Name: _____ Date: _____

Why Leaves Turn Colors in Autumn

Circle group

In many places, summer leaves are green. In autumn, they turn yellow, orange, and red. The leaves are not painted. The colors were in the leaf all along, and some new ones are made.

Leaves look green because of chlorophyll. This is the stuff that takes in sunlight to make food. Leaves also have yellow and orange colors, but the green hides them.

In autumn, the days get shorter and the nights get cooler. The tree stops making chlorophyll. The green fades, and the yellow and orange show. Birches and aspens often turn a clear yellow.

Reds and purples are new. Leaves make new colors in autumn, when sugar builds up in the leaf. Sunny days and cool nights make the best reds. So the show is not the same each year.

Not every tree joins this show. Pines and spruces keep most of their needles all year. They replace them a few at a time. Bright fall color is best known in places with cool autumns and cold winters, such as parts of North America, Europe, and eastern Asia. Dropping leaves also helps a tree in winter. The ground may freeze, so the roots cannot take up much water. Bare branches lose far less water to the air.

At last, a layer of cells forms where the leaf meets the twig. The leaf falls. The tree rests all winter.

Questions

1. What makes leaves look green?

_____

_____

2. Why can we not see the yellow in summer?

_____

_____

3. What does the tree do when the days get shorter and the nights get cooler?

_____

_____

4. Where do the reds and purples come from?

_____

_____

5. Why is the show different each year?

_____

_____

6. Why does the passage say the leaves are not painted?

_____

_____

Words to know

chlorophyll: the green pigment that captures sunlight in leaves

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Why Leaves Turn Colors in Autumn

Triangle group

In many places, the green of summer gives way to brilliant yellows, oranges, and reds each autumn. The change is not a sudden painting of the leaves. It is the uncovering of colors that were there all along, combined with some new ones.

Leaves look green because they contain chlorophyll, the pigment that captures sunlight for photosynthesis. During the growing season, chlorophyll is constantly broken down and rebuilt. Leaves also hold yellow and orange pigments called carotenoids, but the abundant green hides them.

As autumn arrives, the days grow shorter and the nights grow cooler. The tree responds by slowing and then stopping its production of chlorophyll. The green fades, and the carotenoids show through. This is why birches and aspens often turn a clear yellow.

Reds and purples have a different origin. In many kinds of trees, the leaves make new pigments called anthocyanins in autumn, when sugars build up in the leaf. Bright, sunny days and cool nights tend to produce the strongest reds, so the display varies from one year to the next.

Not every tree takes part in this show. Evergreens such as pines and spruces keep most of their needles through the year and replace them gradually instead of all at once. Brilliant autumn color is best known in regions with cool autumns and cold winters, such as parts of North America, Europe, and eastern Asia. Dropping leaves also helps a tree through winter, because the ground may freeze and the roots cannot take up much water, and bare branches lose far less of it to the air.

Eventually, a layer of cells forms where each leaf joins the twig, and the leaf falls. The tree then rests through the winter and saves its energy for spring.

Questions

1. What pigment makes leaves look green?

_____

_____

2. Why can people not see the yellow pigments in summer?

_____

_____

3. What does a tree do as the days grow shorter and the nights cooler?

_____

_____

4. Where do the reds and purples come from?

_____

_____

5. Why might the colors look different from one autumn to the next?

_____

_____

6. Why does the passage say the change is not a sudden painting?

_____

_____

Words to know

pigment: a natural substance that gives something its color
chlorophyll: the green pigment that captures sunlight in leaves
abundant: present in a very large amount
production: the making of something
display: a show that is meant to be seen

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Why Leaves Turn Colors in Autumn

Square group

In many parts of the world, the green of summer gives way to brilliant yellows, oranges, and reds every autumn. The transformation is not a sudden painting of the leaves. Rather, it is the uncovering of colors that were present all along, joined by a few entirely new ones.

Leaves appear green because they contain chlorophyll, the pigment that captures sunlight for photosynthesis. Throughout the growing season, chlorophyll is continually broken down and rebuilt. Leaves also hold yellow and orange pigments called carotenoids, but the abundant green conceals them from view.

As autumn approaches, the days grow shorter and the nights grow cooler. The tree responds by slowing and eventually stopping its production of chlorophyll. The green fades, and the carotenoids become visible, which is why birches and aspens frequently turn a clear, bright yellow.

Reds and purples have a different origin altogether. In many kinds of trees, the leaves manufacture new pigments called anthocyanins in autumn, at a time when sugars are building up in the leaf. Bright, sunny days followed by cool nights tend to produce the strongest reds, so the spectacle varies noticeably from one year to the next.

Not every tree takes part in this annual show. Evergreens such as pines and spruces keep most of their needles throughout the year and replace them gradually instead of all at once. Brilliant autumn color is best known in regions with cool autumns and cold winters, such as parts of North America, Europe, and eastern Asia. Dropping leaves also helps a tree survive the winter, because the ground may freeze so that the roots cannot take up much water, and bare branches lose far less of it to the air.

Eventually, a layer of cells forms at the point where each leaf joins the twig, and the leaf drops away. The tree then rests through the winter and saves its energy for the return of spring.

Questions

1. Which pigment makes leaves appear green?

_____

_____

2. Why are the yellow and orange pigments invisible in summer?

_____

_____

3. How does the tree respond to shorter days and cooler nights?

_____

_____

4. What is the source of the reds and purples?

_____

_____

5. Why might the display of color vary from year to year?

_____

_____

6. Why does the passage say the change is not a sudden painting?

_____

_____

Words to know

pigment: a natural substance that gives something its color
chlorophyll: the green pigment that captures sunlight in leaves
abundant: present in a very large amount
production: the making of something

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: Why Leaves Turn Colors in Autumn

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: Why Leaves Turn Colors in Autumn

Easier · 230 words · Flesch-Kincaid grade 2.8

1. Chlorophyll.
2. The green hides it.
3. It stops making chlorophyll.
4. The leaves make new colors in autumn.
5. The reds depend on the weather, such as sunny days and cool nights.
6. Most of the colors were in the leaf all along and were only hidden by the green.

Triangle: Why Leaves Turn Colors in Autumn

This passage · 292 words · Flesch-Kincaid grade 7.1

1. Chlorophyll.
2. The abundant green hides them.
3. It slows and then stops making chlorophyll.
4. New pigments called anthocyanins that the leaves make in autumn.
5. The reds depend on the weather, such as sunny days and cool nights.
6. Most of the colors were already in the leaf and were only hidden by the green.

Square: Why Leaves Turn Colors in Autumn

Harder · 318 words · Flesch-Kincaid grade 9

1. Chlorophyll.
2. The abundant green conceals them.
3. It slows and eventually stops producing chlorophyll.
4. New pigments called anthocyanins that the leaves make in autumn.
5. The reds depend on the weather, such as bright sunny days and cool nights.
6. Most of the colors were already present in the leaf and were only hidden by the green.