

# Amherst College



## Plant Fossils (Grade 8 and up)

### *Hints for Teachers*



#### **MUSEUM INFORMATION:**

*The "Plant Fossils" activity sheet is designed for students to practice scientific inquiry to be used in the Beneski Museum of Natural History in conjunction with the classroom curriculum; however, it can also be used independently.*

- The *Beneski Museum of Natural History* displays the fossil remains of many different creatures throughout different periods of life.
- While exploring the exhibition, encourage your students to look above their heads to see specimens displayed at different levels of the museum.
- The *Beneski Museum of Natural History* can accommodate up to 45 children and chaperones at a time. Please consider splitting into smaller sub-groups when completing the Plant Fossils activity.
- When your students arrive at the museum, they will be given a brief greeting by a museum staff member. After this greeting is a good time for you to talk to your students and chaperones about the *Plant Fossils* activity.

#### **PREPARING AN ACTIVITY:**

- The museum does NOT provide copies of *Plant Fossils*. Please prepare copies for your students.
- *Plant Fossils* asks students to look critically at specimens and use their skills in scientific inquiry to hypothesize about the why such fossils persist.
- The museum asks that students refrain from leaning on any of the glass cases while working. We recommend providing students with clipboards or notebooks to lean on.
- *Plant Fossils* has a brief set of directions printed at the top for chaperones use.

# Amherst College

## Plant Fossils Information for Chaperones



Complete this activity in the Beneski Museum of Natural History.

- Please allow your students a few minutes to explore the main and bottom floor before beginning the *Plant Fossils* activity.
  - Divide into groups and have each group begin with a different question so that not all the students are looking at the same specimen at the same time.
  - The “Broad Questions” at the end can be done either before your visit as part of scaffolding, at the end of the visit with museum/teacher guidance or back at school as follow-up.
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- ✓ Remind your students to look all around them, even above their heads.
  - ✓ Remember: While in reach of students, remind them that the exhibits in the museum are fragile. Please do not allow them to touch any of the exhibits.

### Acknowledgements

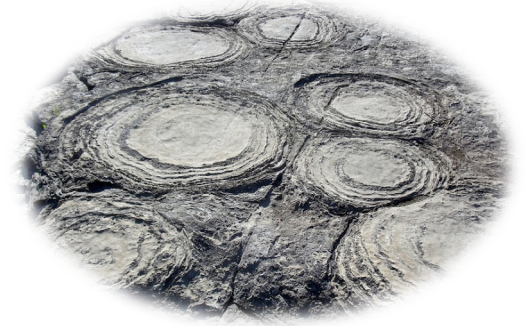
We wish to acknowledge and thank the staff of the following organizations for permitting us to share some of the best lab and field guide materials created for use in the Beneski Museum of Natural History.

- Amherst Public Schools
- Brown University
- Four Rivers Charter School
- Greenfield Community College
- Holyoke Community College
- McAuliffe Regional CPS
- Mount Holyoke College
- Northampton Montessori School
- Northampton Public Schools
- Smith College
- University of Massachusetts
- Williamsburg Schools

Name: \_\_\_\_\_ Date \_\_\_\_\_

## Section 1 - 2<sup>nd</sup> Floor – Shallow Inland Seas display (500MYA)

- *Cryptozoon proliferum* (Stromatolite) ~500MYA
  - (Specimen 1) Large example on the floor East Wall
  - (Specimen 2) Cross-Section shallow inland sea display
    - Once crowded into great barrier reefs around an island which now forms the Adirondack Mountains, in New York.



**Questions:** examine the large stromatolite.

1. What organisms were responsible for the formation of this large structure?
2. Why do they form 'layers'?
3. What part could they have played in the endosymbiotic theory, if any?

## Section 2 - 2<sup>nd</sup> Floor Plant Drawers (330 – 310 MYA)

- Set 1
  - *Stigmaria* sp. ~330 MYA
    - What structures do you think these are?
  - *Neuropteris hirsute* ~330 MYA
    - What structures do you think these are?
  - *Lepidostrobus* sp. ~330 MYA
    - What structure is this?
  - *Lepidodendron* ~330 MYA
    - What tissue/organ is this?



1. What do you think makes it have that specific kind of texture?

# Amherst College



- Set 2
  - *Neuropteris rogersi* ~330 MYA (Early Conifer relation)
    - Why is this a conifer relative?
  - *Calamites* sp. ~310 MYA (Horsetails & Spores)
    - There are ridges that form a ring around this stem, what are these ridges?
    - What would form out of these ridges?
- *Sigillaria* Sp. ~ 310 MYA (Club Moss)

**Questions:** Plant Fossil drawers, locate the large *Lepidodendron* fossil.

2. Are the leaf-like structures coating the stem of this species microphylls or megaphylls?
3. How do you know they are on or the other?
4. Did these plants have vascular tissue?
5. Did these plants have secondary growth?

## Section 3 - Main Level ~310 MYA – Near front door

- *Pecopteris distans*
  - Fern (Draw a quick sketch here)

## Section 4 - 2<sup>nd</sup> Floor Rifting Display (~200 – 180 MYA) –local fossils

- *Clathropteris platyphylla* ~190 MYA
- *Clathropteris meniscoides* ~190 MYA
- *Pachyphyllum* sp.
  - Specimen 1, 2, and 3
- *Vultzia heterophylla* ~190MYA
- *Dendrophycus triassicus* ~190MYA
- *Palissa* sp. ~190 MYA





**Questions:** Examine the painting above the plant fossils found here.

1. How may have the plants matched to environmental conditions in the Connecticut River Valley some 190MYA?
2. Was the valley in the painting comprised of grasses? If so, why? If not, what plants could have been there?

## Section 4 - Lower Level ~190 MYA –local fossils

- *Calathropteris* ~190MYA
  - Fern in Sandstone
  - Non-Local ~200 MYA
- *Araucarioxylon arizonicun* ~200MYA
  - Fossilized tree conifer

**Questions:** Examine the diorama here. Carefully read the exhibit display.

1. Do we still have plants like those of 190MYA?
2. What environment might these plants be found today?
3. What group of plants diversified leaves and is it evident with the fossils we have seen here today?

## Section 6 - Other 2<sup>nd</sup> Floor Location

2<sup>nd</sup> Floor Chemical Replacement Drawers (~170MYA)

- *Pleurophyllum compton* ~170MYA
  - Also, 2 pieces of petrified wood no date.
  - How is petrified wood made? (Ask if you can't find the answer)
- 2<sup>nd</sup> Floor Molds and Cast Drawers (~14MYA)
  - *Laurus similis* (Laurel Leaf) ~14MYA
  - *Ulmus specioca* (Elm Leaf) ~14MYA
  - *Quercus cognatus* (Oak Leaf) ~14MYA



# Amherst College



## Section 7 - 1<sup>st</sup> near Wall of Mammals (~15MYA)

- *Menziesia knowlton*
- *Quercus payettensis* (Oak)
- *Umbelularia ensis* (Laural)
- *Sequoia langsdorf* (Sequoia)
- *Betula heterophylla* (Birch)
- *Populus heterophylla* (Poplar)



### Questions:

1. Do any of these look familiar? Why?

### Broad Questions:

2. What is a fossil?
3. How do they help explain the process of evolution?
4. What are three traits plants have evolved since green algae started the course of plants to move onto land?
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5. How do we know that, what provides the evidence?
6. Are plant fossils good environmental indicators of past environments? If so why?