

Plant Respiration

By Jackie Grundberg



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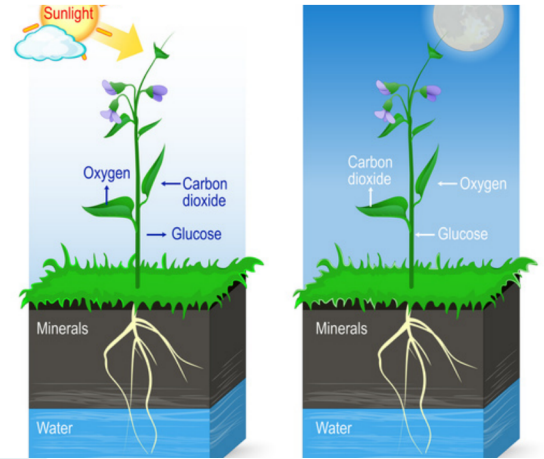
PLANT RESPIRATION

Age range:

2nd grade through middle school

Prior Knowledge and Lessons:

- (I can help you here)



Materials:

- Presentation cards (provided).
- 5 part cards (included) for further work on the shelf
- Depending on what children select for follow-up or extension lessons.

LEARNING OBJECTIVES

Students will:

- Use observations to describe patterns of what plants and animals (including humans) need to survive.

* Every time you see the symbol, ☼, it indicates to lay down the appropriate label card for the students to view. Every time you see the symbol, ✚, it indicates to lay down the appropriate sample (such as a rock or organic matter).

**In this lesson, the *italics* are what I suggest you present to the student. The rest is information for you or depending on your students you may inform them. In the follow-up activity, the student will most likely discover this and more to share with the group.

***During the presentation notes, if you see words highlighted or underlines, it is connected to a link to a research article .

Presentation

⌘ We know that humans breathe. ⌘ Animals breathe, but do ⌘ plants breathe? If a plant or tree breathes, does it do it the same way humans do?

Now, plants aren't breathing in what we consider breathing. Plants breathe during a process called ⌘ respiration.

We may not be able to see the cycle of breathing in plants, but it's happening! Gases go in and out of the plants through small holes, but it's not really like ⌘ human breathing.

Take note that plants don't have lungs or bloodstreams, so we can't say that they breathe in the same way as animals.

Photosynthesis is the cause of respiration in plants. In other words, because of photosynthesis, plant respiration happens. They go hand-in-hand.

Let's go back to our first question, ⌘ HOW does a plant or leaf breathe?

Green plants breathe all the time, day and night. ⌘ But remember that a plant photosynthesizes only in the light of the sun, so that means it's only taking in light energy during the day.

THAT is why plants develop tropic movements ⌘ to get as much light as they can.

Plants need the energy that results from photosynthesis. This energy is used to carry out different functions, for example, ⌘ create a scent, color or fruit to attract animals who are potential pollinators.

When plants breath, it's different from that of mammals. We have 2 places, our mouth and nose to bring in oxygen and release carbon dioxide, and both are connected to our lungs.

Plants can independently, in different parts of the plant, take carbon dioxide from the air, use it to get energy and emits, or releases, oxygen.

Oxygen really is a critical resource for all the existence on earth! We can't live without it! Plants help us breathe by collecting carbon dioxide for photosynthesis and distributing oxygen by the leaves.



Presentation

Do you remember I mentioned that leaves have pores? These are microscopic ☿ holes on the leaf surface called stomata.

I always thought it was cool ☿ how stomata works. Each stoma is basically an opening, like a ☿ mouth. Along the sides of the opening are 2 sausage shaped guard cells. They remind me of lips.

These guard cells control the opening or closing of the stoma. They sense whether the plant cell is dehydrated and doesn't have enough water.

I'm sure you've seen ☿ when a plant will wilt because it doesn't have enough water. In this case, the stoma's guard cells will close up to try to retain and hold on to all the water it can.

☿ When water is pulled from the roots to the leaves this process is called transpiration. When there's too much water in the plant, the guard cells won't be as tightly shut.

Just like a mouth with too much water..... some water might dribble out.... ☿ This water vapor escapes through the stomata.

You might ☿ have seen this if you look really close to a plant in the sun. There's a great follow-up activity that demonstrates this.

The stoma is also responsible for gases going in and out of the plants. When the leaf doesn't have enough carbon dioxide, the guard cells open wide to allow more carbon dioxide in.

I'm not going to lie...the actual process of cellular respiration can really be complicated, but all I want you to know right now is that this process provides the plant cells with energy they need to work.

What is so interesting in plants is that they also a circulatory system. ☿ In humans and animals, our circulatory system brings oxygen through blood throughout our body. We have veins and arteries

Plants have a similar system in which they have the ☿ xylem and phloem.

I'm telling you, learn how to spell xylem. Whenever you play Scrabble, it's the best way to use an "x" and a "y"



Presentation

⌘ The xylem carries up water and minerals from the roots to the leaves, and the phloem brings the sugar down and into all the cells of the plant. This is like a large transport or highway system!

The phloem carries sugars and proteins, produced by photosynthesis in the leaves, down to the roots and stems of the plant to be used and stored.

Did you know that roots are what keeps the plant stable AND... they are the ones who absorb moisture, or water, and the necessary nutrients from the soil? It's also an interesting phenomenon, especially when the plant needs to work against gravity.

Let me ask you.... what would happen if you hold your breath, go under water, for example in the ocean or pool, and then let your breath out. What happens to that air?

You're right, you'd see bubbles rising to the top. If you want to prove that leaves really do release gas, do the follow-up called, Bubble, Bubbles, Bubbles. The process of photosynthesis allows us to see the ⌘ bubbles as the leaves release their extra oxygen. Since oxygen is lighter than liquids, the bubbles must inevitably go to the surface.

In a few of the follow-up experiments, they're designed for you to demonstrate that this really is happening. It only goes so far that I'm telling you something is happening, you have to see it to believe it, right?

Reflection

- Which affects plant respiratory? and how does it affects it's growth?
- Explain how oxygen and carbon dioxide are exchanged between living organisms and the environment

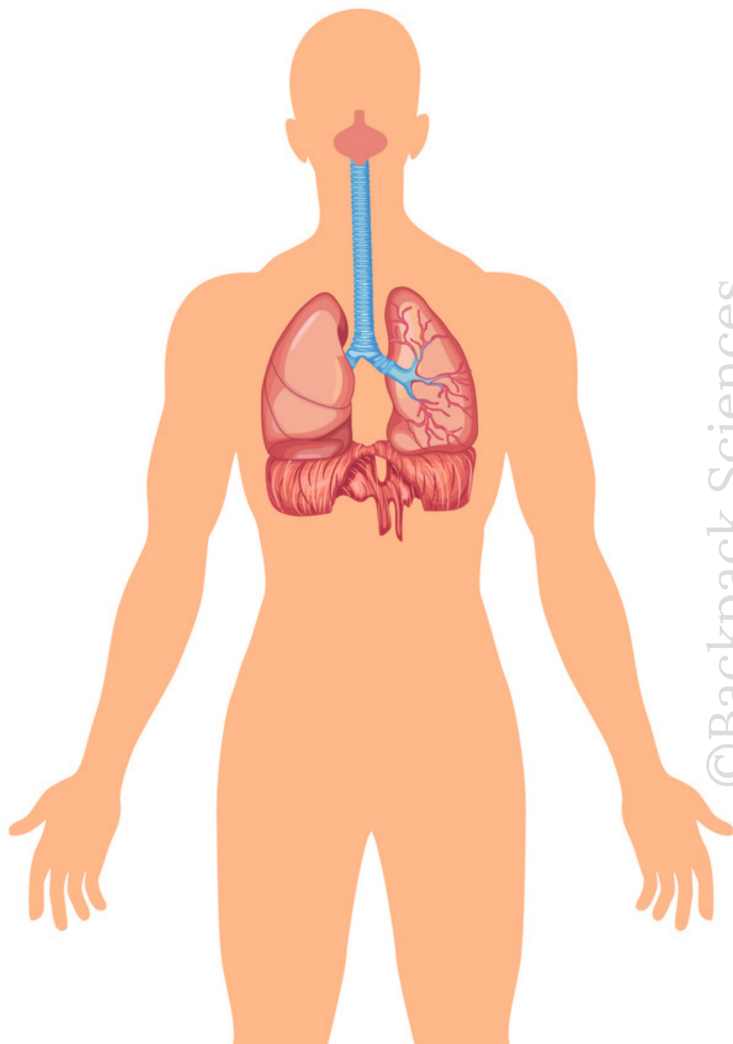




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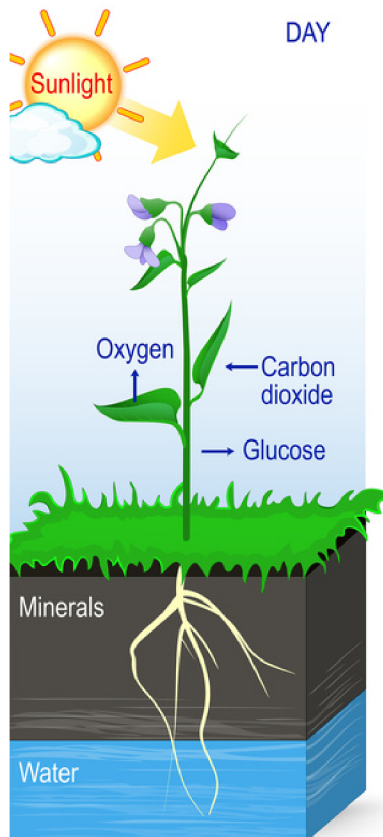


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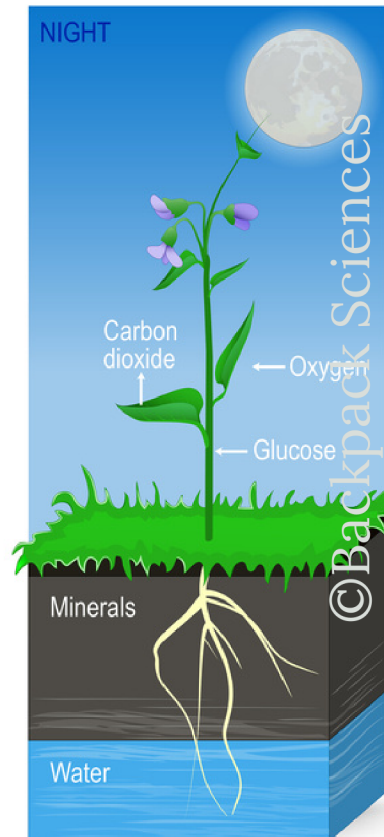


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Photosynthesis



Cellular respiration



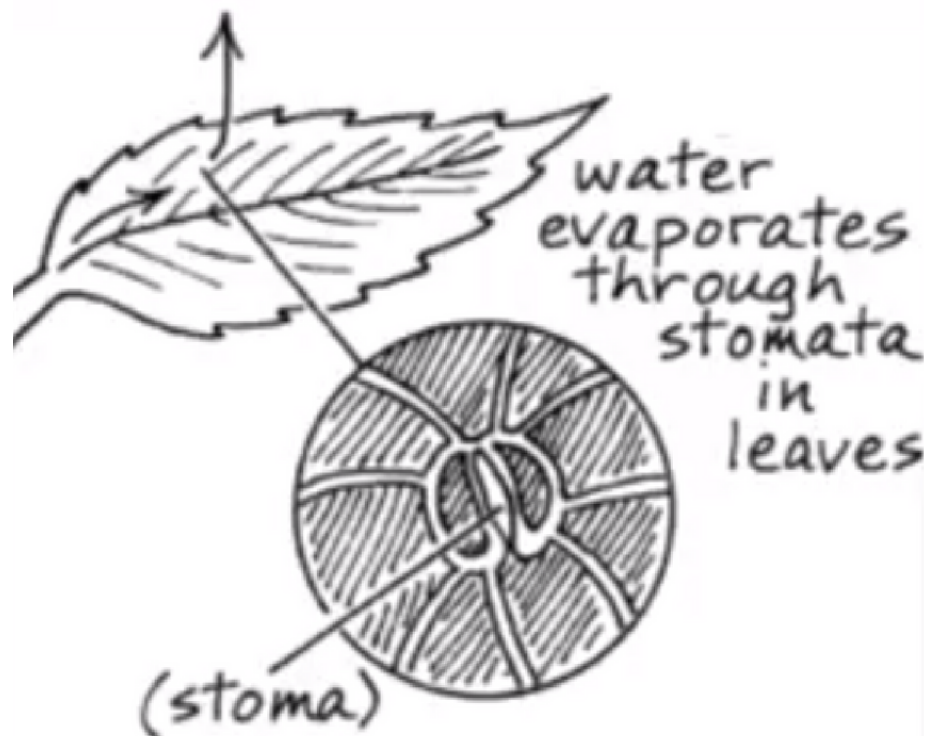
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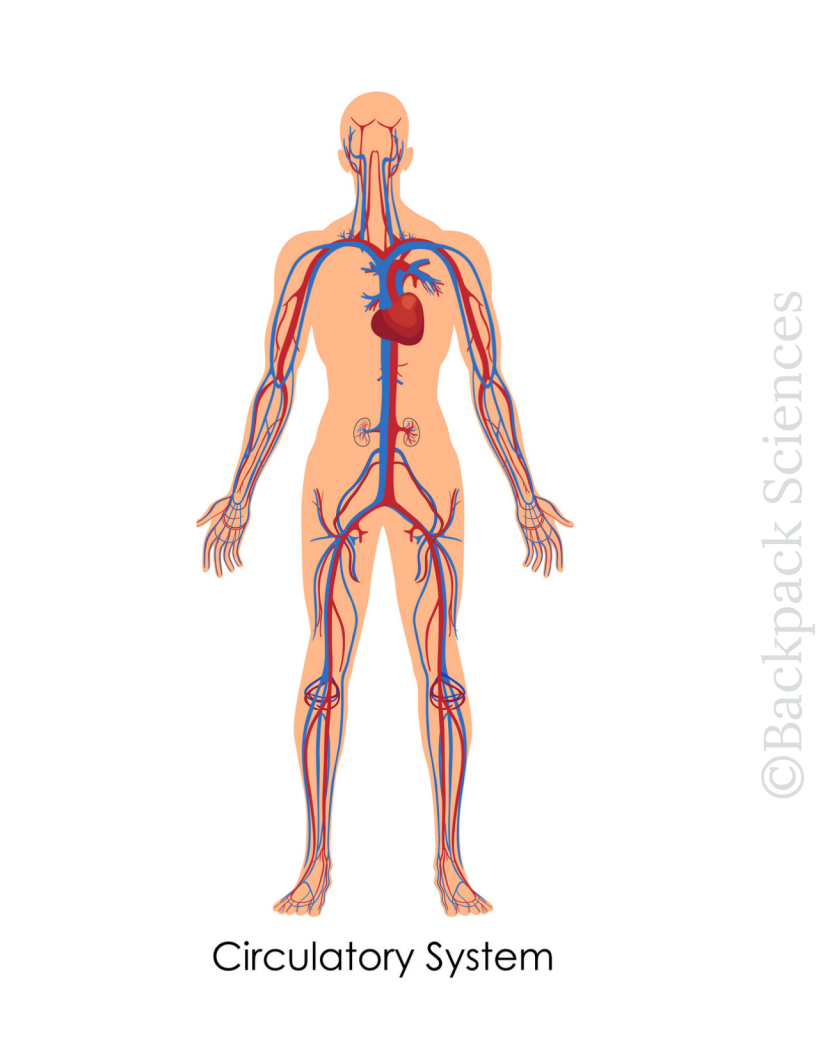
Respiration

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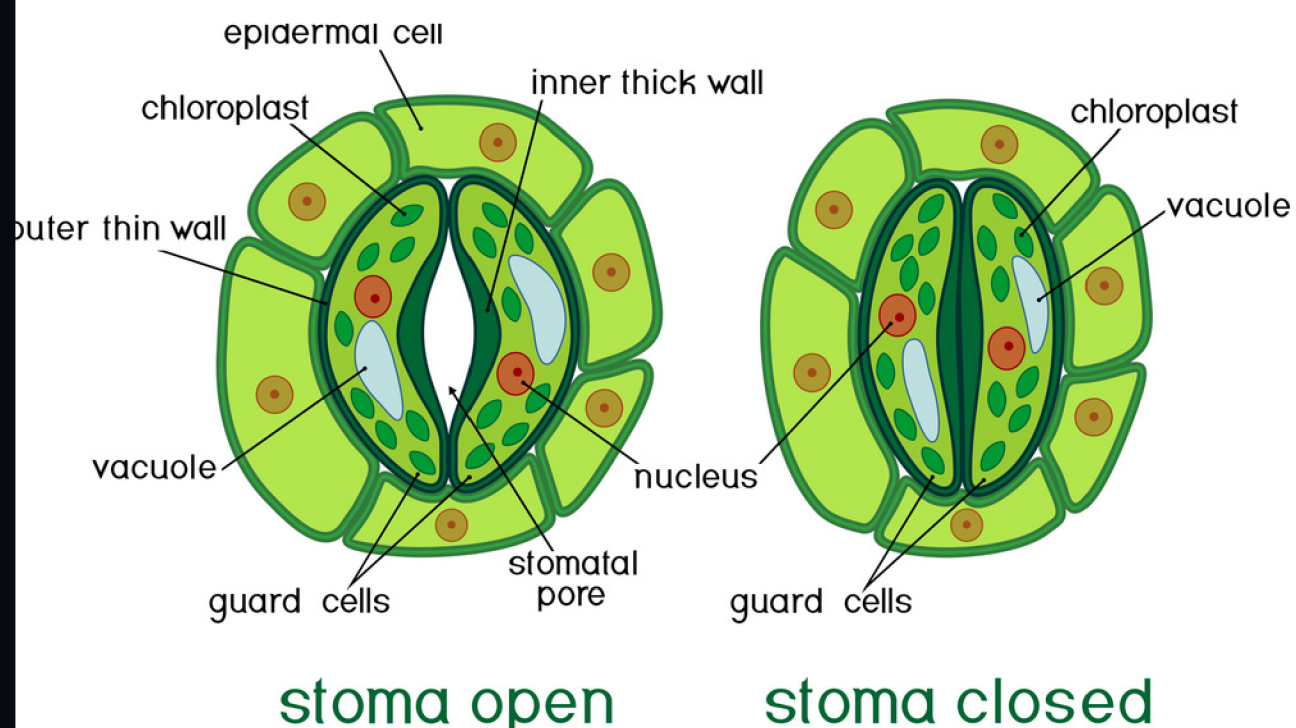
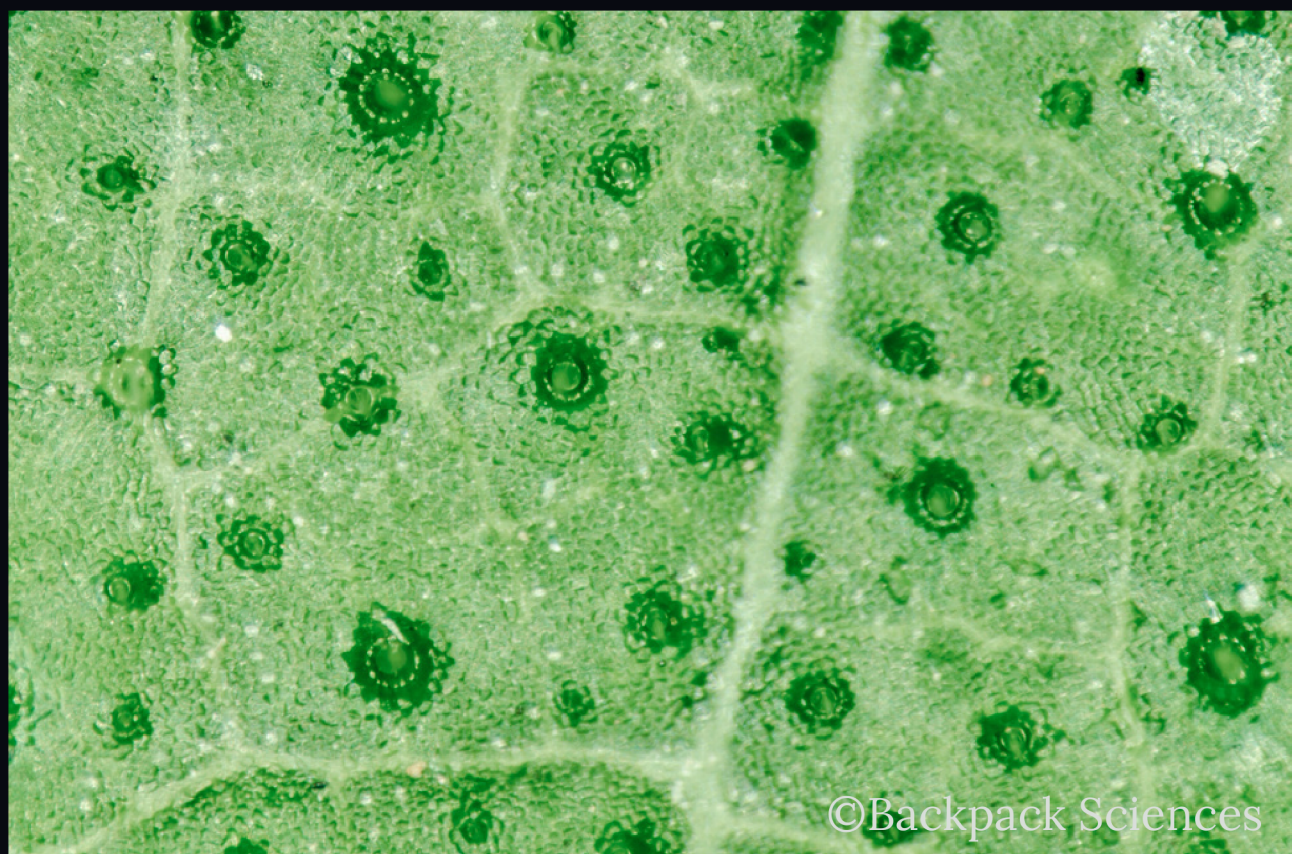
**A process where
plants breath**

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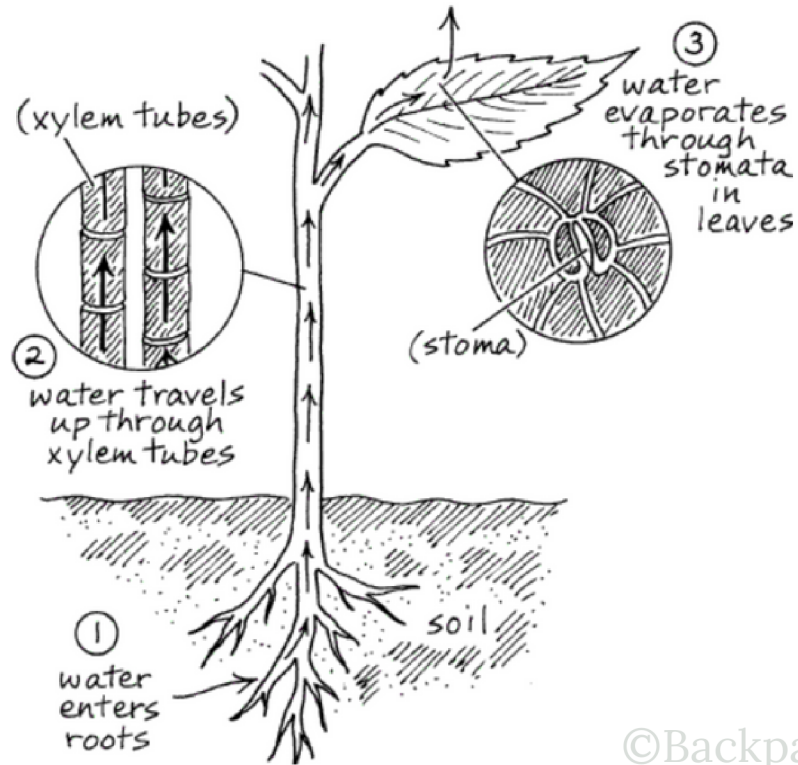




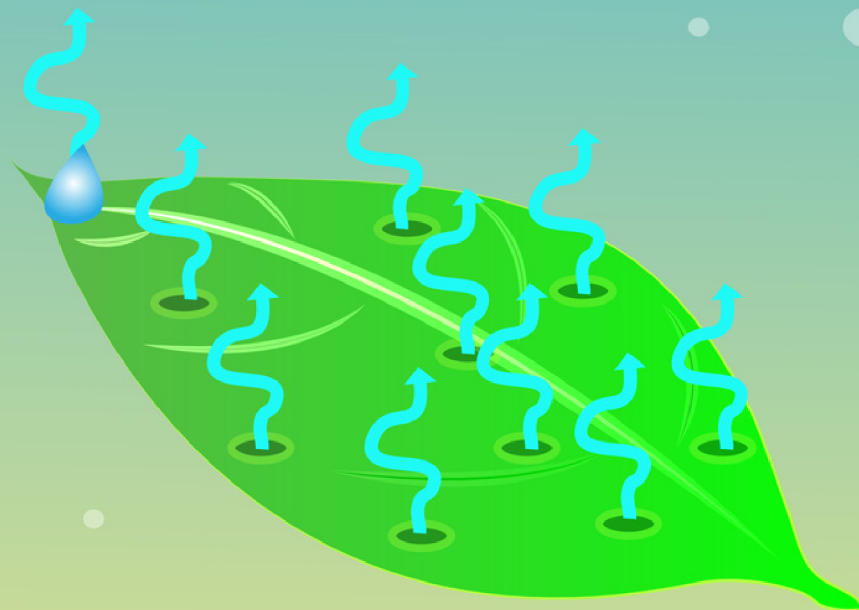
Circulatory System



Transpiration Process



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Xylem and Phloem

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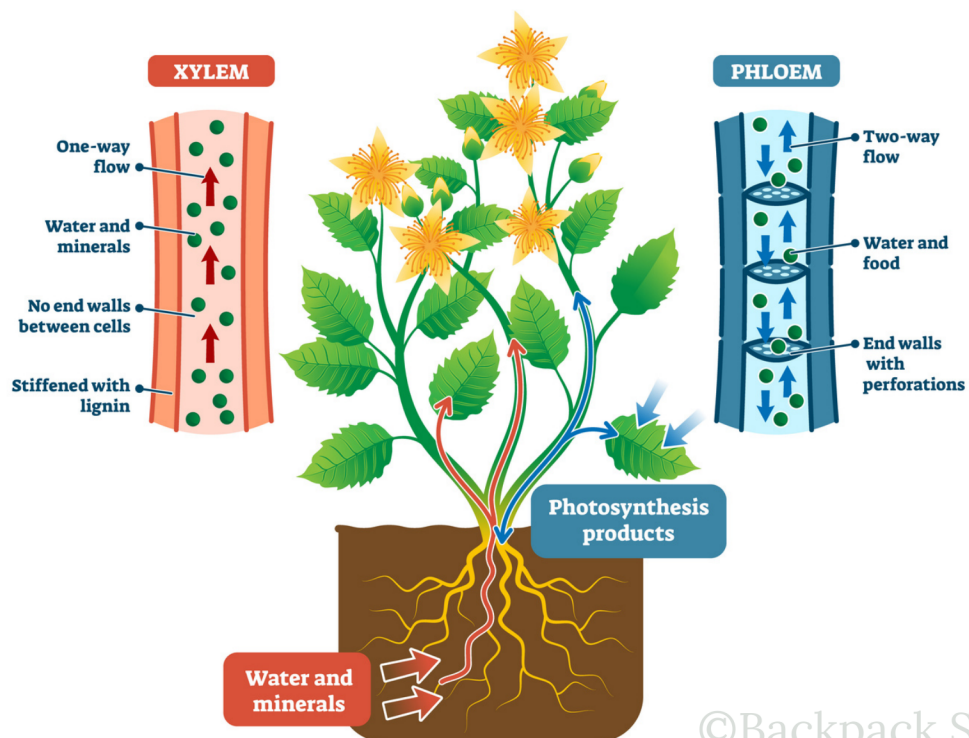
**The xylem carries up water and
minerals from the roots to the
leaves**

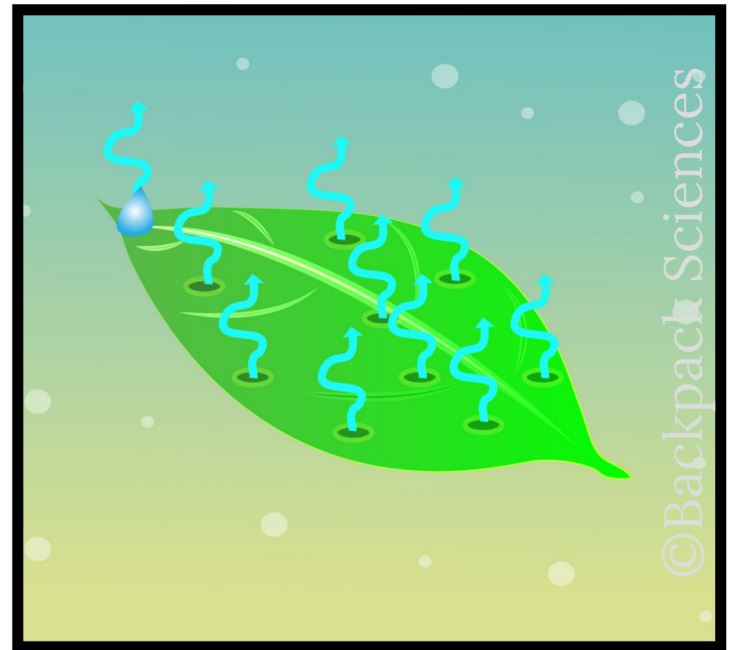
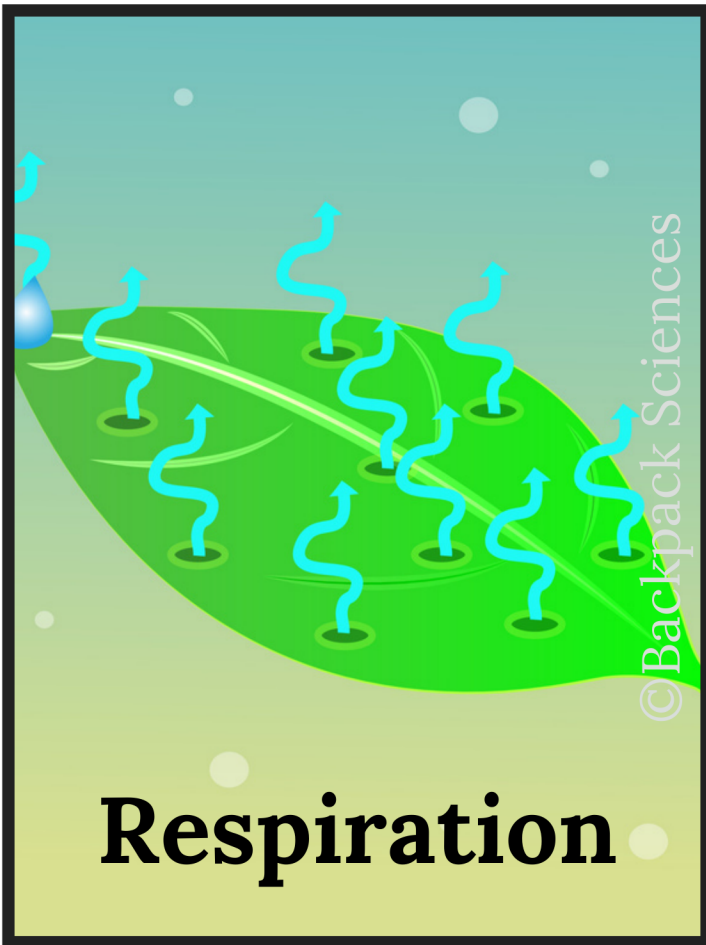
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**The phloem carries sugars
and proteins**

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XYLEM AND PHLOEM





Respiration

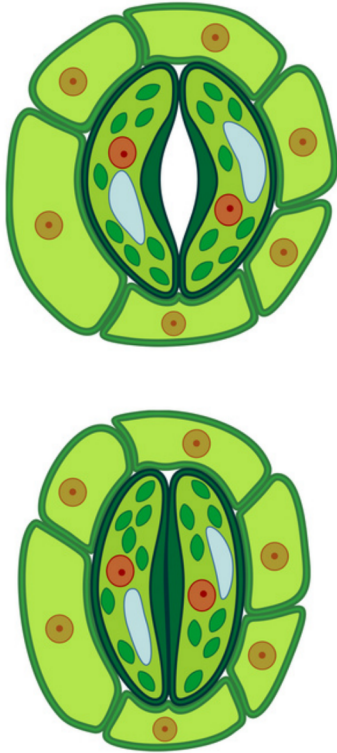
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Respiration is a process where plants breath. The process of respiration in plants involves using the sugars produced during photosynthesis plus oxygen to produce energy for plant growth. In many ways, respiration is the opposite of photosynthesis.

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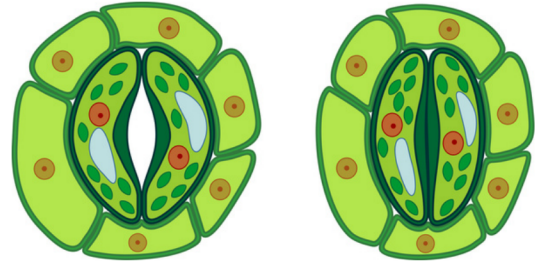
_____ is a process where plants breath. The process of _____ in plants involves using the sugars produced during photosynthesis plus oxygen to produce energy for plant growth. In many ways, _____ is the opposite of photosynthesis.

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Stomata



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Stomata

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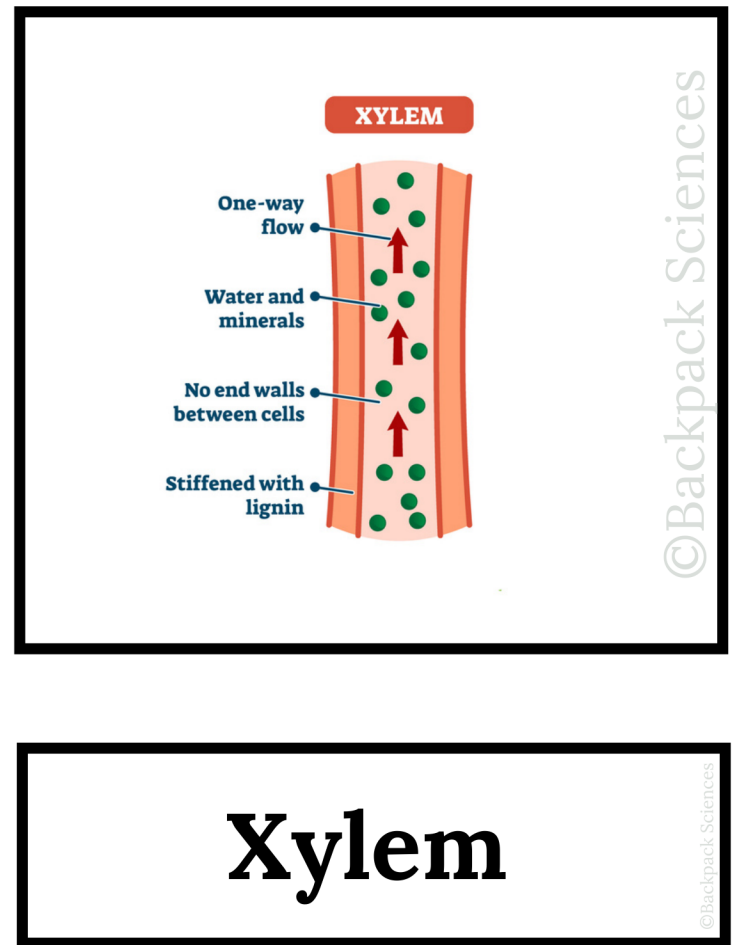
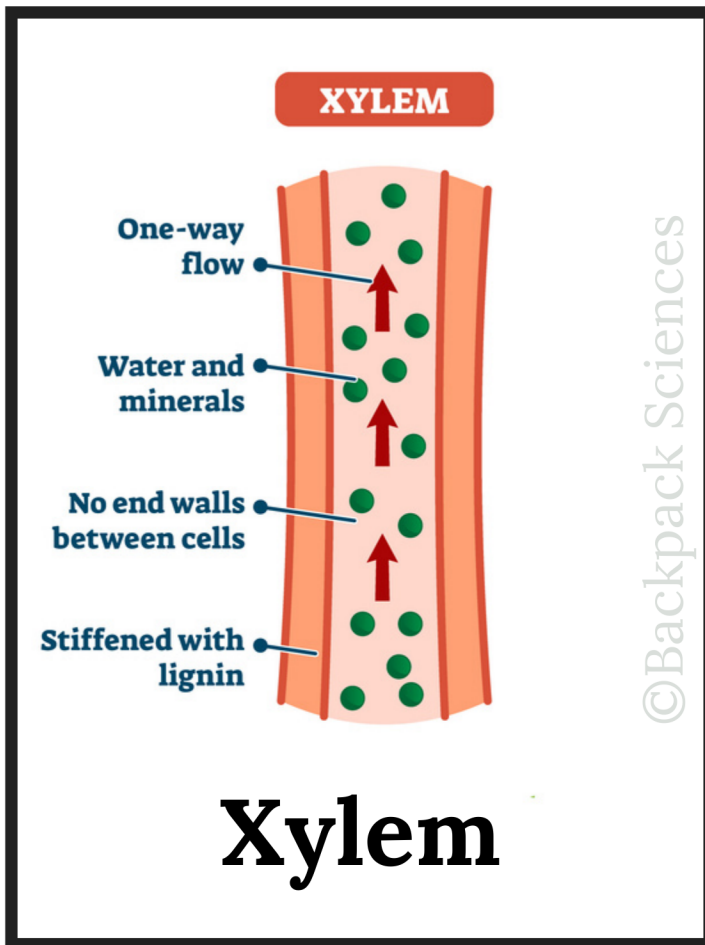
Stomata are tiny openings or pores in plant tissue that allow for gas exchange. Stomata are typically found in plant leaves but can also be found in some stems. Specialized cells known as guard cells surround stomata and function to open and close stomatal pores.

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_____ are tiny openings or pores in plant tissue that allow for gas exchange.

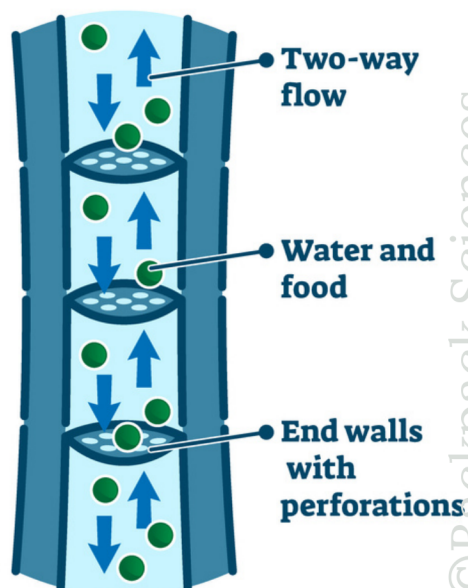
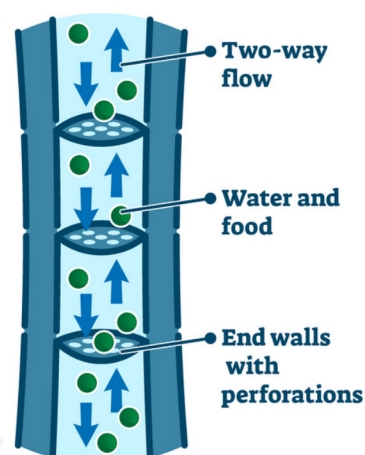
_____ are typically found in plant leaves but can also be found in some stems. Specialized cells known as guard cells surround _____ and function to open and close _____ pores.

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The xylem carries up water and minerals from the roots to the leaves. xylem, plant vascular tissue that conveys water and dissolved minerals from the roots to the rest of the plant and also provides physical support.

The ____ carries up water and minerals from the roots to the leaves. ____, plant vascular tissue that conveys water and dissolved minerals from the roots to the rest of the plant and also provides physical support.

PHLOEM**Phloem****PHLOEM****Phloem**

Phloem, plant vascular tissue that conducts foods made in the leaves during photosynthesis to all other parts of the plant. Phloem is composed of various specialized cells called sieve elements, phloem fibres, and phloem parenchyma cells.

_____, plant vascular tissue that conducts foods made in the leaves during photosynthesis to all other parts of the plant. _____ is composed of various specialized cells called sieve elements, _____ fibres, and phloem parenchyma cells.