

Lab 09 - Mesozoic Index Fossils

For the final 3 labs you will be working with a set of approximately 20 of the most common index fossils from the Paleozoic Era, the Mesozoic Era and the Cenozoic Era. The materials presented in this lab (and from previous labs) will be useful in the completion of these assignments.

Binomial Nomenclature - For each of the fossils you will be working with I have given you the *Genus, species*. Note that for some fossils the species is unknown and is just designated with the word “*species*”. Using the table on the following page, complete the classification (naming) of the fossil. You may find additional information for the full classification from the “Cambrian Explosion” lab, from the treatises and/or from the web. Note that subclasses are only important for a few of the phyla (notably the cephalopods).

Common Name - The “common name” is simply a means of helping to remember the proper name and classification of the fossils. Names like: snail, clam, brach, foram, fern,... etc. are useful as memory joggers.

Time Range - Below is a simplified chart with the time ranges of the major fossil phyla and classes. You can find more specific ranges for individual fossils from many of the previously-mentioned sources.

The Major Invertebrate Groups and Their Stratigraphic Ranges

Phylum Protozoa	Cambrian-Recent	Phylum Mollusca	Cambrian-Recent
Class Sarcodina	Cambrian-Recent	Class Monoplacophora	Cambrian-Recent
Order Foraminifera	Cambrian-Recent	Class Gastropoda	Cambrian-Recent
Order Radiolaria	Cambrian-Recent	Class Bivalvia	Cambrian-Recent
Phylum Porifera	Cambrian-Recent	Class Cephalopoda	Cambrian-Recent
Phylum Archaeocyatha	Cambrian	Phylum Annelida	Precambrian-Recent
Phylum Cnidaria	Cambrian-Recent	Phylum Arthropoda	Cambrian-Recent
Class Anthozoa	Ordovician-Recent	Class Trilobita	Cambrian-Permian
Order Tabulata	Ordovician-Permian	Class Crustacea	Cambrian-Recent
Order Rugosa	Ordovician-Permian	Class Insecta	Silurian-Recent
Order Scleractinia	Triassic-Recent	Phylum Echinodermata	Cambrian-Recent
Class Hydrozoa	Cambrian-Recent	Class Blastoidea	Ordovician-Permian
Order Stromatoporoida	Cambrian-Cretaceous	Class Crinoidea	Cambrian-Recent
Phylum Bryozoa	Ordovician-Recent	Class Echinoidea	Ordovician-Recent
Phylum Brachiopoda	Cambrian-Recent	Class Asteroidea	Ordovician-Recent
Class Inarticulata	Cambrian-Recent	Phylum Hemichordata	Cambrian-Recent
Class Articulata	Cambrian-Recent	Class Graptolithina	Cambrian-Mississippian

CLASSIFICATION OF MAJOR BIOLOGIC GROUPS COMMONLY REPRESENTED BY FOSSILS

KINGDOM MONERA

bacteria, blue-green algae

KINGDOM PROTISTA

Phylum Protozoa

Class Sarcodina-“amoebas”

Order Foraminiferida-marine amoebas mostly with calcite skeletons

Order Radiolaria-marine amoebas with opal skeletons

KINGDOM FUNGI-the fungi

KINGDOM PLANTAE-the plant kingdom

“algae” — several groups of aquatic plants, some of which secrete calcite or aragonite skeletons

*Phylum Bryophyta-the mosses and liverworts

Phylum Tracheophyta-the vascular or principal land plants

*botanists use the term “division” for this rank

KINGDOM ANIMALIA — the animal kingdom

Phylum Porifera — the sponges

Phylum Cnidaria

Class Scyphozoa — the jellyfish

Class Anthozoa — the corals

Order Rugosa

Order Scleractinia

Order Tabulata

Phylum Bryozoa — the bryozoans or “moss” animals

Phylum Brachiopoda — the “lamp shells”

Class Inarticulata — brachiopods with unhinged valves

Class Articulata — brachiopods with hinged valves

Phylum Mollusca — the mollusks

Class Gastropoda — the snails

Class Pelecypoda (Bivalvia) — the clams

Class Cephalopoda

Subclass Nautiloidea

Subclass Ammonoidea

Subclass Coleoidea — the squids and octopuses

Phylum Arthropoda

Class Trilobita — trilobites

Class Ostracoda — ostracodes

Class Insecta — the insects

Note that these are only a few of, but generally the most commonly fossilized, major groupings of arthropods.

Phylum Echinodermata

Class Blastoidea — blastoids

Class Crinoidea — sea lilies and feather stars

Class Asteroidea — star fish

Class Echinoidea — sea urchins, heart urchins, sand dollars

Phylum Protochordata (Hemichordata) — includes extinct graptolites

Phylum Chordata — chiefly vertebrate animals

Class Pisces — fish

Class Amphibia — frogs, toads, salamanders

Class Reptilia — extinct dinosaurs, turtles, snakes, lizards

Class Aves — birds

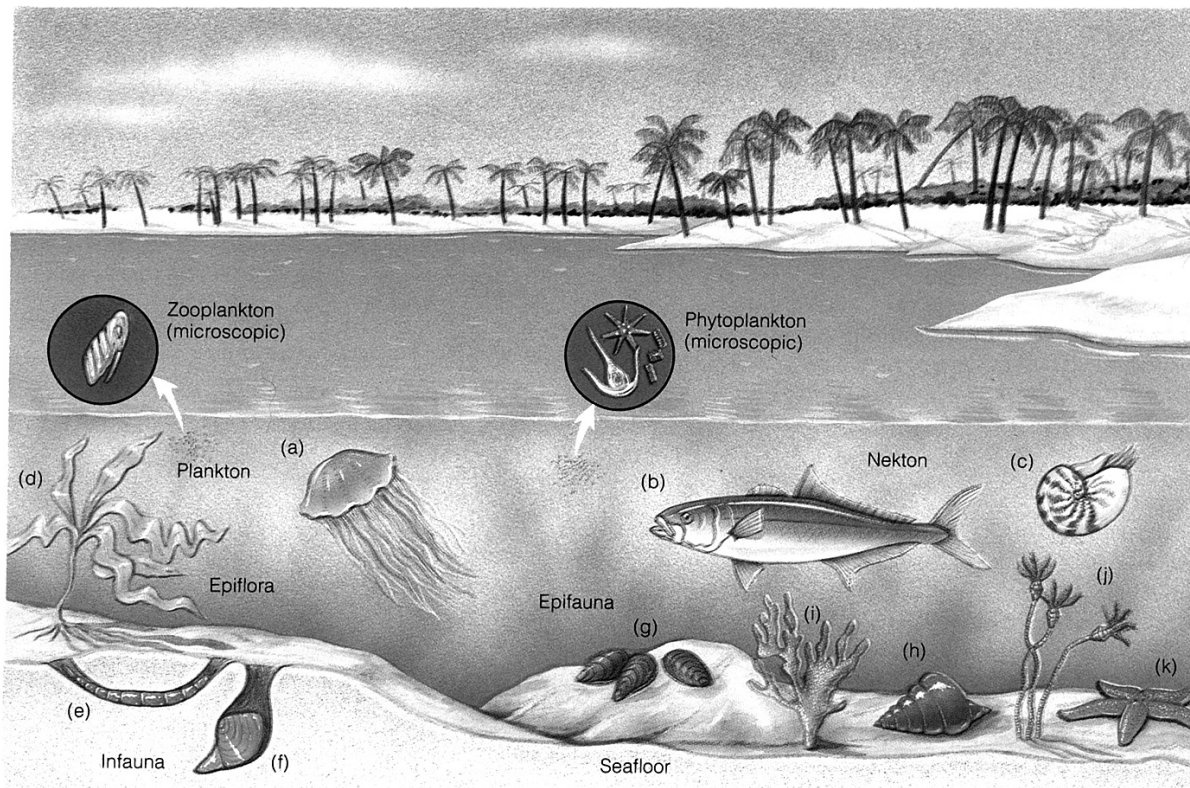
Class Mammalia — mammals

Environments - All of the information about which environment a fossil once lived in was presented to you in the Environments Lab. The vast majority of fossils are from the marine environment and it is helpful in understanding the organism to know which of the marine environments it once inhabited. Common marine environments are illustrated in the diagram below:

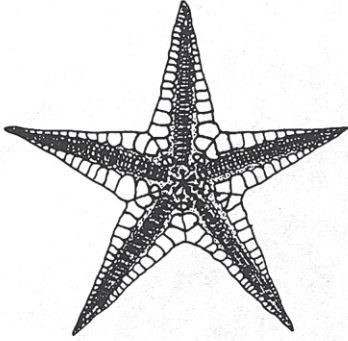
Plankton	- floating
Nekton	- swimming
Benthos	- bottom - dwellers
epifaunal sessile	- stationary
epifaunal mobile	- moving
epifloral	- attached (plants)
infaunal	- burrowers

Preservation - The mode of preservation can tell you a great deal about a fossil. For instance Paleozoic fossils are often either replaced or as molds; whereas many Cenozoic fossils have their original hard parts preserved. Preservation may also help you identify a fossil (ie... commonly only bone or wood is permineralized).

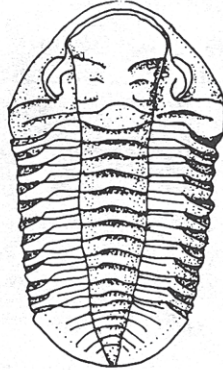
Where and how animals and plants live in the marine ecosystem.
 Plankton: (a) jellyfish. Nekton: (b) fish and (c) cephalopod. Benthos: (d) through (k).
 Sessile epiflora: (d) seaweed. Sessile epifauna: (g) bivalve, (i) coral, and (j) crinoid.
 Mobile epifauna: (k) starfish and (h) gastropod. Infauna: (e) worm and (f) bivalve.
 Suspension feeders: (g) bivalve, (i) coral, and (j) crinoid. Herbivores: (h) gastropod.
 Carnivores-scavengers: (k) starfish. Sediment-deposit feeders: (e) worm.



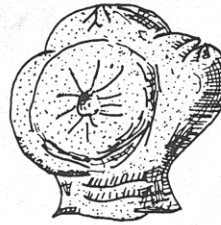
SYMMETRY



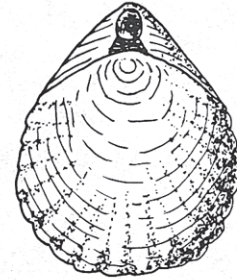
radial
symmetry



bilateral
symmetry

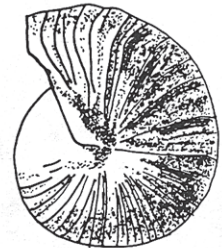
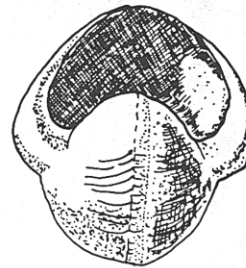
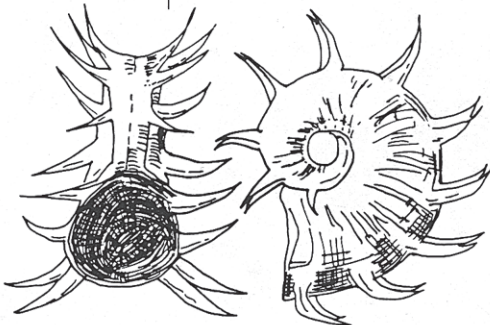
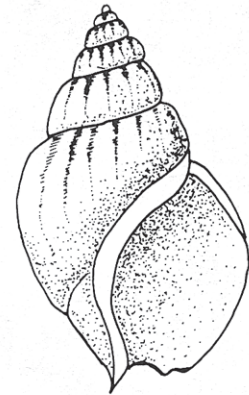
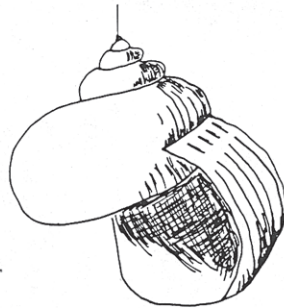
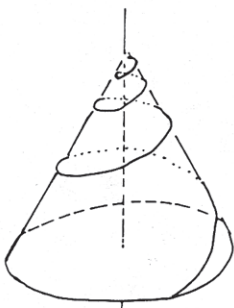


no
symmetry

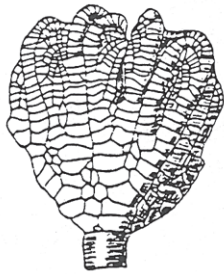


bilateral
symmetry

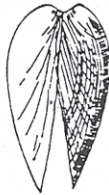
COILED SYMMETRY



NUMBER OF BODY PARTS



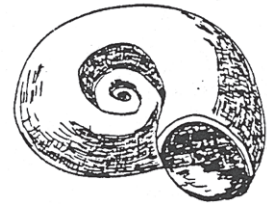
crinoid
(1000's)



clam
(2)



trilobite
(16)



snail
(1)



Solitary Coral



Colonial Coral

LAB 08

name _____

Sample #1 <i>Heteraster texanus</i>			
Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____
Sample #2 <i>Exogyra arietina</i>			
Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____
Sample #3 <i>Kingena wacoensis</i>			
Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____

Sample #4 <i>Orbitolina texana</i>			
Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____
Sample #5 <i>Orthospinctes species</i>			
Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____
Sample #6 <i>Neohibilites minimus</i>			
Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____

Sample #7 *Pentacrinus asteriscus*

Common Name _____

Time Range _____

Kingdom _____

Environment Marine Transitional Terrestrial

Phylum _____

If Marine _____

Class _____

Symmetry _____

Subclass _____

Body parts _____

Order _____

Preservation _____

Sample #8 *Palaeocoma ergertoni*

Common Name _____

Time Range _____

Kingdom _____

Environment Marine Transitional Terrestrial

Phylum _____

If Marine _____

Class _____

Symmetry _____

Subclass _____

Body parts _____

Order _____

Preservation _____

Sample #9 *Baculites compressus*

Common Name _____

Time Range _____

Kingdom _____

Environment Marine Transitional Terrestrial

Phylum _____

If Marine _____

Class _____

Symmetry _____

Subclass _____

Body parts _____

Order _____

Preservation _____

Sample #10 *Astrocoenia hyatti*

Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____

Sample #11 *Araucaria species*

Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____

Sample #12 *Protolindenia wittei*

Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____

Sample #13 *Edmontosaurus annectens*

Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____

Sample #14 *Pugnoides triassica*

Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____

Sample #15 *Dactylioceras commune*

Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____

Sample #16 *Raphidonema farringdonensis*

Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____

Sample #17 *Perisphinctes species*

Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____

Sample #18 *Ostrea falcata*

Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____

Sample #19 *Porocystis globularis*

Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____

Sample #20 *Hypselosaurus priscum*

Common Name	_____	Time Range	_____
Kingdom	_____	Environment	Marine Transitional Terrestrial
Phylum	_____	If Marine	_____
Class	_____	Symmetry	_____
Subclass	_____	# Body parts	_____
Order	_____	Preservation	_____