Name & Surname: _____ Class: _____ Date: _____

Photosynthesis: Matter and Energy

Trace matter and energy through plants

About 60 minutes Level ★★★☆☆



How Photosynthesis Works

Plants, algae, and some bacteria make **glucose** using **sunlight**; in plants and algae this happens in **chloroplasts**. The equation is 6CO2 + 6H2O + light -> C6H12O6 + 6O2.



- **Reactants** carbon dioxide from air and water go into the leaf.
- **Chlorophyll** in chloroplasts captures light **energy**.
- **Products** glucose and oxygen are made; atoms are rearranged, not used up.
- **Energy** flows in as light and is stored as **sugar** while **matter** cycles.

TASK A

Describe the word on top so your partner guesses it without saying any banned words.

Cut out the cards.



photosynthesis

Don't say:

sunlight
plants
glucose
oxygen



chlorophyll

Don't say:

green
pigment
leaf
light



glucose

Don't say:

sugar
food
energy
product



carbon dioxide

Don't say:

air
gas
breathe
carbon

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Trace Matter Energy

Brainstorm where matter and energy go during photosynthesis.

Key words

photosynthesis: process that makes sugar from carbon dioxide, water, and light

chlorophyll: green pigment that captures light

chloroplast: cell part where photosynthesis happens

glucose: sugar that stores chemical energy

reactant: starting material in a reaction

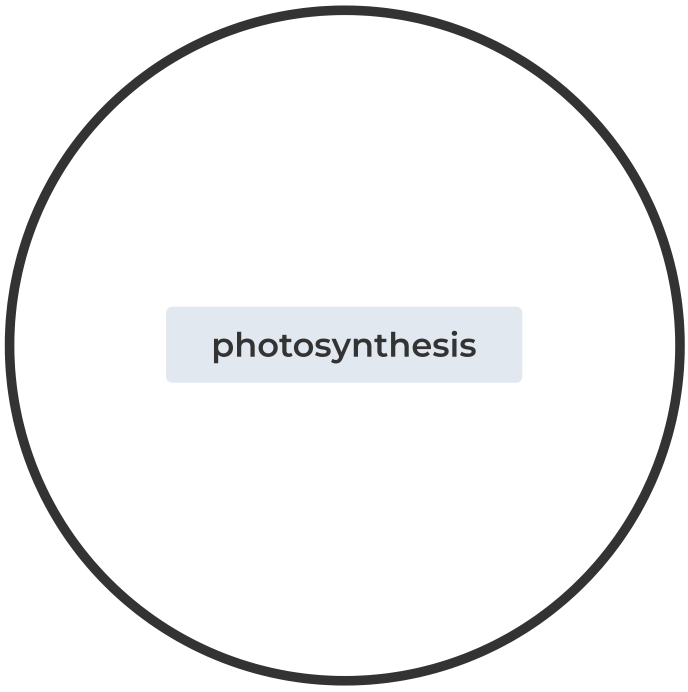
product: material made by a reaction

matter: anything that has mass and takes up space

energy: ability to do work or cause change

TASK B

Fill the shape with ideas about matter cycling and energy flow in plants.



Spot the Difference

Compare pairs that are easy to mix up.

TASK C

/6

Explain the difference for each pair in one clear sentence.

matter vs **energy**

The difference is...

reactant vs **product**

The difference is...

chloroplast vs **chlorophyll**

The difference is...

Find the Odd One

Circle what does not belong and explain why.

TASK D Example done for you /3

Circle the odd one out and explain your reason using evidence.

1. light | oxygen | carbon dioxide | water

Why?

Light is energy, the others are matter made of atoms that cycle.

2. glucose | carbon dioxide | chlorophyll | oxygen

Why?

3. root | flower | chloroplast | stem

Why?

4. glucose | starch | cellulose | sunlight

Why?

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Facts and Talk

Check facts, then explain the evidence to a partner.

TASK E

/7

Tick fact or opinion and explain how evidence supports the fact.

Statement	Fact	Opinion
Photosynthesis uses **light**, water, and carbon dioxide to make glucose and oxygen.		
The mass of a plant comes mostly from **carbon** in carbon dioxide from air.		
Oxygen released by plants comes from **water** during photosynthesis.		
Learning about photosynthesis is the most **interesting** part of science.		
Everyone should think plants are **amazing** because they make oxygen.		
Growing plants in light is **better** than growing them in the dark.		

How can you tell that one of them is an opinion?

.....

.....

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Photosynthesis: Matter and Energy

TASK F

/3

Complete the talk to explain photosynthesis with evidence.

Student A Our plant gained mass. Did that mass come from soil or from **air**?

Student B .....

.....

Student A Where did the extra **oxygen** we measured come from?

Student B .....

.....

Student A So how does **energy** flow into and out of the plant?

Student B .....

.....

How did I do?

Circle a face for each line.

I can explain the photosynthesis equation using evidence.	☹	😐	☺
I can trace how matter cycles and energy flows.	☹	😐	☺
I can explain what plants need to grow and why.	☹	😐	☺

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Answer sheet: Photosynthesis: Matter and Energy

Task A

A speaking game: no written answers.

Task B

Ideas: sunlight brings energy in, carbon dioxide gives carbon atoms

Task C

1. Matter cycles because atoms move from air and water into sugar and oxygen, while energy flows one way from light into chemical energy.
2. A reactant such as carbon dioxide goes into photosynthesis, while a product such as glucose comes out of it.
3. The chloroplast is the cell part where photosynthesis happens, while chlorophyll is the pigment inside it that captures light.

Task D

1. light (Light is energy, the others are matter made of atoms that cycle.)
2. chlorophyll (Chlorophyll is the pigment that captures light, the others are reactants or products.)
3. chloroplast (The chloroplast is a cell structure for photosynthesis, the others are whole plant parts.)
4. sunlight (Sunlight is incoming light energy, the others store chemical energy in bonds.)

Task E

1. Fact
2. Fact
3. Fact
4. Opinion
5. Opinion
6. Opinion

Task F

1. Student B: Mostly from air. Carbon dioxide gives carbon atoms that become glucose.
2. Student B: From photosynthesis. Water and carbon dioxide are rearranged and oxygen is released.
3. Student B: Light energy changes to chemical energy in sugar, which moves to animals that eat plants.

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