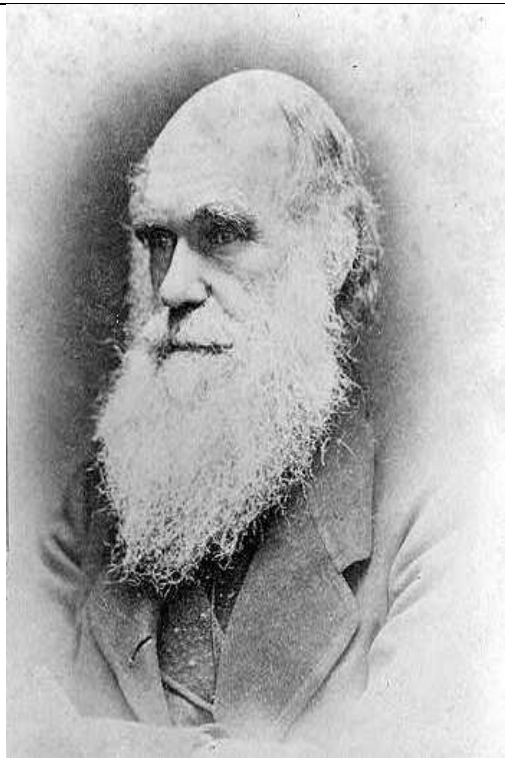


# Evolution and Natural Selection

Name:

Due:

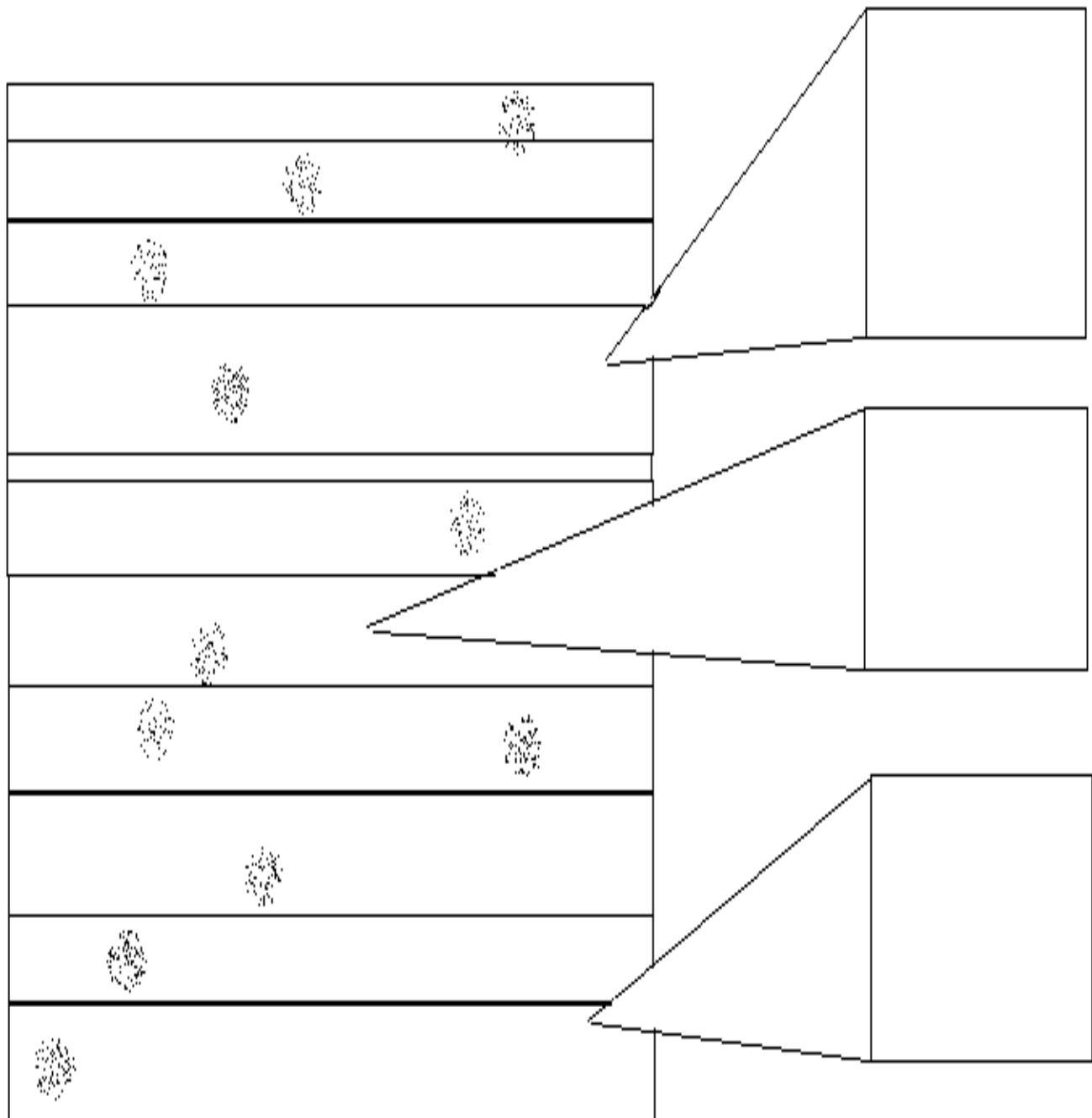
Evolution in its simplest form is change over time. How much time have organisms had to change?



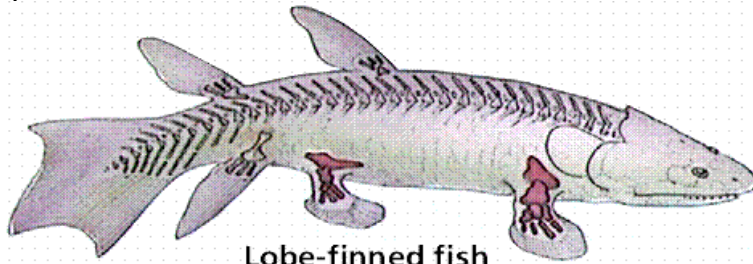
Please describe some of the history associated with evolution and the persons associated with this science theory.

Which rock layer is the oldest and which is the youngest, Label them below?

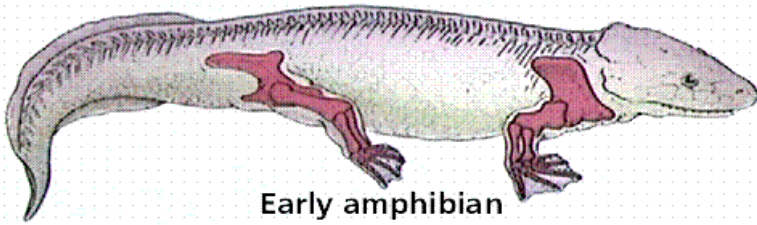
Please describe using pictures how changes in the fossil record and relative dating can be used as an evidence of evolution. Remember the "Principle of Superposition."



Is there any connection between lobe-finned fish and early amphibian fossils? Please describe these connections in detail in the space below.

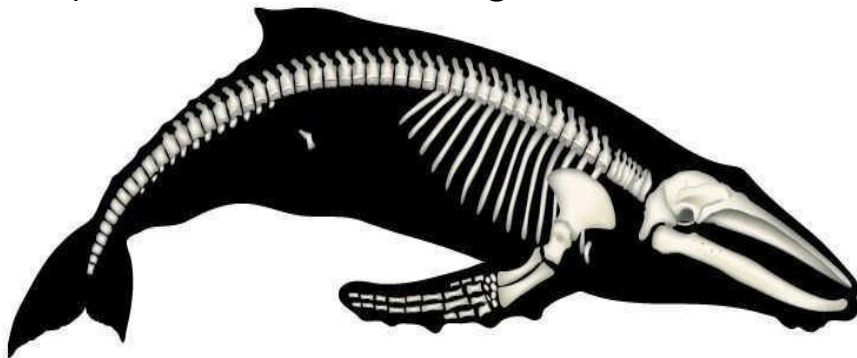


Lobe-finned fish



Early amphibian

Why do whales have leg bones?



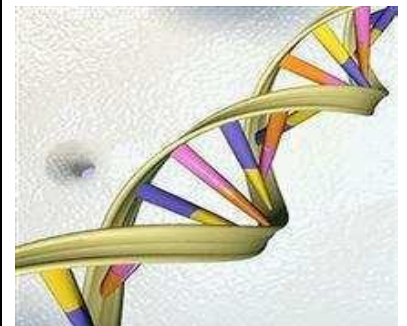
What is the picture on the right? Why is this important to understanding evolution?

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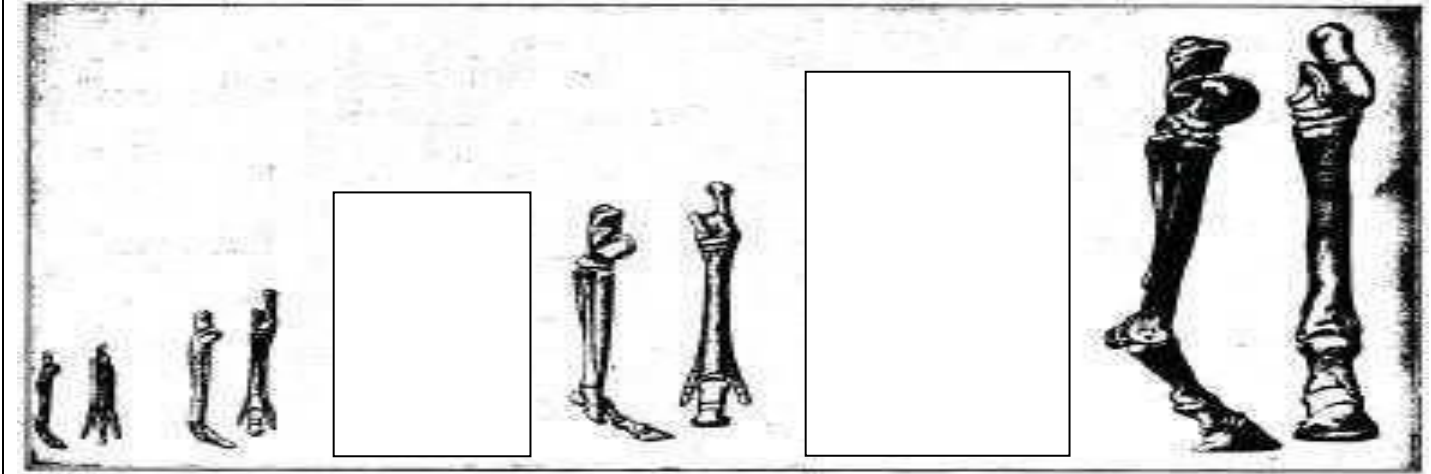
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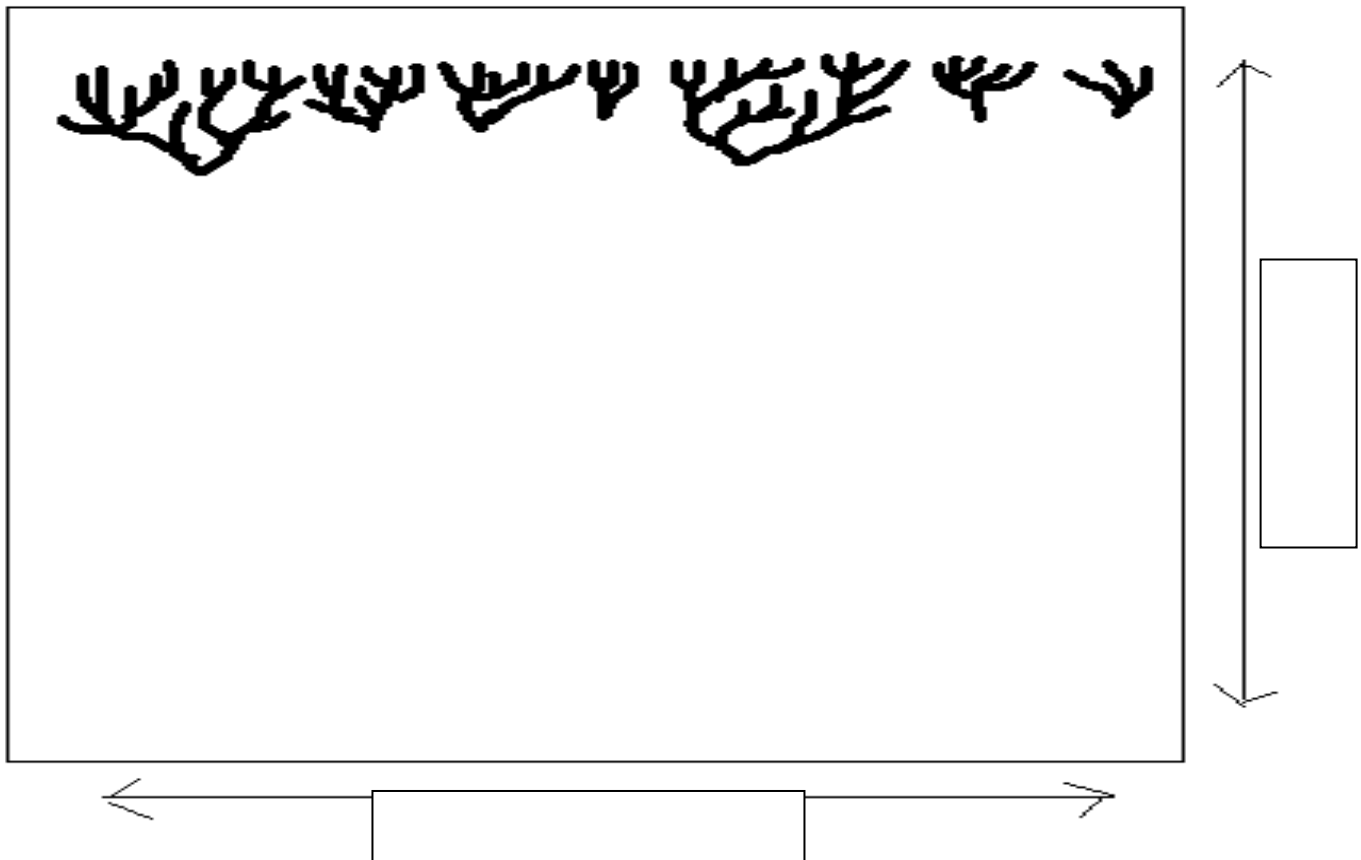
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What changes do you see in bones of these different horse species over the last several millions years. Sketch in what the missing fossils may look like.



Please complete the diagram below so it represents how living things that are on the earth today share a common ancestor. **Please make references to extinctions.** What words are hidden in the boxes?



Write a really good description of why giraffes have long necks.

Write a really bad description of why giraffes have long necks.

- ◇ Draw a lion and describe mechanism #1.
- ◇ Draw a small herd of zebra and describe mechanism #2.
- ◇ Draw a giraffe eating from this one tree (#3)
- ◇ Make each zebra slightly different (#4)
- ◇ Make a baby zebra like its parent but slightly different (#5)

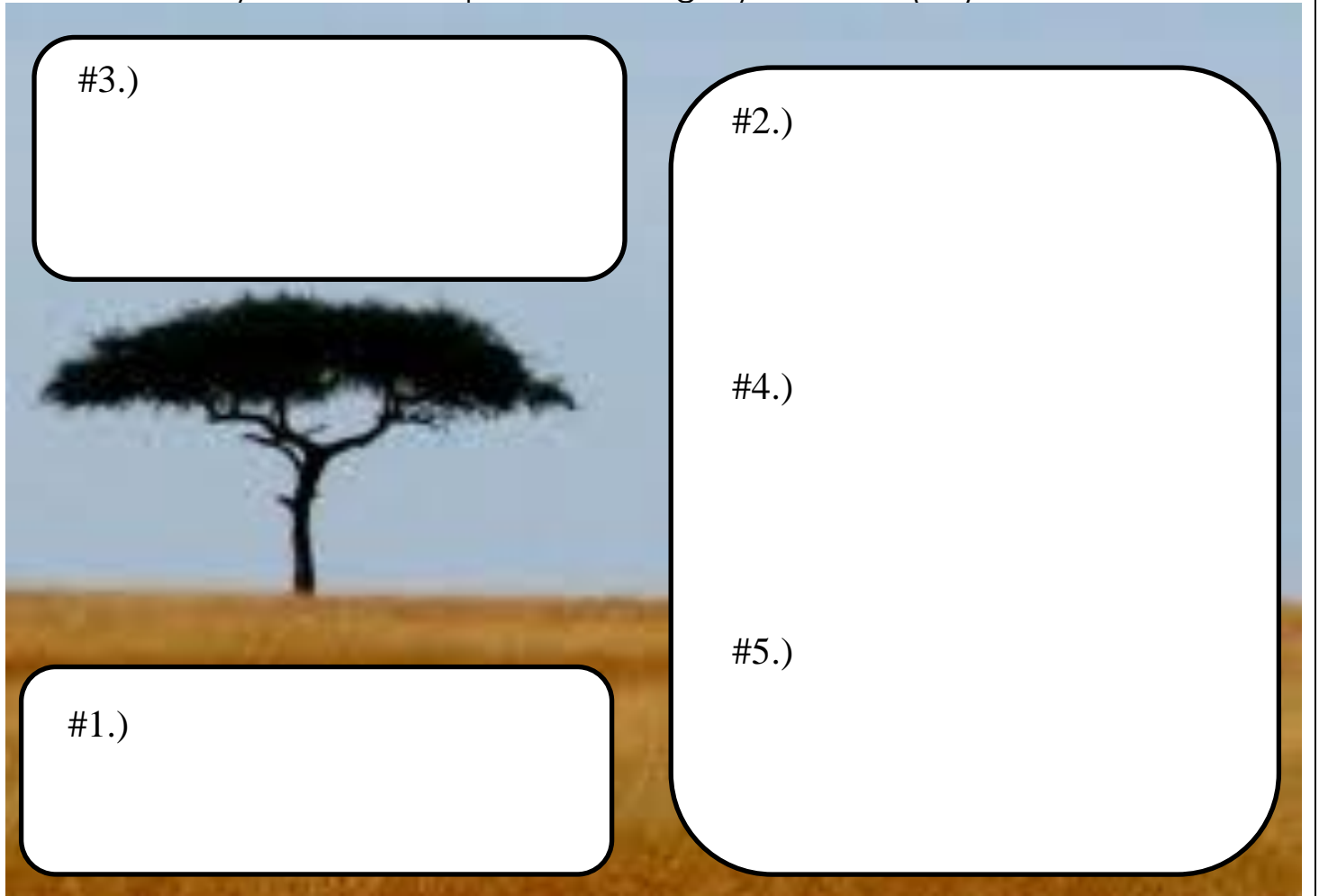
#3.)

#2.)

#4.)

#5.)

#1.)



\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = Natural Selection.

Summarize how a new species may be formed in divergent evolution? Remember the Hypoetheticus.

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Please describe how this picture represents convergent evolution.



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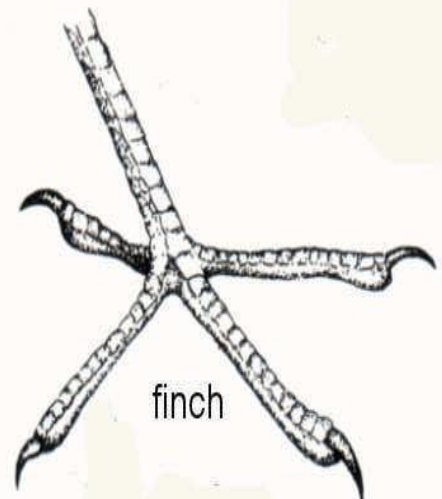
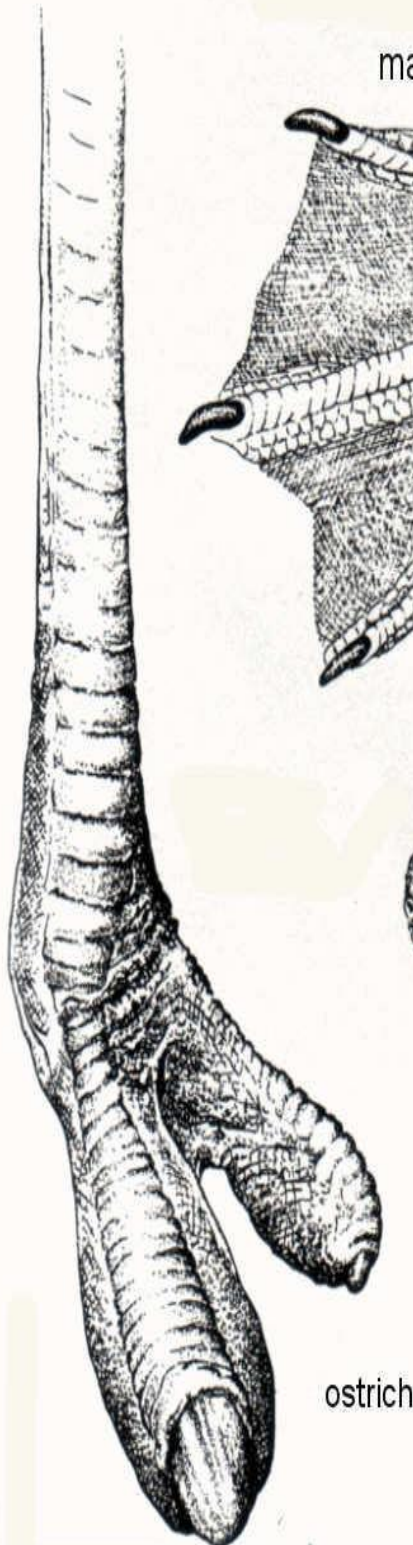
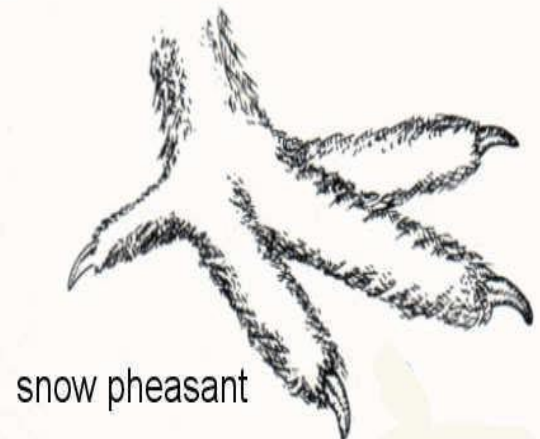
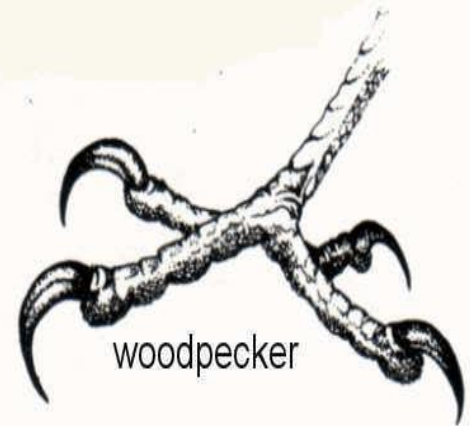
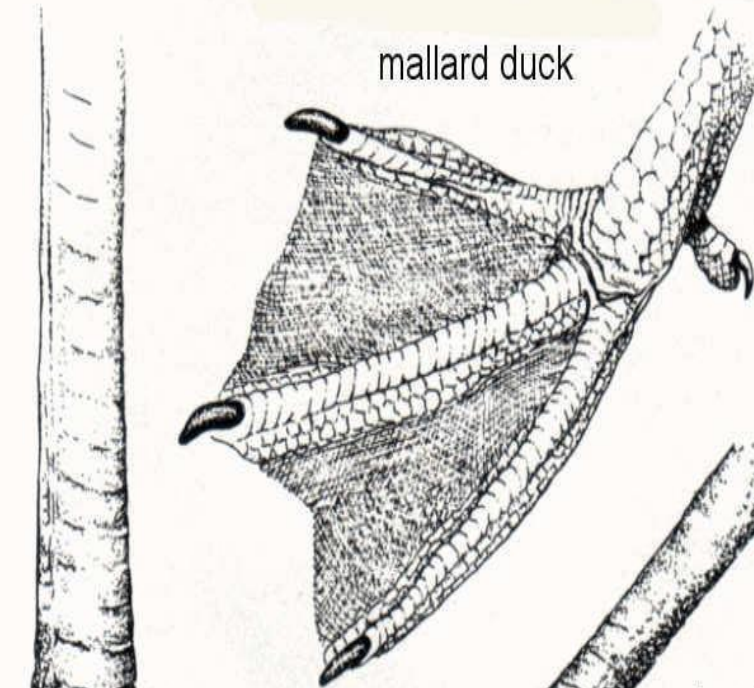
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Describe how the types of feet below allow the bird to be successful at....? Describe why this is an adaptation.





# EARTH SYSTEM HISTORY

Name: \_\_\_\_\_

Due: \_\_\_\_\_

◇ This photograph best represents what Principle?

◇ Please explain using some of the fossils on the right.

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Please circle the fossil that is older based on this principle



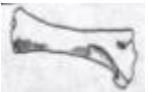
or



or



or



or



What happened at #10? \_\_\_\_\_

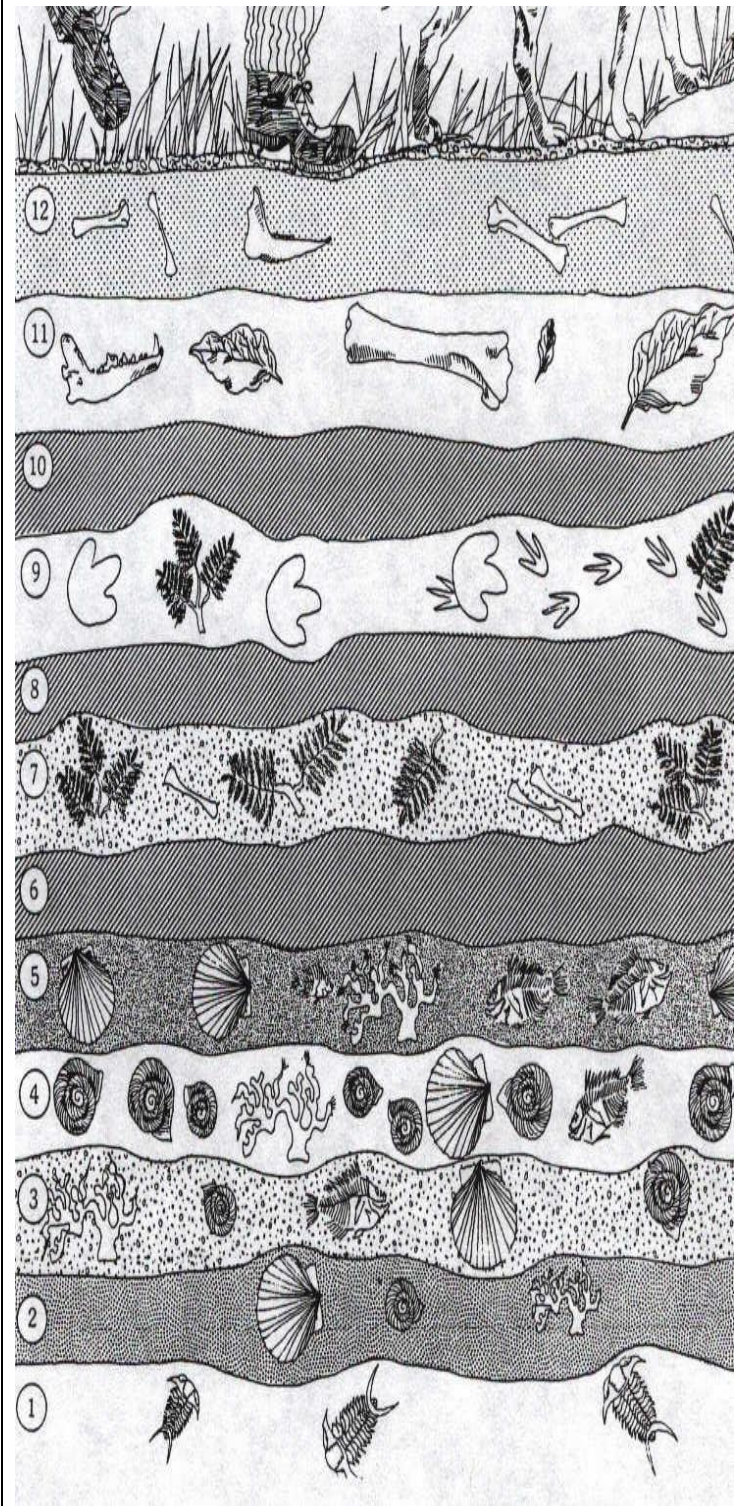
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Please record the name of time periods from earliest to latest in their chronological order below. Use the boxes beneath to group them according to Era

H A D E A N				C A M B R I A N						T R I A S S I C				Q U A R T E R N A R Y
----------------------------	--	--	--	--------------------------------------	--	--	--	--	--	--------------------------------------	--	--	--	---

Eon   Eon   Eon   Period   Period   Period   Period   Period   Period   Period   Period   Period   Period   Period   Period

Precambrian Super-Eon			
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Many aspects of science including earth system history have \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ components.

\_\_\_\_\_ - Laws of nature do not change over time.


What percentage of all species that ever lived still exist today?  
\_\_\_\_\_ (Caution! Re-read Question)

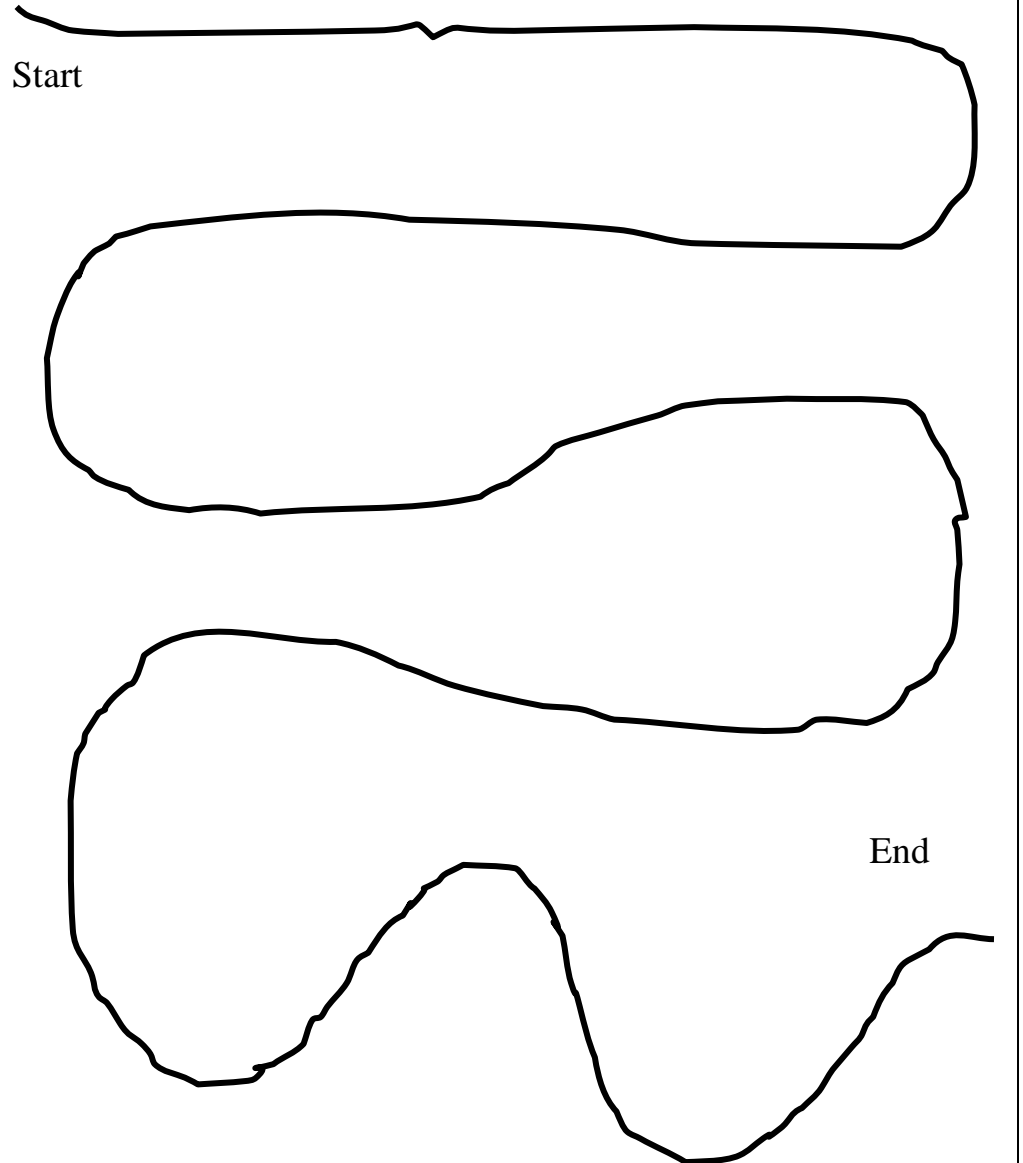
Research one creature that has gone extinct. Draw a quick sketch, its name, and some relevant information.

Please use the line below as the history of the earth from 4.6 billion years ago until present. Record the events on the left in the correct order and space them accordingly along the timeline.

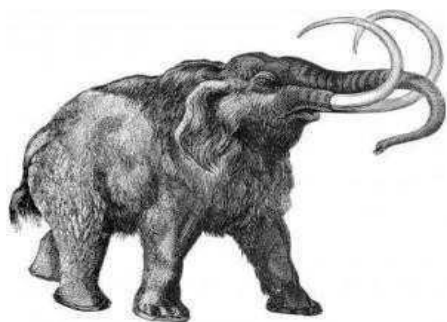
- ◇Moon Forms
- ◇Earliest Life Begins
- ◇Human Civilization
- ◇Earliest Mammals
- ◇First Insects
- ◇First Multicellular Life
- ◇Carbon Swamps
- ◇First Flowering Plants
- ◇Computer Age
- ◇Dinosaurs Rule
- ◇K-T Mass Extinction
- ◇Earliest Humans
- ◇Age of Exploration
- ◇Formation of the Earth
- ◇Age of Fish
- ◇ Last Ice Age
- ◇Age of Marine Invertebrates
- ◇First Human Hominid
- ◇Hadean
- ◇Cenozoic
- ◇Proterozoic
- ◇Mesozoic
- ◇Paleozoic
- ◇Archean
- ◇Today



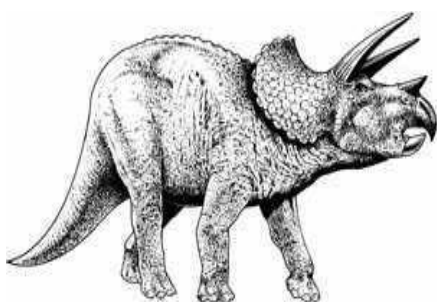
Include a  when an extinction event occurs. There have been a few.



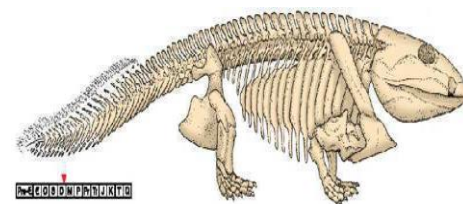
Please look at the pictures below and describe the best time period that each picture represent. Record some information about each photograph as well.



First evidence of life



Not K-T Mass Extinction



First Amphibian

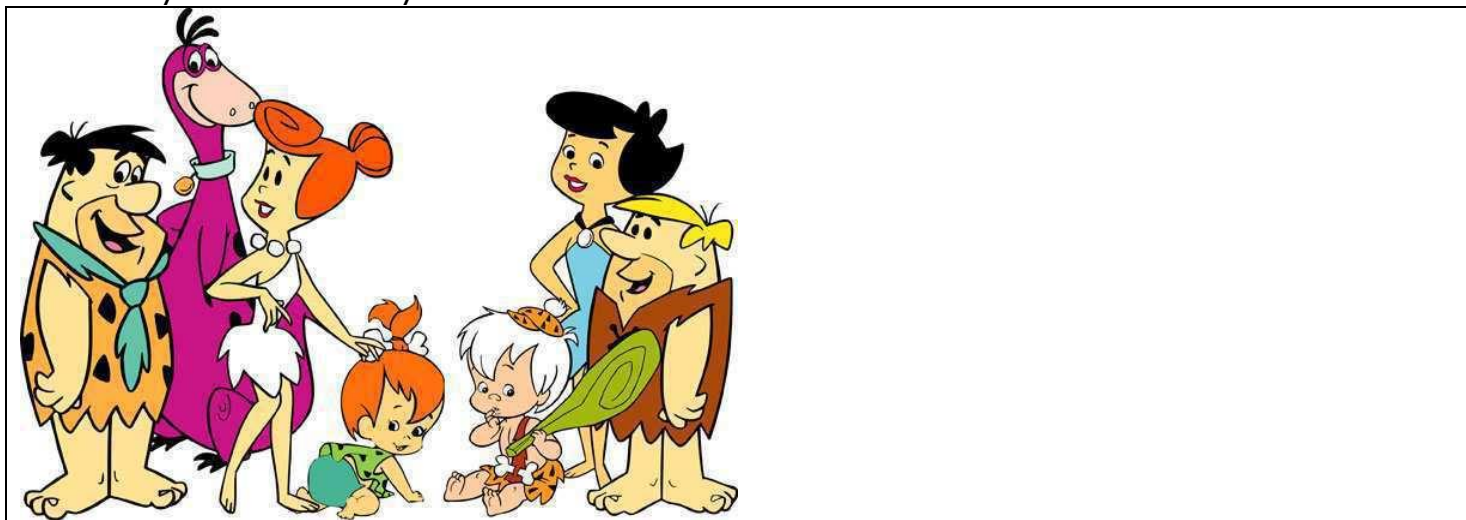
GEOLOGIC TIME SCALE						
Time Units of the Geologic Time Scale				Development of Plants and Animals		
Eon	Era	Period	Epoch			
Phanerozoic	Cenozoic	Quaternary	Holocene	0.01	Earliest <i>Homo sapiens</i>	
			Pleistocene	1.6		
		Tertiary	Pliocene	5.3	Earliest hominids	
			Miocene	23.8		
			Oligocene	33.7	"Age of Mammals"	
			Eocene	55		
			Palaeocene	65		
	Mesozoic	Cretaceous	145	"Age of Reptiles"	Extinction of dinosaurs and many other species First flowering plants First birds Dinosaurs dominant First mammals	
		Jurassic	208			
		Triassic	248			
	Palaeozoic	Carboniferous	Permian	286	"Age of Amphibians"	Extinction of trilobites and many other marine animals  First reptiles Large coal swamps Amphibians abundant
			Pennsylvanian	320		
			Mississippian	360		
			Devonian	410	"Age of Fishes"	First amphibians First insect fossils Fishes dominant
			Silurian	438		
			Ordovician	505	"Age of Invertebrates"	First land plants First fishes Trilobites dominant
			Cambrian	545		
			Vendian	650	"Soft-bodied faunas"	First organisms with shells Abundant Ediacaran faunas
			Proterozoic	2500	Collectively called Precambrian  comprises about 87% of the geological time scale	
Archean						
Hadean						
	4600 Ma					



# Human Evolution

Name: \_\_\_\_\_

Please describe why this family portrait is inaccurate according to earth system history



What is a hominid? How do Paleoanthropologists know what they know?



Below is a copied page from a science textbook, please read this page about human evolution. Note – It is the only page on the topic.

## Evidence of Human Evolution

### SKILLBUILDER

#### Interpreting Data

Scientists studied the chemicals found in four bacteria. The table shows the types of chemicals found in each type of bacteria. Each letter represents a different chemical. Use this data to determine which of the bacteria are closely related. If you need help, refer to the **Skill Handbook** on page 690.

Bacteria 1	A, G, T, C, L, E, S, H
Bacteria 2	A, G, T, C, L, D, K, H
Bacteria 3	A, G, T, C, L, D, P, U, S, R, I, V
Bacteria 4	A, G, T, C, L, D, H

**Figure 17-14**

- A** A monkey is able to hold fruit because it has opposable thumbs.



You know that the DNA of chimpanzees and gorillas has been found to be very similar

to the DNA of humans.

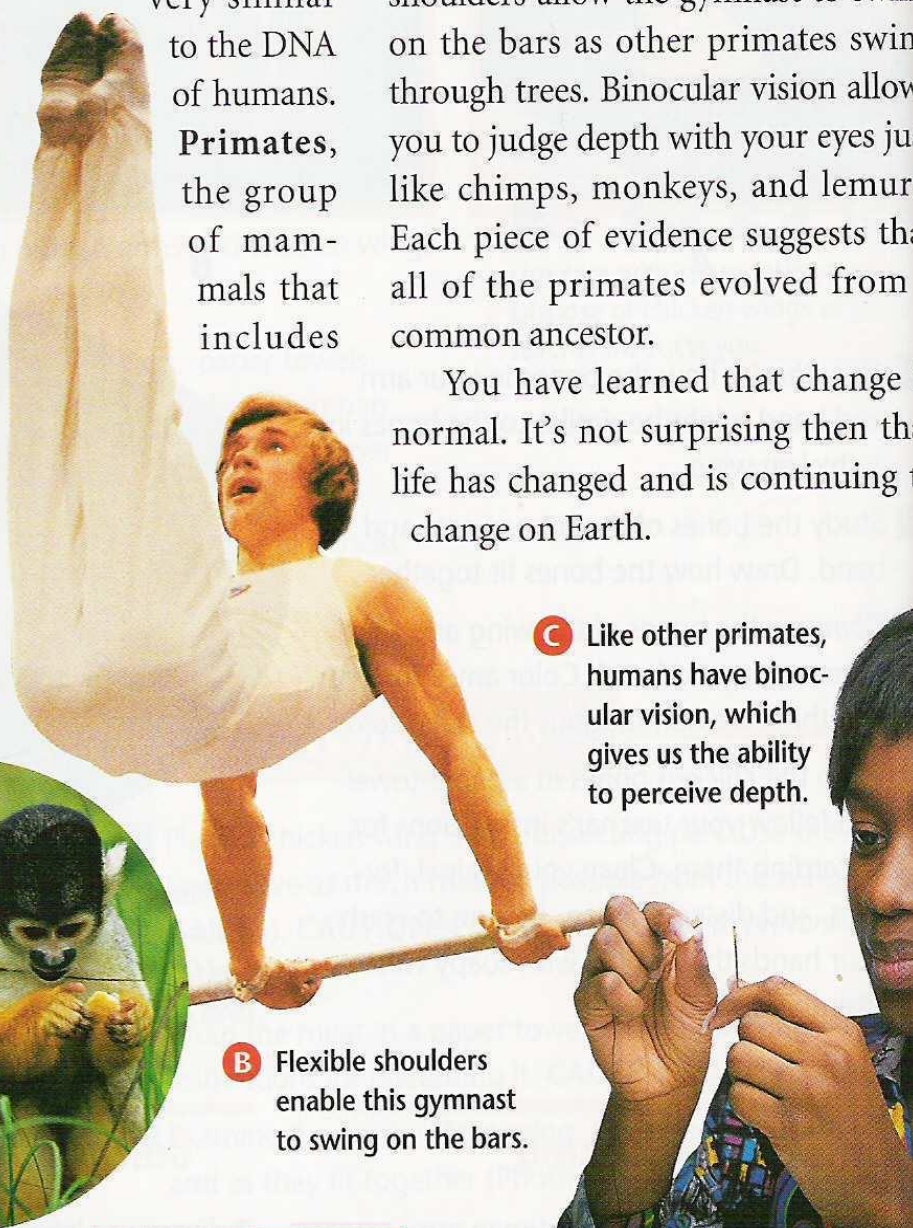
**Primates**, the group of mammals that includes

monkeys, apes, and humans, share many characteristics. Opposable thumbs allow you and other primates to grasp and hold objects. Flexible shoulders allow the gymnast to swing on the bars as other primates swing through trees. Binocular vision allows you to judge depth with your eyes just like chimps, monkeys, and lemurs. Each piece of evidence suggests that all of the primates evolved from a common ancestor.

You have learned that change is normal. It's not surprising then that life has changed and is continuing to change on Earth.

- C** Like other primates, humans have binocular vision, which gives us the ability to perceive depth.

- B** Flexible shoulders enable this gymnast to swing on the bars.



Did this page help you understand human evolution? What did it include, and what did it leave out? Should I teach human evolution from this book?

Please rewrite the textbook in the space below. Provide helpful visuals in the open spaces

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

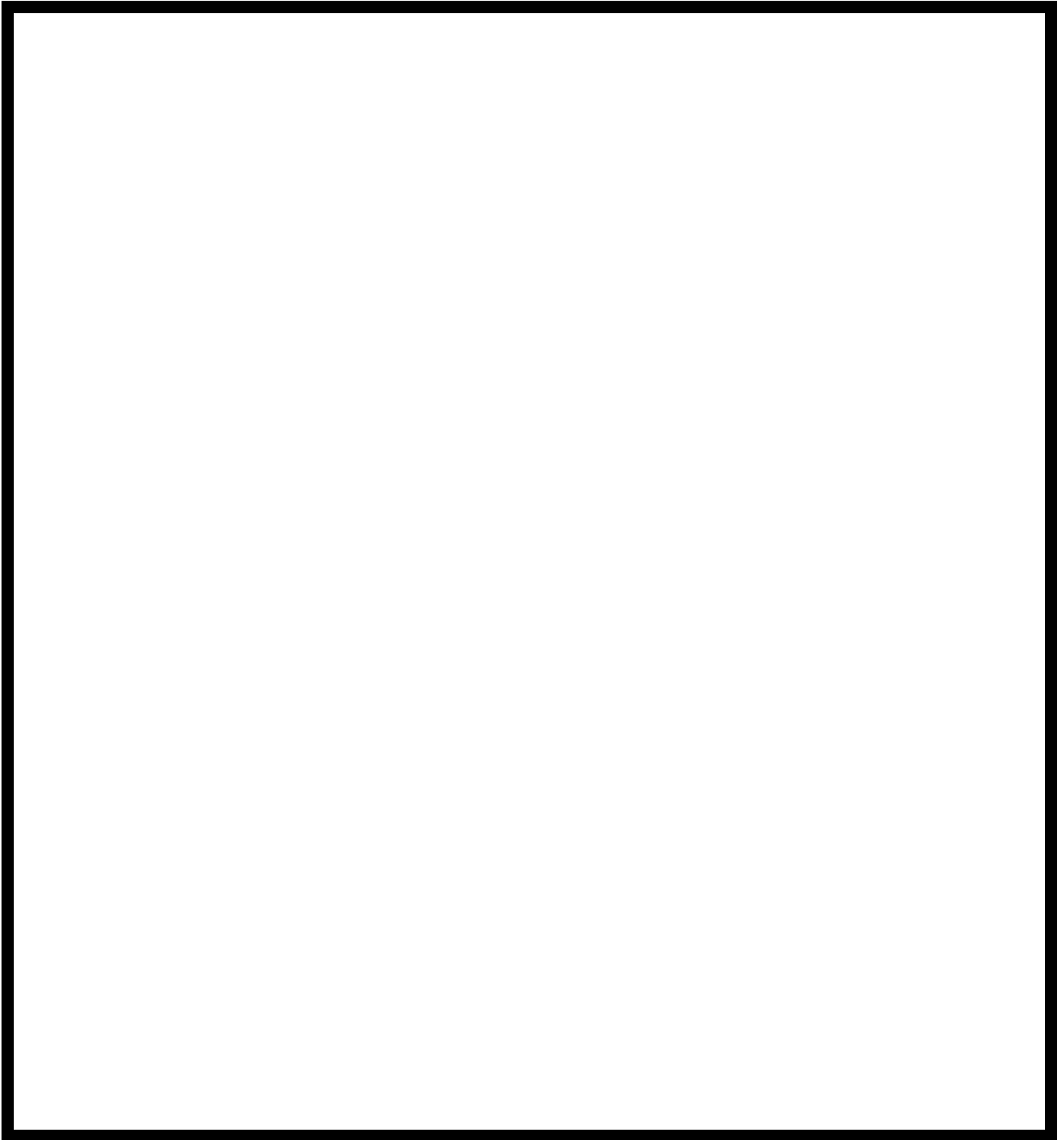


Please put these hominid skulls (1-4) in order from the oldest to the youngest, Provide a rationale for why you choose the oldest, a middle one, and the most recent.





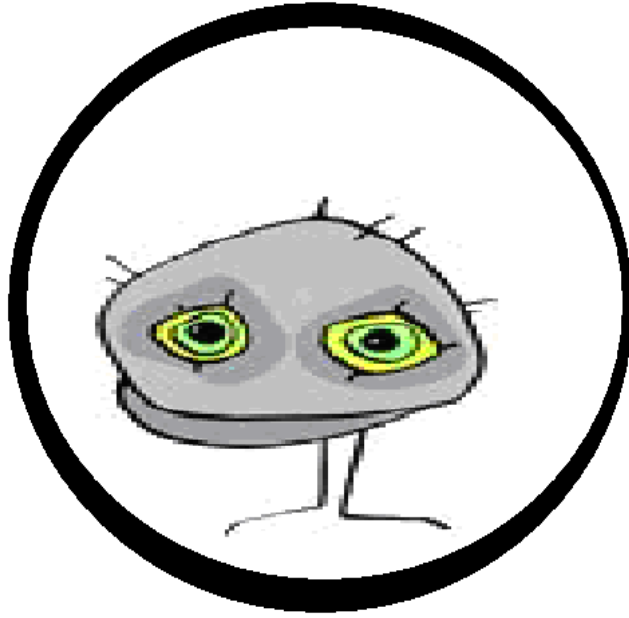
Sketch out a one square cartoon that includes a fact about any human hominid. Your cartoon must describe the name and something specific / accurate to that hominid.



# Life Origins

Name: \_\_\_\_\_

While looking under the microscope, you observe the object below. How can you determine if this is a living creature? What will it need to survive if it is living?



Which, if any of the four ideas on the origin of life mentioned in class do you believe? Why? The only wrong answer is no answer at all, unless you give a good reason as to why you have no good reason, but that reason better be a good reason.

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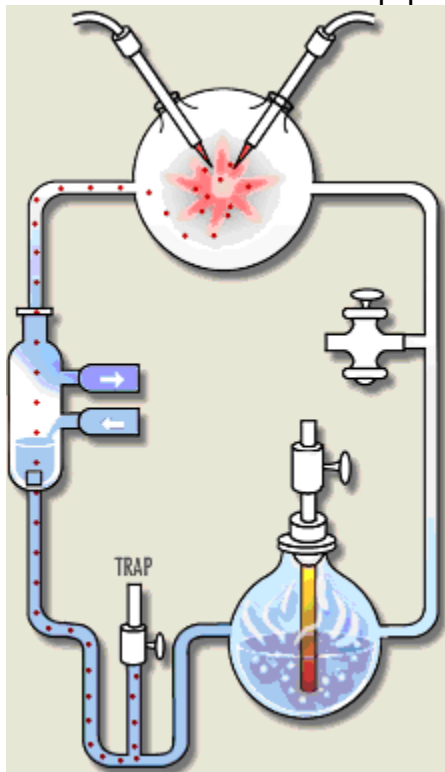
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Please describe as much as possible about Miller-Urey (1953) and their study concerning primitive earth. Please include the SPONCH elements where appropriate.



How did water aid in the origin of life? Don't forget, (Solvent, Medium, Participant)

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NICE WORK! DO NOT LOSE! PUT IN YOUR SCIENCE FOLDER!



# ECOLOGICAL SUCCESSION

Name: \_\_\_\_\_

◇ Do this question last! What is the essence of ecological succession?

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◇ Which picture represents primary succession and which picture represents secondary succession?



Why does it take longer for trees to grow when starting from primary succession?

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Why does growth tend to occur faster during secondary succession?

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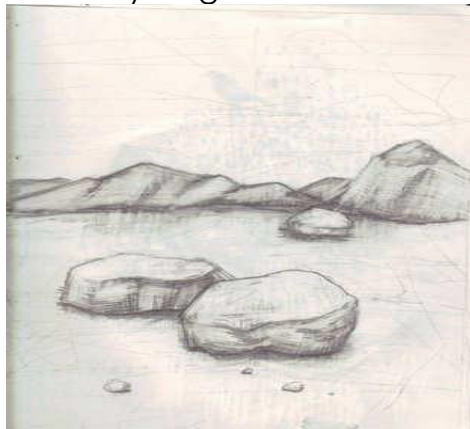
Describe the role of lichens in early ecological succession. Decorate the rock below as a visual to help you explain.



◇ Please sketch in plants and animals to show 200 years of ecological succession in six pictures spread out over time.

◇ **Provide with text some** of the plant species represented in your drawings in the space below each box.

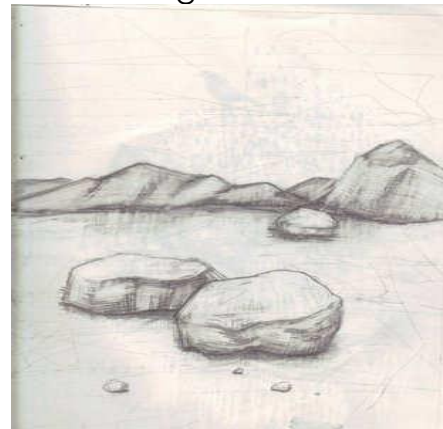
The early stages



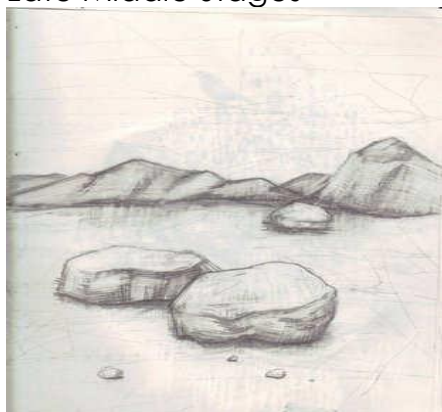
Early Middle



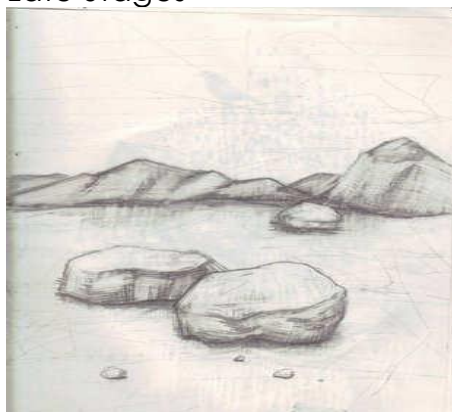
Middle Stages



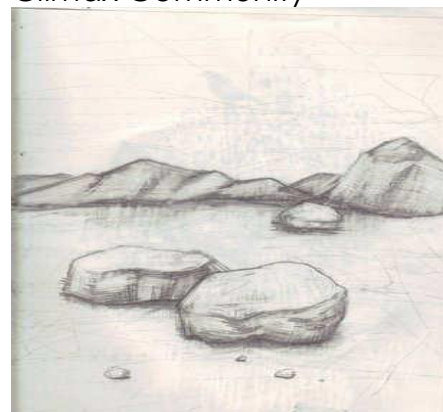
Late Middle Stages



Late Stages



Climax Community



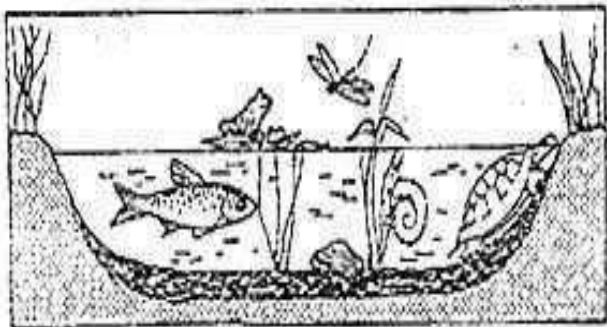
Describe some events that will turn this climax community back to the beginning of secondary succession.



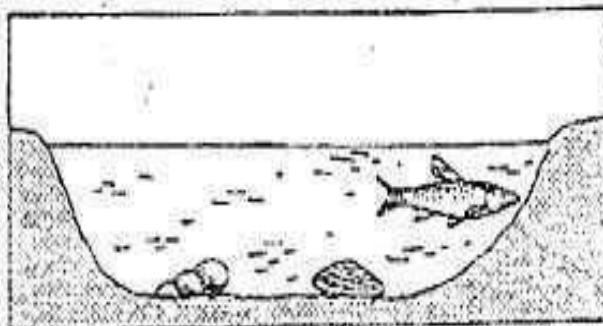


Describe the order of the pond ages from youngest to oldest based on aquatic ecological succession. Which is Oligio, Meso, and Eutrophic?

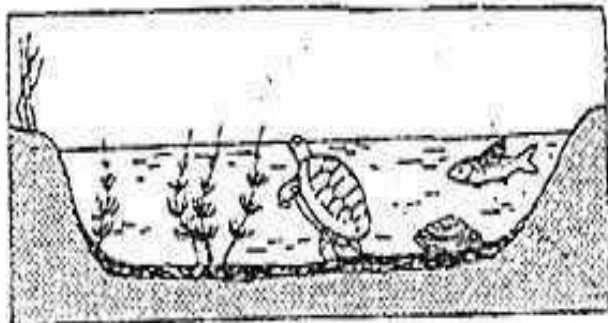
**Pond A**



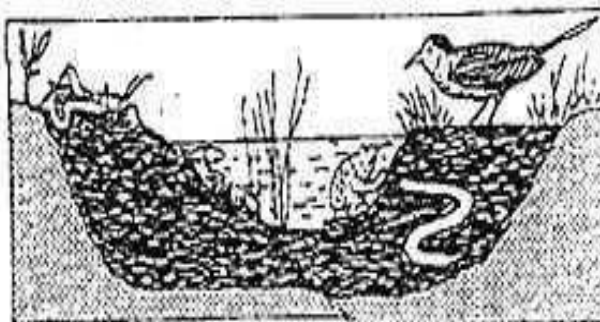
**Pond B**



**Pond C**



**Pond D**



Youngest \_\_\_\_\_, Next oldest \_\_\_\_\_ Next oldest \_\_\_\_\_ The Oldest \_\_\_\_\_

Why did you put them in that order? \_\_\_\_\_

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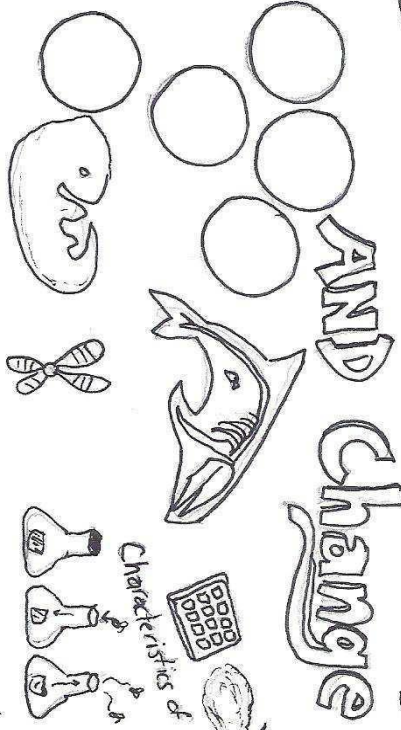
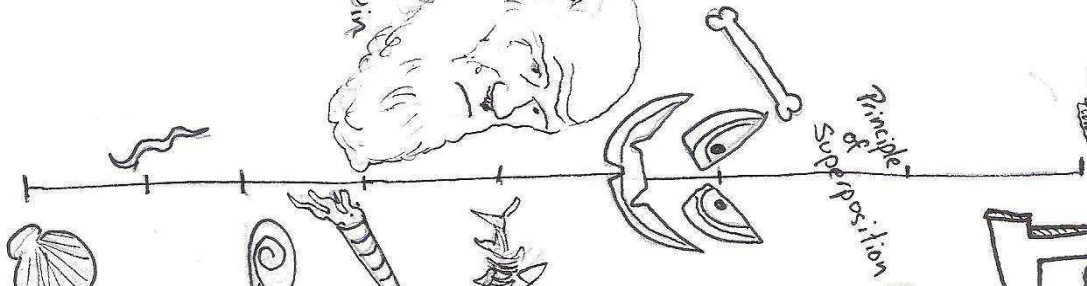
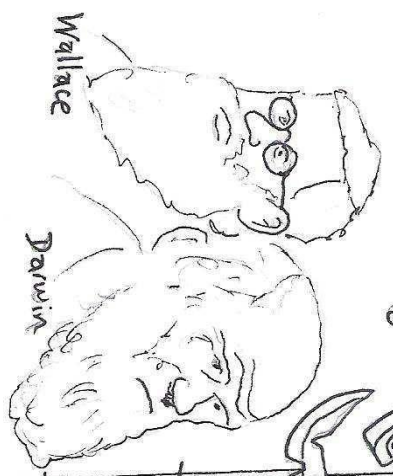
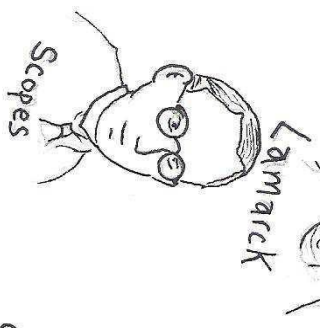
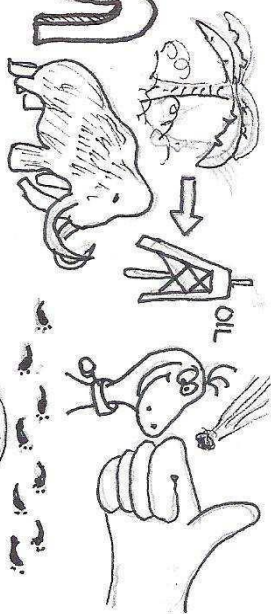


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NICE WORK! THIS WAS A DIFFICULT ASSESSMENT. DO NOT LOSE! PUT IN YOUR SCIENCE FOLDER! Please color the pictures on the next page and record info in the white space.

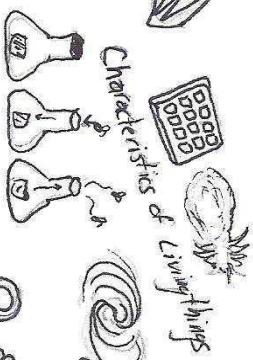
4.65 b.y.a.

# Evolution AND change

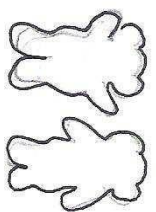


Evolution is natural Selection

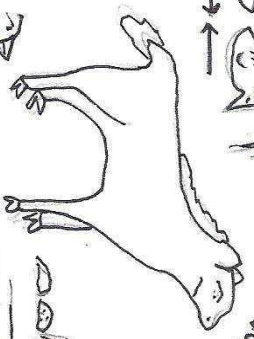
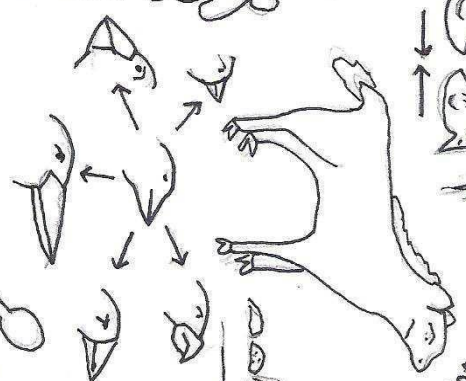
- 1)
- 2)
- 3)
- 4)
- 5)



Characteristics of living things



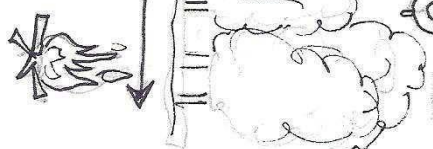
38-00



H<sub>2</sub>O

Hot

Primary  
Secondary



25

