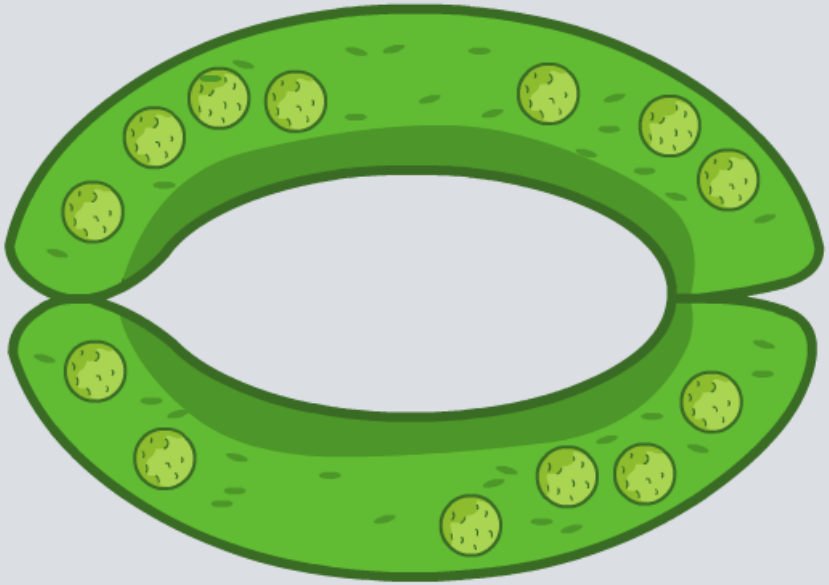
Specialized Plant Cells



How do leaves maximize photosynthesis?

Leaves are the **most efficient solar panels** on Earth!

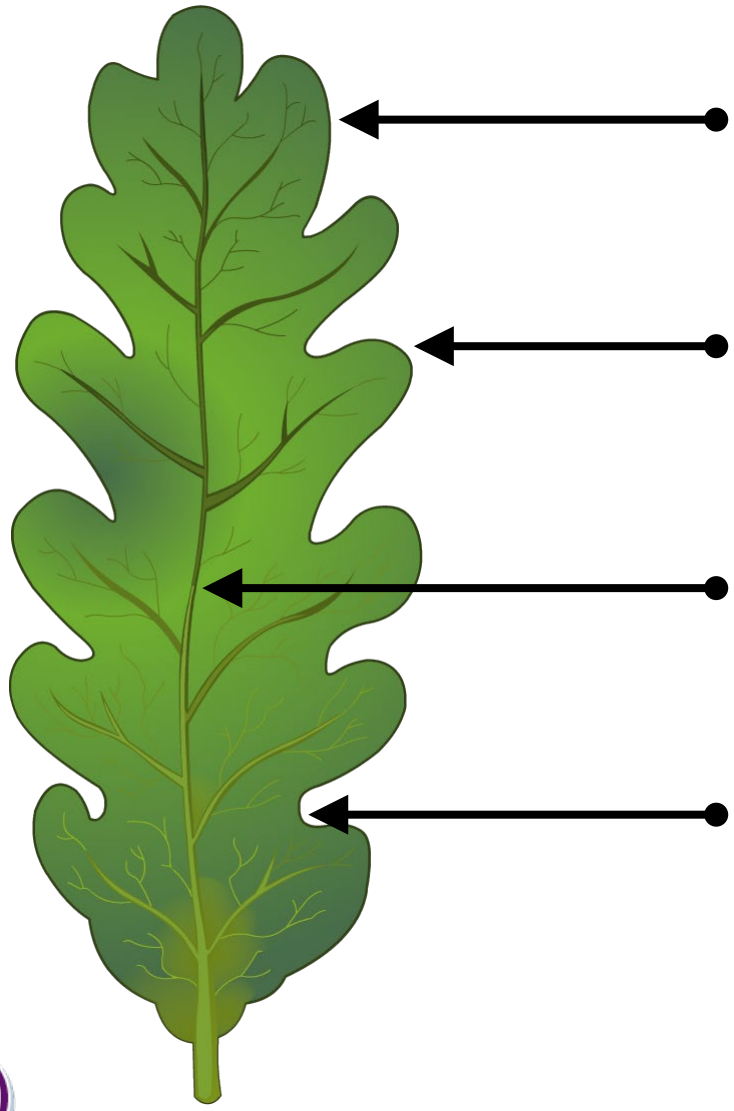
What does this mean?

Like solar panels, leaves convert energy from the Sun into usable chemical energy.

Although leaves come in a variety of shapes and sizes, they share certain features that enable the plant to maximize photosynthesis.

How are leaves adapted for photosynthesis?

To increase photosynthesis, leaves have certain key features:

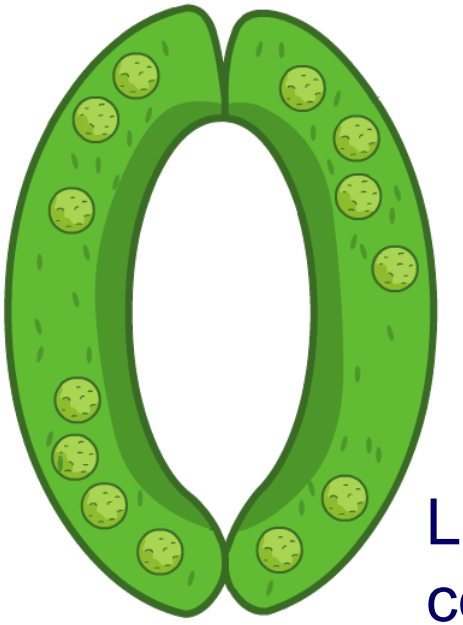


- **thin –** this allows gases to reach cells easily
- **wide and flat –** this creates a large surface area to absorb as much light as possible
- **veins –** these carry water to the cells and carry glucose away and also support leaves
- **stomata –** these are pores on the underside of leaves through which gases move in and out.

Take a look inside a leaf

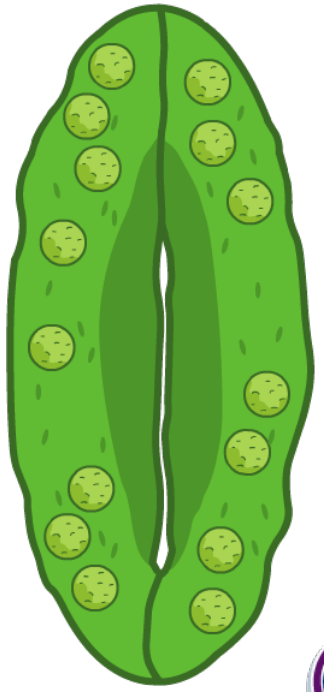
How do gases enter and leave plants?

On the underside of leaves are small holes, or pores, called **stomata**. A single hole is called a **stoma**. Each stoma is surrounded by two **guard cells**.



When guard cells gain water, they curve outwards. This opens the stoma, allowing gases in and out.

Losing water causes the guard cells to come closer together, closing the stoma. This stops the movement of gases, but also prevents water loss.



Structure of a leaf activity

Match leaf adaptation to its purpose

stomata	absorbs light
chlorophyll	large area for light absorption
broad	allows gases to reach cells easily
veins	transport and support
thin	allows gases in and out

?

solve

Why do plants need transport systems?

Some small or primitive plants, such as mosses, absorb all the nutrients they need directly from their environment.

Larger plants do not have a large enough surface area to take in what they need. Like most multicellular animals, they have developed specialized tissues for transporting water and nutrients to all their cells.

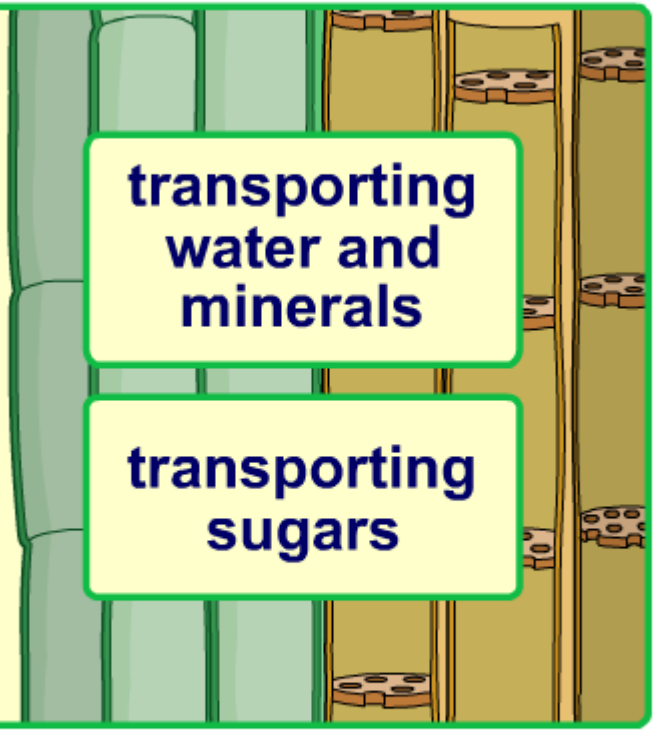
Plants that have specialized transport systems are known as **vascular plants**.

Transporting water and nutrients

What are the common features of a vascular plant?

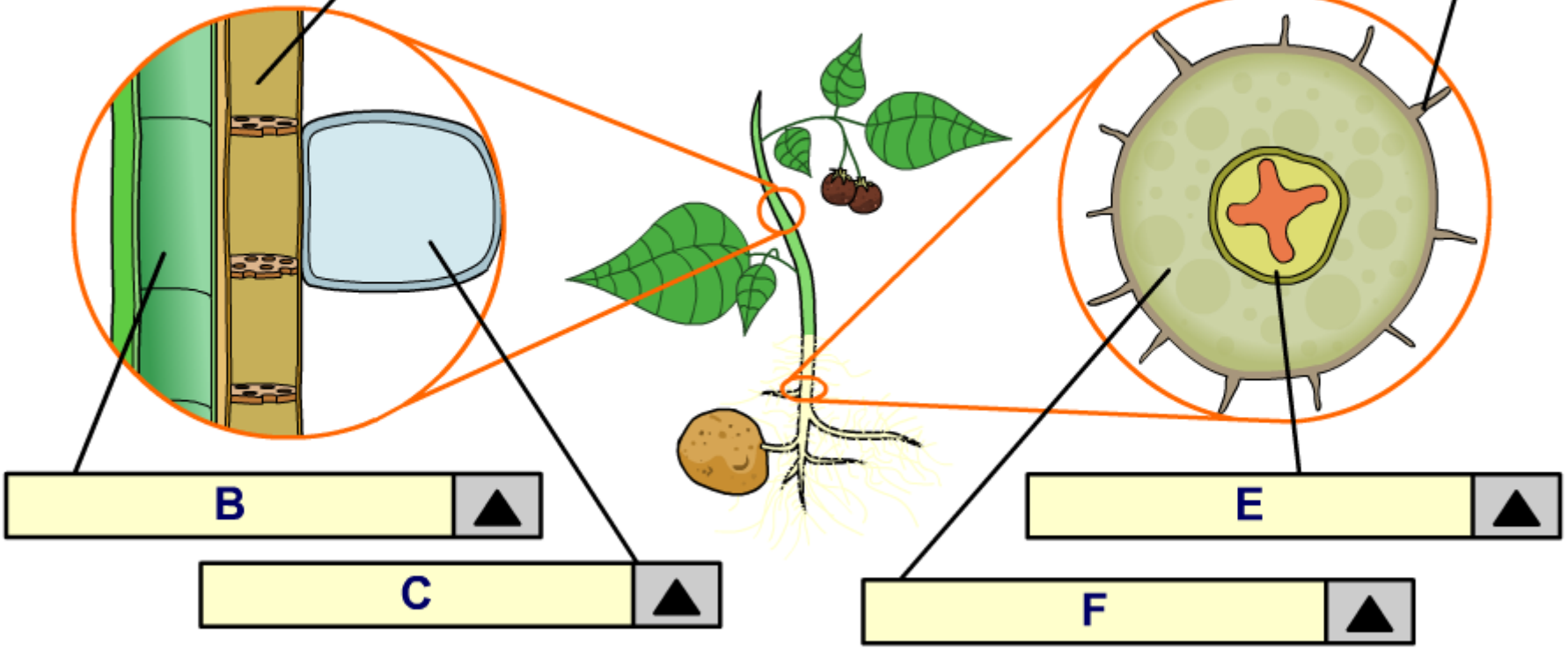
Plants need to move water from roots to leaves for photosynthesis. The sugars produced in photosynthesis are needed for respiration throughout the plant.

Click on a button to find out more about each transport system.



Plant anatomy

What are the features of a plant transport system?



Parts of a plant transport system

Match these parts of a transport system to their functions

vessel element	provides energy and support to sieve tube cells
tracheid	provides support in vascular tissues
plasmodesmata	narrow, elongated cell for transporting water in all vascular plants
companion cell	transports sugars
sieve tube	water transport cell that joins to form continuous vessels in higher plants
sclerenchyma fiber	pores connecting cytoplasm of neighboring cells across cell walls