

### **Phylum Mollusca Class Cephalopoda – Subclass Ammonoidea**

The phylum Mollusca includes the familiar classes Gastropoda (snails), Pelecypoda (clams, oysters and scallops) and Cephalopoda (squids, octopuses, and the chambered Nautilus).

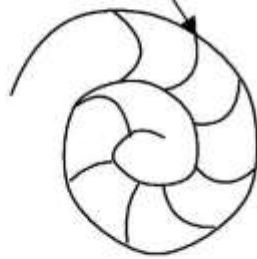
This class is represented in the fossil record by members who built a hard outer shell like that of the modern chambered Nautilus. We also find the record of cephalopods which lacked an outer shell but, like the modern squid, had a hard internal pin.

The shape of fossil cephalopod shells is highly variable, and they cannot be distinguished from snails on shape alone. However, there is one important difference which serves to distinguish the two. Cephalopod shells are partitioned transversely. These partitions called septa cannot be seen on the shell's outer surface, but internal molds of shells show that the trace of each septum is marked by a line called a suture. Each suture is actually a plane that separates the fillings of adjacent chambers.

The character of the septa and sutures is a basis for the classification of cephalopods, ammonoids in particular. Nautiloids have septa that are concave to the opening of the shell while ammonoids have septa that are convex to the opening.

### Septal curvature

curves toward opening



nautiloid

curves away from opening



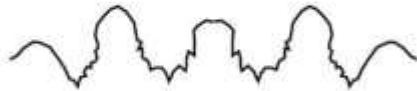
ammonoid



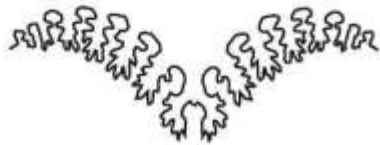
nautiloid suture



goniatitic suture



ceratitic suture



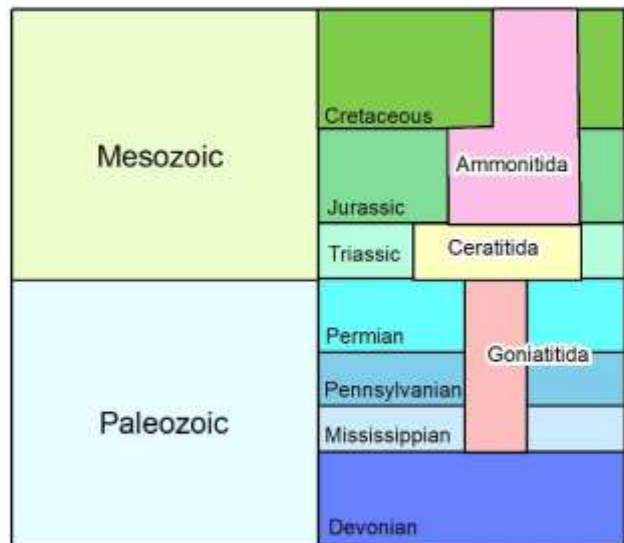
ammonitic suture

Ammonoids are classified according to their type of suture pattern. Nautiloids have a basic suture pattern. There are three types of suture patterns for ammonoids: goniatitic, ceratitic, and ammonitic. Ammonoids with a goniatitic suture are called goniatites, those with ceratitic sutures are called ceratites, and those with an ammonitic suture are called ammonites.

Ammonoids are mostly coiled cephalopods that have been extinct since the end of the Cretaceous period. Straight and loosely coiled ammonoids are present in Triassic through Cretaceous. Ammonoids are present in Mississippian and Pennsylvanian age rocks in the Ozark Plateaus Region and in Cretaceous age rocks in the West Gulf Coastal Plain. These animals were swimmers and floaters in fairly shallow water. Because of their short stratigraphic range, we can restrict them to certain geologic ages and formations in the state, thus using them as index fossils.

#### Range of Common Ammonoid Orders Throughout Geologic Time

This chart shows three of the more common orders of ammonoids throughout geologic time (modified from Kennedy *in* Hallam, 1977). Keep in mind not all of the ammonoid orders are represented in this chart. ***It is also important to note that there are no Permian, Triassic, or Jurassic age rocks exposed at the surface in Arkansas.***



Ammonoids that are present in Mississippian and Pennsylvanian age rocks in Arkansas are generally referred to as goniatites because they belong in the Order Goniatitida. Likewise, Ammonoids found in Cretaceous age rocks can generally be called ammonites because they belong in the Order Ammonitida. ***Not all ammonoids are ammonites but all ammonites are ammonoids!***



Ammonoids from Mississippian age rocks generally called goniatites. Notice the suture pattern in ammonoids on the left. Scale in centimeters.



Ammonoids from Cretaceous age rocks sometimes called ammonites. Notice loosely coiled ammonoids in picture on right.

\*Top drawing and excerpt from Fossils of Arkansas by Tom Freeman, 1965.