

**SANSKAR SCHOOL**  
**IGCSE-GRADE-9**  
**SESSION-2020-21**  
**COMBINED SCIENCE (0653)-BIOLOGY**  
**UNIT-B1-CELLS Worksheet No. – 1**  
**B1.01-The Characteristics of Living things**




In this activity, you'll identify observable characteristics of life in videos of various organisms and describe those characteristics.

**Review**

Q1 What are the six easily observable characteristics of living things?

**Characteristics of Life Data Table**

Category	Characteristics of Life	Description of Observed Characteristics
<a href="#">C. elegans</a> ( <i>Caenorhabditis elegans</i> ) Video: Moving <i>C. elegans</i>		
<a href="#">Sea Urchins</a> ( <i>Lytechinus pictus</i> ) Video: Sea urchin cell division		
<a href="#">Sea Urchins</a> ( <i>Lytechinus pictus</i> ) Video: Sea urchin fertilization		
<a href="#">Blood Cells</a> Video: Human white blood cells		
<a href="#">Cellular Structure and Function</a> Video: Elodea leaf cells		
<a href="#">Stem Cells</a> Videos: Compare Mouse embryonic stem cells—movie 1 with Heart cells grown from mouse embryonic stem cells—movie 1		
<a href="#">Cell Motility</a> Video: Crawling Amoeba		
<a href="#">Zebrafish</a> ( <i>Danio rerio</i> ) Video: Zebrafish development		

 <b>Cambridge Assessment</b> International Education	 <b>SANSKAR</b> <b>SCHOOL</b> <i>The Revival of Tradition</i>	 <b>INTERNATIONAL</b> SCHOOL AWARDS 2016-2019
GRADE: 9	SUBJECT: BIOLOGY(0653)	DATE: 2 <sup>nd</sup> April 2020
WORKSHEET NUMBER: 2	WORKSHEET TOPIC:CHARACTERISTICS OF LIVING ORGANISMS	
INSTRUCTION (IF ANY):	Answer the following questions in the hard copy/ note-book and send back pics.	

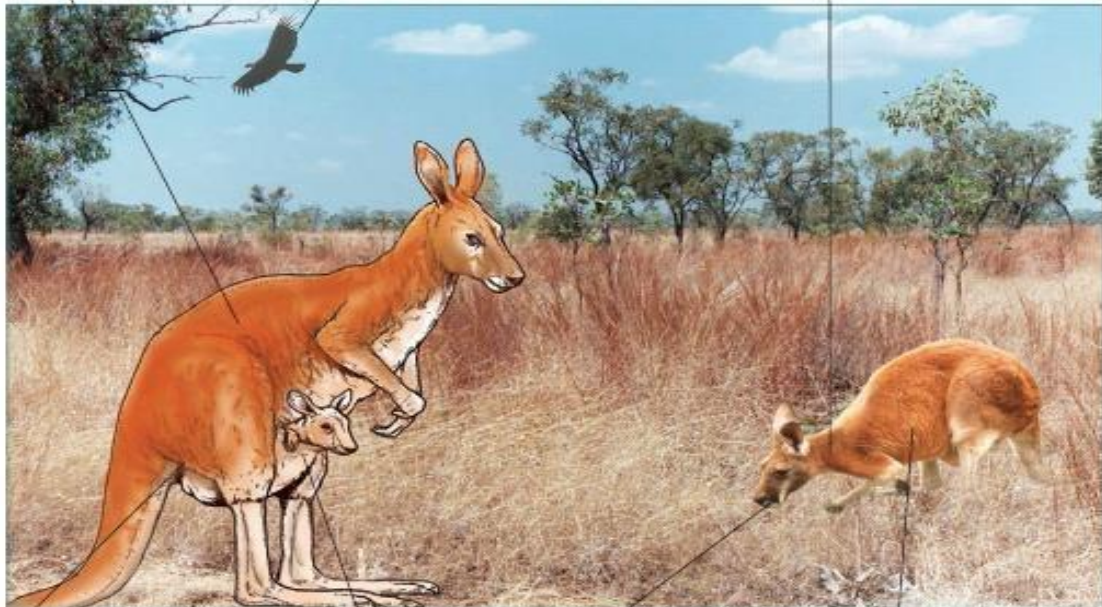
NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

### READING MATERIAL

**Growth** All organisms begin small and get larger, by the growth of their cells and by adding new cells to their bodies.

**Movement** All organisms are able to move to some extent. Most animals can move their whole body from place to place, and plants can slowly move parts of themselves.

**Sensitivity** All organisms pick up information about changes in their environment, and react to the changes.



**Excretion** All organisms produce unwanted or toxic waste products as a result of their metabolic reactions, and these must be removed from the body.

**Reproduction** Organisms are able to make new organisms of the same species as themselves.

**Nutrition** Organisms take substances from their environment and use them to provide energy or materials to make new cells.

**Respiration** All organisms break down glucose and other substances inside their cells, to release energy that they can use.

Figure 1.2 Characteristics of living organisms.

#### Key definitions

**movement** – an action by an organism causing a change of position or place  
**respiration** – the chemical reactions in cells that break down nutrient molecules and release energy  
**sensitivity** – the ability to detect and respond to changes in the environment  
**growth** – a permanent increase in size

**reproduction** – the processes that make more of the same kind of organism  
**excretion** – removal from organisms of toxic materials and substances in excess of requirements  
**nutrition** – taking in of materials for energy, growth and development

Q1. The equation shows a chemical reaction that occurs in living organisms.  $\text{glucose} + \text{oxygen} \rightarrow \text{carbon dioxide} + \text{water}$

Which of these characteristics of living organisms is this equation associated with?

	respiration	nutrition
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

[ ]

Q2 Some lizards detach their tails when threatened by a predator.

Which characteristic is shown?

A excretion

B growth

C reproduction

D sensitivity

[ ]

Q3 What is not a characteristic of all living organisms?

A excretion

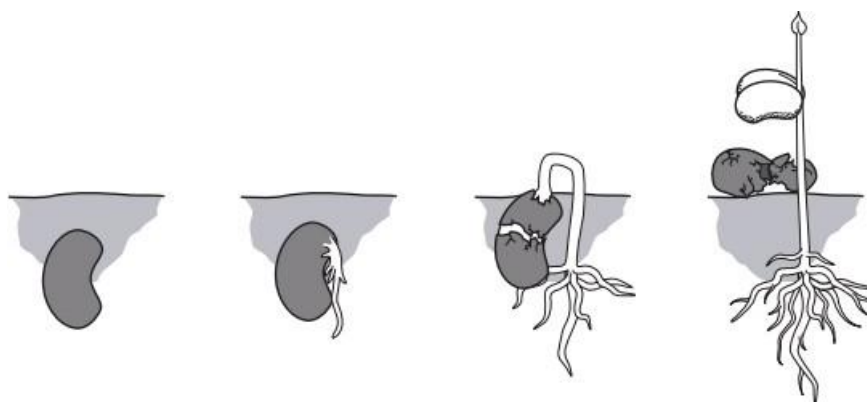
B photosynthesis

C reproduction

D respiration

[ ]

Q4.



Which characteristics of living things are demonstrated by this sequence?

- A growth and reproduction
- B growth and sensitivity
- C nutrition and reproduction
- D nutrition and sensitivity [ ]

Q5. Which characteristic do all living organisms show?

- A breathing
- B excretion
- C photosynthesis
- D Movement [ ]

Q6. Why does the energy needed by a human increase during the first ten years of life?

- A Coordination and responses improve.
- B Energy is needed for gamete formation.
- C The body is growing.
- D The diet is more balanced. [ ]

Q7. Growth is a characteristic feature of living organisms.

Which process provides the energy for growth?

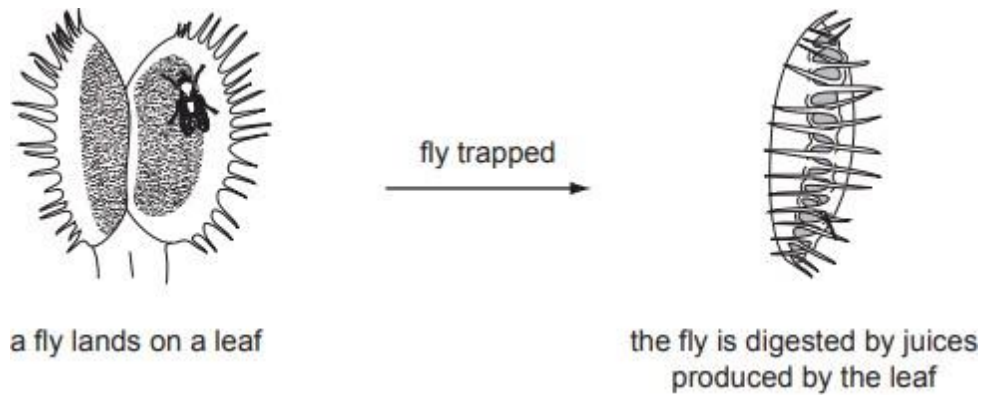
- A excretion
- B movement
- C respiration
- D sensitivity [ ]

Q8. Which process provides the raw materials needed for tissue repair?

- A excretion
- B growth
- C nutrition
- D respiration [ ]



Q9. The diagram shows how a plant, called a Venus fly-trap, reacts to a fly landing on it.



Which characteristics of living things are shown by the plant in the diagram?

A excretion and growth

B growth and sensitivity

C nutrition and reproduction

D nutrition and sensitivity

[    ]

Q10. Describe the 7 characteristics of living organisms in your own word.

1).....

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2).....

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5).....

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6).....

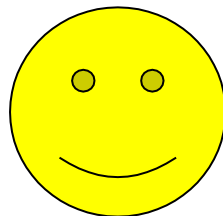
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Q11. Differentiate between living and non-living on the basis of characteristics of life.

<b>Characteristic</b>	<b>Living</b>	<b>Non-living</b>

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GRADE: IGCSE-I	SUBJECT: BIOLOGY(0653)	DATE: 2 <sup>nd</sup> April 2020
WORKSHEET NUMBER: 3	WORKSHEET TOPIC: Cells and Cell Organelles	
INSTRUCTION (IF ANY):	Do the worksheet neatly in the hard copy/ note-book and send back pics.	

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

**Q1.** Complete the following table by writing the number of the structure/function in the left hand column that matches the cell part in the right hand column.

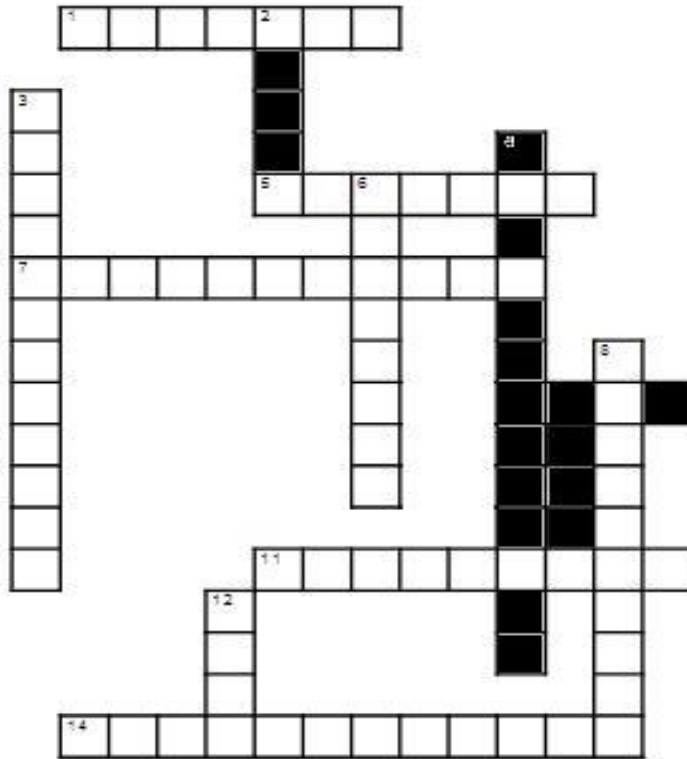
S. No.	Structure/Function	Cell Part
1	Produces a usable form of energy for the cell	<b>NUCLEUS</b>
2	Organelle that manages or controls all the cell functions in a eukaryotic cell	<b>CELL WALL</b>
3	Contains chlorophyll, a green pigment that traps energy from sunlight and gives plants their green color	<b>MITOCHONDRIA</b>
4	Provides temporary storage of food, enzymes and waste products	<b>VACUOLE</b>
5	Firm, protective structure that gives the cell its shape in plants.	<b>CELL MEMBRANE</b>
6	The membrane surrounding the cell	<b>CHLOROPLASTS</b>

**Q2.** Put a check in the appropriate column(s) to indicate whether the following organelles are found in plant cells, animal cells or both.

Organelle	Plant Cells	Animal Cells
Cell Wall		
Chloroplast		
Cytoplasm		
Mitochondria		
Nucleus		
Central vacuole		

Q3. Complete the crossword with the help of hints

### Cell Structures Crossword



**Across**

- 1 This organelle stores food, water, and waste for a cell. (7)
- 5 This organelle is usually in the center of the cell and controls the cell. (7)
- 7 This organelle can be found in plant cells and is the place where photosynthesis occurs. (11)
- 11 A gel-like substance that fills a cell. (9)
- 14 This controls what goes in and out of a cell. (4,8)

**Down**

- 3 These organelles provide the cell with energy by breaking down food. (12)
- 6 Plants cell have this thick outer part but animal cells don't. (4,4)
- 8 A tool used to view cells. (10)
- 12 A basic building block of living organisms. (4)



- 1..... 3.....
- 5..... 6.....
- 7..... 8.....
- 11..... 12.....
- 14.....

**Q4.** Explore a little and match

<b>Column I</b>	<b>Column II</b>
1. Mitochondria	(a) Cell
2. Functional unit of life	(b) Nucleus
3. Control unit of cell	(c) Unicellular
4. Single-celled organism	(d) Discovery of cell
5. Robert Hooke	(e) Power house of a cell
6. Combination of tissues	(f) Transfers messages
7. Cytoplasm	(g) Jelly-like substance
8. Nerve cell	(h) Forms organ
9. Living substance in the cell	(i) Cell wall
10. Outermost thick layer in plant cells	(j) Protoplasm

**Q5.** Draw neat proportionate and labeled diagram of the typical plant cell and the typical animal cell.

**NOTE:**

- Make good use of the space on your sheet paper.
- Your drawing should be large, but do leave space around it so that you have room for labels.
- Always use a sharp HB pencil and have a good eraser with you.
- Keep lines single and clear.
- Don't use shading unless it is absolutely necessary.
- Don't use colours.
- Draw proportionately.
- Use a ruler to draw each label line.
- Make sure the end of the label line actually touches the structure being labeled.
- Write labels horizontally.
- Keep the labels away from the drawing as well they should be properly spaced.

**TYPICAL ANIMAL CELL**




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**TYPICAL PLANT CELL**

Q5.



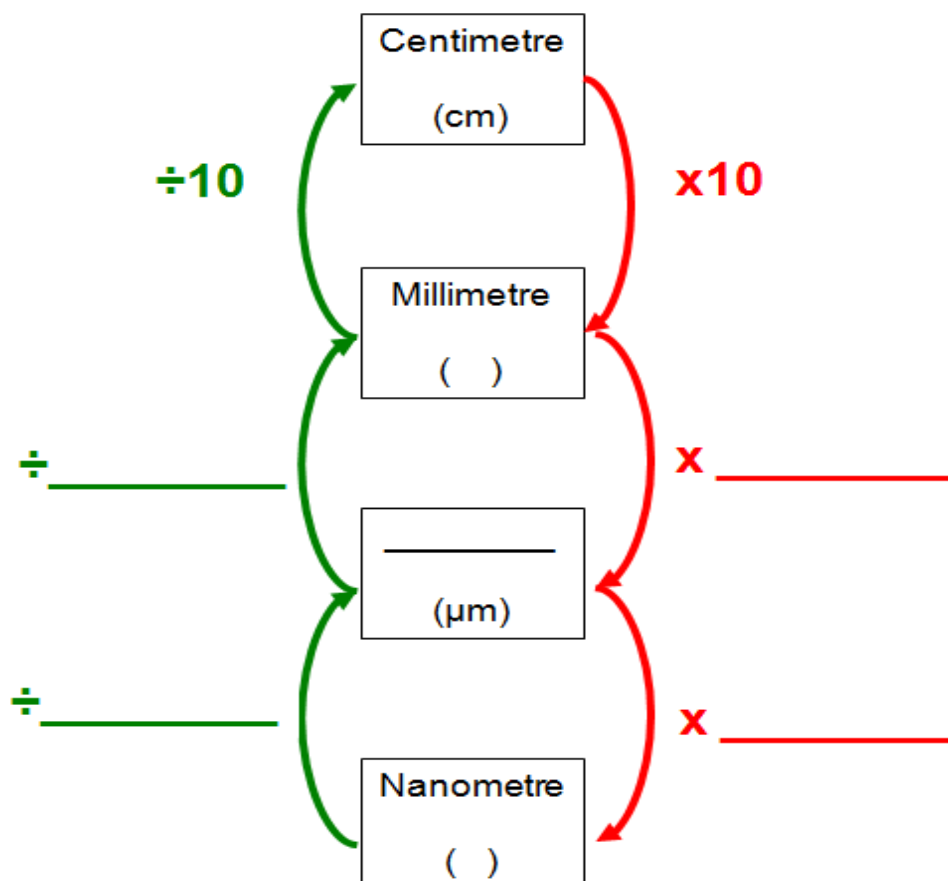


 <b>Cambridge Assessment International Education</b>	 <i>The Revival of Tradition</i>	
<b>GRADE: IGCSE YR-1</b>	<b>SUBJECT: BIOLOGY (0653)</b>	<b>9<sup>th</sup> April, 2020</b>
<b>WORKSHEET NUMBER: 4</b>	<b>WORKSHEET TOPIC: Microscopes and magnification</b>	
<b>INSTRUCTION (IF ANY):</b>	Answer the following questions in the hard copy/note-book and mail back pics.	

**NAME:** \_\_\_\_\_ **SUBMISSION DATE:** **12<sup>th</sup> April, 2020**

## Units of measurement

**Q1)** Complete the diagram below to show: names of the units of measurement, unit symbols and mathematical operations for converting between units.



**Q2)** Complete the table below to show the corresponding value nanometres, micrometres and millimetres for the measurements given in each row. The first row has been completed for you. Ensure that your answers use the correct unit symbols.

<u>Nanometre</u>	<u>Micrometre</u>	<u>Millimetre</u>
5	0.005	0.000005
1		
	1	
		1
	3	
7		
		0.5

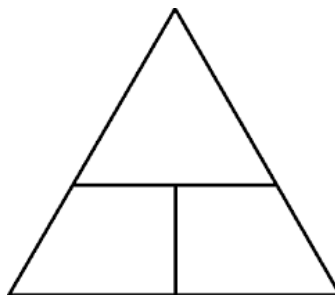
### Calculating Magnification

**Magnification** is the number of times larger an image is compared with the real size of the object.

In order to calculate magnification you need to divide the size of the image by the actual size of the specimen.

<p><b>Formula</b></p> <p>Magnification =</p>
--

You also need to rearrange the equation. Putting it in a triangle helps.



### Worked Example

In Biology class, Judy drew a diagram of a worm. The actual length of the worm is 10cm but Judy drew it 15cm long. Using this information work out the magnification of her drawing.

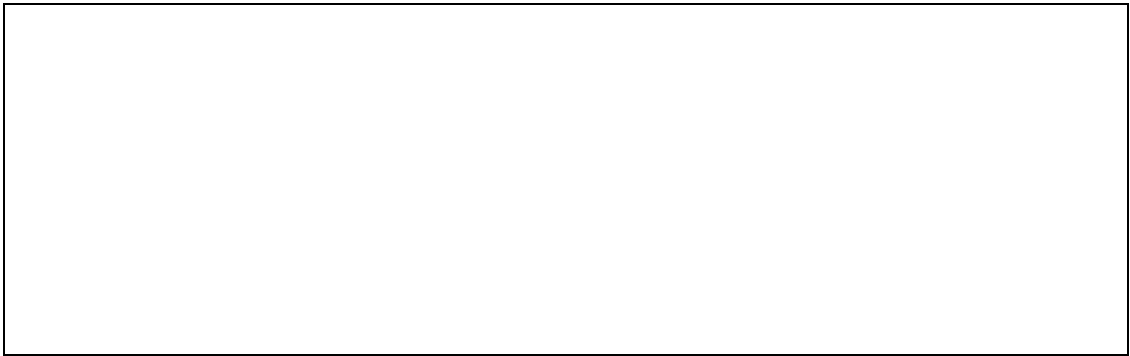
- 1) Magnification = Image / Actual
- 2) Image= 15cm
- 3) Actual= 10 cm
- 4) Magnification = 15cm/ 10 cm
- 5) **Magnification = x1.5**

### Practice questions- You must show your working out!

**Q3)** The actual size of a woodlouse is 0.4mm but Robert drew is 5mm long. What is the magnification?

**Q4)** A plant cell in a photograph measures 15 mm across. If the actual size of the cell is 0.015 mm, what is the magnification in the photograph?

**Q5)** The nucleus in a photograph of a cell measures 3 mm across. If the magnification in the photograph is  $\times 500$ , what is the actual size of the nucleus?



**Q6.** You are looking at onion cells under a microscope and want to know how big the cells really are. You measure the size of the cells as it appears and find out that it measures 20mm with a magnification of  $\times 1000$ . Work out the actual size of the cell.



**Q7)** What is the image size of a virus head, in the actual size is 6.8mm and it has been magnified  $\times 2500$ ?



**Q8)** A scientist observed a cell using an electron microscope.

The size of the image was 25 mm.

The magnification was  $\times 100\,000$

Calculate the actual size of the cell.

Give your answer in micrometers.

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Real size = \_\_\_\_\_ micrometers

**Q9)** How many times a light microscope magnify?

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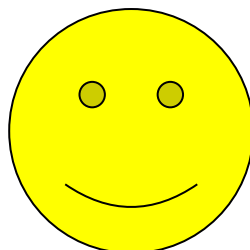
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**Q10)** If an object was 1 mm across, how big would it look like if it were magnified ten times?




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<b>GRADE: IGCSE YEAR - I</b>	<b>SUBJECT: BIOLOGY (0653)</b>	<b>DATE: 16<sup>TH</sup> APRIL, 2020</b>
<b>WORKSHEET NUMBER: 5</b>	<b>WORKSHEET TOPIC: CELLS</b>	
<b>INSTRUCTION (IF ANY ):</b>	<b>Answer the following questions in the hard copy/note-book and send back pics. Do the End of Unit questions also.</b>	

**NAME:** \_\_\_\_\_ **SUBMISSION DATE:** 19<sup>th</sup> April, 2020

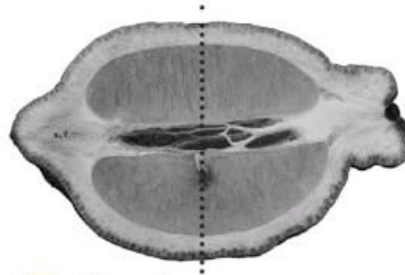
**NOTE – The questions are based on the complete unit.**

- Q1. How the structure of the following relate to their functions.
- Root hair cells
  - Palisade mesophyll cells
  - Red blood cells
  - Ciliated cells
- Q2. Name the cells produced by ovaries.
- Q3. How the long tail of a sperm cell helpful to it?
- Q4. What sorts of cells are surrounded by a cell membrane?
- Q5. What are plant cell walls made up of?
- Q6. What does 'fully permeable' mean?
- Q7. What does 'partially permeable' mean?
- Q8. What is the main constituent of cytoplasm?
- Q9. What is a vacuole?
- Q10. What is cell sap?
- Q11. Chloroplasts contain chlorophyll. What does chlorophyll do?
- Q12. What is stored in the nucleus?

### End-of-chapter questions

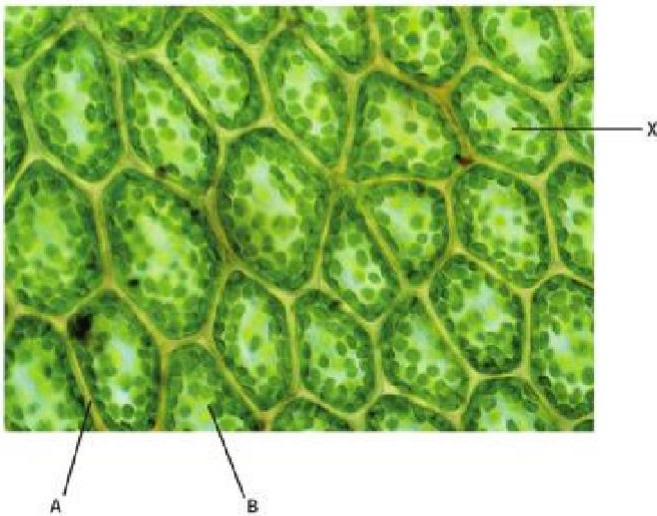
- 1 a** Without looking back at the beginning of this chapter, decide which **five** of the following characteristics are found in all living things:
- movement    blood system    sight    growth    photosynthesis  
 nutrition    sensitivity    speech    excretion
- b** List the other **two** characteristics of all living organisms.

- 2 State which part of a plant cell:
- a makes food by photosynthesis
  - b controls what goes in and out of the cell
  - c stores information about making proteins
  - d contains cell sap
  - e protects the outside of the cell
- 3 Distinguish between each of the following pairs of terms:
- a chloroplast, chlorophyll
  - b cell wall, cell membrane
- 4 The photograph shows a section through a fruit.



- a Make a large diagram of the fruit. You do not need to label your diagram. [5]
- b The photograph shows the fruit at a magnification of  $\times 0.6$ . Calculate the diameter of the actual fruit at the point indicated by the dotted line. Show your working, and remember to include the unit. [3]




- 5 The micrograph shows a group of cells from a plant.



- a Name the parts of the cell labelled **A** and **B**. [2]
- b State **two** ways in which you can tell that the cells in the micrograph are plant cells and not animal cells. [2]
- c
  - i Measure the maximum diameter of the cell labelled **X**. Record your measurement in millimetres. [1]
  - ii The micrograph has been magnified 250 times. Calculate the real maximum diameter of the cell labelled **X**. Show your working clearly. [2]



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 Cambridge Assessment International Education		
GRADE: IGCSE YEAR - I	SUBJECT: BIOLOGY (0653)	DATE: 23 <sup>rd</sup> APRIL, 2020
WORKSHEET NUMBER: 1	UNIT – B14-Organisms and their environment WORKSHEET TOPIC(S): B14.01-Ecology	
INSTRUCTION (IF ANY):	Watch Videos and read the reading material.	

NAME: \_\_\_\_\_ SUBMISSION DATE: 26<sup>th</sup> April, 2020

Links for videos <https://youtu.be/EdKhQVHc3Ao>

<https://youtu.be/sKJoXdrOT70>

<https://youtu.be/clfpKL0brwQ>

# B14

## Organisms and their environment

167

**This chapter covers:**

- food chains, webs and ecosystems
- efficiency of energy transfer in food chains
- the carbon cycle and how human activities affect it
- water pollution.

### B14.01 Ecology

One very important way of studying living things is to study them where they live. Animals and plants do not live in complete isolation. They are affected by their surroundings, or **environment**. Their environment is also affected by them. The study of the interaction between living organisms and their environment is called ecology.

There are many words used in ecology with which it is useful to be familiar.

The area where an organism lives is called its **habitat**. The habitat of a tadpole might be a pond. There will probably be many tadpoles in the pond, forming a **population** of tadpoles. A population is a group of organisms of the same species, living in the same area at the same time.

But tadpoles will not be the only organisms living in the pond. There will be many other kinds of animals and plants making up the pond **community**. A community is all the organisms, of all the different species, living in the same habitat.

The living organisms in the pond, the water in it, the stones and the mud at the bottom make up an **ecosystem**. An ecosystem consists of a community and its environment (Figure B14.01).

**KEY TERM**

**ecosystem:** a unit containing all of the organisms and their environment, interacting together, in a given area, e.g. a lake

**1. The natural place of an organism or community is known as**

1. Niche
2. ecosystem
3. Habitat
4. Habit

**2. Which is an example of a population?**

- A all the animals and plants living in a pond
- B all the mahogany trees growing in a forest
- C all the people born in a country over a period of 100 years
- D all the species of animals in Africa

**3. The region of earth, where life exists is known as**

- (A) Atmosphere
- (B) Biosphere
- (C) Lithosphere
- (D) Hydrosphere

**4. The region of earth, where life exists is known as**

- (A) Atmosphere
- (B) Biosphere
- (C) Lithosphere
- (D) Hydrosphere

**5. Ecosystem may be defined as**

1. A species along with environment
2. Plants found in water
3. Plants found on land
4. All plants and animals species along with environment

**6. A pond / lake is**

1. A habitat
2. Natural ecosystem
3. An artificial ecosystem
4. Community of plants and animals only

7. Define the following terms

(a) Environment

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(b) Ecology

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(c) Population

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(d) Species

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(e) Community

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(f) Habitat

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(g) Niche

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(h) Ecosystem

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<b>GRADE: IGCSE YEAR - I</b>	<b>SUBJECT: BIOLOGY (0653)</b>	<b>DATE: 30<sup>th</sup> APRIL, 2020</b>
<b>WORKSHEET NUMBER: 2</b>	<b>UNIT – B14-Organisms and their environment</b> <b>WORKSHEET TOPIC(S): B14.02-Energy flow</b>	
<b>INSTRUCTION (IF ANY):</b>	<b>Read the reading material and do questions.</b>	

NAME: \_\_\_\_\_ SUBMISSION DATE: 3<sup>rd</sup> May, 2020

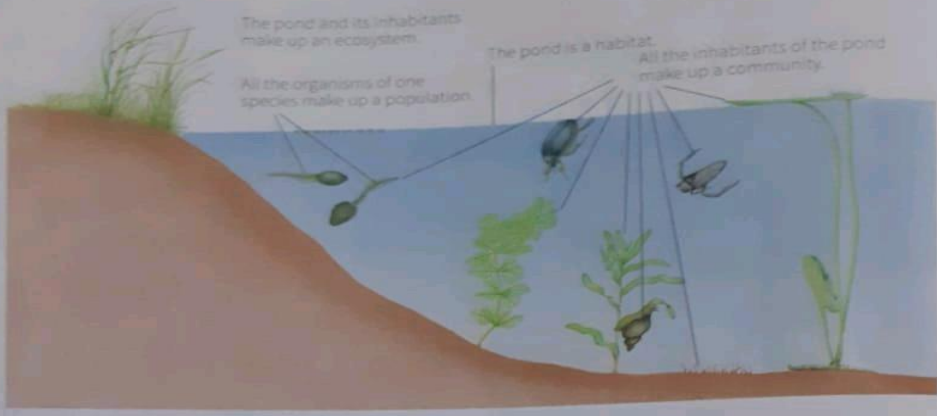


Figure B14.01 A pond and its inhabitants – an example of an ecosystem.

### B14.02 Energy flow

All living organisms need energy. They get energy from food, by respiration. All the energy in an ecosystem originates from the Sun. Some of the energy in sunlight is captured by plants, and used to make food – glucose, starch and other organic substances such as fats and proteins. These contain some of the energy from the sunlight. When the plant needs energy, it breaks down some of this food by respiration.

Animals get their food, and therefore their energy, by ingesting (eating) plants, or by eating animals which have eaten plants.

The sequence by which energy, in the form of chemical energy in food, passes from a plant to an animal and then to other animals is called a **food chain**. Figure B14.02 shows one example of a food chain.

Many different food chains link to form a food web. Figure B14.03 shows an example of a food web.

**KEY TERMS**

**producer:** an organism that makes its own organic nutrients, usually using energy from sunlight, through photosynthesis

**consumer:** an organism that gets its energy by feeding on other organisms

**herbivore:** an animal that gets its energy by eating plants

**carnivore:** an animal that gets its energy by eating other animals

**KEY TERMS**

**food chain:** a diagram showing the flow of energy from one organism to the next, beginning with a producer

**food web:** a network of interconnected food chains

### Producers and consumers

Every food chain begins with green plants because only they can capture the energy from sunlight. They are called **producers**, because they produce food.

### Energy losses

As energy is passed along a food chain, some of it is lost to the environment. This happens in many ways.

- When an organism uses food for respiration, some of the energy released from the food is lost as heat energy to the environment.
- When one organism eats another, it rarely eats absolutely all of it. For example, the grasshopper in the food chain in Figure B14.02 may eat almost all of the parts of the plant above ground, but it will not eat the roots. So not all of the energy in the plant is transferred to the grasshopper.

Plants- primary producers

Grasshopper-a primary consumer

Flycatcher-a secondary consumer



Figure B14.02 A food chain.

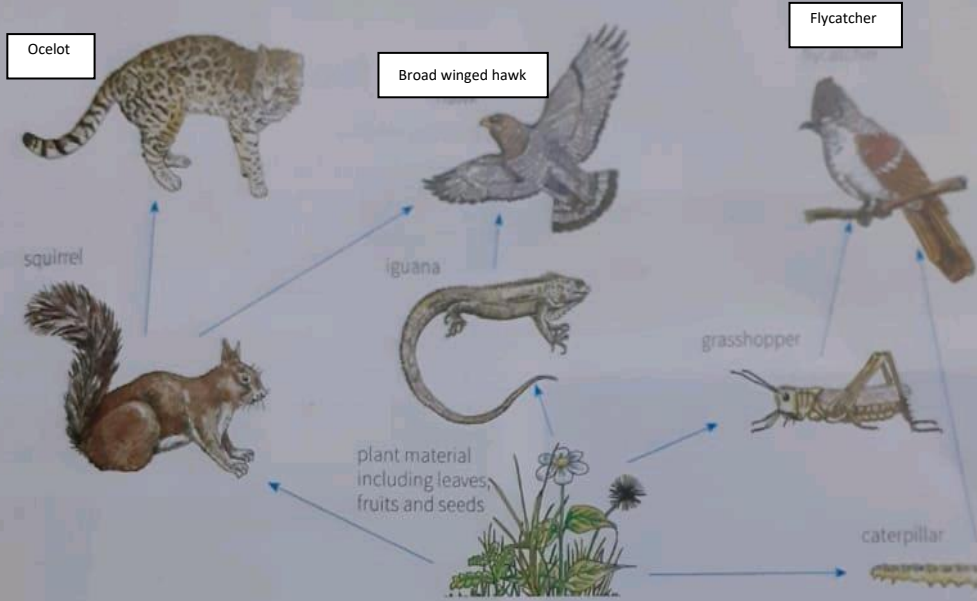


Figure B14.03 A food web.

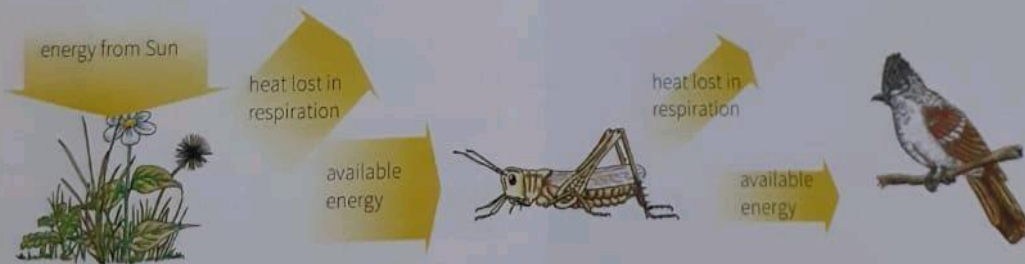


Figure B14.04 Energy losses in a food chain.

- When an animal eats another organism as food, enzymes in its digestive system break down most of the large food molecules, so that they can be absorbed. But not all of the food molecules are digested and absorbed, and the ones that are not are eventually lost from the body in the faeces. These faeces contain energy that is lost from this food chain.

This means that, the further you go along a food chain, the less energy is available for each successive group of organisms (Figure B14.04). The plants get a lot of energy from the Sun, but only a fraction of this energy is absorbed by the grasshoppers, and only a fraction of that is absorbed by the flycatchers. This explains why predators are usually much rarer than herbivores, and why there are usually many more plants than animals in an ecosystem.

## Trophic levels

Each stage in a food chain is called a **trophic level** ('trophic' means feeding).

Because there is less energy available as you go up the trophic levels, there are fewer organisms at each level. This loss of energy limits the length of food chains. They rarely have more than five trophic levels, as there is not enough energy left to support a sixth.

Many organisms feed at more than one trophic level. You, for example, are a primary consumer when you eat vegetables, a secondary consumer when you eat meat or drink milk, and a tertiary consumer when you eat a predatory fish such as a salmon.

## QUESTIONS

- B14.01** Where does all the energy in living organisms originate from?
- B14.02** Write down a food chain **a** which ends with humans, **b** is in the sea, and **c** that has five links in it.
- B14.03** Why are green plants called producers?
- B14.04** Why are there rarely more than five links in a food chain?

**INTEXT QUESTIONS**

14.01 .....

14.02 (a) .....

14.02(b) .....

14.02(c) .....

14.03 .....

.....

14.04 .....

.....

**Q1.** Define

1) Food Chain : .....

.....

2) Food Web : .....

.....

3) Consumer : .....

.....

4) Herbivore : .....

.....

5) Carnivore : .....

.....

6) Decomposer : .....

.....

**Q2.** Describe how energy is transferred between trophic levels.

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GRADE: IGCSE YEAR - I	SUBJECT: BIOLOGY (0653)	DATE: 7 <sup>th</sup> May, 2020
WORKSHEET NUMBER: 3	UNIT – B14-Organisms and their environment WORKSHEET TOPIC(S): B14.03- The Carbon Cycle	
INSTRUCTION (IF ANY ):	Read the reading material and do questions.	


NAME: \_\_\_\_\_ SUBMISSION DATE: 8<sup>TH</sup> May, 2020

## B14.03 The carbon cycle

### Decomposers

One very important group of organisms, which is easy to overlook when you are studying an ecosystem, is the **decomposers**. They feed on waste material from animals and plants, and on their dead bodies. Many fungi and bacteria are decomposers.

Decomposers are extremely important, because they help to release substances from dead organisms, so that they can be used again by living ones. One of these substances is carbon.

 **KEY TERM**

**decomposer:** an organism that gets its energy from dead or waste organic matter

### The carbon cycle

Carbon is a very important component of living things, because it is an essential part of carbohydrates, fats and proteins.

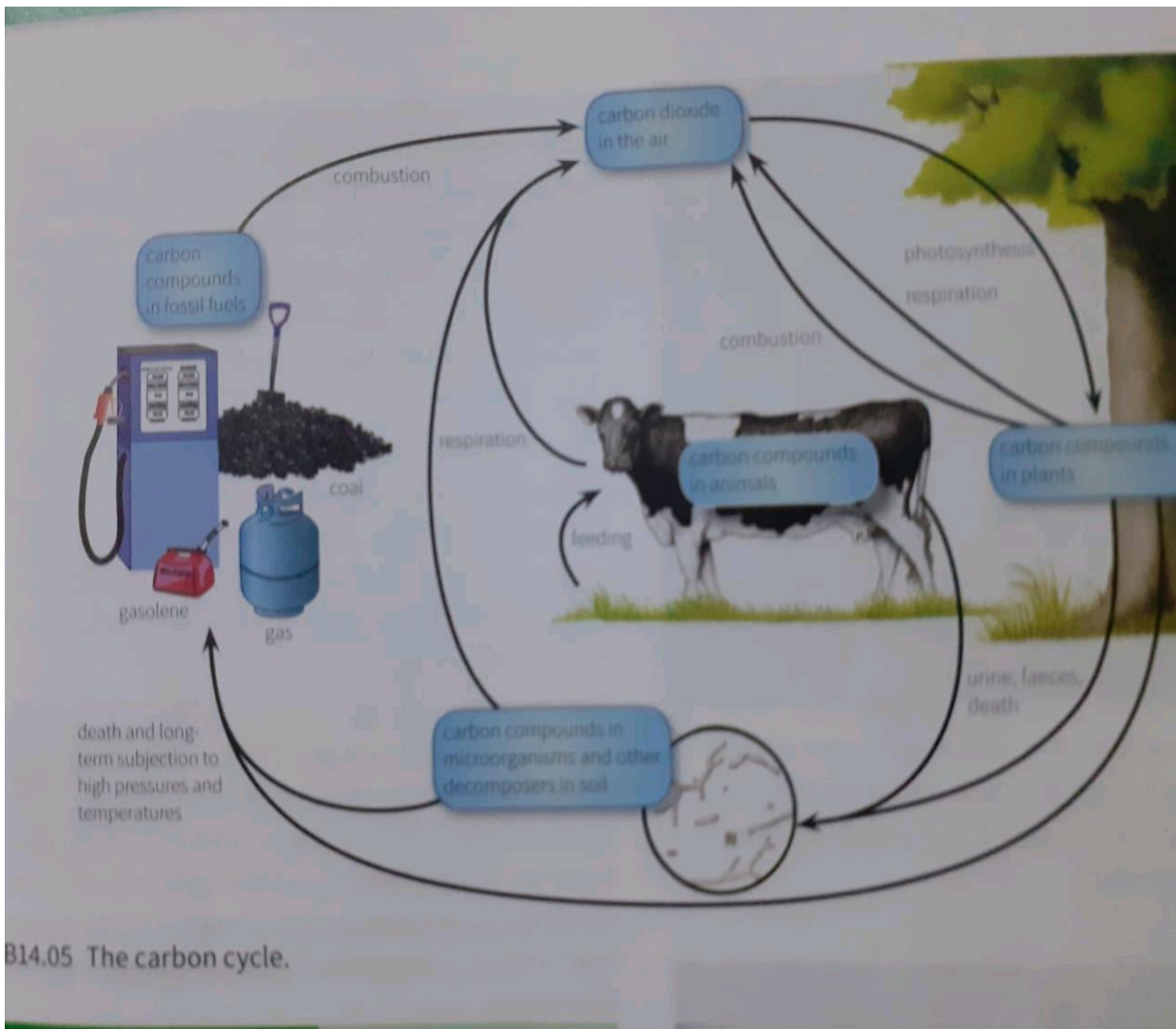
Figure B14.05 shows how carbon circulates through an ecosystem. The air contains about 0.04% carbon dioxide. When plants photosynthesise, carbon atoms from carbon dioxide become part of glucose or starch molecules in the plant.

Some of the glucose is then broken down by the plant in respiration. The carbon in the glucose becomes part of a carbon dioxide molecule again, and is released back into the air.

Some of the carbon in the plant will be eaten by animals. The animals respire, releasing some of it back into the air as carbon dioxide.

When the plant or animal dies, decomposers will feed on them. The carbon becomes part of the decomposers' bodies. When they respire, they release carbon dioxide into the air again.





### INTEXT QUESTIONS

**QUESTIONS**

**B14.05** Name the only process shown in Figure B14.05 that removes carbon dioxide from the air.

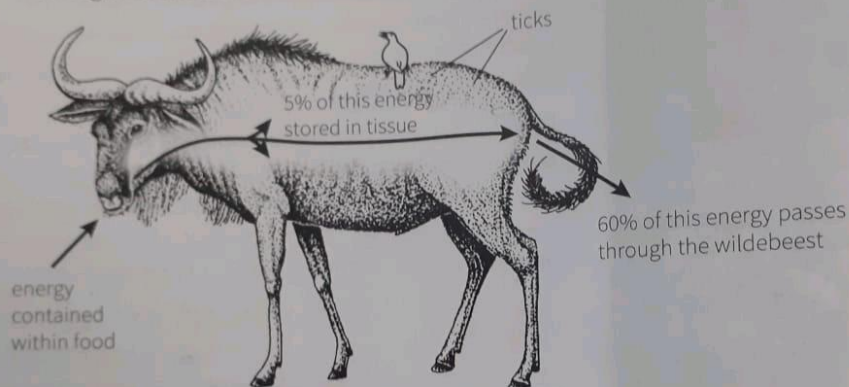
**B14.06** Name **two** carbon compounds that are found in the body tissues of animals.

**B14.07** Explain what will happen to the quantity of carbon dioxide in the air if fossil fuels are burnt faster than they are formed.

## End-of-chapter questions

- 1 Explain the difference between each of the following pairs of terms, giving examples where you can:
  - a producer, consumer
  - b primary consumer, secondary consumer
  - c food chain, food web
- 2
  - a Why do living organisms need carbon?
  - b Explain how carbon atoms become part of a plant.
  - c What happens to some of these carbon atoms when a plant respire?
  - d Explain the role of decomposers in the carbon cycle.

- 3 The diagram below shows what happens to energy as it passes through a herbivorous mammal (an ox).



- a
  - i State the source of the energy in the food eaten by the ox.
  - ii State the form in which the energy is present in the carbohydrate eaten by the ox.
- b
  - i Name the process that makes the remaining 35% of the energy in the food available to the ox.
  - ii State **three** ways in which the energy may be used within the ox.




The bird on the ox's back is an oxpecker that feeds both on blood-sucking parasites (ticks) living on the ox, and on blood from the ox's wounds.

- c
  - i Draw a food web to show the feeding relationships of the organisms in the diagram.
  - ii Explain why there must always be fewer oxpeckers than ticks in this food web.

(Cambridge O Level Biology, 2000, 2003, 2005, 2008, 2010)

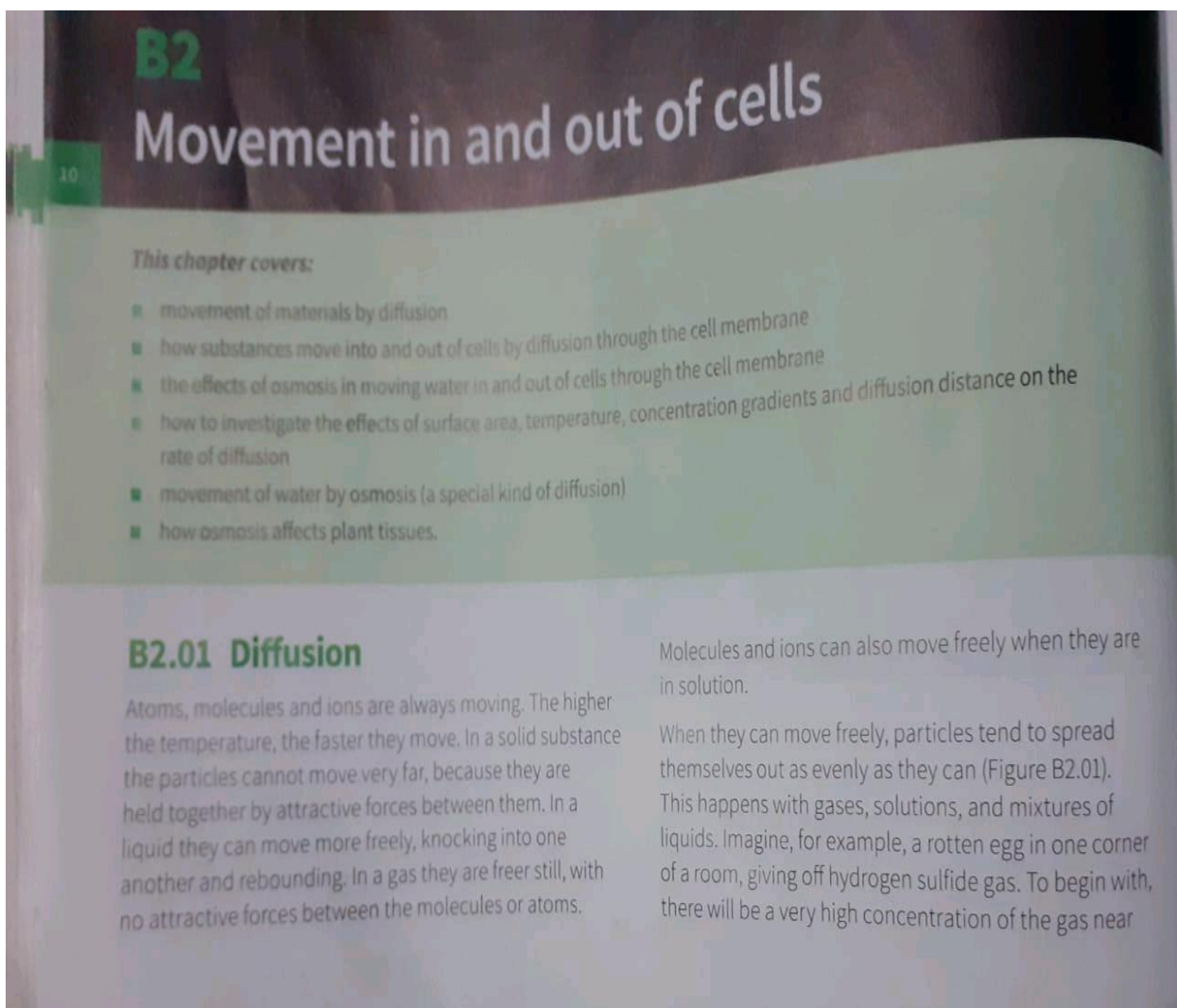
**"STAY SAFE & HEALTHY"**



 <b>Cambridge Assessment International Education</b>		
<b>GRADE: IGCSE YEAR - I</b>	<b>SUBJECT: BIOLOGY (0653)</b>	<b>DATE: 21<sup>st</sup> May, 2020</b>
<b>WORKSHEET NUMBER: 1</b>	<b>UNIT – B2 WORKSHEET TOPIC(S): B2.01</b>	
<b>INSTRUCTION (IF ANY ):</b>	<b>Read the reading material and do questions.</b>	

**NAME:** \_\_\_\_\_ **SUBMISSION DATE:** 25<sup>th</sup> May, 2020

Link for video on diffusion - <https://youtu.be/C5pMigXBAgk>





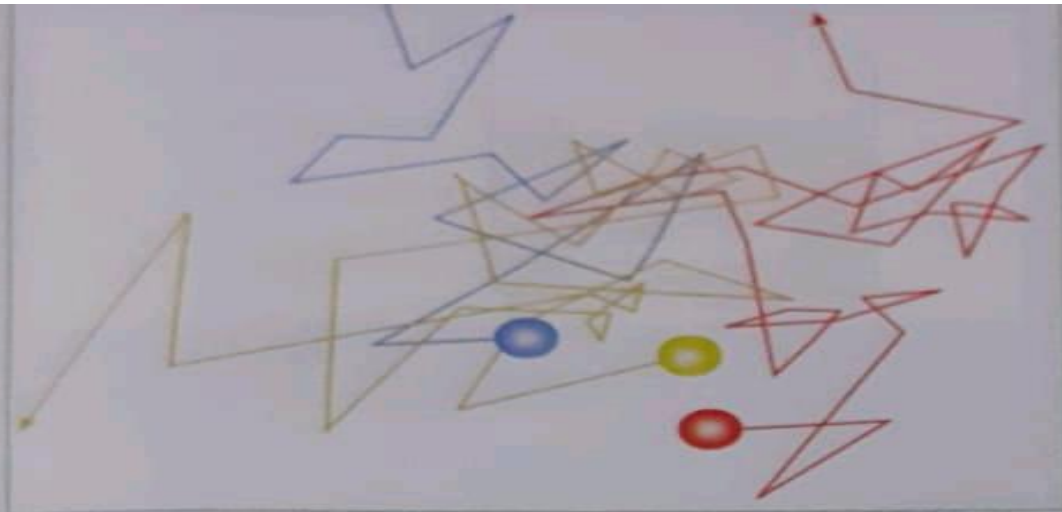


Figure B2.01 Diffusion is the result of the random movement of particles.

the egg, but none in the rest of the room. However, before long the hydrogen sulfide molecules have spread throughout the air in the room. Soon, you will not be able to tell where the smell first came from – the whole room will smell of hydrogen sulfide.

The hydrogen sulfide molecules have spread out, or diffused, through the air.



#### KEY TERM

**diffusion:** the net movement of molecules and ions from a region of their higher concentration to a region of their lower concentration down a concentration gradient, as a result of their random movement

### Diffusion and living organisms

Living organisms obtain many of their requirements by **diffusion**. They also get rid of many of their waste products in this way. For example, plants need carbon dioxide for photosynthesis. This diffuses from the air into the leaves, through the stomata. It does this because there is a lower concentration of carbon dioxide inside the leaf, as the cells are using it up. Outside the leaf in the air, there is a higher concentration. Carbon dioxide molecules therefore diffuse into the leaf, down this concentration gradient.

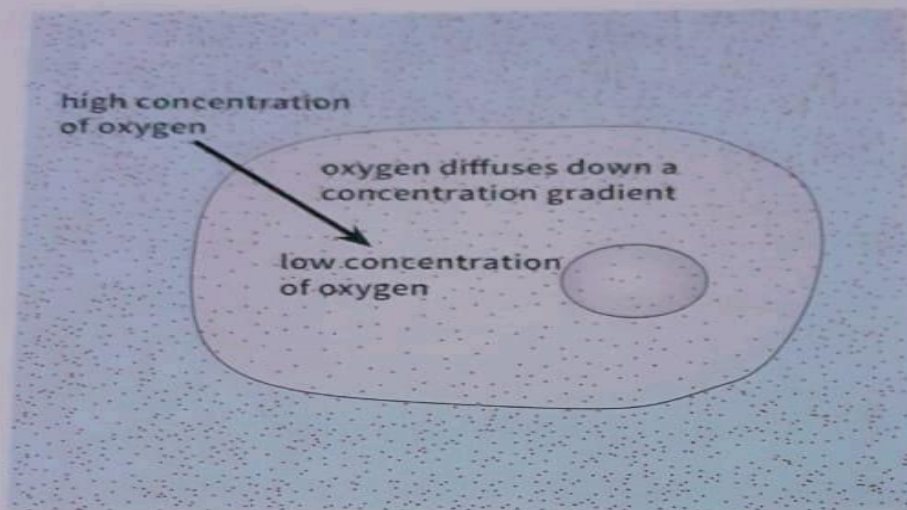


Figure B2.02 Diffusion of oxygen into a cell. The red dots represent oxygen molecules.

Oxygen, which is a waste product of photosynthesis, diffuses out in the same way. There is a higher concentration of oxygen inside the leaf, because it is being made there. Oxygen therefore diffuses out through the stomata into the air.

Diffusion is also important in gas exchange for respiration in animals and plants (Figure B2.02). Cell membranes are freely permeable to oxygen and carbon dioxide, so these easily diffuse into and out of cells.



**TIP**




Remember that diffusion is simply the result of particles moving about randomly. Cells don't have to do anything to make it happen.

**QUESTIONS**

- B2.01 Define diffusion.
- B2.02 List **three** examples of diffusion in living organisms.

“STAY SAFE & HEALTHY”



 <b>Cambridge Assessment International Education</b>		
<b>GRADE: IGCSE YEAR - I</b>	<b>SUBJECT: BIOLOGY (0653)</b>	<b>DATE: 22<sup>nd</sup> June, 2020</b>
<b>WORKSHEET NUMBER: 1</b>	<b>UNIT – B-3-BIOMOLECULES</b> <b>WORKSHEET TOPIC(S): B3.01- What are we made up of?</b> <b>B3.02 - Carbohydrates</b>	
<b>INSTRUCTION (IF ANY ):</b>	<b>Do the questions in notebook.</b>	

## CLASS ASSIGNMENT

### KEY TERMS

1. Biological Molecules
2. Carbohydrates
3. Proteins
4. Fats
5. Lipids
6. Metabolic reaction
7. Solvent
8. Monosaccharide
9. Polysaccharide
10. Monomer
11. Polymer
12. Glucose
13. Maltose
14. Sucrose
15. Cellulose
16. Starch
17. Glycogen
18. Benedict's solution
19. Iodine
20. Reducing sugar

A **biomolecule** or **biological molecule** is molecule that is present in **living organisms**, including large macromolecules such as **proteins**, **carbohydrates**, **lipids**, and **nucleic acids**.



**Q1.** What are we made up of?

## The building blocks of life

- ❖ The four most common elements in living organisms are, in order of abundance - **hydrogen**, **carbon**, **oxygen** and **nitrogen**.
- ❖ They account for more than **99%** of the atoms found in all living things.
- ❖ **Carbon** is particularly important because carbon atoms can join together to form long chains or ring structures.
- ❖ They can be thought of as the basic skeletons of organic molecules to which groups of other atoms are attached.
- ❖ **Organic molecules** always contain **Carbon** and **Hydrogen**.

**Q2.** Is water a biomolecule?



# WHAT IS METABOLISM?

**Metabolism** is a collection of chemical reactions that take place in the body's cells.

**Q3.** Give two examples of metabolic reactions?

## Why is water so important?

1. All the **chemical reactions** in living things take place in water solutions.
2. Organisms use water to **transport materials** through their bodies.
  - Plants use water to **move minerals and sugars** between roots and leaves.
3. The large percentage of water in living things **acts like an insulator.**
  - The water in a cell helps **keep its temperature constant**, which allows life-sustaining chemical reactions to take place.

**Q4.** Define solvent.

**Q5.** Why water is called universal solvent?



# CARBOHYDRATES

- ❖ All carbohydrates contain the elements **carbon, hydrogen and oxygen**.
- ❖ The 'hydrate' part of the name comes from the fact that hydrogen and oxygen atoms are present in the ratio of **2 : 1**, as they are in water ('hydrate' refers to water).
- ❖ The general formula for a carbohydrate can therefore be written as  **$C_x(H_2O)_y$**
- ❖ Carbohydrates are divided into three main groups, namely

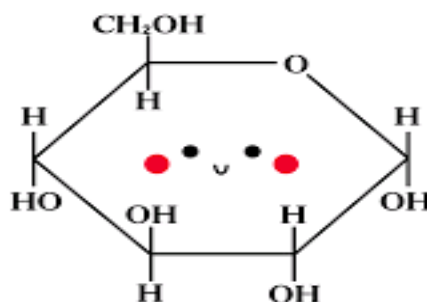
Monosaccharides  
Disaccharides  
and Polysaccharides.




- ❖ The word 'saccharide' refers to a **sugar or sweet** substance



**Q6.** Who am I? Draw me nicely and correctly in your notebook with an HB pencil only.

**I'M SO SWEET!**



 Cambridge Assessment International Education		
GRADE: IGCSE YEAR - I	SUBJECT: BIOLOGY (0653)	DATE: 25 June, 2020
WORKSHEET NUMBER: 2	UNIT – B-3-BIOMOLECULES WORKSHEET TOPIC(S): B3.02 - Carbohydrates	
INSTRUCTION (IF ANY):	Do the questions in notebook.	

**Submission of Home Assignment: 29.6.20**

**CLASS ASSIGNMENT**

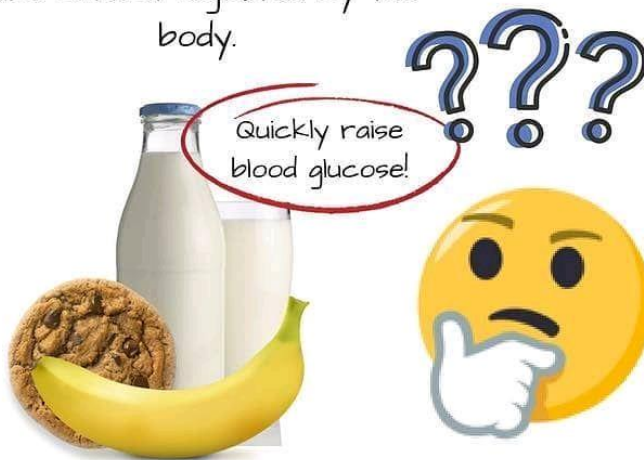
# Carbohydrates: twanfit

## Simple vs. Complex

@Twanfit

### Simple Carbs

These are simple sugars and are EASILY digested by the body.



- Easily digested by the body
- Do not provide long-term energy
- Usually NOT ACCOMPANIED by any real NUTRIENTS
- Spike your blood sugar, leaving you craving MORE

### Complex Carbs

These are your fiber & starches, the SLOWER digesting carbs.



- Long lasting energy
- Found in nutrient dense foods (beans, sweet potato, etc.)
- Provide a sustained source of energy
- AID IN FAT LOSS

@Twanfit

• **Function:**

- Monosaccharides provide cells with a quick burst (short term) of energy.
- Polysaccharides provide cells with more intermediate energy.

• **THINK** → Why do you think people say that WHEAT is better for you than WHITE FLOUR or SUGAR?



Q7. How much energy is released from 1 gram of carbohydrates?

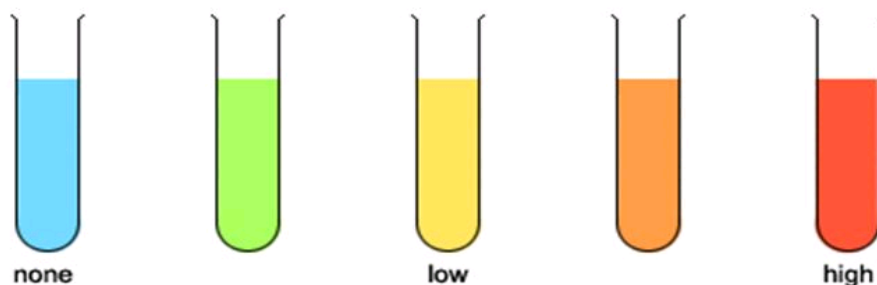
Q8. Which carbohydrate is generally used in respiration?

**Test for Reducing sugars**

All mono and disaccharides are reducing sugars.

•What is a reduction reaction?

Benedict's reagent is an alkaline solution of copper (II) sulphate. When a reducing sugar is heated with Benedict's reagent it donates the electrons changing the colour of the solution.

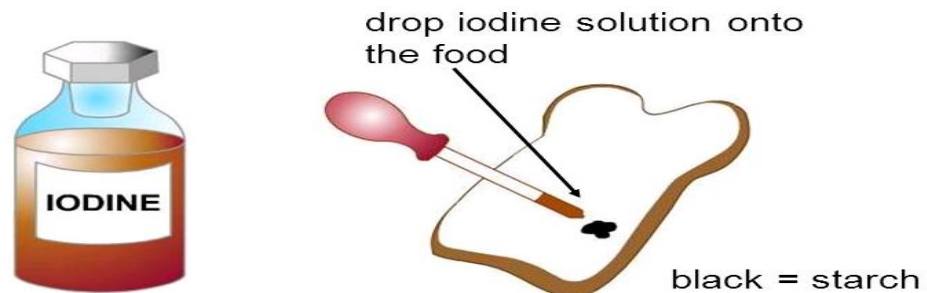


**NOTE :** Link for testing reducing sugars <https://youtu.be/J7qIsbXAmdU>

Q9. Give example of reducing sugars?

We can test foods to find out what chemicals they contain.

- Orangey-brown iodine turns **blue-black** when it reacts with starch.






**NOTE : testing foods for starch** <https://youtu.be/5YMDOX71Tel>

### **HOME ASSIGNMENT**

**Do in- text questions From B3.01 to B3.06 (given on page 24 of course book)**

**Do “End-of-chapter questions” Q1 and 2 (page no. – 32 of course book)**

 Cambridge Assessment International Education		
GRADE: IGCSE YEAR - I	SUBJECT: BIOLOGY (0653)	DATE: 29 <sup>th</sup> June, 20
WORKSHEET NUMBER: 3	UNIT – B-3-BIOMOLECULES WORKSHEET TOPIC(S): B3.03- Fats	
INSTRUCTION (IF ANY ):	Do the questions in notebook.	

**Submission date of home assignment: 1.7.20**

### **CLASS ASSIGNMENT**

#### **KEY TERMS**

- 1) Glycerol
- 2) Fatty acids
- 3) Blubber
- 4) Walruses
- 5) Ethanol emulsion test

## **Lipids: Fats**

- Fats are made up of 2 smaller molecules: *glycerol* and *fatty acids*.
- A fat molecule contains **1 *glycerol*** and **3 *fatty acids***.
- For this reason, fats are called *triglycerides*.

**Q1.** Why are fats called triglycerides?

**Q2.** Give two examples of fat containing food items?



# Functions of Fats

- Supply energy
- Carry certain types of vitamins
- Enhance flavor in foods
- Tenderize meats and baked goods
- Protect organs
- Insulate the body

**Q3.** Why do animals such as walruses have thick layer of fat, called blubber?

**Q4.** How much energy is released from 1 gram of fat?

**Table 10.6: Difference between Fats and Oils**

S.no	Fats	Oils
1	Fat is solid at room temperature	Oil is liquid at room temperature
2	Fat is obtained from animals(i.e) butter, ghee, egg yolk ,meat	Oils are obtained from plant sources (i.e) mustard oil, groundnut oil, almond oil

**Q5.** Where do plants store oil?

## TEST FOR OIL AND FAT

- Place about 1cm<sup>3</sup> of ethanol in a test tube.
- Add a few drops of oil and mix by shaking.
- Add an equal amount of water and shake again.

- Positive Result :

- **A cloudy emulsion forms**

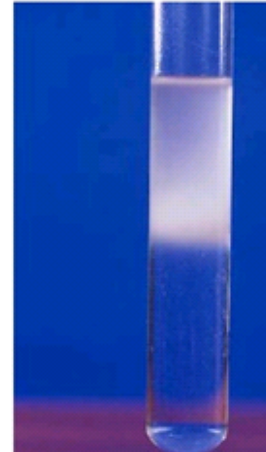
- Negative results:

- **Liquid remains clear**

- Note

*Food with solid fats can be tested*

*by crushing them in ethanol.*



**NOTE – Link for testing foods for fats** <https://youtu.be/Xq6GJvPjUPA>

## Test for lipids

### Ethanol emulsion test

The one on the **left** forms an emulsion. The oil is dispersed within the water.



The tube on the **right** contains oil and water. The oil can be seen floating on the water in the tube on the right.




**Q6.** What happens when oil or fat is added to water?

**Q7.** What happens when oil or fat is added to ethanol (an alcohol)?

**Q8.** What happens when oil, ethanol and water are mixed?

### HOME ASSIGNMENT

**Do in text questions From B3.07 to B3.09 (given on page 26 of course book)**

 Cambridge Assessment International Education	 <i>The Revival of Tradition</i>	
<b>GRADE: IGCSE YEAR - I</b>	<b>SUBJECT: BIOLOGY (0653)</b>	<b>DATE: 9.7.2020</b>
<b>REVISION TEST-II</b>	<b>UNIT – B-3-BIOMOLECULES</b> <b>TOPIC- CARBOHYDRATES, FATS AND PROTEINS</b>	
<b>INSTRUCTION (IF ANY ):</b>	<b>Time : 30 mins    MM: 35</b>	

**PAPER-I**

**MCQ [10x1=10 Marks]**

- 1) The physical state of fat at room temperature is
  - a) Solid
  - b) Liquid
  - c) Gas
  - d) Plasma
  
- 2) Which of the following acts as thermal insulators in mammals?
  - a) Skin
  - b) Fat
  - c) Lipids
  - d) Proteins
  
- 3) If a lipid is liquefied at room temperature, it is called
  - a) Fat
  - b) Oil
  - c) Proteins
  - d) Ghee
  
- 4) The building blocks of lipids are
  - a) Fats
  - b) Oils
  - c) Proteins
  - d) Fatty acids
  
- 5) Enzymes are used in digestion to break down larger molecules into smaller molecules. Which row matches the large molecules with the small molecules they are broken down into?

	large molecules	small molecules
A	fat	glycerol and fatty acids
B	glycogen	glycerol and amino acids
C	protein	simple sugars
D	starch	amino acids



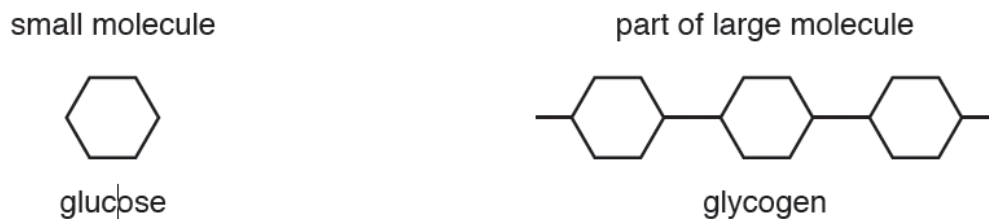
- 6) Ethanol emulsion test is used to test for the presence of
- A Proteins
  - B Fats and oils
  - C monosaccharide
  - D polysaccharides
- 7) Which of the following is NOT one of the four main elements of an amino acid?
- a) Hydrogen
  - b) Carbon
  - c) Nitrogen
  - d) Calcium
  - e) Oxygen
- 8) How many different kinds of amino acids are in our bodies?
- a) 4
  - b) 12
  - c) 20
  - d) 180
- 9) Proteins are made up of:
- a) Short strands of RNA
  - b) Short strands of amino acids
  - c) Long chains of RNA
  - d) Long chains of amino acids
- 10) Tests were performed on four samples of food. The results are shown in the table.

Which food contains protein **only**?

	results of food tests		
	Benedict's test	biuret test	iodine test
<b>A</b>	blue	blue	blue/black
<b>B</b>	blue	purple	brown
<b>C</b>	red	blue	blue/black
<b>D</b>	red	purple	brown

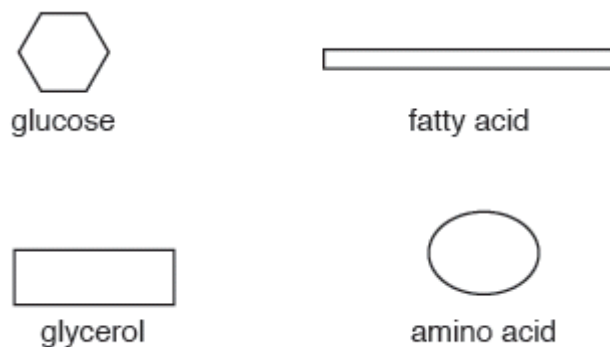
**PAPER-II**

Q1. Most large molecules in living organisms are made by joining many smaller molecules together. An example of this is glycogen which is made from glucose molecules. A short length of glycogen is shown in Fig. 1.1.



**Fig. 1.1**

Some of the small molecules that join together to make large molecules in living organisms are shown in Fig. 1.2.



**Fig. 1.2**

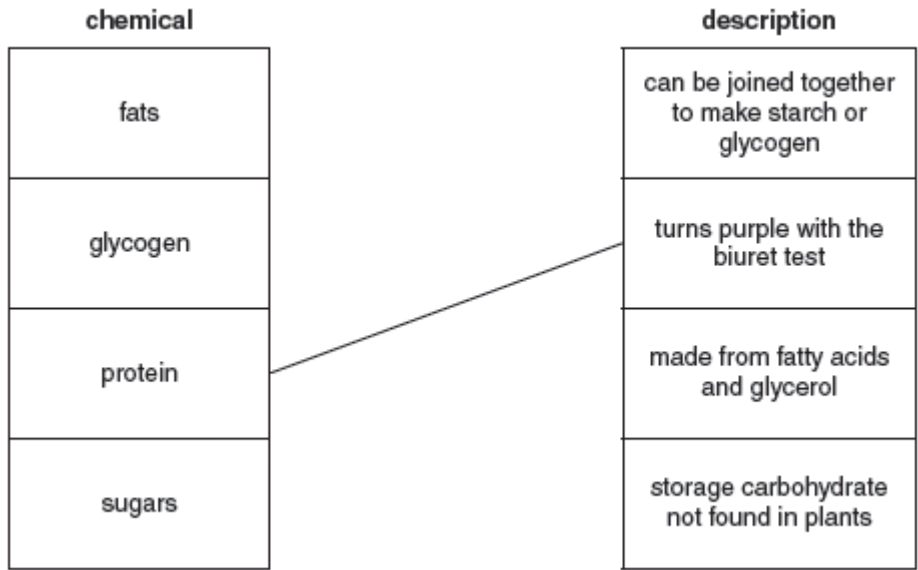
Select molecules from Fig. 1.2 and make drawings in Table 1.1 to show how protein and starch are made up. Your diagrams should be similar to Fig. 1.1.

**Table 1.1**

large molecule	small molecule	part of large molecule
protein		
starch		

[4]

Q2) Use lines to connect the boxes on the left with the correct boxes on the right.  
Use each description **once** only. One line has been drawn for you.



[2]

Q3. A student investigates the nutrient content of three solutions, **A**, **B** and **C**.  
He tests **A**, **B** and **C separately** with Benedict's solution, biuret solution and iodine solution.

(a) Name the test solution which requires him to use a hot water-bath.

..... [1]

(b) His results are shown in Table 3.1.

**Table 3.1**

solution	observation with Benedict's solution	observation with biuret solution	observation with iodine solution
<b>A</b>	blue	purple	blue-black
<b>B</b>	green	blue	Brown
<b>C</b>	blue	blue	blue-black

Use Table 3.1 to state the nutrients present in each of solutions **A**, **B** and **C**.

solution **A** contains

.....

solution **B** contains

.....

solution **C** contains

.....[3]

- (c) State **and** explain **one** safety precaution that the student should use when carrying out these tests.

safety precaution .....

explanation .....[1]

- (d) Describe a method used to test a liquid for the presence of fats. Include the observation for a positive result.

Method.....

.....

observation for a positive result .....[2]

- (e) Another student carries out an experiment on two different solutions using Benedict's solution.

This allows her to compare the concentration of the nutrient tested for in each solution.

- (i) State **two** variables which need to be controlled in this experiment.

variable 1 .....

variable 2 .....[2]

- (ii) Explain how the results will allow the concentrations of the nutrient in the two solutions to be compared.

.....

.....[2]

- Q4) A student investigates the nutrient content of two solutions, **A** and **B**.

- He pours some of solution **A** into each of three test-tubes.
- He adds Benedict's solution to one test-tube, mixes well and places it in a hot water-bath for a few minutes.
- He adds biuret solution to another test-tube and mixes well.
- He adds a few drops of iodine solution to the other test-tube and mixes well.

He repeats the procedure above for solution **B**.

- (a) Complete the second row of Table 4.1 to show which nutrient each test identifies

- (b) Solution **A** gives a positive result with Benedict's solution and iodine solution.

Solution **B** gives a positive result with biuret solution and iodine solution.

**All other observations are negative.**

Complete the third and fourth rows of Table 4.1 to show the student's observations for solutions **A** and **B**.

[3]

**Table 4.1**

reagent	Benedict's solution	biuret solution	iodine solution
nutrient tested for			
colour obtained with solution <b>A</b>			
colour obtained with solution <b>B</b>			

(C) State and explain a safety precaution the student should have taken when carrying out his experiment.




.....[ 2]

(d) Describe how you would test for the presence of fat in cooking oil.

You should include the following in your answer:

- what you would do
- the reagents you would use
- any safety precautions you would take
- the observations you would make that indicate the presence of fat.

.....  
.....  
.....  
.....  
.....[3]

 Cambridge Assessment International Education		
<b>GRADE: IGCSE YEAR - I</b>	<b>SUBJECT: BIOLOGY (0653)</b>	<b>DATE: 6.7.20</b>
<b>WORKSHEET NUMBER: 4</b>	<b>UNIT – B-3-BIOMOLECULES</b> <b>WORKSHEET TOPIC(S): B3.04 - Proteins</b>	
<b>INSTRUCTION (IF ANY):</b>	<b>Do the questions in notebook.</b>	

**Submission date of home assignment – 7.7.20**

### **CLASS ASSIGNMENT**

#### **KEY TERMS**

- 1) Proteins
- 2) Haemoglobin
- 3) Enzyme
- 4) Biuret test

## **What are Proteins?**

**Proteins:** large complex molecules composed of amino acids.

- Contain carbon, hydrogen, oxygen, **nitrogen**
- Primary source of **nitrogen** in our diets
- 20 different amino acids are used to make proteins
- Essential component of the body cells, tissues and fluids.
- Building blocks of muscle, bone, skin, hair, and virtually every other body part or tissue.

# Proteins

Proteins are very important in your body.

They are made up of long chains of **amino acids**.



**Q1.** What do you mean by monomer and polymer?

## Biuret Reagent



The reagent used in the Biuret Test is a solution of copper sulfate ( $\text{CuSO}_4$ ) and sodium hydroxide ( $\text{NaOH}$ ). The  $\text{NaOH}$  is there to raise the pH of the solution ...




**NOTE – LINK for testing proteins** <https://youtu.be/Dzqu2tNRTxQ>

**Q2.** Which test tube is showing positive result?

### HOME ASSIGNMENT

**Do in text questions From B3.10 to B3.14 (given on page 26 of course book)**

**Do “End-of-chapter questions” Q3 (page no. 32 of course book)**

 <p>Cambridge Assessment International Education</p>		
<b>GRADE: IGCSE YEAR - I</b>	<b>SUBJECT: BIOLOGY (0653)</b>	<b>DATE: 13.7.2020</b>
<b>WORKSHEET NUMBER: 5</b>	<b>UNIT – B-3-BIOMOLECULES</b> <b>WORKSHEET TOPIC(S): B3.05- Enzymes</b>	
<b>INSTRUCTION (IF ANY ):</b>	<b>Do the questions in notebook.</b>	

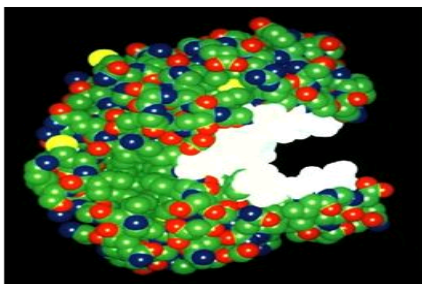
**Submission date of home assignment 14.7.20**

## **CLASS ASSIGNMENT**

### **KEY TERMS**

1. Catalyst
2. Amylase
3. Protease
4. Catalase
5. Carbohydrase
6. Lipase
7. Substrate
8. Product
9. Active site
10. Denatured
11. Optimum temperature

## **1. What are enzymes?**



1. Enzymes are found in all living cells.
2. Enzymes are made of protein.
3. Enzymes are Biological Catalysts
4. Enzymes speed up reactions
5. Enzymes are unchanged by the reaction

**Q1. Define enzyme in one statement.**



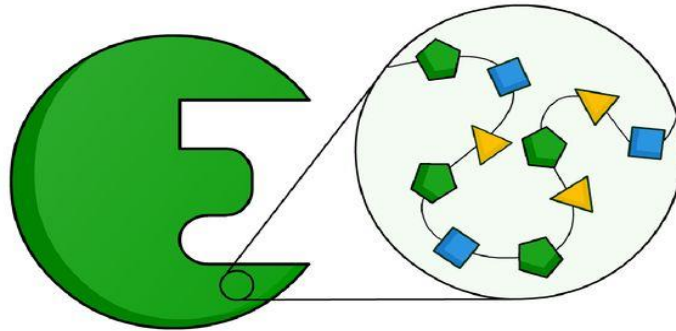
Q2. What is the role of enzymes?

## What are enzymes made of?



Enzymes are protein molecules, and so are made up of **amino acids**. Most enzymes contain between 100 and 1,000 amino acids.

These amino acids are joined together in a long chain, which is folded to produce a unique 3D structure.



Different types of enzymes have different shapes and functions because the sequence and type of amino acids in their structure is different.



4 of 23

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Q3. What are enzymes made up of?

## Name of Enzymes

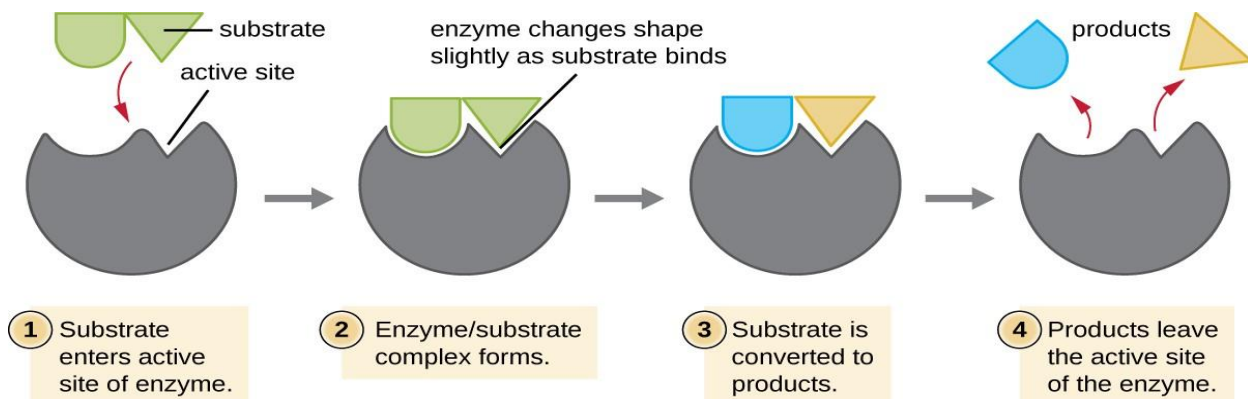
- **End in *-ase***
- **Identifies a reacting substance**
  - sucrase** – reacts with sucrose
  - lipase** - reacts with lipid
- **Describes function of enzyme**
  - oxidase** – catalyzes oxidation
  - hydrolase** – catalyzes hydrolysis
- **Common names of digestion enzymes still use *-in***
  - pepsin, trypsin**

3

Q4. Name the enzyme that reacts with proteins.

Q5. Describe the function of enzyme catalase?

# How Enzymes Work



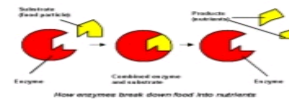
**NOTE :** Link for “How enzyme works” <https://youtu.be/XTUm-75-PL4>

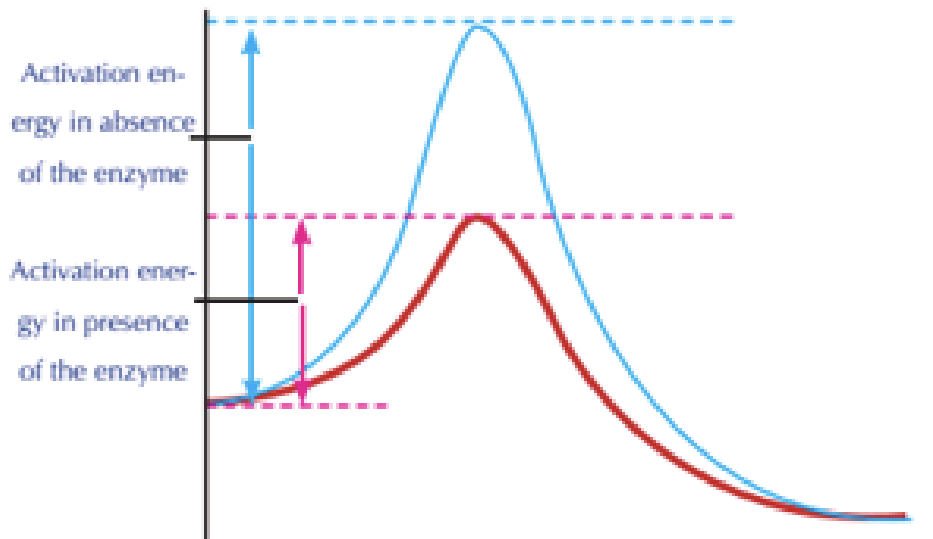
**Q6.** Can enzymes be reused?

**Q7.** What do you mean by lock and key mechanism in terms of enzymes and substrates?

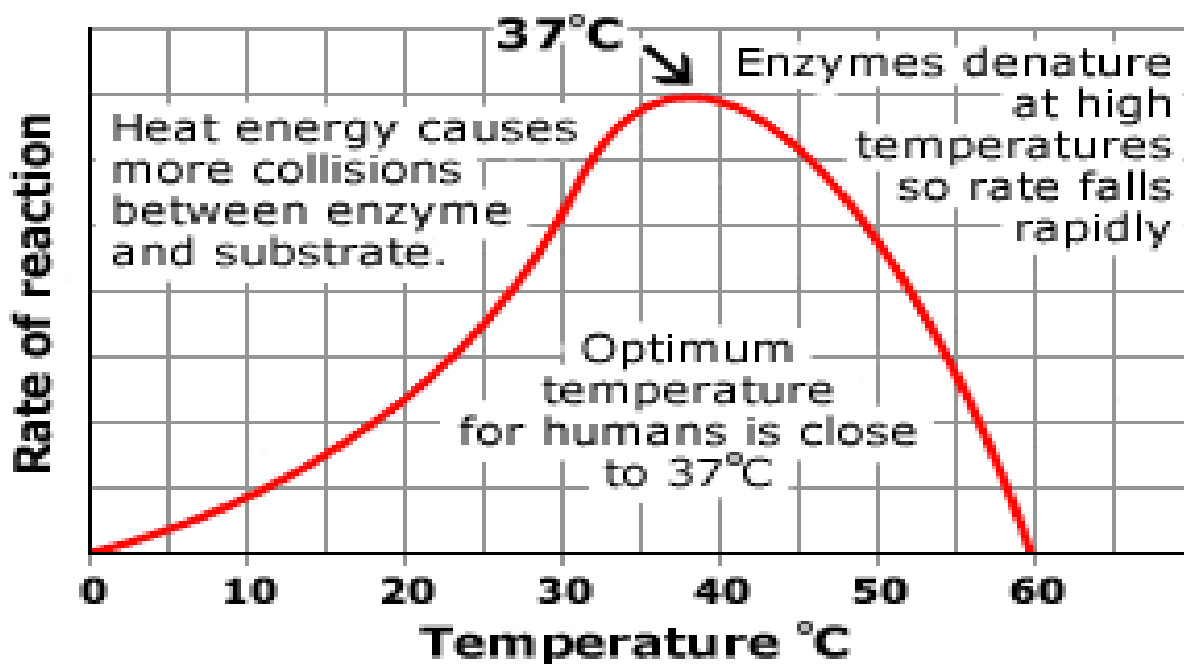
## Properties of Enzymes

1. Speeds up chemical reaction
2. Required in small amounts
3. Specific in action
4. Affected by temperature
5. Affected by pH
6. Catalyse reversible reactions



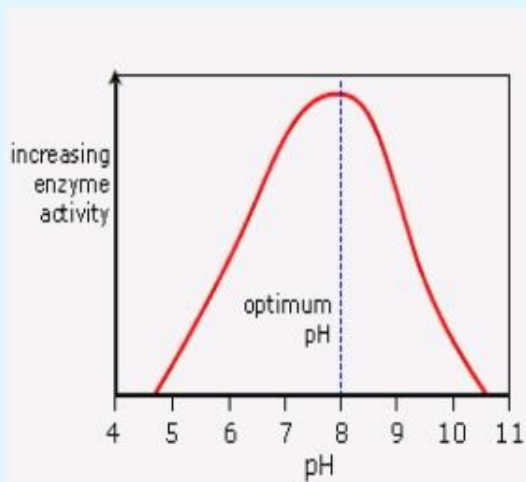


**Q8 How enzymes speed up the chemical reactions?**



**Q9. How temperature affects enzymatic activity?**

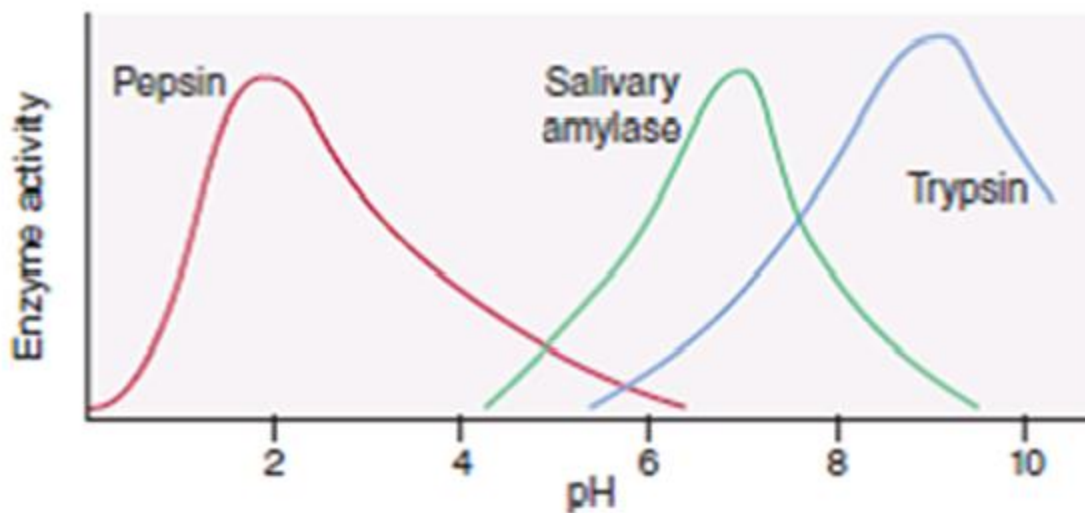
## Effect of pH on enzyme activity



- Hydrogen ion concentration also have an influence on enzyme activity.
- For most enzymes, the effective pH range is 4.0-9.0.
- Beyond these limits, denaturation of enzymes take place.
- Optimum pH for pepsin is 2.0 and for trypsin 8.0

**Q10. How pH affect enzymatic activity?**

**Q11. What do you mean by denaturation?**






**Q12 Which enzymes would be most active in the stomach? Explain.**

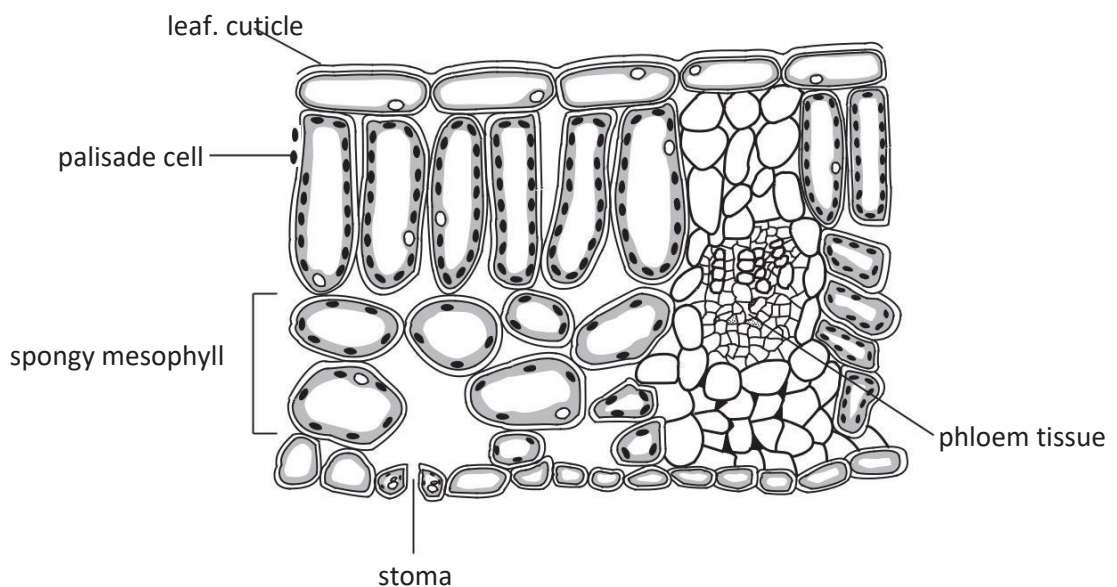
### HOME ASSIGNMENT

**Do in text questions From B3.15 to B3.18 (given on page 28 of course book)**

**Do "End of chapter questions" from Q 4 to 9 (page 32 of course book)**

 <b>Cambridge Assessment International Education</b>	 <b>SANSKAR SCHOOL</b> <i>The Revival of Tradition</i>	
<b>GRADE:IGCSE YEAR 1</b>	<b>SUBJECT:BIOLOGY</b>	<b>DATE: 7 AUGUST 2020</b>
<b>WORKSHEET NUMBER:1</b>	<b>WORKSHEET TOPIC: PLANT NUTRITION</b>	
<b>INSTRUCTION (IF ANY ):</b>	<b>DO THE ANSWERS IN YOUR NOTEBOOK</b>	

1 (a) Fig. 1.1 shows a section through a



**Fig. 1.1**

(b) Xylem vessels transport water into the leaf. State two other functions of xylem vessels.

(c) Some of the glucose made in the leaf is changed into another compound and stored by the plant.

Name this other compound.

(d) The mesophyll cells and stomata of the leaf are involved in




*transpiration*. Describe the process of *transpiration*. Use the terms

*mesophyll cells* and *stomata* in your answer.




(e) On Fig. 1.2 draw **one** straight line between **each** structure and the function it carries out.

structure	function
cuticle	allows gaseous exchange with surroundings
stoma	allows diffusion of gases within the leaf
palisade cell	waterproofs the leaf
phloem tissue	transports sucrose out of the leaf
spongy mesophyll	produces glucose

2. Outline the environmental effects of an increase in carbon dioxide in the atmosphere as a result of burning forest. [4]
3. (a) Write the complete balanced equation for photosynthesis. [1]
- (b) Describe the role of chlorophyll in the production of glucose during photosynthesis. [2]
- (c) Many glucose molecules may be joined together to form starch. State the function of starch in plants. [1]
- (d) Name one other large molecule made from many glucose molecules joined together. [1]

 <b>Cambridge Assessment International Education</b>		
<b>GRADE:IGCSE YEAR 1</b>	<b>SUBJECT:BIOLOGY</b>	<b>DATE: 14 AUGUST 2020</b>
<b>WORKSHEET NUMBER:2</b>	<b>WORKSHEET TOPIC: PLANT NUTRITION</b>	
<b>INSTRUCTION (IF ANY ):</b>	<b>DO THE ANSWERS IN YOUR NOTEBOOK</b>	

1. What are the raw materials needed for photosynthesis.
2. What percentage of the air is carbon dioxide?
3. How does carbon dioxide get into a leaf?
4. Give two reasons why the large surface area of leaves is advantageous to leaf.
5. Leaves are thin. What purpose does this serve?
6. Why is glucose not very good for storage in leaf?
7. Explain why a plant that does not get enough nitrate ions has weak growth.
8. How do parts of the plant such as roots, which cannot photosynthesise, obtain food?

 <b>Cambridge Assessment International Education</b>		
<b>GRADE:IGCSE YEAR 1</b>	<b>SUBJECT: BIOLOGY</b>	<b>DATE: 17 AUGUST 2020</b>
<b>WORKSHEET NUMBER:3</b>	<b>WORKSHEET TOPIC: PLANT NUTRITION</b>	
<b>INSTRUCTION (IF ANY ):</b>	<b>DO THE ANSWERS IN YOUR NOTEBOOK</b>	

End of chapter questions  
Chapter B4  
Pg 46 : Science course book