SI Geology - Full Discipline Demo

Geologic Time

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI Geology - Full Discipline Demo
Course	SI Geology - Full Discipline Demo
Instructor	Sales SI Demo

Test Your Knowledge

Place the following units of time in order from largest to smallest.

≡ Ages

1 **Correct answer:** Eons

≡ Eons

2 **Correct answer:** Eras

≡ Epochs

3 **Correct answer:** Periods

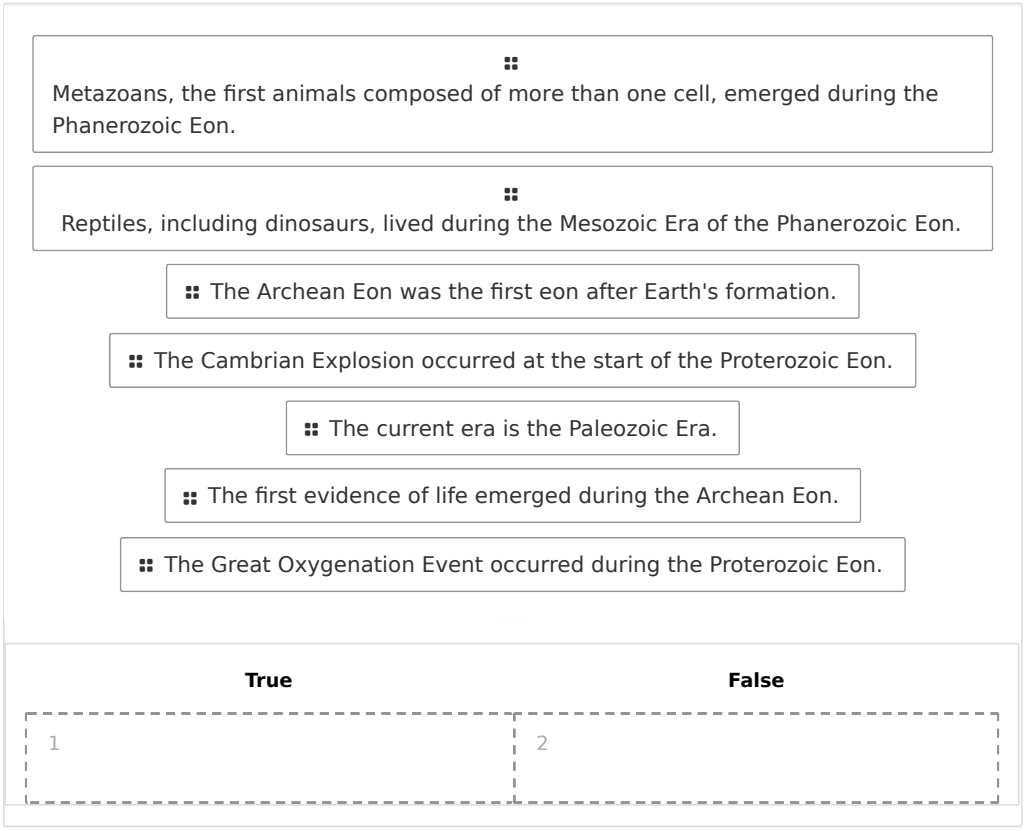
≡ Eras

4 **Correct answer:** Epochs

≡ Periods

5 **Correct answer:** Ages

Classify the following statements as true or false.



Correct answers:

1

Reptiles, including dinosaurs, lived during the Mesozoic Era of the Phanerozoic Eon.

The first evidence of life emerged during the Archean Eon.

The Great Oxygenation Event occurred during the Proterozoic Eon.

2

Metazoans, the first animals composed of more than one cell, emerged during the Phanerozoic Eon.

The Archean Eon was the first eon after Earth's formation.

The Cambrian Explosion occurred at the start of the Proterozoic Eon.

The current era is the Paleozoic Era.

Exploration

The Geologic Time Scale becomes more detailed with smaller divisions of time as it approaches due to present day due to an inherent bias in the rock record, leading to better data.

- [x] True
- [ ] False

The _____ Eon is characterized by the beginning of modern plate tectonics, the Great Oxygenation Event, and the emergence of the first multicellular organisms.

- [ ] Hadean
- [ ] Archean
- [x] Proterozoic
- [ ] Phanerozoic

The _____ Era of the Phanerozoic Eon is characterized by the rise of shelled marine animals, fish, amphibians, and reptiles.

- [ ] Hadean
- [x] Paleozoic
- [ ] Mesozoic
- [ ] Cenozoic

Exercise 1

How much time elapsed (in millions of years) between the formation of the Earth and the accumulation of oxygen in the atmosphere? How much time does this represent on your calendar (round to the nearest day)?

How many days on your calendar passed between the first evidence of life on Earth and the first appearance of humans?

How much time elapsed (in millions of years) between the formation of the Earth and the first evidence of life?

Based on your answer to Question 3, what percentage of Earth's history was complete devoid of life? Round to the nearest tenth of a percent.

Dinosaurs were wiped out during the Cretaceous-Tertiary extinction event 66 million years ago. What percent of Earth history had already passed when this event happened? Round to the nearest tenth of a percent.

What percentage of Earth's history has included human beings (*Homo sapiens*)? Round to the nearest thousandth of a percent.

Data Table 1: Units of Time on the Calendar
(SAMPLE ANSWER BELOW)

Calendar Unit of Time	Amount of Geologic Time (years)
1 Day	12,438,356
1 Hour	518,265
1 Minute	8,638
1 Second	144

Data Table 2: Geologic Timescale
(SAMPLE ANSWER BELOW)

Eon/Era	Number of Years Ago	Number of Days Ago on Calendar	Date on Calendar
Hadean	4.54 billion	365	January 1
Archean	4.0 billion	322	February 13
Proterozoic	2.5 billion	201	June 14
Paleozoic	541 million	44	November 18
Mesozoic	252 million	20	December 12
Cenozoic	66 million	5	December 27

Data Table 3: Calendar of Geologic Events
(SAMPLE ANSWER BELOW)

Event	Number of Years Ago	Number of Days Ago on Calendar	Da
Formation of the Earth	4.54 billion	365	Ja
Formation of the Moon	4.5 billion	362	Ja
First Evidence of Life	3.8 billion	306	Ma
Oxygen Accumulates in the Atmosphere	2.3 billion	185	Ju
First metazoans	635 million	51	No
First vertebrates	520 million	42	No
Ordovician-Silurian Extinction	444 million	36	No
Permian-Triassic Extinction	252 million	20	De
First dinosaurs	230 million	19	De
First mammals	210 million	17	De
Cretaceous-Tertiary Extinction	66 million	5	De
Beginning of Ice Age	2.6 million	1	De

Data Table 4: Calendar of Human Events
(SAMPLE ANSWER BELOW)

Human Event	Number of Years Ago	Date on Calendar	Time
First humans (*Homo sapiens*)	200,000	December 31	11:37 pm
Development of agriculture	10,000	December 31	11:58:51 pm

Development of the wheel	6,500	December 31	11:59:15 pm
First geologic map published	~200	December 31	11:59:59 pm
Present Day	0	December 31	Midnight

Photo 1: Completed Calendar
(SAMPLE ANSWER BELOW)

No sample answer provided

Competency Review

Eras are divided into smaller sections of time, called ____.

- Epochs
- Periods ✔
- Eons
- Ages

The ____ Era is considered the time of mammals, including the emergence of humans.

- Paleozoic
- Cenozoic ✔
- Mesozoic
- Proterozoic

When creating a 12-month calendar representing the Geologic Time Scale, on what day does the Cenozoic Era begin?

- June 14
- December 12
- December 27 ✔
- November 18

The first evidence of life dates back to the Archean Eon.

- [x] True ✔
- [ ] False

The Declaration of Independence was signed in 1776. Considering the 12-month calendar, on what date and time did this date occur?

- [ ] December 24, 9:00:00 pm
- [ ] December 28, 11:41:00 pm
- [ ] December 31, 10:42:16 pm
- [x] December 31, 11:59:58 pm ✔

When creating a 12-month calendar representing the Geologic Time Scale, how many years does one minute represent?

- [ ] 144
- [x] 8,638 ✔
- [ ] 518,265
- [ ] 12,438,356

The Cambrian Explosion occurred during the _____ Eon.

- [ ] Archean
- [ ] Hadean
- [x] Phanerozoic ✔
- [ ] Proterozoic

The evolution of dinosaurs, birds, and mammals occurred during the Mesozoic Era on the Phanerozoic Eon.

- [x] True ✔
- [ ] False

Extension Questions

A friend tells you that he recently found a fossil that dates back to the Ordovician Period of the Paleozoic Era.

- **Is it possible that this fossil contains hard body parts? Why or why not?**

- **Is it possible that the fossil your friend found is a dinosaur bone? Why or why not?**

(SAMPLE ANSWER BELOW)

Yes, it is possible the fossil contains hard body parts, because the Ordovician period occurred after the Cambrian Explosion, when hard body parts became widespread.

It is not possible for the fossil to be a dinosaur bones. Dinosaurs did not exist until the Mesozoic Era, which was many millions of years after the Ordovician Period.