ANSWER KEY

BEST FOR Grades 7–12

PALEO PLANTS PRESERVE THE PAST

A Deep-time Look at Alaska using Fossil Leaves

MISSION #1: HOW TO ESTIMATE TEMPERATURE

Step 1 – Use the four pages of images of fossil leaf species (at the end of this document) to count how many species have leaves with smooth margins and how many have toothed margins. But be careful! Many of the leaves are not preserved perfectly, so you have to try to determine what the actual leaf margin is, instead of broken edges of the leaf (see below).

(see text on images at end of document)

Step 2 – Calculate the percentage of species with smooth margins.

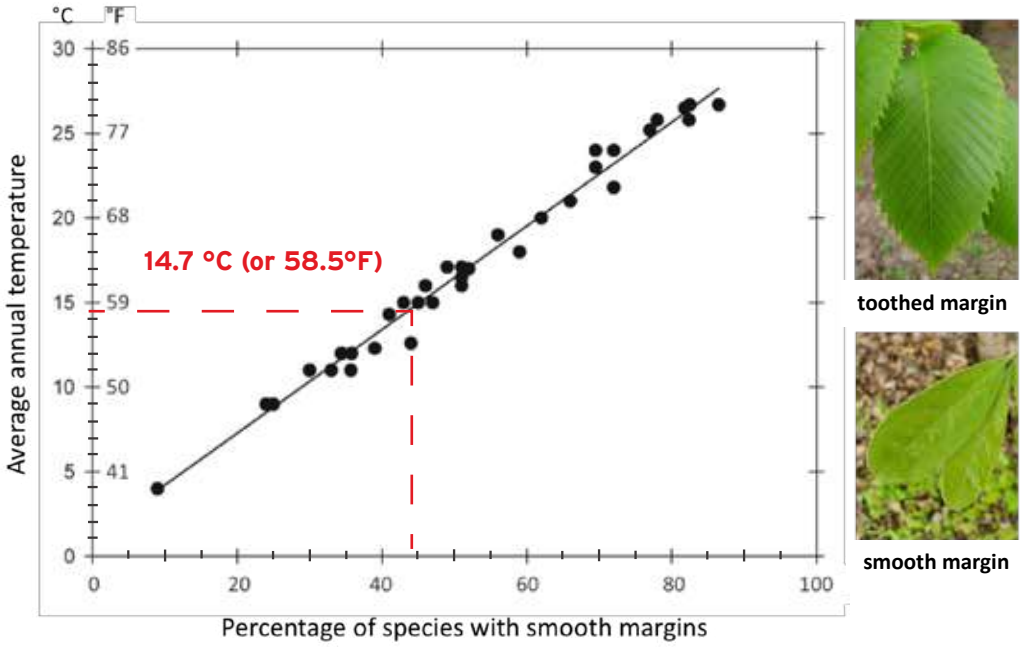
Total number of species = ___36___

Number of species with smooth margin = ___16____

(number of species with smooth margin) ÷ (total number of species) x 100 = ___44.4%____

Step 3 – Use the graph above, or the equation, to determine the paleo temperature in Celsius and Fahrenheit.

(44.4) x 0.306 + 1.141 = 14.7 °C (or 58.5°F)



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Questions: How does the average temperature for the Late Cretaceous of Alaska compare with today? What does the vegetation look like in places with similar temperature today?

Example answer: The average annual temperature of the Alaskan peninsula was much higher in the Cretaceous, and actually closer to modern Dallas! In places with similar climate (mild warm, not much freezing, and plenty of rain) there are usually forests or woodlands, with lots of trees, shrubs, and herbs. (note: San Francisco CA and Washington D.C. have similar average annual temperature, both 14.6 °C, even though they have very different ranges of temperatures throughout the year!)

MISSION #2: RECREATE THE VEGETATION AND ENVIRONMENT

Use what you have learned about the climate, plus the images of the fossil flora and the clues below to sketch what you think the environment looked like on the Alaskan Peninsula in the Late Cretaceous!

Additional clues:

1) More plants! The plants used for temperature are only the flowering plants, but there were other groups of plants that were also important in the vegetation. Here are some of the most common ones:
   a. *Nilssonia serotina* (a cycad-like shrub with large leaves)
   b. *Ginkgo minor* (a tree)
   c. *Sequoia obovata* (relative of modern redwood trees)
   d. Ferns (herbs on ground)

2) Perot Museum paleontologist Dr. Tony Fiorillo and other scientists have found large fossil trunks of trees.

3) Some of the dinosaurs that lived there, based on fossil evidence, were: hadrosaurs, therizinosaurs, theropods, and ankylosaurs. Include them if you would like!

Answer: Interpretations here will vary, and this should be a creative exercise. Based on the information, there should be trees, with both flowering trees and conifer trees, and lots of plants under the trees (shrubs and herbs, including ferns).

***SHOW US YOUR SKETCH AT @PEROTMUSEUM ON SOCIAL MEDIA!**

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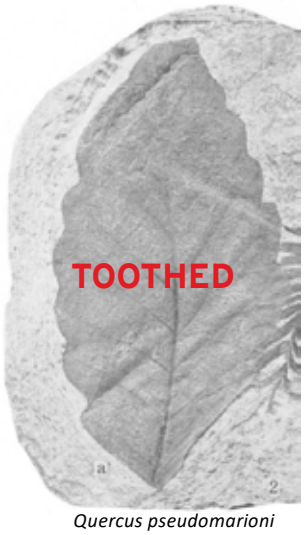
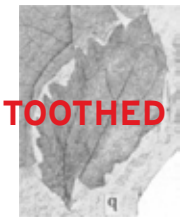
BEST FOR Grades 7-12

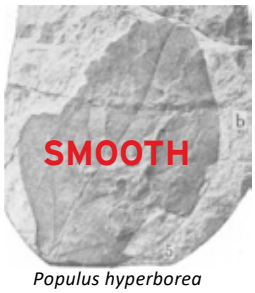


Quercus pseudomarioni

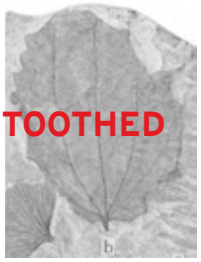
Diospyros steenstrupi



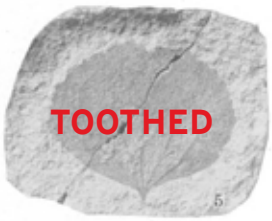
Zizyphus meeki



Populus hyperborea

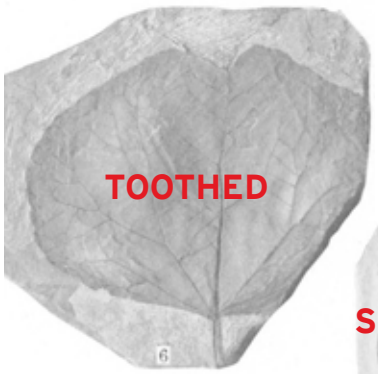


Urtica exemplaris



Populus elliptica

Alnus pyramidalis



Populus pseudoelliptica

Cornus benjamini

Rulac quercifolium

Diospyros cornifolius

Viburnum simile

Quercus paleoilicoides

Quercus chignikerensis

Ulmus oblongifolia

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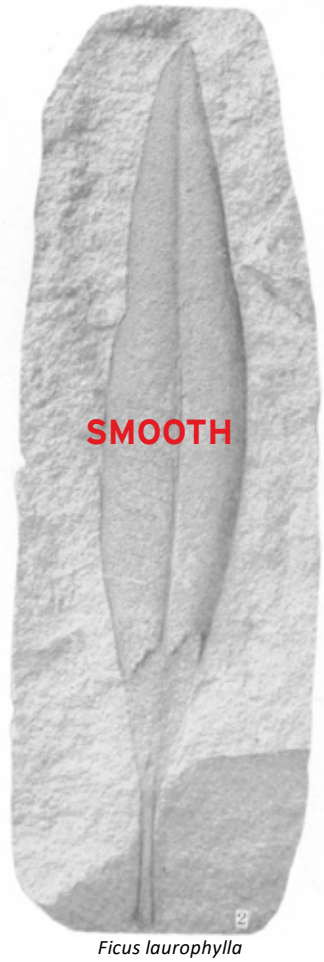
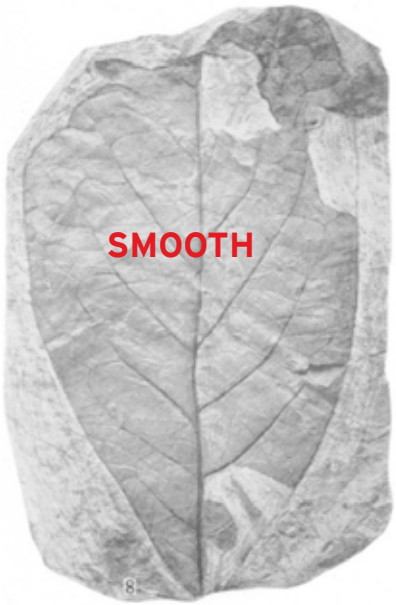


Ficus laurophylla

Ulmus alnoides

Dryophyllum bruneri

Urtica alaskana



Persea hyana

Celastrus pseudocurvinervis

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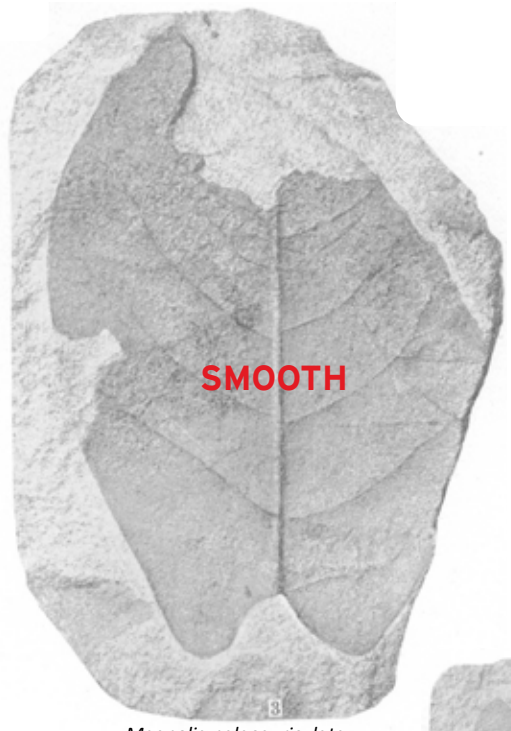
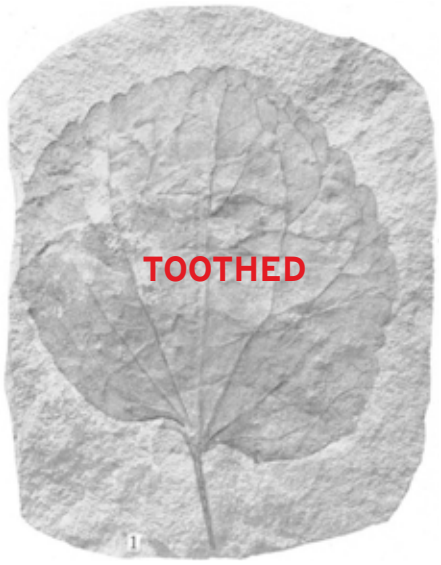


Magnolia palaeauriculata



Grewia alaskana

Colutea primordialis

Celastrus herendeenensis

Cornus ceterus

Quercus turbulenta

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Rhamnus herendeenensis

Zizyphus electilis

Ficus juglandifolia

Paliurus visibilis

Cornus forchhammeri

Trapa microphylla

Cornus rhamnoides

Paliurus pseudopinsonensis

Vitis populoides

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