

# ANCIENT PLANTS AND POLLEN

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## PROGRAM OVERVIEW

TOPIC: The plant life of Cretaceous Alberta

THEME: Understanding plants of the Cretaceous Period and their place in the palaeoenvironment of Alberta.

PROGRAM DESCRIPTION: Explore the world of plants by stepping in to our living exhibit – the Cretaceous Garden! Here, students will discover what plants looked like in Alberta during the Age of Dinosaurs. In a practical curriculum-based exercise, working in teams, students will locate a specific plant, analyze, describe, and draw it; gathering information to present to their classmates. This program will encourage students to use their observation, investigative, artistic, and public speaking skills.

AUDIENCE: Grades 4 - 7

### CURRICULUM CONNECTIONS

- Grade 4     **Science:** Plant Growth and Changes
- Grade 4     **Social Studies:** Alberta: The Land, Histories and Stories
- Grade 5     **Science:** Wetland Ecosystems
- Grade 6     **Science:** Trees and Forests, Evidence and Investigation
- Grade 7     **Science:** Interactions and Ecosystems

### PROGRAM OBJECTIVES

Students will be able to:

1. Name and describe at least one plant from the Cretaceous Garden through a presentation to the class and describe the position in the forest ecosystem.
2. Identify the differences between angiosperms, gymnosperms, and spore producing plants.
3. Compare the ancient environment with the modern environment.
4. Recognize and describe the scientific method.

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## SUGGESTED PRE-VISIT ACTIVITIES

### 1. PROGRAM TERMINOLOGY

Here are some terms to introduce to your class before attending your program at the Royal Tyrrell Museum. These terms will prepare the students so they will get the full benefit of the program.

**Angiosperm:** also called flowering plant, have seeds that are enclosed within an ovary (usually a fruit). Angiosperms are a large group and include herbaceous plants, shrubs, grasses, and most trees.

**Canopy:** the uppermost trees or branches of the trees in a forest, forming a more or less continuous layer of foliage.

**Forest floor:** the ground beneath the trees of a forest, consisting of tree roots, soil, and decaying organic matter.

**Gymnosperm:** a plant that has no flowers or fruits, and have enclosed or 'naked' seeds on the surface of their scales or leaves. Gymnosperm seeds are often configured in cones (i.e., coniferous trees like spruce and pine).

**Leaf:** is an organ of a plant that is specialized for photosynthesis. Leaves capture energy from sunlight as well as carbon dioxide from the air.

**Leaflet:** one of the divisions of a compound leaf.

**Palaeoenvironment:** the past environment of an area during a given period of its history.

**Palynology:** the branch of science that deals with the study of plant pollen, spores, and certain microscopic plankton organisms both in living and fossil form.

**Pollen:** a fine powdery substance consisting of microscopic particles produced by the male part of a flower that causes the female part of the same type of flower to produce seeds. Pollen is carried by wind, insects, or other animals.

**Spore:** is a tiny structure produced by non-flowering plants that helps them reproduce. Since they are so small and light, they can be dispersed by the wind to new locations where they can grow. Spore producing plants include mosses and ferns.

**Stem:** the main structure of a plant that supports branches, leaves, flowers and fruit. Stems have vascular tissues that move food and water around the plant to help it grow. Plants often store food in their stems.

**Understory:** is the underlying layer of vegetation in a forest, particularly the trees and shrubs growing between the forest canopy and the forest floor.

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## SUGGESTED PRE-VISIT ACTIVITIES

2. Visit a park, garden, zoo, or other outdoor natural space and observe the variety of plants present. Make a list of the different varieties of plant life that you saw (trees, shrubs, flowers, etc.) and their structures (leaves/needles, stem/trunk, branches, etc). Discuss the diversity and what adaptations they have.

### 3. QUESTIONS FOR CLASS DISCUSSION:

- What do plants need to survive?
- How do they spread their seeds? (i.e., cones, fruit, etc.)
- How do plants change with the seasons?
- What challenges do their environments pose?

## POST-PROGRAM ACTIVITIES

### 1. PROJECT IDEAS:

- Create visual journals of the plants that your students observed and studied in the Cretaceous Garden.
- Research the palaeoenvironment of Alberta during the late Cretaceous Period.
- Grow plants and study the traits using what was learned in the program at the Royal Tyrrell Museum.
- Social media sharing of school efforts to protect the environment – planting trees, three Rs (reduce, reuse, recycle), etc.

### 2. QUESTIONS FOR DISCUSSION:

- Where in the world today do you find an environment similar to the one in Alberta during the Cretaceous Period? What kinds of plants and animals live there now? What is the climate like? Is the landscape hilly or flat? How much water is there?
- How would you describe the climate and environment of the part of Alberta where you live? How do you think it will change next?
- Flowers first appeared/evolved during the Cretaceous Period. What would the world have looked like without them?
- What kinds of animals live in each level of the forest (floor, understory, canopy) today? What kinds would have lived in each level during the Cretaceous Period?

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## ONLINE RESOURCES

The following websites contain information and activities related to the material that was delivered in the Ancient Plants and Pollen program at the Royal Tyrrell Museum. You may want to have your students participate in these activities as a review of the subject.

Advice for growing plants in the classroom:

<https://sciencing.com/fastest-growing-plants-science-project-7859692.html>

Games and activities to explain the process and importance of pollination:

<https://gardenatschool.wordpress.com/2012/06/16/pollination-games/>

<http://www.life.illinois.edu/entomology/pollinators/docs/Pollination%20Activity%20Book.pdf>

Advice for building a terrarium in the classroom:

[https://kidsgardening.wpengine.com/wp-content/uploads/2016/03/KG\\_GardenActivities-buildingaterrarium.pdf](https://kidsgardening.wpengine.com/wp-content/uploads/2016/03/KG_GardenActivities-buildingaterrarium.pdf)

<http://www.stemmom.org/2013/04/terrarium-building-with-students.html>

<https://climatekids.nasa.gov/mini-garden/>

Climate change and its impact in Alberta and the world

**Interactive:** <http://climateatlas.ca/>

<https://climatekids.nasa.gov/menu/weather-and-climate/>

Tree planting for schools

<https://treecanada.ca/en/programs/greening-canadas-school-grounds/>

**Note: Links were last accessed March 2018.**

### *Links to Other Websites*

*Links to websites are provided solely for your convenience. The Royal Tyrrell Museum does not endorse, authorize, approve, certify, maintain, or control these external Internet addresses and does not guarantee the accuracy, completeness, efficacy or timeliness of the sites listed.*