

# Fossils

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# What is a fossil?

- A fossil is the preserved remains of a once-living organism.

# What do fossils tell us?

- Fossils give clues about organisms that lived long ago.
- They also provide evidence about how Earth's surface has changed over time.
- Fossils help scientists understand what past environments may have been like.

# Four types of fossils:

Mold

Cast

Trace fossils

Whole or part of an organism that has been preserved

# Molds and Casts

1. A mold forms when: a. an organism dies and is buried in sediment such as sand, silt or clay b. the sediment changes to rock and the organism's body decomposes leaving an imprint or mold in the rock. Molds can be seen if the rock is broken open.



Mold of a scallop in clay



Present day scallop



Mold of scallop in rock

2. A cast forms when an organism dies and is buried in sediment. Its body rots leaving a “hole” in the shape of its body. Water with minerals fills up the hole. When the water evaporates, a copy of the original structure of organism is formed as a rock.

Picture of present day snail



Bob Hermann//Cochise College.

Picture of fossilized snail



R.Weller/Cochise College.

Ammonite  
mold



Ammonite  
cast



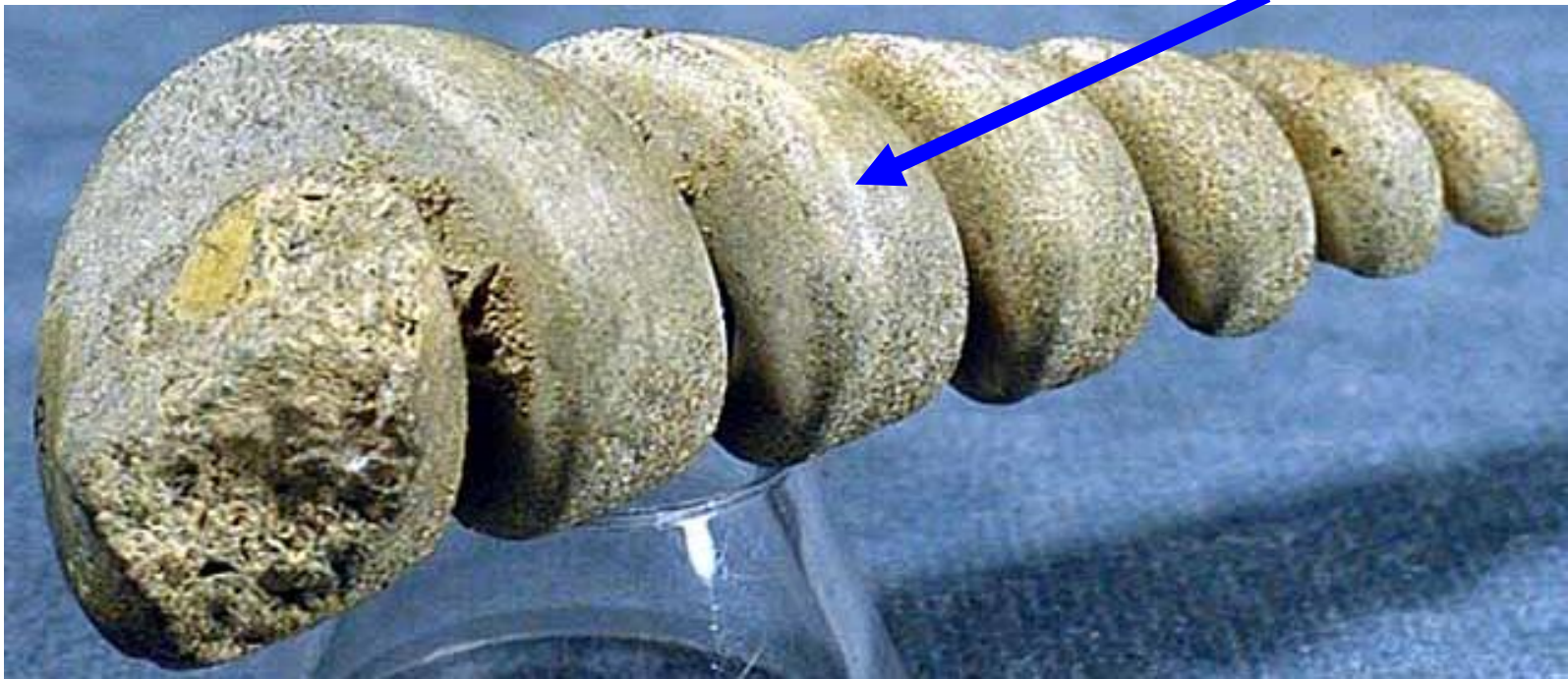
Molds and casts are often found together.



gastropod mold



gastropod casts







Which is the cast of the clam and which is the mold?



**Clam mold**



**Clam cast**

www.oum.ox.ac.uk/thezone/fossils/intro/form.htm  
<http://www.oum.ox.ac.uk/thezone/fossils/intro/form.htm>

# 3. Trace Fossils

Trace fossils include leaf prints, burrows, coprolites (feces or poop), trails, footprints.

Trace fossils of an animal tell something about its movement and behavior.

Trace fossils are not an imprint of the hard part of an animal's body.



# Leaf imprints



R.Weller/Cochise College



# Dinosaur tracks



Coprolite (dinosaur poop)

[dmr.nd.gov](http://dmr.nd.gov)





Worm  
tubes  
made by  
ancient  
worms as  
they  
moved  
through  
soil.

## 4. Whole or a part of a body is preserved

In rare instances an entire organism or its skeleton is preserved because the organism gets trapped in a substance that protects its body from decaying.

Examples are:

A spider trapped in tree sap. The tree sap hardened into amber, preserving the whole spider.



A sabre tooth cat skeleton found in La Brea Tar Pits in California. The tiger fell into the tar and got “stuck”. His skeleton was preserved by the tar.



*[Wikimedia Commons](#)*

Sometimes, a whole organism can be preserved if it is *frozen very quickly*.



Photo: Francis Latreille/National Geographic

40,000 year old frozen baby mammoth found in Siberia

In the next few slides you will see fossil casts found either in or near Fort Worth.



Gastropod casts



Oyster casts





Clam cast



Scallop cast



Sea urchin cast



Ammonite cast



One arm of an ammonite cast

Looking at these organisms, you can conclude they once lived:

- a. in a forest
- b. In an ocean
- c. in a grassland
- d. in a desert

Yes, you could conclude that they once lived in an ocean.

So what must have been here in Fort Worth at that time (100 million years ago)?

Yes, at one time, very long ago, this area was covered by a shallow sea.

**The North American continent  
during late Cretaceous time.**

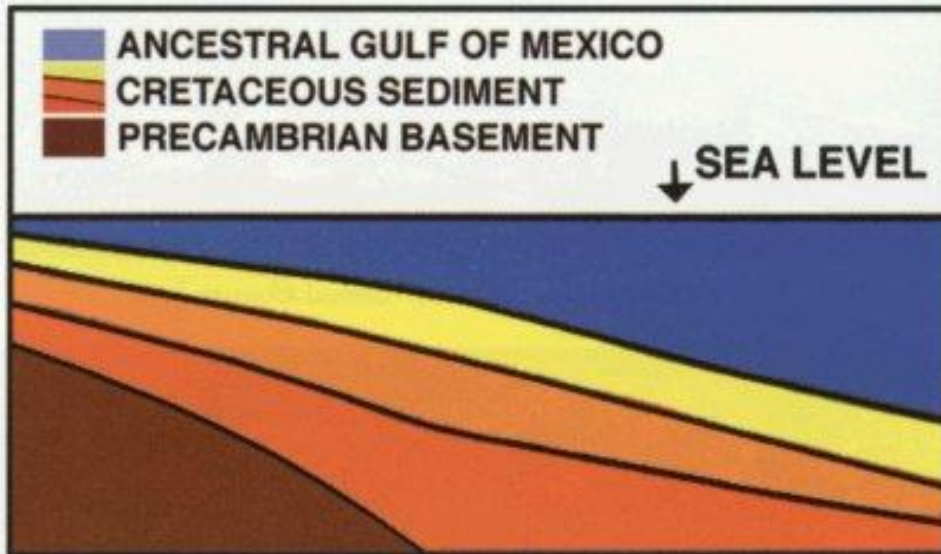
**The Western Interior Sea covered most of  
the Midwest from the present Gulf of  
Mexico to the Arctic.**



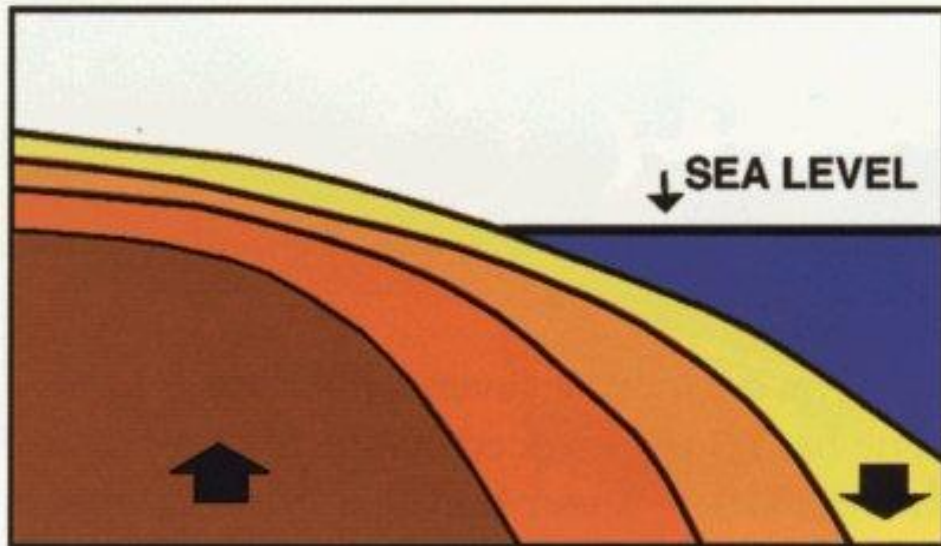
Wikipedia Commons

Western Interior Seaway during the mid-Cretaceous, about 100 million years ago.



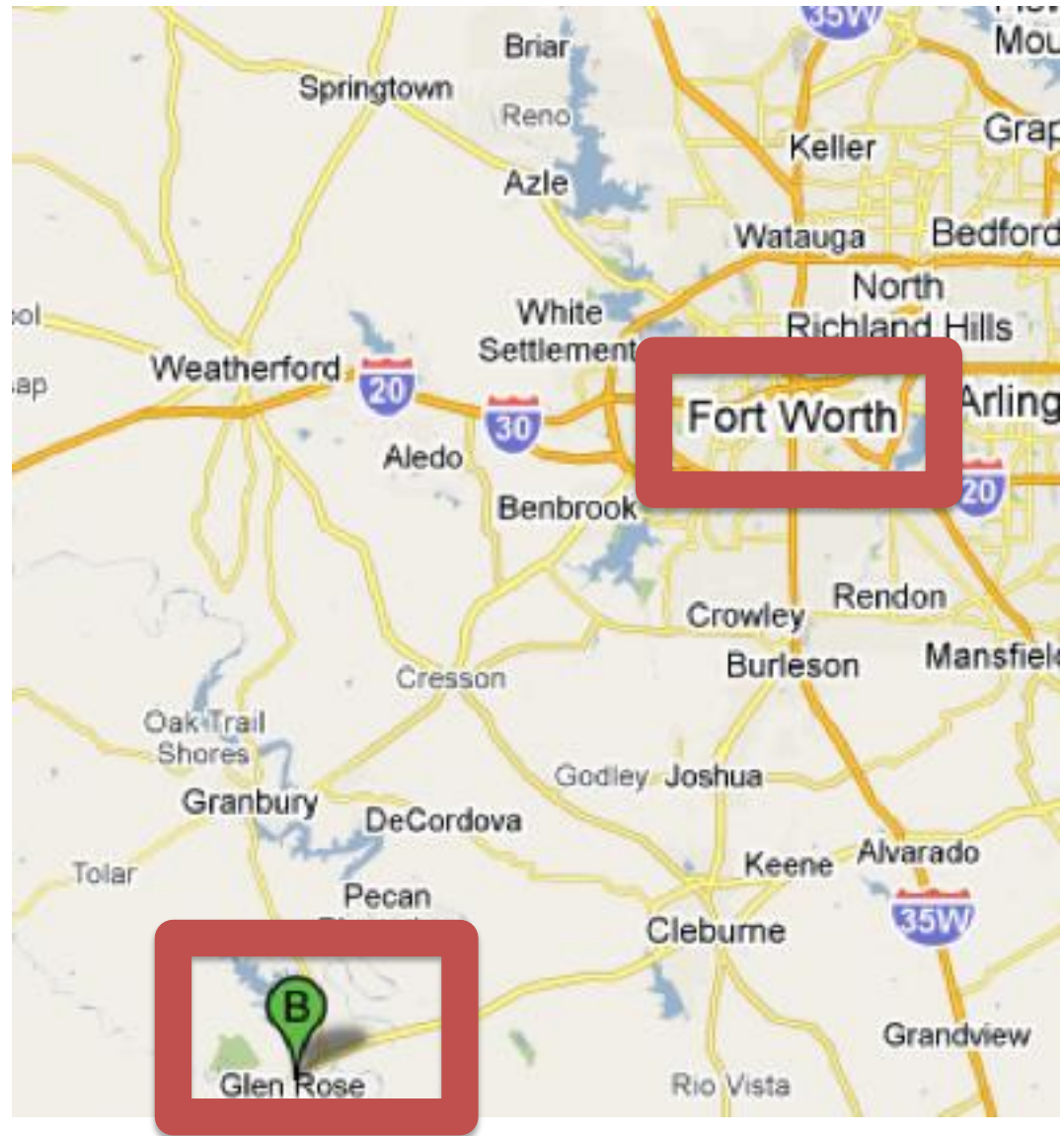


100 million years ago Central Texas was a shallow sea



As the sea receded, Central Texas rose above sea level.

The next page shows dinosaur footprints found in the Paluxy River bed in Dinosaur State Park, Glen Rose, TX very close to Fort Worth.





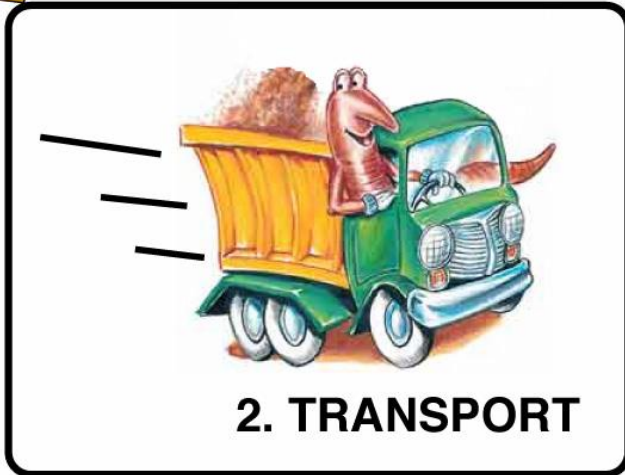
Dinosaur tracks made 113 million years ago in the Paluxy River bed near Glen Rose, TX.

Based on what scientists know about dinosaurs, what can we conclude about the climate at Glen Rose 113 million years ago and the kinds of plants that grew during this time?



# The Making Of **SEDIMENTARY ROCKS**

1. WEATHERING /  
EROSION



2. TRANSPORT



3. DEPOSITION



4. CEMENTATION /  
LITHIFICATION

Most sedimentary rock is formed from the deposition of sediment. If sediment continues to be deposited in the same place, newer layers of sediment will bury older sediment. The added weight of the newer sediment increases the pressure on the older sediment and squeezes the bottom layers. The layer of newer sediment also acts like a blanket insulating the lower layers such that the temperature also increases. So as sediments get buried by other sediments, they can eventually become "as hard as a rock".



If sediment covers a dead organism before the it has time to rot, the organism's body may become fossilized.

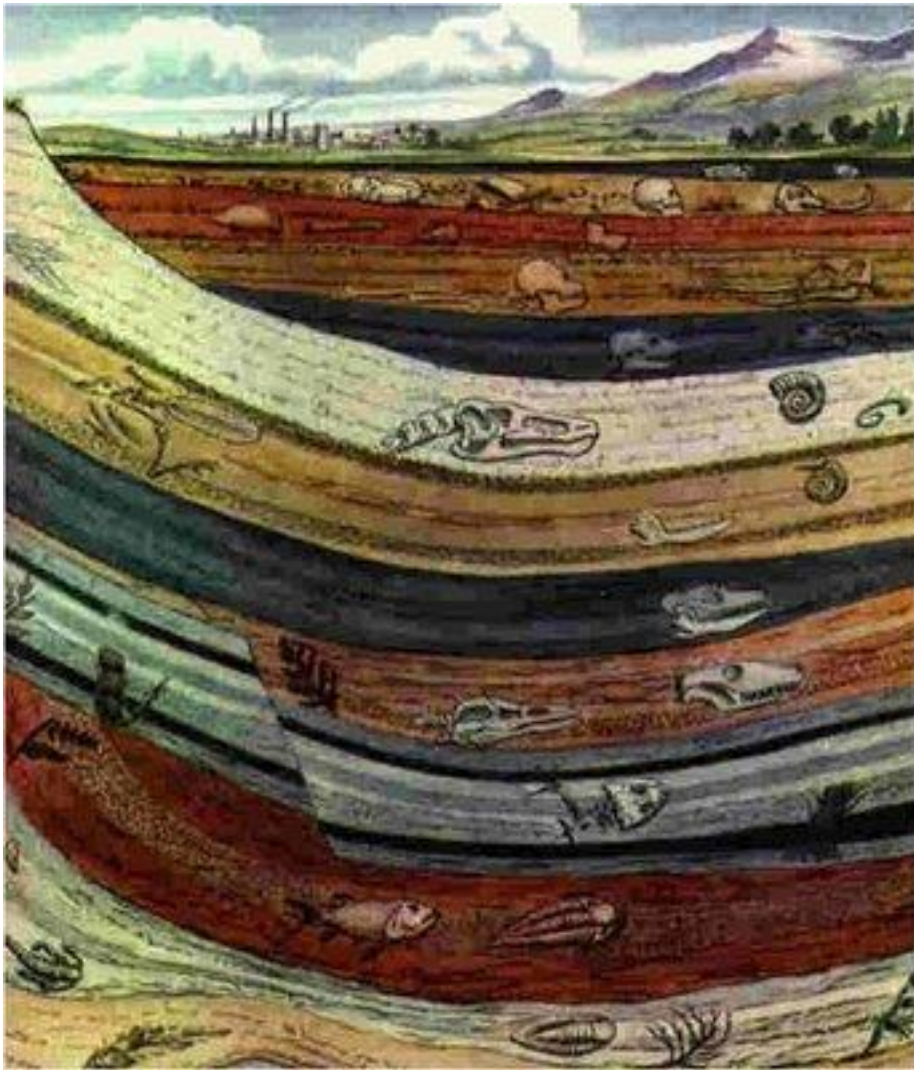
As many, many years pass, new types of sediment are deposited on top of the original sediment containing the fossil and the layers of sediment change to rock. As a result, the fossils are finally buried under layers of rock.



Fossils are usually found in

- a. soil
- b. sedimentary rock
- c. igneous rock from volcanoes
- d. Interior of the Earth





- The youngest fossils would be found in the
- top layers of rock
  - the middle rock layers
  - the bottom layers of rock