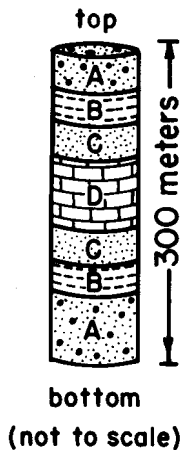1. The diagram at the right represents a core drilling in a region consisting of only four sedimentary rock layers, *A*, *B*, *C*, and *D*. Which geologic event could explain the order of the rock layers in the core drilling?

top

A
B
C
D
C
B
A

300 meters

bottom
(not to scale)

1) Volcanic activity caused rapid deposition of the sedimentary layers.
2) Large-scale erosion caused a gap in the time record.
3) Extensive folding caused the rock layers to overturn.
4) Intrusion of igneous material occurred sometime between the deposition of layer *A* and layer *D*.

2. Base your answer to the following question on the diagram below which represents a cross section of an eroded fold that has *not* been overturned.

KEY
[ ] SANDSTONE
[ ] LIMESTONE
[ ] SILTSTONE
[ ] SHALE
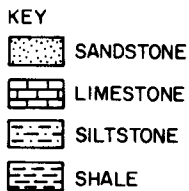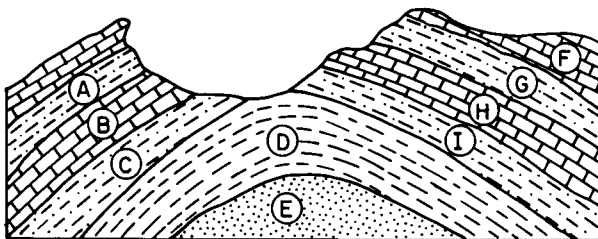
If rock layer *A* is of Devonian Age, rock layer *E* could be of

1) Triassic Age   3) Cambrian Age
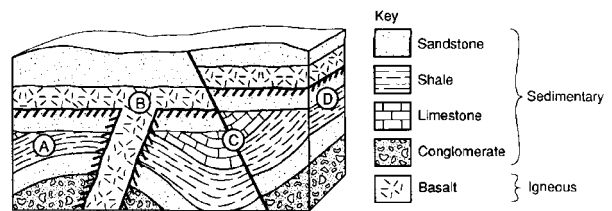2) Carboniferous Age 4) Tertiary Age

3. The age of an igneous intrusion is 50 million years. What is the most probable age of the rock immediately surrounding the intrusion?

1) 10 million years   3) 40 million years
2) 25 million years   4) 60 million years

4. The diagrams below show geologic cross sections of the same part of the Earth's crust at different times in the geologic past.

SEA LEVEL
A

SEA LEVEL
C

SEA LEVEL
B

SEA LEVEL
D
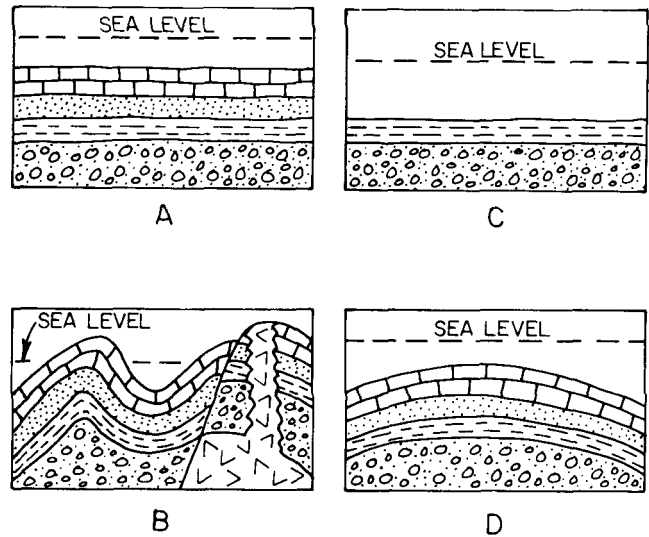
Which sequence shows the order in which this part of the crust probably formed?

1) $A \rightarrow B \rightarrow C \rightarrow D$ 3) $C \rightarrow A \rightarrow D \rightarrow B$
2) $C \rightarrow D \rightarrow A \rightarrow B$ 4) $A \rightarrow C \rightarrow B \rightarrow D$

5. Base your answer on the geologic cross section below.

Key
[ ] Sandstone
[ ] Shale   } Sedimentary
[ ] Limestone
[ ] Conglomerate
[ ] Basalt   } Igneous

Which geologic event occurred most recently?

1) folding at *A*   3) faulting at *C*
2) the intrusion at *B* 4) the unconformity at *D*

6. According to available fossil evidence, which set of events is listed in the correct order from earliest to most recent?

1) extinction of trilobites, extinction of armored fishes, extinction of dinosaurs
2) appearance of first corals, appearance of earliest insects, appearance of earliest reptiles
3) decline of brachiopods, appearance of earliest amphibians, appearance of earliest grasses
4) peak development of eurypterids, appearance of earliest birds, appearance of earliest chordates

7. The rocks 50 kilometers east of Buffalo contain many fossils of

1) birds   3) reptiles
2) mammals   4) fish

Earth History Review

Base your answer to the following question on the diagrams below which represent two rock outcrops found several miles apart in New York State. Individual rock layers are lettered, and fossils and rock types are indicated.
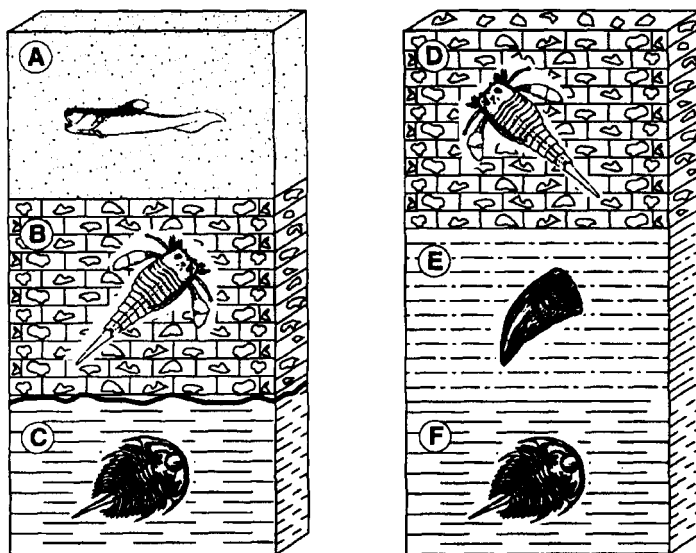
An unconformity (buried erosional surface) is represented by the interface between which two layers?
1) *A* and *B*   2) *B* and *C*   3) *D* and *E*   4) *E* and *F*

9. The three geologic columns below represent the rock layers in outcrops located several miles apart. The rock layers have not been overturned. Two different index fossils are shown.

Column I   Column II   Column III
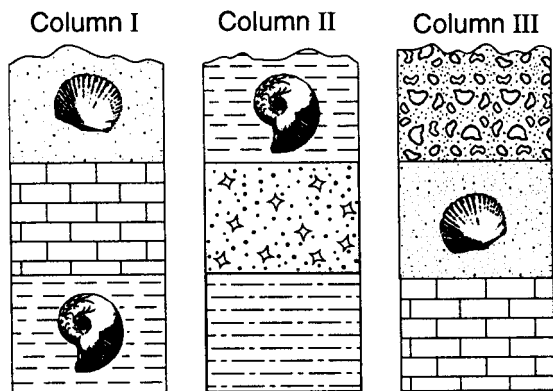
Of the rock layers found in these three outcrops, which layer was probably formed most recently?

1)   3)

2)   4)

10. Which statement correctly describes an age relationship in the geologic cross section below?
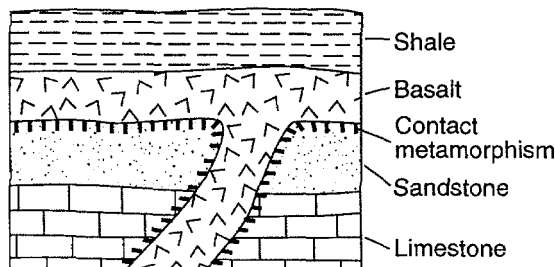
1)   The sandstone is younger than the basalt.
2)   The shale is younger than the basalt.
3)   The limestone is younger than the shale.
4)   The limestone is younger than the basalt.

11. 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?
1)   They have undergone glacial deposition.
2)   They were once covered by thick vegetation.
3)   They have undergone intense metamorphism.
4)   They were once covered by shallow seas.

12. Which characteristics of a fossil would make it useful as an index fossil in determining the relative age of widely separated rock layers?
1)   a wide time range and a narrow geographic range
2)   a wide time range and a wide geographic range
3)   a narrow time range and a wide geographic range
4)   a narrow time range and a narrow geographic range

Earth History Review

Base your answers to questions **13** through **16** on the block diagrams below, which represent three widely separated outcrops. All rock layers are sedimentary. No overturning has occurred. Layers labeled with the same letter are the same age.

Evansburg Outcrop   Smithtown Outcrop   Hiltonia Outcrop
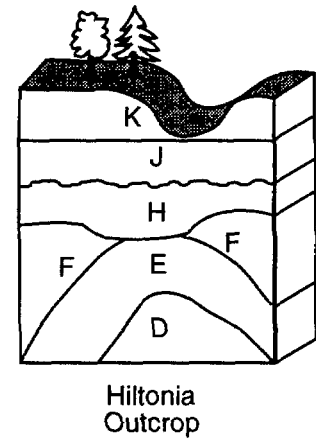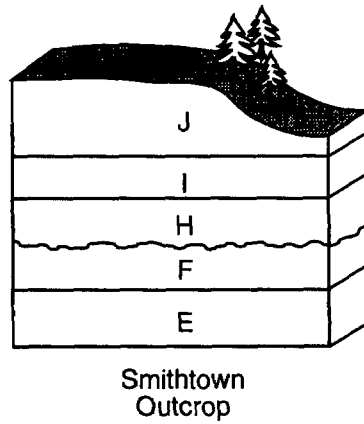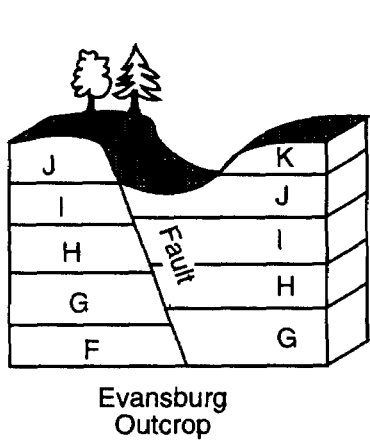
Layer *I* is of Permian age. Which fossil could be found in layer *H*?
1) early flowering plant   2) early human   3) early reptile   4) early dinosaur

The fault in the Evansburg Outcrop is younger than
1) *G*, only   2) *J*, only   3) *G* and *J*, only   4) *F, G, H, I,* and *J*

Which method would provide the most reliable evidence for the idea that layer *J* was deposited at the same time in each location?
1) measuring the percentage of the mineral cement in each *J* layer
2) measuring the thickness of each *J* layer
3) comparing the mineral composition of each *J* layer
4) comparing the fossils in each *J* layer

16. The diagram below represents a rock consisting of granite pebbles and sand grains cemented together.
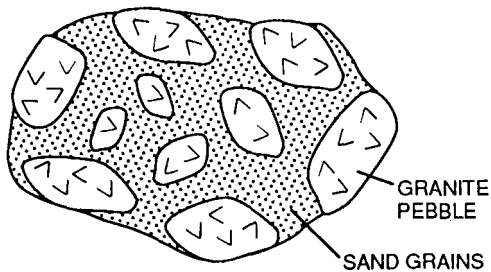
How does the age of the granite pebbles compare to the age of the rock itself?
1) The pebbles are younger than the rock.
2) The pebbles are older than the rock.
3) The pebbles are the same age as the rock.
4) The relative age of the pebbles cannot be determined.

17. At which location could a geologist find shale containing eurypterid fossils?
1) Old Forge   3) New York City
2) Syracuse   4) Long Island

18. Which rock is most likely the oldest?
1) conglomerate containing the tusk of a mastodon
2) shale containing trilobite fossils
3) sandstone containing fossils of flowering plants
4) siltstone containing dinosaur footprints

19. The geologic columns *A*, *B*, and *C* in the diagrams below represent widely spaced outcrops of sedimentary rocks. Symbols are used to indicate fossils found within each rock layer. Each rock layer represents the fossil record of a different geologic time period.


COLUMN A   COLUMN B   COLUMN C
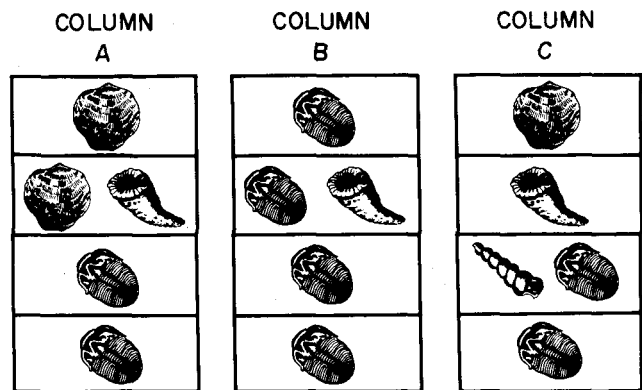
According to the diagrams for all three columns, which would be the best index fossil?

1)   3)

2)   4)

Earth History Review

20. Which statement about the species of animals and plants that lived on Earth in the past is best supported by the fossil record?
    1) Most became extinct.
    2) Most lived on the land.
    3) Most were preserved in metamorphic rock.
    4) Most appeared during the Cambrian Period.

21. Which pair of index fossils can be found in Ordovician bedrock?
    1)

    and

    2)

    and

    3)

    and

    4)

    and
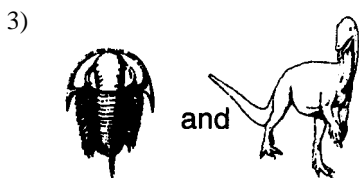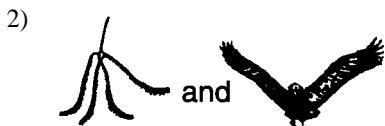
22. Widespread layers of volcanic ash deposits are useful to geologists because the deposits
    1) serve as time markers
    2) contain index fossils
    3) are used for carbon-14 dating
    4) show a time gap in the rock record

23. Which event occurred at the start of the Mesozoic Era?
    1) the extinction of the armored fishes
    2) the extinction of the mastodont
    3) the appearance of the reptile
    4) the appearance of the dinosaur

24. For which segment of the Earth's geologic history are fossils rarely found?
    1) Cenozoic   3) Paleozoic
    2) Mesozoic   4) Precambrian

25. Geologists have subdivided geologic time into units based on
    1) rock type   3) erosion rates
    2) fossil evidence   4) landscape development

26. Dinosaur footprints may be preserved in Triassic and Jurassic rock. In which section of New York State would these footprints most likely be found?
    1) northeastern   3) central
    2) southwestern   4) southeastern

27. Approximately what percent of geologic time since the estimated origin of the Earth is represented by the Precambrian Era?
    1) 37%   3) 67%
    2) 50%   4) 87%

28. The glaciers that shaped the landscape of New York State occurred at approximately the same time as the
    1) formation of the Taconic Mountains
    2) development of humans
    3) appearance of the first sharks
    4) extinction of the trilobites

29. Which geologic event occurred most recently?
    1) initial opening of the Atlantic Ocean
    2) formation of the Hudson Highlands
    3) formation of the Catskill delta
    4) collision of North America and Africa

30. A skull was discovered that has human characteristics and is about 2.8 million years old. Based on this information, during which epoch could early humans have existed?
    1) Pliocene   3) Oligocene
    2) Miocene   4) Eocene

31. Why are radioactive materials useful for measuring geologic time?
    1) The disintegration of radioactive materials occurs at a predictable rate.
    2) The half-lives of most radioactive materials are less than five minutes.
    3) The ratio of decay products to undecayed material remains constant in sedimentary rocks.
    4) Measurable samples of radioactive materials are easily collected from most rock types.

32. Samples of plant pollen are preserved in sediment deposited by the last glacial ice sheet in New York State. Which radioactive isotope is best for determining the age of the samples?
    1) potassium-40   3) uranium-238
    2) carbon-14   4) rubidium-87

33. A rock sample contained 8 grams of potassium-40 (K^{40}) when it was formed, but now contains only 4 grams due to radioactive decay. What is the approximate age of this rock?
    1) 0.7×10^9 years   3) 2.8×10^9 years
    2) 1.4×10^9 years   4) 5.6×10^9 years

Earth History Review

The diagrams below represent the rock layers and fossils found at four widely separated rock outcrops.

Outcrop 1	Outcrop 2	Outcrop 3	Outcrop 4
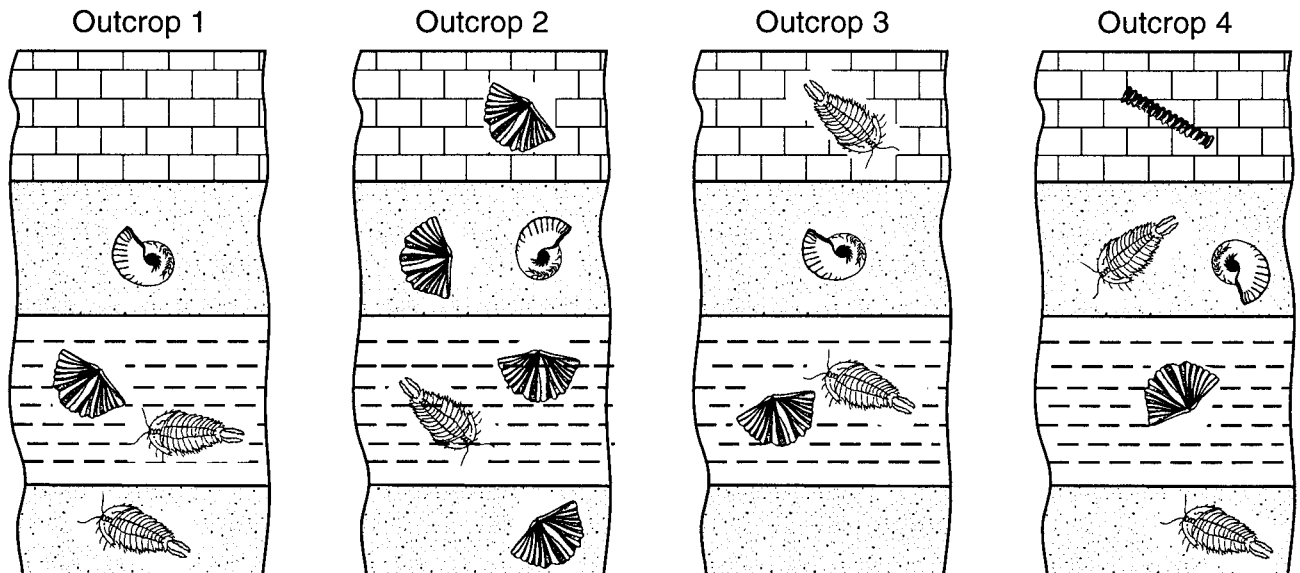
Which fossil appears to be the best index fossil?

1)   2)   3)   4)

The graph below shows the rate of decay of the radioactive isotope K-40 into the decay products Ar-40 and Ca-40.
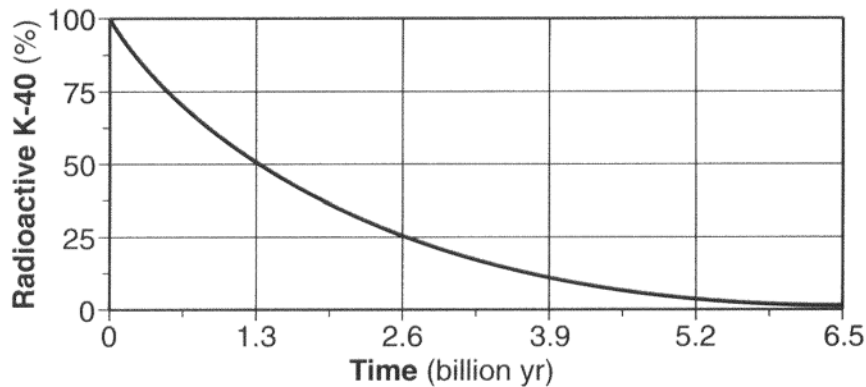
Analysis of a basalt rock sample shows that 25% of its radioactive K-40 remained undecayed. How old is the basalt?

1) 1.3 billion years   2) 2.6 billion years   3) 3.9 billion years   4) 4.6 billion years

---

36. What is the approximate age of an igneous rock that contains only one-fourth of its original potassium-40 content due to radioactive decay?

1) 1.3×10^9 years   3) 3.9×10^9 years
2) 2.6×10^9 years   4) 5.2×10^9 years

37. Carbon-14, an isotope used to date recent organic remains, would most likely be useful in determining the age of a fossil

1) trilobite   3) armored fish
2) *Coelophysis*   4) Beluga whale

Earth History Review

38. The graph below shows the percent remaining (not decayed) of the original amount of carbon-14 at different times (*A*, *B*, and *C*) during radioactive decay. How many half-lives of time are represented by point *B* along the time axis?
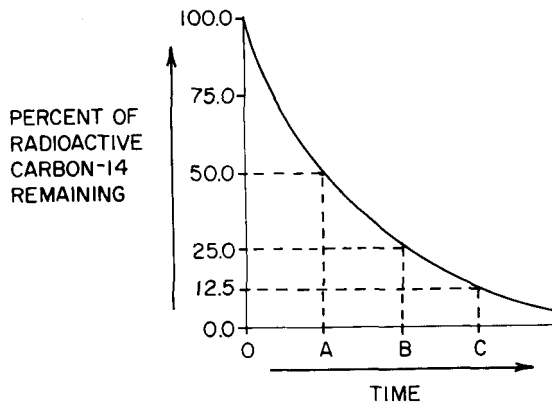
1) 1 half-life
2) 2 half-lives
3) 3 half-lives
4) 4 half-lives

39. The diagram below represents a clock used to time the half-life of a particular radioactive substance. The clock was started at 12:00. The shaded portion on the clock represents the number of hours one-half of this radioactive substance took to disintegrate.
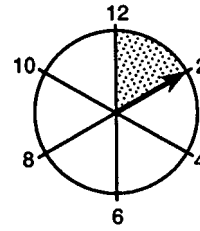
Which diagram best represents the clock at the end of the next half-life of this radioactive substance?

1)   3)

2)   4)

40. The diagram below represents the present number of decayed and undecayed atoms in a sample that was originally 100% radioactive material.

Key
☐ Decayed atoms
▦ Undecayed atoms
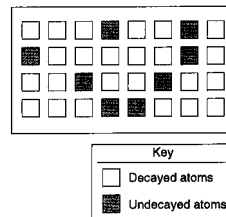
If the half-life of the radioactive material is 1,000 years, what is the age of the sample represented by the diagram?

1) 1,000 yr   3) 3,000 yr
2) 2,000 yr   4) 4,000 yr

Earth History Review

1. ___3___

2. ___3___

3. ___4___

4. ___3___

5. ___3___

6. ___2___

7. ___4___

8. ___2___

9. ___4___

10. ___2___

11. ___4___

12. ___3___

13. ___3___

14. ___4___

15. ___4___

16. ___2___

17. ___2___

18. ___2___

19. ___4___

20. ___1___

21. ___1___

22. ___1___

23. ___4___

24. ___4___

25. ___2___

26. ___4___

27. ___4___

28. ___2___

29. ___1___

30. ___1___

31. ___1___

32. ___2___

33. ___2___

34. ___3___

35. ___2___

36. ___2___

37. ___4___

38. ___2___

39. ___2___

40. ___2___