

## SUGGESTED REFERENCES

■ A.K. Behrensmeyer, et al. 1992.  
**Terrestrial Ecosystems Through Time**  
University of Chicago Press, 1992

■ T.N. Taylor & E.L. Taylor  
**The Biology and Evolution of Fossil Plants**  
Prentice Hall, 1993

## WEBSITES

■ *The Mysterious Venus Flytrap*  
Botanical Society of America  
<http://www.botany.org/bsa/misc/carn.html>

■ *Photosynthesis: How do Plants Make Food?*  
Newton's Apple  
<http://www.pbs.org/ktca/newtons/9/phytosy.html>

■ Encarta Online  
<http://www.encyclopedia.msn.com>  
key word: photosynthesis

■ *Royal Botanic Gardens at Kew: Plant Evolution*  
<http://www.hcs.ohio-state.edu/ukstudy2000/postcard/kew5.htm>

■ *The Silurian Period*  
Georgia Geoscience Online  
<http://www.dc.peachnet.edu/~pgore/geology/geo102/silur2.htm>

■ Encyclopedia.com  
<http://www.encyclopedia.com>  
key word: vascular plants

## NATIONAL SCIENCE EDUCATION STANDARDS

Science Content Standards: 5 - 8 Structure and Function of Living Systems  
Regulation and Behavior  
Populations and Ecosystems  
Diversity and Adaptation of Organisms

9 -12 Biological Evolution  
Interdependence of Organisms  
Matter, Energy, and Organization in Living Systems

## CREDITS

The producers thank Channel 4 Television Corporation/4 Learning for materials used in this program.

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## VOLUME 32 ISSUE 6 THE EVOLUTION OF PLANTS



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## SYNOPSIS

During the four hundred million years that plants have been on earth, they have adapted from living exclusively in the sea to thriving on land. Once established on land, plants diversified and moved into many different habitats.

This edition of SCIENCE SCREEN REPORT takes a look at the history of plants. It explores the anatomy of the plant and the process of photosynthesis. It examines different plant species, including the carnivorous Venus flytrap. It also travels to the Redwood forest to learn about the giant sequoias that grow over 300 feet or approximately 91 meters.

## CURRICULUM UNITS

- BIOLOGY
- BOTANY
- CONSERVATION
- ECOLOGY
- HORTICULTURE

## RUNNING TIME

13:21

## BACKGROUND

There are approximately 260,000 known species belonging to the plant kingdom. Plants are able to manufacture their own food through a process called photosynthesis. Because plants convert light energy into chemical energy, they are the foundation of life's food web. However, only a small percentage of plant species are used directly for human consumption. More important are the indirect benefits organisms receive from the plant kingdom through the exchange of carbon dioxide and oxygen gases. The abundance of plants in our world's biomass also modifies our climates.

Plants originated in the sea where they depended on water for survival. Over 400 million years ago, during the Paleozoic period, the first terrestrial land plants evolved. The development of a vascular system made it possible for plants to leave the water and to survive on land. This development brought forth an entirely different type of plant species, the land plant. The vascular system is comprised of roots and transport vessels found in stems and leaves. Most terrestrial plants contain internal vascular tissue that transports water, minerals, and food throughout the plant.

Some terrestrial plants with woody stems evolved into trees. The wood pulp, or lignin, found in roots is the same substance needed to form the hard trunk of a tree. The Wollemi Pine is a rare species that grows in Australia. Scientists have found fossils that show that the Wollemi Pine existed 100 million years ago. Even though this tree can grow to the great height of 120 feet, there is another tree that grows even taller, the Redwood or Giant Sequoia.

Giant Sequoias have existed since the age of the dinosaurs. They reproduce with the help of forest fires. This is because only at the extremely high temperatures from the fires will their pine cones open and drop seeds to germinate in the soil.

Green plants are one of the few organisms in the natural world that can manufacture their own food. Photosynthesis is the process by which plants use the energy of light to convert carbon dioxide and water into glucose. Plants take in carbon dioxide and in exchange fill our world with oxygen.

The green color of plants comes from a pigment called chlorophyll. Some plants have flowers, and the sweet nectar that their blooms produce entices insects to feed. Insects are essential in pollinating flowers.

Land plants rely on soil to anchor their roots and receive nutrients. Some plant species grow in areas with soil that is deficient in nutrients. One such species, which makes its home in deficient soil, is the Venus flytrap. Instead of getting its nutrients from the soil, this carnivorous plant receives some nutrients by catching prey in its leaves. It feeds on insects and even small frogs.

Plants aesthetically fill our world with their beauty and wonder. They also add life-sustaining oxygen into our air. As our forests are diminished and our world becomes filled with more buildings, it is increasingly important to preserve the plants that add to our lives.

## ADVANCED ORGANIZERS

Prior to showing the program:

1. Discuss ways that plants and trees contribute to our environment.
2. Discuss how plants and trees are vital to life on Earth.
3. Identify various tree and plant species that are local natives.
4. Research the Wollemi Pine and the Giant Sequoia. Compare and contrast their attributes.
5. Discuss what earth must have been like prior to the emergence of plants.

## CRITICAL THINKING EXERCISES

1. After showing the video, ask your students the following:
  - a | How did plants evolve from living in the sea to living on land?
  - b | The Wollemi Pine is considered a living fossil. Explain.
  - c | Explain deforestation and its effects on the environment.
  - d | Why are some Redwood trees capable of living for thousands of years?
2. Create a table outlining important stages in the development of land plants.
3. Draw a diagram of a vascular plant. Summarize how it functions.
4. What natural element protects Redwood trees from fires, and how are fires helpful to this species?
5. Describe the process of photosynthesis.
6. Research and explain the steps involved in pollination.
7. In what ways can plants help our environment?
8. Explain how the Venus flytrap can survive in soil that is deficient in nutrients.  
Bring in a Venus flytrap to show the students.

## VOCABULARY

Carnivorous  
Chloroplasts  
Chlorophyll  
Evaporate  
Fossil  
Germinate  
Lignin  
Photosynthesis

Pollinate  
Psilophytes  
Reservoir  
Sequoia  
Stomata  
Tannin  
Wollemi Pine

## CAREER POSSIBILITIES

- BIOLOGIST
- BOTANIST
- ECOLOGIST
- ENVIRONMENTAL ENGINEER
- ENVIRONMENTALIST
- HORTICULTURIST