

## Geologic History

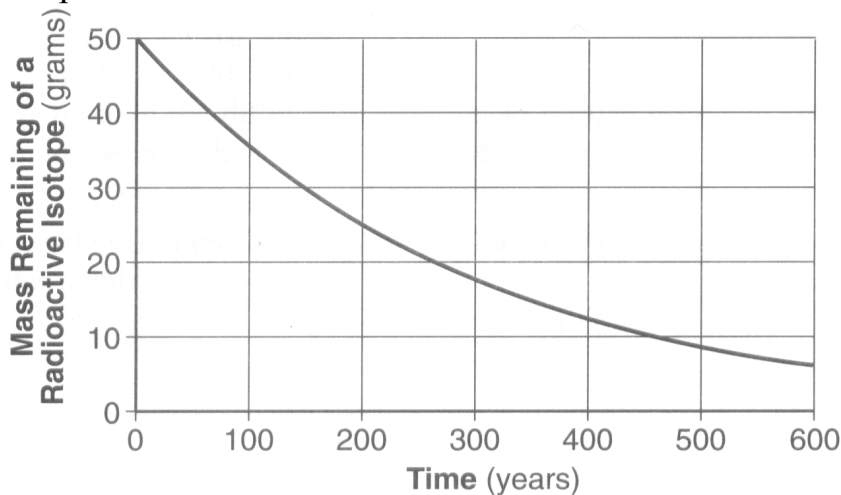
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1. Which event occurred earliest in geologic history?
    - A) appearance of the earliest grasses
    - B) appearance of the earliest birds
    - C) the Grenville Orogeny
    - D) the intrusion of the Palisades Sill
  
  2. When did the Jurassic Period end?
    - A) 66 million years ago
    - B) 144 million years ago
    - C) 163 million years ago
    - D) 190 million years ago
  
  3. Studies of the rock record suggest that
    - A) the period during which humans have existed is very brief compared to geologic time
    - B) evidence of the existence of humans is present over much of the geologic past
    - C) humans first appeared at the time of the intrusion of the Palisades sill
    - D) the earliest humans lived at the same time as the dinosaurs
  
  4. What is the estimated length of time of the Mesozoic Era?
    - A) 65 million years
    - B) 160 million years
    - C) 225 million years
    - D) 345 million years
  
  5. Which radioactive isotope disintegrates to lead ( $\text{Pb}^{206}$ )?
    - A)  $\text{C}^{14}$
    - B)  $\text{K}^{40}$
    - C)  $\text{Rb}^{87}$
    - D)  $\text{U}^{238}$
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6. Radioactive carbon ( $C^{14}$ ) would be especially useful in determining the age of
- A) geologically young organic remains
  - B) geologically young inorganic remains
  - C) Precambrian igneous rocks
  - D) extremely small amounts of material
7. Which radioactive substance has the longest half-life?
- A) carbon-14
  - B) potassium-40
  - C) rubidium-87
  - D) uranium-238
8. A fossil shell contains 25% of the original amount of its carbon-14. Approximately how many years ago was this shell part of a living organism?
- A) 5,700 years ago
  - B) 11,400 years ago
  - C) 17,100 years ago
  - D) 22,800 years ago
9. The graph below shows the radioactive decay of a 50-gram sample of a radioactive isotope.



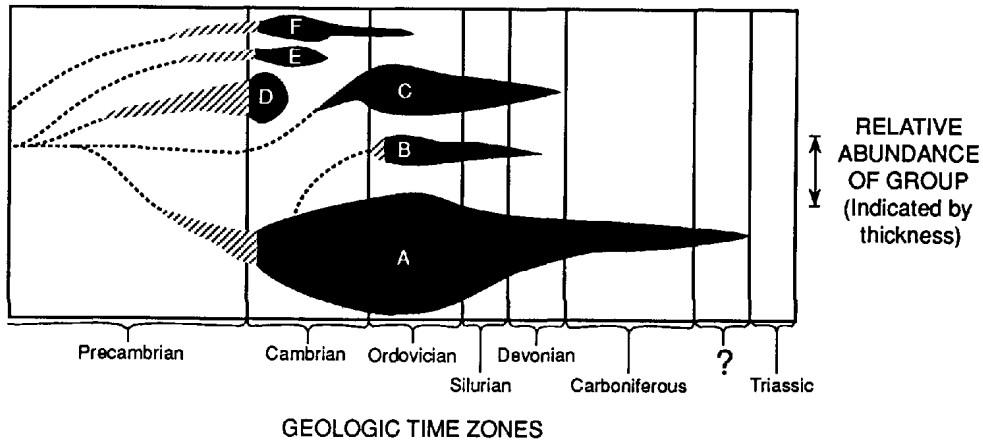
According to the graph, what is the half-life of this isotope?

- A) 100 years
  - B) 150 years
  - C) 200 years
  - D) 300 years
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13. Base your answer to the following question on the graph below which shows the development, growth in population, and extinction of the six major groups of trilobites, labeled *A* through *F*.



KEY TO SYMBOLS:

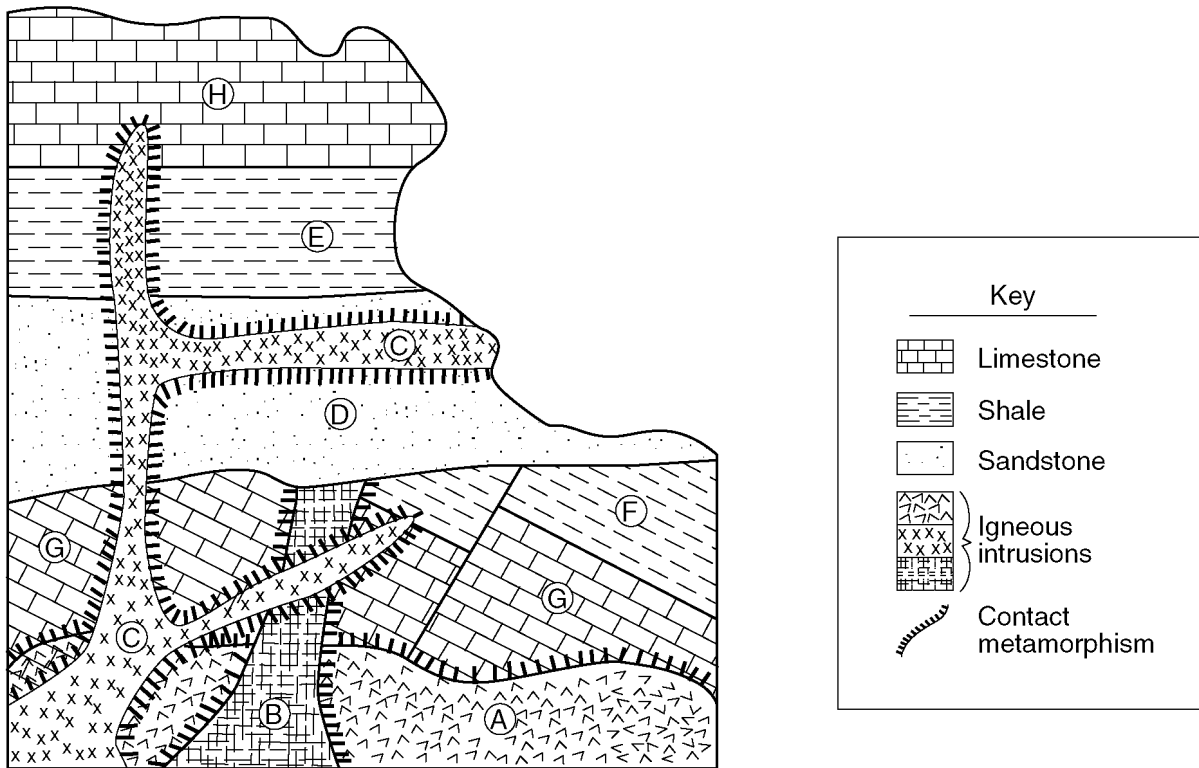
- Population based on fossil record
- ▨ Population presumed: fossil evidence rare
- Assumed evolutionary relationship

During which period did the last of these trilobite groups become extinct?

- A) Cretaceous
  - B) Triassic
  - C) Permian
  - D) Carboniferous
14. Which life-form appeared first?
- A) trilobite
  - B) human
  - C) coelophysis
  - D) stromatolite

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Base your answers to questions **15** and **16** on the diagram below, which shows a cross section of Earth's crust.

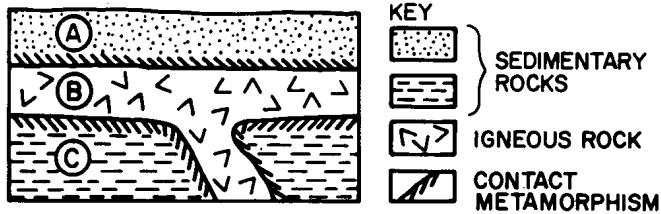


15. Which statement gives an accurate age relationship for the bedrock in the cross section?
- A) Intrusion *A* is younger than intrusion *C*.
  - B) Intrusion *C* is younger than intrusion *B*.
  - C) Intrusion *B* is older than intrusion *A*.
  - D) Intrusion *C* is older than layer *E*.
16. The most apparent buried erosional surface is found between rock units
- A) *A* and *B*
  - B) *C* and *D*
  - C) *D* and *F*
  - D) *E* and *H*

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17. The diagram below represents layers of rock.



Rock layer *A* is inferred to be older than intrusion *B* because

- A) layer *A* is composed of sedimentary rocks
  - B) parts of layer *A* were altered by intrusion *B*
  - C) layer *B* is located between layer *A* and layer *C*
  - D) parts of layer *C* were altered by intrusion *B*
18. Unless a series of sedimentary rock layers has been overturned, the bottom rock layer usually
- A) contains fossils
  - B) is the oldest
  - C) contains the greatest variety of minerals
  - D) has the finest texture
19. Organisms that later became good index fossils lived over a
- A) wide geographic area and existed for a long geologic time
  - B) wide geographic area and existed for a short geologic time
  - C) limited geographic area and existed for a long geologic time
  - D) limited geographic area and existed for a short geologic time
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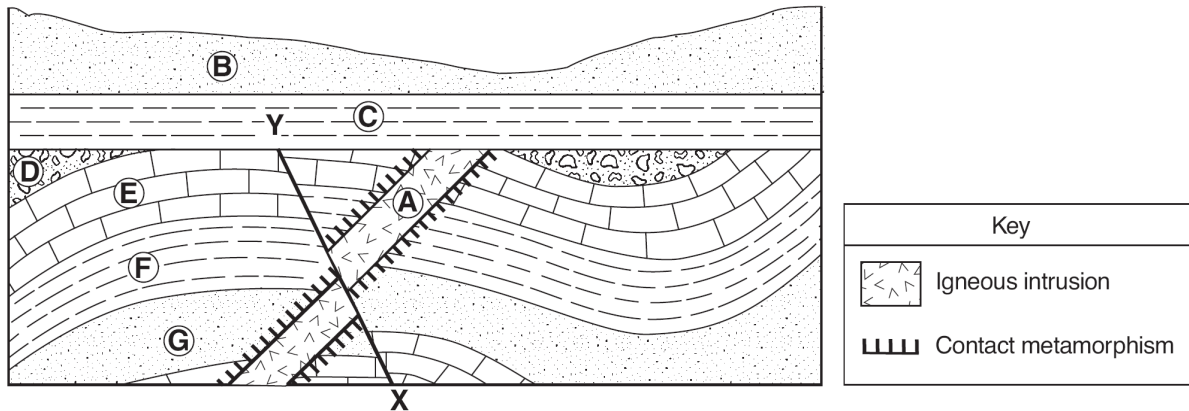
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20. Thin layers of volcanic ash act as excellent time markers in the correlation of bedrock because volcanic ash
- A) is easily eroded and lasts only a short time on Earth's surface
  - B) stays in the atmosphere for millions of years
  - C) is deposited over millions of years
  - D) falls to Earth over a large area in a short period of time
21. According to the fossil record, which group of organisms has existed for the greatest length of time?
- A) gastropods
  - B) corals
  - C) mammals
  - D) vascular plants
22. Shark and coral fossils are found in the rock record of certain land areas. What does the presence of these fossils indicate about those areas?
- A) They have undergone glacial deposition.
  - B) They were once covered by thick vegetation.
  - C) They have undergone intense metamorphism.
  - D) They were once covered by shallow seas.
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Base your answers to questions 23 through 26 on the geologic cross section of bedrock below. Letters *A* through *G* identify rock units and line *XY* represents a fault. The rocks have not been overturned.



23. *Maclurites* fossils are found in rock unit *F*. During which geologic time period were the sediments that formed rock unit *F* deposited?
24. What evidence indicates that the folded bedrock is older than fault line *XY*?
25. Identify *one* metamorphic rock that would likely form in layer *G* along igneous intrusion *A*.
26. On the cross section above, draw a dark line to indicate the most likely location of an unconformity.



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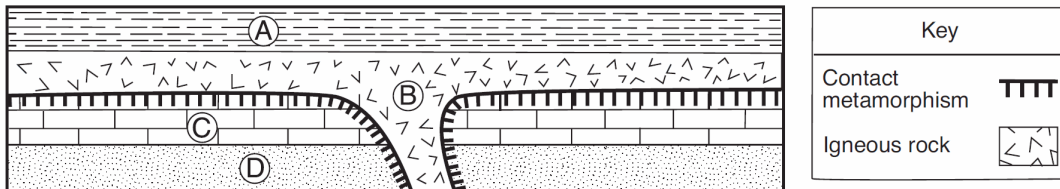
27. Which sequence shows the correct order of Earth's geologic time intervals from oldest to youngest?

- A) Archean → Mesozoic → Cenozoic → Paleozoic → Proterozoic
- B) Archean → Proterozoic → Paleozoic → Mesozoic → Cenozoic
- C) Cenozoic → Mesozoic → Paleozoic → Proterozoic → Archean
- D) Cenozoic → Paleozoic → Archean → Mesozoic → Proterozoic

28. Geologists have subdivided geologic time into units based on

- A) rock type
- B) fossil evidence
- C) erosion rates
- D) landscape development

29. The cross section below shows four rock units, *A*, *B*, *C*, and *D*.



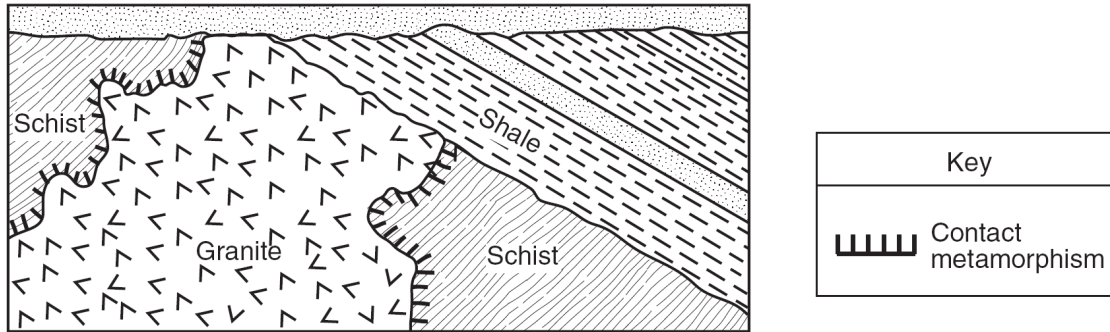
Which rock unit is youngest in age?

- A) *A*
  - B) *B*
  - C) *C*
  - D) *D*
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30. The geologic cross section below shows a complex structure containing a granite intrusion.



If the granite intrusion occurred 24 million years ago, what are the most probable ages of the schist and shale, in millions of years?

- A) schist – 25; shale – 23                      B) schist – 25; shale – 26  
C) schist – 23; shale – 25                      D) schist – 23; shale – 20
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