

Leaving Certificate Biology

New Exam Paper Layout 2023

List of topics

Unit 1	Unit 2	Unit 3
Scientific Method Characteristics of Life Food Ecology	Cell Structure Cell Diversity Cell Division Enzymes Osmosis/Diffusion Photosynthesis Respiration DNA and RNA Genetic Crosses Variation and Evolution Genetic Engineering	Monera (Bacteria) Fungi Protista (Amoeba) Viruses Blood The Heart Lymphatic System Human Breathing Human Digestion Homeostasis Excretion Nervous System The Senses Endocrine System Skeleton Human Defence System Human Reproduction Structure of a Plant Transport in a Plant Plant Responses Plant Reproduction Vegetative Propagation

Layout of the New Biology Exam Paper 2023

Section A: Questions 1 – 7

In section A you will have one additional short question included. Students will be able to answer **any five** of seven questions. Section A is worth **100 marks**.

- Two questions are **usually** asked from Unit 1
- Two questions are **usually** asked from Unit 2
- Two questions are **usually** asked from unit 3
- The extra 7th question this year can be asked from any of the 3 units

Section B: Questions 8 – 10

Answer **any two** of three questions. Each of the three questions will be aligned with a specific experiment section. Section B is now worth **60 marks**.

One question from these 8 experiments

- To test for starch, To test for lipids, To test for proteins, To test for a reducing sugars
- To use simply keys to identify 5 fauna and 5 flora
- To use different apparatus to collect plants and animal
- To carry out a quantitative survey of plants / To carry out a quantitative survey of animals.
- To investigate three abiotic factors.
- To be familiar with and to use a light microscope.
- To prepare a plant cell and examine using a light microscope / To prepare an animal cell and examine using a light microscope.
- To isolate DNA from a plant tissue

One question from these 7 experiments

- To investigate the effect of pH on enzyme activity
- To investigate the effect of temperature on enzyme activity
- To investigate the effect of heat denaturation on enzyme activity
- To prepare an enzyme immobilisation and examine its application
- To investigate the influence of light intensity or carbon dioxide on the rate of photosynthesis
- To prepare and show the production of alcohol using yeast
- To demonstrate osmosis

One question from these 7 experiments

- To investigate the growth of leaf yeast using agar plates
- To prepare and examine a transverse section (TS) of a dicot stem
- To dissect and identify the parts of a heart
- To investigate the effect of exercise on the pulse rate or To investigate the effect of exercise on the breathing rate
- To investigate the effect of IAA growth regulator on plant tissue
- To investigate the effect of water, oxygen and temperature on germination
- To use starch agar or skimmed milk plates to show digestive activity during germination

Section C: Question 11 – 17

Students will be able to answer **any four** of seven questions. Section C is now worth **240 marks**.

- One question is **usually** asked from Unit 1
- Two questions are **usually** asked from Unit 2
- Three questions are **usually** asked from unit 3
- The extra 7th question this year can be asked from any of the 3 units

There is one extra full long question that will be Q15 which has a similar structure to Q11, 12, 13, 14. An additional part (d) will be added to both of the following questions Q16 and Q17. In these two questions students will have a **choice of four parts and to answer any two**.

Remember:

The Leaving Certificate Biology exam is still 3 hours in length but is now only 400 marks.

Suggestions for a revision schedule:

Unit 1:

Study all of unit 1 (is usually at least 25% of paper):

Unit 1 - Scientific Method, Characteristics of Life, Food and Ecology.

Suggestions for a revision schedule:

Unit 2:

Study all of unit 2:

Unit 2 – Cell Structure, Cell Diversity and Diffusion/Osmosis

Unit 2 - Cell division, Enzymes, photosynthesis and Respiration

Unit 2 - DNA and RNA, Genetic Crosses, Variation and Evolution, Genetic Engineering

Study all experiments from Unit 1 and Unit 2 (at least 15% of paper):

Experiments : One question from these 8 experiments

- 1) To test for starch, To test for lipids, To test for proteins, To test for a reducing sugars
- 2) To use simple keys to identify 5 fauna and 5 flora
- 3) To use different apparatus to collect plants and animals
- 4) To carry out a quantitative survey of plants
 To carry out a quantitative survey of animals
- 5) To investigate three abiotic factors
- 6) To be familiar with and to use a light microscope
- 7) To prepare a plant cell and examine using a light microscope
 To prepare an animal cell and examine using a light microscope
- 8) To isolate DNA from a plant tissue

One question from these 7 experiments

- To investigate the effect of pH on enzyme activity
- To investigate the effect of temperature on enzyme activity
- To investigate the effect of heat denaturation on enzyme activity
- To prepare an enzyme immobilisation and examine its application
- To investigate the influence of light intensity or carbon dioxide on the rate of photosynthesis
- To prepare and show the production of alcohol using yeast
- To demonstrate osmosis

Suggestions for a revision schedule:

Unit 3:

Study all of unit 3:

Unit 3 - Bacteria, Fungi, Protista

Unit 3 - Viruses, Human Defence, Lymphatic System, Blood

Unit 3 - The Heart, Human Digestion, Excretion, Human Breathing, Homeostasis

Unit 3 - Nervous System, The Senses, Endocrine System, Skeleton

Unit 3 - Human Reproduction, Plant Reproduction and Vegetative Propagation

Unit 3 - Plant Structure, Plant Transport, Plant Responses

Study all experiments from Unit 3 (at least 7.5% of paper):

One question from these 7 experiments

- To investigate the growth of leaf yeast using agar plates
- To prepare and examine a transverse section (TS) of a dicot stem
- To dissect and identify the parts of a heart
- To investigate the effect of exercise on the pulse rate or To investigate the effect of exercise on the breathing rate
- To investigate the effect of IAA growth regulator on plant tissue
- To investigate the effect of water, oxygen and temperature on germination
- To use starch agar or skimmed milk plates to show digestive activity during germination

How important are definitions?

- Definitions are very important area as they have a major impact on your overall grade.
- Definitions are usually worth around 15 - 20% of the overall grade.
- You should approach studying the definitions by chapter. You need to have a list of all the definitions on an A4 sheet or on flash cards so you can continuously look over them whenever you have free time and not waste time trying to find them in a text book.

How important is it to use questions from past papers?

- It will make you aware of certain keywords that might be expected in certain answers to gain full marks. You will also notice that you can gain full marks without always giving every single detail on the question asked.
- It is very important that past questions are continuously studied to improve your exam technique and the ability to interpret the more difficult questions.

Example:

- 2020 – What is the function of the myelin sheath? To insulate the impulses
- 2018 – Explain the importance of the myelin sheath in the **transmission** of the impulse: It speeds up the transmission of the impulse

NOTE: Be aware that a true or false short question in Section A, similar to the question below, has been asked numerous times in the past 7 years.

Indicate whether the following statements are true or false by placing a tick (✓) in the appropriate box in **each** case.

- (a) Spindle fibres contract during metaphase of mitosis.
- (b) Glucose is produced by yeast cells during fermentation.
- (c) The process of translation results in a protein being made.
- (d) Prokaryotic cells contain a nucleus.
- (e) Darwin and Wallace proposed the Theory of Natural Selection.
- (f) A mutation to a cell's DNA always has a negative impact for the cell.
- (g) The ribosome of the cell contains the chromosomes.

True	False

Useful tips on exam paper:

- In section B and C most correct points are worth **3 marks** each.
- If a question is worth 12 marks, it will require 4 key points of information (if possible try to give a few extra points).

Note: it is very disappointing if a student loses marks just because they didn't provide enough key points.

- To achieve a high grade in the Leaving Certificate you must revise all topics thoroughly and include the more difficult areas of a topic.
- **Diagrams** are very important in the Biology exam. They are normally worth **9 marks (6 marks for diagram and 3 marks for labelling)**.
- Examiners do not like essay style answers in questions that require 4 or 5 key points. Examiners find it much easier to correct bullet point answers as they can find key points much easier.
- Remember spelling mistakes do not matter as long as it is obvious what you are trying to spell.

Some other instructions for the paper:

- Write your answers in blue or black pen. You may use pencil for sketches, graphs, and diagrams only.
- Anything written outside the answer areas may not be seen by the examiner as the paper is scanned and presented to an examiner on a screen.

Marking Schemes

How the marking scheme can change?

- Marking schemes can sometimes vary depending on the difficulty of the paper. Below are some examples of past marking schemes for individual questions:

Marking scheme 2010:

1.		5(4) any FIVE points out of SIX	
	(a)	Small amount (needed) or indication of e.g. < 0.01%	
	(b)	e.g. Fe, Cu, Zn or other correct	
	(c)	Oil is liquid (at room temperature) or fat is solid or oils are unsaturated or explained	
	(d)	Fat-soluble Water-soluble	(4, 2, 0)
	(e)	Fat (or lipid or oil) unit (or molecule) or glycerol and three fatty acids or ester	
	(f)	Respiration or fermentation or glycolysis [allow digestion]	

What does 5(4) represent?

- All five answers are 4 marks each.

4.		6 (3) + 2	
	(a)	Cells with common function (or with common structure)	
	(b)	Dermal or ground or vascular (or xylem or phloem) or meristematic	
	(c)	Function relevant to tissue named in (b)	
	(d)	Epithelial or Muscular or Connective or Nervous or named example	
	(e)	Function relevant to tissue named in (d)	
	(f)	Cells grown on (or in) medium or cells grown outside organism	
	(g)	Appropriate application	

What does 6(3) + 2 represent?

The first six answers are 3 marks each and the last correct answer is 2 marks.

Marking Scheme 2012:

4.	2(7) + 6(1)
(a)	(i) Management of environment or management of species (or organism(s))
	(ii) To allow species to develop or (maintaining) biodiversity or prevent extinction or protection
(b)	(i) Harmful addition to the environment (or named part of environment)
	(ii) <i>Pollutant:</i> Any relevant pollutant
	<i>Effect:</i> Must match pollutant
	(iii) Matching control measure for pollutant from (ii)
(c)	(i) <i>Advantage:</i> Amount of waste greatly reduced or useable heat or reduced landfill
	(ii) <i>Disadvantage:</i> Harmful products

What does 2(7) + 6(1) represent?

The first two correct answers are 7 marks each and the last six answers are only 1 mark each.

5.	8 + 7 + 5(1)
(a)	One seed leaf or one embryonic leaf
(b)	Example of monocot
(c)	Vascular bundles
(d)	(i) More than one (vascular) bundle
	(ii) Bundles scattered or described
(e)	Parallel or described
(f)	Reticulate or net or branched or described

What does 8 + 7 + 5(1) represent?

The first correct answer is 8 marks, the second correct answer is 7 marks, and the last five correct answers are only 1 mark each.

2.	8 + 7 + 5(1)
<p>(a) All (individuals) get some of a (scarce) resource</p> <p>(b) Water or minerals or space</p> <p>(c) Water or mate(s) or shelter or territory (or space)</p> <p>(d) Different food or feed on different parts of the plant</p> <p>(e) (i) Frequency or cover or transect or quadrat</p> <p>(ii) Throw (object) over shoulder (and place quadrat) or random numbers matched to a Grid</p> <p>(iii) pH or temperature or air content or water content or mineral content or humus content or soil type or particle size or soil texture or soil microorganisms</p>	

What does 8 + 7 + 5(1) represent?

The first correct answer is 8 marks, the second correct answer is 7 marks, and the last five correct answers are only 1 mark each.

How might you determine the amount of marks awarded to individual questions:

Exam paper 2020:

The question below has four parts, part (i) 3 marks, part (ii) 6 marks, part (iii) 3 marks, part (iv) 12 marks.

Why is part (iv) worth most marks? As they have asked you to **outline** the events.

(c) Answer the following questions in relation to the second stage of aerobic respiration.

- (i) Name the 3-carbon molecule which enters the mitochondrion.
- (ii) Name the **two** carbon containing molecules produced when the 3-carbon molecule at (i) above is broken down.
- (iii) One of these carbon containing molecules formed at (ii) above enters a series of reactions. Name this series of reactions.
- (iv) Outline the events that take place in the electron transport chain (system).

(24)

Solutions:

(c) (i) *Name the 3-Carbon molecule which enters the mitochondrion:*

*Pyruvate (*Pyruvic acid) **3**

(ii) *Name the two products formed when the 3-Carbon molecule at (i) above is broken down:*

*CO₂ **3**

*Acetyl (Co A) **3**

(iii) *Name the series of reactions that take place:*

Krebs Cycle **3**

(iv) *Outline the events that take place in the electron transport chain (system)*

High energy electrons/ pass along carriers/ (electrons) lose energy/ (used to) form ATP/ from ADP and P/ (electrons) combine with O₂ and H⁺/ to form water.

Any four 4(3)