NEW YORK CITY DEPARTMENT OF
HEALTH AND MENTAL HYGIENE
*Ashwin Vasan, MD, PhD*
*Commissioner*

## Supplementary activity: Ticks in fossils
## Grades 3 through 5
## Expected time: About 15 minutes

### Overview

Ticks have been around for a very long time. In this activity, students will learn to interpret data from images of real amber fossils to provide evidence on the lives of ticks that lived long ago. This activity provides an interesting learning experience by allowing students to imagine themselves as paleontologists, who perform detective work to learn more about ancient organisms.

### NYC Prekindergarten Through Grade 8 Science Scope and Sequence

LS4.A: Evidence of Common Ancestry and Diversity

- Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (3-LS4-1)
- Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1)

To view the science and scope sequence, visit
weteachnyc.org/resources/collection/scope-and-sequence-science.

### Materials, Preparation and Setup:

1. Locate images in the corresponding Ticks in Fossils folder.
2. Prepare the projector to display images from the folder. Alternatively, print out images as a handout for each student.

### Procedure:

1. **Ask students: What is amber?**
    a. Amber is a type of fossil made from hardened tree sap. A long time ago, sometimes a small animal or plant part would get stuck in sticky tree sap. Over thousands, sometimes millions of years, the sap would harden into amber, preserving anything that was trapped inside. Like other fossils, amber can give us clues about life that happened long ago.

Figure 1. Image courtesy of Enrique Peñalver Mollá.

b. **Display or provide to students Figure 1.** Here are some examples of amber. (In the middle is a modern tick placed by the researchers).

2. **Display or provide to students Figure 2**.
    a. **Provide background to students:** This picture shows a piece of amber found in Myanmar (a country in Asia) that is estimated to be 99 million years old. This amber is from the Cretaceous period, a time when large dinosaurs were still around.

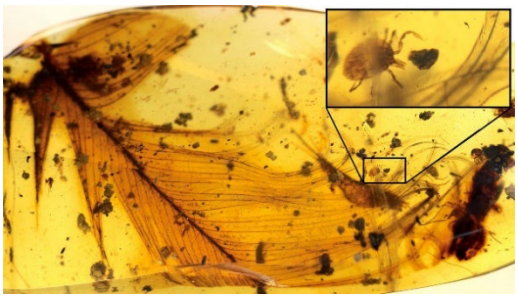

Figure 2. Image courtesy of Enrique Peñalver Mollá.

    b. **Ask guiding questions for students:**
        i. What do you see in this piece of amber?
            a. Examples could be feathers, ticks (zoomed in via the pop-out box), possibly dirt or other organic matter.
    c. Scientists believe the feather belonged to a feathered dinosaur, a member of the dinosaur group Pennaraptora. This group includes feathered dinosaur ancestors that later evolved into birds.
3. **Display for students Figure 3**.
    a. **Background for students**: Upon closer look, scientists can see that one of the tick's legs is grabbing onto the feather. This is shown in this drawing.
        i. What do you think this suggests about the relationship between ticks and feathered dinosaurs?
            a. According to paleontologists, or scientists who study fossils, this fossil of a tick with its leg entangled in a feather is the first direct fossil evidence we have suggesting that ancient ticks might have fed on dinosaur blood. Ticks today will also grab onto the hair, fur or feathers of animals or even our clothing in search of a host.
            b. This relationship between dinosaurs and ticks is still reflected today. Although the species of tick found in this amber is now extinct, there are ticks alive today that feed on birds, which are our modern-day dinosaurs.

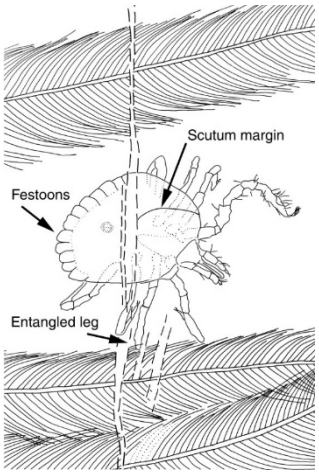


Figure 3.Image courtesy of Enrique Peñalver Mollá

## Acknowledgements and Further Reading

Thank you to Dr. Enrique Peñalver of the Geomineral Museum, Geological and Mining Institute of Spain (Museo Geominero, Instituto Geológico y Minero de España) for providing permission for the use of images and data.

Peñalver, E, Arillo, A, Delclòs, X, et al. Ticks parasitised feathered dinosaurs as revealed by Cretaceous amber assemblages. *Nat Commun*. 2017;8(1). doi.org/10.1038/s41467-017-01550-z

Vogel G. 99-million-year-old ticks sucked the blood of dinosaurs. Science.org. Published December 12, 2017. Accessed March 11, 2024. https://www.sciencemag.org/news/2017/12/99-million-year-old-ticks-sucked-blood-dinosaurs.

## Additional Resource

- American Museum of Natural History's Transformation: Dinosaurs to Birds video (youtube.com/watch?v=XAzGC89n0S4)