What are Fossils?

Chapter 8 Lesson 2

ByDesign Science, Level 4
By Allyssa Sharpe

Forming Fossils

- Scientists who study fossils are paleontologists.
- *Paleontology* is an historical science.
- This science assumes that nature was the same in the past as it is today.

- Paleontologists are like detectives, collecting clues and trying to make sense of them.
- But a paleontologist's worldview influences how the evidence is interpreted.

Forming Fossils

Fossil of a Bat

- *Fossils* are the remains, impressions, or other traces of organisms that lived in an ancient past.
- Most common fossils involve **petrification**, which minerals replaces hard parts of organisms, including bones, teeth, shells, and wood.
- These parts naturally last longer after soft parts decay, especially when organism die in a watery environment and are quickly buried in mud and sand.

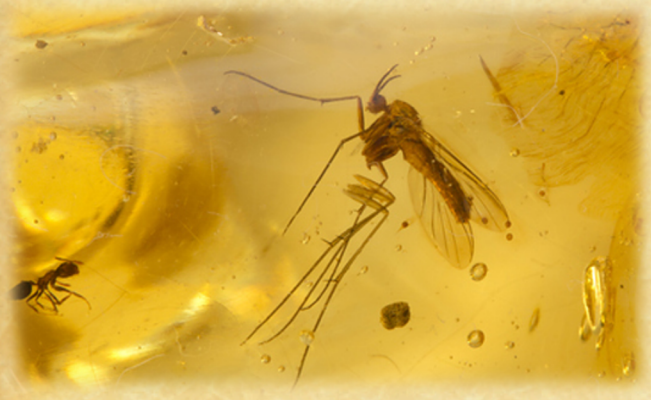
Forming Fossils

Cast and Mold of Fossil Leaf

- If rock forms around a dead body and then the body rots away, it leaves a **mold** of the body in the rock.
- This mold can be filled with minerals as water carries them through the rock.
- This forms a **cast** preserving the shape of the original creature or plant.
- Other fossils form when they are flattened in rock and leave an impression.

Forming Fossils

- Some fossils are formed when insects and other creatures get stuck in plant resin.
- As the resin hardens, the creatures' bodies are preserved in what is now called **amber**.



Insects in Fossil Amber

- Soft body parts are among the least common kind of body fossils.
- Rarely, organism's bodies are preserved in ice, salt, tar, or peat.

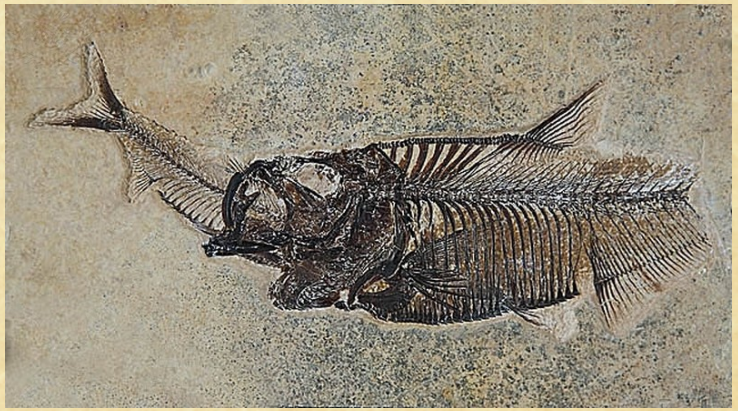
Forming Fossils

- Some fossils that tell about hoe animals behaved in the past do not preserve anything of the animal itself.
- **Trace fossils** include a track, trail, or burrow made in mud by an animal that lived long ago.
- The mud hardens and preserves the trace fossil.
- Trace fossils can tell us how organisms walked, what direction they took, and whether they walked alone or in groups.

Trace Fossils in Sandstone

Interpreting the Evidence

- Most animals do not turn into fossils.
- Instead, they rot quickly or are eaten by other animals.



Fossil of a fish eating another fish

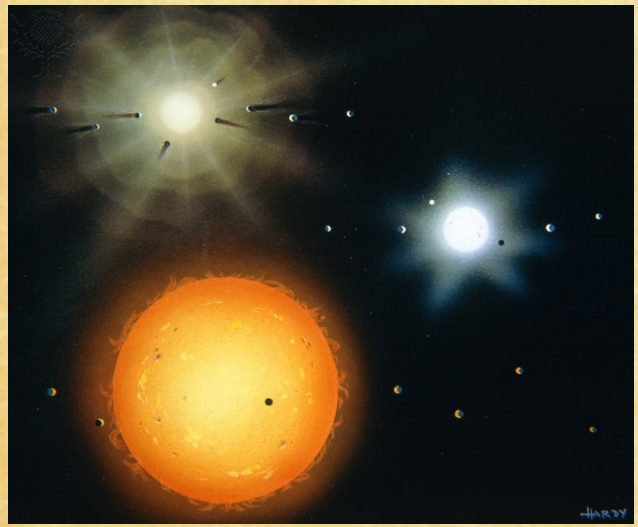
- The abundant fossil record tells us that in the past many organism were rapidly buried.
- Many paleontologist agree that fossils and other evidence point to past catastrophes.

Interpreting the Evidence

- The Bible tells about one large global Flood catastrophe.
- Other worldviews talk about multiple catastrophes, such as large meteorites hitting Earth.
- Because sedimentary rock often forms in water, the widespread fossil-containing sedimentary rock fits well with the Genesis Flood story.

Interpreting the Evidence

- Many Bible-believing scientists believe that the Flood swiftly formed many of the rock layers where fossils are found.
- Most scientist agree that the lower the layer of rock, the older the layer is.



- Some believe the layers formed slowly over thousands or even millions of years and that the fossils in them represent different kinds of animals that took millions of years to evolve.

Interpreting the Evidence

Trilobite Fossils

- Christians look at the same evidence as other scientists.
- They see fossils as representing organism that appear complex and amazing.
- These organism look beautifully designed.
- Fossils buried in the Flood all lived at the same time.
- They were rapidly buried in layers one above the other.

Fossils

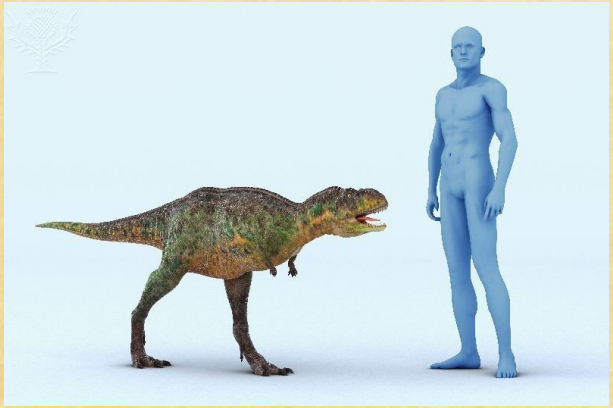
Dinosaurs

- Dinosaurs are extinct, so everything we understand about them comes from interpreting their fossils.
- From dinosaur bones we can see that they were reptiles, but their legs were underneath their bodies rather than out to the sides as in modern lizards.

Fossilized dinosaur skull found in the Jura Mountains, Switzerland

Dinosaurs

- Some dinosaurs were huge creatures.
- But other dinosaurs were small, the size of a turkey or a dog.



Model of a Aucasauruseye dinosaur showing the size in comparison to a human.

Model of a Spinosaur dinosaur showing the size in comparison to a human.

Dinosaurs

Fragment of a lower jaw that once belonged to the carnivorous dinosaur Megalosaurus.

- What do you think dinosaurs ate?
- Several clues, such as fossilized stomach contents, fossil dung, and fossil teeth, tell us.

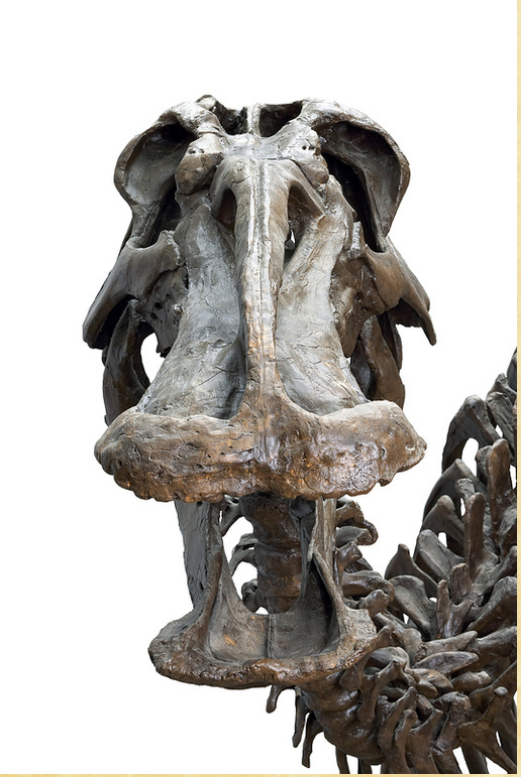
- Looking at a dinosaur's teeth tells you a lot about how it lived, the type of food it ate, how it got food, and whether it chewed it, or swallowed it whole.
- Some dinosaurs were **carnivores**, or meat-eaters.
- Others were **herbivores**, or plant-eaters.

Dinosaurs

- Teeth are harder than bone and are more likely to fossilize than bones.
- Many fossil dinosaur teeth have been found.
- Some species are known only from their fossil teeth.

Peg teeth of a Diplodocus, a large herbivorous dinosaur.

Dinosaurs



Head of Edmontosaurus, a type of duck-billed dinosaur.

- The number of teeth that dinosaurs had varied widely.
- Some had no teeth. Others had many.
- Tyrannosaurus rex, or T. rex, had 50 to 60 thick cone-shaped teeth, some more than 20 cm (8 in.) long.
- Duck-bill dinosaurs had the most teeth, up to 960.

Dinosaurs

T-rex

- Dinosaur teeth also varied in shape.
- Some dinosaurs had peg-like teeth, some had spoon-shaped teeth, some had sharp-pointed teeth, and some had strong, bone-crushing teeth.
- Others had chisel-like teeth for nipping plants or flattening teeth for grinding plants.
- Dinosaurs with no teeth had cutting beaks and swallowed food without chewing.

Dinosaurs

- How did dinosaurs that lacked grinding teeth grind up tough plants?
- Some fossil dinosaurs have smooth rocks in the stomach area.
- Paleontologists believe that some dinosaurs swallowed rocks and these rocks are used to grind up food in dinosaurs' gizzards like some birds do today.

Dinosaur stomach stones

Dinosaurs

Dinosaurs

- Scientists often have strong disagreements about how to interpret fossils.
- These disagreements may be because scientists have different worldviews and interpret the same evidence differently.

Dinosaur fossil research.

Dinosaurs

- But fossils themselves do not always provide enough evidence to draw a conclusion.
- For example, what was dinosaur skin like?
- There were fossils of dinosaur skin imprints, so we can know about dinosaur skin texture, but skin imprints do not tell us about skin color or patterns.
- These details must be filled in with your imagination

Dinosaurs

- Some scientists think that dinosaurs had feathers, like birds.
- There are rare dinosaur fossils with structures that could be feathers, but they are not easy to see.
- Other scientists say these structures are not true feathers.
- There are other similarities between some dinosaur skeletons and birds. As a result, some scientists say birds come from dinosaurs.

Anchiornis feathered dinosaur, artwork

Dinosaurs

- Studying the clues that fossils give us about ancient life is fun and challenging.
- Fossils are like old photos.
- Each one reveals something about what life was like in the past.
- Christians appreciate that life in the past was amazing, fascinating, and complex.
- Fossils certainly show this.