

Trees of Stone

A strange forest exists in the deserts of eastern Arizona. Unlike in most forests, these trees aren't standing in groves. Instead, they are lying on the ground, and some are even partly buried. Also the trees are missing their leaves and branches. Another odd thing about these leafless tree trunks is their color. Instead of being dull brown, they are brightly colored and sparkle in the sunlight. Clearly, these are not ordinary trees in an ordinary forest. They are petrified trees — trees that have turned to stone. They are found in the Petrified Forest National Park.

How Trees Changed to Stone

When trees die and fall down, they usually decompose. Over time they rot. In the case of the petrified trees, however, this did not happen. After the trees died, they fell into soggy marshes. They quickly became covered by sand, mud, and ash from volcanoes. Buried and not exposed to the air, the trees could not rot. Instead, a different and more interesting process took place.

As the volcanic ash became soaked with water, a mineral called silica was leached, or removed, from the ash. The water also removed other minerals, such as iron, from the mud. As the water seeped slowly into the wood, so did the minerals. The minerals gradually replaced the cells of the wood, turning the tree trunks into colorful stone. This transformation happened over many years.

The stone formed in the same patterns and shapes as the wood it replaced. Even the rings that show a tree's annual growth became visible in the stone. The minerals gave the tree trunks their beautiful colors. For example, iron turned the trees red, yellow, brown, blue, or green, depending on what other minerals it mixed with. Carbon turned the trees black.

Uncovering the Petrified Trees

Today many of the trees lie on the desert's surface. Over time the swampy areas dried up. Then the wind and rain wore away much of the loose rock and sand. After many years all of the material covering the trees was gone, and they were no longer buried.

Many of the tree trunks have remained in large pieces. Some measure as large as four feet in diameter and 100 feet in length. Amid thousands of these large logs are tens of thousands of smaller pieces of petrified wood.

Protecting the Petrified Trees

The Arizona desert is one of the few places in the world where stone trees can be seen. The petrified forest became a national park in 1962 so that these special trees could be preserved and protected. Known as one of the natural wonders of our country, the petrified forest attracts many tourists each year.

The park covers an expanse of more than 93,000 acres of land. It includes a museum, picnic areas, a petrified-log bridge, and an ancient dwelling built entirely from petrified wood.

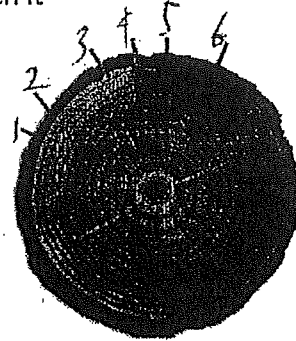
The idea of going to see logs and pieces of stone scattered across a desert may seem boring. However, seeing the lovely colors of the petrified trees makes a visit well worth the time.

- 15 Petrified trees are usually —
- A lying on the ground
 - B stacked in piles
 - C displayed in people's homes
 - D found in museums
- 16 Information in the passage suggests that —
- F the Petrified Forest National Park charges an admission fee
 - G different combinations of minerals produced different colors
 - H petrified trees are used for firewood
 - J the Petrified Forest National Park is open all year
- 17 The trees in the petrified forest did not rot because —
- A the area became very dry
 - B they were lying on the desert's surface
 - C their wood was unusually hard
 - D they were buried under layers of sand, mud, and ash
- 18 What is the main idea of the passage?
- F Stone trees found in the Petrified Forest National Park were formed over time.
 - G The Petrified Forest National Park attracts many tourists each year.
 - H Petrified trees are blue, red, yellow, brown, black, or green.
 - J Wind and rain wore away the material that covered the trees.
- 19 Which of these is a FACT in this passage?
- A People enjoy the museum and picnic areas.
 - B Silica and iron are minerals.
 - C The deserts in Arizona are most beautiful in winter.
 - D The visitor center at the park is open seven days a week.
- 20 From information in the passage, the reader can conclude that —
- F the national park is open only during the summer
 - G wild animals roam the national park in search of food
 - H the national park is an expensive place to visit
 - J the petrified trees were not well protected before 1962
- 21 Arizona's petrified trees can now be seen on the desert's surface because —
- A they have all been put in one area
 - B wind and rain wore away the loose rock and sand
 - C many of the tree trunks are very large
 - D all of the other trees have disappeared

Tree Cookies

Tree cookies are cross sections of tree trunks that reveal different layers of a tree. Each layer can tell us something about the tree's life and the climate in which it grew.

1 is the **cambium**. It is a layer just one cell thick that produces the xylem and phloem cells. This is **where diameter growth occurs**, and where rings and inner bark are formed.



2 is the **phloem** or inner bark. This layer **carries sugar made in the leaves or needles down to the branches, trunk, and roots**, where it is converted into the food the tree needs for growth.

3 is the **xylem** or sapwood. This layer **carries the sap** (water, nitrogen, and mineral nutrients) **up from the roots to the leaves**. Sapwood gives a tree its strength.

4 is a **growth ring**. The lighter portion is called the "early wood" (it grows in the spring), and the darker portion the "late wood" (it grows in the summer). Together, they represent one year of growth.

5 is the **heartwood**. Heartwood is old sapwood that no longer carries sap. It **gives the trunk support and stiffness**. In many trees heartwood is a darker color than sapwood, since its xylem tubes are clogged.

6 is the **outer bark**. This layer **protects a tree from insects and disease, excessive heat and cold**, and other injuries.

Look at your tree cookie to make measurements and observations.

Smallest tree ring in mm _____ Biggest tree ring in cm _____

Number of rings _____ Age of tree _____

Most interesting observation _____

What carries sugar from the leaves down to the trunk and roots? _____

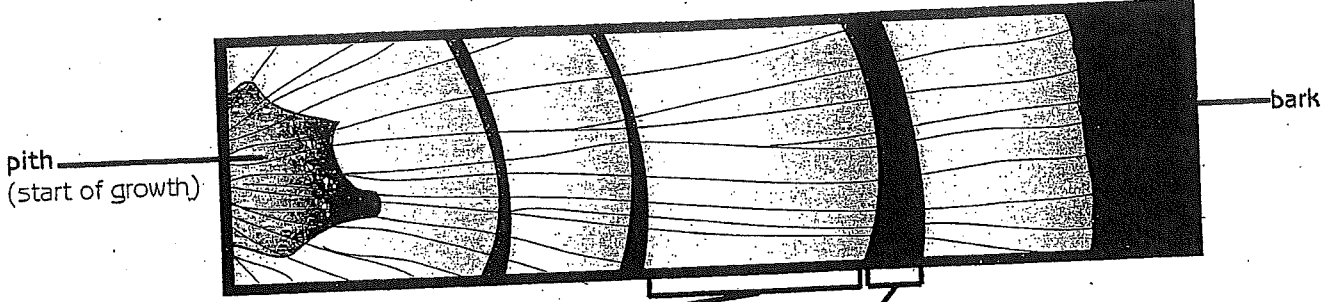
What gives the trunk support and stiffness? _____

Where does diameter growth occur? _____

Name _____

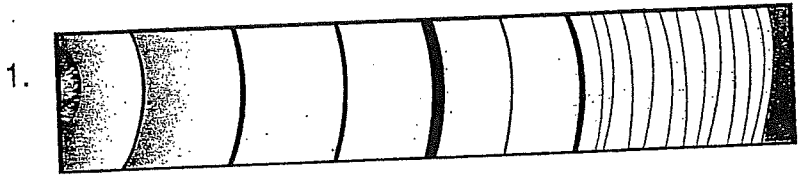
Getting at the Core of Climate

Use the diagram to help you describe what the tree rings tell about the climate during the trees' growth.

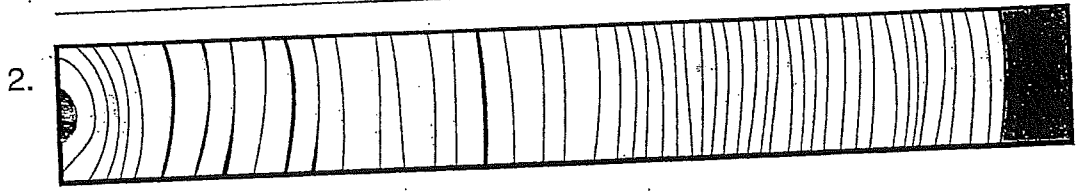


light part (earlywood, or growth during spring) + dark part (latewood, or growth later in a season) = one annual ring

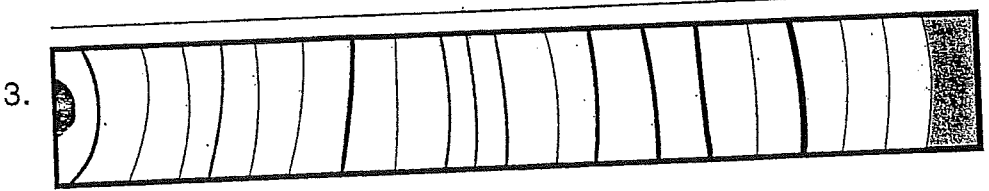
narrow ring = slow growth (cool, dry year)
 wide ring = fast growth (warm, wet year)



Climate: _____



Climate: _____



Climate: _____
