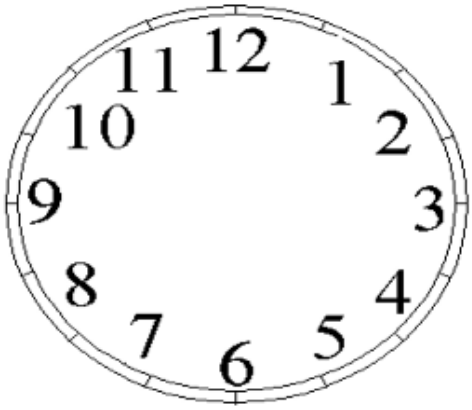
Earth System History

Part 3 Lesson 1 Time

Name:
Due:

If the history of the earth from its formation 4.6 billion years ago until present was put into a 12-hour day… How many hours, minutes, or seconds have humans been around? Draw clock arrows and explain.



The earth is roughly _____ years old.

Primitive life is believed to have formed _____ Billion years ago.

The Earth is old, and a lot has changed over time.

Earth History Components

Earth system history has p_____, c_____, and b_____ components.

Uni_____: Laws of nature have not changed over time.

Principle of superposition: _____ rocks and fossil are on _____, youngest on top.

Please highlight the fossil that is older based on this principle.


_____ or _____


_____ or _____


_____ or _____


_____ or _____

Which rock layer has the oldest fossils?___

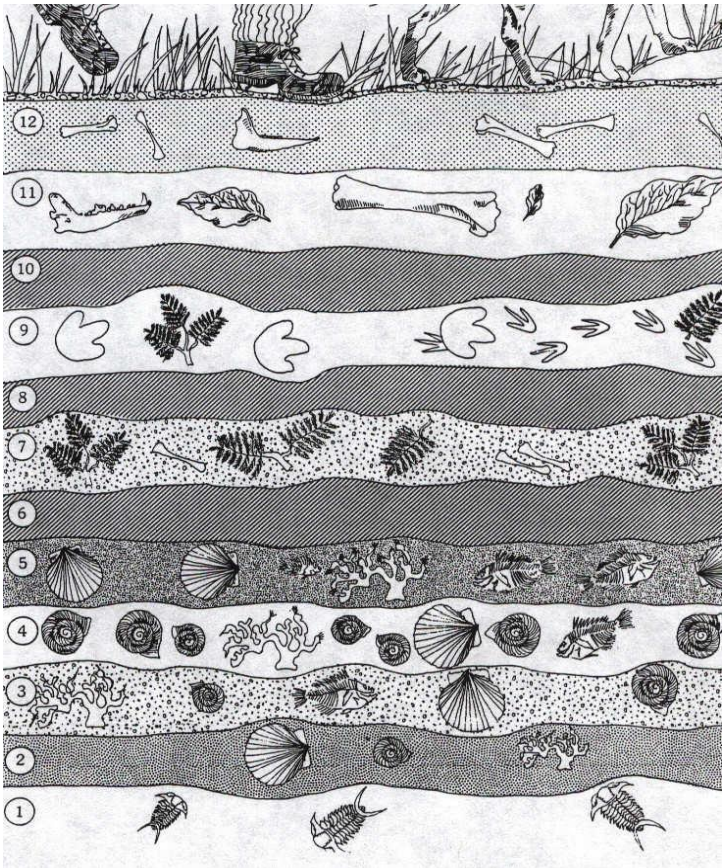
Which rock layer has the youngest fossils?___

What rock layers contain mammals?_____

When do you find the first vertebrate?____

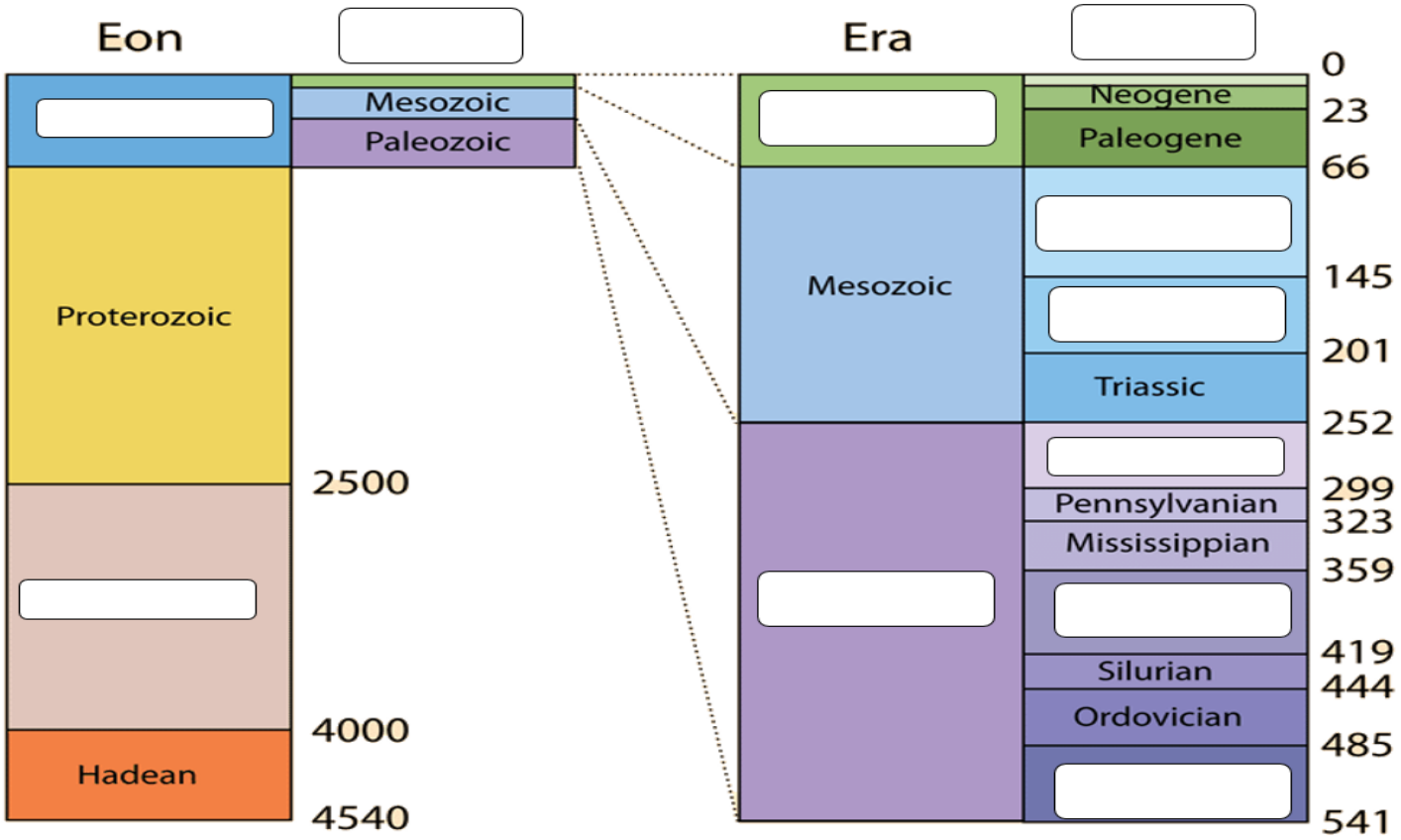
Are ferns older than broadleaf trees?____

What happened at #10?



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

Can you fill-in the blanks with the correct unit of time? Part 3 Lesson 2 Units of Time



Precambrian Part 3 Lesson 3 Precambrian Super-Eon

Hadean, Archean, and Proterozoic Eon's

Earth's M_____ layers form (Denser to middle)

Formation of Earth's C_____ (cooling).

- M_____ bombard the planet and carry with it water molecules and amino acids (building blocks of protein).

Moon c_____ from impact event

A_____ originates (No oxygen yet)

Earliest life begins (primitive protocells)
Microbes helped produce an o_____ atmosphere through photosynthesis.

First Multi-cellular life (many cells)
Explosion of new animals (sea). The Vendian / The Ediacaran Period is an interval of geological time ranging 635 to 541 million years ago at the end of the Proterozoic Eon.
It was a time of immense geological and biological change, and records the transition from a planet largely dominated by microscopic organisms, to a Cambrian world swarming with animals.

Paleozoic Era Part 3 Lesson 4 Paleozoic
Cambrian, Ordovican, Silurian, Devonian, Carboniferous, and Permian Periods.
M_____ invertebrates dominate
Jawed F_____ Evolve
Plants invade land (O_____ to atmosphere)
In_____ emerge
First Amp_____
First R_____
First winged in_____

Mesozoic Era Part 3 Lesson 5 Mesozoic
Triassic, Jurassic, Cretaceous Periods
Di_____ dominate
First B_____
First M_____
First Fl_____
K-T or K-Pg Mass E_____ Event, ___mya

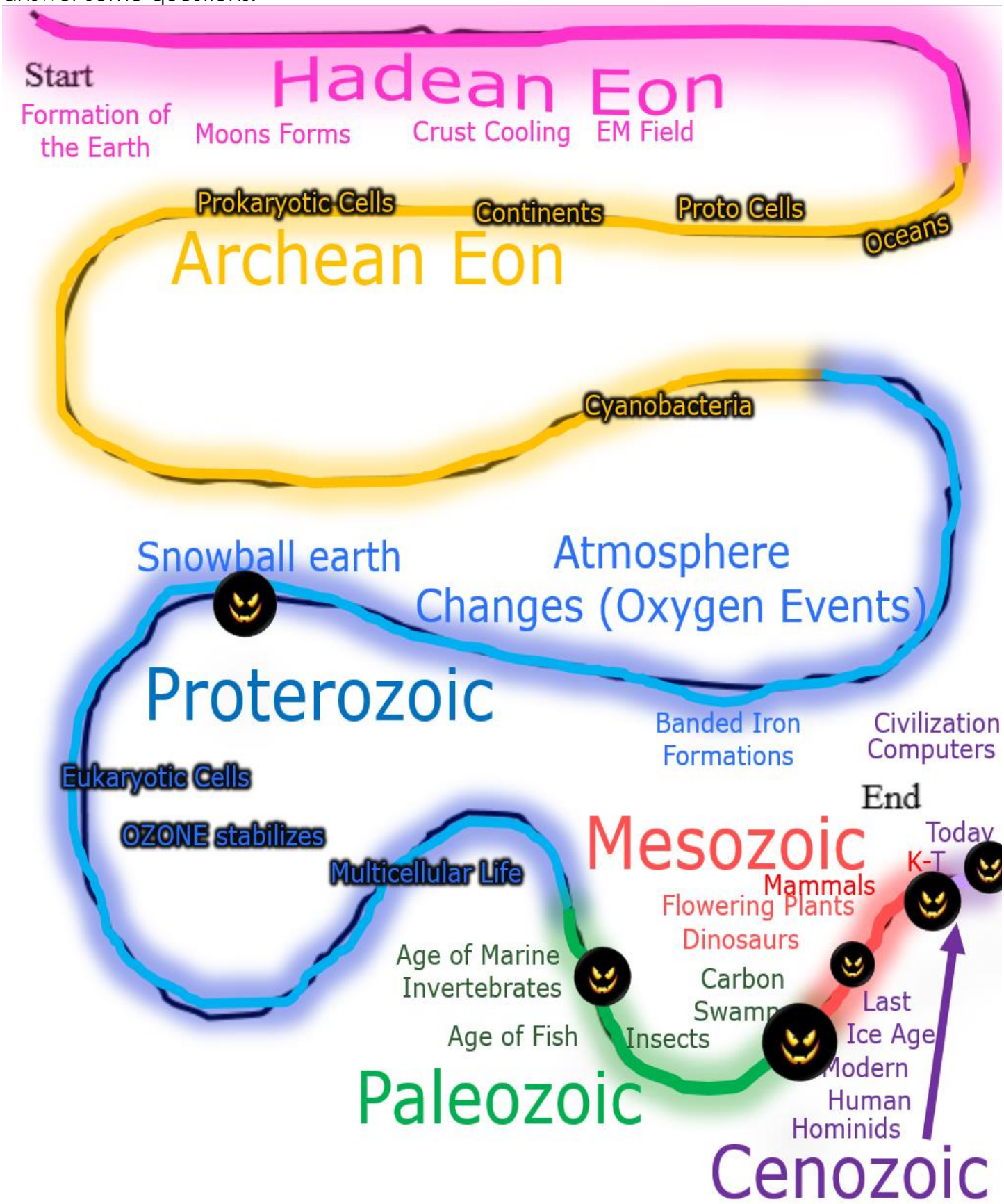
Cenozoic Era Part 3 Lesson 6 Cenozoic
Tertiary, and Quaternary Periods
M_____ change
Earliest M_____
Climate becomes drier
P_____ attaches South America to North America
First _____ hominids
Modern Man (Whoa)
Civilization
Age of Exploration, Industrial and Computer Age

Research one creature that has gone extinct. Draw a quick sketch, its name, and add some relevant information. Please cite your source APA format.

Author's name
Date of publication
Title of page
Name of the website

Lund, N. (2015). How to begin birding. Retrieved from National Audubon Society website:
http://www.audubon.org/news/how-begin-birding → URL

Please use the line below of the history of the earth from 4.6 billion years ago until present to answer some questions.



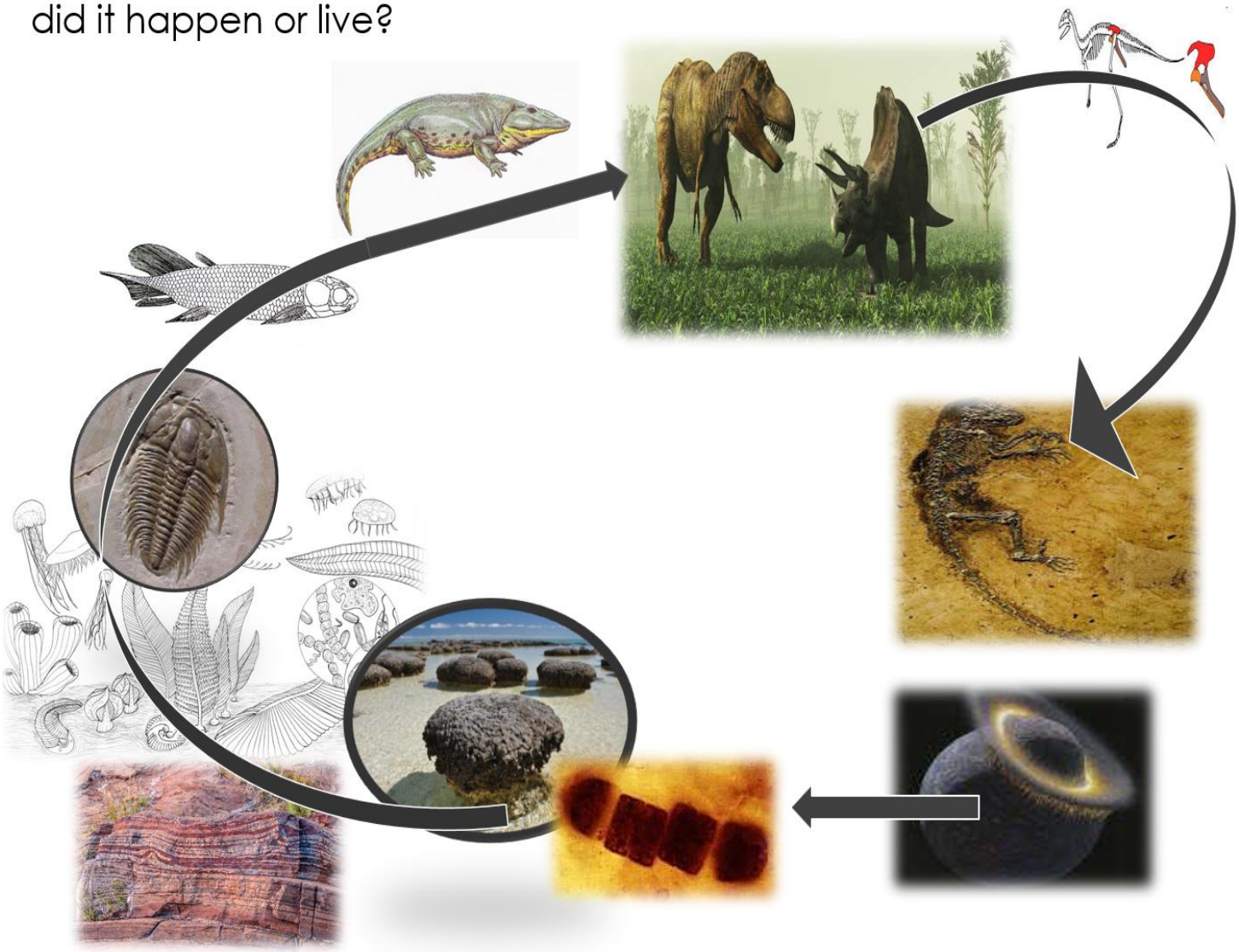
Name the Eon for the next set of questions.

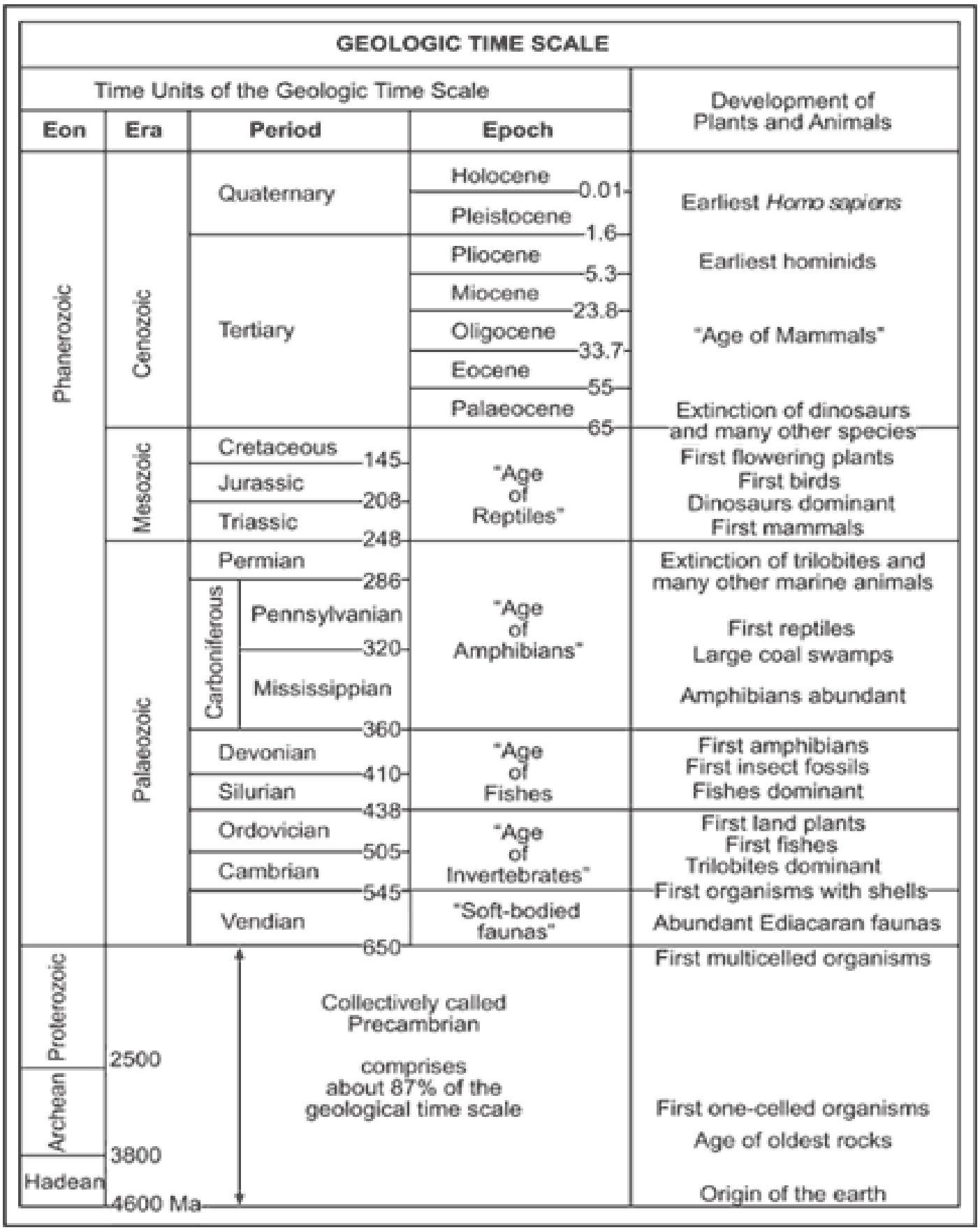
- When did the moon form?
- When did life first occur?
- When did the EM field occur?
- When did cyanobacteria provide oxygen?
- When did the ozone layer stabilize?
- When did the first eukaryotic cell evolve?
- When did multi-cellular life occur?

Name the Correct Era (Paleozoic, Mesozoic, Cenozoic)

- When did the age of marine invertebrates occur?
- When did mammals evolve?
- When did humans evolve?
- When did dinosaurs go extinct?
- When did insects evolve?
- When did mammals dominate/radiate?

Please record some names / information about each picture. When did it happen or live?




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
Pleistocene
1.6
Earliest Homo sapiens
Tertiary
Pliocene
5.3
Earliest hominids
Miocene
23.8
Oligocene
33.7
"Age of Mammals"
Eocene
55
Palaeocene
65
Extinction of dinosaurs and many other species
Mesozoic
Cretaceous
145
Jurassic
208
Triassic
248
"Age of Reptiles"
First flowering plants
First birds
Dinosaurs dominant
First mammals
Palaeozoic
Permian
286
Extinction of trilobites and many other marine animals
Carboniferous
Pennsylvanian
320
Mississippian
360
"Age of Amphibians"
First reptiles
Large coal swamps
Amphibians abundant
Devonian
410
Silurian
438
"Age of Fishes"
First amphibians
First insect fossils
Fishes dominant
Ordovician
505
Cambrian
545
"Age of Invertebrates"
First land plants
First fishes
Trilobites dominant
First organisms with shells
Vendian
650
"Soft-bodied faunas"
Abundant Ediacaran faunas
Proterozoic
2500
First multicelled organisms
Archean
3800
First one-celled organisms
Age of oldest rocks
Hadean
4600 Ma
Origin of the earth
Collectively called Precambrian
comprises about 87% of the geological time scale

Part 3 EARTH SYSTEM HISTORY

Name:

Score ____ / 100

1-20 = 5 pts Part 3 Lesson 7

*20-*25 * = Bonus + 1 pt,

(Secretly write owl in correct space +1 pt)

Final Question = 5 pt wager

IN THE NICK OF TIME	UNITS OF TIME	PICTURES IN TIME	ANYTHING GOES	DINOSAURS Bonus round 1 pt each
1)	6)	11)	16)	*21)
2)	7)	12)	17)	*22)
3)	8)	13)	18)	*23)
4)	9)	14)	19)	*24)
5)	10)	15)	20)	*25)

Final Question Wager ___ /5 Answer

Earth System History

Name:

Part 3 Lesson 1 Time

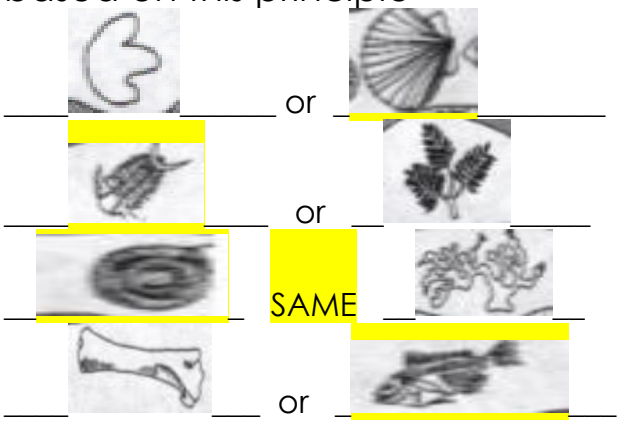
Due:

◊This photograph best represents what Principle?

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

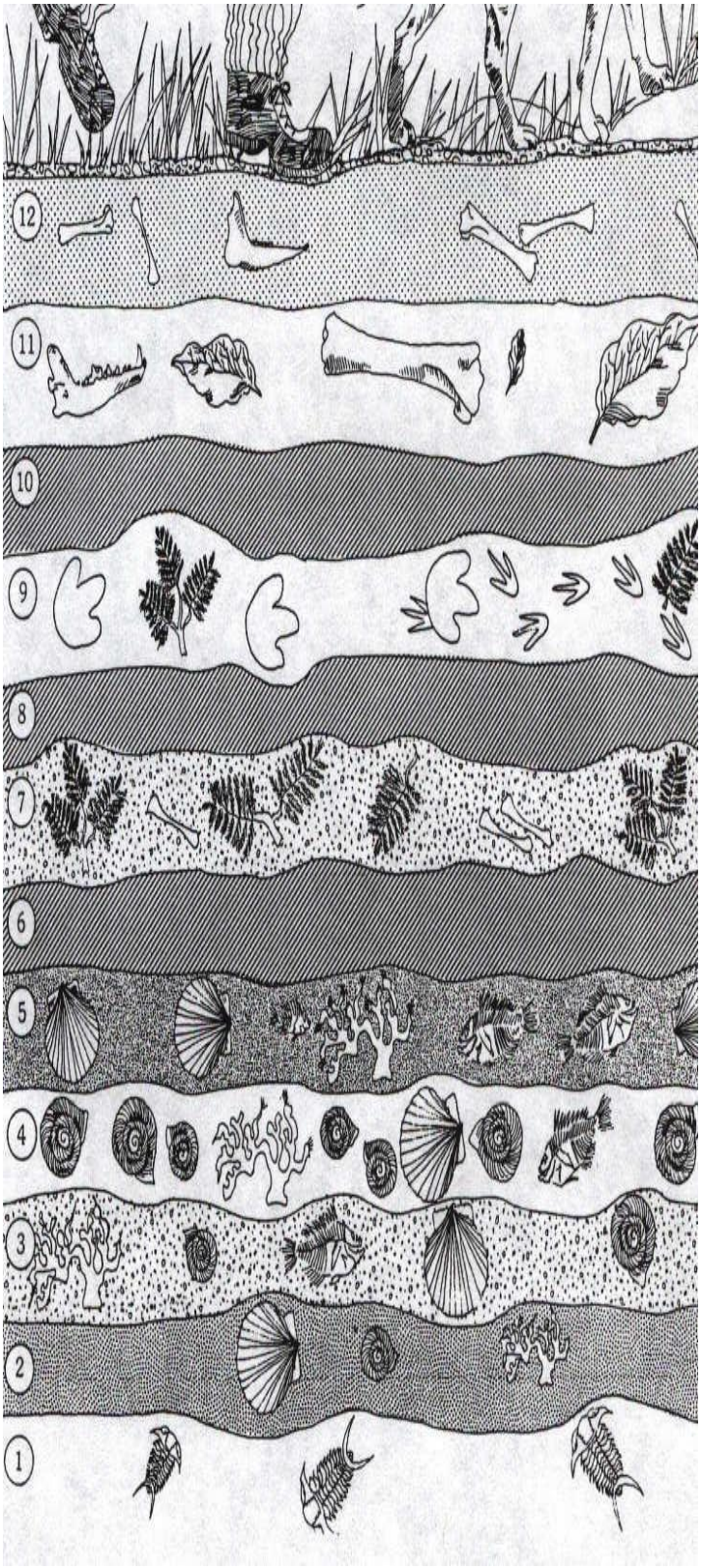
This represents the principle of superposition. The older layers of the earth and fossils are found on the bottom, and the younger fossils and layers are found on the upper layer. It looks like a new layer is forming at the top.

Please highlight the fossil that is older based on this principle



What happened at #10?

Perhaps an extinction event happened at layer number 10. They're few fossils found at this layer, as well as layer #6, and layer #8. New species tended to emerge after these layers.



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

The earth is roughly 4.543 billion years old. Life was believed to have begun 3.7 billion years ago. This is an incredibly long amount of time for life to change on planet earth. The species on this planet started off simple and have become increasingly more complex over this long period of time.

Earth History Components

- Earth system history has physical, chemical, and biological components
- Uniformitarianism: Laws of nature have not changed over time.
- The system is fragile. Changes in living conditions for animals have been numerous throughout earth's history.
- 99.5% of all things that have ever lived have become extinct.

Precambrian

Hadean, Archean, and Proterozoic Eon's

Earth's Molten layers form (Denser to middle)

Formation of Earth's Crust (cooling).

- Meteors bombard the planet and carry with it water molecules and amino acids (building blocks of protein).

Moon created from impact event

Atmosphere originates (No oxygen yet)

Earliest life begins (primitive protocells)

- Microbes helped produce an oxygen atmosphere through photosynthesis.

First Multi-cellular life (many cells)
Explosion of new animals (sea)

Paleozoic Era

Vendian, Cambrian, Ordovican, Silurian, Devonian, Carboniferous, and Permian Periods.

Marine invertebrates dominate
Jawed Fish Evolve
Plants invade land (Oxygen to atmosphere)
Insects emerge
First Amphibians
First Reptiles
First winged insects

Mesozoic Era

Triassic, Jurassic, Cretaceous Periods

Dinosaurs dominate
First Birds
First Mammals
First Flowers
K-T Mass Extinction Event, 65mya

Cenozoic Era

Tertiary, and Quaternary Periods

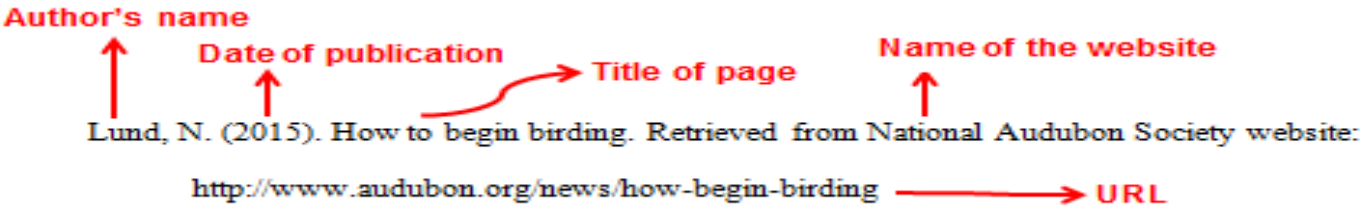
Mammals change
Earliest Monkeys
Climate becomes drier
Panama attaches South America to North America
First human hominids
Modern Man (Whoa)
Civilization
Age of Exploration, Industrial and Computer Age

Research one creature that has gone extinct. Draw a quick sketch, its name, and add some relevant information. Please cite your source APA format.

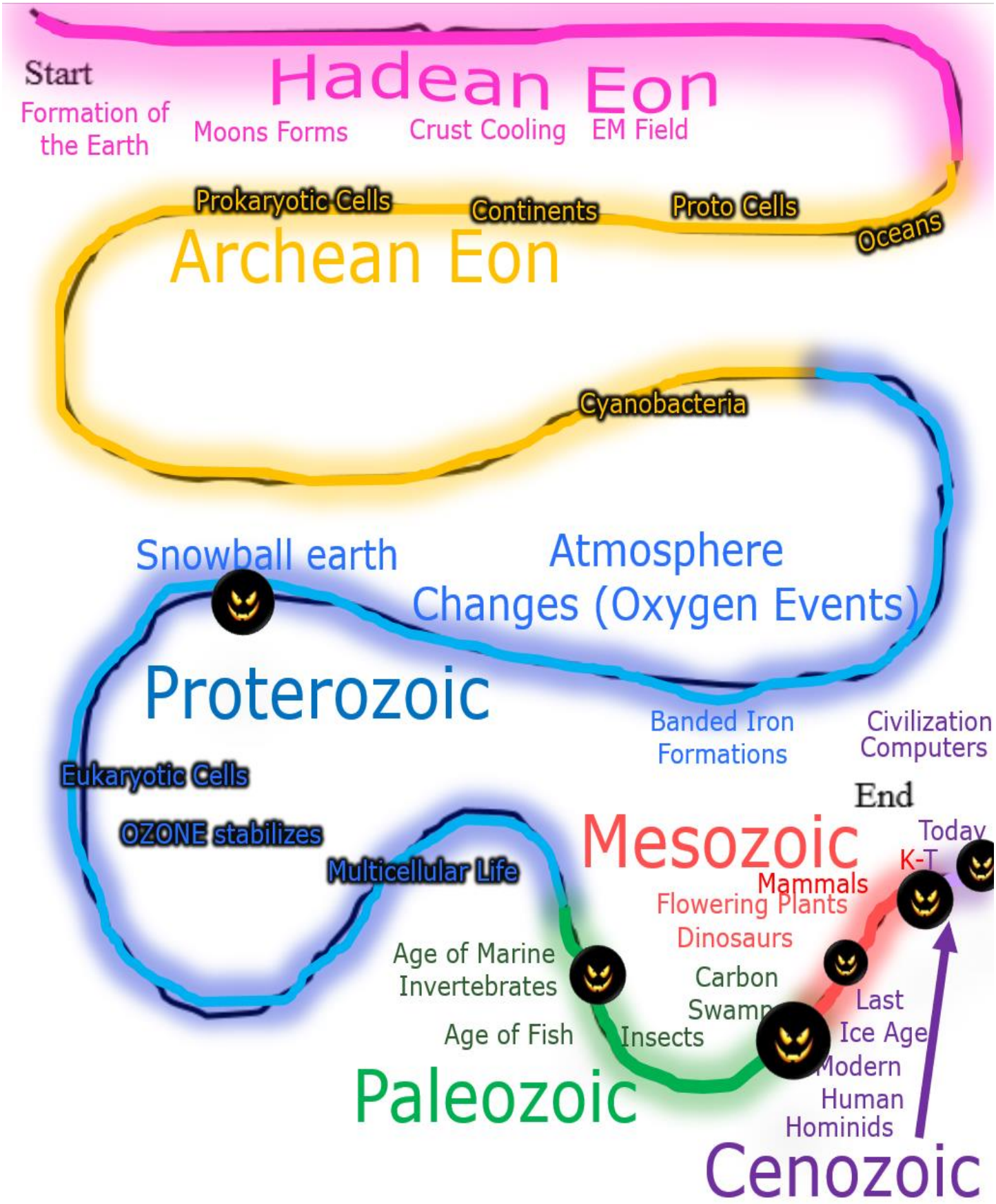
Answers will vary based on selected organisms

Tyrannosaurus Rex was a predatory dinosaur with small arms and large powerful legs and tail to counterbalance its large head when it runs. T-Rex fossils are found in the western United States with some fossils found in Asia. It's suggested that the T Rex could run between 10 and 25 mph. T-rex was believed to have lived during the last part of the Cretaceous Period and existed right up to the extinction event. The T-Rex has 200 bones, and could reach heights of 20 feet tall. T-Rex could also weigh close to 9 tons, and many serrated teeth for piercing its prey.

Castro, J. (2017, October 17). Tyrannosaurus Rex: Facts About T. Rex, King of the Dinosaurs. Retrieved September 23, 2020, from https://www.livescience.com/23868-tyrannosaurus-rex-facts.html



Please use the line below of the history of the earth from 4.6 billion years ago until present to answer some questions.


Start
Formation of the Earth
Hadean Eon
Moons Forms
Crust Cooling
EM Field
Prokaryotic Cells
Continents
Proto Cells
Oceans
Archean Eon
Cyanobacteria
Snowball earth
Atmosphere Changes (Oxygen Events)
Proterozoic
Banded Iron Formations
Civilization Computers
End
Eukaryotic Cells
OZONE stabilizes
Multicellular Life
Mesozoic
Today
K-T
Mammals
Flowering Plants
Dinosaurs
Age of Marine Invertebrates
Carbon Swamp
Last Ice Age
Age of Fish
Insects
Modern Human
Hominids
Paleozoic
Cenozoic

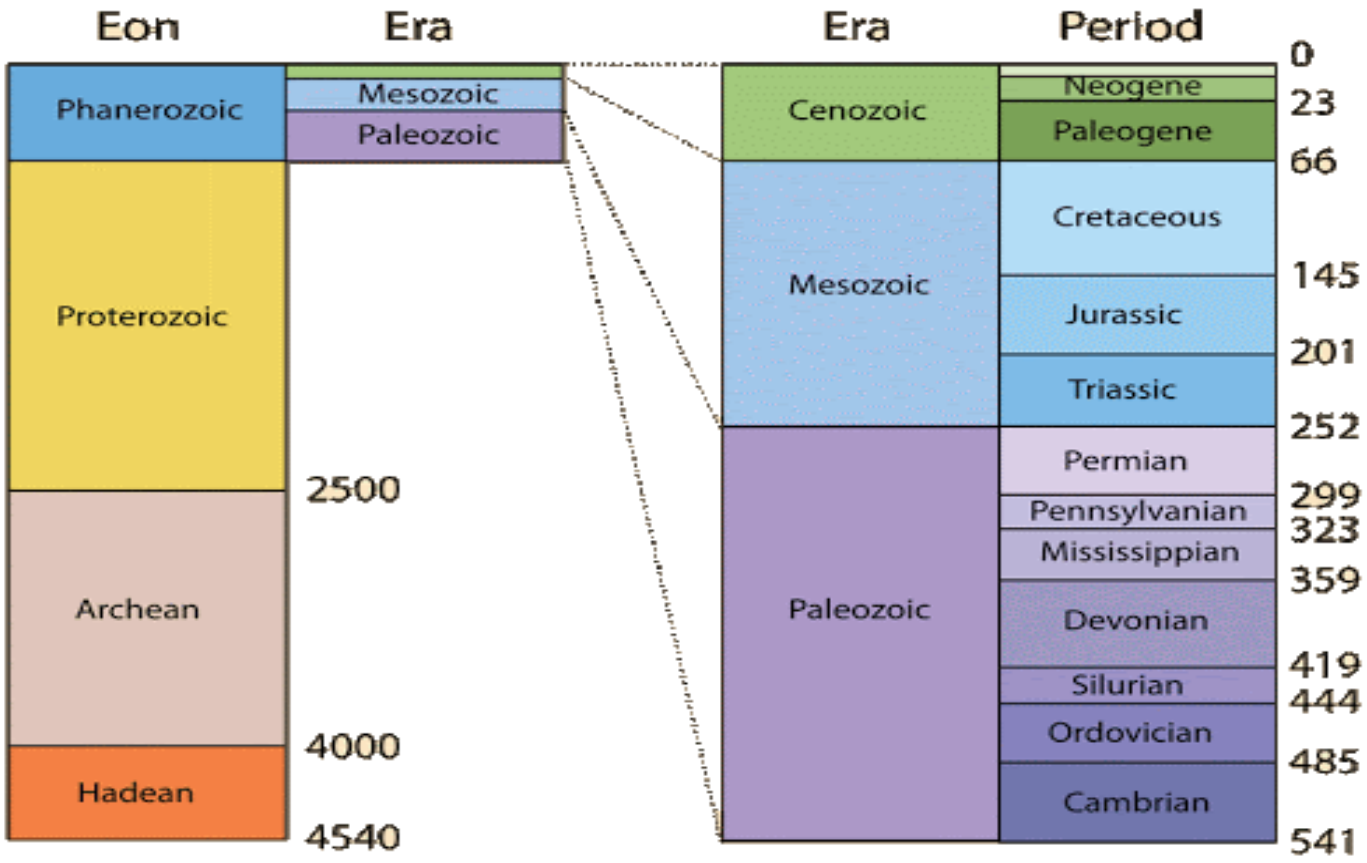
Name the Eon for the next set of questions.

When did the moon form? Hadean Eon
When did life first occur? Archean Eon
When did the EM field occur? Hadean Eon
When did cyanobacteria provide oxygen? Archean Eon
When did the ozone layer stabilize? Proterozoic Eon
When did the first eukaryotic cell evolve? Proterozoic Eon
When did multi-cellular life occur? Proterozoic Eon

Name the Correct Era (Paleozoic, Mesozoic, Cenozoic)

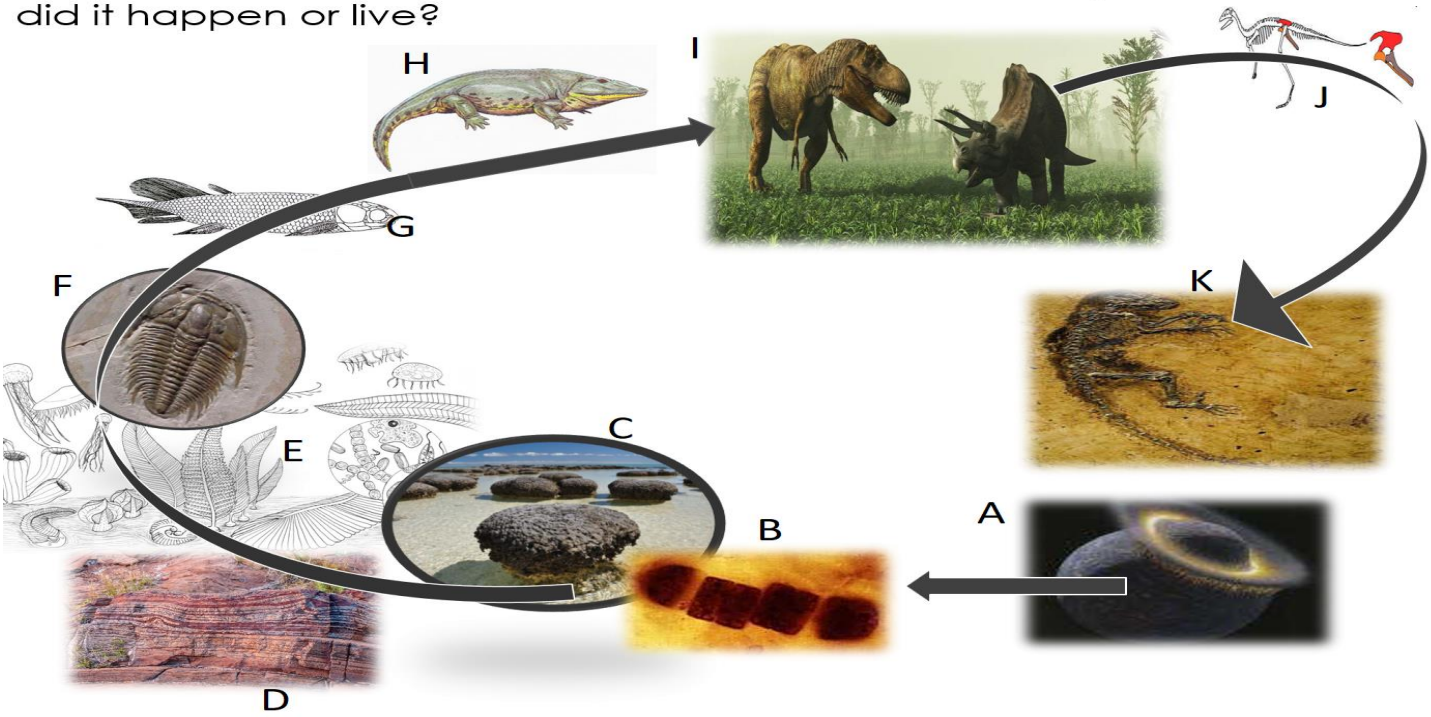
When did the age of marine invertebrates occur? Paleozoic Era
When did mammals evolve? Mesozoic Era
When did humans evolve? Cenozoic Era
When did dinosaurs go extinct? Mesozoic Era
When did insects evolve? Paleozoic Era
When did mammals dominate/radiate? Cenozoic Era

Can you fill-in the blanks with the correct unit of time?



Geologic time and the geologic column

Please record some names / information about each picture. When did it happen or live?



A= The Moon forms from giant impact event (Hadean Eon)	B= Earliest Life Forms Archean Eon Could be Cyanobacteria that makes oxygen	`C= First Multi-Cellular life forms on planet. These are Stromatolites in Australia.
D= Banded Iron formations. This suggests that oxygen was present in atmosphere. Early life created our atmosphere	E= Abundant Marine invertebrates existed in the oceans of the early Paleozoic Era	F= Trilobite extinction at theend of the Permian about 252 million years ago.
G= Early Jawed Fish evolve about 400 million years ago in the Devonian Period	H= First amphibians evolve from lobe finned fish 370 million years ago at the end of the Devonian Period	I= Dinosaurs Dominate the Mesozoic Era
J= Ornithischia, or "bird-hipped" dinosaurs, and the Saurischia, or "lizard-hipped" dinosaurs.	K= Mammals in the Cenozoic, First Primates appear about 50 million years ago	

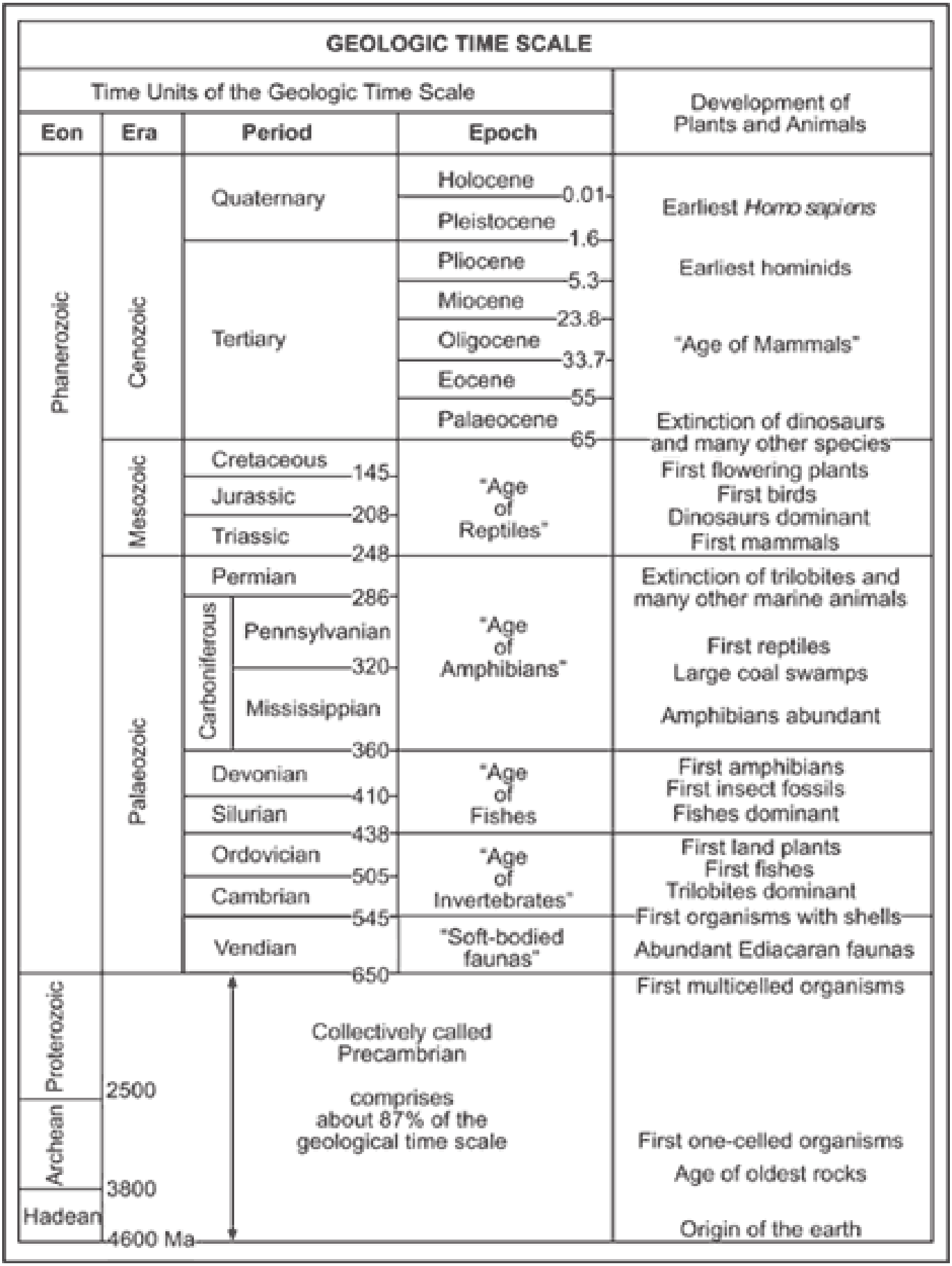
Part 6 EARTH SYSTEM HISTORY 8

Name:
Score ____ / 100

1-20 = 5 pts
*20-*25 * = Bonus + 1 pt,
(Secretly write owl in correct space +1 pt)
Final Question = 5 pt wager

IN THE NICK OF TIME	UNITS OF TIME	PICTURES IN TIME	ANYTHING GOES	DINOSAURS Bonus round 1 pt each
1) TIME 11:59PM	6) LETTER B	11) Ordovician Period	16) K=Cretaceous Period	*21) LAND OF THE LOST
2) Letter D Archean Eon	7) Letter A	12) Devonian Period	17) Layers of the Earth Forming	*22) JURASSIC PART III
3) 4.54 billion years old	8) Letter C	13) Carboniferous Period	18) Early Ocean And Atmosphere	*23) DINOSAUR TRAIN
4) Principle of Superposition	9) Hadean Eon Or Precambrian Super Eon	14) Jurassic Period	19) LETTER C	*24) DINOCO
5) Possible Extinction EVENT	10) Paleozoic Era or Vendian Period	15) Tertiary Period	20) PANGEA	*25) Tyrannosaurus

Final Question Wager ___ /5 Answer TRILOBITE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Quaternary
Holocene
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Pleistocene
1.6
Earliest Homo sapiens
Tertiary
Pliocene
5.3
Miocene
23.8
Oligocene
33.7
Eocene
55
Palaeocene
65
Earliest hominids
"Age of Mammals"
Extinction of dinosaurs and many other species
Mesozoic
Cretaceous
145
Jurassic
208
Triassic
248
"Age of Reptiles"
First flowering plants
First birds
Dinosaurs dominant
First mammals
Palaeozoic
Permian
286
Carboniferous
Pennsylvanian
320
Mississippian
360
"Age of Amphibians"
Extinction of trilobites and many other marine animals
First reptiles
Large coal swamps
Amphibians abundant
Devonian
410
Silurian
438
"Age of Fishes"
First amphibians
First insect fossils
Fishes dominant
Ordovician
505
Cambrian
545
Vendian
650
"Age of Invertebrates"
"Soft-bodied faunas"
First land plants
First fishes
Trilobites dominant
First organisms with shells
Abundant Ediacaran faunas
Proterozoic
2500
Archean
3800
Hadean
4600 Ma
Collectively called Precambrian
comprises about 87% of the geological time scale
First multicelled organisms
First one-celled organisms
Age of oldest rocks
Origin of the earth