General comments

Moderators reported that it was pleasing to see that a high proportion of centres were assessing students at the correct level, though some were not. To maintain standards, assessors should ensure that all advice offered on the individual feedback forms, within the TOLS system and in the following pages is heeded.

Administration

Schools and colleges are reminded to refer to the Instructions for the Administration of the ISA, published on the AQA website in the Teaching and learning resources web page (http://filestore.aqa.org.uk/subjects/AQA-2410-W-TRB-ISAADMIN.PDF) and also to the relevant JCQ instructions for guidance on how to conduct the ISA in order to maintain the confidentiality and integrity of the ISA assessments.

Schools and colleges are also reminded that the statement in the Teachers’ Notes, ‘There must be no further discussion and students must not be given any further resources to prepare for the assessment’, applies from the time the students are given the title of the investigation one week before sitting Stage 1 all the way through until all students have completed the Written Test for the unit.

Most schools and colleges had worked extremely hard to ensure that the required sample of work and the accompanying documentation arrived with the moderator in good time. This was very much appreciated.

Several centres are still completing separate CRF for their students. This is no longer a requirement since completion and signatures on the ISA front cover are the AQA replacement of the CRF. This should save centres additional, non-essential administrative work.

There was some excellent evidence of internal standardisation. This usually resulted in the better overall judgement of an individual piece of work as well as an overall standard of assessment that was close to, or matched, that which was required and expected.

The mechanics of marking

Moderators do their utmost to support the marking of a school or college. Marks are only changed when what was rewarded failed to meet the requirements of the Marking Guidelines. It is much easier to support marking when the instructions in the Guidelines for Teachers marking Biology ISAs have been followed as required. Assessors are reminded that this section should be read before any work is marked. The following points should be noted.

Work should only be marked in red ink. Marking in blue, black and green ink, as well as pencil, were all seen. Where a different colour is used for internal standardisation, the final agreed mark should be shown in red. It was not always clear which ticks or marks contributed to the final mark.

For each mark awarded, a tick should be placed on the work as near as possible to the point awarded. In all cases, a tick should represent a single mark. The total number of marks for each part answer should be written in the right-hand margin. The practice of ringing or crossing through the mark allocation leads to difficulties in interpretation.
Marking points awarded for tables and graphs must be clearly identified. The simplest approach is to indicate each marking point with either a tick or a cross in a column or in a row at the side of the table or graph.

Schools and colleges are reminded to show the marking point number alongside the tick. This proves helpful both to the assessor, ensuring that the same marking point is not awarded more than once, and to the moderator, who is then able to understand which marking point is being awarded and better appreciate a school's or college's application of the Marking Guidelines.

**Applying the Marking Guidelines**

Where marking fell outside AQA’s tolerance limits, differences between the marks awarded by a school or college and those given by the moderator often resulted from a failure to apply the general principles of marking outlined in the initial *Guidelines for Teachers marking Biology ISAs*, or a failure to apply the Marking Guidelines with sufficient rigour. Schools and colleges should note the following points in particular.

The guidelines are presented in two columns. The first is headed *Marking Guidance* and the other is headed *Comments*. Both must be considered in determining whether a mark should be awarded or withheld. Many moderators reported that consideration of the mandatory points made in the *Comments* column was not always evident in the marking of the work.

The points made in the *Marking Guidance* represent the minimum acceptable answer. More detailed answers should clearly gain credit but moderators found scripts in which such answers had not gained the credit they deserved. In contrast, moderators found answers in which the detail was less than that stipulated had incorrectly been given credit. For example, in Question 15(a) of ISA Option P, the marking point stipulates, “(Mean rate of) carbon dioxide uptake was constant and fell after the light turned off”. A response, such as “The carbon dioxide uptake was around 4.5 at first then fell later”, should not gain credit as it does not make clear that the level stays constant at 4.5 and furthermore, does not state when the level falls.

Some marking points require more than one aspect to be included before the mark can be awarded. Thus the *Marking Guidance* for ISA Option P required students in Question 12(a) and 12(b) to identify the xerophytic feature and explain how it reduced water loss. Without both aspects the mark should not be awarded but this was seen, albeit infrequently. Issues like these, however, explain how moderators might begin to identify a school's or college’s marking as not being within acceptable tolerance limits.
ISA P – Investigating lengths of cells in plant tissues

The task did not appear to cause any issues with cell outlines being clearly visible on white and green areas of the leek.

Stage 1

Most students drew a satisfactory table to show their raw data. Some did not give a full, accurate description of the independent variable (part of the leek), either missing out ‘leek’ or implying that there was a green leek and a white leek and so did not gain credit for mark point 1.

Stage 2

Most students correctly calculated the mean cell length using the recorded field of view diameter. Some got the calculation the wrong way round and some incorrectly incorporated the magnification (the ruler to measure the field of view was magnified in the same way as the cells counted). Incorrect rounding was seen negating mark point 1. Graphs were generally drawn successfully with only the occasional error of units or bar height or widths.

Written Test: Section A

Question 1

All mark points were seen and most students scored this mark. Some only referred to precision. As stated in the comments column, this was insufficient as a standalone statement.

Question 2

Most students achieved this mark; although it should be noted that mark points 1 and 2 required some reference to disrupting/stopping the view of the cells.

Question 3

Although there were many convoluted answers to this question, many students fulfilled the mark point in the end.

Question 4

(a) The vast majority of students achieved this mark, nearly all with oxygen rather than nitrogen.

(b) Mark points 1 and 2 were more common than 3 and 4. It should be noted that the Comments column in the Marking Guidelines required these mark points to be marked in pairs; it was not correct to award two marks for mark point 1 and 4.
Question 5

The majority of students suggested that the alternative method would make the measurements more accurate/precise but far fewer could explain why this was so in order to gain mark points 2, 3 or 4.

Question 6

Most students fulfilled one or other mark point for this question, although there were some vague answers using recall of a fundamental idea from the AS specification.

Question 7

This was generally well answered by the majority of students. A few got in a muddle with the context of the question and gave answers along the lines of ‘they would be genetically identical’, although the question asked about why two different leek plants would not be used.

Question 8

(a) Only better answers correctly used the standard deviation to identify overlaps and to state the significance of this. Very few students were awarded mark point 4.

(b) All but the weakest answers showed appreciation that three readings are required in order to calculate volume.

Question 9

(a) The vast majority of students successfully answered this question.

(b) Most students achieved this mark, although some mistakenly suggested that the light microscope would not show colour.

Written Test: Section B

Question 10

It was vital in this question that students used the information provided in Resource A. Other answers relating to general methodology were not creditworthy.

Question 11

Most students gained mark point 1 and 2 but many did not multiply by two for the upper and lower surface of the leaf in order to achieve mark point 3.

Question 12

Both parts to this question required a feature and an explanation for each mark point and AS level answers were expected before credit was given; the marking guidelines give the minimum acceptable answer. So, for example, answers relating to water concentration in place of water potential are at a lower level and were, therefore, not creditworthy.
Question 13

Very few students could combine the two pieces of information from the table to appreciate that the very small leaf surface area meant that the total number of stomata was very low.

Question 14

Most students gave reasonable suggestions for the purpose of treatments 1 and 2 but found the purpose of treatment 3 more difficult to explain. In this question and in Question 16(a), it was important that students had read the information in Resource B stating that these leaves have stomata only on their lower surface.

Question 15

(a) Students still find it difficult to describe a trend on a graph such as this accurately. Many students failed to state clearly that the rate stayed constant for the first 60 minutes and then fell (as required for mark point 1).

(b) Some students were not explicit enough in their answer that the water is lost through the stomata in order to achieve mark point 1.

Question 16

(a) Students who stated that there were stomata on the upper surface of the leaf could not be awarded this mark, as Resource B stated that these leaves have stomata only on their lower surface.

(b) Most students achieved mark point 1 but only better answers went on to explain why this meant there was no uptake of carbon dioxide.
ISA Q – Investigating the rate of flow in arteries

The task was successful, with centres sourcing five different diameters of tubing (six were suggested in the Teachers’ Notes but only five were required) and, once centres had trialled the task, tubing could be adequately attached to the base of a funnel. Students were instructed not to measure the length of the tubing but not all heeded this instruction and so, incorrectly, used the tubing length in their rate of flow calculation.

Stage 1

Most students used a correct layout for their table and gave sufficient description of the independent and dependent variables. Several students use ‘secs’ as a unit of time – the correct SI unit (and only creditworthy abbreviation) for seconds is ‘s’.

Stage 2

Some students calculated speed (distance divided by time), or mean time for water to flow, rather than flow rate and so were unable to achieve mark points 1, 2 and 3 (as stated in the Comments column of the Marking Guidelines). Some students used 1/time to calculate rate of flow. This only gives a figure proportional to the rate rather than an actual rate, so was inappropriate in this instance. The correct calculation for mark point 1 was 100/time giving a unit of cm$^3$ s$^{-1}$. The use of a solidus in the unit (cm$^3$/s) is inappropriate when giving the unit in a table or a graph (please refer to page 7 of IOB’s Biological Nomenclature 4th edition for further information).

Students should take care when drawing line graphs – lines should not be extrapolated beyond the first and last point plotted.

Written Test: Section A

Question 1

(a) Most students achieved one mark here but few were able to express their reasoning clearly enough to score both marks.

(b) The majority of students answered this successfully.

Question 2

(a) Students tended to give vague answers here, not all of which fulfilled any of the mark points. Mark point 1 could not be awarded for ideas of the tubing and an artery both being hollow; ‘valves’ was underlined in the marking guidelines as a requirement in the answer in order to award credit.

(b) This was generally answered better than part (a). Mark points 1, 2 and 5 were clearly presented. Some vague answers came close to mark points 3 and 4 but did not fulfil all aspects. For example a simple statement that ‘the water in the tubing was not under pressure’ was insufficient to award mark point 4, as there was no suggestion of the pressure in the artery coming from the heart beat.
Question 3

In both parts of this question students often referred to ‘human error’ which was not creditworthy. In questions relating to methodology, we assume that the student/scientist carrying out the task demonstrated practical competence.

(a) Again, some vague answers were seen but the idea in mark point 1 was the most common creditworthy answer.

(b) Only better answers showed appreciation that measuring to 2 decimal places was inappropriate but many found it difficult to express why this was so.

Question 4

(a) Many students could answer this successfully and both mark point 1 and 2 were seen.

(b) This question required students to explain one advantage. Many answers stated an advantage (eg ‘so there is a shorter diffusion pathway’) without giving a full description and accompanying explanation linked to the function of the capillary. Some answers relating to the short diffusion pathway did not demonstrate AS level understanding of the importance of this being between the blood inside the capillary and the surrounding tissues with which exchange is occurring. Without this further description, mark point 1 could not be awarded.

(c) Most students achieved this mark.

(d) Most students successfully answered this question either suggesting fluid remains in the tissue fluid or returns in the lymph. Some suggested blood was left in the tissue fluid which is the incorrect context and so negates the mark point. Better answers gave a full explanation of fluid remaining in the tissue fluid and then draining into the lymph.

Written Test: Section B

Question 5

There were many very good answers to this question, with much greater detail than required by the marking guidelines.

Question 6

Both the simple mathematical principles required in this question were well understood.

Question 7

This question proved difficult for many students, since it required more than a rote-learnt definition of standard deviation. The mark point required application to this example of the principle that most/68% of the data were within one standard deviation of the mean. Stating that 45 to 69 was the age range of the sample was not correct and so not creditworthy.
Question 8

(a) All figures had to be given to 2 decimal places (including 0.00) and all rounded correctly for full credit here. This was, perhaps surprisingly, fairly rarely done.

(b) This question required application of the regularly examined principle that giving data per million allows for comparison when each group is of a different size (this idea gained mark point 1). Students then found it difficult to use both tables to explain the effect of this calculation in order to gain mark point 2 or 3. It is vital within Section B that students make full use of the resource material and link it to their answers.

Question 9

Only the better mathematicians could successfully answer this question.

Question 10

Most could select information from the resource to achieve this mark.

Question 11

This question was generally well done with mark point 2 being more commonly seen than mark point 1. Some students went along these lines but did not include reference to ‘risk’ or ‘chance’ to fulfill the mark point.

Question 12

Most students successfully answered this question.

Question 13

Assessment objective 2 requires students to identify overall patterns or trends in data. Here, mark point 1 required identification of an overall trend; point to point descriptions were not sufficient to gain credit. Correctly identifying the times of largest decrease or slowest decrease were tricky as the times given on the x-axis of the graph did not correspond to the points of a change of gradient. The changes of gradient occurred at the times the blood flow readings were taken, as stated in the information provided above the graph.

Question 14

These data proved difficult for students to analyse and it was pleasing that many achieved two marks. Unfortunately, most students did not read the command word carefully enough. This was an ‘evaluate’ question and thus required both positive and negative comments to gain full credit.

Question 15

This was a difficult final question and relatively few scored both marks. The question required students to combine information from both resources to make specific statements. Too many generalised answers were seen that did not make full use of the information provided.
Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator www.aqa.org.uk/umsconversion