Paleobotany

Paleobotany is the study of fossil plants. There are many species of plants alive on Earth today, and there have many, many more that went extinct at some point in the past. Paleobotanists study the fossils that those plants left behind.

What makes a plant a plant? Plants are different from animals in several very important ways. The first is that plants are autotrophic - that means they can make their own food. Animals can’t do that; we have to eat plants, or other animals that have eaten plants, to get our nutrients. Plants use energy from the sun to make food in their leaves through a process called photosynthesis. Another important difference is that animals can move freely from one place to another - we aren’t attached to a substrate, like a rock or the ground, but plants are. Plants often attach to the ground using structures called roots, which animals lack. Despite these differences, plants and animals actually have a lot in common. All plants and animals grow - they get bigger or change form in some way over the course of their lives. All plants and animals also reproduce - we make more organisms like ourselves. And we all breath, but plants use carbon dioxide in the air while animals use oxygen.

Illustration from Scandinavian Ferns by Benjamin Øllgaard and Kirsten Tind, Rhodos, 1993.
Plants have been around for a very long time - millions and millions of years. The time scale below shows when different kinds of plants evolved during Earth's history. Ages are in millions of years ago.

<table>
<thead>
<tr>
<th>Era</th>
<th>Period/Epoch</th>
<th>Age</th>
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<tbody>
<tr>
<td>Precambrian</td>
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<td>Cambrian</td>
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<td>Ordovician</td>
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<td>Silurian</td>
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<td>Carboniferous</td>
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<tr>
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**Precambrian**

- Late Silurian Period: first vascular plants. These are the ancestors of modern plants. **Vascular** means vessel; these plants have microscopic tubes inside for transporting food and water, just like our blood vessels.

**Carboniferous**

- This period was dominated by **ferns** and **horsetails**.

**Triassic-Jurassic**

- Cycads, conifers, and **ginkgos** were dominant plants during this time.

**Cretaceous**

- This was when the first **flowering plants** started to evolve.

**Middle Devonian**

- The dominant group of land plants was the **lycopods**.

**Late Silurian Period**: first vascular plants. These are the ancestors of modern plants. **Vascular** means vessel; these plants have microscopic tubes inside for transporting food and water, just like our blood vessels.
Make Your Own Plant Fossil!

You can make your own plant fossil using a few simple ingredients. Follow the steps below to create a fossil like the ones paleobotanists study.

Supplies: Plaster of Paris, water, mixing bowl, leaf or blade of grass, petroleum jelly or cooking oil, paper plate

1. Rub petroleum jelly or cooking oil on your leaf or blade of grass to keep the plaster from sticking to it.
2. Follow package directions for combining Plaster of Paris with water in a small mixing bowl.
3. Pour the Plaster of Paris onto the paper plate, and place the plant specimen gently on top, pressing it slightly into the plaster.
4. Allow the plaster to harden according to the package instructions.
5. When plaster has hardened you can peel away your plant part, leaving the fossil behind!

Here are what some real fossil leaves look like:
Paleobotany Crossword

Across
1. Plant that was dominant in the Carboniferous, and was named after part of an animal.
4. Period during which the flowering plants became dominant.
8. A type of plant dominant during the Triassic-Jurassic periods.
9. The study of fossil plants.
10. A structure that was only found on plants starting in the Cretaceous Period.

Down
2. Cone-bearing trees that were dominant during the Jurassic.
3. Plants dominant in the Devonian.
5. Structures that plants use to attach to substrates like the ground.
6. A tree dominant in the Triassic.
7. Word meaning ‘vessel.’
10. Plants with feather-like leaves that were dominant in the Carboniferous Period.
11. Part of the plant where photosynthesis creates food.
SEED DISPERsal - The power of the Angiosperm

For seeds to grow, they need to travel to new places in the ground. Here are some ways that they travel:

Some seeds are light and have wings to travel on the wind.

Some plants explode and send their seeds flying into the air.

Some birds and animals can move seeds around and forget them on the ground.

Heavy seeds fall down to the ground.

Some seeds have little hooks on them so they stick to an animal’s fur and travel to a new place.

Many seeds are eaten by animals and are planted in their droppings.

Some seeds are hollow inside so that they can float on the water until they find a new place to grow.

Miss Maple’s Seeds, a picture book by Eliza Wheeler (Nancy Paulsen/Penguin Books) wheeler studio.com

The Museum of the Earth is a public education venue of the Paleontological Research Institution.

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Science Buddies "Whirly Bird" Template

1. Cut along the solid lines

2. Fold parts A and B inward along the dashed lines

3. Fold part C upward to create a tab that holds parts A and B in place

4. Fold part D toward you along the dashed line

5. Fold part E away from you along the dashed line

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