

Specification points to cover:

the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis **to build organic molecules that are an essential energy store** and to maintain levels of oxygen and carbon dioxide in the atmosphere

Conversion of glucose into starch for storage, amino acids (with nitrates from soil) for protein synthesis, lipids for storage in seeds, sugars such as fructose in fruit, and cellulose for cell walls.

Key teaching points:

Recall photosynthesis equation

Students explain the process (link to extended writing last lesson)

List uses of glucose and the importance of each molecule for the plant – can be an information extraction activity

Test leaf for starch – can be demo or class practical

Link with a healthy balanced diet – all herbivores get every nutrient they need from plants

Practical/skills points to cover:

How to set out a word equation

Testing leaf for starch – use kettles rather than bunsens due to ethanol

Title: Uses of glucose

Date: 19/11/2020

Underline
date and
title!

DO NOW:

Name the 4 limiting factors in photosynthesis

- 1)
- 2)
- 3)
- 4)

B
E

P
R
O
U
D

Challenge: 5) Give an example of a viral disease



STOCKSBRIDGE
HIGH SCHOOL
— This is Just the Start —

Self assess using green pen!

1 Carbon dioxide concentration

2 Light levels

3 Temperature

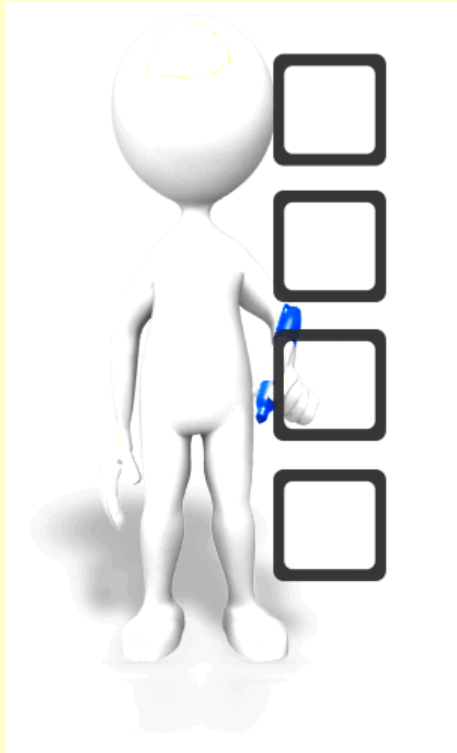
4 Amount of chlorophyll

5 HIV

Learning Intent

What do plants use glucose for?

Success Criteria



Name different ways that plants use glucose.

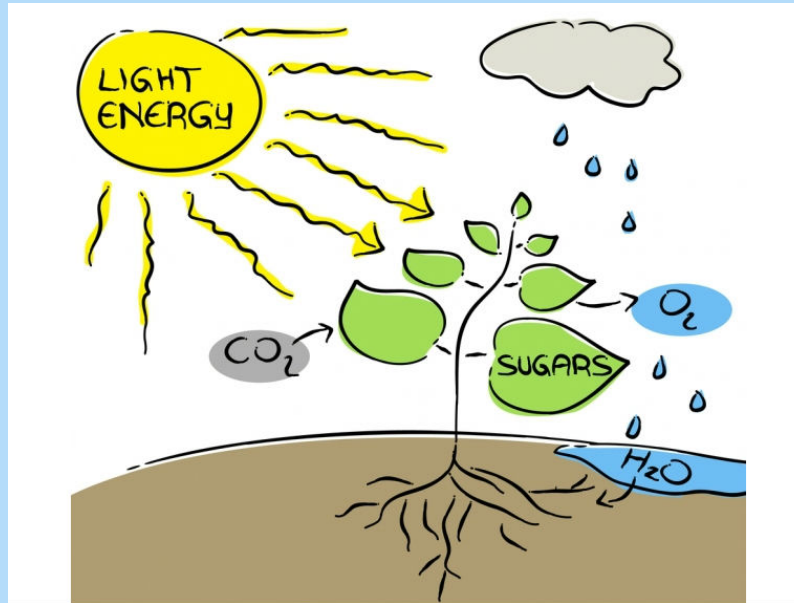
Describe how we can detect starch in leaves

Explain why it is important for plants to change glucose into substances such as starch and lipids.

Where does the energy come from?

We know that energy can not be created or destroyed, it is merely transferred from one form to another.

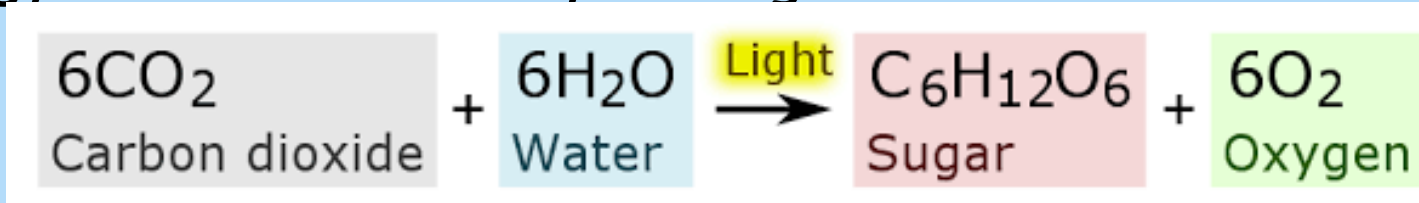
So where does all the energy come from?



Where does the energy come from?

There is relatively little energy within the reactants, however there is greater energy in the products.

Energy is transferred by the light.



This energy is used to power the reaction. It breaks apart the chemical bonds in the reactants and re-forms them with some extra energy stored in the bonds of the products.

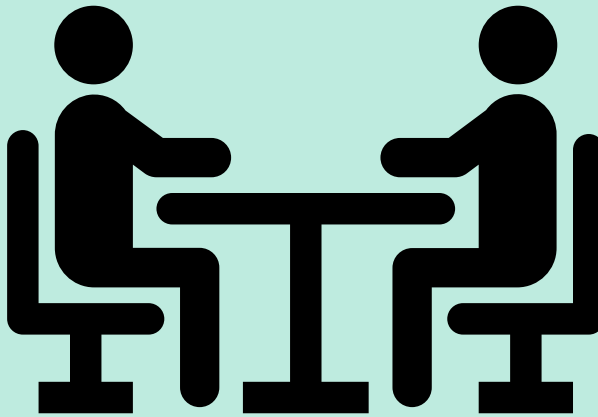
It is this extra energy that supports almost all life on Earth.

What do plants do with all their glucose?

Success criteria:



Think for 1 minute in silence.



Work as a pair to discuss your ideas.



Share your ideas with the class

Keywords:

The wonderful world of glucose...



Task

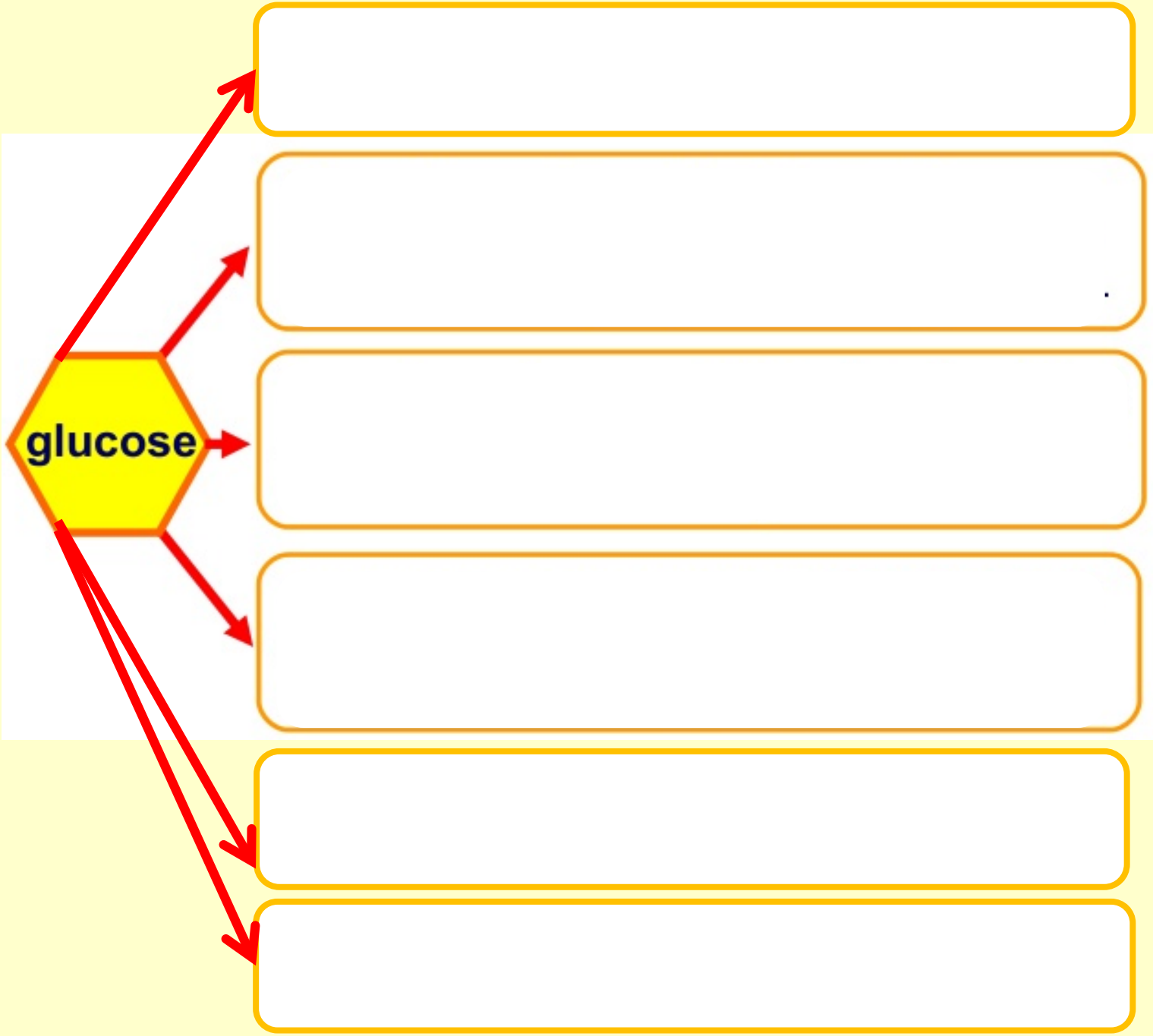
Produce a mind map in your books of how plants use glucose.

Support: Work sheets around the room!

Extra challenge: How do plants store glucose and why?



What do plants use glucose
for?



RESPIRATION



Plants use some of the glucose they produce for respiration.

This chemical reaction releases energy which allows them to convert the rest of the glucose into other useful substances which they can use to build new cells and grow.

To produce some of these substances they also need to gather a few minerals from the soil.

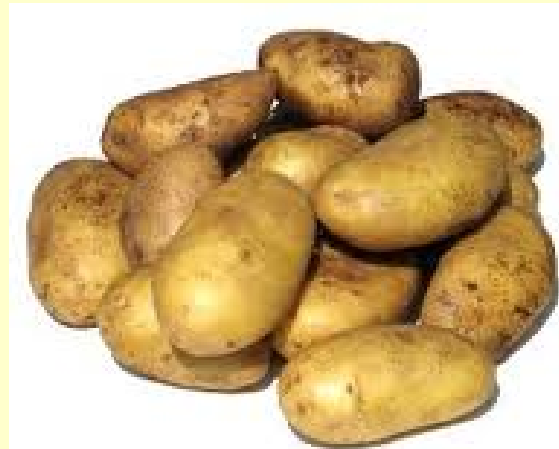
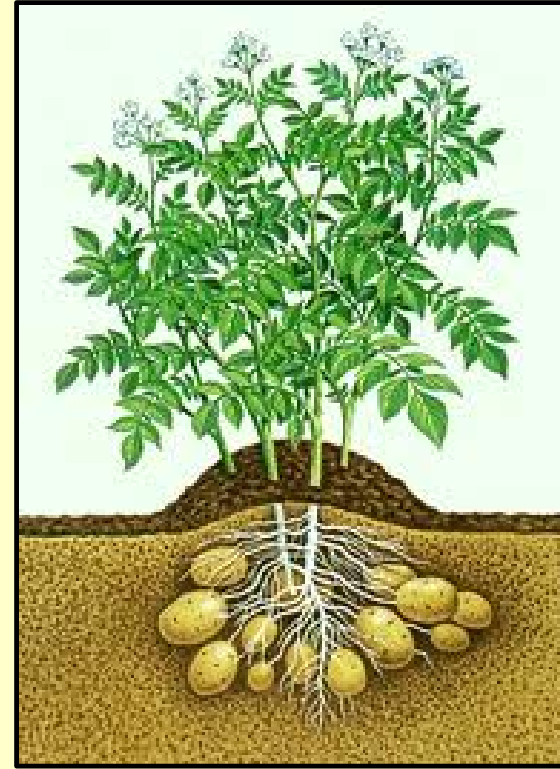


STORAGE

Glucose is converted into starch for storage.

This starch can then be stored in roots, leaves and stems .

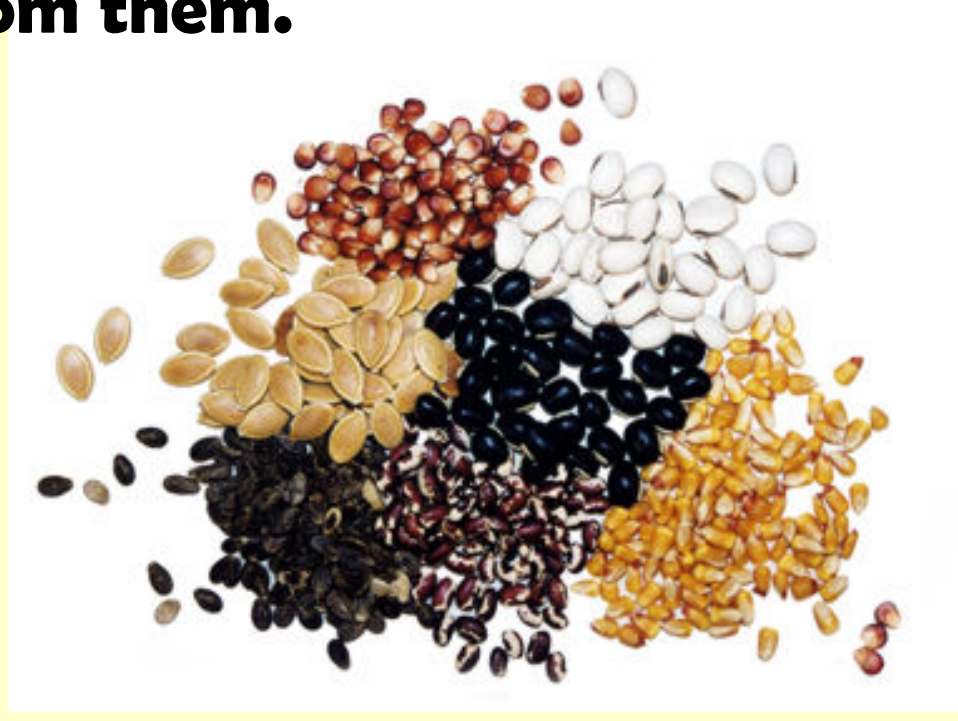
Potato and carrot plants store a lot of starch underground over the winter so a new plant can grow from it the following spring – we are eating the swollen storage organs.



SEEDS

Glucose is turned into fats and oils for storing in seeds. Seeds also store starch.

Sunflower seeds, for example contain a lot of oil – we get oil and margarine from them.





FRUIT

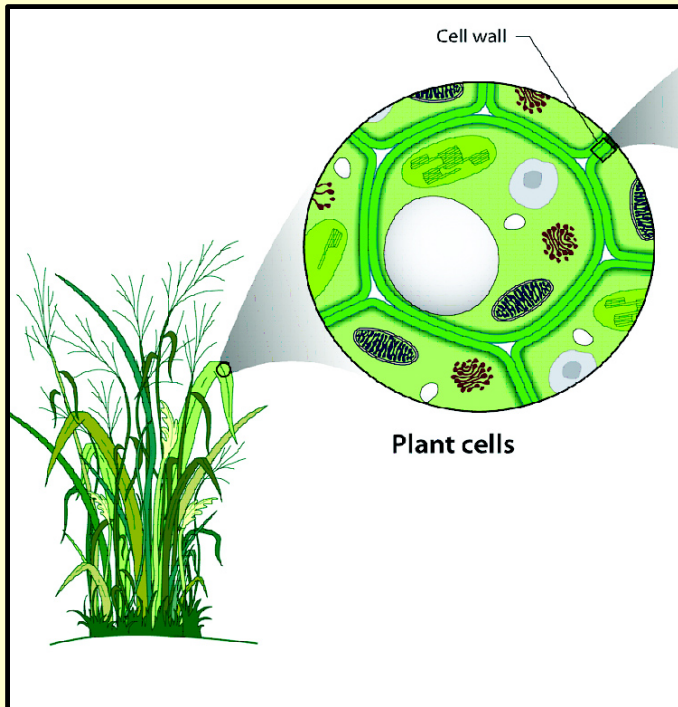
Glucose, along with another sugar called **fructose**, is turned into **sucrose** for storing in fruits.

Fruits **deliberately** taste nice so that animals will **eat** them and **spread** the **seeds** all over the place in their poo.



CELLULOSE

Glucose is converted into cellulose for making cell walls, especially in a rapidly growing plant.
The cell wall is the tough layer that surrounds plant cells.



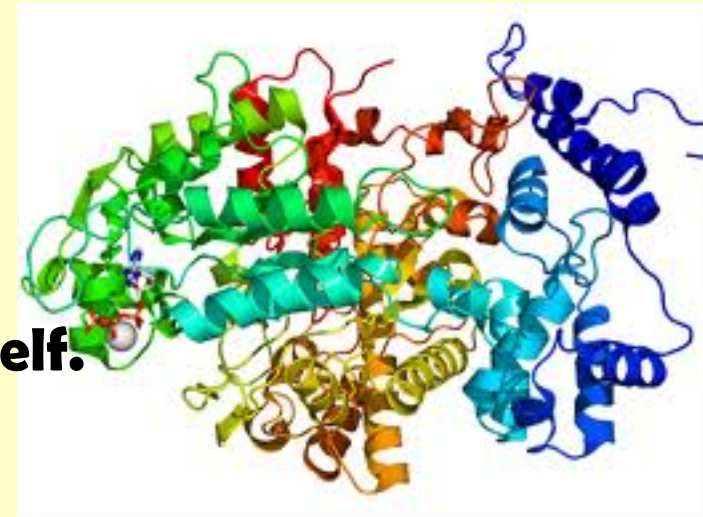
It is located outside the cell membrane and provides cells with structural support and protection.

They allow plants to grow tall without any other support.

PROTEIN SYNTHESIS

Glucose is combined with nitrates (collected from the soil) to make proteins.

Protein is the building blocks of life itself.



Nuts and seeds always contain large amounts of protein, as they need to sustain the plant in its first few days of 'life'.

Starch

Starch is a way for plants to store glucose.

Discuss... how could we test for starch?

Testing for starch- Iodine test

- **Iodine** tests for starch - it turns **blue**/black in the presence of starch
- If a plant photosynthesises a lot, then there should be more starch present (as more glucose would have been made and converted into starch).

Testing for starch



Variables- answer in full sentences...

1. What was the independent variable?

What did they change?

2. What was the dependent variable?

What did they measure?

3. What were the control variables?

What did they keep the same?

Complete the sentences...

We use _____ to test for starch.

In a positive starch test , the _____
turns from brown to _____/_____.

Escape the room!

What solution do we use to test for starch? 1pt	Recall the equation for photosynthesis 3pts	Recall the equation for respiration 3pts	Name 3 limiting factors of photosynthesis? 2pts
Can you name 3 glucose stores? 2pts	What is the name of the variable you change ? 1pt	What colour does iodine turn in the presence of starch? 1pt	Name the two types of sampling? 2pts
What is the name of the variable you measure? 1pt	Name the 3 organelles only found in plant cells ? 2pts	Name the two structures that act as veins in leaves? 2pts	What type of energy is needed for photosynthesis? 1pt