Biology · Nutrition, respiration, transport and excretion

Life Processes



Goals

By the end of this lesson you can

- Define life processes and why organisms need them
- Compare autotrophic and heterotrophic nutrition
- Explain aerobic and anaerobic respiration
- Describe transport in humans and plants
- Explain how kidneys filter blood

What are life processes?

- Processes that maintain a living body, even during sleep
- Repairing and maintaining cells needs a steady supply of energy
- Energy comes from food broken down inside the body
- Four core processes: nutrition, respiration, transportation, excretion

Two ways to get food

Autotrophic

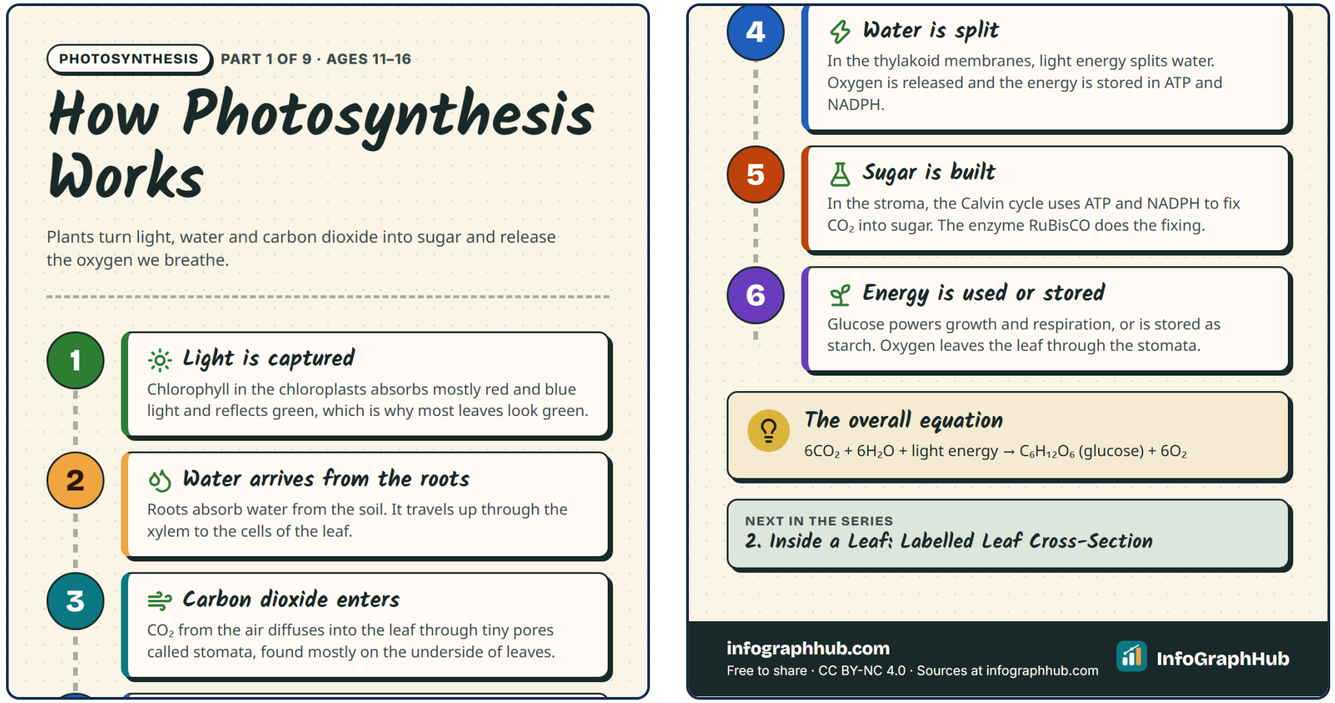
- Make their own food from simple substances
- Use carbon dioxide, water and sunlight
- Examples: green plants, some bacteria

Heterotrophic

- Take in food made by other organisms
- Break complex food into simpler molecules
- Examples: animals, fungi, most bacteria

Photosynthesis: how plants make food

- Chlorophyll absorbs light energy
- Light splits water and releases oxygen
- Carbon dioxide is fixed into glucose



Poster: How Photosynthesis Works: From Sunlight to Sugar

Nutrition in humans

- Mouth: teeth chew food; saliva starts breaking down starch
- Stomach: acid and pepsin begin digesting proteins
- Small intestine: digestion is completed; villi absorb nutrients
- Large intestine: absorbs water; waste is removed

Respiration: releasing energy from food

Aerobic

- Uses oxygen
- Glucose is broken down fully
- Products: carbon dioxide and water
- Releases much more energy

Anaerobic

- No oxygen
- Yeast makes ethanol and carbon dioxide
- Tired muscles make lactic acid
- Releases less energy

Breathing in humans

- Air enters through the nostrils and passes down the trachea
- Bronchi branch into bronchioles ending in alveoli
- Alveoli have thin walls and a rich blood supply
- Oxygen diffuses into blood; carbon dioxide diffuses out

Transportation in humans

- The heart has four chambers and pumps blood
- Arteries carry blood away from the heart
- Veins carry blood back to the heart
- Capillaries exchange materials with cells

The heart never rests

4

chambers keep oxygen-rich and oxygen-poor blood apart

- Right side pumps blood to the lungs
- Left side pumps blood to the whole body

Transport in plants

Xylem

- Carries water and minerals
- Moves upward from roots
- Pulled up by transpiration

Phloem

- Carries food such as sucrose
- Moves up or down as needed
- Uses energy from ATP

Excretion in humans

- Kidneys filter waste such as urea from blood
- Each kidney has about a million filtering units called nephrons
- Useful substances like glucose are reabsorbed
- Urine flows to the bladder through the ureters

Worked example

Real-life example: a football match

- Breakfast is digested and glucose absorbed
- Breathing speeds up to supply oxygen
- Heart rate rises to move blood faster
- Sweat and urine remove waste and extra water

Quick check

Which blood vessels carry blood away from the heart?

A. Veins

B. Arteries

C. Capillaries

D. Nephrons

Summary

Key takeaways

1. Life processes keep organisms alive and maintained
2. Nutrition supplies the raw materials and energy source
3. Respiration releases energy from glucose
4. Transport moves materials around the body
5. Excretion removes harmful waste