Leaving Certificate
Biology
Nutrition

Please see *Teachers' Notes* for explanations, additional activities, and tips and suggestions.

Levels	Students' English-language skills should be developed to **Level B1** during funded Language Support. Mainstream subject learning will require the development of skills at **Level B2** if students are to cope with public examinations.	
Language focus	Key vocabulary, word identification, sentence structure, extracting information from text, writing text, grammar.	
Learning focus	Using Biology textbooks and accessing curriculum content and learning activities.	
Acknowledgement	The *English Language Support Programme* gratefully acknowledges the permission of Gill and Macmillan to reproduce excerpts from *Biology Now!* by Tommy Murtagh.	
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Using this unit

Language support and mainstream subject class

The sections ***Activating students' knowledge***, ***Focus on vocabulary***, and ***Focus on grammar*** have been designed, in particular, for Language Support classes.

Focus on reading and ***Focus on writing*** are suitable for use in either Language Support or subject classes.

Answer Key

Answers are provided at the end of the unit for all activities except those based on free writing.

Textbooks

This unit focuses on the section *Nutrition* of the Leaving Certificate Biology curriculum. Students will need to use their textbooks if they are to gain the most benefit from the activities.

Learning Record

The Learning Record is intended to help students monitor their progress. This can be downloaded or printed from the website in the section *Advising Students and Record of Learning for the Leaving Certificate.* A copy of the Learning Record should be distributed to each student for each Unit studied.

Students should:

1. Write the subject and topic on the record.
2. Tick off/date the different statements as they complete activities.
3. Keep the record in their files along with the work produced for this unit.
4. Use this material to support mainstream subject learning.

Symbols

Symbols are used throughout the unit to encourage students to develop their own learning and support materials.

prompts students to file the sheet when they have completed the activity. This is used for activities which can be used as a reference in the future e.g. for subject classroom, revision, homework etc.

prompts students to add vocabulary, definitions, or examples of vocabulary in use to their own personal glossary for the topic. A personal glossary makes study and revision more efficient.

NAME: _____ DATE:_____

Leaving Certificate Biology: Nutrition

Keywords

Nouns
amino acids
calcium
carbohydrate
carbon
cellulose
chitin
copper
dioxide
disaccharides
enzymes
fat/fats
fructose
glucose
glycerol
glycogen
hydrogen
hydroxide
iodine
keratin
lactose
lipids
magnesium
maltose
minerals
monosaccharides
myosin
nitrogen
oxygen
phosphate
phospholipids
phosphorus
polysaccharides
protein
proteins
ribose
salts
sodium
starch
sucrose
sugar
sulphate
sulphur
triglyceride
vitamin
vitamins
water
zinc

Nouns (energy)
animal
cells
condensation
human
metabolism
organisms
photosynthesis
plants
respiration
sunlight

Nouns (molecules)
molecule
biomolecules
molecules
bioelements

Nouns (nutrition)
atoms
body
bones
chains
chemicals
citrus
deficiency
diet
digestion
DNA
elements
food
hooves
liver
membranes
muscle
nails
nutrients
reactions
rickets
scurvy
skin
tissue

Nouns (cell structure)
atom
Benedict's
chain
chlorophyll
colour
component
continuity
control
experiment
H2O
hydrolysis
result
sample
soil
solution
sources
temperature
test tube

Verbs
to add
to bond
to clot
to contain
to dissolve
to find
to form
to heat
to join
to make
to reduce
to release
to repeat
to slide
to synthesise

Adjectives
absorbed
autotrophic
branched
chemical
connective
essential
inorganic
organic
positive
soluble
termed
translucent
unsaturated

Fehling's

Vocabulary file for the topic

Nutrition

Word	Meaning	Page(s) in my textbook	Note
bioelements			
biomolecules			
carbohydrates			
condensation			
hydrolysis			
lipids			
saturated			
unsaturated			
fuels			

Word	Meaning	Page(s) in my textbook	Note
insulation			
proteins			
amino acids			
metabolic regulators			
vitamins			
deficiency			
scurvy			
rickets			
qualitative tests			
anabolic reactions			

Word	Meaning	Page(s) in my textbook	Note
catabolic reactions			
photosynthesis			
respiration			
organic nutrients			
inorganic nutrients			
minerals			
to bond			
monosaccharides			
disaccharides			
polysaccharides			

Introduction

Activating students' existing knowledge

Use a spidergram to activate students' ideas and knowledge on the key points in this chapter. See **Teachers' Notes** for suggestions.

Possible key terms for the spidergram:

Nutrition

We are what we eat!

- Invite students to provide key words in their own languages.
- Encourage dictionary use.
- Encourage students to organise their vocabulary into relevant categories (e.g. meaning, nouns, keywords, verbs etc.).

Students should record vocabulary and terms from the spidergram in their personal dictionaries.

NAME: _____ **DATE:**_____

Leaving Certificate Biology: Nutrition

Level: B1
Individual / pair

Focus on vocabulary

1. Prefixes

Prefixes are placed before words and change the meanings of those words. We often use 'un' or 'in' to make a word negative.
For example: **tidy** (positive) **untidy** (negative)
complete **incomplete**

to cover **(**to place over, hide or protect) **to uncover** (to remove, reveal or find)

Sometimes a prefix indicates number.

For example: **monolingual** (speaking *one* language) **bilingual** (speaking *two* languages)

Check your textbook or dictionary to see what these prefixes mean and write the meaning in the grid.

monosaccharides	mono_____	
disaccharides	di_____	
polysaccharides	poly_____	
triglyceride	tri_____	
inorganic	in_____	
unsaturated	un_____	
hydrophobic	hydro_____	
misshapen	mis_____	
biomolecules	bio_____	

2. Matching

Match each term in Column A with a definition in Column B. Draw a line between them. Look at your text book if you need help.

Column A	Column B
trace elements	coming from animals
three-dimensional (3-D)	do not dissolve in water
a major component	bones with an unusual or unnatural shape
insoluble in water	chemical substances necessary for healthy growth and development which exists in animals and plants in small amounts
animal sources	with three dimensions which are length, width, and height
misshapen bones	an important part which combines with other parts

3. Key phrases in use

The sentences below are all from your text books. They are missing 4 of the key terms from exercise 2. Select the correct ones.

a) Delay in treating rickets can result in permanently _____.

b) When carbon forms four chemical bonds it takes on a _____ tetrahedral shape.

c) All fats are _____ but they dissolve in organic solvents.

d) Essential amino acids are always contained in proteins that come from _____.

4. Word building

Complete the grid by writing the adjective form of the nouns. It is possible that there are two or more adjective forms for some of the nouns.
Use your dictionary or textbook for help if necessary.

Noun	Adjective
structure	
deficiency	
digestion	
continuity	
metabolism	
connection	
experiment	

Level: B1
Individual / pair

Focus on grammar

5. Verbs : The passive form

The passive form is frequently used to describe scientific facts and processes. It is important to be able to use the passive form when writing text.

Put the verbs in brackets into the passive form in the following sentences.

a) The amino acids _____in chains to form the proteins. (to join)

b) A chain of many amino acids _____a polypeptide. (to term)

c) Every chemical process in biology _____and _____by a specific enzyme. (to direct, to regulate)

d) Vitamin C _____for the formation of connective tissue in animals and humans. (to need)

e) All tests, except for that for lipids, _____in test tubes. (to carry out)

f) Mineral salts _____in soil water and within almost any food material. (to find)

g) In anabolic reactions an input of energy _____ to form the new chemical bonds. (to require)

6. Verbs followed by prepositions

You will find verbs that are followed by prepositions in your textbook. These sentences are taken from a textbook. Put prepositions from the box below into the spaces. Then make a list of the verbs with their prepositions below.

It is important to learn the preposition at the same time as you learn the verb.

a) In catabolic reactions large biomolecules are broken _____ .

b) Essential amino acids are always contained _____ proteins from animal sources.

c) Phospholipids differ _____ fats in that one of the three fatty acid chains is replaced by a phosphate group.

d) A deficiency of vitamin D leads _____ rickets in children.

e) Carry _____ a test with water and compare the results.

from		to
in	down	out

to break _____ to contain _____

to differ _____ to lead _____

to carry _____

NAME: _____ **DATE:**_____

Leaving Certificate Biology: Nutrition

Level: B1 / B2
Individual / pair

Focus on reading

7. Read the text carefully and find the correct statement below. There is one correct answer for each question. Circle the correct answer.

Foods contain many different chemical elements: some in large amounts, many in tiny amounts or traces. All these bioelements are originally gathered by plants (from the air, water and soil) and then passed along food chains for all other organisms.

The six common bioelements in food are carbon, hydrogen, nitrogen, oxygen, phosphorus and sulphur. Also found in food are sodium, magnesium, chlorine, potassium and calcium – all of these present as parts of dissolved salts in water. Iron, copper, zinc and other elements are found in tiny amounts in food. These are termed trace elements.

Plants obtain hydrogen and oxygen from soil water and carbon from atmospheric carbon dioxide. All of the other elements in food are initially absorbed by plants in dissolved salts in soil water. The role of plants in nutrition is crucial. By gathering all of these elements and then assembling them through photosynthesis, plants make food and oxygen for themselves and for all other organisms. Food (containing the bioelements) is passed from the plants to all of the other organisms through feeding relationships or food chains.

1) Food contains chemical elements in

a) large amounts only. **b) their leaves.**

c) large and tiny amounts. **d) water.**

2) Nitrogen is

a) a trace element. **b) never found in food.**

c) not a bioelement . **d) a common element in food.**

3) Carbon is obtained from

a) soil. **b) water.**

c) the air. **d) animals.**

4) Plants make food and oxygen

a) for themselves and other living things. **b) for the atmosphere.**

c) for humans only. **d) for animals only.**

5) Bioelements are passed to other organisms

a) through the air. **b) through water.**

c) through the soil. **d) through feeding.**

6) Name three trace elements:

_____

7) What does **crucial** mean in this text?

_____

8. Reading for the main idea

It is not always necessary to read through every sentence and paragraph of text. Nor do you have to understand every single word. However, It is important to read with a purpose.

1. In this exercise you must read each paragraph (taken from your textbook) to decide on the main idea of that paragraph.
2. Then write **a phrase** on the blank line which **summarises** the topic of the paragraph.

You should **try** to read quickly, without stopping to check every word. However, sometimes it is necessary to read with more focus when the topic is not immediately clear.

a) Topic: _____

Biomolecules are the basic chemical structures found within most organic chemicals. They are found in food and within the bodies of all living organisms. They contain carbon, hydrogen and oxygen elements (and sometimes nitrogen, phosphorus, sulphur and others) joined together in different ratios to form more complicated molecular units.

b) Topic: _____

Most lipids are constructed from glycerol molecules and fatty acid molecules joined together. A typical fat or oil is made from three fatty acids attached to a glycerol molecule. The joining is by condensation and some water is released during this process. The smallest fat is called a triglyceride.

c) Topic: _____

Proteins have a complicated overall structure. The typical protein is made from lots of polypeptide chains (made from lots of amino acids joined) and these chains will be linked, folded and branched.

d) Topic: _____

Vitamin D (calciferol) is a fat-soluble vitamin found in fish liver oil, milk, eggs and dairy products. It is needed in the diet for absorbing calcium and phosphorus from food, for hardening bones and for aiding blood clotting. It can be synthesised in the skin on exposure to sunlight.

e) Topic: _____

In other reactions (catabolic reactions), large biomolecules are broken down into smaller chemicals with a release of energy from the broken chemical bonds. One example of this is during respiration where glucose is broken down to produce carbon dioxide, water and energy. The released energy is now available to the cells.

9. Reading for specific information

Read the following extract from your textbook. Don't read slowly though every word and sentence.

Read the questions first
Read the text in order to find the answers.
Underline the key sentences when you have found the answers.

Tip: It's a good idea to time yourself so that you learn how to find important information quickly.

Questions:

1. Where is protein found in animals?
2. What are polypeptide chains made from?
3. Why is there so much variation in the structure of proteins?
4. Do lipids or carbohydrates have the same amount of variation?

Proteins

Examples of protein are: collagen in skin, ligaments and bone; keratin in hair and nails; myosin in muscle; albumin in egg white; the food stores in peas and beans; all enzymes and antibodies.

All proteins contain carbon, hydrogen, oxygen and nitrogen atoms (sulphur is often present). Proteins are constructed from amino acids of which there are about 20 different kinds occurring in nature. The amino acids are joined in chains (condensation) to form the proteins. There may be as many as 600 amino acids in any chain. Two amino acids joined together form a dipeptide, three a tripeptide and so on. A chain of many amino acids is termed a polypeptide.

Proteins have a complicated overall structure. The typical protein is made from lots of polypeptide chains (made from lots of amino acids joined) and these chains will be linked, folded or branched.

This means that an unlimited variation in protein structure is possible – giving rise to thousands of proteins with totally different properties. The order of amino acids in a chain can be varied and so too can the linking and folding of these chains.

For example, folded chains may produce a soft protein with fluid properties like egg white, whereas linked or branched chains can be tough enough to form the hooves or a horse.

This huge variation is necessary as the typical organism requires thousands of different enzymes (which are proteins) in order to maintain itself. The same degree of variation is not needed in lipids or carbohydrates.

Level: B1 / B2
Individual / pair

Focus on writing

9. Writing a paragraph

Remember!

- A paragraph is a unit of information unified by a central controlling idea.
- Paragraphs should focus on one piece of information.
- The main idea in a paragraph is often expressed in *one particular sentence* (called the topic sentence). This sentence is usually at the beginning of a paragraph, but can come at the end or even in the middle.
- It is important to organise the information logically in a paragraph.

a) Write a paragraph on the topic *Anabolic Reactions***.**

Include a sentence about each of the following points. Use your **textbook** if you need to check the information.

- Chemicals combined to make molecules
- Is energy required?
- Where does the energy come from?
- Examples from plants and animals

b) Write a paragraph on the topic *Catabolic Reactions***.**

Include a sentence about each of the following points. Use your **textbook** if you need to check the information.

- Biomolecules broken down
- Energy?
- Example

Answer Key

Focus on vocabulary

1. Prefixes

monosaccharides	mono_____	one or single
disaccharides	di_____	two or pairs
polysaccharides	poly_____	many
triglyceride	tri_____	three
inorganic	in_____	not
unsaturated	un_____	not
hydrophobic	hydro_____	water
misshapen	mis_____	badly
biomolecules	bio_____	connected with life or living things

2. Matching

Column A	Column B
trace elements	chemical substances necessary for healthy growth and development which exists in animals and plants in small amounts
three-dimensional (3-D)	with three dimensions which are length, width, and height
a major component	an important part which combines with other parts
insoluble in water	do not dissolve in water
animal sources	coming from animals
misshapen bones	bones with an unusual or unnatural shape

3. Key phrases in use

a) Delay in treating rickets can result in permanently ***misshapen bones***.
b) When carbon forms four chemical bonds it takes on a ***three-dimensional*** tetrahedral shape.
c) All fats are ***insoluble in water*** but they dissolve in organic solvents.
d) Essential amino acids are always contained in proteins that come from ***animal sources***.

4. Word building

Noun	Adjective
structure	structural
deficiency	deficient
digestion	digestive
continuity	continuous continual
metabolism	metabolic
connection	connective connecting
experiment	experimental

Focus on grammar

5. Verbs The passive form

a) The amino acids ***are joined*** in chains to form the proteins. (to join)
b) A chain of many amino acids ***is termed*** a polypeptide. (to term)
c) Every chemical process in biology ***is directed*** and ***regulated*** by a specific enzyme. (to direct, to regulate)
d) Vitamin C ***is needed*** for the formation of connective tissue in animals and humans. (to need)
e) All tests, except for that for lipids, ***are carried out*** in test tubes. (to carry out)
f) Mineral salts ***are found*** in soil water and within almost any food material. (to find)
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a) In catabolic reactions large biomolecules are broken ***down*** .
b) Essential amino acids are always contained ***in*** proteins from animal sources.
c) Phospholipids differ ***from*** fats in that one of the three fatty acid chains is replaced by a phosphate group.
d) A deficiency of vitamin D leads ***to*** rickets in children.
e) Carry ***out*** a test with water and compare the results.

Focus on reading

7.

1. c)
2. d)
3. c)
4. a)
5. d)
6. iron, copper and zinc
7. extremely important or necessary

8. Reading for the main idea

a) Topic: Where we find biomolecules and how they are formed
b) Topic: How lipids are constructed
c) Topic: The chain structure of typical proteins
d) Topic: Why we need vitamin D in our diets
e) Topic: How catabolic reactions take place

9. Reading for specific information

Examples of protein are: [1] collagen in skin, ligaments and bone; keratin in hair and nails; myosin in muscle; albumin in egg white; the food stores in peas and beans; all enzymes and antibodies.

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This means that an unlimited variation in protein structure is possible – giving rise to thousands of proteins with totally different properties. The order of amino acids in a chain can be varied and so too can the linking and folding of these chains.

For example, folded chains may produce a soft protein with fluid properties like egg white, whereas linked or branched chains can be tough enough to form the hooves or a horse.
[3] This huge variation is necessary as the typical organism requires thousands of different enzymes (which are proteins) in order to maintain itself. [4] The same degree of variation is not needed in lipids or carbohydrates.