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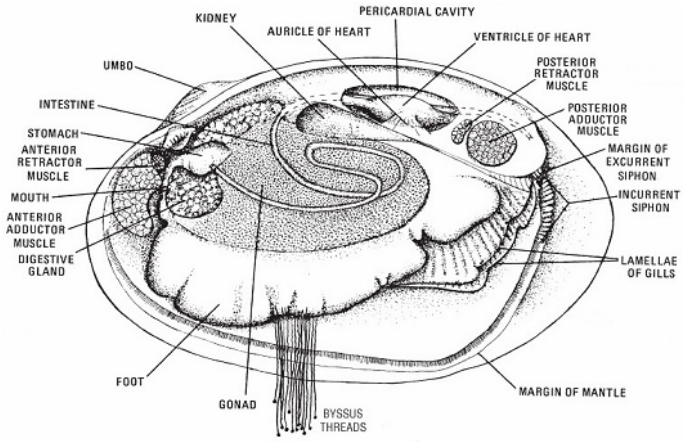
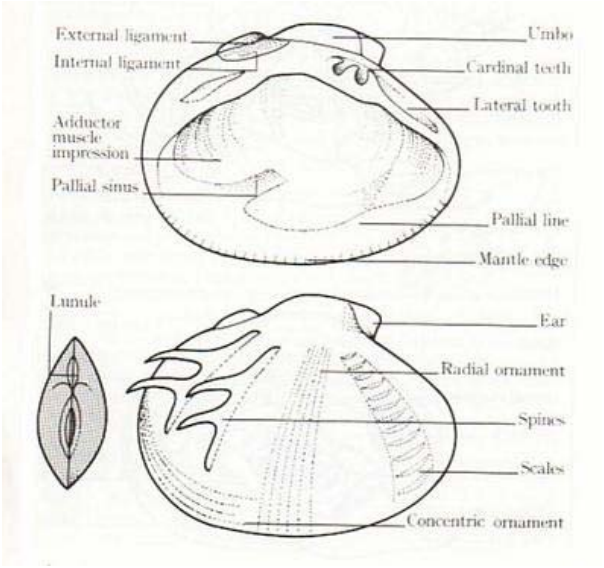
Lab 13: Mesozoic Fossils
(plus some Paleozoic ones)

Phylum Mollusca
Bivalves

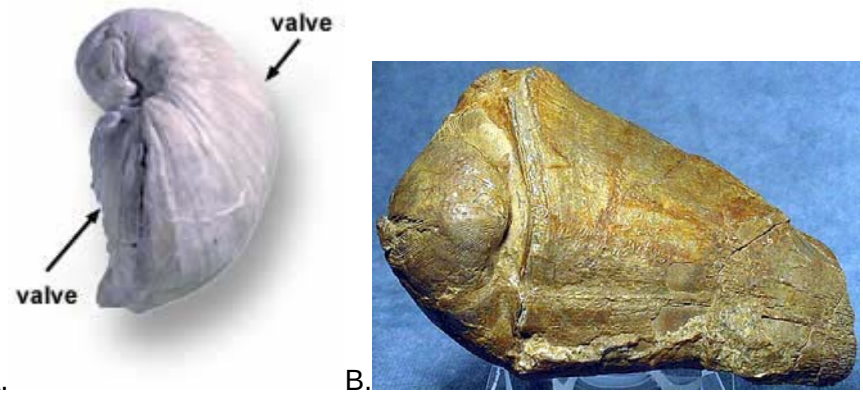
Bivalves became an increasingly important part of marine faunas during the Mesozoic, surpassing brachiopods in abundance and diversity. .



Internal anatomy of a bivalve.



Shell anatomy of a bivalve.

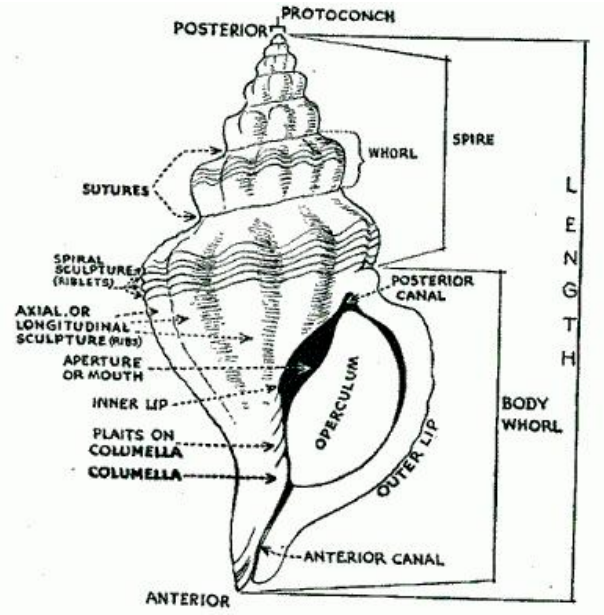


A. B.

In some bivalves one of the two valves is extended. A. a Cretaceous oyster with a spiraled valve. B. a Cretaceous rudist with on longer valve.

Gastropods

Gastropods also become more common in the Mesozoic. These snails usually have whorled shells, tough some like the nudibranchs have lost them. The gastropod group Pulmonata is terrestrial. Gastropods have a radula, which is a rasping organ in the mouth that the animals use to graze, scrape, and drill.



Gastropod shell morphology.

Ammonites

Ammonites are the most common cephalopod group of the Mesozoic. The chambered shells of these squid-like animals had chamber walls that were sometimes intricately folded. The pattern of folds can be used to identify three major groups.

A. Goniatitida (Devonian to Permia) have rounded saddles and pointed lobes.

B. Ceratitida (Carboniferous to Triassic) have rounded saddles and serrated lobes.

C. Ammonitida (Permian to Cretaceous) have folded saddles and lobes.

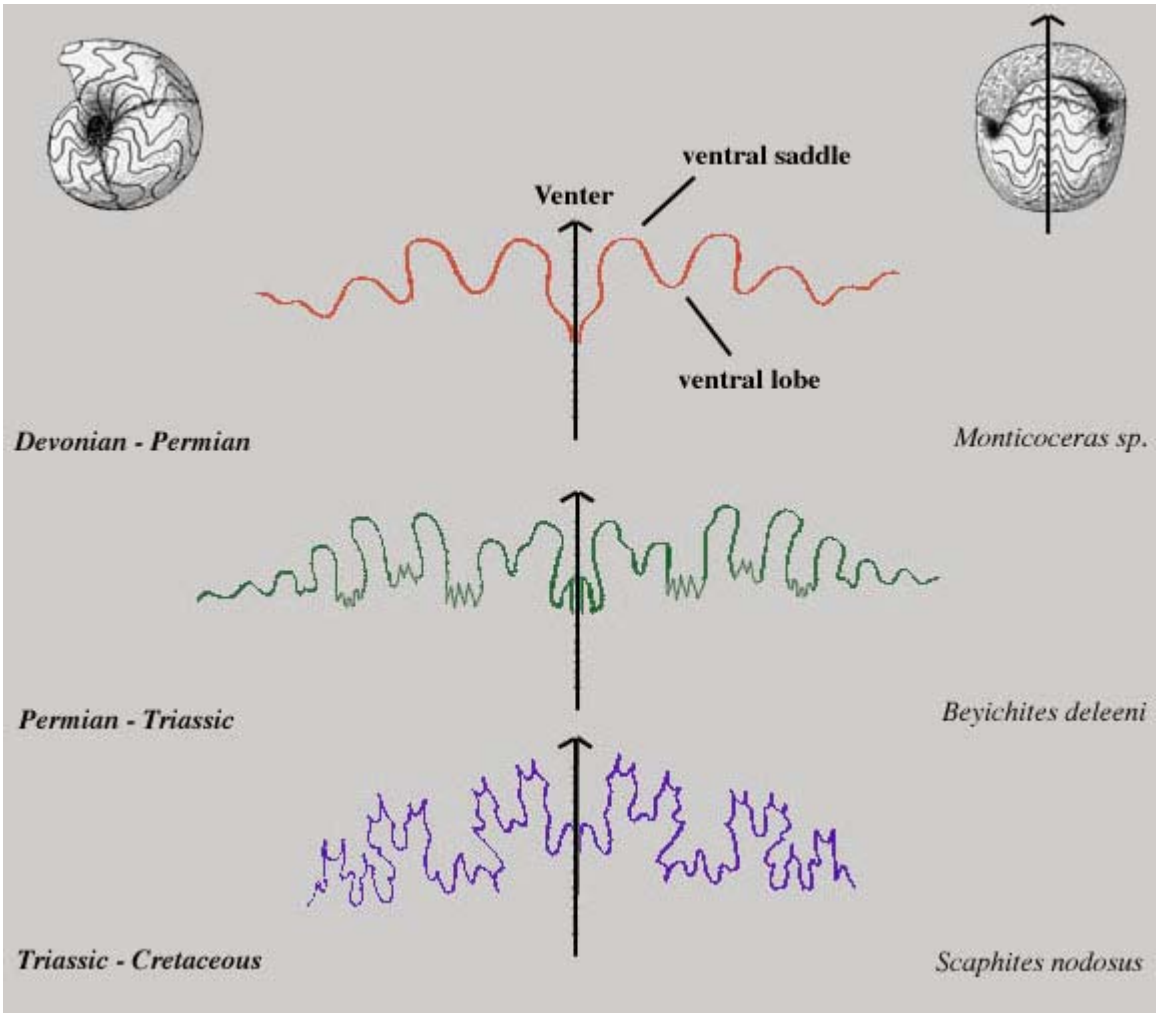


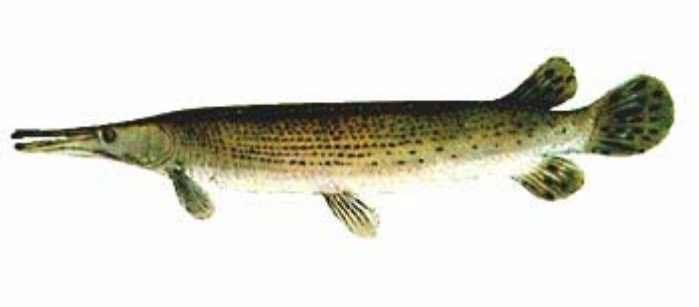
Diagram showing goniatite, ceratite, and ammonite suture patterns.

Vertebrata

In addition to dinosaurs, common Mesozoic vertebrates included sharks, lizards, amphibians, birds, pterosaurs, mosasaurs, ichthyosaurs, and others. Some Mesozoic vertebrate fossils have been put out for your perusal.

Bug Creek Anthills Sample

The box contains vertebrate fossils from a site in the Hell Creek Formation of Montana, latest Cretaceous, called Bug Creek Anthills. The box contains fish vertebrae, crocodile scutes (the bony plates found under the scales of crocodilians), tiny mammal teeth, gar fish scales (which have a surface similar to tooth enamel), and other bones.



A gar fish.

A fish vertebra.

Crocodile scute and tooth.

Cretaceous of Kazakhstan

Casts of several Cretaceous vertebrate fossils are on display. The most dramatic of these are claws from dromaeosaurid dinosaurs, similar to the claws of *Velociraptor*, but there are also turtle jaws, dinosaur teeth, shark teeth, and a dinosaur tarsal bone.

Deinonychus, a dromaeosaur dinosaur, and its claw.

Relative Abundances

The relative abundance of different species is often of interest in paleontology because it can tell us something about changes in ecology or the environment and provide clues as to the causes of extinction, as well as data on the age of rocks.

Relative abundance is simply the proportion of fossils of one type relative to others. Relative abundance can be calculated at many levels: relative abundance of fossil specimens, of individuals, of species, etc. To calculate a relative abundance, calculate the percentage of each group in the sample, as follows:

1. Count the total number of individuals in the sample;
2. Divide the sample into groups and count the number in each group;
3. Divide the group number by the total sample number and multiply by 100 to get a percentage for each group.

Name _____

Lab 11 Worksheet
Mesozoic Fossils

A. Relative abundance at Stobo Bioherm

Calculate the relative abundance of the following major groups at the Stobo Bioherm: crinoids, brachiopods, corals, bryozoans, other.

1. First calculate the relative abundance of your own sample. (5 points)

	Crinoids	Brachs	Corals	Bryozoa	Other	Total
Number						
Relative abundance						100%

2. Now combine your data with everyone else's to calculate relative abundances based on the combined class sample. (5 points)

	Crinoids	Brachs	Corals	Bryozoa	Other	Total
Number						
Relative abundance						100%

3. Discuss how much the estimates of relative diversity differ between parts 1 and 2 above. Which is the better estimate and why? (3 points)

4. What issues, difficulties, or points of uncertainty are involved in estimating relative abundance? (3 points)

Relative abundance of drill predation in bivalves and gastropods

Samples of bivalves and gastropods have been put out, each of which has individuals that have been attacked by drilling. Calculate relative abundances of affected individuals.

1. Gastropods (3 points)

	Drilled	**Not drilled**	**Total**
Number			
Relative abundance			100%

Where are the drill marks found in the gastropods?

2. Bivalves (3 points)

	Drilled	**Not drilled**	**Total**
Number			
Relative abundance			100%

Where are the drill marks found in the bivalves?

3. How can you best explain the position of the drill holes in the shell? (2 points)

Camp Creek Shale and Del Rio Fm. Samples

Fossil samples from two marine deposits are put out.

1. Sketch and ID three taxa from Camp Creek Shale (3 points)

2. Sketch and ID two taxa form the Del Rio Fm. (2 points)

3. Which fauna is Paleozoic and which is Mesozoic and why? (1 point)

Ammonite sutures

Sketch the suture line from the ammonite and identify it as ceratitic, goniatitic, or ammonitic. (2 points).