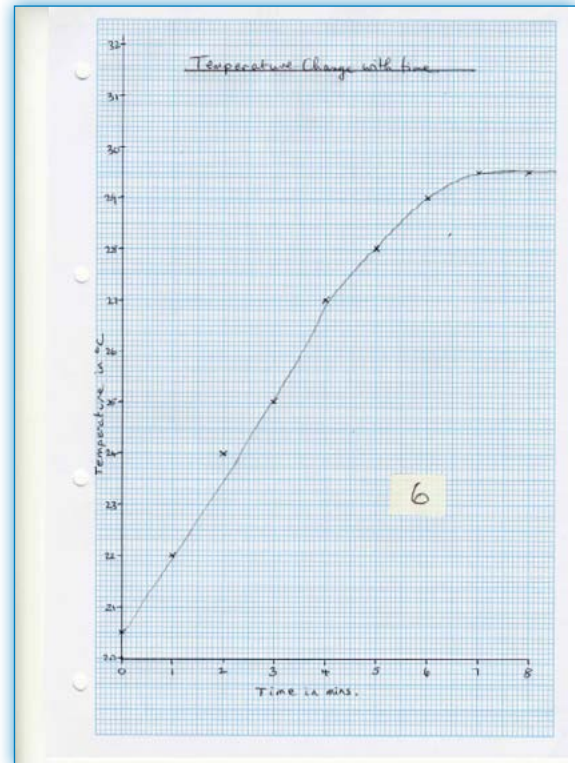
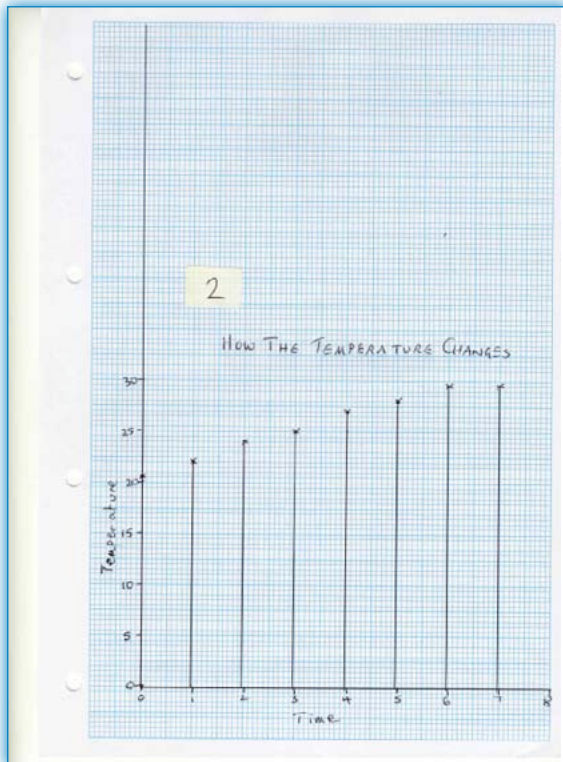
5-6 marks: calculating rate, calculating gradient of a line, changing the subject of an equation, calculation of surface area of a complex shape, serial dilutions, quantitative assessment of uncertainty.

These lists are not exhaustive but are indicative of the level of work required.

Remember that marking is by best fit and that annotation is advisable where there is a mismatch between the two aspects of the skill.



EXAMPLES OF GRAPHICAL WORK



These graphs and those on the next page are based on an experiment where temperature changes over time. The raw data are as follows:

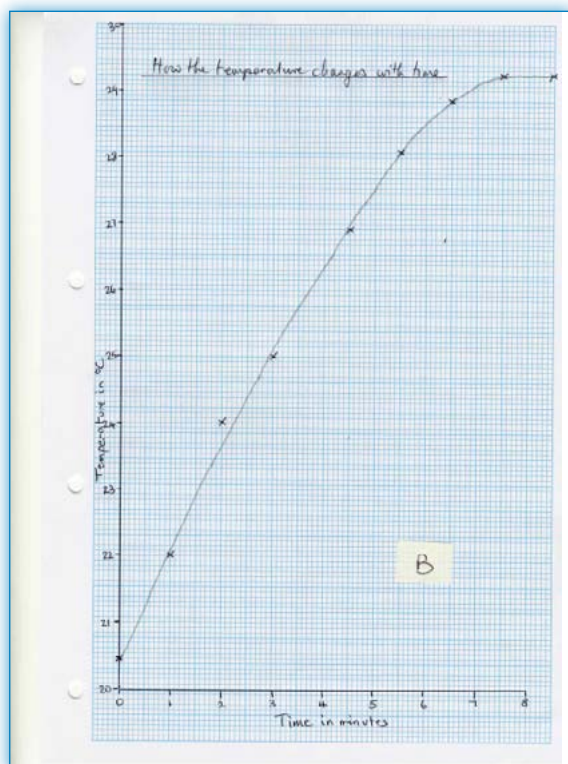
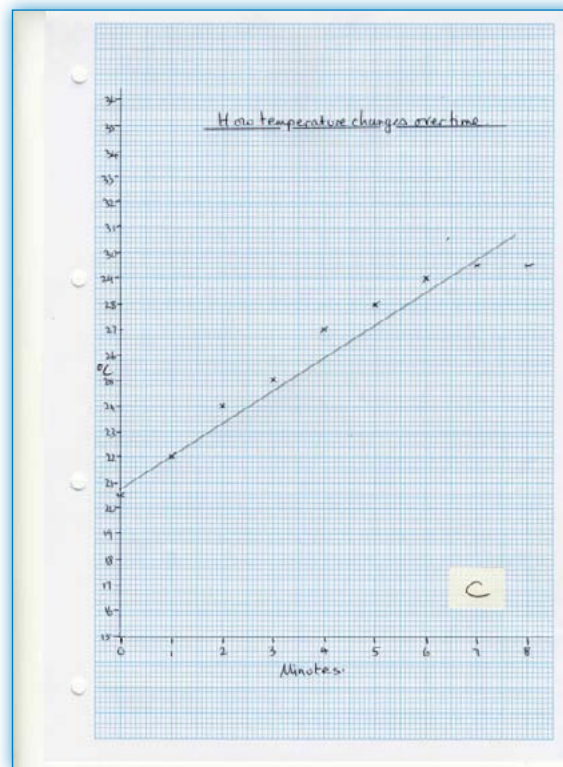
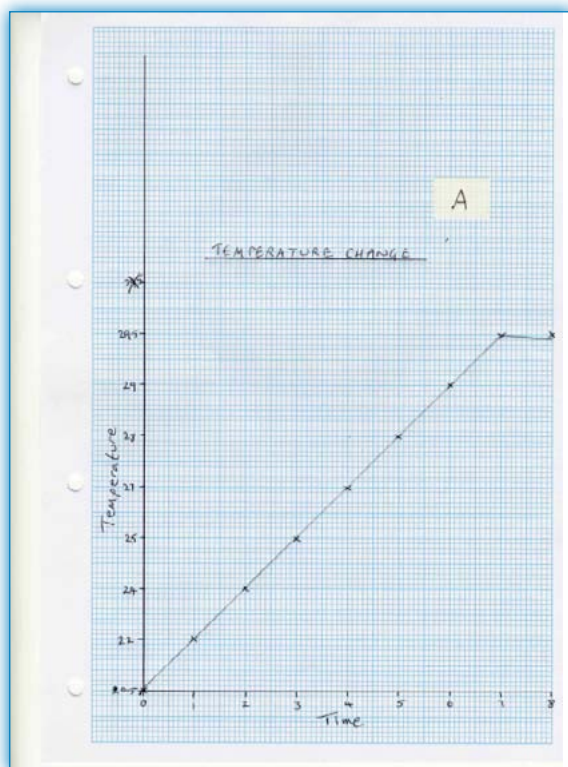
Time	0	1	2	3	4	5	6	7	8
Temp	20.5	22	24	25	27	28	29	29.5	29.5

The graphs on this page show what might be expected at each mark level.

The graphs are not intended to be ideal examples but represent graphs around the borderline for the mark concerned.

N.B. This mark may not be the mark awarded overall for Processing, as the use of mathematical techniques also has to be taken into consideration.

The three graphs overleaf, labelled A-C, have issues sometimes observed in candidate's work.



A] Seen quite commonly, mostly with weak candidates. Only worth two marks.

B] Good attempt to use the whole sheet of graph paper with an odd scale. Unfortunately, there are three plotting errors. Worth four marks.

C] Scale is just about OK with graph occupying about half the grid. Plotting is accurate but the points clearly indicate a curve. A 'best fit' straight line is only worth four marks.

These marks are what might be given based purely on the graph.

The use of mathematical techniques must also be taken into consideration.

If the two do not match in marks, a compromise mark must be given according to 'best fit'. Annotation is advisable.

ANALYSING AND INTERPRETING

This skill is about finding and explaining patterns. The marks are differentiated by how the finding of the patterns is approached and by the sophistication of the explanation.

Simply stating the pattern and making an attempt at linking own results to secondary data with a limited explanation is sufficient for two marks.

For four marks, there must be some explicit link between the description of the pattern/trend and the data from which it is derived. The explanation of the trend/pattern must have some science in it and be largely correct. Any anomalies in the data should have been spotted and taken into account, although a detailed explanation of their origin would receive credit under the evaluation criteria. A comparison between own results and secondary data should be made and reasons for similarities or differences suggested.

Six marks demands the same factors as above but the scientific explanation should be in more depth, showing thorough understanding of the theory involved. Any uncertainty as to the truth or otherwise of the pattern/trend observed should also be explored.

Marks should be awarded for correct answers given to questions 2 and 3 in Part 3. Candidates may also be given credit for correct application of these skills in relation to question 6.

EVALUATING [QUALITY OF WRITTEN COMMUNICATION]

Evaluation requires both comments on:

- the quality of the data obtained
- the methods used to obtain it.

The criteria are clear in their description of how differentiation should be achieved.

Teachers should be aware of the official meanings of certain terms – see Appendix H.

Evaluating is the second skill in the controlled assessment where Quality of Written Communication (QWC) should be assessed.

As with Planning, there will often be a match between the level of written English and the level of the actual Evaluation. Where this match is not evident, marks should awarded by best fit. An annotation explaining why a particular mark has been chosen is both advisable and helpful to the moderator.

JUSTIFYING A CONCLUSION

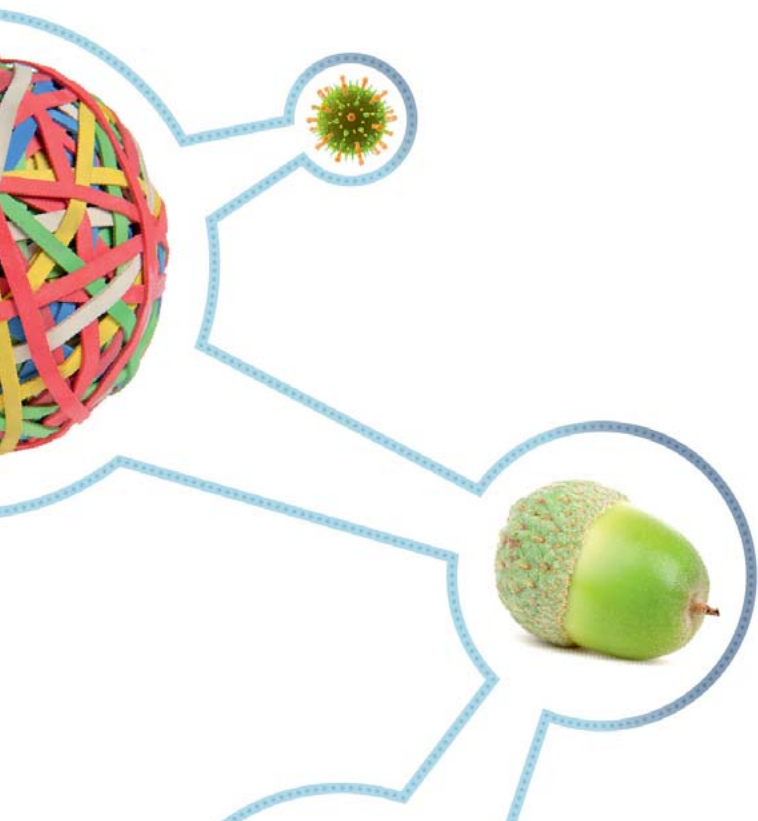
There will inevitably be some overlap between the answers concerning Analysing and interpreting and those concerning Justifying a conclusion. Marks can be awarded based on the answers to any of the questions provided that they conform to the criteria.

There are similarities in the wording of the two sets of criteria and the basis of differentiation is very similar.

A simple answer to question 5 or a simple conclusion to question 6, based on their results, and will merit two marks.

For four marks, a conclusion must be linked to the analysis of the results from Part 2 and the research from Part 1. The justification of the conclusion should clearly demonstrate some understanding of the science. Question 5 should be answered with a limited explanation.

For six marks, there must be a discussion of the data which justifies the conclusion arrived at. The scientific explanation must be thorough and demonstrate that the science concerned is fully understood. At this level, candidates will also be able to synthesise both primary and secondary data to draw a conclusion in answer to question 6. Their answer to question 5 will have a detailed explanation linked to their results from Part 2.



ANNOTATION OF CANDIDATE WORK

The Code of Practice for GCSE Examinations requires teachers to show how the marks have been awarded. One convenient way of meeting this requirement is by hand written annotation on each candidate's work.

There are occasions, mentioned in the notes on previous pages, where annotation is particularly helpful to the moderator but any annotation is useful.

It is the task of a moderator to support, wherever possible, the decisions made by the centre.

A brief note explaining why a particular mark has been decided upon can aid this process significantly.

It is particularly important where the reason is not readily apparent, e.g. where an observation has been made by the teacher during the practical session.

RECORDING OF MARKS

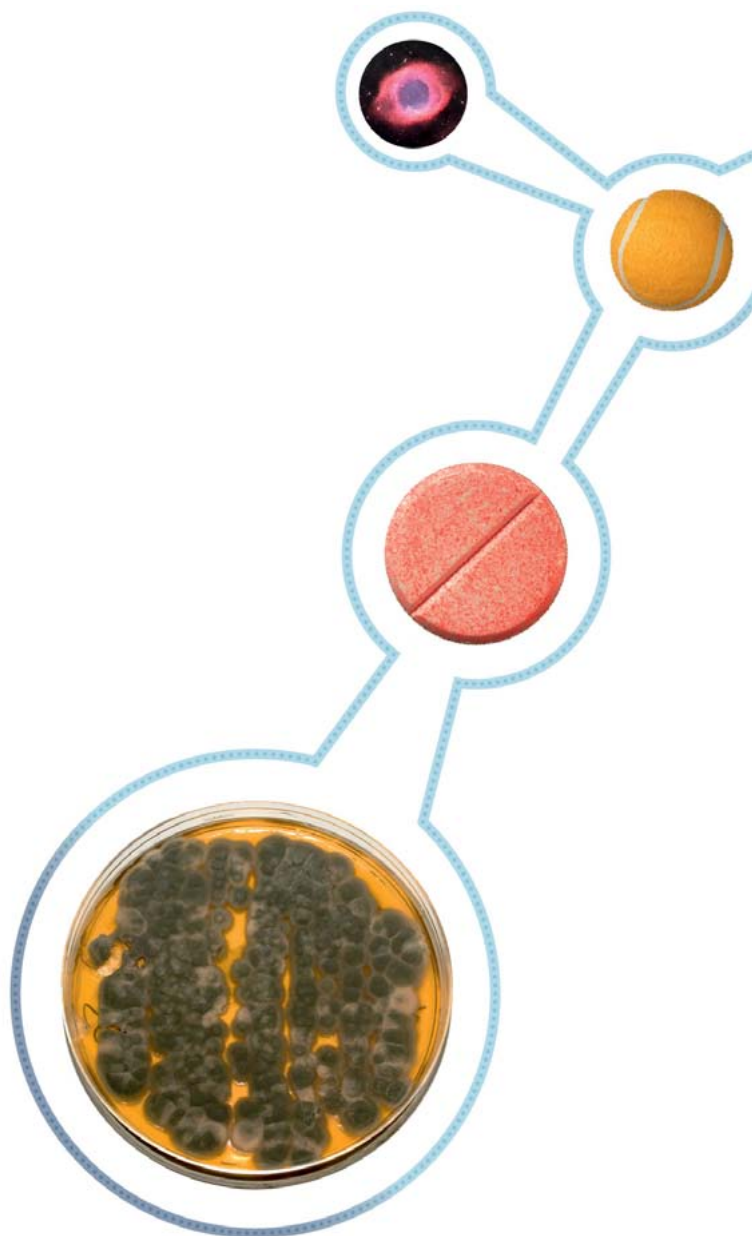
The marks awarded should be recorded in the spaces provided on the front of the Part 3 candidate answer booklet. The candidate's research notes, planning, results and graphs should be attached securely to the answer booklet.

It is important that internal moderation takes place within the centre to ensure that the same standards are being applied by all members of staff concerned.

Moderators rely on the internal consistency of the marking when checking the standards applied by the centre. If it becomes evident that there are differences in the way in which the criteria have been applied by different teachers' it can result in a centre having to remark all of the work at short notice.

STORAGE OF SCRIPTS

When the task and its associated marking are complete, the scripts should be stored securely until needed for the moderation process.



SECTION G**SUBMITTING A CONTROLLED ASSESSMENT TASK****PRESENTATION OF FINAL PIECES OF WORK**

Candidates must observe certain procedures in the production of controlled assessments:

- tables, graphs and spreadsheets may be produced using appropriate ICT. These should be inserted into the candidate's work at the appropriate place.
- any copied material must be suitably acknowledged
- quotations must be clearly marked and a reference provided wherever possible.

Work submitted on paper for moderation or marking must be securely attached to the Part 3 answer booklet.

Further details are available in the Specification.

RESUBMITTING WORK

A candidate may **not** resubmit a controlled assessment task in the year following the date on the front.

A candidate may **not** resubmit a Science controlled assessment task for any of the Separate Sciences.

As all controlled assessment tasks are limited to submission in one year only, it is not possible to resubmit once the moderator has confirmed marks.

However, a candidate may submit the same task twice in the same examination series. A task submitted for one of the Separate Sciences can be submitted for Additional Science, and the relevant Additional Science tasks can be submitted for Biology, Chemistry and Physics.

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 their 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, should there be evidence that too much

help has been given or that a candidate has simply copied work directly from another candidate, then that piece of work should not be counted for assessment purposes.

In such circumstances, 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 procedures 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 20 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 for the initial sample of work requested from the 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.

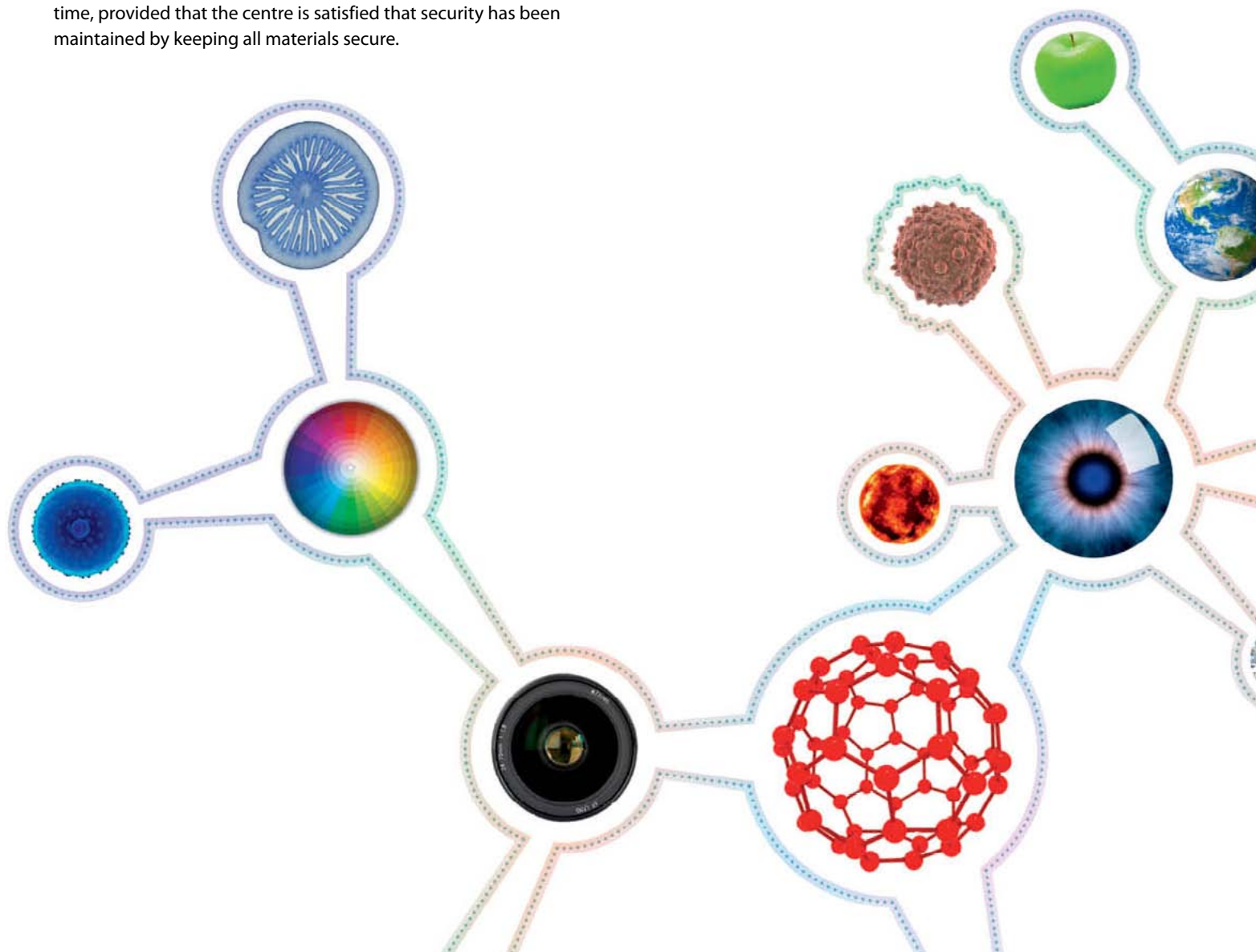
Candidates' scripts for all completed controlled assessment must be stored securely and they should be available for moderation.

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 circumstances beyond the teacher's control) occurs while a controlled assessment task is taking place, the task may be resumed subsequently, provided the teacher ensures that no candidate is likely to have been advantaged or disadvantaged by doing so.



SECTION H

CANDIDATE GUIDELINES FOR CONTROLLED ASSESSMENT

These guidelines are available as a separate document for use by candidates during completion of the task.

THE CONTROLLED ASSESSMENT TASK

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

Each task is about a particular idea and is divided into three parts:

Part 1 Research

Part 2 Planning and carrying out an investigation to collect results

Part 3 Analysing and evaluating your research and experimental results

PART 1 RESEARCH

The Part 1 sheet tells you the information you need to find out. You can do the research and collect data/information either in school or as homework.

Your teacher will tell you how much time you will have and will give you advice on where you are likely to find resources (for example the library or the internet).

In class, you use your research to make notes. These notes will be used later in Part 2 and Part 3 of the task.

Things to think about:

- how you will approach the task (you can discuss this with your teacher)
- make sure that you have time to cover all the points needed
- only collect the information asked for on the sheet.

What you need to write down:

- write a list of all the sources you have used. You need to include references and a bibliography when you write up your notes. This includes the full URL of all websites you use
- write up notes to answer all the questions on the sheet.

Remember, it is important that your notes contain all the information you need because this is all you will have access to during Part 3 of the task.

During research/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 doing the research with them.

You must write up your own notes.

PART 2 PLANNING

Your teacher will give you the Part 2 sheet. You will also be able to use the notes you made on your research.

You will work on your own or with one or two other students.

For Science: the sheet will have an explanation of some observations (a hypothesis). You will plan an investigation to find out if this explanation is right.

For Additional Science, Biology, Chemistry and Physics: the sheet will have some observations. You will come up with an explanation of these observations (a hypothesis).

You will then plan an investigation to find out if your explanation is right.

Things to think about:

- what are you trying to prove or disprove? Discuss this with your group.
- how can you make sure the investigation is a fair test?
- what is the independent variable that you are going to change?
- what is the dependent variable that you are going to measure?
- what different values of the independent variable are needed?
- what other variables must be kept the same?
- what equipment is the best to use? Are you able to use it? Do you need to try it out?
- can you use this equipment to detect small enough changes?
- how do you make sure your results will be accurate?
- how many times should you repeat the experiment?
- do you need to try out any parts of the experiment to help with your plan?
- what are the risks in carrying out this experiment? How can you make the experiment safe?
- how many columns and what headings are needed for the results table?

During Planning you can talk to your teacher about the task. You can also work with other candidates and share ideas about the task with them.

However, **you must write up your plan and results table on your own.**

You will be marked on the quality of written communication in your plan.

PART 2 CARRYING OUT THE INVESTIGATION TO COLLECT RESULTS

You will work on your own or with one or two other students.

You will use your plan to do the experiment. You might need to make changes as you go along. Make sure you write them down.

Things to think about:

- were changes to the plan made? Why did you make changes?
- did you work safely?
- how did you reduce any risks?
- how many repeats did you do? Should you have done any more?
- how careful were you in reading the measurements on the equipment?

You must record your results in your own table.

PART 3 ANALYSING AND EVALUATING YOUR RESEARCH AND EXPERIMENTAL RESULTS

This part of the task has to be completed within school time and supervised by your teacher or another invigilator.

You must do this part of the task by yourself.

You will be given your notes from Part 1 and your results from Part 2.

Your work for this part is written in the Part 3 answer booklet, which will guide you with questions. If you need more space for your answers then you can continue on writing paper.

You will process and analyse your results from the investigation.

Things to think about:

- you will usually need to calculate the mean of your results
- record the mean in your results table
- display the results in an appropriate graph. Don't forget to add a title, label the axes and include the correct units.
- plot the points correctly. You might like to include range bars.
- you will usually need to draw a line of best fit
- describe patterns and trends in your results and make comments on any results you didn't expect
- look at similarities and differences between your results and the data you collected in your research (or the data given to you).

This part of the task also requires you to evaluate your method and your results.

Things to think about:

- the parts of the method that worked well
- any errors in reading the measurements
- the quality of the data
- whether the repeat readings were close together
- whether your results were close to the theoretical result
- any possible risks and hazards you noticed
- how well you managed the risks
- how the method could be improved the next time you or someone else does it.

You will be marked on the quality of written communication in your evaluation.

Part 3 ends with you writing about whether or not your investigation supports the explanation stated in Part 2 (the hypothesis). You will also write a conclusion in answer to a question. It is important that you use scientific explanations and all the information you have collected to explain your answers to both of these questions.

Remember that Part 3 must be your own work.

You should collect all your work together. Make sure you have:

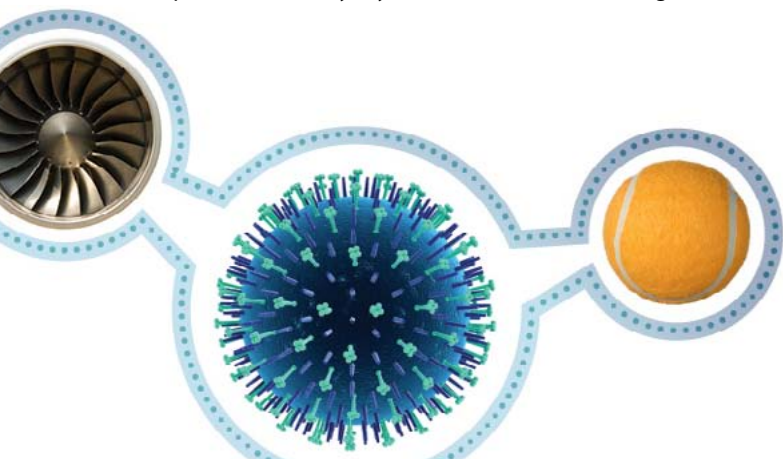
Your notes from Part 1 and the bibliography

Your plan (and hypothesis) from Part 2

Your results table(s) from Part 2

Your graph(s) from Part 3

Your answer booklet from Part 3.



SECTION I

FREQUENTLY ASKED QUESTIONS

When and where can teachers and candidates access the material?

Teachers can access tasks from Interchange. 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.

Access to Interchange for science teachers can be organised through the school's examination officer.

When can controlled assessments be taken?

The controlled assessments 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 Interchange web site. Each controlled assessment is allocated to a specific examination year. 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 assessment valid for?

Each controlled assessment task is valid for submission in one examination year only.

An 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 Interchange.

Can candidates select which controlled assessment to do?

There is nothing to prevent a centre allowing candidates to select one of the three tasks available for that examination year, although this may not be practicable for the majority of centres.

Different classes within a centre could do different tasks.

When should I do the controlled assessment?

The timing of the assessment is entirely up to the centre but it should be:

- after the modules concerned have been studied
- when there is time to complete the three parts of the task reasonably close together
- early enough to allow for marking and internal moderation to take place before May 15th.

Can any work for submission be done outside the classroom?

The only work which is permitted outside the classroom is the initial research task. All other parts of the assessment, including planning, must be done under supervision in a school environment.

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

Guidance is given in each task regarding the amount of time which should be required; a total of six hours for a Science task and seven hours for the Additional Science and the Separate Science tasks. Candidates do not have to use all of that time. The timings given for Parts 1 and 2 are guidance as to the expected time needed. Part 3 is under a higher level of control and the timings for Part 3 reflect the approximate time that candidates should be given. Candidates should not be given significantly more time. If tasks take more than one session then work should be collected in and stored securely until re-issued for the next session.



Where can the mark schemes be accessed?

There are no mark schemes as such, but there are marking criteria which are common to all tasks. In addition, each task has additional guidance which is included in the Teacher Guidance booklet for the task. This guidance may give assistance in determining the standard of work expected BUT it is not a mark scheme.

Do we have to do the controlled assessment under examination conditions?

Different parts of the assessment require different amounts of supervision. Only Part 3 requires close supervision. These conditions are similar to those required for examinations but close supervision in a classroom or laboratory will suffice if, collusion between candidates is prevented.

Can controlled assessments be re-sat like examinations?

A particular controlled assessment task cannot be re-sat, just as candidates cannot re-sit the same examination paper, but candidates can attempt another of the available tasks if they perform badly on early attempts.

Do we mark controlled assessments or does OCR?

Controlled assessments are marked by teachers in the centre. A sample of work is then sent to OCR for moderation after the marks have been submitted.

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

Since the tasks change every year it will not be possible to repeat the same practical year after year.

Is it possible for candidates to work together?

Candidates can work together in certain parts of the task:

- they can do their research in small groups although each candidate must make their own notes
- they can work in small groups in devising their plan and in trialling experiments but each candidate must write their own individual plan
- they can work in small groups during the actual practical session although each candidate must make their own record of the results obtained.

In these contexts a 'small group' is no larger than three (two is preferable).

These are the only times when candidates can work together.

Can I give a list of equipment for candidates to choose from?

Yes. You may also display a range of equipment for them to look at, but this should include more equipment than you wish them to use so that they can select the most appropriate.

Can we give a list of resources or a library box for candidates to select from for their research?

Yes. However, it should include a range of resources for candidates to select from rather than just one or two items that everyone is to use as their sources.

Can candidates undertake research work outside the classroom?

Yes. They may carry out the initial research for Part 1 as a homework exercise.

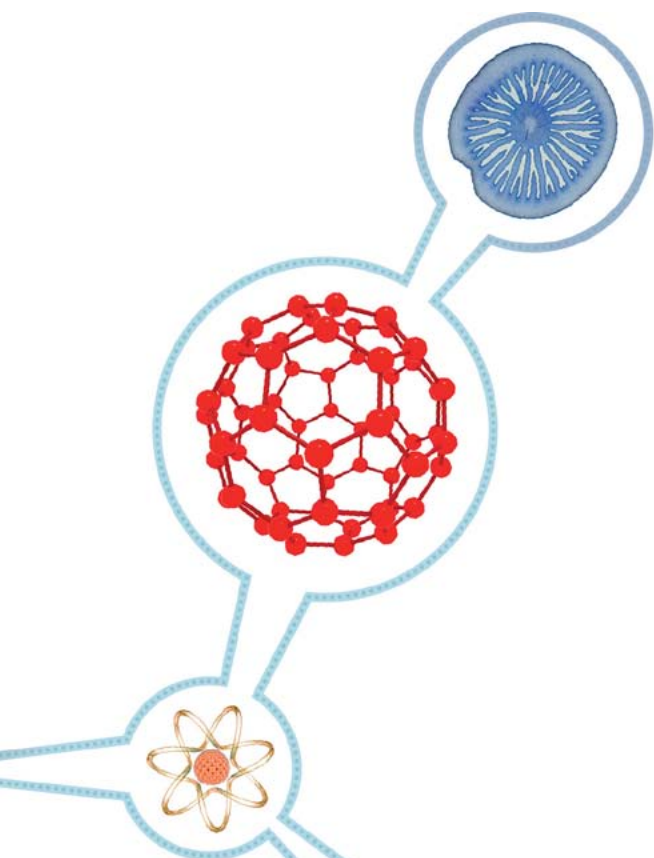
Can candidates use ICT?

Yes. However, whether they are using laptops or desk top computers, access to the Internet and their own network areas should be disabled when writing up work.

Candidates should not simply be able to access and print work they have previously done (possibly with help).

Can candidates use Excel to produce graphs?

Yes. If a candidate is to attempt to draw a graph of sufficient quality using Excel they need to be very proficient in its use.



What happens if candidates cannot fit all of their answers into the spaces in the answer booklet?

As with an examination paper, answers should be continued on additional sheets (clearly marked with question number) and these extra sheets should be attached to the back of the booklet.

How should I mark my candidates work?

Work is marked using the marking criteria that are printed in the specification and in the Teacher Guidance for each task. A best fit approach should be adopted when marking candidate's work. Additional Guidance is also included with the Marking Criteria in the Teacher Guidance booklet but should NOT be used as a mark scheme.

More detailed guidance on marking work is given in section F of this booklet.

How should candidates present their work?

The work to be presented for moderation in May will consist of:

- 1] Their research notes and bibliography from Part 1
- 2] Their plan (and hypothesis in Additional Science and Separate Sciences) from Part 2
- 3] Their record of results and observations from Part 2
- 4] Their graph/s from Part 3
- 5] Their candidate answer booklet from Part 3.

Parts 1] to 4] should be securely attached to the answer booklet.

Can I start a controlled assessment before year 10?

Yes. You do, however, need to think about when marks from the assessment are going to be sent in to the examination board. This will affect which year's task you select. You also need to have taught the item/s from the specification before the candidates attempt the controlled assessment.

I have candidates with physical handicaps that make practical work impossible. Can they have teacher data?

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

Can candidates bring in a word processed bibliography from home?

Yes. Candidates may bring a word processed bibliography into the supervised session. However, they cannot bring in previously written notes.

Can writing frames be used for research, write up and planning?

Writing frames cannot be used in any part of the assessment exercise.

Can candidates redraft their plans?

Candidates cannot redraft their plans or any other part of the assessment.

If they trial a procedure as part of the planning session and, as a result, make an addition to their plan this does not constitute redrafting. Candidates may make adaptations to their original plan during the collection of data and should annotate their plans. Writing down these changes does not constitute redrafting.

Can they do their planning at home?

No. The only thing which may be done at home is the initial research for Part 1.

Can we develop our own controlled assessment tasks?

No. Only the tasks on Interchange may be used and they may be used only in the examination year they were written for.

If a candidate is absent for the practical session can they do it at a later date?

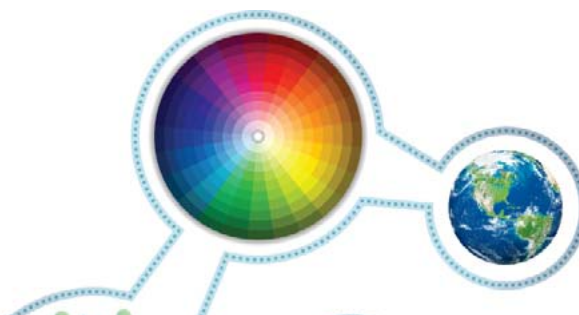
Yes, as long as they have not been present in the class when the teacher has gone through the completed Part 3.

Can candidates have a copy of the marking criteria?

Yes. They can have a copy of the Marking Criteria but giving candidates access to the Additional Guidance for a particular task is strictly forbidden.

Can candidates have scribes or amanuenses if needed?

Yes. Access arrangements are exactly the same as for examinations.



What are candidates allowed during the controlled sessions?

In Part 1, the write up of their research, they can have the stimulus sheet and their research sources.

In Part 2, the planning session, they can have the stimulus sheet and their research notes.

In Part 2, the practical session, they can have the stimulus sheet, their plan, results table, and their research notes.

In Part 3, the analysing and evaluating session, they can have their research notes, plan, results and the stimulus sheets.

The only other things they are allowed are a Periodic Table and the Physics equation sheet.

Access to textbooks, the Internet, exercise books or any other written material is forbidden during Parts 2 and 3.

Can candidates share their results for comparison purposes?

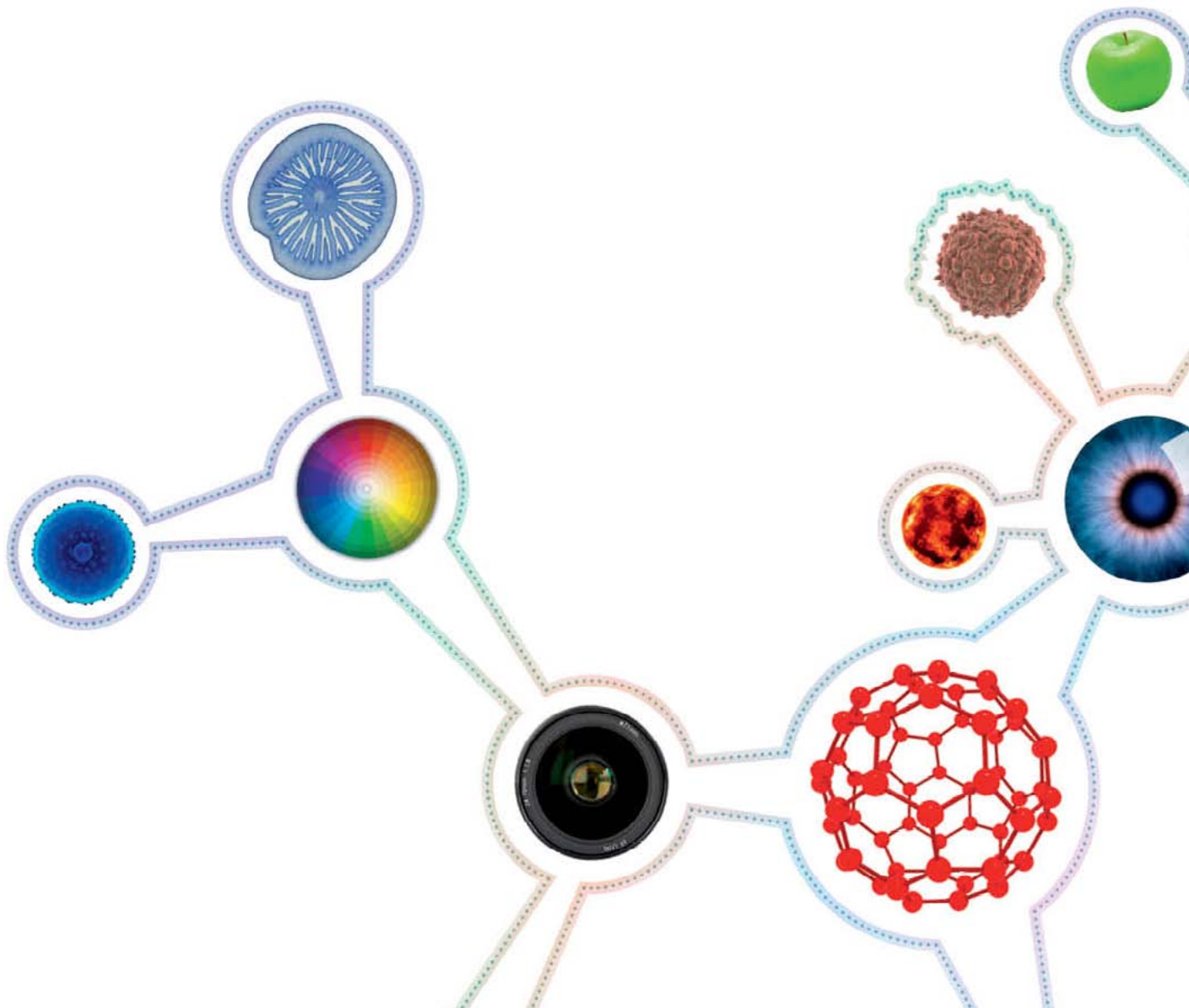
Yes. They may be asked to do so in some of the tasks. Teachers may photocopy some results from other groups of pupils to be issued when required during the Part 3 session. Alternatively, results could be written up on a white board.

The use of Teacher results is not allowed.

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.

Student speak versions are not permitted.



SECTION J

GUIDANCE ON DOWNLOADING CONTROLLED ASSESSMENT TASKS FROM INTERCHANGE

BEFORE YOU START

Controlled assessment materials will be available to download from OCR Interchange from June 2011.

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

If your centre already has an Interchange user account, 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.

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.

OCR interchange
RECORDING ACHIEVEMENT

Help Log out

Print page

You are here: Home

Welcome to Interchange

What's new?

Support material
Controlled assessment materials sign of our secure website, Interchange, which has been redeveloped following your feedback. [Find out more](#)
Science co-ordinator materials [DSE](#)

Tests
Key Skills test invoices to help teachers review the performance of individual candidates or whole schools. [Find out more](#)

Moderation
OCR Repository [What's new?](#)
'NO' role - your Interchange Centre Administrator will be able to help you with this.

Tell us what you think
As with all of our products and services, we value your feedback and would appreciate any comments that you might have. [Send us your feedback to interchange@ocr.org.uk](mailto:feedback@interchange@ocr.org.uk)

By task

- Entries
- Coursework and tests
- e-assessment
- Certification claims
- Results
- Post results
- Centre information
- Assessors
- Search
- Resources
- Admin

By qualification

- GCSE, OCRSE, Principal Learning...
- OCR Nationals
- Functional Skills
- Skills for Life
- NVQ
- Vocationally related
- CLAIT and iPro

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.

OCR interchange
RECORDING ACHIEVEMENT

Help Log out

Print page

You are here: Home > Controlled assessment materials

Controlled Assessment Materials

Notices

Controlled Assessment materials for GCSE specifications will be available to download from June 2009

Use the drop-down menus below to select the controlled assessment material you require or search by unit code.

Unit Code (eg. F123)

Select qualification type:

Select subject:

Select subject detail:

A266 - Controlled Assessment (PDF 254K/B)

A266 - Resource Booklet (PDF 254K/B)

Page notes

Windows XP and Windows Vista have a built in zip extractor.
If you use Windows 95, 98, 2000, ME, or NT, use a zip program such as WinZip or PKZip to extract the files.

By task

- Entries
- Coursework and tests
- e-assessment
- Certification claims
- Results
- Post results
- Centre information
- Assessors
- Search
- Resources
- Admin

By qualification

- GCSE, OCRSE, Principal Learning...
- OCR Nationals
- Functional Skills
- Skills for Life
- NVQ
- Vocationally related
- CLAIT and iPro

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. A 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 search form is displayed with a red error message: 'Invalid Unit Code entered'. The search form includes a 'Unit Code (eg, F123)' field containing 'F123', a 'Search' button, and three dropdown menus for 'Select qualification type', 'Select subject', and 'Select subject detail', all set to '-Please Select-', '-Nothing to Select-', and '-Nothing to Select-' respectively. A 'Page notes' section at the bottom provides instructions on zip file extraction 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 a valid unit code 'A9B2' entered in the 'Unit Code (eg, F123)' field. The 'Search' button is visible. The dropdown menus for 'Select qualification type', 'Select subject', and 'Select subject detail' remain set to '-Please Select-', '-Nothing to Select-', and '-Nothing to Select-' respectively. A yellow message box is displayed below the search form, stating: 'No document available. Please check the unit code.' The 'Page notes' section at the bottom remains the same.

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 for OCR Interchange is visible, along with navigation links for Help and Log out, and a Print page button. Below the header, the breadcrumb trail reads "You are here: Home » Controlled assessment materials".

The main content area is titled "Controlled Assessment Materials". It features a "Notices" section with a message: "Controlled Assessment materials for GCSE specifications will be available to download from June 2009".

Below the notice, there is a search section 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:

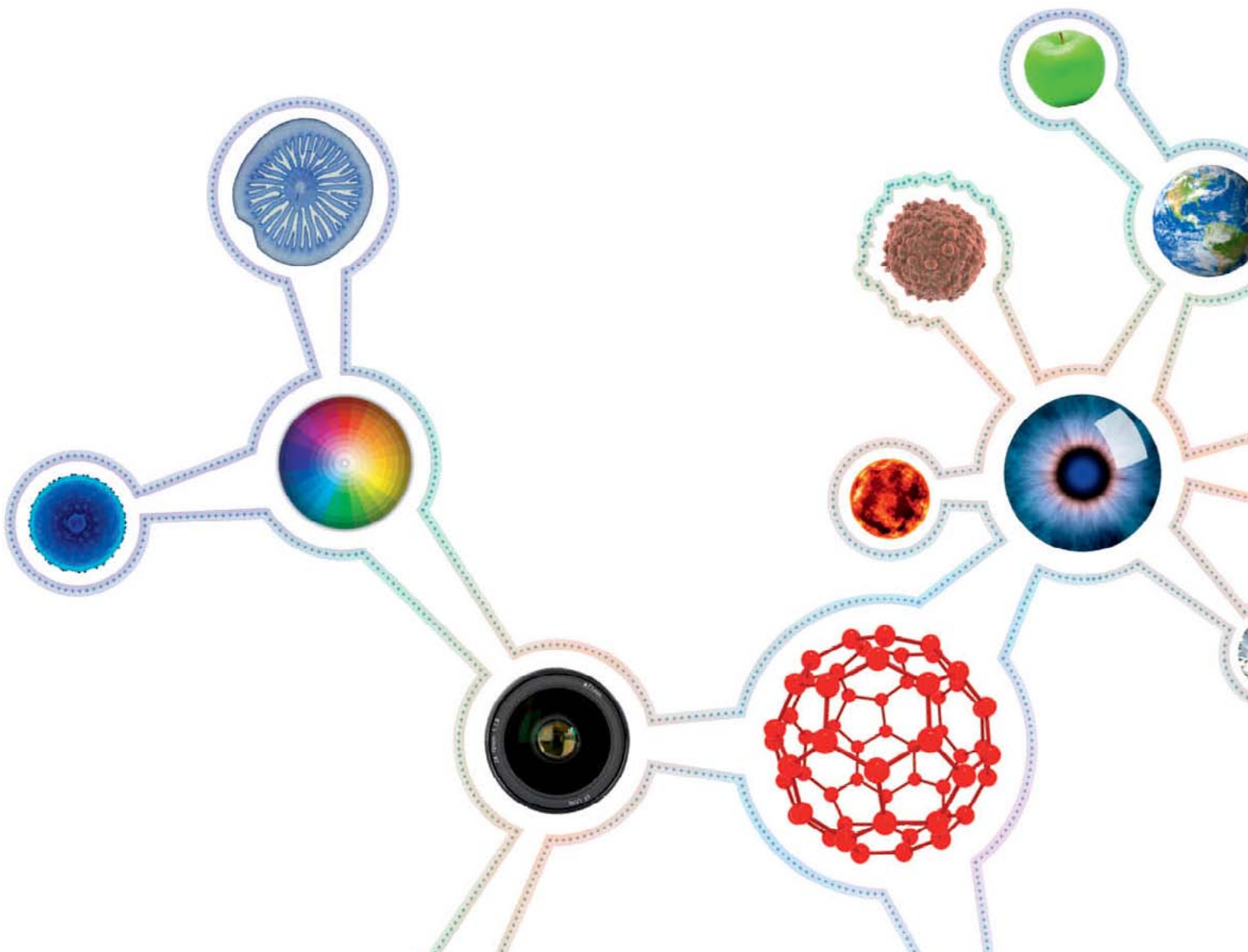
- Unit Code (eg, F123): []
- Select qualification type: [GCSE]
- Select subject: [Business and Communications]
- Select subject detail: [Developing Bus Comm Systems]

 A "Search" button is located below the unit code field.

A yellow message box displays the result: "No document available. Please check the search details." Below this, there is a "Page notes" section with the following text:

Windows XP and Windows Vista have a built in zip extractor.
If you use Windows 95, 98, 2000, ME, or NT, use a zip program such as WinZip or PKZip to extract the files.


SECTION K
APPENDICES



APPENDIX A MARKING CRITERIA FOR SCIENCE

Extracted from the Specification for GCSE Science B


5

Skill quality	0	1 – 2 marks	3 – 4 marks	5 – 6 marks	AO
Researching collect secondary data including the use of appropriate technology	*	Some information collected and used from at least two sources.	Relevant information collected from at least three sources; information presented clearly and all sources identified.	Range of relevant sources identified and judgement used to select those appropriate to the task. Information collated and presented clearly in appropriate formats including a full bibliography.	AO1 – 1 AO2 – 3 AO3 – 2
Planning  plan practical ways to answer scientific questions and test hypotheses; devise appropriate methods for the collection of numerical and other data	*	Outline plan includes equipment and techniques to be used. Plan provides a 'fair test'. No evidence of modifications of plan during the data collection phase. Plan shows limited structure with errors in spelling and punctuation.	Plan gives sufficient detail for experiment to be repeated, including choices of: equipment and techniques; range and number of data points for the independent variable; number of replicates; other variables to be controlled with the aim of collecting quality data. Some consideration given to how errors will be minimised. No evidence of modifications of plan during the data collection phase. Plan structured clearly with occasional errors in spelling and punctuation.	Comprehensive plan shows scientific understanding in making appropriate choices of: equipment, including resolution, and techniques; range and number of data points for the independent variable; number of replicates; control of all other variables, with the aim of collecting accurate data. Detailed consideration given to: how errors will be minimised; variables which cannot be controlled. Where appropriate, reasoned modifications made to the plan as evidence is collected. Plan structured coherently with few, if any, errors in grammar, punctuation and spelling.	AO1 – 1 AO2 – 4 AO3 – 1
Collecting data collect primary data including the use of appropriate technology	*	Results recorded clearly but not in an appropriate format.	Results tabulated to include all data expected, though not in the most appropriate format. Headings given but units not always correct.	Results tabulated clearly and logically, including use of correct headings and units; all data expected recorded to appropriate levels of precision.	AO1 – 2 AO2 – 4

* No evidence of achievement for this quality, or evidence insufficient for the award of 1 mark.

Skill quality	0	1 – 2 marks	3 – 4 marks	5 – 6 marks	AO
Managing risk assess and manage risks when carrying out practical work	*	Limited understanding of risks in procedures with only standard laboratory safety features mentioned. Some teacher intervention required to ensure safety.	Some risks in procedures analysed and some specific responses suggested to reduce risks. Risks managed successfully with no significant incidents or accidents and no requirement for teacher intervention.	All significant risks in the plan evaluated. Reasoned judgments made to reduce risks by use of appropriate specific responses. Risks managed successfully with no incidents or accidents and no requirement for teacher intervention.	AO3 – 6
Processing data process primary and secondary data including the use of appropriate technology	*	Some evidence of processing quantitative data: data presented as simple charts or graphs with some errors in scaling or plotting; use of one simple mathematical technique.	Graphical and mathematical techniques used to reveal patterns in the data: charts or graphs used to display data in an appropriate way, allowing some errors in scaling or plotting; correct use of more than one simple mathematical technique.	Appropriate graphical and mathematical techniques used to reveal patterns in the data: type of graph, scales and axes selected and data plotted accurately, including where appropriate a line of best fit; correct use of complex mathematical techniques where appropriate; appropriate quantitative treatment of level of uncertainty of data.	AO3 – 6
Analysing and interpreting analyse and interpret primary and secondary data	*	At least one trend/pattern identified and outlined correctly; an attempt is made to interpret the information linking primary and secondary data/information.	Main trend(s)/pattern(s) described and interpreted with reference to quantitative data and scientific knowledge and understanding, with some errors; reasoned comparison between primary and secondary data/information; any anomalous results identified correctly and implications discussed.	All trend(s)/pattern(s) described and interpreted correctly with reference to quantitative data and relevant scientific knowledge and understanding; links between primary and secondary data/information evaluated; level of uncertainty of the evidence analysed.	AO3 – 6

* No evidence of achievement for this quality, or evidence insufficient for the award of 1 mark.


Skill quality	0	1 – 2 marks	3 – 4 marks	5 – 6 marks	AO
Evaluating  evaluate methods of data collection and the quality of the resulting data	*	Relevant comments made about the quality of the data and the method used. Answer is simplistic with limited use of specialist terms.	Comments made on the quality of the data including accuracy and sources of error, linked to the method of collection; limitations in the method of data collection identified and suggestions for improvement given. Information is relevant and presented in a structured format. Specialist terms are for the most part used appropriately.	Detailed and critical consideration given to the data and methods used to obtain them: sources of error and quality of the data discussed and explained, including accuracy, repeatability and uncertainty; limitations of the method identified and suggestions for improvements justified. Information is relevant, clear, organised and presented in a coherent format. Specialist terms are used appropriately.	AO1 – 1 AO3 – 5
Justifying a conclusion draw evidence-based conclusions	*	Conclusion given using the data collected. Answers simplistic with little scientific understanding.	Conclusion given and justified based on an analysis of the data and information from research and investigation, demonstrating an understanding of the underpinning science.	Conclusion given and justified based on a critical analysis of the data and information from research and investigation, and clearly linked to relevant scientific knowledge and understanding.	A03 – 6

* No evidence of achievement for this quality, or evidence insufficient for the award of 1 mark.

APPENDIX B MARKING CRITERIA FOR ADDITIONAL SCIENCE AND SEPARATES

Extracted from the Specification for GCSE Additional Science B


5

Skill quality	0	1 – 2 marks	3 – 4 marks	5 – 6 marks	AO
Researching collect secondary data including the use of appropriate technology	*	Some information collected and used from at least two sources.	Relevant information collected from at least three sources; information presented clearly and all sources identified.	Range of relevant sources identified and judgement used to select those appropriate to the task. Information collated and presented clearly in appropriate formats including a full bibliography.	AO1 – 1 AO2 – 3 AO3 – 2
Planning  develop hypotheses and plan practical ways to test them	*	Simple hypothesis or prediction relates to the data or information provided but does not identify a trend or pattern to be investigated. Outline plan includes equipment and techniques to be used. Plan provides a 'fair test'. No evidence of modifications of plan during the data collection phase. Plan shows limited structure with errors in spelling and punctuation.	Hypothesis provides a limited scientific explanation of the data or information provided. Plan gives sufficient detail for experiment to be repeated, including choices of: equipment and techniques; range and number of data points for the independent variable; number of replicates; other variables to be controlled with the aim of collecting quality data. Some consideration given to how errors will be minimised. No evidence of modifications of plan during the data collection phase. Plan structured clearly with occasional errors in spelling and punctuation.	Complex hypothesis provides a complete scientific explanation of the data or information provided and is capable of investigation. Comprehensive plan shows scientific understanding in making appropriate choices of: equipment, including resolution, and techniques; range and number of data points for the independent variable; number of replicates; control of all other variables with the aim of collecting accurate data. Detailed consideration given to: how errors will be minimised; variables which cannot be controlled. Where appropriate, reasoned modifications made to the plan as evidence is collected. Plan structured coherently with few, if any, errors in grammar, punctuation and spelling.	AO1 – 1 AO2 – 3 AO3 – 2
Collecting data collect primary data including the use of appropriate technology	*	Results recorded clearly but not in an appropriate format.	Results tabulated to include all data expected, though not in the most appropriate format. Headings given but units not always correct.	Results tabulated clearly and logically, including use of correct headings and units; all data expected recorded to appropriate levels of precision.	AO1 – 2 AO2 – 4

* No evidence of achievement for this quality, or insufficient for the award of 1 mark.

Skill quality	0	1 – 2 marks	3 – 4 marks	5 – 6 marks	AO
Managing risk manage risks when carrying out practical work including risk assessment	*	Limited understanding of risks in procedures with only standard laboratory safety features mentioned. Some teacher intervention required to ensure safety.	Some risks in procedures analysed and some specific responses suggested to reduce risks. Risks managed successfully with no significant incidents or accidents and no requirement for teacher intervention.	All significant risks in the plan evaluated. Reasoned judgments made to reduce risks by use of appropriate specific responses. Risks managed successfully with no incidents or accidents and no requirement for teacher intervention.	AO3 – 6
Processing data process primary and secondary data including the use of appropriate technology	*	Some evidence of processing quantitative data: data presented as simple charts or graphs with some errors in scaling or plotting; use of one simple mathematical technique.	Graphical and mathematical techniques used to reveal patterns in the data: charts or graphs used to display data in an appropriate way, allowing some errors in scaling or plotting; correct use of more than one simple mathematical technique.	Appropriate graphical and mathematical techniques used to reveal patterns in the data: type of graph, scales and axes selected and data plotted accurately, including where appropriate a line of best fit; correct use of complex mathematical techniques where appropriate; appropriate quantitative treatment of level of uncertainty of data.	AO3 – 6
Analysing and interpreting analyse and interpret primary and secondary data	*	At least one trend/pattern identified and outlined correctly; an attempt is made to interpret the information linking primary and secondary data/information.	Main trend(s)/pattern(s) described and interpreted with reference to quantitative data and scientific knowledge and understanding, with some errors; reasoned comparison between primary and secondary data/information; any anomalous results identified correctly and implications discussed.	All trend(s)/pattern(s) described and interpreted correctly with reference to quantitative data and relevant scientific knowledge and understanding; links between primary and secondary data/information evaluated; level of uncertainty of the evidence analysed.	AO3 – 6

* No evidence of achievement for this quality, or evidence insufficient for the award of 1 mark.

Skill quality	0	1 – 2 marks	3 – 4 marks	5 – 6 marks	AO
Evaluating  review methodology to assess fitness for purpose	*	Relevant comments made about the quality of the data and the method used. Answer is simplistic with limited use of specialist terms.	Comments made on the quality of the data including accuracy and sources of error, linked to the method of collection; limitations in the method of data collection identified and suggestions for improvement given. Information is relevant and presented in a structured format. Specialist terms are for the most part used appropriately.	Detailed and critical consideration given to the data and methods used to obtain them: sources of error and quality of the data discussed and explained, including accuracy, repeatability and uncertainty; limitations of the method identified and suggestions for improvements justified. Information is relevant, clear, organised and presented in a coherent format. Specialist terms are used appropriately.	AO1 – 1 AO3 – 5
Justifying a conclusion draw evidence-based conclusions; review hypotheses in light of outcomes	*	Conclusion given and hypothesis reviewed using the data collected. Answers simplistic with little scientific understanding.	Conclusion given and justified and hypothesis reviewed based on an analysis of the data and information from research and investigation, demonstrating an understanding of the underpinning science.	Conclusion given and justified and hypothesis reviewed, based on a critical analysis of the data and information from research and investigation, and clearly linked to relevant scientific knowledge and understanding.	AO3 – 6

* No evidence of achievement for this quality, or evidence insufficient for the award of 1 mark.

APPENDIX C SCIENCE SKILLS

Links to specification items	Low demand	Standard demand	Higher demand
B1b, B1e, B1g, B2g, C1b, C1f, C1g, C2b, C2c, C2f, C2g, C2h, P1a, P1d, P2a	Suggest a hypothesis which is relevant to the data or problem to be investigated	Suggest a hypothesis which provides a limited scientific explanation of the data or problem	Suggest and explain a hypothesis which provides a complete scientific explanation of the data or problem and is capable of investigation
	Select and use equipment to collect a limited amount of data to investigate a specific question or idea	Select techniques and equipment which are appropriate for the ranges of variables, numbers of replicates and values for the measurements and observations to be taken	Justify the choice of equipment and techniques to collect high quality, valid data
B1b, B1e, B1g, B2g, C1g, C2b, C2c, C2f, P1c, P2a	Explain how variables have been controlled to produce a "fair test"	Use an investigative approach based on an understanding of the experimental independent and dependent variables	Use an investigative approach based on an understanding of the experimental independent and dependent variables
B1b, B1d, B1e, B1g, B2g, C1f, C1g, C2b, C2c, C2f, C2g, P1a, P2a	Describe how a routine task has been carried out in terms of repeating observations/measurements and the ranges/intervals chosen	Explain how a straightforward investigation has been planned to minimise error and produce good quality data	Explain how a complex investigation has been planned to minimise error and produce high quality, valid data
B1b, B1e, B1g, C1f, C1g, C2b, C2c, C2f, C2g, P1a, P2a	Control risks in familiar practical tasks	Consult appropriate resources to control risks in unfamiliar practical tasks	Prepare a detailed risk assessment to control risks in a complex, unfamiliar practical task
B1b, B1e, B1f, B1g, B2g, C1g, C2b, C2c, C2d, C2f, P1a, P1b, P2a	Present data as tables, pie charts or line graphs, identify trends in the data, and process data using simple statistical methods such as calculating a mean	Select the most appropriate format for presenting data and process data using mathematical techniques such as statistical methods or calculating the gradients of graphs to identify trends or patterns	Identify complex relationships between variables, including inverse relationships, using several mathematical steps
B1b, B1e, B1f, B2g, C1a, C1b, C2a, P1a, P1b, P1d, P1f, P1h, P2a, P2g, P2h	Present scientific data in an appropriate format	Communicate qualitative or quantitative information/data, using a clear structure and appropriate visual material	Communicate abstract ideas clearly and effectively using explanations, arguments, diagrams, graphs, flow charts, pictures and tables
B1a, B1c, B1e, B1f, B1g, B2c, B2e, B2f, B2h, C1a, C1c, C1e, C1h, C2a, C2c, C2d, C2e, C2g, P1b, P1e, P2a, P2b, P2c, P2d, P2e, P2f, P2g	Combine and present information/data from two different sources, making limited use of specialist terms; use of grammar, punctuation and spelling sometimes prevent communication of the science	Combine information/data from a limited range of sources to present an analysis which is for the most part relevant, structured and coherent; specialist terms and spelling, punctuation and grammar are for the most part used correctly	Collate relevant information/data from an appropriate range of sources to present a structured and coherent analysis, using specialist terms appropriately and with few, if any, errors in grammar, punctuation and spelling
B1a, B1e, B1g, B2e, B2h, C1a, C1c, C2a, C2e, C2d, C2e, C2g, P1b, P1d, P2a, P2d, P2e, P2f, P2g	Distinguish between claims/opinions and scientific evidence in sources	Explain how claims/opinions are based on scientific evidence	Evaluate critically the quality of scientific information or a range of views, from different sources, in terms of shortcomings in the explanations, misrepresentation or lack of balance
B1b, B1d, B1e, B1g, C1f, C1g, C2b, C2c, C2f, P1a, P2a, P2b	Suggest and explain how working methods could be improved	Evaluate the effectiveness of the apparatus or techniques, or alternative methods of collecting data, and suggest improvements	Suggest and justify improvements to apparatus or techniques, or alternative ways to collect data, and explain the advantages of taking an investigation further
B1b, B1d, B1e, B1f, B1g, B2g, C1g, C2b, C2c, C2f, P1a, P2a	Link simply the quality of measurements/observations with the limitations of the experimental method	Use the general pattern of results or degree of scatter between repeats to assess the quality of the evidence and decide the extent to which a conclusion can be supported	Consider critically the quality and validity of the evidence, identifying anomalies and suggesting scientific explanations for unexpected observations or measurements
B1b, B1e, B1g, B2g, C1g, C2b, C2e, C2f, P1a, P2a	Explain how a conclusion is based on the scientific evidence which has been collected	Determine the level of confidence in a conclusion based on the identification of a qualitative relationship between variables, and describe how further predictions can lead to more evidence being obtained	Identify and critically analyse conflicting evidence, or weaknesses in the data, which lead to different interpretations, and explain what further data would help to make the conclusion more secure

APPENDIX D 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 all mark totals are correct
- check marks have been correctly transferred to the MS1 or electronic alternative.

The centre will receive an email request for the sample of candidates' work required by the moderator.

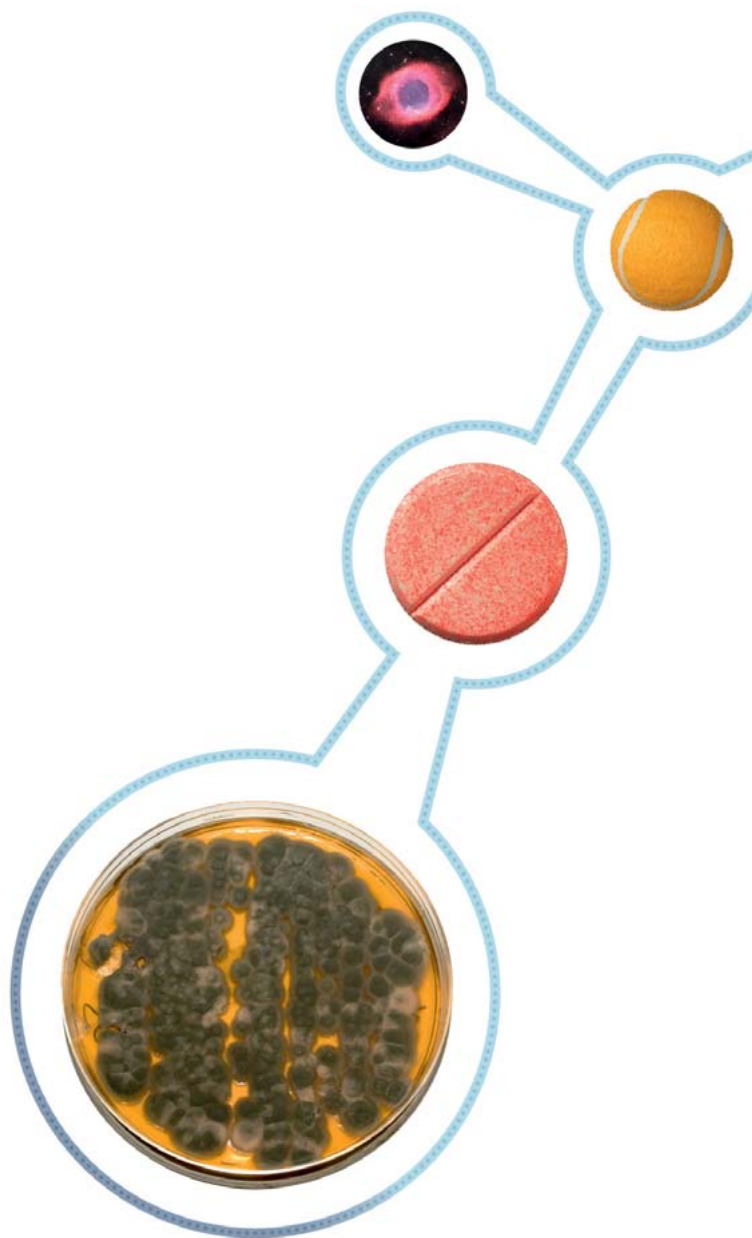
It is good practice to check that the work requested for the sample has been clearly annotated.

For each candidate the following items should be securely fastened to the rear of the candidate answer booklet for Part 3:

- research notes from Part 1
- plan (and hypothesis for Additional/Separate Sciences) from Part 2
- results table from Part 2
- graph(s) from Part 3
- any additional writing paper required for Part 3.

Treasury tags are ideal for attaching the items 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 a good idea to include a contact email for the Head of Science in case the moderator wishes to clarify anything.



APPENDIX E GLOSSARY OF TERMS

These definitions are consistent with ASE (2010) *The Language of Measurement: Terminology* used in school science investigations
ASE. ISBN 978 0 86357 424 5

Term	Definition	Notes
accuracy	a measurement result is considered accurate if it is judged to be close to the true value	how close a reading is to the true value eg value of resistance obtained from experiment compared to calculated 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
control variable		variables other than the independent and dependent variables which are kept the same
dependent variable		variable which is measured whenever there is a change in the independent variable
independent variable		variable which is deliberately changed by the person in the planning of the experiment
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 eg titration results: 1.30; 1.20; 1.25cm ³
range (of a variable)	the maximum and minimum values of the independent or dependent variables	eg choosing to use pH values from pH2 to pH12
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	how close (precise) values are when repeated by the same person with the same equipment
reproducibility	precision obtained when measurement results are produced by different laboratories (and therefore by different operators using different pieces of equipment)	how close (precise) values are when repeated by different people using different 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 eg in a titration it would be usual to use a burette and record readings to 0.5 division on the scale
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 and based on sound reasoning	

GENERAL QUALIFICATIONS

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