Photosynthesis: Matter Cycles, Energy Flows

How do plants turn sunlight into life?



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Today we will...

WE ARE LEARNING TO

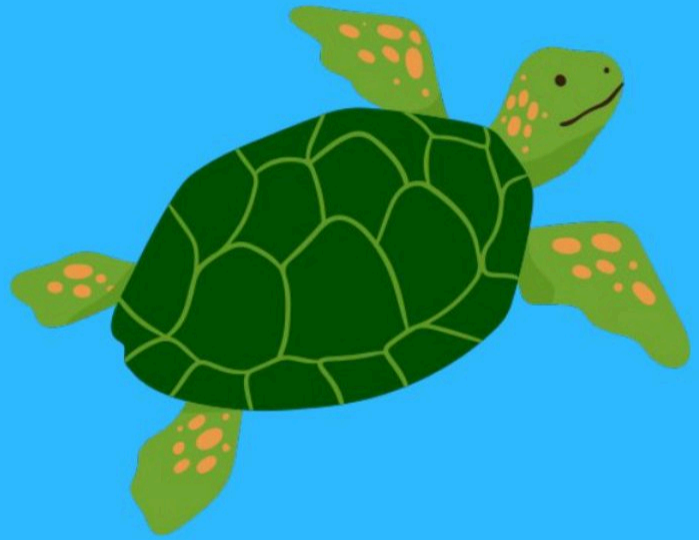
- Explain inputs and outputs of photosynthesis
- Trace how matter cycles through plants
- Trace how energy flows into organisms

SUCCESS LOOKS LIKE

✓ I can write the photosynthesis equation

✓ I can trace atoms from air and water to sugar

✓ I can explain energy flow from sunlight to sugar



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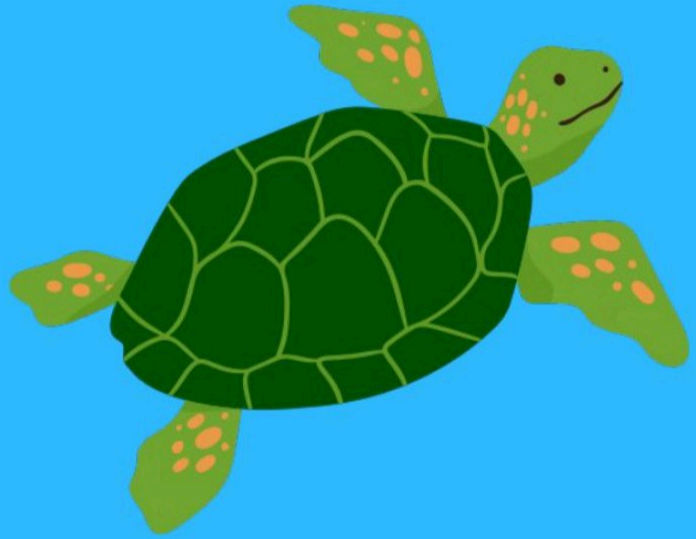
DID YOU KNOW?

Plants are not alone — algae and some bacteria photosynthesize too.

They all use sunlight to turn water and carbon dioxide into sugar and oxygen.



Photo: CoastalSandpiper · Pixabay



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Photosynthesis in 4 stages

1. Capture

Chlorophyll in chloroplasts traps blue and red sunlight

2. Enter

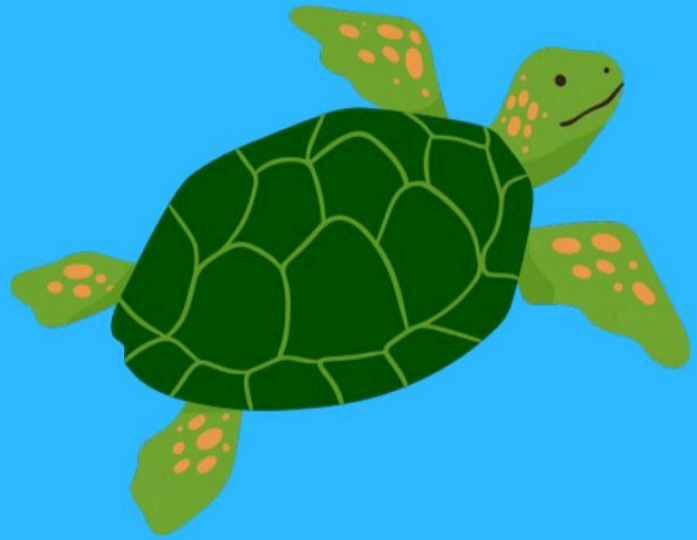
Water and carbon dioxide enter the plant

3. Store

Light energy is stored in a chemical called ATP

4. Build

ATP helps build sugar; oxygen is released



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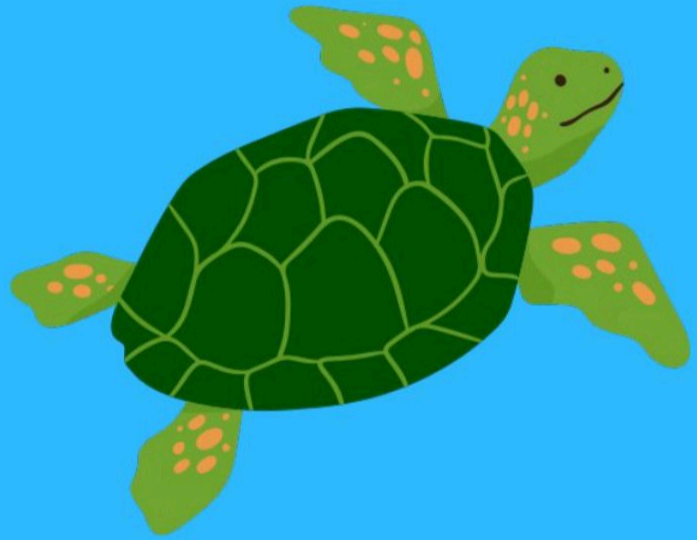
Why does photosynthesis matter most?

Why is photosynthesis most important for life on Earth?

A It makes sugary food for almost all life

B It releases oxygen for animals to breathe

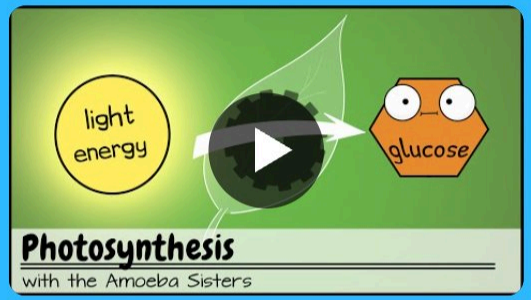
C It moves Sun energy into living things



Vote with your hands, then explain why.

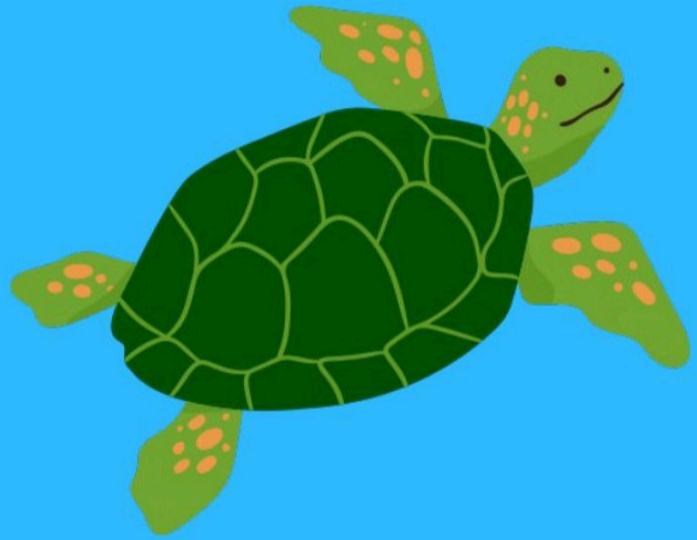
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Watch: Inputs and Outputs



▶ 0:00 – 5:00

- Spot water, carbon dioxide, and light going in
- Spot sugar and oxygen coming out
- Listen for how atoms get rearranged



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BIG IDEA

In photosynthesis, atoms are recycled but energy flows one way — from Sun to life.

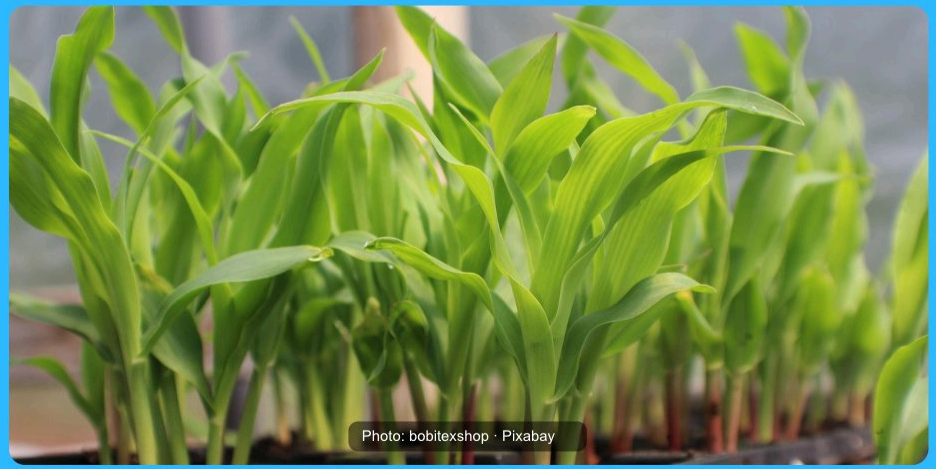
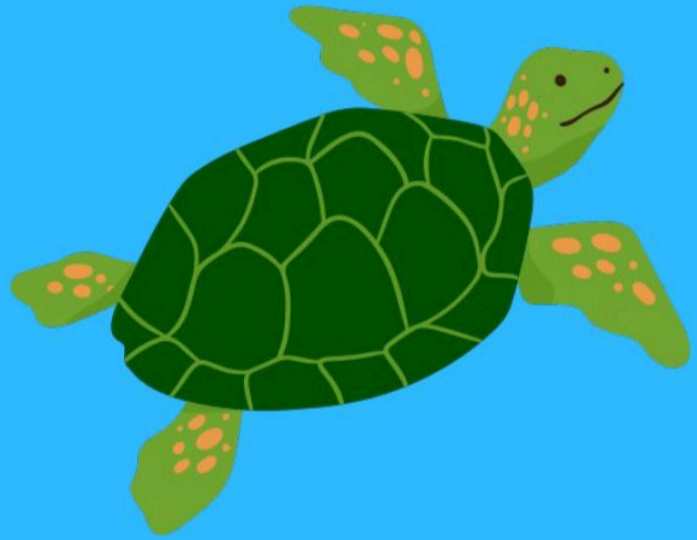
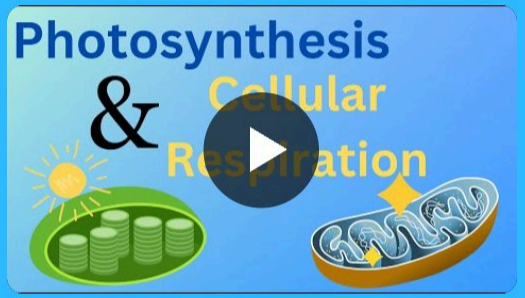


Photo: bobitexshop · Pixabay



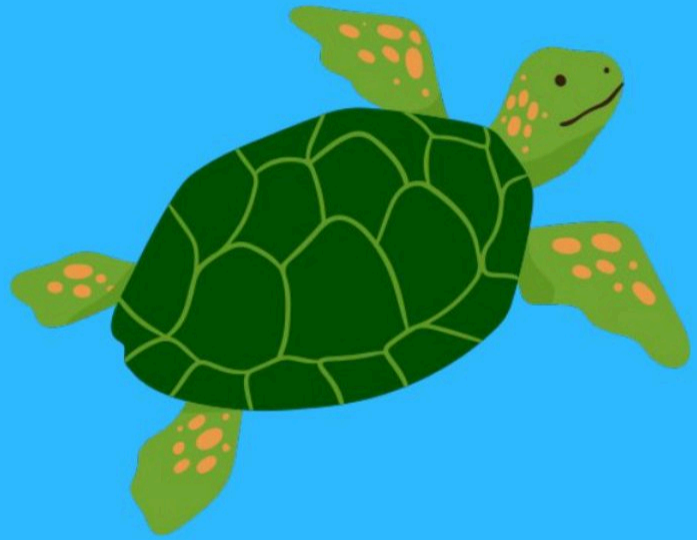
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Watch: Energy and Matter on the Move



▶ 0:00 – 4:10

- Follow energy from sunlight into sugar bonds
- Follow carbon and oxygen as they cycle

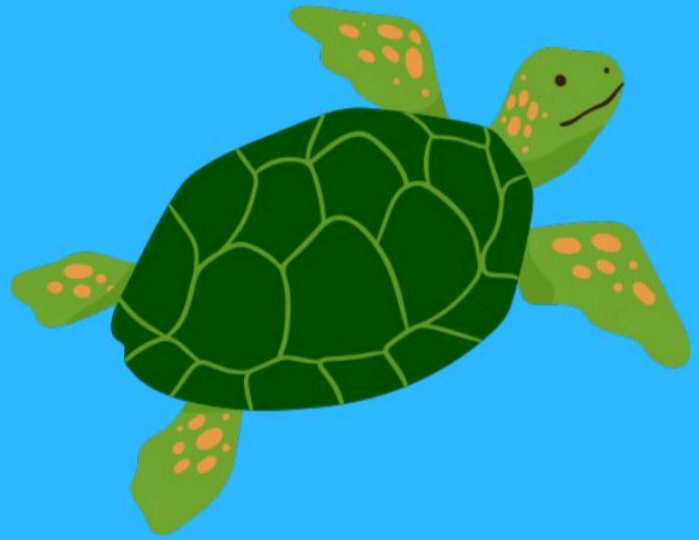


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Your task

In pairs, explain with this equation: $6CO_2 + 6H_2O + light \rightarrow C_6H_{12}O_6 + 6O_2$.

1. Write the equation and label reactants and products.
2. Trace carbon, hydrogen, and oxygen atoms to sugar and oxygen.
3. Draw energy flow: sunlight in, chemical energy in sugar.



10 min

In pairs

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What cycles? What flows?

1. Carbon dioxide + water rearrange into sugar + oxygen
2. Atoms cycle: same carbon and oxygen move on
3. Light energy becomes chemical energy in sugar bonds
4. Oxygen exits; sugar fuels growth and other organisms

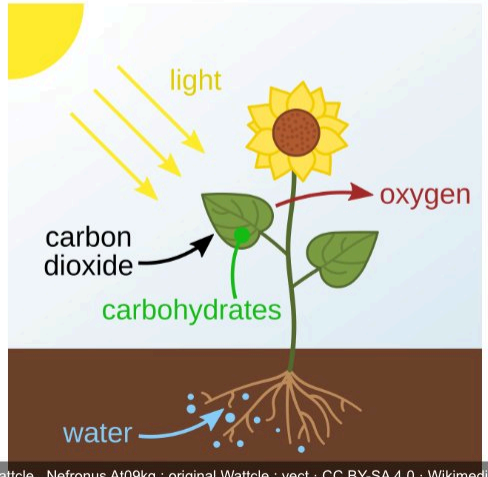
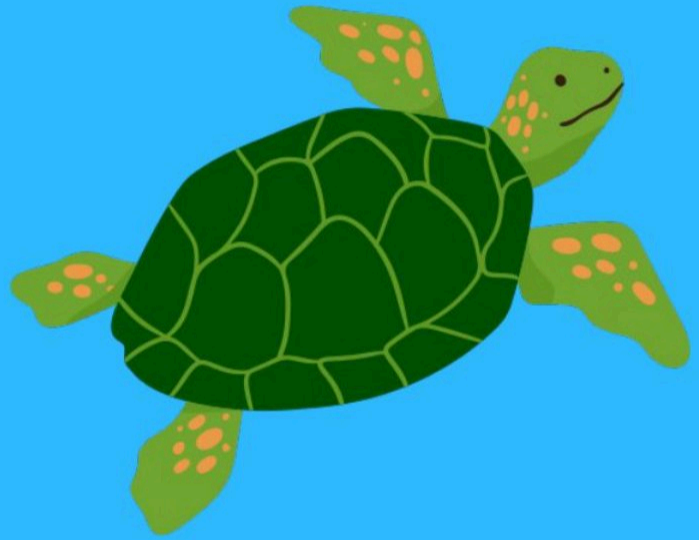


Diagram: At09kg , Wattcle , Nefronus At09kg : original Wattcle : vect · CC BY-SA 4.0 · Wikimedia Commons

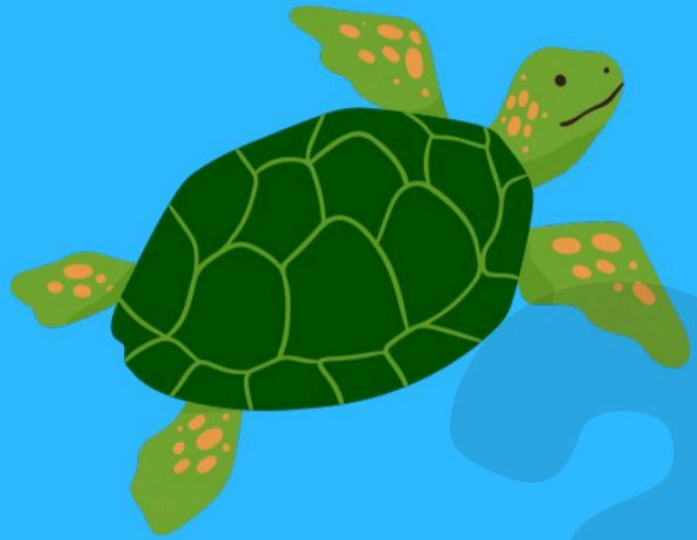


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Think, pair, share

A plant gains wood but soil stays the same — where did the new mass come from?

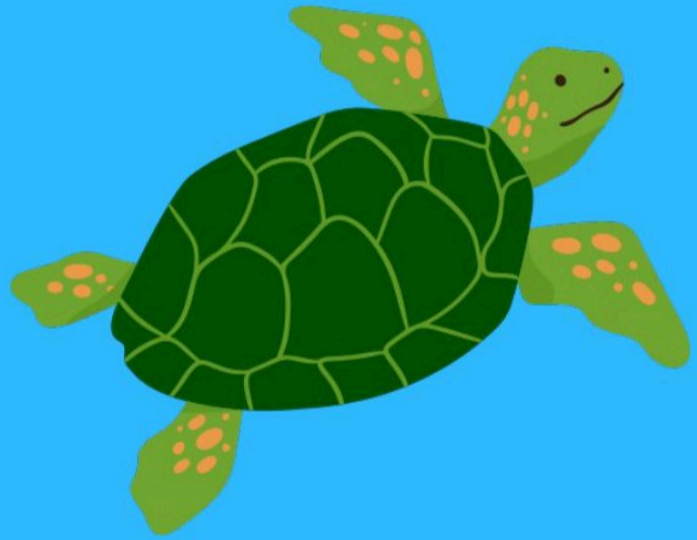




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Quick quiz

1. What three inputs does photosynthesis need?
2. What two products are made?
3. Where does energy in sugar come from?
4. How does matter cycle here?



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