

GCSE Combined Science: Trilogy

Worksheet: Uses of glucose from photosynthesis

TIME 35 min	TOTAL 31 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Uses of glucose from photosynthesis

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

Plants use the glucose made in photosynthesis in several ways.

0 1 . 1

Which **two** of these are uses of glucose in plants?

Tick (✓) **two** boxes.

To absorb light energy

☐

To make cellulose for cell walls

☐

To make mineral ions

☐

To make oxygen

☐

To make starch for storage

☐

[2 marks]

0 1 . 2

Plants store glucose as starch.

Give **one** reason why starch is better for storage than glucose.

.....

.....

[1 mark]

0 1 . 3

Name the substance made from glucose that strengthens plant cell walls.

.....

.....

.....

.....

[1 mark]

0 1 . 4

Plants use glucose to make amino acids.

Which ions, absorbed from the soil, are also needed to make amino acids?

.....

.....

.....

.....

[1 mark]

0 2

Plants convert some of the glucose made in photosynthesis into other substances.

0 2 . 1

Which substance does a plant make from glucose to strengthen its cell walls?

Tick (✓) **one** box.

Cellulose

☐

Chlorophyll

☐

Protein

☐

Starch

☐

[1 mark]

0 2 . 2

Plants convert glucose into starch for storage.

Explain why starch is better than glucose for storage.

.....

.....

.....

.....

[2 marks]

0 2 . 3

Plants absorb nitrate ions from the soil.
Name the substances that plants make from glucose and nitrate ions.

.....

.....

.....

.....
[1 mark]

0 3

The glucose produced by photosynthesis can be used by a plant in several ways.

0 3 . 1

State **four** ways a plant can use the glucose produced by photosynthesis.

.....

.....

.....

.....

.....

.....

.....

.....

[4 marks]

0 4

As a banana ripens, starch stored in the fruit is converted into sugars, such as glucose, making the fruit taste sweeter. Table 1 shows the concentrations of starch and of sugars in a banana at two stages.

Table 1

Stage	Starch concentration in mg/g	Sugar concentration in mg/g
Unripe	180	15
Ripe	20	165

0 4 . 1

Describe how the concentration of starch changes as the banana ripens.

.....

.....

[1 mark]

0 4 . 2

Calculate the percentage decrease in starch concentration as the banana ripens.

.....

.....

.....

.....

Percentage decrease = %

[2 marks]

0 4 . 3

Explain why the ripe banana tastes much sweeter than the unripe banana.

.....

.....

.....

.....

[2 marks]

0 5

Plants convert some of the glucose they make into other substances.

0 5 . 1

Explain why plants convert glucose into starch for storage.

.....

.....

.....

.....

[2 marks]

0 5 . 2

Sunflower seeds store oil rather than starch.
Suggest **one** advantage of this for the seed.

.....

.....

[1 mark]

0 5 . 3

A plant grown in soil containing no nitrate ions can still make glucose, but it cannot make proteins.
Explain why.

.....

.....

.....

.....

[2 marks]

0 5 . 4

Plants also use glucose for respiration.
Explain why plant cells need to respire.

.....

.....

.....

.....

[2 marks]

0 6

Table 2 shows the percentage by mass of starch, oil and protein in the seeds of three plants.

Table 2

Seed	Starch as a percentage of mass	Oil as a percentage of mass	Protein as a percentage of mass
Wheat	68	2	12
Sunflower	3	50	21
Pea	45	1	23

0 6 . 1

Which seed would be the best source of vegetable oil?

.....

.....

.....

.....

[1 mark]

0 6 . 2

Calculate the mass of protein in 250 g of pea seeds.

.....

.....

.....

.....

Mass = g

[2 marks]

0 6 . 3

Calculate the percentage of the mass of a wheat seed that is **not** starch, oil or protein.

.....

.....

.....

Percentage = %

[1 mark]

0 6 . 4

Explain why seeds need stores of starch, oil and protein.

.....

.....

.....

.....

[2 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Uses of glucose from photosynthesis · 31 marks

Question 1 (5 marks)

01.1 [2 marks]

Correct: To make cellulose for cell walls; To make starch for storage

01.2 [1 mark]

- starch is insoluble (so it does not affect osmosis) (1)

Notes: Allow 'starch molecules are large, so they cannot diffuse out of cells'.

01.3 [1 mark]

Answer: Cellulose

- cellulose (1)
-

01.4 [1 mark]

Answer: Nitrate ions

- nitrate ions (1)
-
-

Question 2 (4 marks)

02.1 [1 mark]

Correct: Cellulose

02.2 [2 marks]

- starch is insoluble (1)
 - so it does not affect the movement of water into and out of the storage cells by osmosis / it does not dissolve and move out of the storage cells (1)
-

02.3 [1 mark]

Answer: Amino acids (which are used to make proteins)

- amino acids / proteins (1)
-

Question 3 (4 marks)

03.1 [4 marks]

- respiration (to transfer energy) (1)
- converted to starch for storage (1)
- converted to sucrose for transport (1)
- converted to cellulose for cell walls (1)
- combined with nitrate ions to make amino acids / proteins (1)
- converted to fats and oils for storage (1)

Any 4 of the points above.

Question 4 (5 marks)

04.1 [1 mark]

- it decreases (from 180 to 20 mg/g) (1)
-

04.2 [2 marks]

Answer: 88.9%

- $(180 - 20) \div 180 \times 100$ (1)
 - 88.9 (%) (1)
-

04.3 [2 marks]

- starch is converted into sugars, e.g. glucose (1)
 - sugars taste sweet and their concentration increased greatly (from 15 to 165 mg/g), while starch does not taste sweet (1)
-

Question 5 (7 marks)

05.1 [2 marks]

- starch is insoluble (1)
- (so) it does not affect the movement of water into or out of cells by osmosis (1)
- starch molecules are large, so they cannot move out of the cell (1)

Any 2 of the points above.

05.2 [1 mark]

- oil stores more energy per gram, so the seed can be smaller / lighter (1)

05.3 [2 marks]

- amino acids / proteins contain nitrogen (as well as carbon, hydrogen and oxygen) (1)
- the nitrogen comes from nitrate ions (glucose does not contain nitrogen) (1)

05.4 [2 marks]

- to transfer energy (1)
- for living processes, e.g. building larger molecules / growth / active transport of mineral ions (1)

Question 6 (6 marks)

06.1 [1 mark]

Answer: Sunflower

- sunflower (1)

06.2 [2 marks]

Answer: 57.5 g

- $250 \times 23 \div 100$ (1)
- 57.5 (g) (1)

06.3 [1 mark]

Answer: 18%

- 18 (%) (1)

06.4 [2 marks]

- starch / oil are used in respiration to transfer energy for germination / before the leaves can photosynthesise (1)
 - protein / amino acids are used to make new cells / enzymes for growth (1)
-