

# *Leaving Certificate*

## Agricultural Science: Plant Science and Cultivation

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

<b>Levels</b>	Students' English language skills should be developed to <b>Level B1</b> during funded Language Support. Mainstream subject learning will require the development of skills at <b>Level B2</b> if students are to cope with public examinations.	
<b>Language focus</b>	Key vocabulary, word identification, sentence structure, extracting information from text, writing text, grammar.	
<b>Learning focus</b>	Using Agricultural Science textbooks and accessing curriculum content and learning activities.	
<b>Contents of this Unit</b>	Keywords Vocabulary file Activating students' knowledge Focus on vocabulary Focus on grammar <i>(nouns and adjectives)</i> Focus on reading Focus on writing <i>(writing sentences)</i> Answer Key	<b>Page</b> 3,4,5 6,7 8 9,10 11 12 13 14-16

## 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 sections dealing with plant science and cultivation in the Leaving Certificate Agricultural Science 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.

## Keywords

The list of keywords for this unit is as follows:

absorbed	colloidal	establishment
abundant	colloids	examine
achieved	coloured	exercise
acid	commonly	extent
acidification	composition	farmer
activity	compounds	farmyard
addition	concentration	feed
additive	conditions	feeding
aeration	cones	fern
agricultural	constituents	fertility
amino	consumption	fertilization
ammonium	content	field
amounts	control	fig
anaerobic	crop	fixation
aphids	cultivate	flasks
application	cut	flocculation
applied	cuttings	floral
autumn	debris	florets
availability	deficiency	flower
bacteria	degradation	flowering
bacterial	degraded	fodder
barley	demonstration	forest
bases	depth	forestry
beakers	derived	formation
beet	described	found
biological	develops	fresh
blades	diffusion	fruits
blanket	digestibility	fungus
blight	digestible	fungicide
borne	disc	fungus
botanical	disease	furrow
buttercup	distilled	further
calcium	drainage	gametophyte
cambium	drained	genus
capacity	dried	germinating
capillary	drill	germination
carbohydrates	drilling	glaciations
cattle	dry	grain
cell	due	granite
cellulose	during	grass
cereal	early	grassland
certified	earth	gravitational
chemical	earthworm	graze
clamps	easily	gritty
clay	effluent	ground
climatic	elodea	grow
clover	ensiling	harrows
clovers	epidermal	harvest
cocksfoot	epidermis	hay

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_  
LC AGRICULTURAL SCIENCE: Plant Science and Cultivation

haymaking	operation	reversible
herbage	organic	rock
herbicide	organisms	rollers
horizon	osmosis	root
horticulture	oxidation	rotary
implements	paddock	rotation
importance	palatable	rotted
infiltration	pallet	ryegrass
inorganic	parent	samples
intensity	particle	sandstone
intensive	parts	sandy
intermediate	pasture	science
involves	perennial	season
laboratory	permanent	seed
lactic	pest	seedbed
land	petals	seedlings
large	phloem	selective
layer	phosphate	shale
leached	phosphorus	sheep
leaching	photosynthesis	shoots
leads	pine	should
leaf	pit	shown
levels	plant	sieved
leys	plants	silage
lime	plough	silt
limestone	pore	similar
lipids	potash	since
livestock	potassium	size
loam	potato	slurry
losses	practised	soil
low	precautions	soluble
machinery	procedure	sowing
mainly	process	spacing
malting	produce	specialized
manure	production	species
manures	productivity	sporangia
material	profile	spores
matter	propagation	sprays
meadow	properties	spreader
microscope	proteins	spring
mineral	protoplasm	sprout
mitochondria	quality	spruce
mixtures	quartz	stage
modifications	rainfall	stamens
modified	range	stem
moisture	record	stocking
molasses	reduction	storage
nitrate	referred	strains
nitrogen	reproduction	straw
nutrient	requirements	structure
oats	residual	sucrose
obtain	residues	sugar
occupy	respiration	sugars
occur	results	suitable

**NAME:** \_\_\_\_\_ **DATE:** \_\_\_\_\_  
**LC AGRICULTURAL SCIENCE: Plant Science and Cultivation**

sulphur  
surface  
surfaces  
sward  
systemic  
table  
tend  
textural  
texture  
thinning  
threads  
thus  
tillage

tillers  
timber  
tissue  
tissues  
tonnes  
topography  
tractor  
trees  
tuber  
tubing  
uptake  
varieties  
vascular

vegetation  
washed  
water  
weather  
weathering  
weed  
wet  
wheat  
wilting  
winter  
xylem  
yield

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_  
LC AGRICULTURAL SCIENCE: Plant Science and Cultivation

Vocabulary file (1) for the topic  
**Plant Science and Cultivation**

<b>Word</b>	<b>Meaning</b>	<b>Page(s) in my textbook</b>	<b>Note</b>
chemicals			
microbes			
fungi			
germination			
stems			
tillage			
cereals			
roots			



NAME: \_\_\_\_\_ DATE: \_\_\_\_\_  
LC AGRICULTURAL SCIENCE: Plant Science and Cultivation

Vocabulary file (2) for the topic  
**Plant Science and Cultivation**

Word	Meaning	Page(s) in my textbook	Note
grassland			
silage			
hay			
forestry			
fertilizers			
manure			
topography			
soil			
classification			



## 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:

Plants

Horticulture

Forestry

- 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.



Level: B1 Individual / pair
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**Focus on vocabulary**

**1. Matching**

Match each expression in Column A with a definition in Column B. Draw a line between the matching expressions.

Column A	Column B
agricultural science	the work and methods of growing crops and looking after animals which are then used for food
forestry	animals that are kept on a farm
agriculture	the study or activity of growing plants
livestock	the work of looking after or making forests
industrialisation	the application of scientific principles to the production of food and fibre for human use
horticulture	the process of developing industries in a country

**2. Now check your understanding of the key words by completing the blanks in the sentences below.**



- \_\_\_\_\_ has been known and practised for very many years.
- \_\_\_\_\_ has always been of great economic and social importance in Ireland.
- The numbers employed in agriculture will continue to fall as \_\_\_\_\_ increases and farming becomes more mechanised and technical.
- There is scope for more expansion in \_\_\_\_\_ especially in the areas of fresh vegetables and protected crops.
- \_\_\_\_\_ is located mainly in mountain and hill land and on blanket peat in the west of the country.
- Planting in Ireland has been restricted because of our long tradition of \_\_\_\_\_ farming.

### 3. Missing Words

Study the words in the box, and then check you understand them by putting them into the sentences (mainly definitions) below.

chromosome	cells	nucleus	hormones	organisms	respiration
transpiration	species	microscopes	plough		
crop rotation	vitamins	carbohydrates			

- \_\_\_\_\_ are the basic unit of all plants and animals.
- \_\_\_\_\_ are precision instruments and must be used with care.
- The vast majority of cells contain a \_\_\_\_\_.
- Normal plant and animal cells have a pair of every \_\_\_\_\_; each member of the \_\_\_\_\_ is identical or almost so.
- The main chemicals found in living \_\_\_\_\_ are carbohydrates, proteins, amino acids and lipids.
- \_\_\_\_\_ are chemicals which contain the elements carbon, hydrogen and water.
- \_\_\_\_\_ are organic chemicals which cannot be made by the animal itself and must be included in its diet.
- \_\_\_\_\_ is the process used by organisms to release energy.
- A \_\_\_\_\_ is a group of closely related organisms which interbreed and produce offspring.
- Plant \_\_\_\_\_ are chemicals which influence the growth of plants.
- \_\_\_\_\_ is the loss of water vapour by the plant to the atmosphere around it.
- The \_\_\_\_\_ is an implement designed to turn over a layer of soil in preparation for further cultivation and sowing the crop.
- \_\_\_\_\_ is the growing of crops in a definite sequence to help control pests and to help maintain soil structure.

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

**LC AGRICULTURAL SCIENCE: Plant Science and Cultivation**

Level: B1  
Individual / pair

**Focus on grammar**

**4. Nouns and adjectives**

(*adjective: a word that describes a noun or pronoun, for example: big, boring, green*)

For each noun in the list, write the matching adjective. We have done the first one for you. (Use your textbooks to help you find the answers).

<b>Noun</b>	<b>Adjective</b>
agriculture	<i>agricultural</i>
science	
biology	
disease	
fungus	
toxicity	
industrialisation	
unemployment	
horticulture	
harvest	
forest	
frequency	

**5.** Write sentences, or search for sentences in your textbooks, which contain the nouns or adjectives from the lists above. Two have been done for you.

**Example 1:** Ireland has developed as an exporter of **agricultural** produce.

**Example 2:** The trend towards **industrialisation** has been less here than in many developed countries.

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Level: B1 / B2  
Individual / pair

### Focus on reading

6. Practise reading quickly! Read the questions a) to h), and then match them to the answers in the boxes, 1-8. Sometimes you won't know the answer because you haven't studied it yet, but you can guess – use clues such as the number of pieces of information, and your own general knowledge.

- a) What is the difference between a selective herbicide and a total herbicide?
- b) Where are chromosomes found in a cell?
- c) What type of cell division leads to a reduction in chromosome number?
- d) What term is used to describe the number of chromosomes in a sex cell?
- e) How can the farm animal be treated immediately for the liver fluke infection?
- f) What causes contamination of milk?
- g) Why are the samples taken in a W-shaped pattern?
- h) What is meant by the term soil pH?

3. Meiosis

1. Dose animal or inject animal

2. Microorganisms or poor hygiene or improper cooling

4. To ensure they are representative of the area.

5. Selective: kills weeds only  
Total herbicide: kills all vegetation

6. Nucleus

7. Haploid or n

8. Acidity

Level: B1 / B2  
Individual / pair

### Focus on writing

7. Practise writing sentences by putting the words and phrases into the correct order.

a) which/groups of cells/ are called tissues/ perform specialized functions.

Groups of cells which perform specialized functions are called tissues.

b) is called the protoplasm /the living part/ and / it is surrounded/ of each cell/ by a cell membrane

c) contain an embryo /the seeds of flowering plants/ develops into a seedling/which

d) generally face outwards / has observed/plants growing on a window / nearly everyone/ how

e) to /many organisms/day length/react

f) of the plant/ are modified/ many parts /for special purposes/ food storage/ such as

g) are a different form /tubers/ underground stems/ of

h) mainly by / are/ flowering plants /classified/their flower structure

i) are identified/plants /using identification guides

j) but/large ploughs/ to operate them/ require a very powerful tractor /are capable of very fast work rates

## Answer key

1.

agricultural science	the application of scientific principles to the production of food and fibre for human use
forestry	the work of looking after or making forests
agriculture	the work and methods of growing crops and looking after animals which are then used for food
livestock	animals that are kept on a farm
industrialisation	the process of developing industries in a country
horticulture	the study or activity of growing plants

2.

- **Agricultural science** has been known and practised for very many years.
- **Agriculture** has always been of great economic and social importance in Ireland.
- The numbers employed in agriculture will continue to fall as **industrialisation** increases and farming becomes more mechanised and technical.
- There is scope for more expansion in **horticulture** especially in the areas of fresh vegetables and protected crops.
- **Forestry** is located mainly in mountain and hill land and on blanket peat in the west of the country.
- Planting in Ireland has been restricted because of our long tradition of **livestock** farming.

3.

- **Cells** are the basic unit of all plants and animals.
- **Microscopes** are precision instruments and must be used with care.
- The vast majority of cells contain a **nucleus**.
- Normal plant and animal cells have a pair of every **chromosome**; each member of the **chromosome** is identical or almost so.
- The main chemicals found in living **organisms** are carbohydrates, proteins, amino acids and lipids.
- **Carbohydrates** are chemicals which contain the elements carbon, hydrogen and water.
- **Vitamins** are organic chemicals which cannot be made by the animal itself and must be included in its diet.
- **Respiration** is the process used by organisms to release energy.
- A **species** is a group of closely related organisms which interbreed and produce offspring.

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_  
LC AGRICULTURAL SCIENCE: Plant Science and Cultivation

- Plant **hormones** are chemicals which influence the growth of plants.
- **Transpiration** is the loss of water vapour by the plant to the atmosphere around it.
- The **plough** is an implement designed to turn over a layer of soil in preparation for further cultivation and sowing the crop.
- **Crop rotation** is the growing of crops in a definite sequence to help control pests and to help maintain soil structure.

4.

<b>Noun</b>	<b>Adjective</b>
agriculture	<i>agricultural</i>
science	<i>scientific</i>
biology	<i>biological</i>
disease	<i>diseased</i>
fungus	<i>fungus</i>
toxicity	<i>toxic</i>
industrialisation	<i>industrialised</i>
unemployment	<i>unemployed</i>
horticulture	<i>horticultural</i>
harvest	<i>harvested</i>
forest	<i>forested</i>
frequency	<i>frequent</i>

6. a) 5

b) 6

c) 3

d) 7

e) 1

f) 2

g) 4

h) 8

7.

- a) Groups of cells which perform specialized functions are called tissues.
- b) The living part of each cell is called the protoplasm and it is surrounded by a cell membrane.
- c) The seeds of flowering plants contain an embryo which develops into a seedling.

**NAME:** \_\_\_\_\_ **DATE:** \_\_\_\_\_  
**LC AGRICULTURAL SCIENCE: Plant Science and Cultivation**

- d) Nearly everyone has observed how plants growing on a window generally face outwards.
- e) Many organisms react today length.
- f) Many parts of the plant are modified for special purposes such as food storage.
- g) Tubers are a different form of underground stems.
- h) Flowering plants are classified mainly by their flower structure.
- i) Plants are identified using identification guides.
- j) Large ploughs are capable of very fast work rates but require a very powerful tractor to operate them.