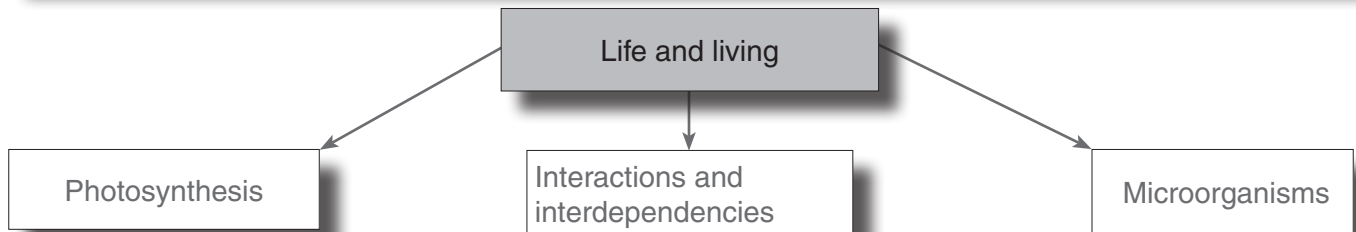
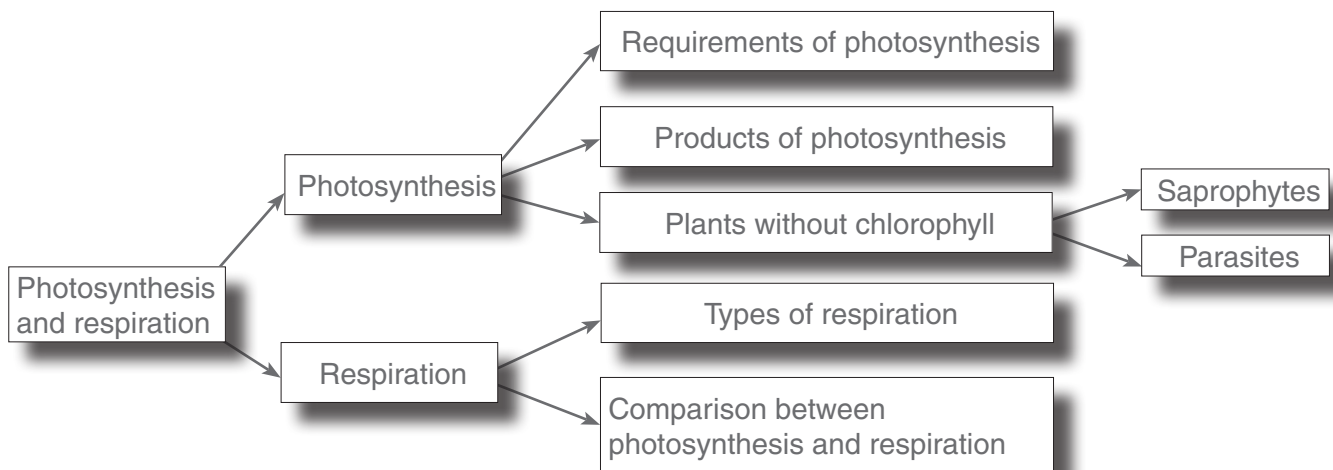




TERM 1: LIFE AND LIVING



UNIT 1 PHOTOSYNTHESIS AND RESPIRATION



1.1 Introduction

All living organisms require energy to survive.

The interactions and interdependence between organisms in ecosystems are driven by the need for energy.

This is why photosynthesis and respiration play a big role in the survival of most organisms.

It is the two most important processes conducted by living organisms to obtain usable energy.

The sun is one of the most important sources of energy, and supplies energy in the form of light and heat.

Most plants photosynthesise, while animals must satisfy their energy needs by the process of respiration.

1.2 Photosynthesis





The process by which plants (and some microorganisms) produce food is known as photosynthesis (photo = light; synthesis = to make).

Photosynthesis is the process whereby plants use carbon dioxide, water and light energy in a series of chemical reactions to produce glucose (food).



1.2.1 Requirements

What do plants need to photosynthesise?

<p>Light energy</p> 	<p>Light energy is provided by the sun.</p>
<p>Carbon dioxide</p> 	<p>Plants obtain carbon dioxide (CO₂) from the atmosphere.</p>
<p>Water</p> 	<p>Plants obtain water from the ground.</p>
<p>Chlorophyll</p> 	<p>Green plants contain the pigment chlorophyll.</p>

Activity 1

Date:

Do further research and write a short report on the requirements for photosynthesis, as well as the products that are produced during photosynthesis.



Quick facts

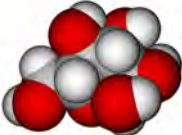

Only green plants contain chlorophyll. The pigment makes it possible for plants to absorb light energy and convert it to chemical energy. Chlorophyll gives plants their green colour. Not all wavelengths of energy radiated by the sun are absorbed by plants.

Interesting facts

Chlorophyll is green because it absorbs all light from the sun, but reflects the green light.

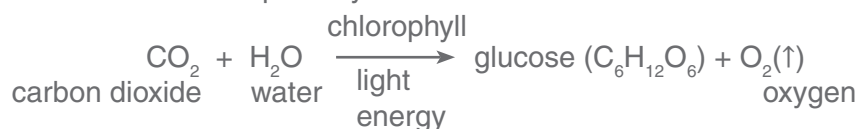
1.2.2 Products of photosynthesis

What do plants produce as a result of photosynthesis?

Glucose 	Glucose (a simplified form of sugar) is produced by plants.
Oxygen 	Oxygen (O ₂) is produced as a by-product, and plants release it into the atmosphere.

Photosynthesis occurs through a series of chemical reactions.

The simplified chemical reaction for photosynthesis is as follows:

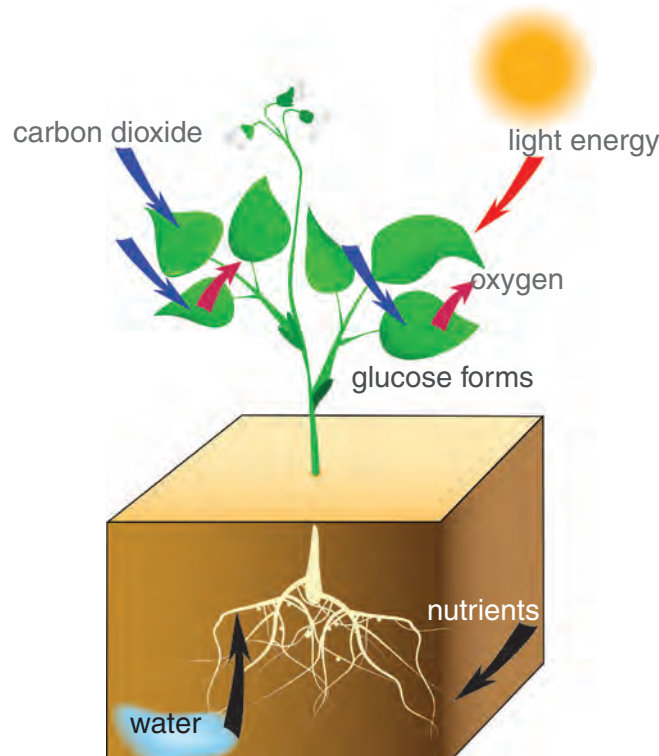


Quick facts

The arrow (↑) in the equation means that O₂ is a gas.



The diagram below is a simple representation of photosynthesis:



Plants absorb carbon dioxide and release oxygen b.m.o. a process known as gaseous exchange. Gaseous exchange is the absorption and emission of gases. This happens through the stomata which are found mainly on the leaves of plants. However, stomata can also be found on other parts of the plant that are above ground, e.g. the stems. Water is absorbed from the ground through the root hairs of the plant.

Plants use glucose to respire.

The energy that is released during respiration is used for the following life processes:

- Propagation
- Cell division
- Growth
- Other life processes

Some glucose is converted into cellulose which forms cell walls. Excess glucose is stored as starch. Stored starch in plants serves as a food source for other living organisms.



Quick facts

Starch is insoluble in water, which is why plants store glucose in this form.

Green plants are autotrophs.

Autotrophic means that plants have the ability to produce their own food.



Quick facts

Green plants are the only organisms that can convert energy from the sun, into organic food.
This is why plants are known as producers.

Plants that do not contain chlorophyll must use other ways to obtain food. Here we can distinguish between saprophytic plants and parasitic plants.

Saprophytes

Saprophytes are plants that survive on dead organic tissue, e.g. sugarcane, Indian pipe and certain orchids.



Photos: Derrick Ditchburn, Victoria, Canada

Parasites

Parasitic plants live on living organic tissue, and obtain all its nutrients from the host. Later in the term we will study parasites in more detail. The host is harmed in the relationship. Examples of parasitic plants are dodder and mistletoe.

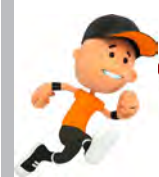


Practical investigation 1

Date:

Aim: To prove that green plants produce starch when exposed to sunlight.

Investigative question:



Quick facts

An investigative question always has a question mark. The answer may not be only "yes" or "no". Tip: Start question with "How?".