

## ES 088F Fossil Exercises

Paleontology tells us much about past life. A disciplined study of evidence can not only tell us about the visible species that existed in Earth's history, it can also tell of how they behaved, and the kind of environment in which they lived.

Further, fossils can indicate changes in the environment. For example: fossilized alligator bones have been found in Arizona. Because alligators are not now native to that state, and they are found in swampy environments, it might be assumed that climatic conditions have changed since the time that these alligators were alive. It can be inferred that the area that is now Arizona had swamps some time in the past.

Many different modes of preservation are recognized for fossil remains. Actual (unaltered) remains, whether they are frozen or dehydrated or have survived chemical and thermal effects can be recognized because very little will have changed in terms of the composition of the preserved material. This can include retention of colour, and pearly lustre (the latter being common in mollusk shells with their mother of pearl interior). Replacement occurs when solutions bearing dissolved mineral species react with the fossil and a foreign mineral substitutes for the original. Pyrite and quartz are common replacements for calcite and aragonite. Recrystallization occurs when the original material grows into larger crystal grains. There is no change in the chemistry of the fossil. This may be conversion of aragonite to calcite for example, or conversion of silica gel (as found in radiolarian shells) to quartz in the form of chert. Permineralization involves the deposition of mineral grains in pore spaces such as marrow cavities and the interiors of cells in wood. Moulds are formed when sediment envelopes and fills spaces within remains. When part disappears due to dissolution, a void space is left, but the external and internal moulds remain. At such time as material fills the void space, a cast of the original fossil is formed.

Traces of activity are sometimes the only evidence that can be found of an animal. This is especially true if the animal is soft-bodied and prone to scavengers and predators. It has been possible to deduce something of the way dinosaurs walked by looking at their track-ways.

**ES088 Fossil Exercises**

**Name** \_\_\_\_\_

**Student #** \_\_\_\_\_

Near room 113 of Biological and Geological Sciences, there is a case containing fossils from western Canada as well as models depicting what these animals might have looked like.

1) Look at the fossils on the bottom of the display case. Describe one piece of evidence indicating that the shells have not been significantly altered since the time at which they were buried (i.e. why they can be considered “actual remains”)

\_\_\_\_\_  
\_\_\_\_\_ (2)

2) What phylum do these fossil organisms belong to ? (2)

\_\_\_\_\_

3) What class includes these fossils and name a member of this class (common name is fine) that is living today.

\_\_\_\_\_ (2)

4) Mosasaurs are believed to have made the pockmarks (circular punctures) seen in some of these shells on the bottom of the display case. Provide name of a mosasaur that is depicted in a picture near this display.

\_\_\_\_\_ (2)

5) Fossils of these animals are abundant in Cretaceous sedimentary rocks of Alberta. Briefly describe how conditions in Alberta were different when these creatures were living than the conditions of present-day southern Alberta (use information provided in the pictures in the hallway close to this display).

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2)

6) Mosasaurs were not dinosaurs. What were they ? (use information provided in a picture in the hallway located close to this display). (1)

\_\_\_\_\_

7) At the southern entrance to Biological and Geological Sciences is a display case containing a mastodon jaw as well as single teeth from a mastodon and a mammoth. Mastodons chewed twigs, whereas mammoths ate leaves. The mastodon tooth that lies loose in the display case is different from those that appear in the jaw. It came from a younger animal. How can that conclusion be supported?

\_\_\_\_\_  
\_\_\_\_\_ (2)

8) Which teeth found in humans that most closely resemble these mastodon teeth and how does the form of such teeth relate to their function in eating ?

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(2)

For questions 9 through 12, look for the specimens and salient information in the display case to the left of room 123 in Biological and Geological Sciences building.

9) Specimen P-1 is a coral. Describe its mode of preservation.

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(2)

10) Specimen P-2 contains the remains of brachiopods that would have been made of calcite. What mode of preservation does it exhibit?

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(2)

11) Specimen P-3 is a pelecypod (clam). What mode of preservation does it exhibit?

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(2)

12) Specimen P-4 is part of the remains of a tree. What mode of preservation does it exhibit?

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(2)