

Grade: 8 - 2020/2021

## Chapter 9 revision      Mixed Questions

### Multiple Choice Questions

1. Cracks in the earth where rock is crushed and bent.

- A) faults
- B) p-lines
- C) earthquakes
- D) v-lines

2. Area around the Pacific Ocean with lots of earthquake and volcano activity.

- A) Ring of Fire
- B) Earthquake Zone
- C) Mt. Fuji
- D) Pacific Ring

3. The different plates on the earth are always moving by pushing and sliding against each other. This is called...

- A) seismography
- B) Pangea
- C) continental drift
- D) platology

4. The *instrument* used to detect record the waves from an earthquake.

- A) seismograph
- B) richter scale
- C) mercalli scale
- D) neumograph

5. Any kind of earthquake or volcanic activity on earth is called this...

- A) continental drift
- B) flying plates
- C) subduction
- D) seismic

6. Which of the following was formed by volcanoes?

- A) Hawaii

- B) Africa
- C) Greenland
- D) India

7. Where does the lava from volcanoes come from?

- A) Igneous Rock
- B) Mantle
- C) Ocean
- D) Sedimentary Rock

8. This is used to measure how powerful an earthquake is.

- A) Richter Scale
- B) Mercalli Scale
- C) Zonometer
- D) Seismo Scale

9. An earthquake of this magnitude would cause minor damage, but would probably not destroy any buildings

- A) 6.2
- B) 9.1
- C) 7.3
- D) 2.4

10. What is the center point of an earthquake called?

- A) center line
- B) plate
- C) epicenter
- D) fault

11. The name of the land mass that had all of the 7 continents together on it.

- A) Palia
- B) Greek
- C) Elturo
- D) Pangea

12. This island nation recently had a 7.1 magnitude earthquake that left 1000s of people homeless and caused great tragedy.

- A) Iceland

- B) Haiti
- C) Turkey
- D) India

13. What building in Istanbul, Turkey is one of the most earthquake proof buildings in the world?

- A) bus station
- B) airport
- C) president's palace
- D) Hagia Sofia church

14. In what state would you most likely find buildings designed to have special modifications for earthquakes?

- A) California
- B) Kentucky
- C) South Dakota
- D) Vermont

15. When two plates crash into each other, what is typically formed?

- A) Deserts
- B) Mountains
- C) Rain forests
- D) Rivers

16. What is the best type of land to build on?

- A) Fault Zone
- B) Bedrock
- C) Marsh
- D) Landfill

17. An earthquake in the ocean that produces large waves is called this.

- A) Seismograph
- B) Typhoon
- C) Hurricane
- D) Tsunami

18. Plates that push together are called

- A) Divergent
- B) Convergent
- C) Transform
- D) Inform

19. Plates that push apart are called

- A) Convergent
- B) Divergent
- C) Transform
- D) Tectonic

20. Plates that slide past one another

- A) Transform
- B) Convergent
- C) Divergent
- D) Unconformity

21. This type of land formation often forms around *divergent* plates

- A) Rift
- B) Mountains
- C) Islands
- D) Hills

22. The continent that has the fewest number of major earthquakes is...

- A) Africa
- B) North America
- C) Europe
- D) South America

## **Short and long Answer Questions**

23. Describe in your own words what a fault is.

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24. How would you describe a strike is a strike-slip?

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25. What is convergent boundary?

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26. explain how a divergent boundary occurs?

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27. What is a Tsunami?

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28. What causes a tsunami to form?

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29. How are earthquake waves produced?

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30. What does a Richter Scale show?

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31. What are the differences between compression, shear, and surface waves?

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32. What would cause the death of so many people during a volcanic eruption?  
Write down least 3 things.

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33. What is a pyroclastic flow?

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34. Where do volcanoes form?

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35. What are the two definitions for the term volcano.

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Write definitions in your own word for the following terms:

36. Active volcano

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37. Dormant Volcano

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38. Extinct Volcano

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39. Cinder cone

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40. shield volcano

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**Chapter 10 revision Mixed Questions****Multiple Choice Questions**

1. The remain or trace of a living thing that lived long ago is a
  - a. fossil
  - b. mammoth
  - c. mold
  - d. eon
  
2. Four ways in which entire organisms can be preserved are
  - a. Oil, gas, coal, paper
  - b. Eon, era, period, epoch
  - c. Molds, casts, imprints, index
  - d. Amber, tar, ice, ash
  
3. If you want to know the specific age of a rock or fossil, you are looking for the
  - a. relative age
  - b. time scale
  - c. index fossil
  - d. absolute age
  
4. In relation to fossils, amber is which of the following
  - a. a color
  - b. a girl fossil's name
  - c. hardened tree sap
  - d. a fossil fuel
  
5. When the hard parts of an organism decay and leave a cavity in the rock, what forms?
  - a. mold fossil
  - b. cast fossil
  - c. imprint fossil
  - d. index fossil
  
6. The Geologic time scale
  - a. is divided into time periods
  - b. gives information about the appearance and disappearance of organisms
  - c. includes eons, eras, periods, and epochs

- d. all of the above
7. Three types of fossil fuels are
- a. oil, gas, coal
  - b. eon, era, period
  - c. molds, casts, imprints
  - d. amber, tar, ice
8. A cast is which of the following
- a. a footprint
  - b. a device used to mend a broken arm
  - c. a mold filled with sediments that produces a copy of the original fossil
  - d. layers of hardened rock
9. The longest subdivision of time on a geologic time scale is:
- a. Period
  - b. Eon
  - c. Cambrian
  - d. Fossil
10. A fossil that forms when an object is pressed into mud and dries is a:
- a. mold fossil
  - b. cast fossil
  - c. imprint fossil
  - d. index fossil
11. An index fossil
- a. lived for only a short period of time
  - e. was abundant and wide-spread geographically
  - f. is used to determine the ages of rock layers
  - g. all of the above
12. An organism often used as an index fossil is a
- a. horse
  - b. trilobite
  - c. tulip
  - d. teacher
13. The earliest time period on the geologic time scale is
- a. Pre-Cambrian
  - b. Pennsylvanian
  - c. Triassic

- d. Jurassic
14. The type of rock in which most fossils are found is
- a. Igneous
  - b. Sedimentary
  - c. Metamorphic
  - d. Erratic
15. Volcanic eruptions could have resulted in an organism being buried and preserved in
- a. Magma
  - b. Silt
  - c. Peat
  - d. Ash
16. What do scientists measure to determine the absolute age of a rock?
- a. amount of radioactivity
  - b. number of uranium atoms
  - c. ratio of neutrons
  - d. ratio of parent and daughter isotopes
17. Which part of a dinosaur is likely to become a good fossil?
- a. Eye
  - b. Tongue
  - c. Brain
  - d. Bone
18. What are isotopes?
- a. atoms of the same element with same number of protons
  - b. atoms of the same element with different types of electrons
  - c. are atoms of the same element that have different numbers of neutrons
  - d. atoms of different elements with the same number of protons
19. What statement best describes radioactivity
- a. The process whereby fossils become extinct
  - b. the process by which animal's footprints remain in the earth
  - c. the process by which a stable element changes to unstable
  - d. the process where by an unstable element changes to another element that is stable

20. Short periods of earthquakes, volcanoes and meteorite impacts is called
- Uniformitarianism
  - Catastrophism
  - Conformity
  - Unconformity

## **Short Answer Questions**

1. State some example of Catastrophism.

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2. State some examples of Uniformitarianism.

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3. Which part of an organism can be fossilized?

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4. What kind of materials can fossils be completely preserved in?

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5. What is the difference between Superposition and Original horizontality in relative ordering of rock layers?

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6. What does the principle of inclusion state?

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7. What are the characteristics of an Index Fossil?

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8. What is a gap in a rock record called?

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9. Give the definition of an Isotope.

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10. How many Isotopes does Hydrogen have?

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11. Which Isotope is used in Radiometric ageing in fossils?

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12. What process is measured to by scientists in finding the Absolute Age of rocks.

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13. Define Half – life.

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### **Long Answer Questions**

1. Describe the differences between Catastrophism and Uniformitarianism in changing the earth's landscapes.

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2. Explain how trace fossils can be used to learn about the characteristic and behaviors of animals.

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3. Compare the difference between Relative ageing and Absolute ageing of rocks.

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4. Scientist believe that at one time in earthsty history all of the continents were joined together. Explain this idea to be true using Correlation in your answer.

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5. Compare the 3 different typeso of Uniformities in rock layers.

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6. Discuss whether humans can be considered as Index Fossils.

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7. Explain why can Sedimentary rocks are not be easily dated?

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8. Compare the differences between parent isotopes and daughter isotopes.

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9. Complete the table below for Isotopes.

<b>Isotope name</b>	<b># of protons</b>	<b># of neutrons</b>
Sodium-__	11	14
Nitrogen-17	—	—
Chlorine-38	—	21
_____ -29	13	—

10. Why can absolute age dating be better than relative age dating?

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## Chapter 11 revision Mixed Questions

### Multiple Choice Questions

1. Which Eon is the present day one?

- A. Proterozoic
- B. Hadean
- C. Archean
- D. Phanerozoic

2. What is the oldest unicellular fossil found on earth?

- A. 2.5 billion years old
- B. 3.5 billion years old
- C. 4.5 billion years old
- D. 5.5 billion years old

3. The Late Paleozoic Era was also known as...

- A. The Age of the Amphibians
- B. The Age of the Humans
- C. The Age of the Birds
- D. The Age of the Fishes

4. The Middle Paleozoic Era consists of Silurian period and...

- A. Permian period
- B. Cambrian period
- C. Carboniferous period
- D. Devonian period

5. When was the Cambrian period?

- A. 542-488 million years ago
- B. 488-444 million years ago
- C. 444-416 million years ago
- D. 416-359 million years ago

6. Which period is part of the Mesozoic Era?

- A. The Permian Period
- B. The Ordovician period
- C. The Cambrian Period
- D. The Cretaceous period

7. When did Pangea form?

- A. Early Paleozoic period
- C. Late Paleozoic period

- B. Middle Paleozoic period
- D. Over the whole Paleozoic period

8. Which of these is the Periods in which large Mega-Mammals lived?

- A. Oligocene period
- C. Pliocene period

- B. Paleozoic period
- D. Pleistocene Period

9. Which one of these is a continent in the Mesozoic Era?

- 1. Burgenland
- 3. Puntland

- 2. Gondwanaland
- 4. Flevoland

10. Which adaptations of amphibians allowed them to survive in the Paleozoic Era.

- A. Huge feet
- C. Thick skin

- B. Small heads
- D. Powerful hearing

11. What were Plesiosaurs?

- A. Flying reptiles
- C. Running reptiles

- B. Walking reptiles
- D. Marine reptiles

12. What is a Coal Swamp?

- A. Oxygen-poor environment where animals changed to coal
- C. Oxygen-rich environment where plants changed to coal skin

- B. Oxygen-poor environment where plants changed to coal
- D. Oxygen-rich environment where animals changed to coal

13. What was the Cretaceous Extinction Event

- A. When the Dinosaur species became extinct
- C. When the Human species became extinct

- B. When Pangea split into two
- D. When the Ice Age began

14. Which species survived the Permian Mass extinction?

- A. Species that did not adapt to the drastic change      B. Species that adapted to the the drastic change very slowly  
C. Species that could run the fastest drastic change      D. Species that adapted to the fastest drastic change

15. What is the oldest multicellular organism fossil found?

- A. 400 million years old      B. 500 million years old  
C. 600 million years old      D. 700 million years old

16. The Quaternary Period is made from

- A. Pliocene and Miocene Epochs      B. Pleistocene and Holocene Epochs.  
C. Oligocene and Eocene Epochs      D. Paleocene Epoch only

17. Which of these lived in the Pleistocene Period?

- A. Giant Horses      B. Giant Sloths  
C. Giant Kangaroos      D. Giant Rodents

18. How much Glaciers covered the Earth in the Ice Age.

- A. 10%      B. 20%  
C. 30%      D. 40%

19. When did multicellular life first appear?

- A. Devonian period      B. Permian period  
C. Cambrian period      D. Ordovician period

20. The Cenozoic era is made from...

- A. Triassic and Jurassic Periods.      B. Ordovician and Cretaceous periods  
C. Silurian and Devonian periods      D. Tertiary and Quaternary Periods.

## **Short Answer Questions**

1. Describe what is a Mass Extinction?

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2. Describe the ancient life-forms from 3.5 billion years ago.

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3. Describe how Precambrian multicellular life-forms were different from the organism today.

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4. State, which is the earliest Era in the Phanerozoic Eon.

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5. In Earth's history, when was the Age of Fishes? Moreover, Why?

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6. Explain the difference in climates between the Mesozoic and the Cenozoic Eras.

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7. Which Era was warmer, the Paleozoic Era or the Mesozoic Era?

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8. What was the biggest geological event of the Mesozoic Era?

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9. Which Ocean started formed because of this geological event?

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10. Why do Scientists know more about the Cenozoic Era than any other Era?

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### **Long Answer Questions**

1. Explain how a Rapid Climate Change can occur.

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2. Explain what the replies could do that Amphibians could not? Why?

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3. Explain why the discovery of Iridium was significant to scientist in explaining why the dinosaurs became extinct.

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4. Describe how the Alps and the Himalayas formed in the Cenozoic Era.

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5. Explain what occurred when Pangea broke up in the Mesozoic Era, how many new continents were formed? What were they called and which of today's continents did they consist of?

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6. Explain how Grooves in the Earth were formed during the Cenozoic Era.

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7. Explain how scientists hypothesize that the Permian Mass Extinction occurred.

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8. Explain how scientists predict that early humans migrated from Asia to North America.

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9. Describe 3 things about Trilobite fossils.

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10. How are present-day reptiles different from Dinosaurs?

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11. State the difference between a Plesiosaur and Pterosaur.

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## Chapter 9 revision      Mixed Questions Mark Scheme

### Multiple Choice Questions

1.A	12.A
2.A	13.B
3.C	14.B
4.A	15.A
5.D	16.B
6.A	17.D
7.B	18.B
8.A	19.D
9.A	20.A
10.C	21.B
11.D	22.B

### Short and Long Answer Questions

23. A fault is a long crack in the crust of the Earth. They can be associated with plate boundaries or can be produced from earthquakes.
24. A strike-slip boundary occurs where two plates are sliding past each other in opposite directions.
25. A convergent boundary occurs where two plates collide.
26. A divergent boundary occurs where two plates are separating. The two plates are moving in opposite directions causing new crust to be formed. These occur at mid-ocean ridges.

27. A tsunami is a very large sea wave. These waves can be up to 100 feet high when they break on the coastline.
28. Tsunamis are caused by 1) an earthquake 2) an underwater landslide  
3) or a volcanic eruption.
29. Earthquakes are caused when energy is released as the lithosphere (crust and upper mantle) of the Earth moves. Energy is emitted in the form of waves.
30. The Richter scale is a measure of the strength and length of time that earthquake lasts.
31. Compression waves are the fastest waves produced from an earthquake. Because of their speed they arrive at the surface first and are also called P (Primary) waves. They hit the surface with a pounding or jackhammer motion.
32. hot steam, gas, ash, hydrochloric acid.
33. A very turbulent mixture of steam, gases, ash, and small pieces of rock that is heavier than air and moves at a high rates of speed.
34. Volcanoes form at subduction zones, mid-ocean or rift zones, and at hot spots.
35.
  - 1) A volcano is an opening in the Earth's surface in which molten rock called magma and gases can escape.
  - 2) The mountain that is formed by repeated volcanic eruptions.
36. A volcano that is currently erupting or has erupted in recorded time.
37. dormant volcano is one that has not erupted recently but is expected to do so again.

38. A volcano that is not currently erupting but has erupted in recorded time and is considered likely to do so again.
39. This volcano is made from moderately explosive eruptions.
40. Large, shield volcano with gentle slopes

## Chapter 10 revision      Mixed Questions Mark Scheme

### Multiple Choice Questions

- |     |   |     |   |
|-----|---|-----|---|
| 1.  | A | 11. | B |
| 2.  | C | 12. | A |
| 3.  | D | 13. | D |
| 4.  | D | 14. | B |
| 5.  | A | 15. | A |
| 6.  | D | 16. | A |
| 7.  | C | 17. | D |
| 8.  | C | 18. | C |
| 9.  | B | 19. | D |
| 10. | A | 20. | B |

### Short Answer Questions

1. State some example of Catastrophism.

**Volcanic eruptions, meteorite impact, violent earthquakes.**

2. State some examples of Uniformitarianism.

**Erosion, ice-thaw, weathering.**

3. Which part of an organism can be fossilized?

**Bones, shells, teeth.**

4. What kind of materials can fossils be completely preserved in?

**Tar pits, amber, ice.**

5. What is the difference between Superposition and Original horizontally in relative ordering of rock layers?

**Superposition are rock layers undisturbed. However original horizontal are rocks that were layered horizontally but later tilted.**

6. What does the principle of inclusion state?

**If one rock contains pieces of rocks, then the rock containing the pieces is younger than the pieces.**

7. What are the characteristics of an Index Fossil?

**They were abundant, lived for a short period of time and lived in many locations.**

8. What is a gap in a rock record called?

**Unconformity**

9. Give the definition of an Isotope.

**Atoms of the same element with different number of neutrons.**

10. How many Isotopes does Hydrogen have?

**3**

11. Which Isotope is used in Radiometric ageing in fossils?

**Radiocarbon or Carbon-14 or C-14**

12. What process is measured to by scientists in finding the Absolute Age of rocks.

## Radioactive decay

13. Define Half – life.

**Time required for half of a Parent isotope to decay into the Daughter isotope.**

## Long Answer Questions

1. Describe the differences between Catastrophism and Uniformitarianism in changing the earth's landscapes.

**Catastrophism is caused by a meteorite impact or a huge volcanic eruption. This will change the landscape of the Earth in a relatively short period of time. (Days, months or a few years). The Earth change is quick due to a violent event.**

**Uniformitarianism is caused by slow geological processes like freeze thaw weathering, normal weathering, acid rain, erosion etc. and take a long period of time (Hundreds or thousands of years) to change the Earth's landscape.**

2. Explain how trace fossils can be used to learn about the characteristic and behaviors of animals.

**These include fossils of footprints, tracks or nests. This helps scientists to learn the size and speed of the animals and whether they lived alone or in groups.**

3. Compare the difference between Relative ageing and Absolute ageing of rocks.

**Absolute Age is given the age of rocks with numbers whereas Relative age is given the age of rocks by comparing it to other things.**

4. Scientists believe that at one time in earth's history all of the continents were joined together. Explain this idea to be true using Correlation in your answer.

**Scientists found that fossils and rocks from South America and Africa to match well. This led them to believe that at one time these 2 continents were joined together at one time.**

5. Compare the 3 different types of Uniformities in rock layers.

**Disconformity is when younger sedimentary layers are deposited on top of older layers that have been eroded.**

**Angular Unconformity is when sedimentary layers are deposited on top of tilted or folded sedimentary layers that have been eroded.**

**Nonconformity is when younger sedimentary layers are deposited on older igneous or metamorphic rock layers that have been eroded.**

6. Discuss whether humans can be considered as Index Fossils.

**Humans fulfill 2 characteristics of Index Fossil – Were abundant and inhabited many locations. However, they have existed for a very long time and not for a short period. So will not be ideal to use as Index Fossils.**

7. Explain why can Sedimentary rocks are not be easily dated?

**The radioactive isotopes in the grains record the age of the grains and not the time when the sediment were deposited there.**

8. Compare the differences between parent isotopes and daughter isotopes.

**Parent isotopes are radioactive and decay forming new elements. Whereas Daughter isotopes are the products of the decay process, so may or may not be radioactive.**

9. Complete the table below for Isotopes.

<b>Isotope name</b>	<b># of protons</b>	<b># of neutrons</b>
Sodium-25	11	14
Nitrogen-17	7	10
Chlorine-38	17	21

<b>Aluminium<sup>29</sup></b>	13	<b>16</b>
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10. Why can absolute age dating be better than relative age dating?

**Absolute ageing labels the age of the sample by number thereby precisely dating a fossils of rock. However, Relative ageing dating estimates when the age of the fossil or rock by comparing it to others in the vicinity.**

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- D. **Phanerozoic**

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- C. Carboniferous period
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5. When was the Cambrian period?

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- C. 444-416 million years ago
- D. 416-359 million years ago

6. Which period is part of the Mesozoic Era?

- A. The Permian Period
- B. The Ordovician period
- C. The Cambrian Period
- D. **The Cretaceous period**

7. When did Pangea form?

- A. Early Paleozoic period
- C. Late Paleozoic period**
- B. Middle Paleozoic period
- D. Over the whole Paleozoic period

8. Which of these is the Periods in which large Mega-Mammals lived?

- A. Oligocene period**
- C. Pliocene period
- B. Paleozoic period
- D. Pleistocene Period

9. Which one of these is a continent in the Mesozoic Era?

- 1. Burgenland
- 3. Puntland
- 2. Gondwanaland**
- 4. Flevoland

10. Which adaptations of amphibians allowed them to survive in the Paleozoic Era.

- A. Huge feet
- C. Thick skin**
- B. Small heads
- D. Powerful hearing

11. What were Plesiosaurs?

- A. Flying reptiles
- C. Running reptiles
- B. Walking reptiles
- D. Marine reptiles**

12. What is a Coal Swamp?

- A. Oxygen-poor environment where animals changed to coal
- C. Oxygen-rich environment where plants changed to coal skin
- B. Oxygen-poor environment where plants changed to coal**
- D. Oxygen-rich environment where animals changed to coal

13. What was the Cretaceous Extinction Event

- A. When the Dinosaur species became extinct**
- C. When the Human species became extinct
- B. When Pangea split into two
- D. When the Ice Age began

14. Which species survived the Permian Mass extinction?

- A. Species that did not adapt to      B. Species that adapted to the the  
drastic change      drastic change very slowly  
C. Species that could run the      **D. Species that adapted to the fastest  
drastic change**

15. What is the oldest multicellular organism fossil found?

- A. 400 million years old      B. 500 million years old  
**C. 600 million years old**      D. 700 million years old

16. The Quaternary Period is made from

- A. Pliocene and Miocene Epochs      B. **Pleistocene and Holocene  
Epochs.**  
C. Oligocene and Eocene Epochs      D. Paleocene Epoch only

17. Which of these lived in the Pleistocene Period?

- A. Giant Horses      **B. Giant Sloths**  
C. Giant Kangaroos      D. Giant Rodents

18. How much Glaciers covered the Earth in the Ice Age.

- A. 10%      B. 20%  
**C. 30%**      D. 40%

19. When did multicellular life first appear?

- A. Devonian period      B. Permian period  
**C. Cambrian period**      D. Ordovician period

20. The Cenozoic era is made from...

- A. Triassic and Jurassic Periods.      B. Ordovician and  
Cretaceous periods  
C. Silurian and Devonian periods      **D. Tertiary and Quaternary  
Periods.**

## **Short Answer Questions**

1. Describe what is a Mass Extinction?

**It is the death of many species within a short period.**

2. Describe the ancient life-forms from 3.5 billion years ago.

**They were unicellular. Small and simple life-forms. They were like Bacteria.**

3. Describe how Precambrian multicellular life-forms were different from the organism today.

**They were all soft bodied life-forms therefore all invertebrates.**

4. State, which is the earliest Era in the Phanerozoic Eon.

**The Paleozoic Era is the earliest in this Eon.**

5. In Earth's history, when was the Age of Fishes? Moreover, Why?

**In the Middle of the Paleozoic Era because the most dominant organism were fishes at the time.**

6. Explain the difference in climates between the Mesozoic and the Cenozoic Eras.

**It was warm in all of the Mesozoic Era but part of the Cenozoic Era went through the Ice Age and so was very cold.**

7. Which Era was warmer, the Paleozoic Era or the Mesozoic Era?

**The Mesozoic Era was much warmer.**

8. What was the biggest geological event of the Mesozoic Era?

**The breakup of Pangea.**

9. Which Ocean started formed because of this geological event?

**The Atlantic Ocean started to formed.**

10. Why do Scientists know more about the Cenozoic Era than any other Era?

**Because we live in the Cenozoic Era and fossils and rocks are better preserved.**

## **Long Answer Questions**

1. Explain how a Rapid Climate Change can occur.

**Gas and dust from violent volcanic eruptions or a meteorite impact can cause global dimming (blocking out of sunlight). This can cause a quick change in weather.**

2. Explain what the reptiles could do that Amphibians could not? Why?

**Reptiles could lay their eggs on land and therefore reproduce on land. This was because their eggs had tough and leathery shells that would not dry out.**

3. Explain why the discovery of Iridium was significant to scientist in explaining why the dinosaurs became extinct.

**Traces of Iridium was found in rocks around the world. Iridium is rare on earth and usually found on meteorites. No dinosaur's fossils were found in rock layers above the Iridium layer.**

4. Describe how the Alps and the Himalayas formed in the Cenozoic Era.

**Continents moved causing some landmass to collide. India crashed into Asia forming the Himalayas. Africa pushed into Europe forming the Alps.**

5. Explain what occurred when Pangea broke up in the Mesozoic Era, how many new continents were formed? What were they called and which of today's continents did they consist of?

**Pangea broke into two new continents. Gondwanaland consisted of Africa, Antarctica, Australia and South America and Laurasia consisted of North America, Asia and Europe.**

6. Explain how Grooves in the Earth were formed during the Cenozoic Era.

**During the Ice Age, many Glaciers were formed. Rocks were carried by the Glaciers, creating deep Grooves in the ground.**

7. Explain how scientists hypothesize that the Permian Mass Extinction occurred.

**A meteorite impact or huge volcanic eruptions took place. This sent ash and rock all into the atmosphere, which blocked out sunlight, Therefore, causing much needed plants (food) to die, destroying food webs.**

8. Explain how scientists predict that early humans migrated from Asia to North America.

**On huge land bridges between Asia and North America. During the Pleistocene ice age.**

9. Describe 3 things about Trilobite fossils.

**Hard body parts. Preserved in limestone. Distant ancestors of organisms alive today.**

10. How are present-day reptiles different from Dinosaurs?

**Dinosaurs were land vertebrates that walked upright on two legs, which were positioned directly below their hips. Today's reptiles walk in a sprawling posture with their legs sticking out sideways.**

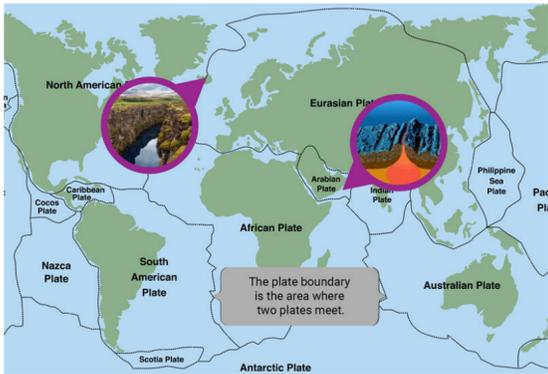
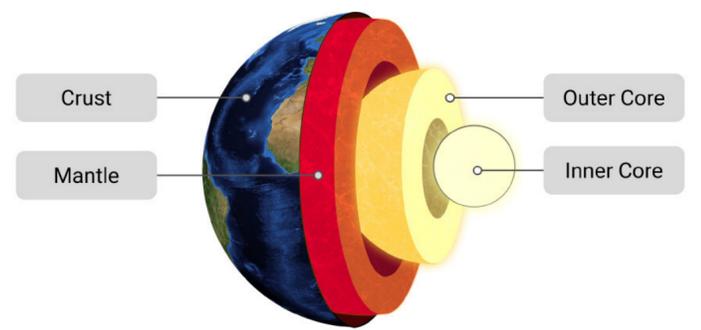
11. State the difference between a Plesiosaur and Pterosaur.

**Plesiosaur were marine reptiles (lived in the water) which had small heads, long necks and flippers.**

**Pterosaur were flying reptiles which large bat like wings.**

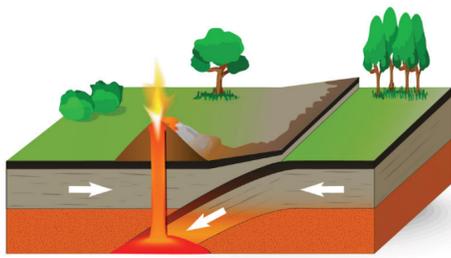
# Earthquakes

the vibrations of the Earth's crust due to movement of the Earth's plate tectonics.



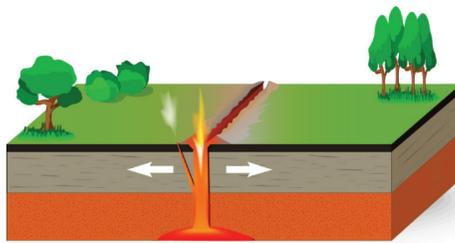
Earthquakes can happen along any type of plate boundary.

deepest earthquakes



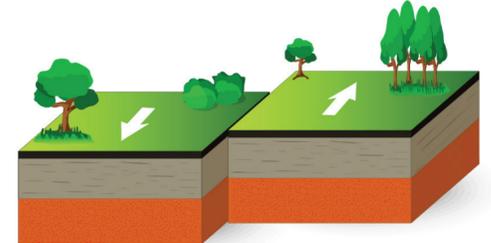
Convergent boundary

shallow earthquakes



Divergent boundary

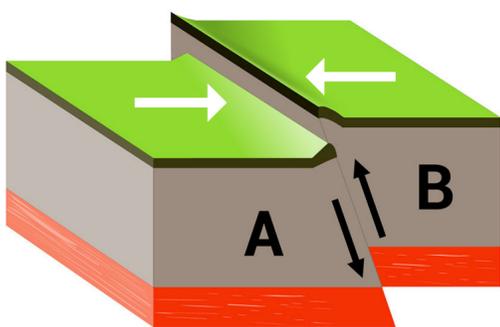
shallow earthquakes



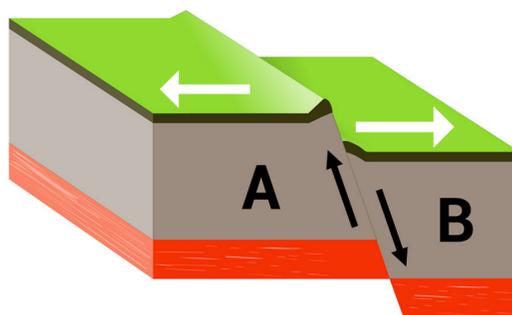
Transform boundary

Cause	Effect
forces build up pressure along faults	movement of rocks occur along the fault
energy is released as rocks move	the ground shakes causing an earthquake

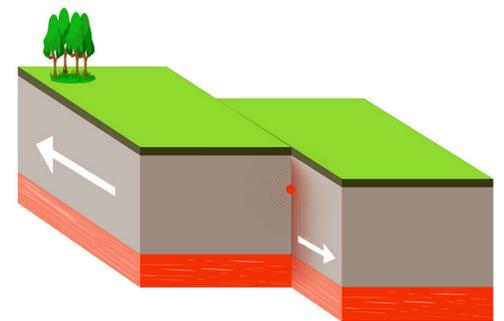
A fault is a large crack in Earth's lithosphere where blocks of rocks can move.



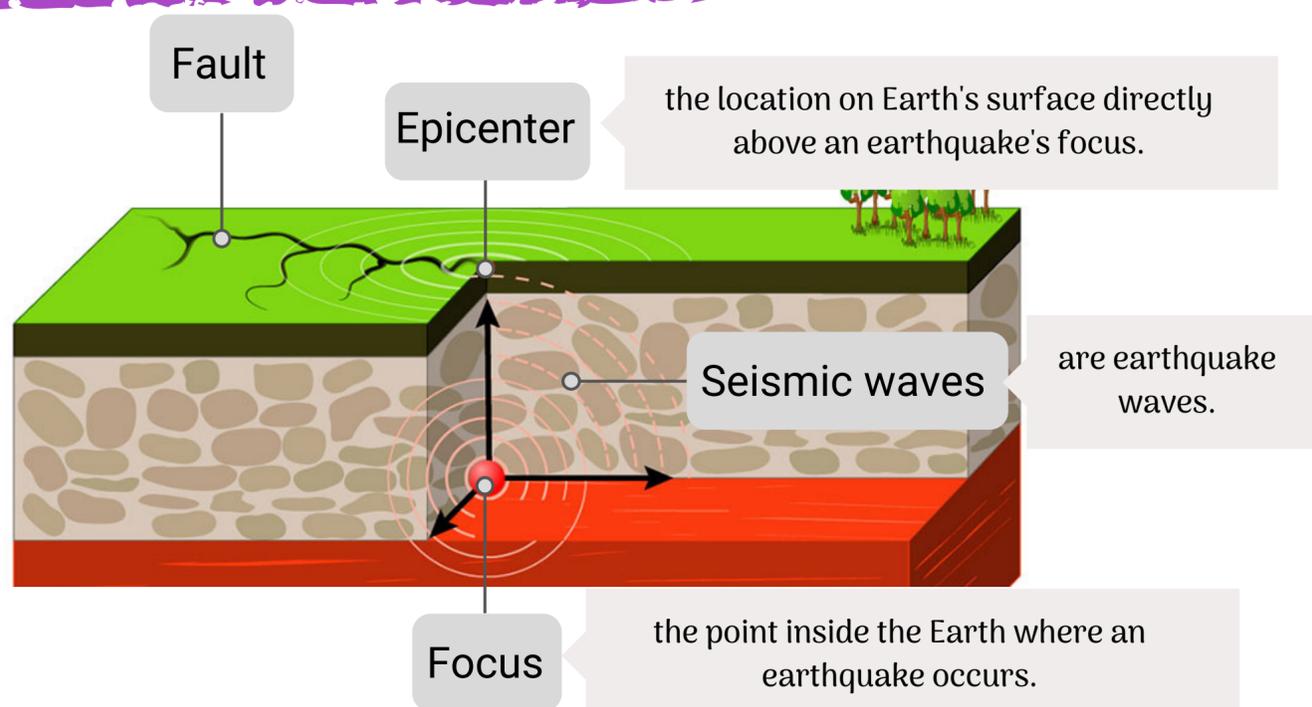
Reverse fault occurs at convergent boundary.



Normal fault occurs at divergent boundary.

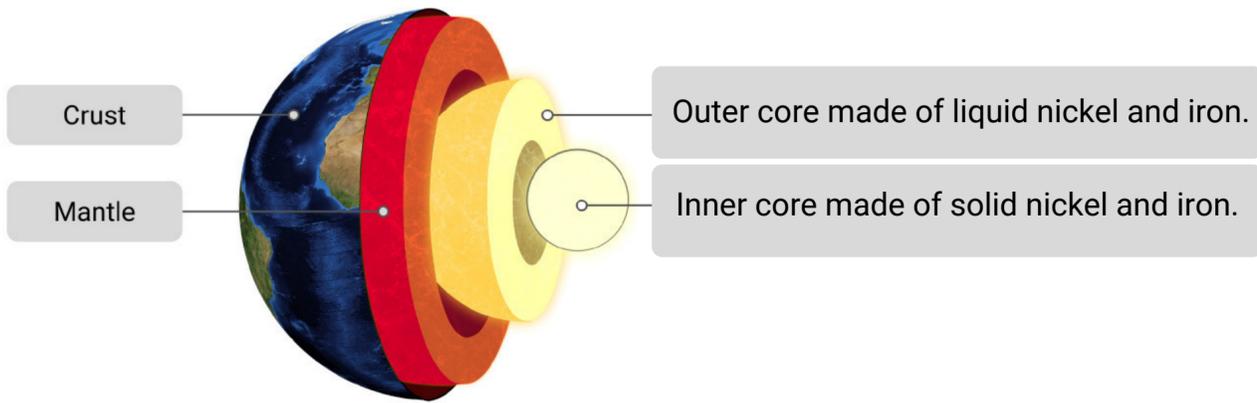


Strike-slip fault occurs at transform boundary.



# Seismic Waves - Earth's Interior

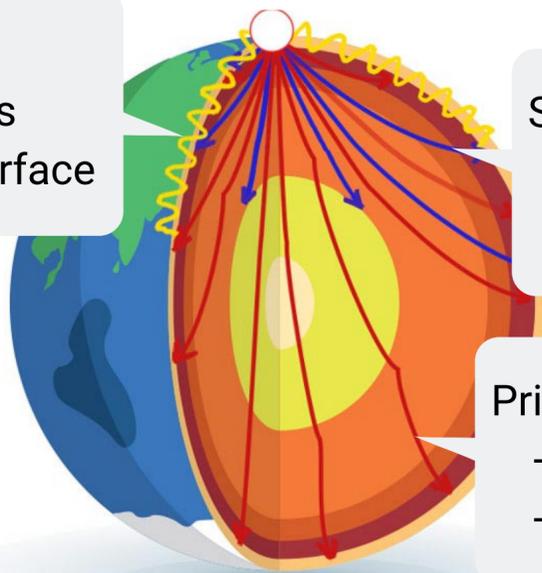
Evidence of the structure of Earth comes from seismic activity.



## Types of SEISMIC WAVES

Surface waves:

- slowest seismic waves
- travel along Earth's surface



Secondary waves (S-waves):

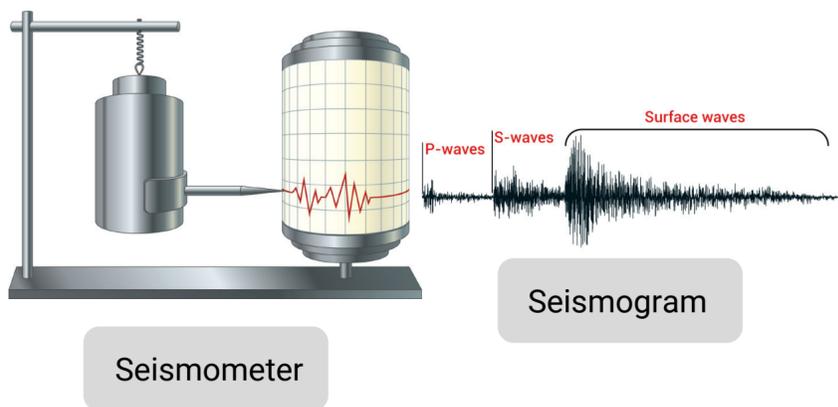
- slower than primary waves
- travel through solids only

Primary waves (P-waves):

- fastest seismic waves
- travel through solids and liquids

Seismologists are scientists that study earthquakes and seismic waves .

Three seismic stations are needed to locate an earthquake epicenter.



## Richter Scale

measures the amount of ground motion at a given distance from the earthquake

## Magnitude Scale

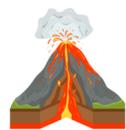
measures the amount of energy released by the earthquake

## Mercalli Scale

measures the intensity of an earthquake based on descriptions of its effects on people and structures



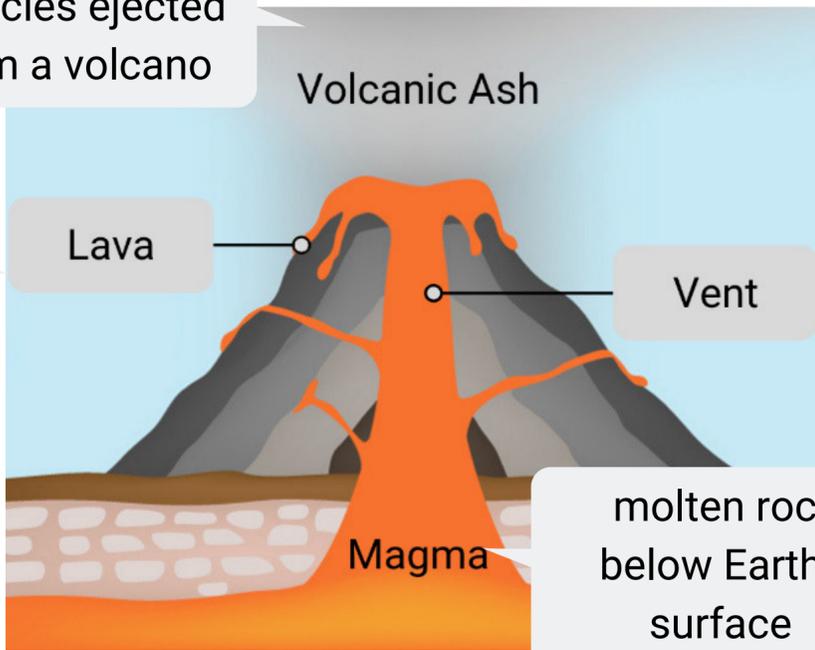
# VOICANOES



A volcano is a vent or an opening in the Earth's crust.

very small solid particles ejected from a volcano

magma that reaches the Earth's surface

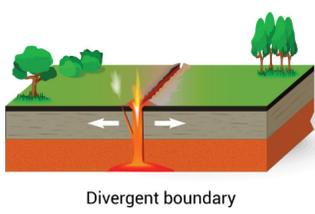
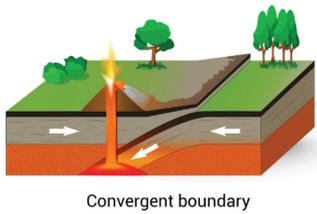


a central tube through which magma

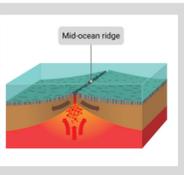
molten rock below Earth's surface

## Volcanoes are mostly found:

- at convergent or divergent plate boundaries



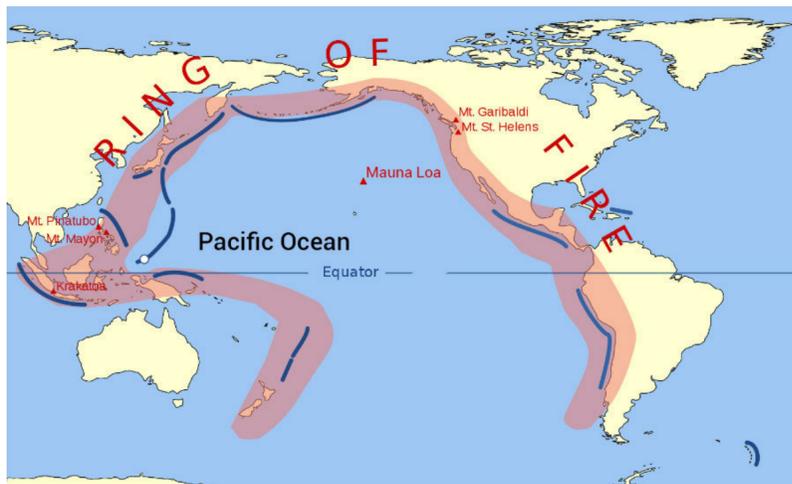
more than 60 percent of volcanic activities occur at mid-ocean ridges



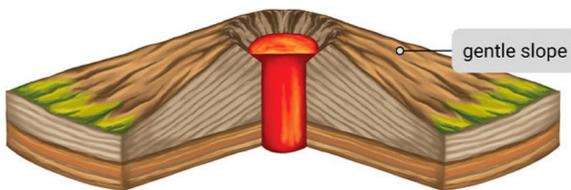
- over hotspots



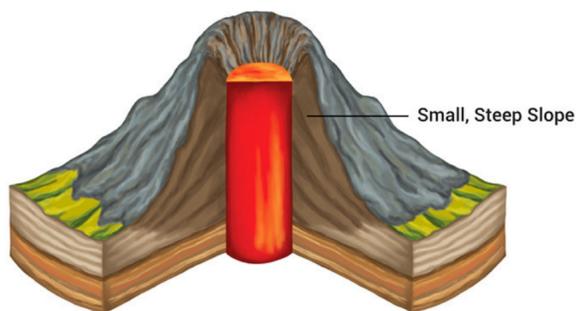
Most volcanoes occur at convergent plate boundaries, especially at a belt around the Pacific Ocean, called the Ring of Fire.



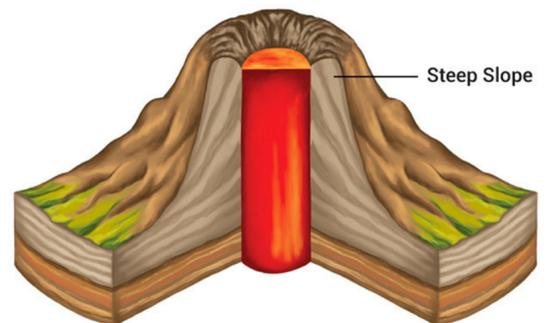
## Types of VOLCANOES



Shield Volcano



Cinder cone Volcano

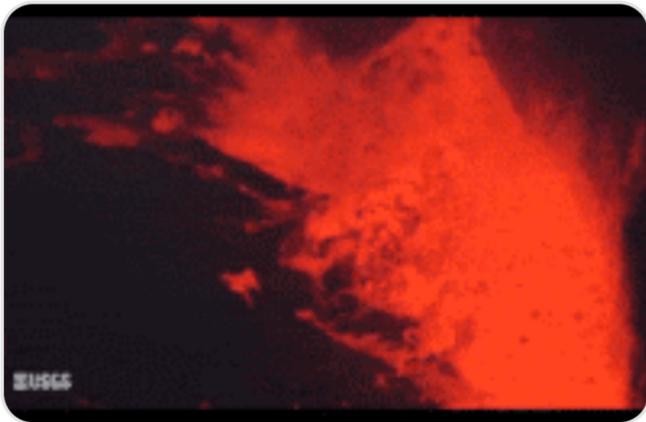


Composite Volcano

# VOICANIC ERUPTIONS

A volcano's eruptive style depends on magma chemistry.

LOW Silica Content, Water Content, Viscosity  HIGH



**Non-Explosive Eruption**  
lava flows easily like honey  
example: shield volcanoes



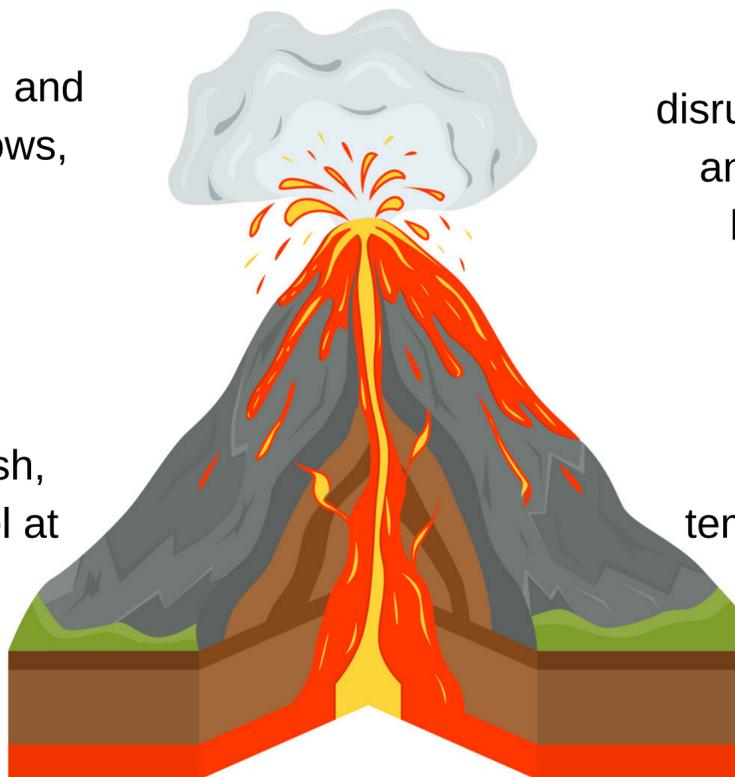
**Explosive Eruption**  
lava flows like toothpaste  
example: composite volcanoes

Volcanic eruptions are predictable but cannot be prevented.

## DANGERS

**Mudflow**  
water mixes with ash and mud causing mudflows, also called lahar

**Pyroclastic Flow**  
mixtures of hot gas, ash, and rock that can travel at very high speeds



**Ash all**  
disrupt flights, cover towns, and pollute air causing breathing problems

**Lava Flow**  
have very high temperatures and can be deadly



Volcanic ash in the atmosphere can block sunlight resulting in lower temperatures.



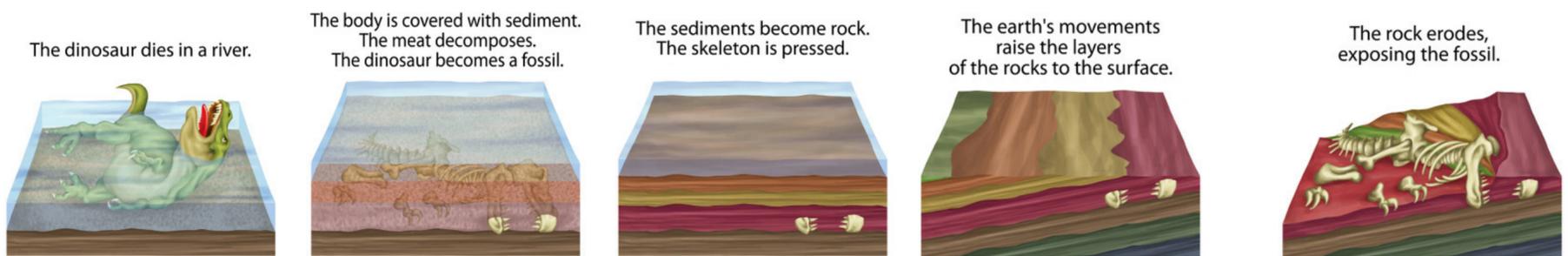
# FOSSILS - Evidence of the Past



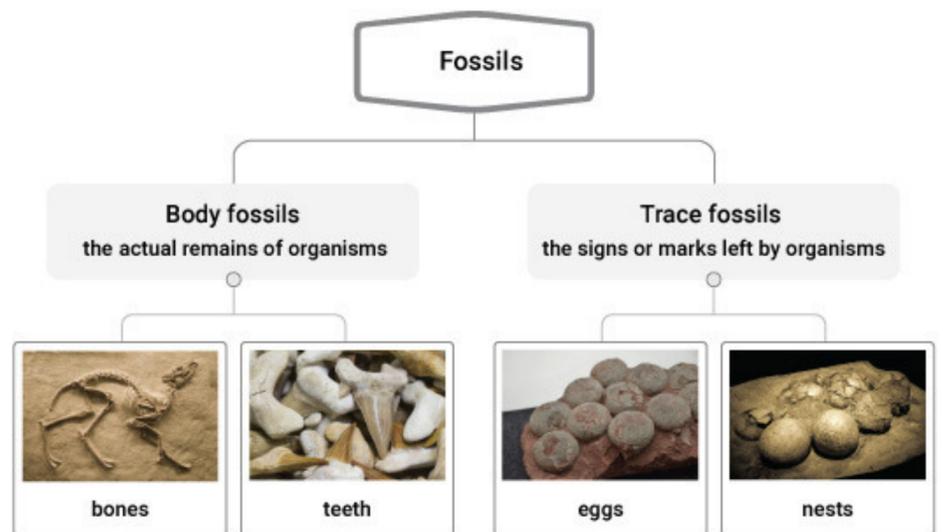
## Fossils:

- are the preserved remains or traces of an ancient organism.
- are most often found in sedimentary rocks.
- vary in size from tiny organisms, called microfossils, to huge dinosaurs.
- are rare, and they form only under certain conditions.
- scientists who study fossils are called paleontologists.

To become a fossil, an organism should have hard parts and must be buried quickly.



Fossils can be divided into two main categories: body fossils and trace fossils.



## Types of FOSSIL PRESERVATIONS



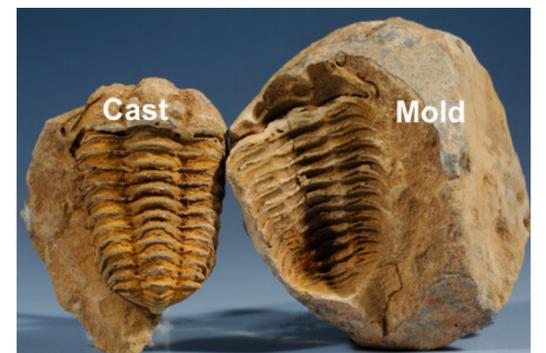
Preserved Remains



Mineral replacement



Carbon Film



Cast and Mold

Theories on the history of our planet Earth.

### Catastrophism

Catastrophic events, such as floods, volcanoes, earthquakes, and meteor impacts caused mass extinctions and the formation of landforms.



### Uniformitarianism

Geological processes, such as erosion and deposition, which occur today are similar to the processes that have shaped Earth in the past.



# RELATIVE - AGE DATING

the age of rocks compared to other rocks.



## Principles of RELATIVE DATING

**Superposition**  
younger rocks are on top and older rocks are on bottom

youngest  
oldest

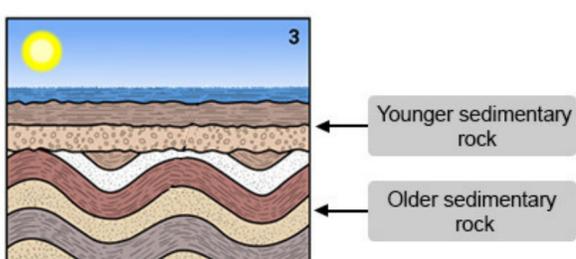
**Original Horizontality**  
layers of sediment are first deposited horizontally

**Lateral continuity**  
rock layers are lateral and continuous in all directions

**Inclusions**  
a piece of rock that's found inside another rock must be older

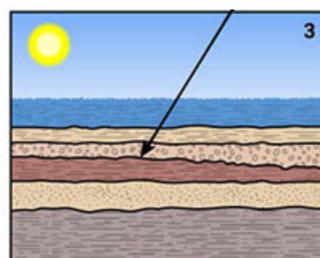
**Cross-Cutting Relationships**  
a fault or a dike is younger than the rock it cuts across

An unconformity is a gap in the geological sequence of rock layers.



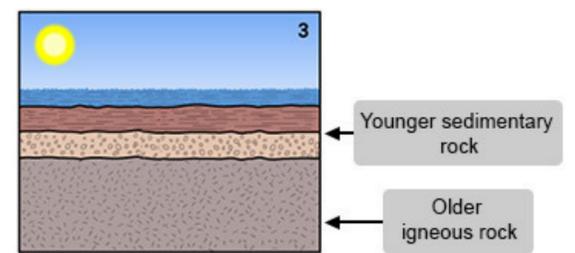
**Angular Unconformity**

younger sedimentary layers are deposited on top of older, tilted or folded sedimentary layers



**Disconformity**

younger sedimentary layers are deposited on top of older, horizontal sedimentary layers



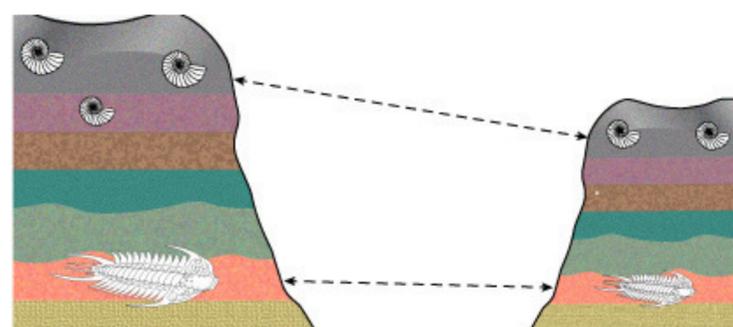
**Nonconformity**

younger sedimentary layers are deposited on top of older, igneous or metamorphic rock layers

Geologists fill in gaps in the rock record by correlating, or connecting rock layers.

An **index fossil** is a fossil that:

- is used in relative-age dating of rocks
- must be widely distributed
- represent an organism that existed for a short length of time
- example: trilobites



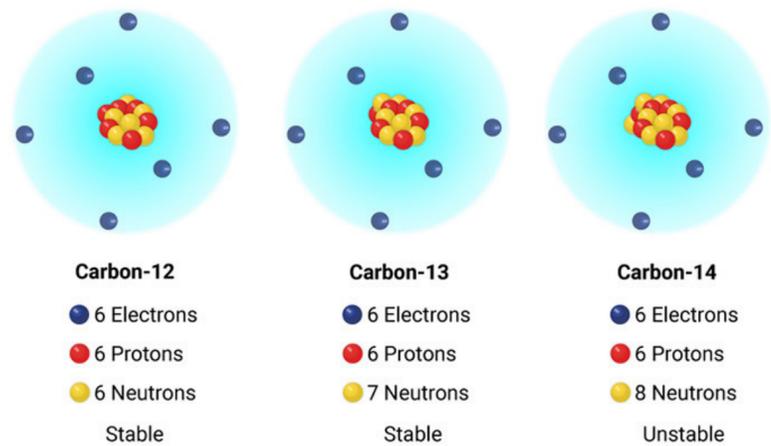
# ABSOLUTE - AGE DATING

the actual age of rocks in years.

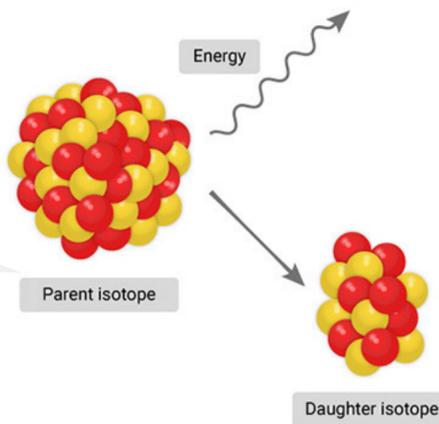
How Can the Absolute Age of Rock be Determined?

Using radioactive Isotopes:

- Isotopes are atoms of the same element with the same number of protons and different number of neutrons.



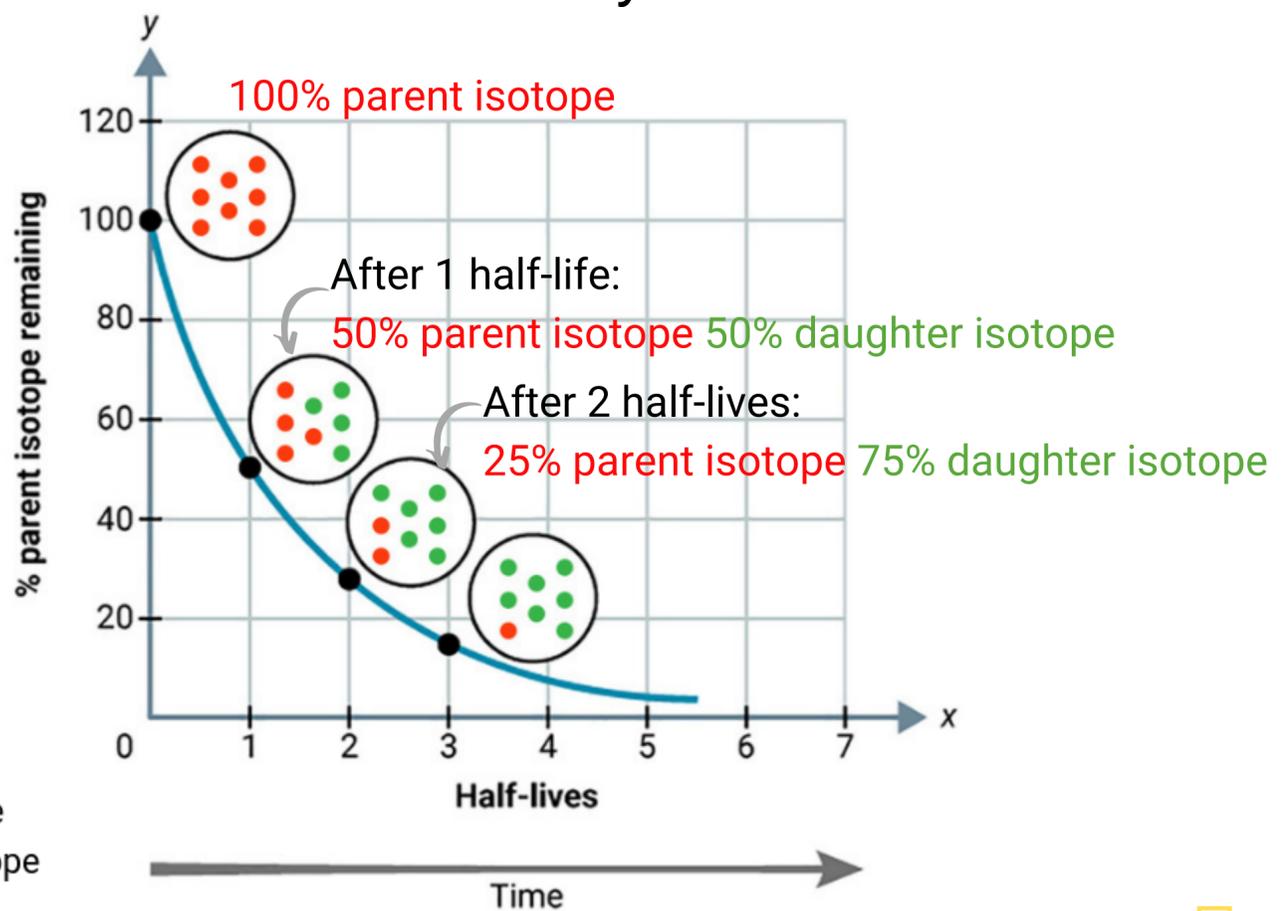
the radioactive isotope that decays



the stable isotope that forms

- Radioactive isotopes are isotopes that are unstable and break down into other isotopes by a process called radioactive decay.

Half-life is the time required for the original quantity of a parent isotope to be reduced by half.



Not all radioactive isotopes have the same half-life. Half-lives range from few microseconds to billions of years.

<b>Radioactive Isotope</b>	Carbon-16	Neptunium-240	Carbon-14	Uranium-238
<b>Half-life</b>	0.74 seconds	1 hour	5,730 years	4.5 billion years

# Radiometric Dating

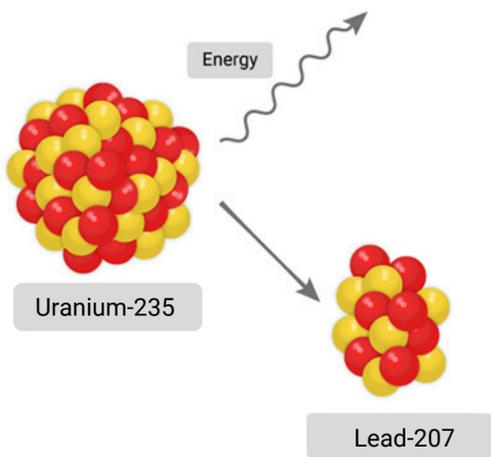
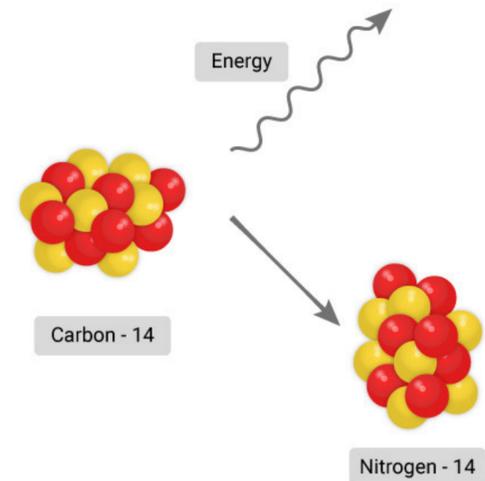
Scientists study the amounts of parent and daughter isotopes to date samples.

Parent Isotope	Half-Life	Daughter Isotope
Uranium-235	704 million years	Lead-207
Potassium-40	1.25 billion years	Argon-40
Uranium-238	4.5 billion years	Lead-206
Thorium-232	14.0 billion years	Lead-208

## RADIOMETRIC DATING Methods

### Radiocarbon (C-14) Dating:

- used to date organic matter only
- has a half-life of 5,730 years
- is used to date material that contain remains that died up to about 60,000 years ago

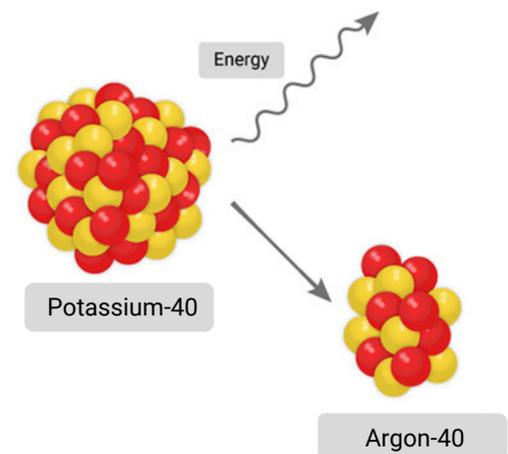


### Uranium-Lead Dating:

- used to date igneous rocks
- uranium-235 has a half-life of 704 million years
- date rocks aged 1 million to few billion years

### Potassium-Argon Dating:

- used to date igneous rocks
- potassium-40 has a half-life of 1.25 billion years
- date rocks aged 1 million to few billion years



The age of Earth is estimated to be 4.6 billion years.

Radiometric dating, relative dating, and fossils all help scientists understand the history of Earth.

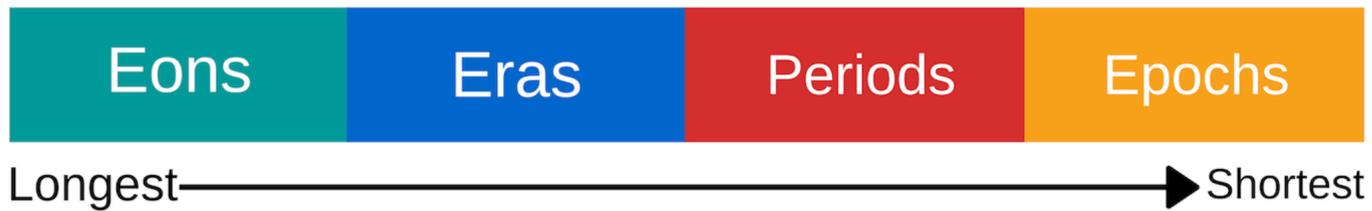


# GEOLOGIC TIME SCALE

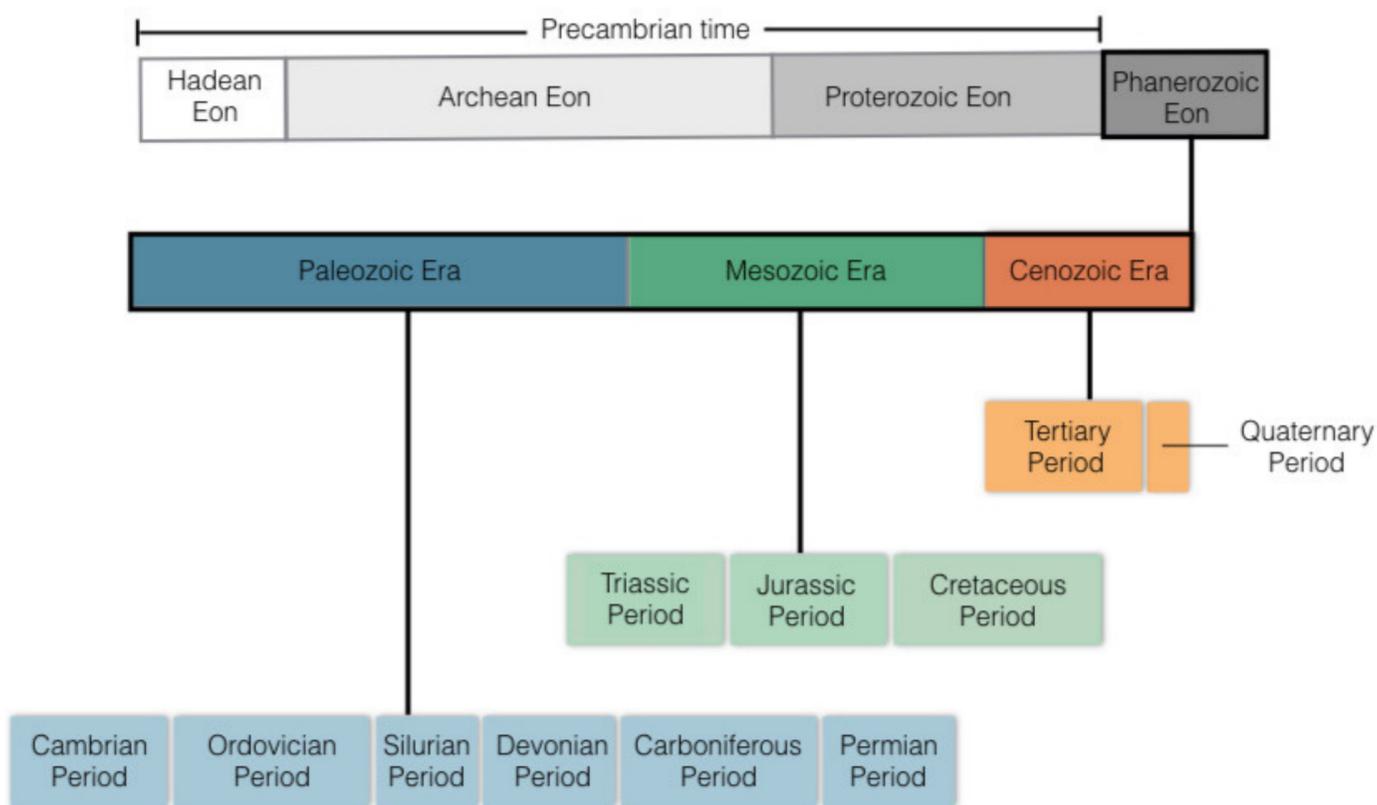
a time line of Earth's past.



The Earth's history is divided into time units in the geologic time scale.



In the geologic time scale, the 4.6 billion years of Earth's history are divided into time units of unequal length.



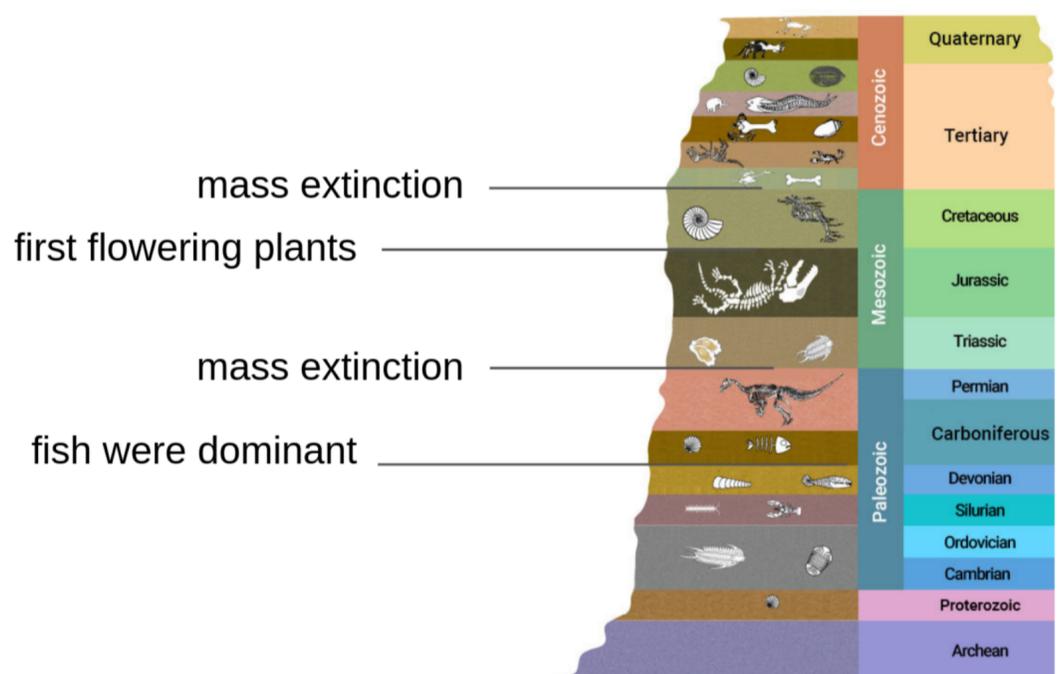
The divisions in the geologic time scale are determined based on:

## Fossils:

- provide clues about the life conditions during a given life span.

## Major Events:

- sudden changes in the fossil record mark major changes in the environment or the formation of new types of organisms.



# Mass Extinction

is the death of a large number of species within a relatively short amount of geologic time.



There have been 5 major mass extinctions in Earth's history.

## Causes of MASS EXTINCTION

### CAUSE:

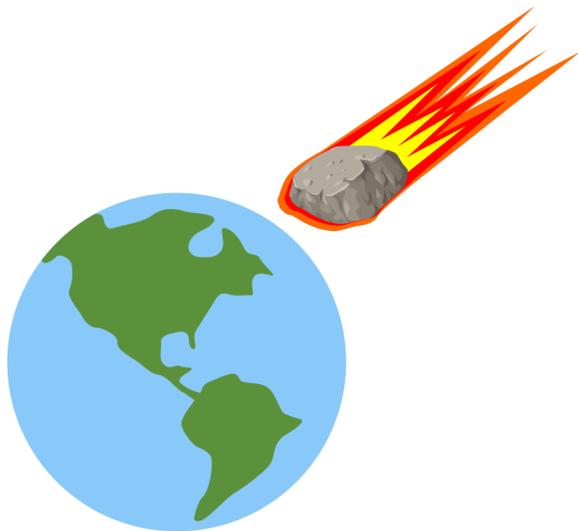
A catastrophic event can cause a sudden change in the environment that organisms cannot adapt to.



### EFFECT:

Many species of organisms become extinct within a short period of time.

Examples of catastrophic events that can cause climate change:



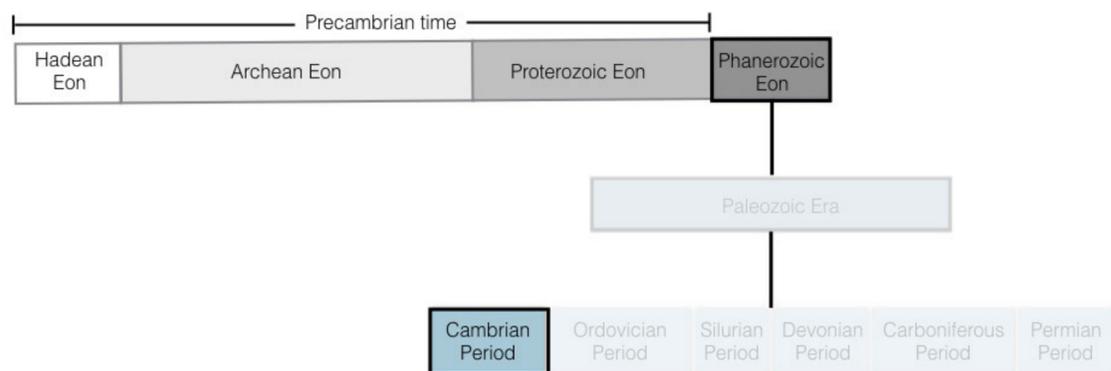
meteorite impacts



volcaoes

The Precambrian time:

- is the time before the Cambrian
- makes 90% of Earth's history
- divided into 3 eons: Hadean, Archean, and Proterozoic
- simple, unicellular organisms and soft-bodied, multicellular organisms

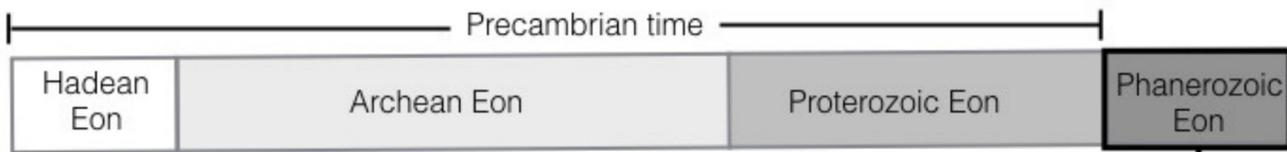
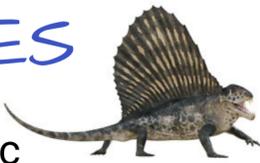


The Cambrian explosion marked the start of life biodiversity. Cambrian life-forms, like trilobites, were the first organisms with hard body parts.





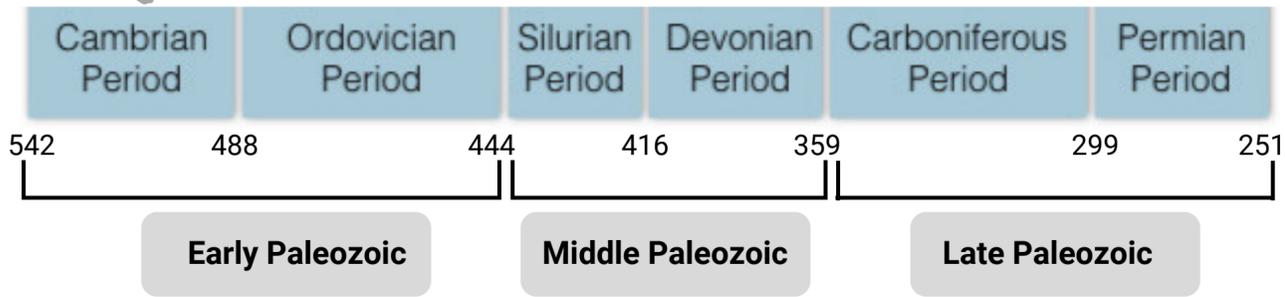
# THE PALEOZOIC ERA - TIME FOR BIG CHANGES



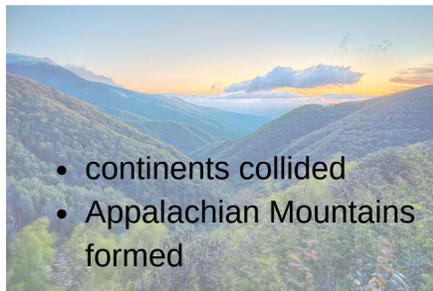
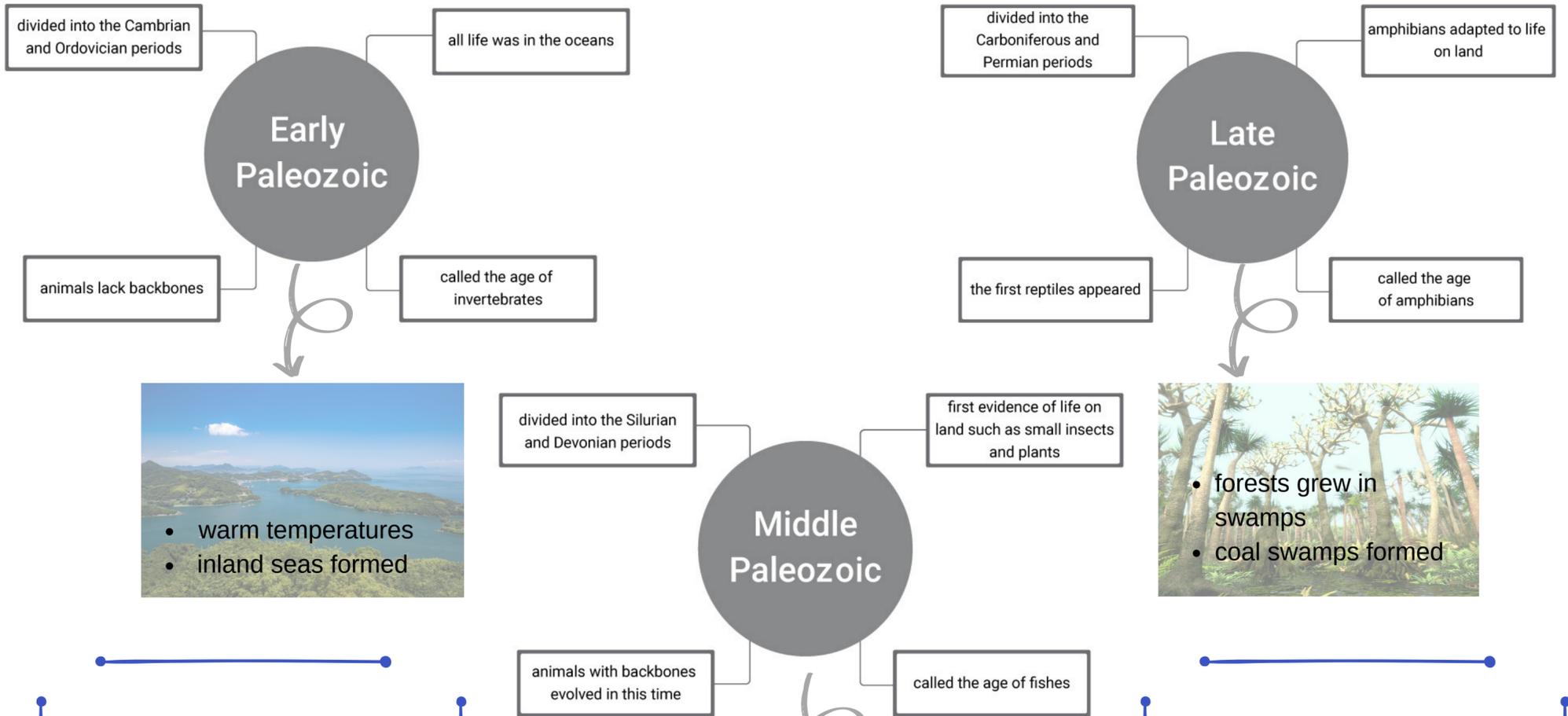
The Phanerozoic eon is divided into 3 eras.

The Paleozoic era - ancient life  
(542- 251 mya)

- is the longest and oldest
- lasted for 291 million years
- is divided into **six periods**



If you could have visited Earth during the Paleozoic era, it would have looked very different.

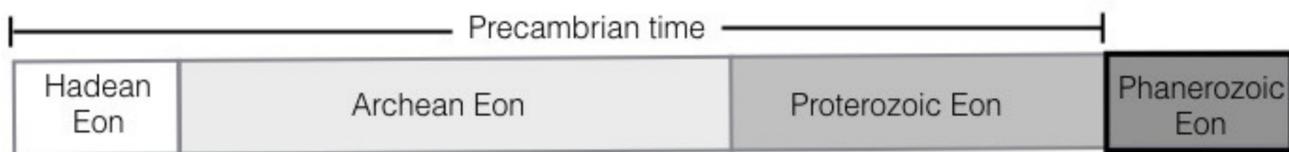


The supercontinent, Pangaea, formed at the end of the Paleozoic era.



The most severe mass extinction in Earth's history, the Permian mass extinction, occurred at the end of the Permian period.

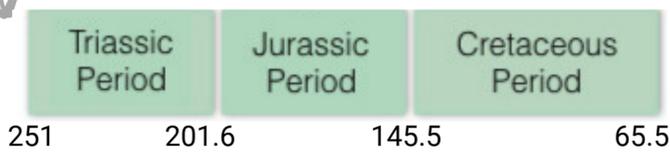
# THE MESOZOIC ERA - The World of Dinosaurs



The Phanerozoic eon is divided into 3 eras.

The Mesozoic era - middle life  
(251 - 65.5 mya)

- is the middle era
- lasted for 185.5 million years
- is divided into **three periods**



## Geology of the MESOZOIC ERA

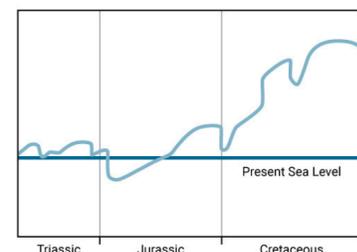
1. Pangaea began to break apart in the late Triassic into:

2. The climate was warm and Earth's sea level was high.

the southern continent called Gondwana included the modern continents: South America, Africa, Australia, and Antarctica.

the northern continent called Laurasia included the modern continents: North America, Europe, and Asia.

the Atlantic Ocean started forming

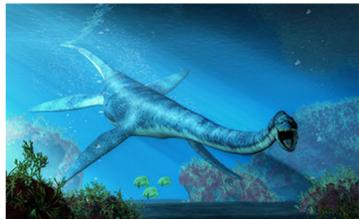


## Life-forms of the MESOZOIC ERA



Dinosaurs

- land reptiles



Plesiosaurs

- water reptiles



Pterosaurs

- flying reptiles



Mammals

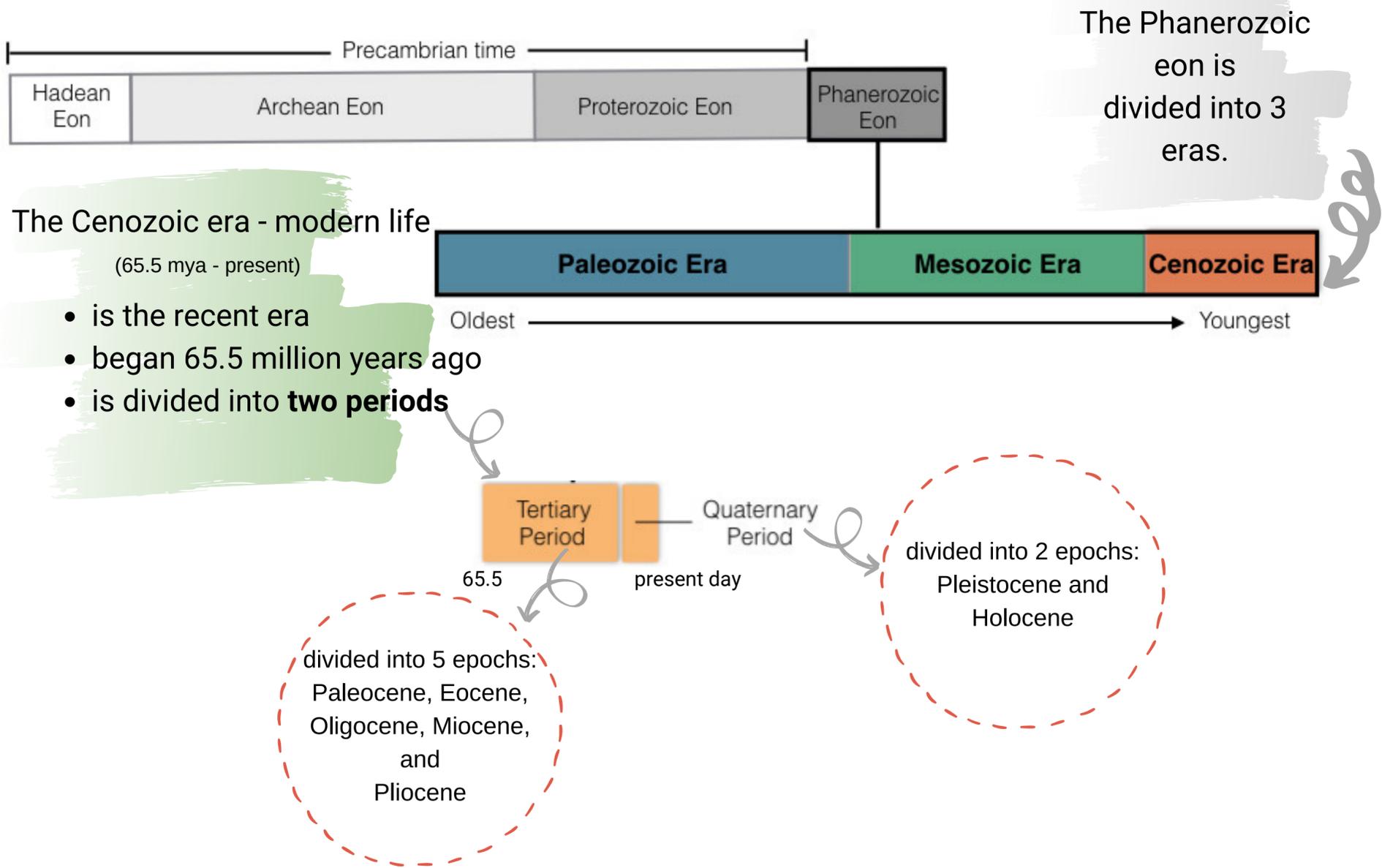
- small in size



Flowering Plants

- first appeared toward the end of Mesozoic era

# THE CENOZOIC ERA - THE EARTH'S MOST RECENT ERA



## Geology of the CENOZOIC ERA

### Mountain Building

Himalayas began forming as India crashed into Asia

Alps began forming as Africa pushed into Europe

Rocky Mountains continued to grow as North America pushed westward

### Ice Age

Glaciers covered up to 30% of land surfaces



## Life-forms of the CENOZOIC ERA



Mega-Mammals

The oldest fossil remains, *Lucy*, of human have been found in Africa. It is about 3.2 million years old.