

Geology exam 2- questions flashcard



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What are some of the events that occurred around the 12, 000-11, 500 years ago in North America? Presence of early humans in America, what is sometimes referred to as Clovis Culture; The extinction of large megafauna such as the Woolly Mammoth, Irish Elk, and the Giant Beaver. best explanation of the term “ megafauna”? Terrestrial species that are typically greater than 44 kg and most likely larger than modern relativesstatement best describes the “ Overkill” hypothesis of what happened to the Pleistocene megafauna? The onset of a cooler climate during the Younger Dryas (~ 12, 900 years ago) caused the extinctionstatement best describes the “ Overkill” hypothesis of what happened to the Pleistocene megafauna? Human arrival in regions such as N. America and Northern Europe increased the amount of hunting of megafaunaIn 2010, researchers in Australia interpreted the demise of that continent’s megafauna to humans because... improved dating techniques show that large mammals and the first human populations in Australia did not overlap as long as previously thought. In August 2010, other researchers argued that climate change was the primary reason for the extinction of the megafauna. What were their interpretations? After the last great glaciation, 21, 000 years before present (b. p.), there as decrease in grasslands that many of the megafauna depended on. The study completed in 2011, by Lorenzen and other (summarized in “ Unraveling the causes of Ice Age Extinction) supports which hypothesis? A combination of human and climatic factorsWhich of the following is evidence for widespread glaciation during the time of the Pleistocene?

Question options:

A)Erratics in Washington and Massachusetts

B) Terminal moraines in Ohio, Wisconsin and Minnesota

C) Striations in Central Park in New York City

D) Choices B and C

E) All of the above

E All of the above What evidence has been used to reconstruct the extent of glaciers from 1.8 million to 5,000 years ago? 1. Shifts in fossil pollen species; 2. The abundance of ice-raft debris or drop stones; 3. Oxygen isotope ratios in fossil shells; 4. Unsorted, unlayered deposits of boulders, pebbles, and sand in moraines Pleistocene-aged drumlins in upstate New York and Wisconsin are interpreted to have formed by the deposition and erosion of material by melting glacial ice based on the comparison to modern observations on the melting glaciers of Iceland forming the same features. This is an example of applying: (a principle) actualism During the last glacial maximum, 20,000 years ago,

Question options:

A) ice covered the earth's entire northern hemisphere to the equator

B) global sea level was only about 10 m lower than it is today

C) on all continents, climate was cooler and drier than it is today

D) ecosystems were shifted northward compared to today.

C. on all continents, climate was cooler and drier than it is today Based on the location of glacial evidence in North America, which statement best

describes the furthest southern extent of glaciers during the Pleistocene epoch?

Question options:

A)Glaciers extended as far south as Florida and Georgia

B)Glaciers extended as far south as Ohio and Illinois

C)Glaciers were present only in Canada

D)It is not possible to identify where glaciers were during the Pleistocene

B; extended as far south as ohio and illinois
During times of widespread glaciation, what happens to humidity in general? Air becomes less humid (holds less water vapor)
How much cooler were global temperatures during the last glacial maximum than today's temperatures? Global temperatures were on average between 2-9°C cooler during the last glacial maximum compared to today. What happened to global sea levels during a glacial maximum? Sea level was about 110 meters lower during the last glacial maximum compared to today. During extensive glaciation, how did vegetation patterns change?

Question options:

A)Dry environments such as deserts and semi-desert and dry grassland expanded.

B)Some areas that were tropical rain forests in warmer times are replaced by grasslands and savannahs.

C)Ecosystems shifted to southern latitudes.

D)Choices A and B

E)Choices A, B, and C.

EHow was species migration affected by extensive glaciation?

Question options:

A)Animal species tended to move south, in many cases farther south than today's current distribution

B)Animal species tended to move north, in many cases farther north than today's current distribution

C)Animals could migrate between continents due to the presence of land bridges or land corridors.

D)Choices A and C

E)Choices B and C.

DWhen we say that some geologic feature or measurement is a “ proxy” for past global climate, we mean that the feature or measurementis a substitute for a direct observation of past global climateGlacial tills deposited across large parts of North America tell us that glaciers were once widespread, but otherwise their usefulness as a proxy for Pleistocene glaciation is not very good. Why?

A)there are no positive or negative feedbacks related to glacial tills

B)all proxy records are based on isotopes of oxygen, not sediments

C)each glacial advance erodes previously deposited tills, thus there are no till deposits for the older Pleistocene glacial events

D)tills form continuously but the best proxy records will form discontinuously

E)Glacial till are useful as a proxy of Pleistocene glaciation

i think CWhat are some examples of proxies that can be used for researching climate change during the Pleistocene epoch?

Question options:

A)Ratio of warm marine to cold marine fossil shells

B)Concentration of gasses in ice cores from Greenland or Antarctic

C)Ratio of elements such as Mg (magnesium) and Ca (calcium) in fossil shells.

D)Choices A and B

E)Choices A, B, and C

EWhat sample is analyzed to obtain the oxygen isotopic information that is used as a proxy for climate change in the Pleistocene?

Question options:

A)the relative proportions of ^{18}O and ^{16}O in deep-sea ocean water

B)the relative proportions of ^{18}O and ^{16}O in the shells of deep-sea fossils

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C)the relative proportions of ^{18}O and ^{16}O in glacial ice

D)the relative proportions of ^{18}O and ^{16}O in the deep-sea sediments, such as clay

B)How does solar energy interact with Earth's surface and atmosphere?

Question options:

A)Some energy is reflected back to space

B)Some energy is absorbed by the atmosphere, biosphere, oceans & land.

C)Some energy is trapped and reemitted by greenhouse gasses

D)Choices A and C only

E)All of the above

E)definition of an albedoAlbedo is the measurement of reflectivity of sunlight of a surfaceWhich of the following events could change the albedo of an area?

Question options:

A)Change in vegetation cover

B)An increase or decrease in global cloud cover

C)Changes in locations of continents and oceans due to plate tectonics

D)Choices A and B only

E) Choices A, B, and C.

E) Which statement best distinguishes between positive feedback and negative feedback?

Question options:

A) Positive feedbacks happen in warm climate conditions; negative feedbacks occur in colder climate conditions.

B) Positive feedbacks reinforce (i. e. amplifies) the changes that are happening; negative feedbacks oppose (i. e. diminish) the changes that are occurring.

C) Positive feedbacks oppose (i. e. diminish) the changes that are occurring; negative feedbacks reinforce (i. e. amplifies) the changes that are happening

D) Positive feedbacks occur in colder climate condition; negative feedbacks occur in warm climate conditions.

B) Increased snow cover due to a cooling climate increases the earth's albedo.

This is an example of what type of feedback loop? Positive
When the atmosphere warms, it can thus hold more water vapor (4% more per degree of warming) thus more clouds, thus more reflectance of incoming solar radiation, which retards the warming trend. This is an example of what type of feedback loop? Negative
Which of the following would NOT explain a cooling trend in the Earth's climate?

Question options:

- A)an increase in global cloud cover
- B)a decrease in solar radiation
- C)an increase in the area of snow cover
- D)an increase in the eccentricity of the earth's orbit about the sun
- E)an increase in atmospheric CO₂, methane, and/or water vapor

E Why can the influx of large amounts of fresh glacial melt water in the North Atlantic slow or even stop the oceanic conveyor system? it lowers the salinity of the surface water, which decreases that water's density and it does not sink as readily All but one of the following is a reason why we think the ocean plays a role in global climate change. Which one does NOT BELONG?

Question options:

- A)the oceans store more heat than the atmosphere
- B)changes in ocean circulates can occur independent of the Milankovitch orbital factors and at very short time scale
- C)changes in the albedo of tropical ocean waters are common occurrences
- D)changes in how the oceans circulate and redistribute heat can occur fairly rapidly

C The onset of Pleistocene glaciation has been linked to the development of the Isthmus of Panama. What is the connection between that tectonic event in Central America and development of ice sheets in the Arctic? It changed

ocean circulation patterns and thus how & where heat was redistributed by the oceans in the northern hemisphere. What is the hypothesis presented in the article “The Great Meltdown” on why are there major glacial meltdowns every 100,000 years at the end of the Pleistocene?

Question options:

A) The 100,000 year cycle corresponds with the 0.2% change of incoming solar energy due to eccentricity of earth's orbit which melts some glacial ice.

B) There is a major change in ocean circulation that promotes greater amounts of circulation in the ocean conveyor in the Northern Hemisphere.

C) There is an increase in CO₂ released by warmer southern oceans due to a change in ocean circulation.

D) Choices A and C

E) All of the above

D) What is the proposed hypothesis presented in “The Great Meltdown” on why glaciers did not melt every time there was an increase in summer sunlight due to obliquity from 350 thousand years ago till the present? The ice sheets would be more susceptible (i. e. fragile) when they at their greatest sizes. Their great weight forces them to sink and be exposed to warmer temperatures at lower altitudes. According to The Great Meltdown, why would the increase of freshwater in the North Atlantic due to melting of glacial ice cause an increase in the amount of atmospheric CO₂? Shutdown of the North Atlantic Ocean conveyor means more heat is in the southern

oceans. In “ Blame the Corals” section of “ The Great Meltdown” article, what type of feedback is the role of corals in atmospheric CO₂: formation of carbonate coral skeletons releases CO₂, which increase temperature and a rise in warm shallow seas which are ideal for coral growth? Positive Which of the following is a TRUE statement that indicates the Cretaceous was characterized by a greenhouse climate?

Question options:

- A) Cretaceous glacial deposits are restricted to just the Antarctic continent
- B) Cretaceous ocean water temperatures at the poles and equator were much warmer than today
- C) Cretaceous coal deposits & subtropical plant and dinosaur fossils only in the tropics
- D) Global occurrence of deep-sea Cretaceous shales that lack any organic matter

B Why do we think the Earth’s albedo was lower in the Cretaceous than it is today? More forests, coal deposits, and no ice at high latitude In the Cretaceous has a low albedo, which is the most likely feedback cycle that would be occurring at high latitudes?

Question options:

- A) The positive feedback cycle of low albedo → higher absorption → increase atm. temperatures → low albedo

B)The positive feedback cycle of low albedo → higher reflectance → increase atm. temperatures → low albedo

C)The negative feedback cycle of low albedo → higher absorption → increase atm. temperatures → low albedo

D)The negative feedback cycle of low albedo → higher reflectance → increase atm. temperatures → low albedo

A)What types of rocks and geological deposits could potentially be Cretaceous in age?

Question options:

A)Coal

B)Black, organic rich shales

C)Tills

D)Choices A and B

E)Choices A, B, and C

D)Why did the Cretaceous have a circum-equatorial surface current circulation pattern? because there was no isthmus of panama yet, europe is underwater in a shallow sea and arabia is further south than todayWhich of the following would characterize a circum-polar ocean circulation system?

Question options:

A)warm ocean at the poles

B)active deep water circulation

C)wet Earth (lots of moisture in the atmosphere and ample rainfall)

D)efficient redistribution of heat

BIf the ocean is in a circum-equatorial circulation system, what would you predict for the amount of vertical mixing between deep and surface waters?

Sluggish and minimal mixing between deep and surface watersWhich of the following statements does NOT characterize the Cretaceous?

Question options:

A)lots of volcanic CO₂ emissions associated with abundant sea-floor spreading

B)high latitude sea-surface temperatures of 15 °C to 20°C

C)formation of coal swamps at latitudes above 60°

D)cold saline ocean water sinking in the oceans

E)abundant deposition of oceanic black shale

DWhat factors would allow for the Cretaceous to develop into a Greenhouse world?

Question options:

A)The low albedo in the high latitudes meant more energy(“ heat”) absorption

B)The efficient distribution of heat from the equator to the poles by the surface ocean circulation

C)An increase in greenhouse gases such as CO₂, due to increase volcanism at mid-oceanic seafloor spreading.

D)Choices A and C only

E)Choices A, B, and C.

D)When there is an increase of CO₂ in the atmosphere due to volcanic degassing, what will happen regarding feedback cycles? inc. in CO₂ in atmosphere, causes an inc. in temp. this increases ocean temp. resulting in release of more CO₂ into atmosphere Why do black, organic rich shales form abundantly in the Cretaceous (142 -65 million years ago) and not the Pleistocene (2 mya till today). Sluggish vertical ocean circulation means less oxygen in the deep sea, so material cannot decompose. Which of the following reservoirs is NOT included in the short-term carbon cycle?

Question options:

A)Atmosphere

B)Oceans

C)Biota

D)Shale

E)Soil/litter

If organic carbon (CH_2O) is removed from the short-term carbon cycle and placed into the “sedimentary organic carbon” reservoir of the long-term carbon cycle, where exactly is that carbon? it is in coal, black shale, or oil. How can carbon be transferred between the short-term carbon cycle into the long-term carbon cycle? The deposition of organic rich sediment.

WHAT IS THE KEY CONCEPT THAT MAKES IT POSSIBLE FOR US TO MEASURE THE PRESENCE OF ICE SHEETS USING OXYGEN ISOTOPES? ice concentrates the lighter isotope of oxygen ^{16}O which causes the ocean to experience an increase in the relative proportion of the heavier isotope of oxygen ^{18}O . An increase in O^{18} ratio means what in terms of positive or negative and if glaciers were growing or melting? Positive-glaciers were growing. sample analyzed to obtain info presented in the oxygen isotopic profiles? relative proportions of ^{18}O and ^{16}O in shells of deep sea fossils. the tilt of earth's axis that cycles between a minimum value of 22.5 and max value of 24.5 degrees every 41,000 years is what? obliquity. the wobble of earth's axis between the n. star and vega that completes a cycle about every 20,000 yrs is what? precession. how could changes in earth's tilt influence global climate? a min. angle of tilt causes high lat. to receive less sunlight during summer, causing an inc. in glaciers. what would result in a tilt of 24.5 degrees? high lat. receive more direct sunlight during summer, causing warmer summer temps; decrease in accumulation of glaciers; increase in the difference in seasonal temps. What is the relationship between a facies and a depositional environment? facies is what is produced in a specific geographic setting (i.e., the environment). If a rock is poorly sorted, this means the rock contains: a wide size range of clasts. Which of the following is a reasonable interpretation of the environmental significance of an attribute of a sedimentary facies?

Question options:

- A) All fossils indicate that a sediment was deposited on land.
- B) Large cross beds in a well-sorted sandstone usually indicate deposition by wind.
- C) Mudcracks are formed in deep-water environments where sand and mud can be deposited in thin layers
- D) Large, angular, poorly sorted clasts reflect a large amount of transport.
- E) None of these

BEach of the following represents a different facies formed in a different environment – (1) unsorted conglomerate, (2) poorly sorted conglomerate, and (3) sorted conglomerate. Sorting is giving information about:

Question options:

- A) oxygen levels
- B) continental vs. marine processes
- C) the role of ancient organisms in the depositional environment
- D) the change in energy between transport and deposition

DWhich of the following would NOT be a characteristic used to describe a sedimentary facies?

Question options:

A)Type of bedding

B)Sedimentary structures such as mudcracks

C)Geologic age

D)Rock type

E)Color

CWhen interpreting depositional environments, what is the significance of plant roots? they only occur in continental environmentsI can take you on a field trip and show you four different layers of rock: (i) some conglomerates that are red in color, (ii) fine sandstone with very large cross bedding that is a pale red color, (iii) a light gray shale and (iv) and a light gray limestone. What do these color differences tell us about oxygen in the depositional conditions of these four layers?

Question options:

A)Oxygen was present in all four environments that produced these four different facies

B)Oxygen was present in the environments that generated the conglomerate and sandstone, but it absent in the environments that formed the shale and limestone

C)Oxygen was absent in all four environments that produced these four different facies

D)The information provided cannot tell us anything about oxygen levels.

AThe large cross beds in these rocks indicate that the sediment was deposited

Question options:

A)deep in the ocean

B)in a lake with a sloping bottom

C)in a tidal flat

D)by an air or water current flowing in a single direction

DHow does a graded bed form? a gradual decrease in the strength of the current over timeWhat is the significance of the bi-directional cross bedding? it means opposing directions of sand movement at shorelinesWhich of the follow sedimentary rock types can be interpreted in terms of its ancient depositional environment based on rock type alone?

Question options:

sandstone

shale

coal

conglomerate

CCoastal dunes and desert dunes will both be made up of very well sorted sandstones with cross bedding. How do we tell them apart in the rock record?

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Question options:

A) You cannot tell them apart. It is necessary to look at the facies above and below it in order to tell.

B) Coastal dunes will be associated with marine shales whereas desert deposits will be associated coals

C) Coastal dunes have bits of marine fossils and are often white in color; desert dunes are red in color and rarely have fossils

D) Coastal dunes have no fossils with parallel beds; desert dunes have fossils with uni-directional cross beds

C This sandstone includes shells of marine creatures that live in shallow water. What is the most likely environment in which it formed, from the choices down below?

Question options:

A) desert dunes

B) river

C) beach next to a sea

D) deep-water turbidity currents

C Which environment is most likely to deposit siltstone or shale?

Question options:

A)windy desert

B)beaches and shorelines

C)bottoms of lakes

D)channel of a river

CIn what geologic era would Earth have the following characteristics and conditions: swamps at high latitudes, circum-equatorial surface ocean currents; deep sea black shales; and dinosaurs. MesozoicIn what geologic era would Earth have the following characteristics and conditions: megafauna such as mammoths and mastodons present; the first arrival of humans in N. America; alternating glacial and interglacial periods? CenozoicWhich statement best describes what geological time frame the Permian is?

Question options:

A)It is the youngest geologic period in the Paleozoic Era

B)It is between about 299 to 251 million years ago

C)It is time when dinosaurs roamed the Earth.

D)Choices A and B only

E)Choices A, B, and C.

DThe Lykins Formation in Boulder was formed by a Permian tidal flat with evaporite deposits such as gypsum and halite. What does this suggest about the environmental conditions in ancient Boulder during the Permian?

Question options:

- A) Conditions were warm and very humid
- B) Conditions were cold and somewhat dry
- C) Conditions were hot and extremely arid
- D) Conditions were freezing and humid.

C) The Fountain Formation is interpreted to be the result of a steep mountain stream. What topography was being eroded that provided the sediment in that steep mountain stream?

Question options:

- A) Ancestral Rockies
- B) Modern Rockies
- C) Canadian Rockies

A) What can explain why the Permian period was so dry, with widespread evaporite deposition?

Question options:

- A) Overall the global temperature was very cool and cooler air cannot hold much water vapor
- B) The great size of the supercontinent Pangaea limited the amount of water vapor that could get into the continental interior

C) A slow vertical ocean circulation means that not as much ocean water can evaporate into the atmosphere

B) What does the presence of the black shales at the end of the Permian suggest about vertical ocean circulation?

Question options:

The oceans slowed down in vertical circulation and became enriched in oxygen

The oceans sped up in vertical circulation and became depleted in oxygen

The oceans slowed down in vertical circulation and became depleted in oxygen

The oceans speed up in vertical circulation and became enriched in oxygen

C) How did flora change during the Permian time?

Question options:

A) Plants that were typically found at higher latitudes were restricted to locations closer to the equator.

B) Plants that thrived in humid environments gave way to plants that do better in drier conditions, such as conifers.

C) Swamps became prevalent in the Permian, covering most of Pangaea.

D) Choices A and B

E)Choices A and C

BWhich of these is NOT a characteristic of a therapsid, a Permian terrestrial vertebrate?

Question options:

A)They are a type of primitive reptile

B)They had complex jaws with specialized teeth

C)Their legs were position more underneath the body, not out to the sides

D)Physiology and bone studies suggest that they were warm-blooded

AWhat are the characteristics of a pelycosaur?

Question options:

A)They were dinosaurs

B)They were carnivorous reptiles

C)They had a fin back or sail on their back, for example Dimetrodon

D)Choices A and C

E)Choices B and C

EWhich statement best finishes this sentence: In general extinctions.....

Question options:

A)A. are short periods of time represented by greatly accelerated rates of death

B)A. are a normal process on time scales of a few millions of years i. e. background extinctions

C)are most likely to affect small carnivores, non-tropical species, and generalists (species capable of living in many types of settings)

D)are specific points in the geologic past when many organisms die out over a very short period of time

BHow does a mass extinction differ from background extinction?

Question options:

A)Only the largest of the species within a group of animals goes extinct in a mass extinction

B)When large numbers of a wide variety of genera, families, and groups of animals go extinct within a short geologic time, e. g. less than a couple of million years that is a mass extinction

C)Mass extinctions only occur due to some catastrophic, fast event such as a meteor impact or volcanic eruption

D)Mass extinctions typically only affect one type of animal, such as coral or specialized predators.

BWhich of the following statements about the fossil record is NOT TRUE?

Question options:

A) In the early Paleozoic, the diversity of shelled invertebrates increased dramatically then leveled off into a stable plateau

B) Invertebrates, such as clams and corals, were not affected by mass extinctions of life

C) The number of families that went extinct at the end of the Mesozoic was greater than the number of families that went extinct at the end of the Paleozoic.

D) Rates of extinction, like other geologic rates, can vary over time

C) What was the effect of the Permian extinction on global ecosystems?

Question options:

A) There was minimal impact on marine ecosystems, most of the animals that went extinct happened on land.

B) Only the highly specialized therapsids went extinct, animals such as simple corals and insects were not affected.

C) The Permian extinction devastated the marine ecosystem, especially corals, and both plants and animals on land as well.

D) Dinosaurs were victims of the Permian extinction

C) According to Stanley, what is the general theme that is shared among the multiple hypotheses on what caused the Permian Mass extinction?

Question options:

A)Global warming due to higher amounts of CO₂ in the oceans and atmosphere

B)The large size of Pangaea severely affected ocean and wind currents

C)The rise of mammalian-like therapsid predators decimated Paleozoic ecosystems.

D)Catastrophic event such as volcanism and meteor impacts occurred at a high frequency at the end of the Permian.

A)Which of these is NOT a hypothesis summarized by Stanley as to the cause of the Permian mass extinction?

Question options:

A)Oxygen poor waters upwelled from the deep sea suffocating shallow marine organisms.

B)Large amounts of carbon dioxide from the deep sea rose into the shallow sea poisoning shallow marine life.

C)The stagnant deep oceans experienced a buildup of toxic hydrogen sulfide that belched into the atmosphere and oceans.

D)It was just too hot.

E)All of these are current hypotheses about what was the kill mechanism for the Permian extinction

EWhat are some concerns that Stanley points out about the hypothesis of CO₂ concentrations from deeper water upwelling to the surface and poisoning shallow marine life?

Question options:

A)This would occur at a time where we have evidence that there was minimum mixing between shallow and deep ocean waters.

B)This would not explain the extinction of land plants, which would benefit from CO₂.

C)CO₂ is not known to be lethal, it mainly just increases temperature

D)Choices A and B

E)Choices A and C

DAccording to a study in 2012 by Clapham and Payne and reported in the New York Times, what types of marine animals were most susceptible to extinction in the Permian? (pdf of article is in D2L)

Question options:

A)Marine animals that were specialized predators

B)Marine animals that were the largest in size for their group

C)Marine animals that had calcium carbonate shells or skeletons

D)Marine animals that lived in tidal flats only

In the same study highlighted in the New York Times, what is the hypothesis on why marine animals went extinct in the Permian?

Question options:

A) They were too widely dispersed in the oceans and too many for the oceans to support

B) There was a lack of dissolved oxygen in ocean water at the same time there was an excess of carbon dioxide

C) Hotter water temperatures and higher acidity levels of ocean waters hampered the formation of calcium carbonate shells (CaCO_3).

D) Choices B and C only

E) Choices A and C only

D) What are the similarities between what we know about global conditions at the end of the Permian and today?

Question options:

A) There were high amounts of CO_2 being added to the oceans and atmosphere

B) There was a trend for ocean acidification, which strongly affected corals

C) There were similar surface ocean currents

D) Choices A and B only

E) Choices A, B, and C.

ASK TEACHER What was new about the research completed by Sun in his 2012 study about temperature and climate from the end of Permian to the beginning of the Triassic? (Pdf of the story is in D2L- Permian Tropical Collapse).

Question options:

A) Sun was the first to take into account the effects of the carbon cycle on the climate of Permian

B) Sun was the first to use oxygen isotopes to determine past temperatures

C) Sun was the first to show that surface water temperature can exceed 30°C (86°F)

D) Sun was the first to create a climate model of the Permian

C What does Sun imply in the interview about his 2012 study about what the tropic region would like after the Permian Extinction? (Pdf of the story is in D2L- Permian Tropical Collapse).

Question options:

A) There would be abundant plants growing in the tropic region because it would be wetter

B) The sea surface temperature would be too hot for phytoplankton to survive

C) There would be no marine fish or reptiles in the area due to extreme heat

D) Choices A and B

E) Choices B and C

While on vacation you make an observation that the beach sands are white in color and are rounded, well sorted sand grains. Also notice that many other beaches have white, well sorted and rounded sand grains and begin to start brainstorming potential hypotheses to explain these observations. What technique are you using? a. actualism b. deductive reasoning c. gradualism d. inductive reasoning e. uniformitarianism

Inductive reasoning

For the majority of the class we will be using the inductive method to interpret geologic history.

What is the first step of this approach? a. forming a hypothesis b. making observations c. identifying the theory that will be tested d. making conclusions or confirmations

making observations

3. In the field you identify an unlayered, unsorted conglomerate that looks identical to an unlayered, unsorted conglomerate that you know was formed by a modern glacier. Which of the following is the best choice about interpreting this conglomerate identified in the field?

A. That the rate of deposition of the conglomerate by the glacier must be the same as the rate of glacial deposition today because of the valid assumption of uniformity of rates

B. You cannot interpret anything about this conglomerate because no one was around to see how it formed.

C. Since the conglomerate in the field looks identical to a known glacial conglomerate, we can interpret that it was formed by a glacier because of the assumption that natural geologic processes work the same in the present as they did in the

past. D. Choices A and C are both valid. cWhich of the following is a TRUE statement regarding earth history? A. Geologic history is complex even though the laws of nature have not changed through timeB. All geologic events which occurred in the past are preserved in the rock recordC. Rates at which geologic processes occurred in the past were the same as the rates observed todayD. The scale of geologic processes and events has not varied through timebWhich of the following rocks/ products would provide evidence or information that would support Cuvier's hypothesis of Catastrophism? A. A pile of sand 10's of meters thick in Mississippi that was deposited by a meandering river over a million yearsB. Layers of ash and cooled lava flows in Iceland in 1973C. A metamorphic rock in Rocky Mountain National Park with alternating light and dark colored bands. D. Examples A and CE. All of the examplesbWhich of the following rocks/ products would provide evidence or information that would support Hutton's hypothesis of Gradualism? A. A pile of sand 10's of meters thick in Mississippi that was deposited by a meandering river over a million yearsB. Layers of ash and cooled lava flows in Iceland in 1973C. A metamorphic rock in Rocky Mountain National Park with alternating light and dark colored bands. D. Examples A and CE. All of the examplesdWhich of the following is NOT in Lyell's hypothesis of Uniformitarianism, according to Stephen Jay Gould? A. Physical natural laws, such as gravity, do not change over time (Uniformity of Natural Laws)B. Geologic process occur today in the same way as they did in the past (Uniformity of Process)C. That the same chemical elements that occur today must have also occurred in the past (Uniformity of Chemistry)D. The rates of geological processes are slow and do not vary over time (Uniformity of Rate)E. All rocks, biology, and other features of earth do not change over

time (Uniformity of Configuration)cWe can use fossil assemblages to subdivide the geologic past into increments of relative time because

Question options:

- A)of radioactive dating techniques
- B)sedimentary rocks are all deposited originally horizontal and laterally continuous
- C)fossils assemblages have changed through time in an irreversible manner
- D)fossils are highly unusual features of sedimentary rocks

cWhich of the following collection of fossils would be most useful for determining the age of a section of rocks?

Question options:

- A)Fossils that are easily visible and distinctive
- B)Fossils that are widely distributed across different parts of Earth
- C)The fossil of a family of creatures that lived unchanged for a very long time
- D)All of these choices
- E)Choice of A and B only

eWhich of the following statements best describes how the order of the Geologic Time Scale was developed?

Question options:

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A)Igneous rocks and volcanic rocks were dated using potassium radioactive isotopes

B)Through the correlation of rock layers using Steno's laws

C)By compiling a master stratigraphic column using principles of biostratigraphy and faunal succession

D)By applying relative ordering principles to explain a rock exposure

aHow can fossils be used to determine when in the geologic time scale a sedimentary rock formed?

Question options:

A)Identifying the type of fossil can place the deposit in a geologic era or period

B)Groups of fossils in a deposit can indicate a smaller window of time than all species were concurrent (i. e biozone)

C)All fossils can be a clue as to the type of environment (e. g. marine vs. land)

D)Choices A and B

E)Choices A, B, and C

dWhich of the following statements is correct?

Question options:

A)Index fossils must have very long geologic ranges

B)Index fossils must have a wide geographic range

C)Biozone boundaries must correspond to lithostratigraphic boundaries

D)Time units are defined by rock type

E)Choices A and B

bWhat is being measured in radiometric dating is:

Question options:

A)The time when the radiometric isotope formed

B)The time of crystallization of a mineral containing an radioactive isotope

C)The amount of the parent isotope only in the present

D)When the dated mineral became part of a sedimentary rock

bWhich of the following is NOT something we can learn by determining isotopic ages?

Question options:

A)The age of a volcanic eruption

B)The age when a rock is uplifted to the surface

C)the age of material from which igneous clasts in a sedimentary rock were derived

D)the cooling history of a magma by using different types of isotopic ages

E)we can determine all of these

eThe term half life represents the time it takes:

Question options:

A)to dissolve half of the atoms in the lattice

B)for the parent atoms to decay into atoms half their original size

C)for half of the parent atoms to decay into daughter atoms

D)for the Sun to decrease its size by 50 percent

cUranium 35 decaying into Lead 207 is an example of a long-lived radiometric isotope pair (half life is 704 million years). Which of the following samples would have the oldest calculated age?

Question options:

A)15% of Lead 207 in rock A

B)57% of Lead 207 in rock B

C)15% of Uranium 35 in rock C

D)57 % of Uranium 35 in rock D

clf an igneous rock started with 1, 000 atoms of a parent isotope but now contains 250 atoms, how many half lives have passed?

Question options:

A)0. 25 half lives

B)0. 5 half lives

C)1 half lives

D)2 half lives

E)There is no way to tell.

dlf a flake of biotite within a sedimentary rock (such as a sandstone) is radiometrically dated, the date obtained indicates when:

Question options:

A)the biotite crystals is formed

B)the sedimentary rock formed

C)the parent radioactive isotope formed

D)the daughter radioactive isotope formed

E)none of the above choices

aThe age of which of following geologic events could be determined through the use of radiometric dating only?

Question options:

A)Cooling of a magma chamber

B) Metamorphosis of a rock at great depth

C) Deposition of sediment in a shallow marine environment

D) Choices A and B

E) Choices A and C.

d Which of Lyell's ideas described in Uniformitarianism has been modified based on our improved understanding of geologic processes through advances such as radiometric dating to better constrain dates or events and GPS to track movement of plate tectonics and glaciers. A. The earth itself has not changed over time B. The natural processes that affect the earth do not change over time C. Natural laws do not change over time D. Geological processes are slow and rates do not change over time E. None of Lyell's ideas have been modified

d Which of Lyell's ideas described in Uniformitarianism was not readily accepted by the geological/paleontological community due to what was known about fossils in the rock record? A. Physical natural laws, such as gravity, do not change over time (Uniformity of Natural Laws) B. Geologic processes occur today in the same way as they did in the past (Uniformity of Process) C. That the same chemical elements that occur today must have also occurred in the past (Uniformity of Chemistry) D. The rates of geological processes are slow and do not vary over time (Uniformity of Rate) E. All rocks, biology, and other features of earth do not change over time (Uniformity of Configuration)

e The difference between Uniformitarianism and Actualism can best be described by the following statement: A. Uniformitarianism is an hypothesis, while Actualism is a theory B. Both Uniformitarianism and Actualism use the assumption that geologic processes

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have stayed the same over time; however Actualism states that rates of those processes can vary. C. Uniformitarianism states that all geologic rates are slow and gradual; Actualism states that all geologic rates are rapid. D. Uniformitarianism states that all geologic processes are uniform through time; Actualism states that geologic processes occur how we actually observe them. bVolcanic eruptions, earthquake frequency, and glacial periods are examples of what category of rates? A. Rate of movementB. Rate of occurrenceC. Steady state ratesbUsing actualism as a way to understand rates of geologic process, which of the following statements is/are correct? A. It is possible for two sandstones to have formed at different rates of depositionB. All granites will form by the cooling of magma at the same rateC. The rate of formation of a glacier deposit will not vary over time. D. Only statements A and C are correctE. All of the above statements are correcta