

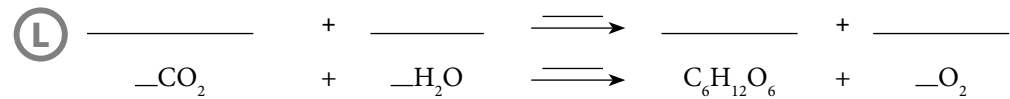
Chapter 8: Photosynthesis

Knowledge organiser

Photosynthetic reaction

Photosynthesis is a chemical reaction in which energy is transferred from the environment as _____ from the Sun to the _____ of a plant. This is an _____ reaction.

Chlorophyll, the green pigment in _____ in the leaves, _____ the light energy. Leaves are well-adapted to _____ the rate of photosynthesis when needed.



Rate of photosynthesis

A _____ is anything that limits the rate of a reaction when it is in short supply.

The limiting factors for photosynthesis are

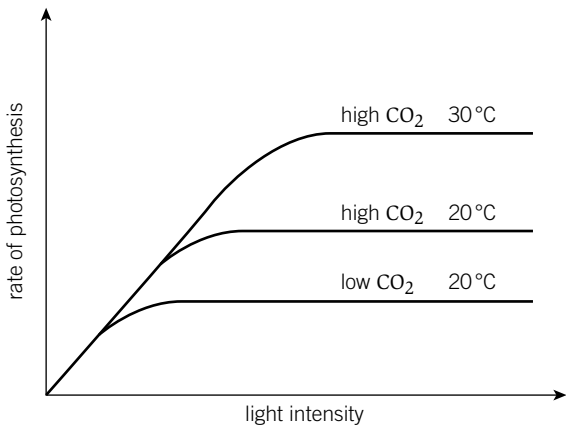
- _____
- _____

Less chlorophyll in the leaves _____ the rate of photosynthesis. More chlorophyll may be produced by plants in well-lit areas to _____ the photosynthesis rate.

Interaction of limiting factors (HT only)

Limiting factors often interact, and any one may be limiting photosynthesis.

For example, on the graph the _____ curve has both carbon dioxide and temperature limiting photosynthesis. _____ is limiting for the middle curve, and the highest curve shows photosynthesis rate increases when both _____ and _____ are increased until another factor becomes limiting.



Inverse square law (HT only)

As the distance of a light source from a plant _____, the light intensity _____ – this is called an inverse relationship. This relationship is not _____, as light intensity varies in inverse proportion to the square of the distance:

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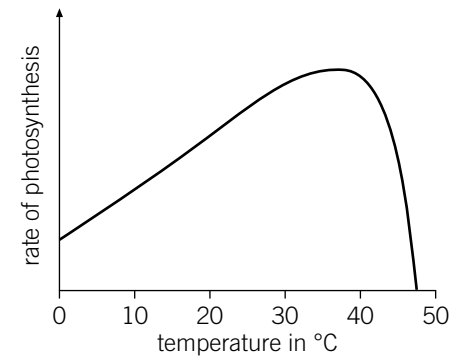
 ∝ _____

For example, if you _____ the distance between a light source and a plant, light intensity falls by three-quarters.

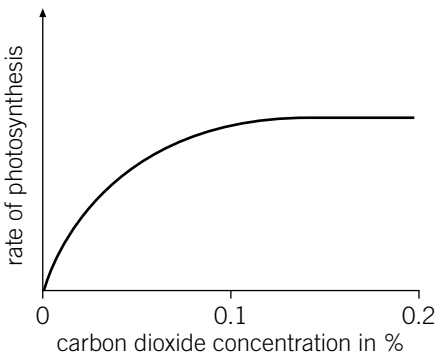
Greenhouse economics

Commercial greenhouses _____ limiting factors to get the highest possible rates of _____ so they can grow plants as quickly as possible or produce the highest _____, whilst still making a profit.

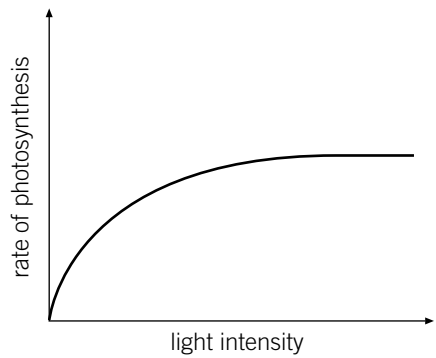
Limiting factors and photosynthesis rate (HT only)



- At low temperatures the rate of photosynthesis is _____ because the reactant molecules have less _____ energy.
- Photosynthesis is an enzyme-controlled reaction, so at high temperatures the enzymes are _____ and the rate quickly _____.

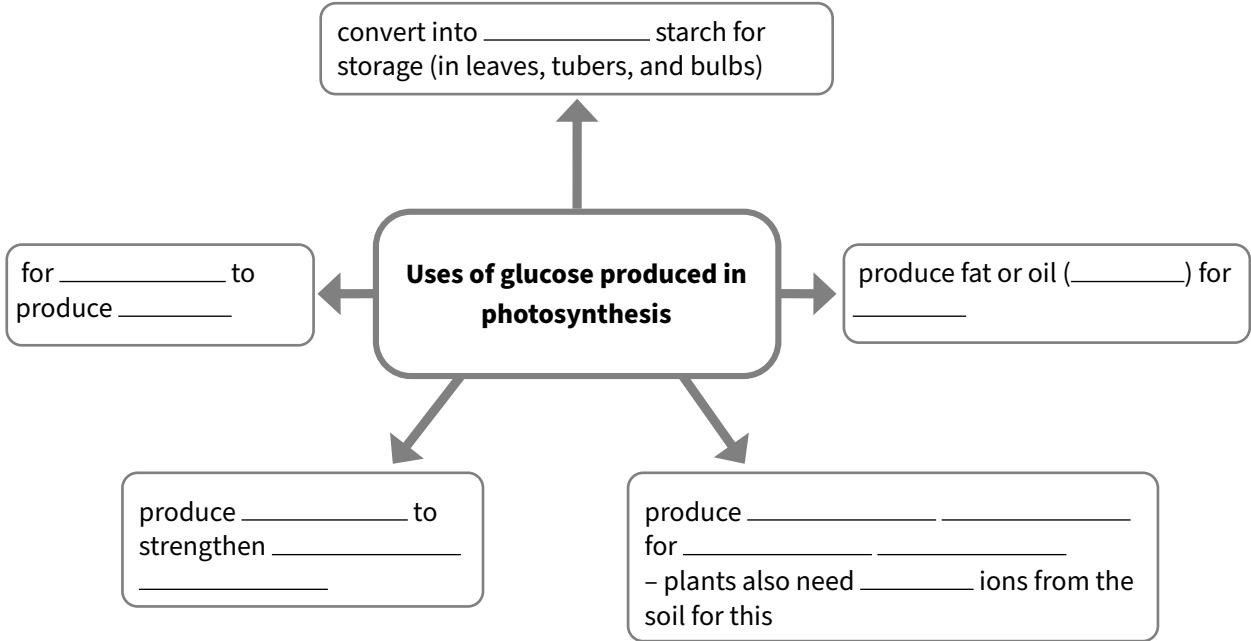


- _____ is used up in photosynthesis, so increasing carbon dioxide concentration _____ the rate of photosynthesis.
- At a certain point, another factor becomes _____.
- Carbon dioxide is often the limiting factor for photosynthesis.



- Light energy is needed for photosynthesis, so increasing _____ increases the rate of photosynthesis.
- At a certain point, another factor becomes limiting.
- Photosynthesis will _____ if there is little or no light.

Uses of glucose



Key terms

Make sure you can write a definition for these key terms.

carbon dioxidechlorophyllchloroplastconcentrationendothermicglucosegreenhouse gaseslight intensityinverse square lawlimiting factorphotosynthesisprotein synthesis

Chapter 8: Photosynthesis

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

B8 questions		Answers
1	Where does photosynthesis occur?	
2	What is the name of the green pigment in the leaves?	
3	What type of reaction is photosynthesis?	
4	What type of energy is used in photosynthesis?	
5	Give the word equation for photosynthesis.	
6	Give the balanced symbol equation for photosynthesis.	
7	Define the term limiting factor.	
8	Give the limiting factors of photosynthesis.	<ul style="list-style-type: none">••••
9	Describe how light intensity affects the rate of photosynthesis.	
10	Describe how carbon dioxide concentration affects the rate of photosynthesis.	
11	Describe how temperature affects the rate of photosynthesis.	
12	Give the equation for the inverse square law for light intensity.	
13	Why are limiting factors important in the economics of growing plants in greenhouses?	
14	How do plants use the glucose produced in photosynthesis?	<ul style="list-style-type: none">•••••