

Moderation Feedback - Retrospective

Assessment Panel:

Biology

Qualification area

**Subject(s) and Level(s)
included in this report**

Biology Advanced Higher Investigation

Central Moderation

General comments on central moderation activity

The evidence submitted by the majority of centres would not have passed the internal assessment element of this unit.

Increased awareness of the Performance Criteria for the NAB would alleviate some of the problems experienced in the external marking of the Reports.

Specific issues identified

In the majority of cases there was a lack of evidence of planning of the investigations and in these cases there was therefore insufficient evidence of Outcome 1 'Develop a plan for an investigation'.

A number of daybooks moderated did not have a 'well thumbed' look. Rather they had a "newly created" look which suggested a heavy workload was being put onto some candidates at an already busy time in the academic year.

There was little evidence of marking of the lab daybooks in several centres. A tick (initialled and dated) after each teacher/candidate discussion is sufficient. The daybook should also contain an acknowledgement of advice/contributions made by staff and other interested parties.

Only a minority of centres were fully aware of the requirements and adopted the best practice of including a checklist (similar to that shown on page 18 of the NAB document) with the PCs ticked off on the checklist and initials in the daybook which indicated on-going assessment.

Outcome 1

- PC(a) - There were several centres where it was obvious that the day books had not been maintained on a regular basis. In most cases it was simply a record of raw data (as is required for O2).
- PC(b) - Many of the investigations lacked clearly stated aims. This often led to investigations lacking a focus.
- PC(c) - While the majority of day-books did have a hypothesis there was little evidence of modifications made in light of experimental or research work carried out.
- PC(d) - A number of the daybooks sampled saw candidates failing to collect useable results due to poor equipment or problems with the sampling technique(s), these flaws should be spotted, discussed and amended with a record noted in the daybook.
- PC(e) - Many investigations lacked sufficient controls and replicates.

Outcome 2

Evidence for this Outcome was in the main at the required standard.

Feedback to centres

The half unit DO34/13 is internally assessed (see AH Arrangements document Fifth edition March 2004, pages 79 to 83). NAB 001, issued July 2002, provides marking guidelines, a checklist (record of attainment) and some advice on how to choose an investigation and how to structure a daybook.

Centres must mark the day books to indicate assessment of the Outcomes and PCs. A tick (initialed and dated) after each teacher/candidate discussion is sufficient.

The daybook should, of course, be a work in progress through the year, it should be filled in regularly with a date next to each entry. Centres should ensure that candidates record the work on an on-going basis and should discourage work being rewritten neatly.

Regular discussion of investigation work and what is recorded in the daybook is recommended as it would increase the clarity of planning, eliminate several issues that have arisen in moderation and, more importantly, raise candidate attainment levels.

Centres should ensure that candidates are aware of the requirements for unit attainment and teachers/lecturers should use a checklist similar to that shown on page 18 of the NAB document.

The descriptors for O1 and O2 are designed to help candidates keep a complete record of work from which to produce the externally assessed report. Setting up systems to ensure O1 and O2 are overtaken will be of great advantage to the candidate at the report writing stage.

Outcome 1 (O1) Develop a plan for an investigation

Evidence seen at moderation showed a general lack of planning which often led to unstructured experimental work and wasted time. Guidance by class teachers at the planning stage can focus a candidate's thinking and aid final evaluation. Planning is a skill which must be developed and attention to the performance criteria should help structure the process.

The following points might be useful as a breakdown of the planning activity.

Plan

- (1) Formulation of an initial aim and hypothesis or/questions relevant to the aims to include ideas and reasons for study.

A statement of the initial aim and hypothesis/questions should be made before the start of the practical work. These may be modified as the work progresses working up to an overall aim which may bring together a series of related practicals. Clarity in setting out the aims is crucial to the success of the investigation since many marks in the course report relate to the aims ie procedures, conclusions and evaluation.

- (2) Background research; list of resources consulted noted in the daybook.

Initial background reading should help focus the candidate in their investigations to decide 'Why is this worth studying?' ie consideration should be given to the biological significance of the investigation at the planning stage. This will help with the formulation of more specific aims and lead to more appropriate evaluations in the course report.

- (3) Consideration of possible options and reasons for selection of techniques/procedures.

Candidates should be encouraged to evaluate any given protocols and to consider the validity of techniques and procedures in relation to the intended aims of the investigation. Limitations in techniques and procedures should be considered and suitable controls built in and/or amendments made.

(4) Justification of experimental procedures in relation to the initial aim, eg

- ◆ What is being measured and how?
- ◆ Do the techniques measure what is intended?
- ◆ What variables have to be controlled?
- ◆ How can validity of procedures be measured?
- ◆ What potential errors may be generated and how can they be minimised?
- ◆ How many replicates are required?

The need for replicates should move on from the Higher LO3 point of mean values being more reliable than an individual result to the idea that replicate treatments should produce identical results. Candidates should appreciate that validity and reliability are compromised if there are no replicates and controls. 'Lack of time' is not an acceptable excuse as this would constitute a design flaw that should have been spotted, discussed and amended in early meetings with the candidate.

(5) List of experimental, observational and sampling procedures, techniques and apparatus to be used.

These should be detailed in full so that candidates can develop an appreciation of the principles behind the techniques and procedures. Again careful consideration at the planning stage will help candidates build in appropriate design features into their investigations.

(6) Resources; availability, cost and source of materials and chemicals.

(7) Safety issues.

(8) Timescale.

At the planning stage teachers/lecturers should encourage candidates to think the investigation through in relation to other factors which might influence the results:

- ◆ rate of diffusion (size/shape/concentration) /toxicity affects the spread of materials from wells cut in agar
- ◆ osmotic effects due to different concentrations will affect growth rates in water cultures
- ◆ other factors may influence recovery time when investigating effect of high energy drinks

The help of teachers/lecturers should be sought as the plan takes shape and the support /suggestions given should be recorded. The daybook should show progression, i.e. evidence of modification of the plan as a result of discussions/initial experiments/unexpected results/problems encountered. There may well be further discussion and feedback with the teacher/lecturer which may lead to a revised aim and further experimentation. Help freely given, accepted and acknowledged at this stage will provide a firm foundation on which the candidate can build when they write their final, individual report.

Many centres present sets of similar Investigations where the candidates have very little individual contribution to the planning, background research and protocols. This form of routine work will result routine marks being awarded for the course report. It is recommended that centres ensure that candidates carry out different investigations. Where a candidate is taking both AH Biology and AH Chemistry, the centre must ensure that different investigations are carried out for the two awards. Submission of the same investigation may result in one or both of the awards being cancelled.

Where centres use a field trip to cover the practical work done in the investigation it is important that each candidate is involved in the planning, background research and protocols. The investigation should be more than an extended practical or related practicals and allow for creativity and discussion.

Where outside school organizations and establishments are involved the presenting teacher must be responsible for the assessment of the unit outcomes and therefore be involved in the planning and carrying out of the investigation.

Outcome 2 (O2) Collect and analyse information obtained from the investigation

All raw data should be recorded accurately with correct units. As long as data is comprehensible to the reader a daybook need not be meticulously presented, first and foremost the book is an on-going record of work carried out.