Reptiles

Geology 331
Paleontology
Review of Reptile Groups, all are Amniotes

- Anapsids
- Synapsids
- Diapsids
- Euryapsids
Reptile Skull Types – openings behind the orbit

Anapsid - none

Synapsid - one

Diapsid - two

Euryapsid – one, marine reptiles only

(derived from diapsids by loss of lower opening)
Typical amniote egg with an embryonic reptile.
Crocodiles hatching from their amniote eggs
Amphibians lack an Amniote egg: Frog eggs in a Morgantown pond

Don’t squeeze so hard!
Amniote Family Tree
Reptiles are a grade of evolution rather than a clade. A clade includes all descendants from a common ancestor. The clade that includes reptiles, mammals, and birds is the Amniota.
Pennsylvanian anapsid or stem reptile
Living anapsid reptile: snapping turtle
Living diapsid reptile: iguana
Living diapsid reptile: crocodile
Permian Synapsids, Germany
Permian synapsid reptiles: *Dimetrodon*

"I'm not a real dinosaur, but I play one in toy stores."
Probable *Dimetrodon* footprint found in the Permian Dunkard Group of SW PA by a WVU student, 2012
Triassic synapsid reptiles: Therapsids or mammal-like reptiles
A Gallery of Therapsids
The Mesozoic: The Age of Reptiles
Archosauria

Early Archosaur:
Thecodont - *Garjainia*
A Nile crocodile. Notice the unspecialized reptilian teeth.
Fossil Crocodile from the Jurassic
Marine crocodiles of the Mesozoic
45 foot long Cretaceous crocodile
28 ft. alligator caught in Alabama lake
Sarcosuchus imperator from the Cretaceous of Niger

www.nationalgeographic.com/supercroc/
Jaw of *Sarcosuchus* in Cretaceous sandstone of Niger, Sahara Desert
Sereno’s team indicating the size of Sarcosuchus
Skull of a living 6 ft. long crocodile compared to *Sarcosuchus*
Paul Sereno and the reconstructed jaw of *Sarcosuchus*
A short-necked Plesiosaur
A Jurassic plesiosaur
Excavating a Plesiosaur skeleton
A Mosasaur sizing up a sea turtle
One species of mosasaur attacking another species
An Ichthyosaur died giving birth

This artistic impression of an ichthyosaur giving birth (LEFT) is based on some remarkable discoveries. Some skeletons contain the remains of young: if a female in the late stages of pregnancy died, spontaneous abortion may have occurred. The German fossil (BELOW) has babies inside and one being born.
Ichthyosaurs looked like mammalian dolphins
Mary Anning, 1799-1847
Famous fossil hunter in Great Britain found marine reptiles.
“She sells sea shells by the sea shore.”
A baby ichthyosaur hiding in a reef
Pterosaurs: did they have a high metabolism?
Pteranodon
Cretaceous pterosaur with 45 ft wing span
Dinosaur Eggs:
The oldest known fossil eggs
Making Dinosaur Eggs
Chinese dinosaur eggs, taxa unknown
Fossilized embryos still in the shells
Dinosaur eggs with embryonic bones
Searching for sauropod dinosaur eggs in Patagonia

On the surface, shell fragments are so abundant that we can hear them crunching under our boots. Eons of wind and rain have swept away the soil surrounding the top layer of shells, exposing them (right). “The eggshells are just sitting there saying ‘turn me over, look at me,’” says photographer and amateur fossil hunter Brooks Walker. Thus far, for unknown reasons, only the eggs on the surface have held traces of skin, adhering to the insides of the shells.
A single egg laying on an outcrop
Dinosaur developing in the egg
Researcher working on a nest of sauropod dinosaur eggs
Mother and hatchlings in Patagonia sometime in the Cretaceous
The fate of many titanosaur hatchlings
Dinosaur parent, *Oviraptor*, died while sitting on eggs.
Recovering the fossil seen in last slide
Dinosaur eggs and reconstructed embryo

**FROZEN FORMS**

- King-size eggs (left) carry a name to match: *Maiasaura peeblesorum* is the largest known dinosaur egg. The name reflects its elongated shape and discovery in Xixia Basin. Names of such “nospesies,” or egg species, are used when an egg lacks an embryo and has not been linked to a known animal species. Other criteria—size, shape, texture, and pattern of airholes—are used to assign nospesies names.

- Most embryos are jumbles of bones that separated and fell to the bottom of the egg as connective tissue degenerated. An extremely rare, mostly articulated embryo (above) somehow stayed intact. It is currently thought to be a theropod, although the shape of the egg differs from that of other theropod eggs.

- A model of the embryo (right) lies curled in its egg, its umbilical cord funneled in nourishment from blood vessels spread throughout the yolk.