Research and Information Services

MONITORING STANDARDS REPORT

SCOTTISH QUALIFICATIONS AUTHORITY

Comparison of Biology Intermediate 2, 2005 and 2002, and Standard Grade Credit 1994

1 Introduction

Intermediate 2 was introduced in Session 1999/2000 and currently runs in parallel with Standard Grade. Some centres present candidates for Intermediate 2 Biology in S4, instead of Standard Grade. Other centres present candidates in S5/S6. These two NQ awards have been benchmarked against each other with an externally-rated equivalence (Unified Point Score) of 28 points for Intermediate 2 at Grade C, band 6 and Standard Grade at Band 2. The working hypothesis during this study was that they were comparable.

2 Methodology

Standards were compared on the basis of *demand:* Arrangements, Assessment Instruments and Marking Instructions, and of the *performance* of candidates: analysis of the responses from the populations at each examination diet.

2.1 Arrangements

Intermediate 2 comprises three Units:

- Living Cells
- Environmental Biology and Genetics
- Animal Physiology

Each Unit has a recommended time allocation of 40 hours. An additional 40 hours of course time is available for induction, consolidation, integration, development of practical skills, completion of Outcome 3 reports and preparation for the external assessment of candidates.

Standard Grade is based on three general aspects: the biological basis for life, relationships and applications. These aspects are dealt with through seven prescribed Topics:

- The Biosphere
- The World of Plants
- Animal Survival
- Investigating Cells
- The Body in Action
- Inheritance
- Biotechnology

Standard Grade has a recommended time allocation of 160 hours. The 7 Topics are of differing complexity and no guidance is given in the SG Arrangements on the time to be spent on each.

As the layout of the Arrangements for Intermediate 2 and Standard Grade are so different a direct comparison of the content cannot be made. However, many topics are covered in both (Appendix 1), albeit some are at a different depth. There are a number of topics that are covered solely in one or the other. For example, 'mitosis' is part of the Standard Grade Arrangements, but is not considered at Intermediate 2, whereas, the mechanism of 'meiosis' is covered at Intermediate 2, but is not covered at Standard Grade. The general trend is that Standard Grade covers a greater breadth, whereas topics in Intermediate 2 may be covered in greater depth. Some modern aspects of biology, e.g. genetic modification, are given more emphasis in Intermediate 2 - reflecting the more recent construction of that course.

The Arrangements Document for Intermediate 2 was revised in 2002, when the Fourth Edition replaced the Third Edition released in 1999. This later edition, in use for the 2005 examination, is considerably more comprehensive in detail, the Course Specification section having been

increased by 40%. The main additions are to the 'Notes' section, specifying examples or giving more detail of the content to be covered. These additions allow greater articulation of topics between Units (e.g. diffusion) and give more emphasis on such modern concepts as GM, factors affecting biodiversity and negative feedback systems. Thus the Intermediate 2 syllabus has expanded somewhat since its inception with a slight increase in the number of topics and more direction being given as to the detail required.

The overall conclusion on the comparison of the Arrangement Documents was that they were broadly equivalent in their level of difficulty but with more depth in some topics in Intermediate 2 and more breadth of coverage in Standard Grade.

2.2 Assessment Instruments

National Assessment at Intermediate 2 comprises 100 marks accessed in 2 hours (one mark per 1.2 minutes). Standard Grade has 80 marks accessed in 1.5 hours (one mark per 1.13 minutes). Although these indices are very similar, Standard Grade requires a greater volume of reading to access the marks fully, with an associated higher demand on English comprehension.

While not part of the remit, a superficial comparison of the 2005 Credit paper with the 1994 Credit paper showed a marked reduction in length, a decrease in the number of marks for answers requiring extended writing and a decrease in the number of marks given for multiple response questions. This would support the view that the Assessment Instrument for Credit level has evolved, implying that conclusions drawn between the 2002 and 2005 Intermediate 2 Assessments and the 1994 Credit level Assessment may not be true reflections of the current situation.

Extended response questions comprised 17% of the final marks awarded in the Standard Grade Credit level assessment of 1994, whereas the weighting of such questions in Intermediate 2 was 32% in 2002 and 28% in 2005. By contrast, 25% of the marks in Intermediate 2 are accessed by multiple-choice questions, whereas there are none in Standard Grade.

Half of the marks available in Standard Grade are designated as 'Problem Solving', whereas this aspect is designated to constitute only 25-30% of the marks at Intermediate 2 (in fact 36% in the 2002 paper and 28% in the 2005 paper) with the level of demand (as indicated in the answers acceptable in the Marking Instructions) in some Standard Grade problem-solving questions being less. Classification of 'KU' and 'PS' appear to have migrated somewhat over the years. A Standard Grade question in 1994 had been classified as 'PS' as information had to be obtained from 2 different sources. Intermediate 2 considered this type of question to be KU based as it required an understanding of the concept.

In addition, in the Intermediate 2 Assessment Instrument more emphasis is placed on experimental design, with questions relating to circumstances that are unfamiliar to the candidates making this aspect particularly demanding. Thus, contrary to first impressions, the demand of the Standard Grade assessment is not so different from, or slightly less demanding than, Intermediate 2.

One change in the mark allocation from the 2002 to the 2005 Intermediate 2 Assessment was the 1 mark for 'coherence' included in the 5 marks for the first extended response question. This coherence mark was discontinued after the 2002 diet and all 5 marks were awarded for 'knowledge and understanding' in 2005.

All questions of each of the three examination papers were mapped to the Arrangements Documents and designated 'KU' or 'PS' (Appendix 2). This analysis demonstrated that there was an acceptable distribution of assessment across the Arrangements, after the topics of the extended response questions of Section C had been taken into account for Intermediate 2. Thus, all three assessments were fair and consistent in their coverage of the Arrangements.

23 questions were investigated in depth – in which the same topic or skill area had been assessed in two or more of the Assessment Instruments and where the format of the questions was substantially similar (Appendix 3).

For most, the degree of difficulty of questions of the same kind was similar as were the Marking Instructions (see 2.3 below). Where there was a variance, four appeared slightly easier at Standard Grade and three appeared slightly easier at Intermediate 2. Occasionally, more items of information were required to access the marks in Standard Grade. The overarching conclusion was that the 1994 Standard Grade questions needed a greater time allocation for reading the longer passages and stems of questions and for comprehending the nature of each question. (Appendix 5 gives a summary of these findings)

2.3 Marking Instructions

For each diet, the Marking Instructions were clear and comprehensive, Intermediate 2 having adopted a tabular format that was considered to be more accessible.

In keeping with the general trend of the 1994 Standard Grade Assessment, more information processing was required compared to similar questions in the Intermediate 2 Assessments to obtain a mark. For example, in the calculation of averages, Standard Grade demanded the mean of 10 numbers whereas Intermediate 2 had 4 numbers in the calculation. Standard Grade candidates had to work out a ratio of 3 numbers whereas Intermediate 2 candidates, in the two years monitored, had to calculate a ratio of 2 numbers only.

In the assessments for both courses there were examples of questions which required candidates to give multiple responses to obtain one mark. In some questions the Intermediate 2 candidates had to provide 4 pieces of information for 3 marks. In other questions to obtain 1 mark candidates would have to answer correctly 1 or 2 pieces of information. The Standard Grade Credit Marking Instructions for 1994 demanded 8 pieces of information for 3 marks in one well-supported question. In other questions to obtain 1 mark candidates would have to give 2 or 3 pieces of correct information.

The 23 examination questions (discussed in 2.2) which addressed the same topic in a similar way were investigated in greater depth. Of these, 7 questions spanned the three examination diets. The Marking Instructions for these 7 questions were comparable and showed broad equivalence over the period.

For Intermediate 2, the Marking Instructions accepted less latitude in 2005. For example, the 2002 Instructions did not penalise for transposed axes or taking up less than half of the area of the graph, but did so in 2005. Therefore, there had been a general tightening up in the Marking Instructions from 2002 to 2005 and the 2005 diet could be matched to Standard Grade in 1994.

3 Performance of candidates

Twelve representative sample scripts were examined for each year. For Intermediate 2, 3 scripts each had overall marks at the lowest Grade A, B, C and D. For Standard Grade, 6 scripts each had the overall marks at the lowest Grade 1 and 2. They were reviewed independently.

For Intermediate 2, the candidate responses were reviewed to give the relative performances in:

1. multiple choice questions (Section A)
2. extended response questions (Section C)
3. descriptive questions in section B
4. non-descriptive questions in section B.

For Standard Grade, the candidate responses were reviewed to give the relative performances in:

1. descriptive questions
2. non-descriptive questions

No distinction was made between KU and PS for either course assessment.

There was a clear correlation across the years. In general for Intermediate 2, decreasing overall marks were reflected by decreasing marks awarded in each question group with Section C and the descriptive showing the largest differences. However, small sample sizes gave some variance and did not give any great confidence in the analysis.

Analysis of SG was further complicated as the overall grade is based on the average grade of the 3 separate elements, KU, PS and the internally assessed PA. The overall trend was similar to that seen in Intermediate 2 with the descriptive questions being the best indicator of the final grade, but the variations seen between the candidates in the small sample make these conclusions tentative. (Appendix 5)

Conclusions

- The Arrangements documents across 1994-2005 were broadly comparable.
- Although the profiles of the Assessment Instruments for Standard Grade and Intermediate 2 are different, variation in the fine detail and different emphasis between them make them comparable.
- Assessment Instruments covered the breadth of the Arrangements in each year under review.
- The Marking Instructions were comprehensive over the period.
- There has been a tightening up of the Marking Instructions between 2002 and 2005 in Intermediate 2, with a more demanding template allowing less latitude now in place.
- For Intermediate 2 the performance of candidates, surveyed at the A/B and C/D interfaces, was comparable in 2002 and 2005.
- SQA considers the Standard Grade Credit and the Intermediate 2 award to be comparable, while the Unified Point Score makes the Intermediate 2 band 6 award equivalent to a Credit band 2. The analysis of the Arrangements, Assessment Instruments and Marking Instructions between these two NQ awards support these comparisons.

Appendix 1: Comparison of topics in Standard Grade and Intermediate 2

Topic	Standard Grade	Intermediate 2
Techniques for measuring populations and abiotic factors	*	
Components of ecosystems	*	*
Niche and biodiversity		*
Food chains and webs	*	*
Adaptations to conditions		*
Pyramids	*	*
Growth curves	*	
Competition	*	*
Predator/prey relationships		*
Inter and intraspecific competition		*
Nitrogen cycle	*	
Effects of pollution	*	*
Effects of grazing		*
Sources and control of pollution	*	
Examples of pollution, indicators	*	*
Poor management of resources	*	
Introduction to plants, importance, potential	*	
Seed structure and germination	*	
Pollination seed dispersal	*	
Flower structure and gamete production	*	*
Artificial and natural propagation	*	
Structure of stem leaf root	*	
Diffusion and photosynthesis	*	*
Photosynthesis equation	*	*
Light reaction and ATP, simple dark reaction		*
Fate of glucose in photosynthesis	*	*
Cellulose made in photosynthesis		*
Limiting factors in photosynthesis	*	*
Production of early crops		*
Requirements of food and compositions	*	*
Teeth	*	
Structure and function of the digestive system	*	*
Gastric glands		*
Structure of gametes	*	
Meiosis		*
Internal and external fertilization	*	
Gamete production and fertilization (animal)	*	*
Trout reproduction	*	
Human development (basic)	*	
Survival of eggs	*	

Topic	Standard Grade	Intermediate 2
Courtship, parental care	*	
Kidney structure and function	*	*
Osmoregulation	*	*
Osmoregulation in fish		*
Rhythmical behaviour	*	
Behaviour in animals for survival	*	*
Cell structure and function (plants & animals)	*	*
Cell structure and function (microbial cells)		*
Diffusion and osmosis	*	*
Hyper, hypo and iso tonic		*
Mitosis	*	
Importance and number/sets of chromosomes	*	*
DNA and relationship to proteins and phenotypes		*
Properties and examples of enzymes	*	*
Enzymes lower activation energy		*
Lock and key structure of enzymes		*
Energy in food	*	*
Equation for aerobic respiration	*	*
More details on the chemistry of respiration		*
Anaerobic respiration		*
Muscles and bones	*	
Breathing	*	
Circulation and respiratory system	*	*
Effect of blocked coronary artery		*
Transport of CO2 in blood		*
Phagocytes and lymphocytes		*
Sense organs	*	
Nervous system	*	*
Brain structure and function	*	*
Hypothalamus, sensory and motor strips		*
Temperature regulation		*
Anaerobic respiration and muscle fatigue	*	*
Effects of training	*	
Variation in species	*	*
Natural selection		*
Monohybrid cross	*	*
Codominance, polygenic characteristics, multiple alleles		*
Variation and meiosis		*
Inheritance of sex	*	*
Genetics and humans	*	
Selective breeding	*	*
Commercial brewing, batch processes	*	

Topic	Standard Grade	Intermediate 2
Bread and alcohol production	*	*
Antibiotics		*
Yoghurt production	*	*
Problems with disposal of sewage	*	
Converting waste into useful materials	*	
Fermented fuels	*	*
Decomposition	*	
Microbial foods	*	
Safe handling techniques	*	
Genetic engineering	*	*
GM Products	*	*
Growth hormone		*
GM -advantages	*	*
GM - disadvantages		*

Appendix 2: Question maps for the Instruments of Assessment

Standard Grade 1994, Credit paper
Mark distribution by topic

Question	Topic		KU marks	PS marks	Total marks
	1a	Biosphere, ecosystem			
12	1b	Biosphere, how it works	0	6	6
2	1c	Biosphere, control & management	2	5	7
	2a	Plants, introduction			
	2b	Plants, growing them			
7	2c	Plants, as food	6	0	6
4	3a	Animal survival, need for food	3	8	11
	3b	Animal survival, reproduction			
8	3c	Animal survival, water & waste	4	0	4
	3d	Animal survival, environmental factors			
	4a	Investigating cells, plant v animal			
3	4b	Investigating cells, diffusion, osmosis	0	5	5
6	4c	Investigating cells, mitosis	3	0	3
5	4d	Investigating cells, enzymes	2	2	4
14	4d		0	3	3
	4e	Investigating cells, aerobic respiration			
	5a	Body, skeleton & muscle			
9	5b	Body, respiration and circulatory	4	3	7
10	5b		0	4	4
8	5c	Body, coordination	3	0	3
	5d	Body, physical activity			
1	6a	Inheritance, species and variation	3	2	5
11	6b	Inheritance, patterns, fertilisation, chromosome	4	0	4
	6c	Inheritance, genetics & society			
15	7a	Biotechnology, fermentation	4	2	6
	7b	Biotechnology, decomposition			
13	7c	Biotechnology, genetic engineering	2	0	2
		Totals	40	40	80

Intermediate 2 paper, 2002: mark distribution, by Unit

Question	Unit ref	Content	Element	Marks	Skill		PS Skill	Marks
A14	1a	Cell structure/function	p	1	Calculation %increase		PS3	1
A6	1a	cell structure/function	k	1	Und & App			1
A7	1a	Cell structure/function	k	1	Recall			1
A17	1b	Diffusion & osmosis	p	1	Prediction		PS7	1
B1	1b	Diffusion & osmosis	K	1	Recall			1
A8	1c1	enzyme action - properties	P	1	Prediction		PS7	1
B7	1c1	enzyme action - properties	P	5	Eval of Exp	Explain 1	PS5	2
					Calculation average		PS3	1
					Conclusion		PS6	1
					Design of Inv		PS4	1
C2	1c1	enzyme action - properties	K	5				5
A15	1d1	aerobic/anaerobic respn energy	K	1	Recall			1
C2	1d1	aerobic/anaerobic respn energy						
A16	1d1	Products	K	1	Recall			1
B3	1d2	Products	K	2	Underst	Explain 2		2
B3	1d2	Products	P	1	Selection	line graph	PS1	1
B8	1e1	photosynthesis energy fixn	K	4	Recall			1
B8	1e1	photosynthesis energy fixn			Und & App			3
B8	1e1	photosynthesis energy fixn	P	3	Const of line graph		PS2	3
B9	1e2	factors affecting rate photosynthesis	K	3	Und & App	Explain 1		3
B9	1e2	factors affecting rate photosynthesis		1	Recall			1
B9	1e2	factors affecting rate photosynthesis	P	2	Conclusion		PS6	2
		SUBTOTAL		**34**				
	Unit 2							
A18	2a1	ecosystems, energy flow	P	1	Calculation		PS3	1
A19	2a1	ecosystems, energy flow	P	1	Calculation%		PS3	1
A20	2a1	ecosystems, energy flow	K	1	Recall			1
A21	2a1	factors affecting variety	K	1	Und & App			1
A22	2a1	ecosystems, energy flow	P	1	Calculation		PS3	1
A23	2a1	ecosystems, energy flow	P	1	Conclusion		PS6	1
B11	2a1	ecosystems, energy flow	K	6	Und & App			1
B11	2a1	ecosystems, energy flow			Recall			5
B11	2a2	factors affecting variety	P	2	Justification	Explain 2	PS6	2
B12	2a2	factors affecting variety	K	3	Recall			2
B12	2a2	factors affecting variety			Und & App	Explain 1		1
B12	2a2	factors affecting variety	P	3	Prediction		PS7	1
B12	2a2	factors affecting variety			Design of Inv		PS4	1
B12	2a2	factors affecting variety			Evaluation of design		PS5	1
C1	2a2	factors affecting variety		5				5
C1	2b1	factors, species variation, fertilisation						
A24	2b2	Genetics	K	1	Und & App			1
A25	2b2	genetics - incomplete dominance	P	1	Processing info			1
B10	2b2	Genetics -monohybrid	K	2	Recall			1
B10	2b2	Genetics -monohybrid			Und & App			1
B10	2b2	Genetics -monohybrid	p	2	Processing info&ratio		PS3	1
B10	2b2	Genetics -monohybrid			Prediction		PS7	1
B10	2b2	genetics -environmental impact	k	1	Recall			1
		SUBTOTAL		**32**				

Question	Unit ref	Content	Element	Marks	Skill		PS Skill	Marks
	Unit 3							
B4	3a1	mammalian nutrition, food breakdown	k	3	Recall			3
B4	3a1	mammalian nutrition, food breakdown	p	3	Completion bar graph		PS2	3
A1	3a2	alimentary canal	k	1	Recall			1
A2	3a2	alimentary canal	k	1	Recall			1
A3	3a2	alimentary canal	k	1	Und & App			1
B6	3b	control internal environment	k	5	Recall			5
A10	3c1	circulation & gas exchange, heart, vessels	p	1	Calculation	Ratio	PS3	1
A9	3c1	circulation & gas exchange, heart, vessels	p	1	Calculation		PS3	1
B2	3c1	circulation & gas exchange, heart, vessels	k	2	Und & App	Explain 1		2
B2	3c1	circulation & gas exchange, heart, vessels	p	2	CalculationRatio + %		PS3	2
B1	3c2	lungs & capillaries	k	4	Und & App	Explain 2		4
A11	3c3	blood	k	1	Recall			1
A4	3c3	blood	p	1	Prediction		PS7	1
A5	3c3	blood	k	1	Recall			1
A12	3d1	sensory mechanisms, brain	k	1	Recall			1
A13	3d1	sensory mechanisms, brain	k	1	Recall			1
B5	3d2	nervous system	k	5	Recall			5
		SUBTOTAL		**34**				**100**
							KU = 64	**PS = 36**

Intermediate 2, 2005: Mark distribution, by Unit

Question	Unit ref	Content	Element	Marks	Skill	PS Skill	Marks
A1	1a	Cell structure/function	k	1	Recall		1
A2	1a	Cell structure/function	k	1	Recall		1
C2	1a	cell structure/function		5			5
A3	1b	Diffusion & osmosis	k	1	Und & App		1
A4	1b	Diffusion & osmosis	p	1	Prediction	PS7	1
B5	1b	Diffusion & osmosis	k	2	Recall		2
B6	1c1	enzyme action - properties	k	6	Recall		4
B6	1c1	enzyme action - properties			Understanding		2
A5	1d1	aerobic/anaerobic respn energy	k	1	Recall		1
B5	1d1	aerobic/anaerobic respn energy	k	1	Und & App Explain 1		1
A7	1d2	Products	k	1	Recall		1
A8	1e1	photosynthesis energy fixn	k	1	Recall		1
A9	1e1	photosynthesis energy fixn	k	1	Recall		1
A6	1e2	factors affecting rate photosynthesis	p	1	Selecting info	PS1	1
C2	1e2	factors affecting rate photosynthesis					
		SUBTOTAL		**23**			
A10	2a1	ecosystems, energy flow	k	1	Recall		1
A13	2a1	ecosystems, energy flow	p	1	Calculation % of		1
B7	2a1	ecosystems, energy flow	k	5	Recall		5
B8	2a1	ecosystems, energy flow	k	3	Und & App Explain 1		1
B8	2a1	ecosystems, energy flow			Recall		2
B8	2a1	ecosystems, energy flow	p	3	Calculation	PS3	1
B8	2a1	ecosystems, energy flow			Conclusion	PS6	2
A11	2a2	factors affecting variety	p	1	Calculation %	PS3	1
A12	2a2	factors affecting variety	p	1	Eval of Exp Design	PS5	1
B10	2a2	factors affecting variety	k	1	Und & App Explain 1		1
B10	2a2	factors affecting variety	p	5	Design of Inv	PS4	5
B11	2a2	factors affecting variety	k	3	Und & App Explain 1		3
A14	2b2	genetics – DNA	k	1	Recall		1
A15	2b2	genetics - incomplete dominance	k	1	Recall		1
A16	2b2	genetics - genetic eng	p	1	Calculation % inc	PS3	1
A17	2b2	genetics - monohybrid cross	p	1	Process info + ratio	PS3	1
A18	2b2	genetics - monohybrid cross	k	1	Process info + %	PS3	1
A19	2b2	genetics - genetic eng	k	1	Und & App		1
B9	2b2	Genetics	k	4	Recall Explain 1		2
B9	2b2	Genetics			Und & App		2
B9	2b2	Genetics	p	2	Conclusion	PS6	2
C1	2b2	Genetics	k	5			5
C1	2b2	genetics					
		SUBTOTAL		**41**			
A20	3a1	mammalian nutrition, food breakdown	p	1	Prediction	PS7	1
A21	3a1	mammalian nutrition, food breakdown	k	1	Recall		1
B3	3a1	mammalian nutrition, food breakdown	p	6	Calculation ratio/equ	PS3	2

Question	Unit ref	Content	Element	Marks	Skill		PS Skill	Marks
B3	3a1	mammalian nutrition, food breakdown			Construction bar gr		PS2	3
B3	3a1	Mammalian nutrition, food breakdown			Justification	Explain 1	PS6	1
A22	3a2	alimentary canal	k	1	Recall			1
B1	3a2	alimentary canal	k	6	Recall			3
B1	3a2	alimentary canal			Und & App			3
B2	3b	control internal environment	k	7	Recall			4
B2	3b	control internal environment			Und & App	Explain 3		3
B4	3c1	circulation & gas exchange, heart, vessels	k	4	Recall			2
B4	3c1	circulation & gas exchange, heart, vessels			Und & App			2
A23	3c2	lungs and capillaries	p	1	Calculation % inc		PS3	1
B5	3c2	lungs and capillaries	k	3	Recall			3
B4	3c3	blood	k	2	Recall			1
B4	3c3	blood			Underst	Explain 1		1
B4	3c3	blood	p	2	Conclusion		PS6	2
A24	3d1	sensory mechanisms, brain	k	1	Recall			1
A25	3d2	nervous system	p	1	Calculation		PS3	1
		SUBTOTAL		**36**				
						Overall	**KU = 72**	
						Overall	**PS =28**	

Appendix 3: Table showing similar questions analysed on compared papers

Questions from Int2 2002	Questions from Int2 2005	Questions from Standard Grdae 1994	Topic or Skill Area
B11ai	B7ai	2ai	Ecosystems, Energy Flow
	A22	4aiv	Digestive System
B4b		15biv	Food
B6bi	B2ci	8b	Kidney Structure & Function
	B2ai	8a	Kidney Structure & Function
C2A		5c	Enzymes
B1a	B5b	9b	Circulation & Gas Exchange
	A24	8cii	Brain Structure
	B9b	11b	Variation
B10ai		11ai	Monohybrid Cross
	A19	13a	Genetic Engineering
A4		1ai	Keys
B7a		3a	Design of an investigation
B7bii		2bi	Averages
B7biii	B8aii	(2bii*) 9cii	Relationships
A10,B2a		4biii	Ratio from chart/graph
B3a		4cii,iii,15bi	Obtaining data from a line graph
A22	A6,B8ai	9ci,10b,15bii	Calculations using data from graphs
B8a		5a	Plotting a line graph
B2b	A16,A23	10c	% calculations
B7biii,B12a	B4biii	14a	Conclusions from data
	B3d	14b	Providing evidence from data to support a statement
B11c		15biii	Justifying a hypothesis

Appendix 4–Comparison of Intermediate 2 Marking Instructions with 1994 Standard Grade Marking Instructions

Question number from Int2 2002	Question number from Int2 2005	Question number from Standard Grade 19494	Comments
B11ai	B7ai	2ai	Ecosystems, Energy Flow All 3 questions are testing the same area of the Arrangements, but in different ways. The SG question does however require more reading and the question has been classified as a PS question as information is obtained from 2 different sources. Int 2 would consider this type of question a knowledge based one. The mark allocation is in line with Int 2
	A22	4aiv	Digestive System Both questions test the same knowledge but SG candidates have to write an explanation of what is happening, but it is a low level explanation and the mark allocation is comparable to Int 2
B4b		15biv	Food Both questions are from the same knowledge area and marked in the same way
B6bi	B2ci	8b	Kidney Structure & Function All 3 questions are testing the same area of the Arrangements but in different ways. The SG question requires more understanding of the concept and some processing of information. The Int2 questions require recall only and Int2 candidates would be able to answer this question without having to understand the process. The mark allocation seems fair for SG (candidates have to identify both factors for 1 mark)
	B2ai	8a	Kidney Structure & Function Both questions are testing the same area of the Arrangements but in different ways. The Int 2 requires candidates to provide 4 pieces of information for 3 marks. To obtain 1 mark candidates would have to answer correctly 1 or 2 pieces of information The SG question requires candidates to provide 8 pieces of information for 3 marks. To obtain 1 mark candidates would have to give 2 or 3 pieces of correct information.
C2A		5c	Enzymes Int2 question is part of an extended response question. The SG question is an 'explain why' – the mark allocation is very similar.

Question number from Int2 2002	Question number from Int2 2005	Question number from Standard Grade 19494	Comments
B1a	B5b	9b	Circulation & Gas Exchange '02 Int2 question has a mark allocation of 4 marks – 2 of the marks being awarded for explanations. '05 Int2 has a mark allocation of 2 marks which is for knowledge only SG has a mark allocation of 2 marks but requires candidates to match 3 sentences to 3 statements in a table. Candidates are not required to write their own explanations/descriptions. The statements and sentences are a mixture of knowledge and explanations. However if candidates only get 1 match correct they are allocated 1 mark.
	A24	8cii	Brain Structure Int2 question has a mark allocation of 1. Candidates are required to give 1 piece of information. The SG question has a mark allocation of 2 and 3 pieces of information are required. However if they give only 1 piece of correct information they are awarded 1 mark.
	B9b	11b	Variation Int 2 question requires candidates to identify the type of variation from an example- 1 mark SG question requires candidates to define the term – 1 mark. The MI seems realistic and fair.
B10ai		11ai	Monohybrid Cross Int 2 question shows a standard example of a monohybrid cross SG is a trickier example – using a heterozygous parent and therefore more processing of information is required. More genotypes have to be identified – the gametes as well as the parents to gain 1 mark.
	A19	13a	Genetic Engineering Very similar questions involving similar skills. They both have the same mark allocation.
A4		1ai	Keys Int2 question requires candidates to identify all 4 cells using information from 4 diagrams and the Key. They need to be able to read information in the table to identify the correct answer. The SG question has a Key with more organisms/statements but the operation is a simpler one.
B7a		3a	Design of an investigation Int2 question requires candidates to identify a variable which has not been mentioned in the description for 1 mark. The SG requires candidates to identify the altered variable and 2 controlled variables for 1 mark, but all the variables have been described in the text.
B7bii		2bi	Averages Int2 question requires an average of 4 numbers, whereas SG question requires an average from 10 numbers. Mark allocation is 1 and in both cases the answer is to 1 decimal point.

Question number from Int2 2002	Question number from Int2 2005	Question number from Standard Grade 19494	Comments
B7biii	B8aii	(2bii*) 9cii	Relationships The '02 Int2 and SG questions are very similar and the mark allocation is comparable -1 mark for a pattern or trend. The '05 Int 2 graph shows a more complicated pattern and the mark allocation is 2 marks – 1 for each trend or pattern.
A10,B2a		4biii	Ratio from chart/graph The SG question is more difficult in that candidates have to work out a ratio of 3 numbers, the Int 2 questions ask for a ratio between 2 numbers. Int 2 also makes it clear in the question that it is a 'simple whole number ratio' that is required whereas the SG does not specify this but it is expected in the answer
B3a		4cii,iii,15bi	Obtaining data from a line graph The Int 2 question is a straight forward reading data from the graph as is 4ciii and 15bi – mark allocations are comparable. The SG question 4cii requires the candidate to process information from the text and then apply that to the graph.
A22	A6,B8ai	9ci,10b,15bii	Calculations using data from graphs These are all straightforward calculations. The mark allocations are comparable.
B8a		5a	Plotting a line graph The mark allocation for the S grade is 2 marks, but one of the axes has been labelled and the scale given. They are also given an instruction that makes it absolutely clear as to which data they must use. These factors make the construction of the line graph easier for candidates. The Int2 graph requires candidates to 'present the results in an appropriate format'. Although the marks allocated are 3 candidates lose the plot mark if they produce a bar chart or plot 3 sets of data.
B2b	A16,A23	10c	% calculations These are all straightforward % increase or % decrease questions. The mark allocation is the same.
B7biii,B12a	B4biii	14a	Conclusions from data The mark allocation is very similar, i.e. when more than one trend or pattern is required then more than 1 mark is allocated.
	B3d	14b	Providing evidence from data to support a statement The mark allocation and level of demand is very similar
B11c		15biii	Justifying a hypothesis The SG question has a 1 mark allocation and candidates need only to establish a hypothesis then look for evidence from the data to justify it. The Int2 question goes one stage further and requires candidates to give an explanation. This has an extra 1 mark allocation.

Appendix 5 – Candidate performance in different types of questions

Performance of selected candidates in 1994 Credit Assessment

Candidate	Descriptive marks	Non descriptive marks	Total marks
1	26	46	72
2	23	40	63
3	24	34	58
4	23	36	59
5	16	46	63
6	18	36	54
7	20	31	51
8	17	28	45
9	20	30	50
10	15	43	58
11	16	36	52
12	13	39	52
Averages			
1-6	21.67	39.67	61.5
7-12	16.83	34.5	51.33

Performance of selected candidates in 2002 and 2005 Intermediate 2 Assessments

2002						2005					
Candidate number	Sect A MC ques marks	Descriptive marks	Sect. C marks	Non descriptive Section B marks	Total marks	Candidate number	Sect A MC ques marks	Descriptive marks	Sect. C marks	Non Descriptive Section B Marks	Total marks
	25	19	10	46	100		25	16	10	49	100
1A	23	13	3	32	71	1A	21	3	5	40	69
2A	21	13	10	26	70	2A	21	10	5	33	69
3A	24	10	6	30	70	3A	22	11	5	31	69
1B	22	11	6	26	65	1B	21	8	4	30	63
2B	21	7	5	32	65	2B	19	11	8	25	63
3B	22	9	6	28	65	3B	20	11	4	31	63
1C	19	7	3	21	50	1C	16	4	4	22	46
2C	20	3	2	25	50	2C	17	6	1	22	46
3C	22	3	2	23	50	3C	16	5	4	21	46
1D	18	5	2	20	45	1D	15	3	3	19	40
2D	18	6	4	17	45	2D	15	2	4	19	40
3D	20	2	3	20	45	3D	14	2	1	23	40
Averages						Averages					
A	22.67	12.00	6.33	29.33	70.33	A	21.33	8.00	5.00	34.67	69.00
B	21.67	9.00	5.67	28.67	65.00	B	20.00	10.00	5.33	28.67	63.00
C	20.33	4.33	2.33	23.00	50.00	C	16.33	5.00	3.00	21.67	46.00
D	18.67	4.33	3.00	19.00	45.00	D	14.67	2.33	2.67	20.33	40.00