Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION 2013

BIOLOGY

CHIEF EXAMINER'S REPORT

Contents

1. Introduction

This report should be read in conjunction with the examination paper(s) and the published marking scheme(s). These are available on the State Examinations Commission's website www.examinations.ie

1.1 Syllabus Structure

The present Leaving Certificate biology syllabus was introduced in its revised form in 2002 and first examined in 2004.

Leaving Certificate science syllabuses are designed to incorporate the following components:

- science for the enquiring mind or pure science, to include the principles, procedures and concepts of the subject as well as its cultural and historical aspects
- science for action or the applications of science and its interface with technology
- science that is concerned with issues – political, social and economic – of concern to citizens.

The three components are integrated within the syllabus, with the first component having a weighting of 70%. The remaining 30% is allocated to the other two components in the ratio 3**:**1. The syllabus content is divided into three units: Unit One: Biology – The Study of Life; Unit Two: The Cell; Unit Three: The Organism.

The syllabus is offered at Ordinary level and Higher level. Practical scientific activities, both laboratory and field work, are thoroughly integrated in the syllabus, with mandatory practical activities itemised in each unit of study. Differentiation between the levels is achieved in terms of depth of treatment. The Higher level course incorporates all of the Ordinary level topics and some further material.

1.2 Assessment

The syllabus is assessed at both levels by means of a three-hour terminal written examination. There is a total mark allocation at each level of 400 marks. The structure and rubrics of the Ordinary level and the Higher level examination papers are the same. Each examination paper consists of fifteen questions and is divided into three sections – A, B and C. It is established practice that in Section A there are two questions from each unit and in Section C there is one

question from Unit One, two questions from Unit Two and three questions from Unit Three, to reflect the amount of examinable content in the various units. The questions in Section B relate to the mandatory practical activities across all units.

Section A (100 marks / 25%) consists of six questions. Each consists of a number of parts that require short answers. Each question is allocated 20 marks. Candidates are required to answer five of the six questions in this section.

Section B (60 marks / 15%) consists of three questions based on the mandatory practical activities from the syllabus, each consisting of a number of parts requiring short answers. Each question in section B is allocated 30 marks and candidates are required to answer two of these questions.

Candidates' answers to the questions in Sections A and B are required to be given in the spaces provided on the question paper, which must be returned with the answer book at the end of the examination.

Section C (240 marks / 60%) consists of six questions requiring answers to be written in an answer book. Each question is allocated 60 marks. There is a degree of internal choice in questions 14 and 15, each of which allows candidates to answer two of three parts. Candidates are required to answer any four of the six questions in Section C.

1.3 Participation Trends

1.3.1 Overall candidature

Table 1 gives the overall Leaving Certificate biology candidature for the last five years. The table shows a continuation of the pattern of increase noted in the 2009 chief examiner's report, both in the total biology candidature and in biology candidate numbers as a percentage of the total Leaving Certificate cohort each year.

Year	Biology Candidature	Total Leaving Certificate Candidature*	Biology as % of total
2009	28101	54196	51.9
2010	29249	54481	53.7
2011	30349	54341	55.9
2012	30541	52589	58.1
2013	31497	52767	59.7

* This total includes school candidates, repeat candidates, external candidates and VTOS/PLC candidates. Leaving Certificate Applied candidates are excluded from all totals.

Table 1: Leaving Certificate Biology candidature, 2009 to 2013.

1.3.2 Candidature at each level

Table 2 compares the number and percentage of candidates taking biology at Ordinary and Higher levels in the years 2009 – 2013. The number of biology candidates taking Ordinary level decreased markedly from 2010 to 2011 but has increased each year since then and the ratio of Ordinary level candidates to Higher level candidates has remained quite stable since 2011. Annual Higher level candidature growth continues apace.

Year	Total Biology candidature	Number at Ordinary level	Number at Higher level	% Ordinary level	% Higher level
2009	28101	7999	20102	28.5	71.5
2010	29249	8278	20971	28.3	71.7
2011	30349	7673	22676	25.3	74.7
2012	30541	7801	22740	25.5	74.5
2013	31497	8064	23433	25.6	74.4

Table 2: Number and percentage of candidates at each level, 2009 to 2013

1.3.3 Gender balance

Tables 3 and 4 show the data for female and male biology candidature at each level. The data show that the preponderance of female candidature over male is greater at Higher level than at Ordinary level. It can also be seen that at each level, over the five years in question, the gap has narrowed between female and male candidature in biology.

Year	Total Higher level	Female Candidates	Male Candidates	Female as % of total	Male as % of total
2009	20102	13244	6858	65.9	34.1
2010	20971	13678	7293	65.2	34.8
2011	22676	14267	8409	62.9	37.1
2012	22740	14057	8683	61.8	38.2
2013	23433	14182	9251	60.5	39.5

Table 3: Gender composition of Higher level cohort, 2009 to 2013

Year	Total Ordinary level	Female Candidates	Male Candidates	Female as % of total	Male as % of total
2009	7999	5024	2975	62.8	37.2
2010	8278	4934	3344	59.6	40.4
2011	7673	4432	3241	57.8	42.2
2012	7801	4471	3330	57.3	42.7
2013	8064	4478	3586	55.5	44.5

Table 4: Gender composition of Ordinary level cohort, 2009 to 2013

2. Performance of Candidates

2.1 Higher Level

The distribution of grades awarded over the last five years is given in **Table 5** (lettered grades) and **Table 6** (sub-grades).

Year	A	B	C	A B C	D	E	F	NG	E F NG
2009	16.5	27.0	26.8	70.3	21.1	6.8	1.5	0.2	8.5
2010	17.6	27.5	25.7	70.8	20.2	6.7	2.0	0.3	9.0
2011	15.8	27.6	27.1	70.5	21.4	6.5	1.6	0.1	8.2
2012	16.9	27.7	26.5	71.1	20.5	6.3	1.7	0.2	8.2
2013	14.6	27.3	27.9	69.8	22.2	6.4	1.5	0.2	8.1

Table 5: Percentage of candidates awarded each lettered grade in Higher Level Biology, 2009 – 2013

Year	A1	A2	B1	B2	B3	C1	C2	C3	D1	D2	D3	E	F	NG
2009	8.2	8.4	8.4	9.0	9.7	9.0	9.0	8.8	7.2	6.7	7.3	6.8	1.6	0.2
2010	9.2	8.4	8.5	9.0	10.0	8.5	8.9	8.4	6.8	6.3	7.1	6.7	2.0	0.3
2011	6.7	9.1	8.0	9.4	10.2	8.9	9.3	8.9	7.5	6.6	7.3	6.5	1.6	0.1
2012	7.8	9.1	8.5	9.1	10.1	8.8	9.0	8.7	6.9	6.6	7.0	6.3	1.7	0.2
2013	6.0	8.6	7.5	9.5	10.3	8.7	9.2	10.0	7.2	7.1	7.9	6.4	1.5	0.2

Table 6: Percentage of candidates awarded each sub-grade in Higher Level Biology, 2009 – 2013

These data support the conclusion that the significant migration of candidates from Ordinary level to Higher level in 2011 and the subsequent stabilisation of the ratio between the candidatures at the two levels (see Table 2) has been followed by a decreasing trend in the proportion of candidates achieving an A grade and a similar but less-pronounced trend in the proportion of candidates achieving any of the top three grades in Higher level biology.

Table 10 compares the distribution of lettered grades at Higher level between female (F) and male (M) candidates from 2009 to 2013.

Year		A	B	C	A B C	D	E	F	NG	E F NG
2009	F	17.3	27.5	26.8	71.6	20.4	6.5	1.4	0.2	8.1
	M	15.2	26.3	26.7	68.2	22.3	7.4	1.9	0.3	9.6
2010	F	17.7	28.2	25.4	71.3	19.8	6.5	2.0	0.3	8.8
	M	17.3	26.1	26.1	69.5	20.6	7.1	2.1	0.4	9.6
2011	F	16.2	27.8	26.8	70.8	21.2	6.1	1.5	0.1	7.7
	M	15.0	26.9	27.6	69.5	21.7	7.0	1.7	0.2	8.9
2012	F	17.4	30.2	26.3	73.9	19.2	6.2	1.6	0.2	8.0
	M	16.1	25.3	27.3	68.7	22.7	6.5	1.8	0.3	8.6
2013	F	15.0	28.6	27.7	71.3	21.7	5.7	1.1	0.1	6.9
	M	14.1	25.2	28.1	67.4	23.0	7.5	2.0	0.3	9.8

Table 7: Comparison of achievement by lettered grade between female and male candidates in Higher level biology, 2009 – 2013 (% achieving each grade).

It is clear from these data that female candidates consistently received more ABC grades and fewer EFNG grades than male candidates in the years 2009 to 2013 at Higher level biology.

2.2 Ordinary Level

The distribution of grades awarded over the last five years is given in **Table 8** (lettered grades) and **Table 9** (sub-grades).

Year	A	B	C	A B C	D	E	F	NG	E F NG
2009	3.6	22.7	32.8	59.1	25.8	9.9	5.0	0.4	15.3
2010	3.1	26.5	33.0	62.6	23.3	8.7	4.5	0.9	14.1
2011	2.2	20.6	36.5	59.3	27.6	9.1	3.7	0.4	13.2
2012	1.3	17.9	39.2	58.4	28.2	9.4	3.5	0.6	13.5
2013	2.1	21.6	34.8	58.5	28.1	9.2	3.6	0.6	13.4

Table 8: Percentage of candidates awarded each lettered grade in Ordinary level biology, 2009 – 2013.

Year	A1	A2	B1	B2	B3	C1	C2	C3	D1	D2	D3	E	F	NG
2009	1.0	2.6	5.2	7.5	10.0	11.0	11.3	10.5	9.6	7.8	8.4	9.9	5.0	0.4
2010	0.7	2.4	5.3	9.3	11.9	11.5	11.5	10.1	8.1	6.7	8.4	8.7	4.5	0.9
2011	0.6	1.6	3.9	6.6	10.1	11.2	13.1	12.2	10.6	8.3	8.7	9.1	3.7	0.4
2012	0.4	0.9	2.6	5.3	10.0	11.5	14.1	13.6	10.7	8.5	9.0	9.4	3.5	0.6
2013	0.5	1.6	3.7	6.9	11.0	10.6	11.6	12.6	10.2	8.9	9.0	9.2	3.6	0.6

Table 9: Percentage of candidates awarded each sub-grade in Ordinary level biology, 2009 – 2013.

The initial drop and subsequent stability in the percentage of candidates achieving an A, B or C grade in Ordinary level biology from 2010 to 2013 mirrors the drop and subsequent stability in candidate numbers at Ordinary level since 2010.

Table 7 compares the distribution (%) of Ordinary level main grades between female (F) and male (M) candidates from 2010 to 2013.

Year		A	B	C	A B C	D	E	F	NG	E F NG
2009	F	2.7	23.3	33.7	59.7	25.8	9.0	4.1	0.3	13.4
	M	2.3	21.5	31.2	55.0	25.7	11.3	6.4	0.6	18.3
2010	F	2.9	27.7	33.6	64.2	23.3	8.3	3.7	0.6	12.6
	M	3.3	24.7	32.3	60.3	23.2	9.3	5.8	1.3	16.4
2011	F	2.5	21.8	37.5	61.8	26.6	8.3	3.0	0.2	13.5
	M	1.7	18.8	35.0	55.5	28.9	10.2	4.7	0.6	15.5
2012	F	1.5	19.7	39.6	60.8	27.0	9.1	3.0	0.2	12.3
	M	1.1	15.6	38.8	55.5	29.6	9.8	4.1	1.0	14.9
2013	F	2.5	25.1	35.6	61.2	26.1	8.2	2.4	0.1	10.7
	M	1.6	17.3	33.8	52.7	30.7	10.4	5.1	1.1	16.6

Table 10: Comparison of achievement by lettered grade between female and male candidates in Ordinary level biology, 2009 – 2013 (% achieving each grade).

It is clear from these data that female candidates consistently received more ABC grades and fewer EFNG grades than male candidates in the years 2010 to 2013 at Ordinary level biology.

3. Analysis of Candidate Performance

3.1 General Commentary on Engagement and Performance

Table 11 shows the rank order of questions, section by section, of candidate answering in the 2013 Higher level biology examination from the point of view of popularity (number of attempts per question) and average number of marks earned per question. These data are taken from a random sample of 1300 examination scripts (5.5% of the total candidature).

Question Number	Topic	Rank Order in popularity	Average mark	Rank order in average mark
Section A				
1	Nutrients	3	14.4	=1
2	Ecology	1	12.4	4
3	Animal body temperature	5	11.7	5
4	Flowering plant reproduction	6	8.3	6
5	Cell water relations	2	13.6	3
6	Nucleic acids	4	14.4	=1
Section B				
7	Ecology	2	21.5	1
8	Enzymes	3	19.8	2
9	Miscellaneous practical activities	1	17.7	3
Section C				
10	Human endocrine system / plant growth regulators	6	32.7	5
11	Genetics / evolution / cell cycle	5	34.4	4
12	Microbiology/ immunity	4	31.9	6
13	Human reproduction	1	40.2	1
14	Photosynthesis/ respiration	3	39.4	2
15	Parasites/ nutrient cycles/ prey-predator cycles.	2	37.1	3

Table 11: Rank ordering of attempts and marks per question, Higher Level Biology 2013.

Table 11 shows the rank order of questions, section by section, of candidate answering in the 2013 Ordinary level biology examination from the point of view of popularity (number of attempts per question) and average number of marks earned per question. These data are taken from a random sample of 420 examination scripts (5.2% of the total candidature).

Question Number	Topic	Rank order in popularity	Average mark	Rank order in average mark
Section A				
1	Nutrients	3	13.2	5
2	Flowering plant structure	5	11.2	6
3	Miscellaneous (True/ False)	=1	17.3	2
4	Cell division	4	13.8	4
5	Enzymes	=1	18.3	1
6	Human urinary system	6	14.2	3
Section B				
7	Photosynthesis	1	23.3	1
8	Osmosis	3	12.0	3
9	Ecology	2	16.2	2
Section C				
10	Genetics	4	38.7	1
11	Ecology	3	30.7	5
12	Human reproduction	1	37.7	2
13	Cells/ respiration	6	32.4	4
14	Bone/ human vascular system/ human senses	5	27.3	6
15	Flowering plant reproduction/ vegetative propagation/ flowering plant vascular tissue	2	35.9	3

Table 12: Rank ordering of attempts and marks per question, Ordinary Level Biology 2013.

3.2 Meeting Syllabus Objectives

The objectives of the biology syllabus are:

Knowledge, Understanding and Skills

Students should have a knowledge and understanding of biological facts, terms, principles, concepts, relationships and experimental techniques, including practical laboratory skills. Such skills should include an ability to carry out practical work, laboratory work and fieldwork activities safely and effectively and an ability to record and interpret biological data.

Application and Interface with Technology

Students should be able to apply, where possible, their knowledge and understanding of biology in environmental, industrial, agricultural, medical, waste management and other technological contexts.

Science in the Political, Social and Economic Spheres

Students should be able to apply, where possible, their knowledge and understanding of biology in personal, social and economic spheres and to make informed evaluations about contemporary biological issues.

How successful candidates have been in meeting the syllabus objectives is judged by analysing the standard of candidate responses to particular questions and parts of questions that focus on those particular objectives.

3.2.1 Biological Knowledge, Understanding and Skills

Candidates' ability to demonstrate their grasp of basic biological knowledge was reasonably good at both levels and better at Higher level. However, it was evident from the standard of answering of some Higher level candidates that they would have been better advised to take the Ordinary level paper. At Ordinary level, candidates' responses tended to be shorter than required and to not fully address what the questions had asked.

Question 1 at both levels examined candidates' knowledge of basic nutritional information and at both levels the answering was reasonably good. There was a question on human reproduction in each paper, Question 12 at Ordinary level and Question 13 at Higher level. These questions tested candidates' fundamental knowledge and basic understanding of the

topic, with some parts at Higher level requiring candidates to demonstrate a greater degree of understanding than was required at Ordinary level. At each level these questions proved to be the most-often attempted in Section C and were among the highest-scoring questions at both levels.

In relation to candidates' understanding of their biological knowledge, there was a marked difference between Ordinary level and Higher level candidate responses, and also between the responses of the more successful and the less successful Higher level candidates. At Ordinary level, those questions that sought to elicit candidates' understanding of particular processes were quite poorly answered. Ordinary level Question 11 (b) (v), which asked candidates why cell nuclear membranes have many pores, and Question 13 (b) (iv), in which candidates were asked to match terms from a list with particular positions in a diagram of the carbon cycle, are cases in point.

Where questions sought straightforward information, at either level, they were generally well answered. This is especially true in Section A at both levels, in which questions are put in such a way as to elicit short, sometimes one-word answers. Questions that test deeper understanding and higher order cognitive skills, such as those that are more typically encountered in section C, are less well handled.

Some notable exceptions to the above generality regarding mastery of straightforward information were:

at Ordinary level:

- the complementary base pairs in DNA structure were poorly known;
- many candidates did not understand that human sex-determination is governed by the XX and XY chromosome pairs, some attempting to use the symbols M for male and F for female instead.

at Higher level:

- there was a noticeable minority of candidates who were unable to list even two common sex-linked characteristics in humans;
- the precisely correct way of drawing the number and position of chromosomes on the spindle equator in metaphase of mitosis needs work;
- details about viruses were not well known;

- while the ‘out-of-sync’ requirement in the drawing of the prey / predator graph was generally well done, the prey plots were almost never shown higher than the predator plots;
- when required to write a note on metabolism, most Higher level candidates did not mention catabolism, anabolism or enzymes.

across both levels:

- graph axes were frequently mislabelled or left unlabelled.

At Higher level, there was a noticeable qualitative difference between the responses of candidates who scored highly on the paper as a whole and those who did not. The more successful candidates took care to answer exactly what a particular question or part of a question actually asked. For example, after being asked to describe a particular biological process or event, candidates at this level are frequently asked to suggest why some part or parts of the process or event occurred the way it did, or perhaps in what way the process or event might have turned out differently had a particular influencing factor been different. In general, Higher level candidates either answer this type of question thoughtfully, and usually correctly, or else fail to answer it at all, or answer it in such a way as to suggest that little thought has been given to the answer. That is, there is little middle ground in candidate answering to such questions. There is evidence in the answering of many candidates of shallow, uncritical learning. This is of particular concern at Higher level, where a deeper and more critical engagement is expected.

Items such as definitions of terms, details of biological processes or the sequential steps in experimental procedures are frequently well answered if asked in a comparatively general way, but candidates display a lack of deeper understanding if the concepts inherent in such items are interrogated more thoroughly. The Higher level questions that highlighted this tendency to the greatest degree in 2013 were: Questions 3 and 4 in Section A and Questions 14 (a) (v) and 15 (a) and (b) (ii) in Section C.

As has been commented upon in previous chief examiner reports, plant topics, whether plant tissues, anatomy, physiology or functions, remain firmly and disproportionately among the least often attempted and most poorly answered questions at both levels.

Candidates frequently confuse similar-sounding or similarly spelled terms in biology. Sometimes, while intending to write a particular word or term, candidates write a word or term that carries a completely different biological connotation. Such words, some of which occurred in the 2013 examination papers, include 'ectotherm' / 'ectoderm'; 'endotherm' / 'endoderm'; 'uterus' / 'ureter' / 'urethra'; 'antibodies' / 'antibiotics'; 'adenine' / 'adenosine'; 'centriole' / 'centromere'.

A related issue is the tendency of many candidates to rely on a key word or words from a term while attempting to define or explain that term. For example, if the term *selective permeability* is to be defined or explained, as in Question 5 (a) (i) at Higher level, candidates must not rely in their answer solely on the words 'selective' or 'permeable' or any of their forms. There has been an improvement in this situation since it was raised in the 2009 report, but it still occurs more often than it should.

Overall, while progress has been made in recent years in the areas of candidates' basic biological knowledge and understanding, in many instances, the lack of specific knowledge and an inability to explain, interpret and apply biological principles, as the above examples illustrate, remains problematical.

Candidates' familiarity with the skills involved in the mandatory practical activities on the syllabus is encouragingly good and has improved over recent years. There is clear evidence in candidate responses to questions in Section B, at both levels, that the practical laboratory and field work prescribed in the syllabus is being carried out and this is to be commended. Particularly well answered in Section B in 2013 were Question 9 at Ordinary level, which examined mandatory practical activities relating to photosynthesis, and Questions 7 and 8 at Higher level, dealing with ecology and enzymes respectively.

3.2.2 Application and Interface of Biology with Technology

To a very large extent at both levels in 2013, candidates demonstrated quite a good grasp of the interface between biology and its technological applications. This was most evident in relation to medical and environmental contexts. At Ordinary level, the following were well answered by the majority of candidates: Question 4 parts (c) and (d) relating to cancer and the cell cycle; Question 6 (e) about kidney failure; Question 10 (b) parts (iv) (v) and (vi) which dealt with DNA profiling and its uses; and Question 11 (c) in relation to waste disposal. At

Higher level, the following questions were similarly well answered: Question 10 parts (b) (iii) 3 and (c) (iv) dealing with how to remedy hormonal excess or deficiency, and plant growth promoters in agriculture, respectively; Question 11 (c) (v) about cancer; Question 14 (c) about fermentation and its industrial application; and Question 15 (b) (iii) in relation to environmental monitoring.

3.2.3 Biology in the Political, Social and Economic Spheres

This objective is often assessed by requiring candidates to read a passage on a topic of contemporary biological relevance and to answer questions, including some that are directly based on the passage, and others that are suggested by the passage but anchored in the syllabus content and objectives. This objective of the syllabus has a weighting of just 7.5% of the total and in 2013 was well dealt with by candidates at both levels. The relevant questions in 2013 were Question 11 (b) parts (i) to (iv) at Ordinary level, which dealt with biological influences on climate change; and Questions 12 (c) (iii) and 15 (a) at Higher level, which dealt with hospital-acquired infections and scientific investigation of natural remedies for bird parasites, respectively.

4. Conclusions

- Where questions sought straightforward information, at either level, they were generally well answered. This is especially true in Section A at both levels, in which questions are put in such a way as to elicit short, sometimes one-word answers. Questions that test deeper understanding and higher order cognitive skills, such as those that are more typically encountered in section C, are less well handled.
- At Higher level the answering in Section B was of a high standard, and it was also of a good standard at Ordinary level. This suggests that the mandatory practical work is being done by the students, as intended. Many candidates at both levels attempted all three questions in this section, although the number of candidates doing so was not as high as in 2009.
- To a very large extent, at both levels, candidates demonstrated quite a good grasp of the interface between biology and its technological applications. This was most evident in relation to medical and environmental contexts.

- The syllabus objective 'Biology in the Political, Social and Economic Sphere was well dealt with by candidates at both levels.
- At Higher level, the standard of answering was very high in some cases, with evidence being presented of comprehensive, in-depth coverage of the syllabus. This was less evident at Ordinary level, however, and among the less successful candidates at Higher level.
- Higher level candidates tend to answer higher order questions, such as those seeking analysis or evaluation, thoughtfully, and usually correctly, or else fail to answer them at all, or answer them in such a way as to suggest that little thought has been given to the answer. That is, there is little middle ground in candidate answering to such questions. There is evidence in the answering of many candidates of shallow, uncritical learning.
- Items such as definitions of terms, details of biological processes or the sequential steps in experimental procedures are frequently well answered if asked in a comparatively general way, but candidates display a lack of deeper understanding if the concepts inherent in such items are interrogated more thoroughly.
- Plant topics remain firmly and disproportionately among the least often attempted and most poorly answered questions at both levels.
- Overall, while progress has been made in recent years in the areas of candidates' basic biological knowledge and understanding, in many instances, the lack of specific knowledge and an inability to explain, interpret and apply biological principles remains problematical.
- Very noticeable among candidates is a tendency to give responses to questions that, while sometimes tangentially related to the topic, had not actually been asked at all. There is ample time to complete the required number of questions. It is better to use that time to answer the prescribed number of questions as fully and comprehensively as possible, rather than to attempt to complete every question on the paper.
- Candidates frequently confuse similar-sounding or similarly spelled terms in biology to the extent that a completely different biological meaning is conveyed
- A related issue that must be guarded against is the tendency of many candidates to rely on a key word or words from a term while attempting to define or explain that term. There has been an improvement in this situation since it was raised in the 2009 report, but it still occurs more often than it should.

- It is notable, especially at Higher level, that many candidates are not prepared for the degree of precision required in answers to particular questions. In general, at Higher level in particular, candidates are expected to recognise and use proper biological terms, where appropriate, rather than relying on colloquialisms encountered in everyday speech.

5. Recommendations to Teachers and Students

It is recommended that teachers

- regard the 'Biology Syllabus' and 'Guidelines for Teachers' as the primary sources of what is to be studied and the appropriate depth of treatment that applies to the various topics. These documents, together with the document 'Laboratory Handbook for Teachers', are available on the website of The Department of Education and Skills at www.education.ie
- note that all topics in the syllabus not specifically designated as topics to be studied by Higher level candidates only are integral parts of the syllabus for Ordinary level candidates and will continue to be examined at Ordinary level
- provide opportunities to students to cover all topics in appropriate depth, including those topics specifically designated as Higher level material
- advise students to follow all instructions in questions, particularly instructions which require them to copy diagrams or tables from the question paper into an answer book
- advise students to learn and to explain compound terms in full
- provide opportunities for students to appreciate and learn the difference between the names of disorders and the symptoms of the disorder
- provide opportunities for students to appreciate and learn the difference between anatomical adaptations and adaptive techniques of organisms
- provide opportunities for students to become familiar with and learn the terminology that is used in the biology syllabus and teacher guidelines
- advise students not to rely on any key word or form of such word included in a term when defining or explaining the meaning of the term. For example, if the word *abiotic* is to be defined or explained, then do not rely on the word 'abiotic' in your answer
- provide appropriate opportunities to students to carry out all mandatory practical activities in field and laboratory and explain the reasons behind the various steps in each activity
- help their students to combat any tendency to respond to questions that have not been asked and to practise the careful reading of questions in order to ascertain and give priority in their responses to the information or analysis actually sought.

- advise their students of the value of taking due time and care to read and evaluate questions in order to choose the best ones to attempt, based on each student's strengths
- advise their students to know the different meanings of similar-sounding or similarly spelled terms, to work on accuracy in such cases, and to pay attention to this issue during their coverage of the syllabus and when preparing for examination
- give appropriate time and emphasis in class to the 'Contemporary Issues and Technology' sections of the syllabus.

It is recommended that students

- use past examination papers for practice
- follow instructions in questions carefully
- practise drawing large, tidy, accurate diagrams and labelling their parts clearly
- learn to explain compound terms in full
- learn to define terms without relying on key words from the term
- appreciate and learn the difference between the names of disorders and the symptoms of the disorder
- appreciate and learn the difference between anatomical adaptations and adaptive techniques of organisms
- become familiar with and learn the terminology that is used in the biology syllabus and teacher guidelines
- practise the careful reading of questions in order to make sure that the questions being answered are the ones that were actually asked
- learn the different meanings of similar-sounding or similarly spelled terms and work on accurate explanation of these terms.