Name: _____

Why Leaves Change Color

By Lydia Lukidis

Every fall, you know the drill. The leaves on the trees change color from green to red, orange, and yellow. The trees become explosions of vibrant color. Eventually, the leaves turn brown and fall off the trees. Of course you know that leaves change color before winter. But do you know why?

Let's start with the basics. Trees need to eat and drink, just like us. But they don't eat food like we do. Instead, the leaves on trees use sunlight to produce food. This process is called photosynthesis. That's quite a mouthful to say! Let's take a closer look at how photosynthesis works.

Basically, the tree breathes in carbon dioxide, which is in the air around us. The tree takes in carbon dioxide through pores on its leaves. The tree also absorbs water through its roots. Every time it rains, the tree is happy!

The leaves are made up of very small cells, and inside those cells are tiny formations called chloroplasts. Each chloroplast has a green chemical that gives it its color. That green chemical is called chlorophyll. The chlorophyll is very important because it allows the photosynthesis to take place.

When the light from the sun enters the leaf, the chlorophyll absorbs the light energy. Then, oxygen is released from the leaves. That oxygen goes into the air and helps us breathe. Also, the light energy is turned into sugar that the trees use for food. That sugar is called glucose. Here's an easy way to remember this:

CARBON DIOXIDE + WATER → (**SUNLIGHT**) → **GLUCOSE + OXYGEN**

Now let's get back to why leaves change color. During the spring and summer, there's a lot of sunlight. But once fall and winter roll around, it doesn't stay light outside as long. So, the leaves don't get as much sunlight as they used to. The chlorophyll in the leaves starts to decrease. And remember, chlorophyll gives leaves their green color. So if there is less chlorophyll, the leaves lose their green color.

So where do the other colors come from? Even though leaves look solid green, they actually have small amounts of other colors in them too. The chlorophyll is the main color and it's green. There is also "carotenoid," which makes yellow, orange, and brown. And there is "anthocyanin," which makes red and purple. When the green starts to fade, you can start to see the other colors coming out. Once the leaf runs out of food, it turns brown, dies, and eventually falls off.

Every tree is different, so the leaves change color at their own pace. And the colors depend on the temperature, the clouds, and the rain. It is different every fall. But, it is always magical.

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1. According to the information in the article, which of the following does a plant require for photosynthesis?

a. sunlight, oxygen, and water

b. carbon dioxide, water, and glucose

c. water, oxygen, and carbon dioxide

d. carbon dioxide, sunlight, and water

2. Identify two outputs of photosynthesis. (Hint: One of them benefits humans, and the other is a sugar.)

_____ and _____

3. What is chlorophyll?

_____

_____

4. Why does the amount of chlorophyll in leaves begin to decrease in the fall?

_____

_____

_____

5. Where do the red, orange, yellow, brown, and purple colors come from when the leaves begin to change in the fall?

_____

_____

_____

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The following terms are vocabulary words from the article. Match the vocabulary word with its correct definition by writing the corresponding letter on the line.

1. _____ vibrant

2. _____ photosynthesis

3. _____ chloroplast

4. _____ decrease

5. _____ chlorophyll

6. _____ carbon dioxide

7. _____ pores

8. _____ absorbs

9. _____ cells

10. _____ eventually

a. lessen in amount or intensity

b. small openings in a surface

c. a natural gas in the air that plants use for photosynthesis

d. vivid, bright

e. the smallest basic units of living organisms

f. takes in or soaks up energy, liquid, or another substance

g. gradually; not happening right away

h. a process by which green plants use sunlight to obtain food from carbon dioxide and water

i. a green pigment inside plants that helps them absorb sunlight for photosynthesis

j. a formation inside a cell that contains chlorophyll; where photosynthesis takes place

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In the article, "Why Leaves Change Color," you learned that the decrease of sunlight in the fall leads to the beautiful red, orange, yellow, purple, and brown colors we see on the trees all around us.

On the lines below, describe what you like about autumn where you live. Does your hometown experience a visible change of seasons where you can see the leaves change color? What other things do you enjoy about autumn?

ANSWER KEY

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   d. carbon dioxide, sunlight, and water

2. Identify two outputs of photosynthesis. (Hint: One of them benefits humans, and the other is a sugar.)

   oxygen and **glucose**

3. What is chlorophyll?

   Chlorophyll is a chemical inside plants that gives them their green color and allows photosynthesis to occur.

4. Why does the amount of chlorophyll in leaves begin to decrease in the fall?

   The days become shorter in the fall, and the decrease in sunlight causes the levels of chlorophyll in the leaves to lessen as well.

5. Where do the red, orange, yellow, brown, and purple colors come from when the leaves begin to change in the fall?

   The other colors appear when the chlorophyll level decreases. They come from chemicals called carotenoids and anthocyanin that have been in the plant all along.

ANSWER KEY

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