NCEA Level 3 Biology – Human Evolution (AS91606) Practice Exam (Sample)

Study Guide

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Questions

1. Which of the following represents a significant adaptation for bipedalism?

A. Narrow pelvis

B. Bowl-shaped pelvis

C. Longer arms than legs

D. Forward-facing eyes

2. What critical development is associated with the use of fire in early humans?

A. Improved hunting techniques

B. Cultural ceremonies and practices

C. Cooking food for better nutrition

D. Social gatherings for communal living

3. What impact did agriculture have on human evolution?

A. Led to the extinction of hunter-gatherer societies

B. Encouraged migratory patterns to urban centers

C. Promoted settled lifestyles and social stratification

D. Eliminated the need for food storage

4. What was the impact of the Neolithic Revolution on human societies?

A. It led to increased reliance on fishing and hunting

B. It marked the shift to agriculture and permanent settlements

C. It decreased population sizes globally

D. It caused significant technological regressions

5. What evidence suggests interbreeding occurred between Neanderthals and modern humans?

A. Fossil similarities between the two

B. Presence of Neanderthal DNA in non-African populations

C. Artifacts found exclusively in Neanderthal sites

D. Distinct physical features among modern humans

6. Which term describes the condition of having a pronounced snout or muzzle?

A. Orthognathism

B. Prognathism

C. Heterognathism

D. Mesognathism

7. What role did harsh environments during the Ice Ages play in evolution?

A. They caused the extinction of all species

B. They prompted migrations and innovations

C. They simplified dietary choices

D. They eliminated the need for social structures

8. How do fossils enhance our understanding of human evolution?

A. They can predict future evolution of species

B. They provide insights into living conditions currently

C. They serve as a record of physical changes over time

D. They highlight the social structures of ancient species

9. How would you describe the structure of the V-shaped jaw?

A. Wide and flat

B. Narrow and pointed

C. Angled with a slight curve

D. Rounded and broad

10. How does mitochondrial DNA aid in tracing human ancestry?

A. It is inherited from both parents

B. It reflects maternal lineage and migration patterns

C. It is identical in all humans

D. It can be used to trace paternal lineage

Answers

1. B
2. C
3. C
4. B
5. B
6. B
7. B
8. C
9. B
10. B

Explanations

1. Which of the following represents a significant adaptation for bipedalism?

A. Narrow pelvis

B. Bowl-shaped pelvis

C. Longer arms than legs

D. Forward-facing eyes

The bowl-shaped pelvis is a significant adaptation for bipedalism because it provides a stable base for the upper body, facilitating efficient upright walking. In species that walk on two legs, particularly humans, the shape of the pelvis supports the alignment of the legs under the body's center of gravity. This adaptation reduces the energy expenditure required for locomotion and enhances balance during upright movement, allowing for more efficient stride and stability when walking or running. A narrow pelvis would not effectively support bipedal locomotion as it could compromise balance and stability. Longer arms than legs would indicate a design more suited for locomotion in trees rather than on the ground. Forward-facing eyes contribute to depth perception and visual fields but are not specifically an adaptation directly related to the mechanics of bipedal walking. The bowl-shaped pelvis, on the other hand, is crucial for supporting the unique biomechanical requirements of bipedalism in human evolution.

2. What critical development is associated with the use of fire in early humans?

A. Improved hunting techniques

B. Cultural ceremonies and practices

C. Cooking food for better nutrition

D. Social gatherings for communal living

The use of fire in early humans is crucially linked to cooking food for improved nutrition. Cooking not only makes food easier to digest but also increases the bioavailability of nutrients, allowing early humans to extract more energy from their food. This increased caloric intake would have significant implications for brain development and overall health, enhancing survival and reproductive success. Cooking also has broader implications beyond nutrition. While improved hunting techniques, cultural practices, and social gatherings may also be associated with fire use, it is the act of cooking that fundamentally transformed the human diet and supported evolutionary changes in physiology and social behavior. The ability to cook food is considered one of the key adaptations that helped shape human life, leading to larger brains and a shift in lifestyle from foraging to more complex forms of social structure.

3. What impact did agriculture have on human evolution?

A. Led to the extinction of hunter-gatherer societies

B. Encouraged migratory patterns to urban centers

C. Promoted settled lifestyles and social stratification

D. Eliminated the need for food storage

The correct answer highlights how agriculture fundamentally transformed human lifestyles and social structures. With the advent of agriculture, communities transitioned from nomadic hunter-gatherer groups to settled societies. This shift allowed humans to cultivate crops and domesticate animals, leading to more stable food sources. As a result, populations could grow, leading to the establishment of permanent settlements. This permanence facilitated the development of complex social structures and social stratification. With more food available from farming, not everyone was required to hunt or gather, allowing individuals to specialize in different roles, such as artisans, merchants, or leaders. These roles contributed to the formation of social hierarchies and organized governments. Additionally, settled lifestyles facilitated technological advancements, the development of trade systems, and cultural evolution, ultimately shaping the social dynamics of human societies in ways that would influence future civilizations. This significant impact of agriculture on human evolution underscores its role in shifting the fabric of society from one based on mobility and egalitarianism to one based on settlement and complexity.

4. What was the impact of the Neolithic Revolution on human societies?

A. It led to increased reliance on fishing and hunting

B. It marked the shift to agriculture and permanent settlements

C. It decreased population sizes globally

D. It caused significant technological regressions

The Neolithic Revolution was a fundamental turning point in human history that marked the transition from nomadic lifestyles based on hunting and gathering to settled agricultural practices. This shift allowed for the domestication of plants and animals, leading to the establishment of permanent settlements. As people began to cultivate crops and rear livestock, they could produce food surpluses, which supported larger populations and ultimately led to the development of complex societies, social hierarchies, and trade networks. The move to agriculture also initiated significant changes in human culture, social structures, and relationships with the environment. Instead of constantly moving in search of food, communities could build homes, create more permanent infrastructure, and organize around a stable food supply, fostering advancements in technology, art, and culture. This transformation laid the foundation for the rise of civilizations, including advancements in tools, pottery, and the creation of written language as societies became more complex. Therefore, the impact of the Neolithic Revolution on human societies was profound and far-reaching, encapsulated in the shift to agriculture and the establishment of permanent settlements.

5. What evidence suggests interbreeding occurred between Neanderthals and modern humans?

A. Fossil similarities between the two

B. Presence of Neanderthal DNA in non-African populations

C. Artifacts found exclusively in Neanderthal sites

D. Distinct physical features among modern humans

The presence of Neanderthal DNA in non-African populations serves as compelling evidence for interbreeding between Neanderthals and modern humans. Genetic studies have shown that individuals of European and Asian descent carry between 1% to 2% of their DNA from Neanderthals, which indicates that there was some level of mating between the two groups after modern humans migrated out of Africa. This genetic contribution illustrates that not only did Neanderthals coexist with modern humans, but they also exchanged genes, which has impacted the genetic makeup of contemporary human populations. The presence of this DNA in modern humans is significant because it provides a concrete, scientific basis for understanding the interactions and relationships between these two hominin species. The genetic material is inherited from Neanderthal ancestors, reinforcing the idea of shared lineage and interbreeding events in our evolutionary history. The other answers, while related to the study of Neanderthals, do not directly provide evidence for interbreeding in the same conclusive manner. Fossil similarities might suggest a close relationship but do not confirm interbreeding. Artifacts found exclusively in Neanderthal sites may reflect cultural similarities rather than genetic exchange. Distinct physical features among modern humans could be influenced by various environmental

6. Which term describes the condition of having a pronounced snout or muzzle?

A. Orthognathism

B. Prognathism

C. Heterognathism

D. Mesognathism

The term that accurately describes the condition of having a pronounced snout or muzzle is prognathism. This is characterized by the forward projection of the jaw or jaws, leading to a more pronounced facial profile, which often gives the face a more protruding appearance. Prognathism is notable in various hominin species and can provide insights into their dietary habits and environmental adaptations. For example, increased prognathism can be associated with adaptations to a diet that requires more chewing or processing of tougher materials, which has implications for understanding the dietary evolution of early humans and their ancestors. The other terms refer to different jaw configurations. Orthognathism denotes a relatively flat face with jaws that are not prominent beyond the normal range, which is typical of modern humans. Heterognathism describes a condition with variations in jaw structure that does not specifically indicate the pronounced facial profile associated with prognathism. Mesognathism refers to a facial profile that is intermediate between prognathism and orthognathism, indicating neither a prominent muzzle nor a flat face. Understanding these terms is essential for studying human evolution, as they illustrate the physical variability that has occurred over time.

7. What role did harsh environments during the Ice Ages play in evolution?

A. They caused the extinction of all species

B. They prompted migrations and innovations

C. They simplified dietary choices

D. They eliminated the need for social structures

The harsh environments during the Ice Ages significantly influenced evolution by prompting migrations and innovations among species, particularly early humans. As climatic conditions became increasingly severe, many species, including humans, were forced to adapt to survive. This led to the exploration of new habitats as populations migrated to seek more favorable living conditions, which is a crucial factor in the process of natural selection. Additionally, the challenges posed by these environments stimulated technological innovations. Early humans developed new tools and strategies to hunt, gather, and create shelter, enhancing their chances of survival. These adaptations not only helped them endure the Ice Ages but also created a foundation for social structures and cultural practices as groups learned to collaborate under stressful conditions. Overall, the pressures of the Ice Ages acted as a catalyst for significant evolutionary changes.

8. How do fossils enhance our understanding of human evolution?

A. They can predict future evolution of species

B. They provide insights into living conditions currently

C. They serve as a record of physical changes over time

D. They highlight the social structures of ancient species

Fossils enhance our understanding of human evolution by serving as a record of physical changes over time. They capture the anatomical characteristics of our ancestors and relatives, allowing researchers to trace the gradual transformations in size, shape, and structure across different species. This record reveals key adaptations that occurred in response to environmental pressures, such as changes in climate, diet, and locomotion. By studying these changes in the fossilized remains, scientists can construct a more comprehensive picture of how modern humans have evolved from earlier primate ancestors. The other options do not accurately reflect the primary function of fossils in the study of evolution. While fossils can provide context about the environments where these species lived, they do not predict future evolutionary changes or directly highlight social structures. Their most significant contribution lies in documenting the physical evidence of evolutionary processes over time.

9. How would you describe the structure of the V-shaped jaw?

A. Wide and flat

B. Narrow and pointed

C. Angled with a slight curve

D. Rounded and broad

The V-shaped jaw structure is characterized by its narrow and pointed form, which is associated with certain adaptations that influence dietary habits and the shape of the face. In species with a V-shaped jaw, such as many primates and early hominins, the jaw tends to taper towards the chin, providing a distinctive triangular appearance. This structure may also relate to the type of diet an organism is adapted for, enabling efficient processing and handling of food. The narrow and pointed nature of the V-shaped jaw allows for a greater range of movement and might facilitate the use of tools or consumption of specific types of food. In evolutionary terms, such jaw morphology can reflect the functional demands placed on the oral structures by the diet and feeding habits of the organism. This contrasts with other jaw shapes, such as wide, flat or rounded jaws, which are typically associated with different feeding mechanisms or ecological niches.

10. How does mitochondrial DNA aid in tracing human ancestry?

A. It is inherited from both parents

B. It reflects maternal lineage and migration patterns

C. It is identical in all humans

D. It can be used to trace paternal lineage

Mitochondrial DNA (mtDNA) is a valuable tool for tracing human ancestry primarily because it reflects maternal lineage. This is due to the unique way in which mtDNA is inherited; it is passed down exclusively from mother to offspring. As a result, all individuals inherit their mtDNA from their mothers, allowing researchers to trace maternal genetic lines over generations. Furthermore, this uniparental inheritance pattern means that changes and mutations in mtDNA can serve as markers for familial connections and migration patterns of ancient human populations. By analyzing the similarities and differences in mtDNA sequences among individuals and populations, scientists can reconstruct migration routes and demographic history, painting a picture of how modern humans have spread across the globe. In contrast, mitochondrial DNA is not inherited from both parents, nor is it identical in all humans, as there are variations in mtDNA sequences that can signify different lineages. Additionally, mtDNA does not trace paternal lineage, which is typically analyzed through Y-chromosome DNA. This unique combination of characteristics makes mtDNA especially useful for understanding our maternal ancestry and the migration patterns of our ancestors.