

## ***Ordering the geological periods – teacher instructions***

This is the first activity in the 90-minute version of the DeKalb County Schools' Fernbank Science Center outreach program, Fossils and Evolution. It is posted here as a pre-visit activity for schools with 50-minute class periods.

Students use the fossil organisms shown on each page, together with the maps showing the reconstructed positions of the continents, to place 14 sheets in order with the **oldest on the bottom** and the youngest on the top. When the activity is finished the students use the page numbers to put the periods back in random order for use by the next group of students.

The activity can be introduced by a short discussion of a picture of the Grand Canyon (see accompanying PowerPoint presentation). Students will be able to tell you that the oldest rocks are on the bottom. Point out that geologists reached this conclusion long ago about layers of (sedimentary) rocks by observing that fossils near the top of a stack of rock layers look more like life on Earth today as compared to the many extinct types of life seen at the bottom of the stack. If students looked at pictures of the fossils the geologists studied, would they be able to observe these changes through time? The exercise is designed to answer this question.

Putting the 14 sheets in order would be a daunting task for most students or adults, except for a shortcut method, (see PowerPoint for a graphic aid in presenting these steps) which is as follows:

1. Find the 3 pictures with dinosaurs on them (not similar-looking animals that came before dinosaurs – check the lettered picture labels if unsure) and place them in a stack in the middle of your workspace.
2. Find the 3 pictures of animals that you think came after the dinosaurs and put them in a stack on the right.
3. Place the remaining 8 sheets in the stack on the left.
4. Now sort each stack, placing the **oldest time periods on the bottom** of the stack, and the youngest on the top. Possible clues: in the left stack, all life was in the ocean at the beginning; animals with legs appear later. Also, look at the arrangement of the continents: they come together over time in the left stack, split apart in the middle stack, and move into today's positions in the right stack.

The instructor can move around the room encouraging students through each step of the process, and at the end pulling out pages that are out of order as a hint to place them correctly.

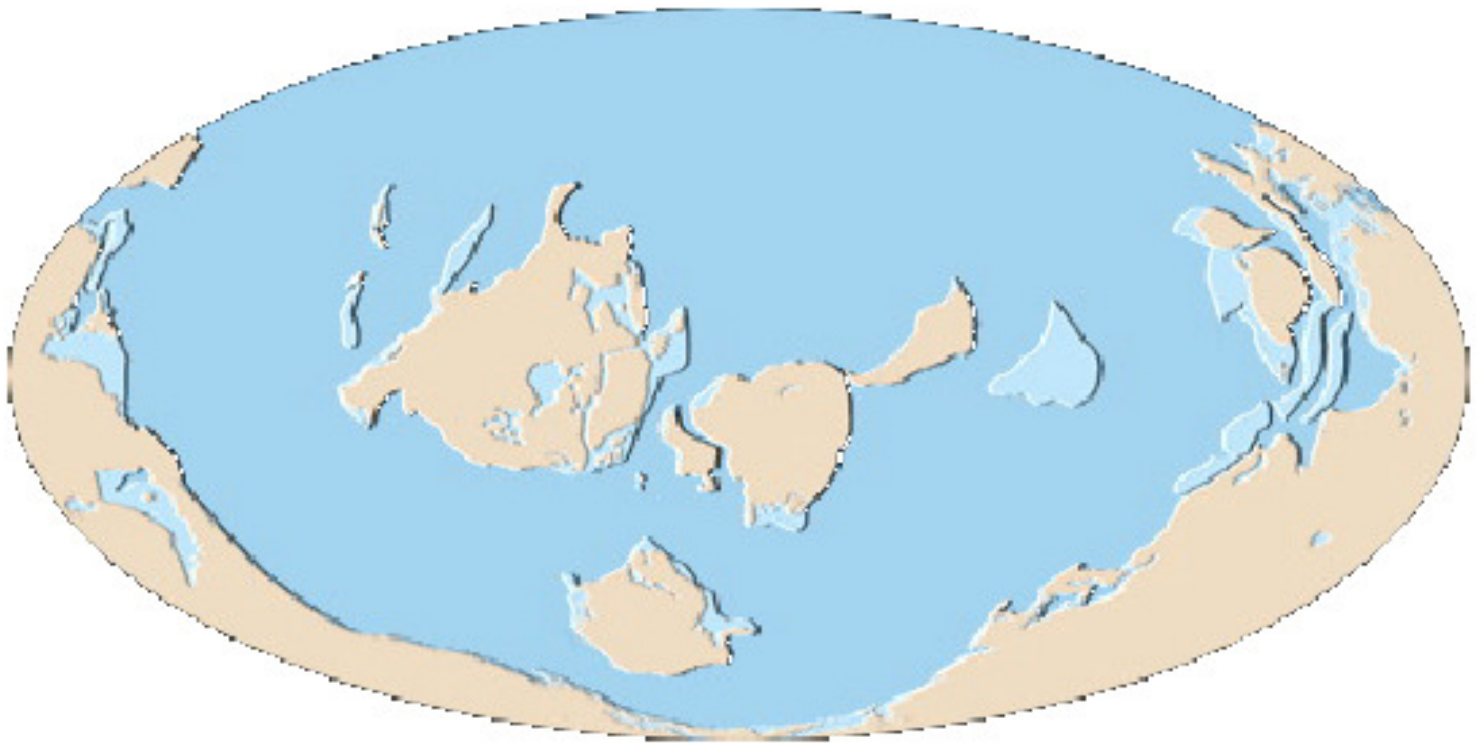
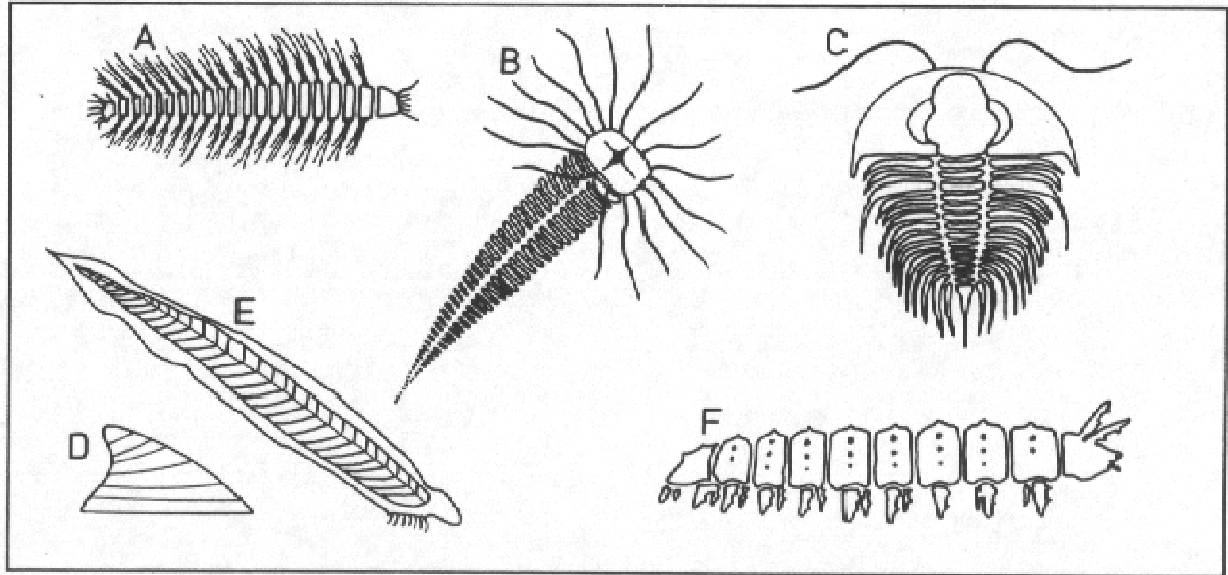
The solutions for each stack immediately follow the graphic aid to the above instructions in the PowerPoint (remember not to reveal them before the students start!). It is worthwhile pointing out the meanings of the era names by which geologists have grouped these periods: the time of the dinosaurs was the Mesozoic ("middle life"); the time after was the Cenozoic ("recent life"); the times before were the Paleozoic ("ancient life") and Proterozoic ("beginning of life" – in reality, the beginning of multicellular life happened at this time).

Students will need more space than one student's workspace to sort out the papers, so it is best to have students work side by side in pairs.

The following pages make better copies (i.e. the maps are more legible) if you print them in color, then run them through a copier on the "photo" setting.

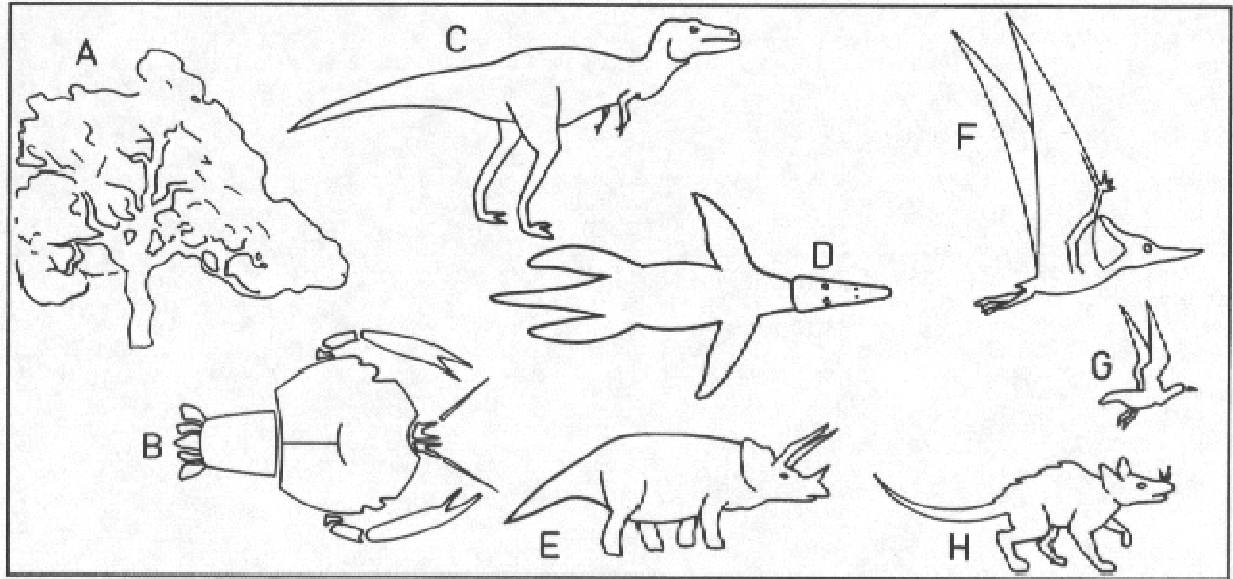
## Cambrian Period

- A Annelid worm
- B Coelenterate
- C Trilobite
- D Mollusk
- E Lancelet
- F Onychophoran



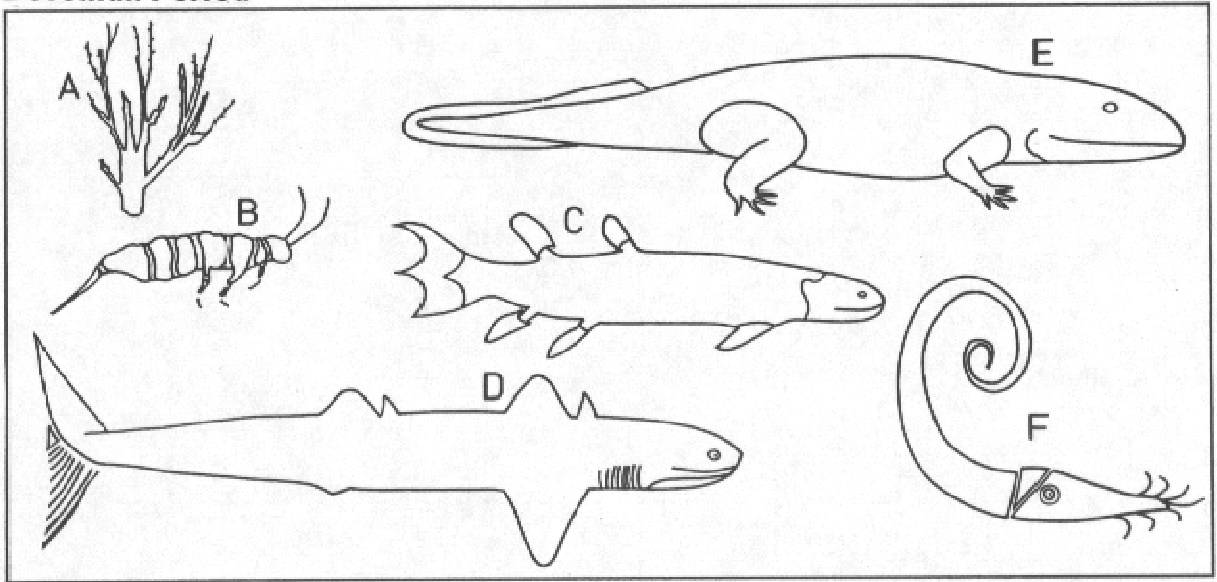
## Cretaceous Period

- A Flowering tree
- B Crablike arthropod
- C Theropod dinosaur
- D Plesiosaur
- E Horned dinosaur
- F Pterosaur
- G Toothed bird
- H Insectivorous mammal



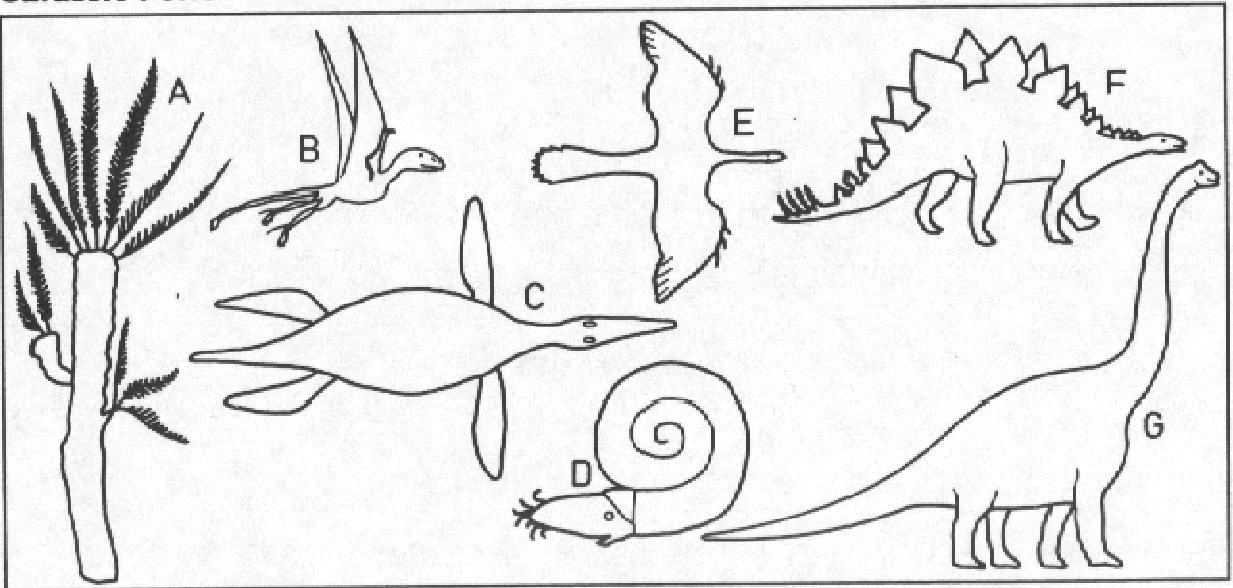
**Devonian Period**

- A Fern ancestor
- B Early insect
- C Bony fish
- D Shark
- E Early amphibian
- F Cephalopod



## Jurassic Period

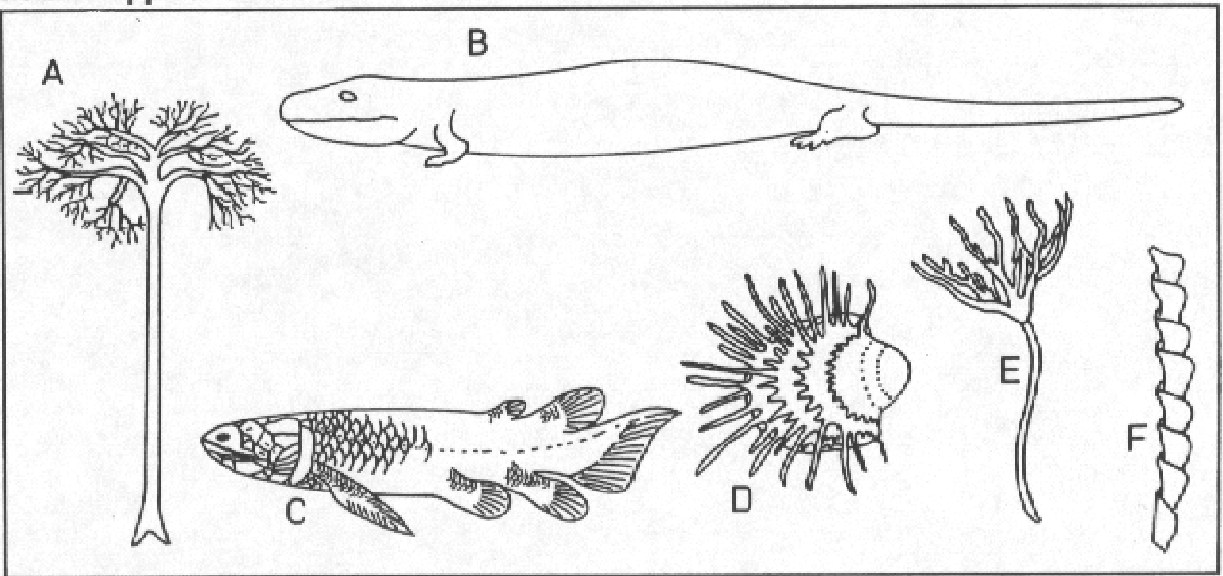
- A Bennettitalean
- B Pterosaur
- C Plesiosaur
- D Cephalopod
- E Early bird
- F Ornithischian dinosaur
- G Sauropod dinosaur





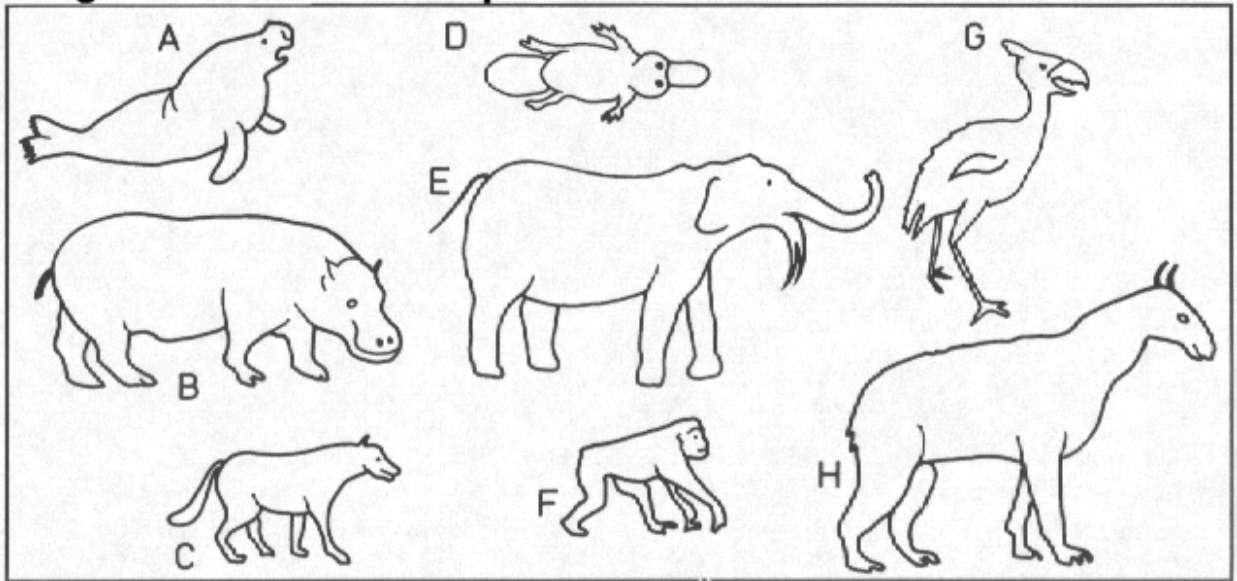
**Mississippian Period**

- A Giant club moss
- B Amphibian
- C Lobe-finned bony fish
- D Brachiopod
- E Crinoid
- F Bryozoan



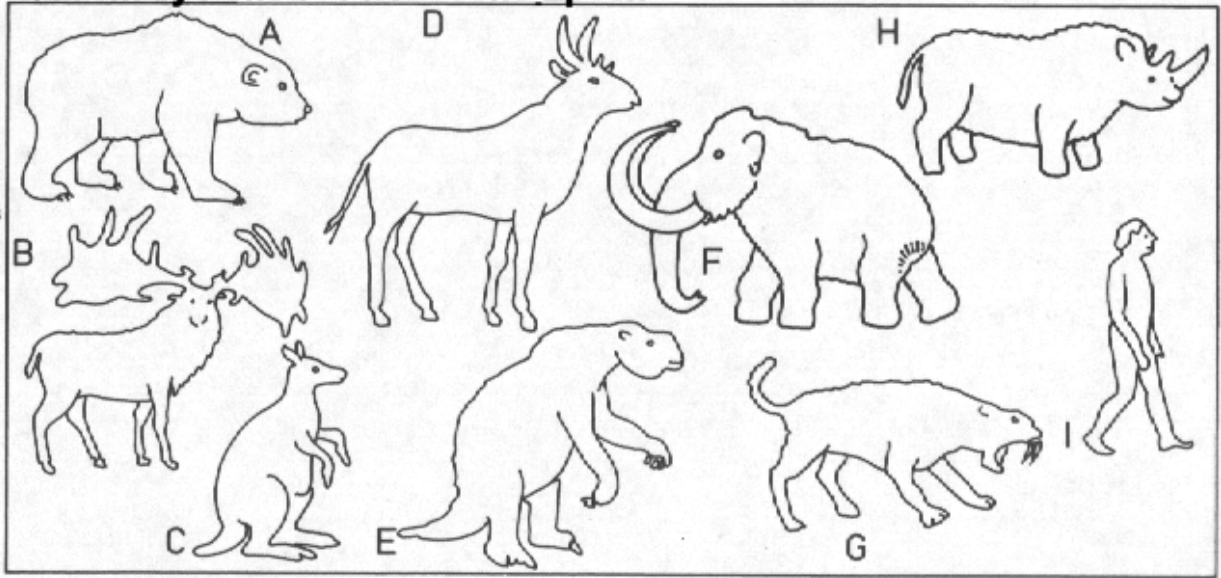
**Neogene Period - Miocene Epoch**

- A Seal
- B Hippopotamus
- C Hyena
- D Platypus
- E Deinother
- F Primate
- G Flightless bird
- H Chalicothere



### Quaternary Period - Pleistocene Epoch

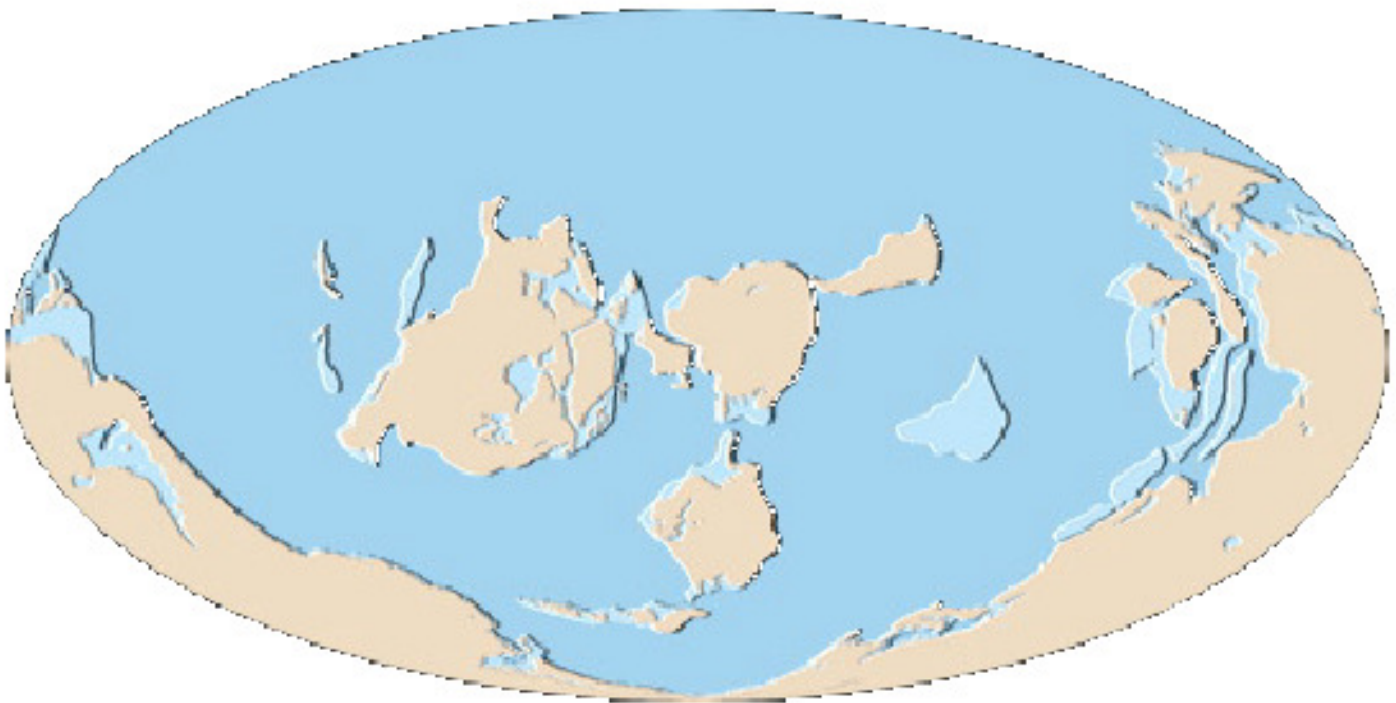
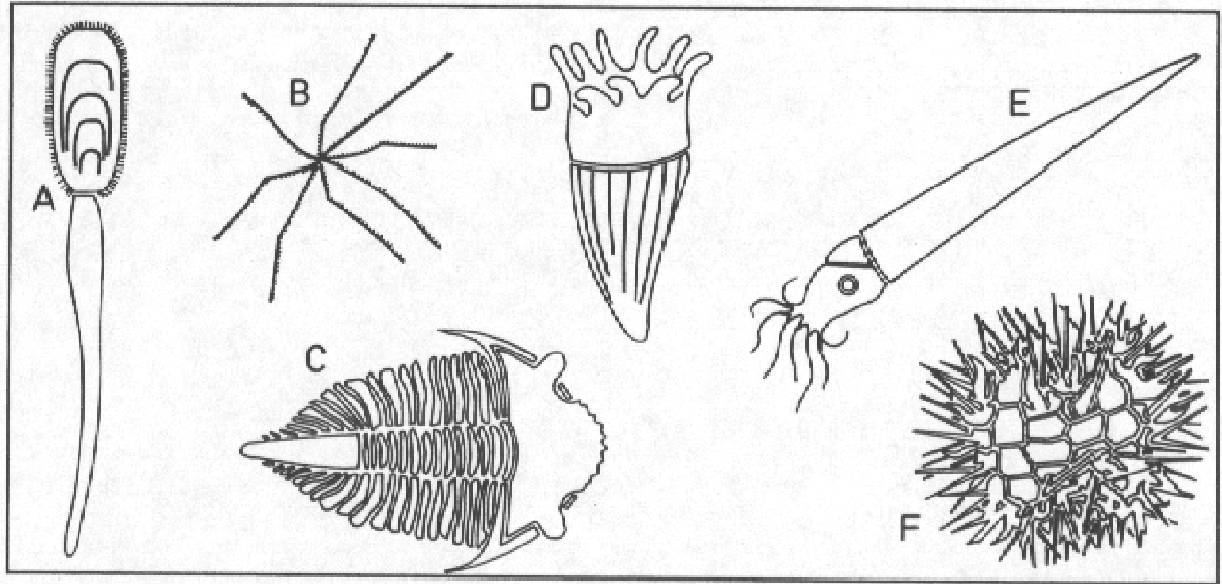
- A Brown bear
- B Giant deer
- C Kangaroo
- D Giraffid
- E Giant sloth
- F Woolly mammoth
- G Sabertooth cat
- H Woolly rhinoceros
- I Man





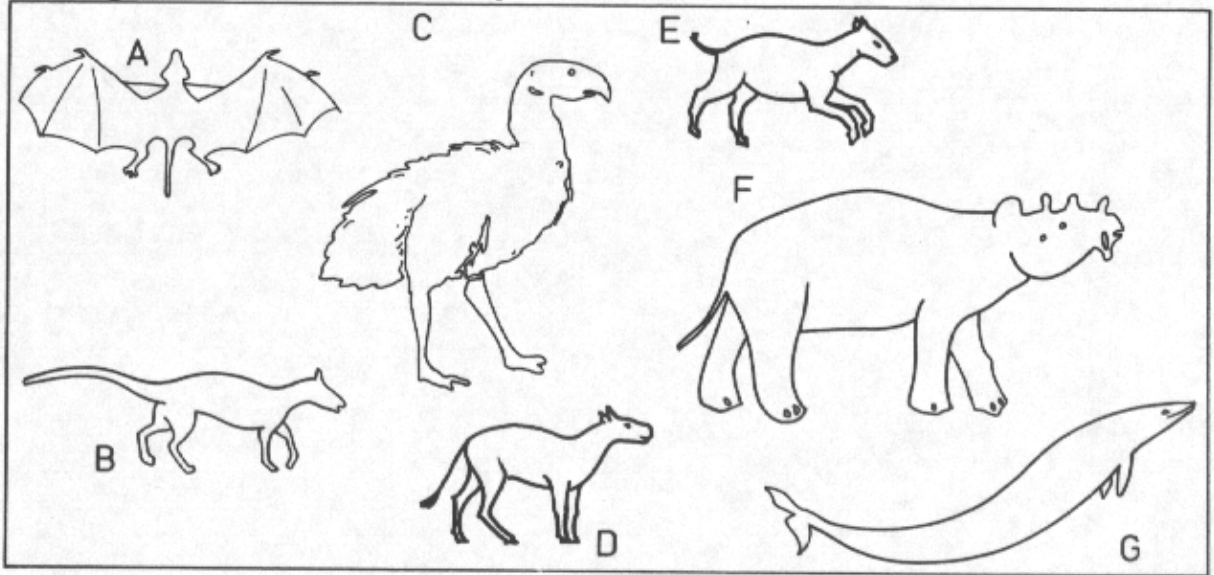
## Ordovician Period

- A Brachiopod
- B Graptolite
- C Trilobite
- D Coral
- E Cephalopod
- F Echinoderm



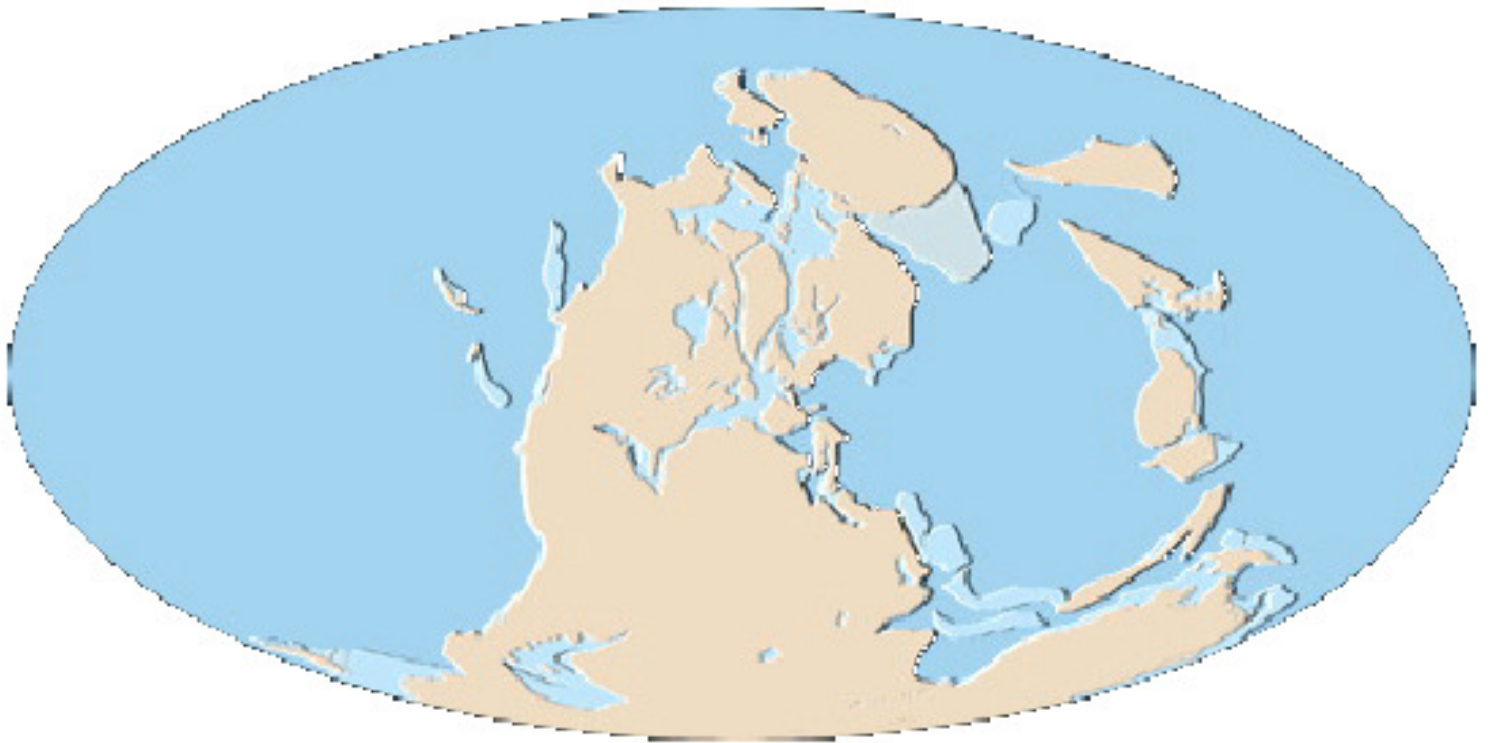
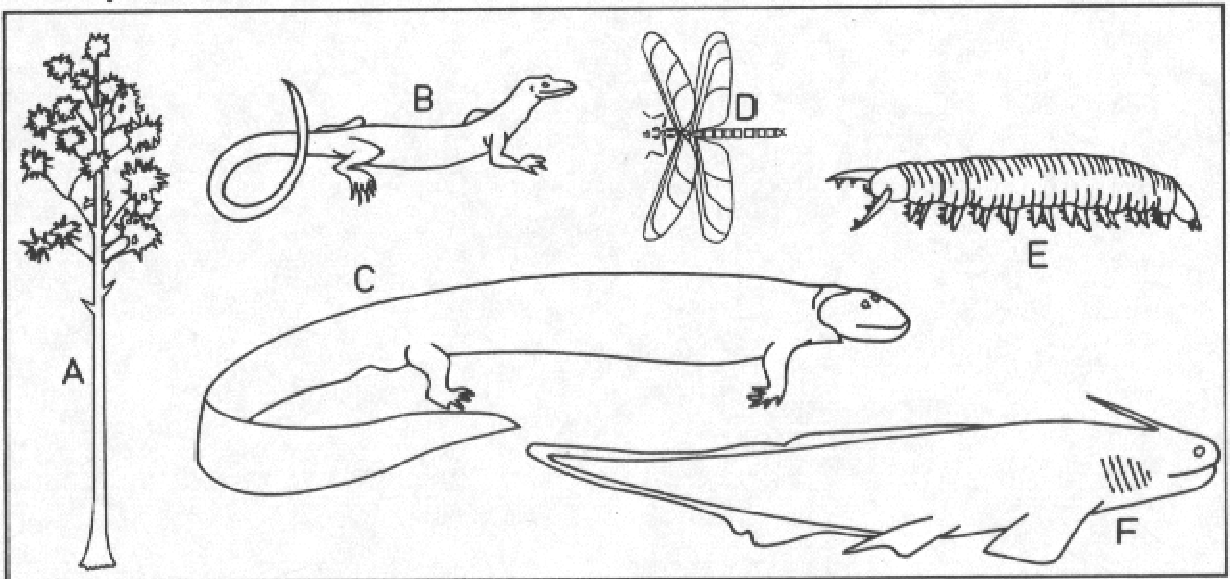
**Paleogene Period - Eocene Epoch**

- A Bat
- B Early carnivore
- C Flightless bird
- D Early horse
- E Early rhinoceros
- F Amblypod
- G Whale



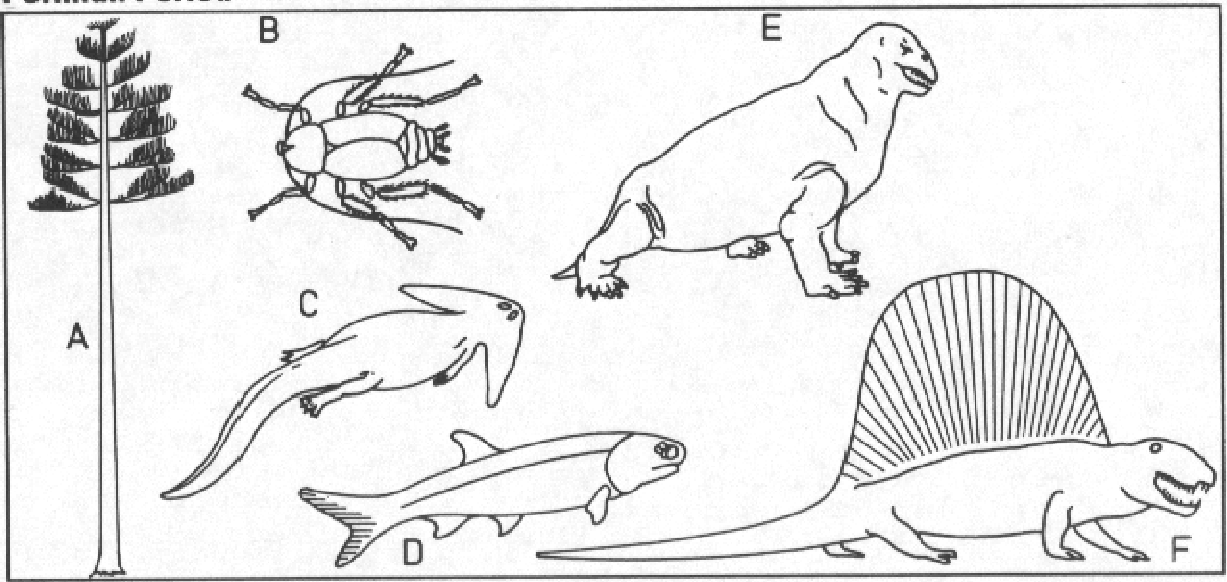
## Pennsylvanian Period

- A *Cordaite* tree
- B Early reptile
- C Amphibian
- D Proto dragonfly
- E *Arthropleura*
- F *Xenacanthus*



**Permian Period**

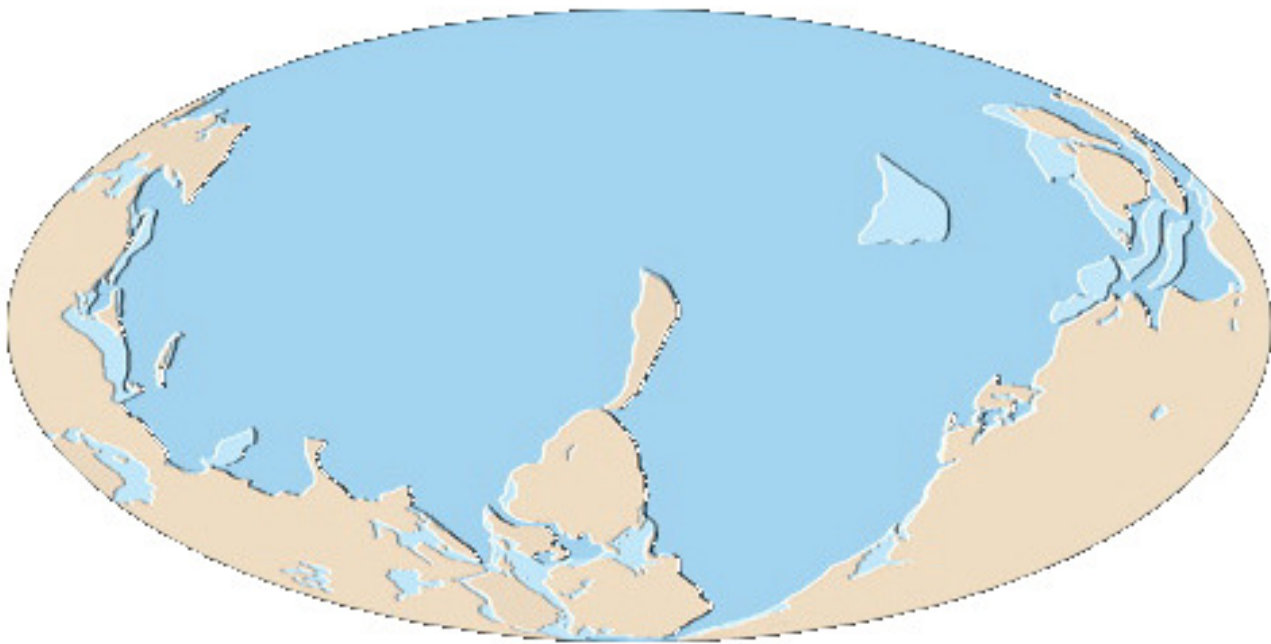
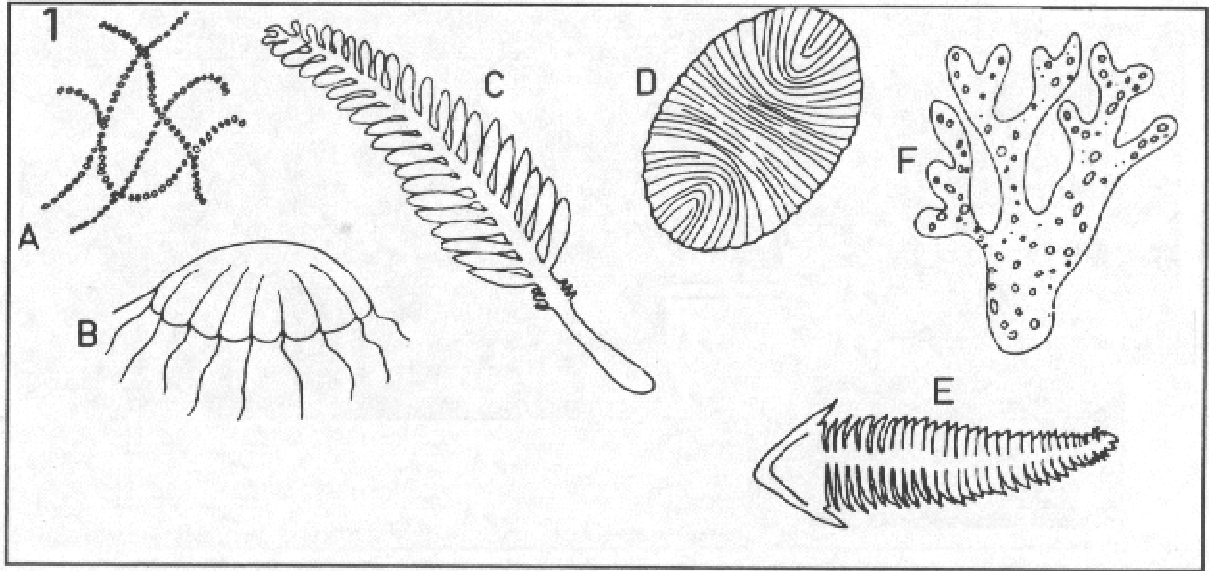
- A** Conifer
- B** Cockroach
- C** Amphibian
- D** Bony fish
- E** Herbivorous mammal-like reptile
- F** Carnivorous mammal-like reptile





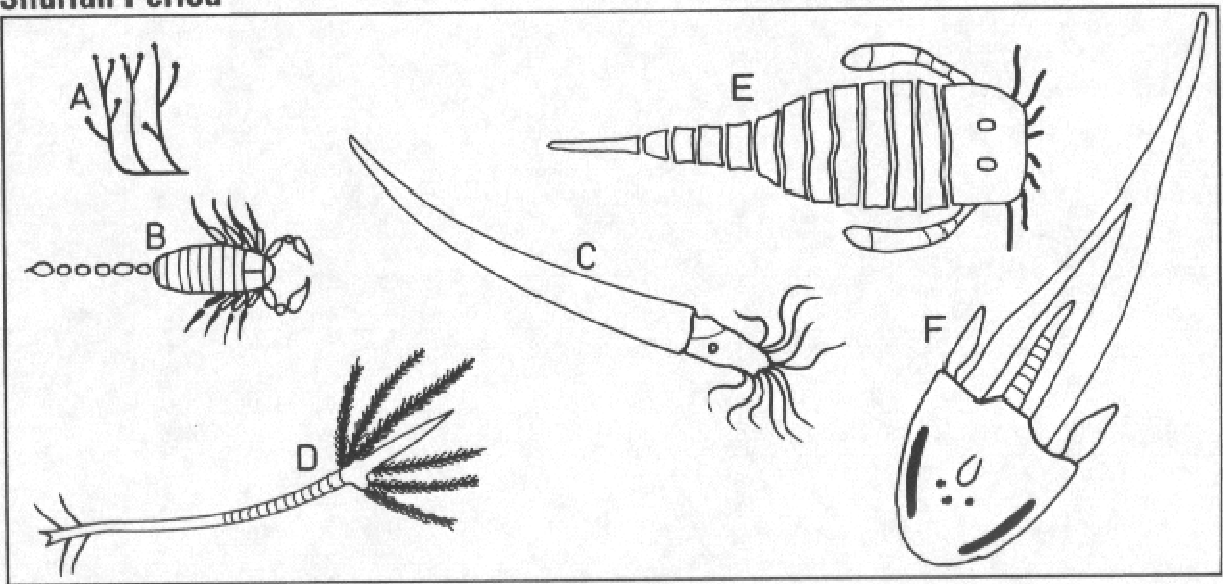
**Proterozoic Eon**

- A Green alga  
B, C Coelenterates  
D, E Annelid worms  
F Sponge



**Silurian Period**

- A Early land plant
- B Early scorpion
- C Cephalopod
- D Crinoid
- E Sea scorpion
- F Jawless fish



## Triassic Period

- A *Pleuromeia*
- B Cycad
- C Theropod dinosaur
- D Crocodilian
- E Turtle
- F Prosauropod dinosaur
- G Early mammal
- H Ichthyosaur

