And the end has come....

Last time...

- What are the major evolutionary trends that define humans?
- Which came first?
    - In what species and population?
    - Why?

Brains....

- When did brain size really start to expand?
- How do we measure brain size? What is EQ?
- Why would larger brain size be selected for?
- What are the advantages of larger brains? What are the disadvantages?
- What is a possible selective advantage to larger brain size?

Language

- When does language evolve?
- How can we identify in the fossil or archaeological records the presence or possibility for language?
- What makes language different from the communication seen in other animals ?
- What are some of the selective advantages of language?

Culture

- What is culture?
- How can we identify it in the fossil or archaeological record?
- When do we first see clear evidence of cultural behavior in human evolution?
- Does is appear all at once or develop gradually over time?

Final Exam

- Same format as Midterm
- 80 1 pt. questions
- Little bit of this and a little bit of that
- Section 1: Friday, May 20: 9:45 am
  Section 2: Wednesday, May 25: 9:45 am
- Emphasizing the material in the second half of the semester, but cumulative

First half (~20-25 pts)

- Anthropology
- Evolutionary theory
- Genetics and Heritability
- Modern Synthesis
- Modern Human Variation
- Mammals and Primates, characteristics

Second half (~55-60 pts)

- Primate Evolution and living primates
- Earliest Hominids
- Australopithecines
- Early *Homo* and *Homo erectus*
- Archaic Humans
- Anatomically Modern Humans
- Evolutionary Story

Primates and Primate Evolution

- Who are the modern primates?
- What are their two major divisions?
- What is the geographic range of living primates?
- What is the size range of living primates?

Last time...

- What are monkey grade primates?
- When and where do they first appear in the fossil record?
- What features are found in the earliest representatives that identify them as monkeys?

Oligocene

- Where do we find primates in the Oligocene?
- Of the Oligocene primates...
  - Who is the potential ancestor of the Catarrhines?
  - Who is the potential ancestor to the NWM?
    - How did the NWM get to South America?
  - Who is the potential ancestor to the OWM?

Taxonomy

- How are monkeys classified?
    - Order? Suborder? Infraorder?
- What are the two groups of monkeys?
    - How do their classifcations differ?
    - How do their characteristics differ?
- Of the Simiiformes, which two groups are most closely related?

New World Monkeys

- What are the potential evolutionary sources of the New World Monkeys
- What is their classification?
- What features distinguish them from other primates and in particular from the Old World monkeys?
- What different kinds of monkeys are New World Monkeys?
- How do Callitrichidae differ from the rest of the Ceboidea?

Old World Monkeys

- What are the potential evolutionary sources of the Old World Monkeys
- What is their classification?
- What features distinguish them from other primates and in particular from the New World monkeys?
- What different kinds of monkeys are Old World Monkeys?
- How do Cercopithecinae and Colobinae, the two divisions, differ from one another?

Question:

- Name two characteristics that define “monkey grade” primates.

Question:

- Name two characteristics that define "monkey grade" primates.
- bigger body, bigger brain, post-orbital closure, full stereoscopic vision

Question:

- Monkey grade animals first become common in the (Eocene / Oligocene / Miocene).

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Question:

- The best potential ancestor for later Old World Monkeys is (*Apidium / Aegyptopithecus / Proconsul.)*

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Question:

- The prevailing thought is that NWM got to the New World from populations of Eocene ancestors in (North America / Africa) by _____.

Question:

- The prevailing thought is that NWM got to the New World from populations of Eocene ancestors in (North America / Africa) by rafting.

Question:

- T/F
  Old world monkeys are more closely related to new world monkeys than they are to apes.

Question:

- T/F
  Old world monkeys are more closely related to new world monkeys than they are to apes.

Question:

- At the circus, I see a primate, fairly small, hanging from its tail. Its really cute. I can't see in its mouth, but I show off and say, I know what that is, its a

a. chimpanzee
b. lemur
c. aye-aye
d. new world monkey
e. old world monkey

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Question:

Name one way in which marmosets and tamarins differ from other New World Monkeys.

Question:

Name one way in which marmosets and tamarins differ from other New World Monkeys.

twinning, three molars, body size, tooth comb

Question:

T / F

Catarrhines all have 3 premolars.

Question:

T / F

Catarrhines all have 3 premolars.

Question:

Name two ways in which old world and new world monkeys differ.

Question:

Name two ways in which old world and new world monkeys differ.

dental formula, prehensile tail, nose shape

Question:

Leaf-eating monkeys are put in the subfamily
(Cercopithecinae / Colobinae / Cebinae).

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(Cercopithecinae / Colobinae / Cebinae).

Question:

T /F

All non-human Catarrhines are tropical or sub-tropical living animals.

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T /F

All non-human Catarrhines are tropical or sub-tropical living animals.

Miocene

- What new grade of primate appears in the Miocene?
- What characteristics do these animals show?
- Where are they found?
- Are they related to any extant species?
- What are their diagnostic morphologies?

Who are the apes?

- What characteristics and trends define the apes?
- When were apes most common
- How many genera of apes are found today?
- How are they classified?

Ape Taxonomy

- Can you draw a tree of the living apes? Which are most closely related to which?
- What is the taxonomic problem with putting chimps in the Pongidae and humans in the Hominidae?
- What is a better classification?

Apes

- Which apes are the lesser apes? What is their family designation? What are their characteristics?
- Which apes are the great apes? What is or are their family designation(s)? What are their characteristics?
- What are the 3 genera of living great ape? How are they related to each other? What differences do they show?
- How are they related to one another?

Question:

- Name two characteristics that might help us identify an early ape in the fossil record.

Question:

- Name two characteristics that might help us identify an early ape in the fossil record.
- lack of tail, shape of thorax, brain size, tooth shape, Y-5 molar

Question:

- The largest primate that ever lived was _____.

Question:

- The largest primate that ever lived was gigantopithecus.

Question:

- Since the Miocene, the number of ape species has_____, while the number of monkey species has_____

- a. increased/ decreased
- b. decreased/ increased

Question:

- Since the Miocene, the number of ape species has_____, while the number of monkey species has_____

- a. increased/ decreased
- b. decreased/ increased

Question:

- The probable ancestor of the gorilla, chimpanzee and bonobo lineages is
  - a. *Ouranopithecus*
  - b. *Dryopithecus*
  - c. *Oreopithecus*
  - d. none of these

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Question:

- An early ancestor to later African apes might be

  - a. *Kenyanthropus*
  - *b. Proconsul*
  - *c. Dryopithecus*
  - *d. Sivapithecus*
  - *e. Aegyptopithecus*

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Question:

- A phylogenetically correct taxonomy of the hominoids would put

  a. humans in their own family, Hominidae

  b. Humans, chimps and gorilla in their own family, the Hominidae, and the orangutan in the Pongidae

  c. Humans and chimps in the Hominidae, and gorillas and orangs in the Pongidae.

  d. all of the apes in the Pongidae

  e. orangs and gibbons in the Pongidae and the rest of the apes in the Hominidae

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Question:

- Which of the following is NOT a defining characteristic of the Hominoidea

a. 2-1-2-3 dental formula

b. lack of a tail

c. larger body size with fewer lumbar vertebrae

d. larger brain size and more complex social behavior

e. flexible shoulder joint

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b. lack of a tail

c. larger body size with fewer lumbar vertebrae

d. larger brain size and more complex social behavior

e. flexible shoulder joint

Question:

Orangutans display a special form of locomotion called _____.

Chimpanzees and Gorillas display a special form of locomotion called _____.

Question:

Orangutans display a special form of locomotion called quadrumanualism.

Chimpanzees and Gorillas display a special form of locomotion called _knucklewalking_.

Question:

Draw an evolutionary tree for these 5 animals: Human, chimp, bonobo, gorilla, orangutan.

Question:

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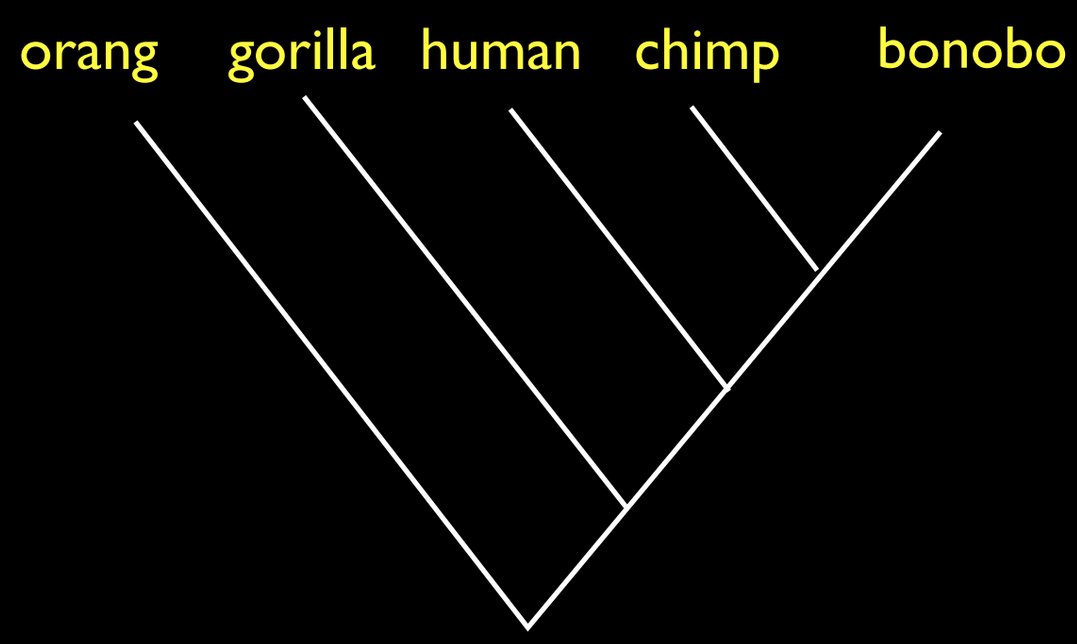

Question:

Fill in this Taxonomy for Humans:

Suborder:

Superfamily:

Family:

Genus:

Species:

Question:

Fill in this Taxonomy for Humans:

Suborder: Haplorhini

Superfamily: Hominoidea

Family: Hominidae

Subfamily: Homininae

Genus: *Homo*

Species: *Homo sapiens*

The hominids

- What is the adaptive niche of the Hominids?
- What is the difference between calling this lineage hominid vs. hominin?
- What are the defining characteristics of the hominids?
- When did hominids first emerge?
- Why bipedalism and small canines?

Bipedalism

- What are the advantages and disadvantages of bipedalism?
- What are the various theories for the origin and adoption of bipedalism?
- Which is the most likely given what we now know about the origins of hominids?
- In what environment did hominids and their features first evolve?

Question:

- The first defining hominid trait to arise was
  - a. small canines
  - b. big brains
  - c. bipedalism
  - d. language

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  - a. small canines
  - b. big brains
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  - d. language

Question:

- Choose one possible explanation for the selection of bipedalism, and explain why it would give a selective advantage.

Question:

- Choose one possible explanation for the selection of bipedalism, and explain why it would give a selective advantage.
- trench-coat hypothesis, attracts mates. more mates = higher reproductive success

Question:

- The anatomical shift from quadrupedalism came after a behavioral shift began in the ape ancestor of the hominid line.

- a. true
- b. false

Question:

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- a. true
- b. false

Question:

- While the femur of a quadruped is straight, the femur of a biped is
    - a. curved
    - b. angled inward to the knee
    - c. reduced at the knee
    - d. angled outward to the knee

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Question:

- The earliest possible hominid found is
  - *a. Ardipithecus ramidus*
  - *b. Ardipithecus kadabba*
  - *c. Sahelanthropus tchadensis*
  - *d. Orrorin tugenensis*

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Question:

- According to evidence from *Ardipithecus*, bipedalism probably arose
  - a. exclusively in the trees
  - b. in a forested environment
  - c. in a savanna environment
  - d. in a desert environment

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  - d. in a desert environment

Question:

- The lineages of the African apes and the hominines separated around _____ million years ago.

Question:

- The lineages of the African apes and the hominines separated around _5-7_ million years ago.

Australopithecines

- What species of hominid are found in the early Pliocene?
- Where are they found?
- What are their distinguishing anatomical characteristics?
- How do the Australopithecines differ from the possible hominids?

Australopithecines

- What are the common characteristics of the early Australopithecines?
- How do the 4 species differ from one another?
- When does each fall in time?
- What are the possible phylogenies of these species?

Gracile and Robust

- How do gracile and robust australopithecines differ?
- What are the different adaptations of these two groups?
- What are the different species?
- Where and when are they found?

Phylogenies

- What are all the species in the Australopithecines?
- Which are robust? Which are gracile? What are the differences between robust and gracile?
- When do they occur in time? Space?
- How did they live? What did they eat? Where did they live?
- What are the possible phylogenies of the Pliocene hominids?

Question:

- Australopithecines show _____.
  - a. no reduction of the canine, but partial reduction of the diastema
  - b. an essentially ape-like dentition
  - c. some reduction of the canine and partial reduction or absence of the diastema
  - d. some reduction of the canine, but an ape-like diastema

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Question:

- The earliest species of *Australopithecus* is
  - a. *Australopithecus africanus*
  - b. *Australopithecus afarensis*
  - c. *Australopithecus anamensis*
  - d. *Australopithecus bahrelghazali*

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Question:

- The majority of the fossil evidence of the earliest hominids has come from _____.
  - a. the Congo Basin in Central Africa
  - b. the Great Rift Valley of East Africa
  - c. sub-Saharan regions in Chad and Niger
  - d. South African caves

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Question:

- The Laetoli footprints show clear bipedalism in *Australopithecus (anamensis / afarensis)*

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Question:

- Of these species, which is most often cited as directly ancestral to the later gracile Australopithecines?
  - a. *Kenyanthropus platyops*
  - b. *Australopithecus afarensis*
  - c. *Australopithecus anamensis*
  - d. *Australopithecus bahrelghazali*

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Question:

- *Australopithecus afarensis* exhibited (HIGH / LOW) sexual dimorphism.

- What does this tell us about their social organization?

Question:

- *Australopithecus afarensis* exhibited (HIGH / LOW) sexual dimorphism.

- What does this tell us about their social organization?
  - competition for mates among males

Question:

- The _____ is a bony crest running lengthwise down the center of the cranium on the parietal bones for the attachment of the temporalis muscle.
- This is most often found in the (gracile / robust) Australopithecines.

Question:

- The _sagittal crest_ is a bony crest running lengthwise down the center of the cranium on the parietal bones for the attachment of the temporalis muscle.
- This is most often found in the (gracile / robust) Australopithecines.

Question:

- True / False Brain size in the gracile Australopithecines increases over time, but not in the robust lineages.

Question:

- True / False Brain size in the gracile Australopithecines increases over time, but not in the robust lineages.

Question:

- The south African robust Australopithecine is *Australopithecus (robustus / boisei / aethiopicus).*

Question:

- The south African robust Australopithecine is *Australopithecus (robustus / boisei / aethiopicus).*

Question:

- True / False Robust Australopithecines continue to occur later in time than do the gracile Australopithecines.

Question:

- True / False Robust Australopithecines continue to occur later in time than do the gracile Australopithecines.

Question:

- *A. africanus* is considered to be more derived than *A. afarensis* for all the following reasons EXCEPT
  - a. *A. africanus* has a cranial capacity of 450-550 cc
  - b. *A. africanus* lacks cranial crests
  - c. *A. africanus* shows greater facial prognathism
  - d. *A. africanus* has small anterior teeth

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Question:

- Robust australopithecines exhibit a group of adaptations that indicate they were specialized for

- a. defending themselves against predators
- b. hard object or grass feeding
- c. carrying large loads over distances
- d. hunting small to medium sized animals

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- a. defending themselves against predators
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- c. carrying large loads over distances
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Question:

- 69. At 2.5 million years ago _____ were all contemporaries on the African continent.

- a. *A. robustus*, *A. afarensis* and *A. garhi*
- b. *A. aethiopicus*, *A. anamensis*, and *A. africanus*
- c. *A. boisei*, *A. anamensis*, and *A. robustus*
- d. *A. garhi*, *A. aethiopicus*, and *A. africanus*

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- d. *A. garhi*, *A. aethiopicus*, and *A. africanus*

Question:

- Name 2 facial/cranial characteristics that distinguish robust from gracile australopithecines.

Question:

- Name 2 facial/cranial characteristics that distinguish robust from gracile australopithecines.

- flaring zygomatics, large molars, small incisors, sagittal crest, flat face

Question:

- True / False Robust and gracile Australopithecines divided up the environment such that they are never found at the same times and places.

Question:

- True / False Robust and gracile Australopithecines divided up the environment such that they are never found at the same times and places.

Question:

- In a phylogeny where evolution in South Africa is separate from hominid evolution in East Africa, _____ is considered the ancestor to *Australopithecus robustus*.
  - a. *Australopithecus boisei*
  - b. *Australopithecus aethiopicus*
  - c. *Australopithecus gahri*
  - d. *Australopithecus africanus*

Question:

- In a phylogeny where evolution in South Africa is separate from hominid evolution in East Africa, _____ is considered the ancestor to *Australopithecus robustus*.
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  - b. *Australopithecus aethiopicus*
  - c. *Australopithecus gahri*
  - d. *Australopithecus africanus*

Homo

- What defines the genus *Homo?*
- When does *Homo* first appear? Where?
- How do we identify these fossils as *Homo* rather than *Australopithecus?*
- How are *Homo habilis* different from the other hominids they are contemporaneous with?

Homo habilis

- Where and when is *Homo habilis* found?
- What are its defining charateristics?
- Why is it considered *Homo* rather than *Australopithecus?*
- How is it similar and dissimilar from *Australopithecus sediba?*
- How is it similar and dissimilar from *Homo rudolfensis?*

Question:

- True / False: The earliest members of the genus *Homo* are remarkably different overall from their Australopithecine ancestors.
- The major distinction between the earliest *Homo* and their Australopithecine ancestors is _____.

Question:

- True / False: The earliest members of the genus *Homo* are remarkably different overall from their Australopithecine ancestors.
- The major distinction between the earliest *Homo* and their Australopithecine ancestors is _brain size_.

Question:

- The earliest members of the genus *Homo* are found about _____ m.y.a.
- True / False: *Homo habilis* shows a larger body size than the Australopithecines.

Question:

- The earliest members of the genus *Homo* are found about _2_ m.y.a.
- True / False: *Homo habilis* shows a larger body size than the Australopithecines.

Question:

- Which of the following species is often subsumed into *Homo habilis* rather than being considered separate?
  - *Australopithecus gahri*
  - *Homo rudolfensis*
  - *Homo ergaster*
  - *Homo erectus*

Question:

- Which of the following species is often subsumed into *Homo habilis* rather than being considered separate?

- *Australopithecus gahri*
- *Homo rudolfensis*
- *Homo ergaster*
- *Homo erectus*

Olduwan tools

- What are Olduwan tools?
- How are they made?
- When are they first found and with which species?

Adaptive pattern

- How does the adaptive pattern of early *Homo* differ from that of the Australopithecines?
- Why was brain size selected for?
- What else changes in adaptation when brain size increases?

H. habilis v. *H. erectus*

- What makes these two species different?
- When are they found in time? space?

Homo erectus

- Who is *Homo erectus*?
- Where is this species found?
- In what time frame?
- What are its identifying anatomies?

Question:

- Name two reasons why increasing brain size may have offered early *Homo* individuals a selective advantage.

Question:

- Name two reasons why increasing brain size may have offered early *Homo* individuals a selective advantage.

- better problem solving, social skills

Questions:

- *Homo erectus* appeared in Africa about _____ mya.

- T / F : Early *Homo erectus* was no bigger in body size than *Homo habilis*.

Questions:

- *Homo erectus* appeared in Africa about __1.8_ mya.

- T / F : Early *Homo erectus* was no bigger in body size than *Homo habilis*.

Question:

- *Homo erectus* left Africa by
  - 2 mya
  - 1.8 mya
  - 1.5 mya
  - 1.2 mya
  - 1 mya

Question:

- *Homo erectus* left Africa by
  - 2 mya
  - 1.8 mya
  - 1.5 mya
  - 1.2 mya
  - 1 mya

Question:

- Which of the following is NOT characteristic of *H. erectus* compared to earlier species of hominid?
  - a. larger body
  - b. larger head
  - c. speech
  - d. unique skull shape
  - e. sagittal keel

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  - c. speech
  - d. unique skull shape
  - e. sagittal keel

Question:

- The "Nariokotome boy" fossil indicates that *H. erectus*
  - a. could grow as tall as modern humans
  - b. had short lower limbs
  - c. was thin-boned
  - d. all of these

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- The "Nariokotome boy" fossil indicates that *H. erectus*
  - a. could grow as tall as modern humans
  - b. had short lower limbs
  - c. was thin-boned
  - d. all of these

Questions:

- The earliest *Homo erectus* found outside of Africa are found in (Indonesia / the Republic of Georgia / China).
- The latest *Homo erectus* are found in (Indonesia / China / Europe / Africa).

Questions:

- The earliest *Homo erectus* found outside of Africa are found in (Indonesia / the Republic of Georgia / China).
- The latest *Homo erectus* are found in (Indonesia / China / Europe / Africa).

Question:

- Stone tools associated with early *Homo* are called _____ tools.
- Briefly describe how these tools were made and used.

Question:

- Stone tools associated with early *Homo* are called _Acheulean_ tools.
- Briefly describe how these tools were made and used.
  - simple bifacially flaked teardrop shaped swiss army knife tools - hand axe.

Questions:

- T / F Due to uninterrupted gene flow, the Chinese *Homo erectus* are identical to those found in Indonesia.
- T / F *Homo erectus* is found throughout the world except in Europe.

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- T / F *Homo erectus* is found throughout the world except in Europe.

Question:

- Long legs and modern limb proportions played what role in the adaptive pattern of *Homo erectus?*

Question:

- Long legs and modern limb proportions played what role in the adaptive pattern of *Homo erectus?*

- *allowed more efficient long distance travel, perhaps for hunting, to get more food, to feed big brain*

Question:

- What cultural advances are seen with *Homo erectus?*

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  - *fire, shelter?, rafts? Acheulean tools*

Question:

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Homo erectus behavior

- What behavioral changes are found in *Homo erectus?*
- What is the adaptive pattern?
- What sorts of tools are found with *Homo erectus?*

"Archaic" *Homo*

- What are "archaic *Homo sapiens*"?
- Why do we call them archaic?
- What features do they show? What does it mean to call them mosaic?
- How are they distinguished from *Homo erectus*?
- Where do they fit in in the evolution from *Homo habilis* to modern *Homo sapiens?*

More on archaics

- What other species names are they known by?
- Why would they be put into other species?
- What does it mean to say that they are mosaic?

Evolutionary Models

- Models of human evolution from *Homo habilis to Homo sapiens* can usually be divided into two paradigms - what are these?

- In each model, where do the various "species" of archaic *Homo* fall?

- What are the differences between the paradigms?

- What is the role of gene flow in these models?

    - How much gene flow is necessary to keep two populations from speciating?

- What are anagenesis and cladogenesis?

Question:

- _____ was likely ultimately responsible for most of the changes in the *Homo erectus* adaptive pattern.
  - A. tool using
  - B. need for male parental investment
  - C. shift to primary carnivory
  - D. decrease in birth spacing
  - E. need for group cooperation for survival.

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Question:

- Archaic *H. sapiens* usually have
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Question:

- Name one *Homo erectus* like feature and one Modern human like feature of an "archaic" *Homo*.

Question:

- Name one *Homo erectus* like feature and one Modern human like feature of an "archaic" *Homo*.
- long tear-drop shaped skull, larger brain sizes

Question:

- T / F Across the world the transition from *Homo erectus to* archaic *Homo* happens at about the same time.

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Question:

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Question:

- The force of evolution most important in determining whether archaic fossils in Africa and Europe are members of our species or not is _____.

Question:

- The force of evolution most important in determining whether archaic fossils in Africa and Europe are members of our species or not is _gene flow__.

Neandertals

- Who were the Neandertals?
- Where and when are they found?
- What are their distinctive morphologies?
- Why do we separate Neandertals from other archaic humans?

More Neandertals

- What is the relationship of the Neandertals to the other archaic humans and to modern humans?

- Why are Neandertals often considered to be separate than the other archaic humans?

Question:

- Neandertal remains have been recovered from sites dating between _____ years ago.
  - a. 130,000 and 230,000
  - b. 13,000 and 100,000
  - c. 30,000 and 150,000
  - d. 130,000 and 1.3 million

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Question:

- T / F Today, scientists agree that Neandertals should be designated as the separate species *Homo neandertalensis*.

- T / F Neandertals are more robustly built than other archaic *Homo*.

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Question:

- The Neandertal Geographic range is _____.

Question:

- The Neandertal Geographic range is _Europe, Western Asia and Russia incl. Siberia_.

Question:

- Which of these is NOT a Neandertal feature?
    - big brain
    - lower facial prognathism
    - retromolar gap
    - occipital bun
    - large browridges

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Question:

- The question of whether or not Neandertals are an extinct uncle to humans or in our lineage is one of the amount or possibility of _____ between the populations.

Question:

- The question of whether or not Neandertals are an extinct uncle to humans or in our lineage is one of the amount or possibility of _gene flow_ between the populations.

Question:

- Many of the unique Neandertal features are the result of an adaptation to a _____ environment.
- Describe how two of these features can be an adaptation to that environment.

Question:

- Many of the unique Neandertal features are the result of an adaptation to a _COLD_ environment.
- Describe how two of these features can be an adaptation to that environment.
  - Bergmann/Allen rules
  - Noses and warming air

Question:

- T / F Analysis of Neandertal DNA indicates that they did not have the FOXP2 gene and were therefore incapable of language.

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Question:

- Investigation of Neandertal skeletons reveals abundant evidence
  - a. that they were not at all different from *H. sapiens*
  - b. of bodies adapted to warm sunny climes
  - c. of a relatively easy and painless lifestyle
  - d. of traumatic injuries associated with rough living

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Question:

- The tools the Neandertals used were of the _____ industry, made using the _____ technique.
- T / F These tools were only used by Neandertals and not by other archaics or modern humans.

Archaic behavior

- What sorts of behaviors are first seen among the archaic humans, including the Neandertals?
- What sorts of tools were they making?
- How were they hunting?
- What was special about their behavior?
- What do these mean about the human adaptation at this time?

Question:

- The tools the Neandertals used were of the _Mousterian_ industry, made using the _Levallois_ technique.
- T / F These tools were only used by Neandertals and not by other archaics or modern humans.

Question:

- T / F Neandertals are the first population known to bury their dead.

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Question:

- T / F Neandertals were at a technological disadvantage to anatomically modern humans living at the same time, such as in Israel around 75,000 years ago.

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Question:

- On Mt. Carmel in Israel, Neandertals seem to have inhabited the area when in was particularly _____ in the world, and modern humans during _____ periods.

Question:

- On Mt. Carmel in Israel, Neandertals seem to have inhabited the area when in was particularly __cold_ in the world, and modern humans during __warm_ periods.

Modern Humans

- What are Anatomically Modern *Homo sapiens?*
- Why are they so hard to define?
- What features are used to define anatomic modernity?
- When and where do these features first appear?

Spread of Modern Humans

- When and where do modern humans first appear?
- When do they appear elsewhere in the world?
- Do all modern humans across the world show the same morphologies?
- Where is the last place that we find modern humans?

Question:

- T / F Modern humans first are identified in Africa before they are found elsewhere in the world.
- T / F Modern humans date in Africa back before 200, 000 years ago.

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Question:

- Name 3 features that identify modern humans separate from the archaics or the Neandertals.

Question:

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- high maximum breadth on skull, chin, forehead

Question:

- What is the last place that modern anatomy appears? Why?

Question:

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- Europe, because there were Neandertals there

Question:

- T / F Modern behavior appears simultaneously with modern anatomy.

- Give 2 examples of modern behavior and approximately when they appear in the archaeological record.

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  - burial, with Neandertals
  - Art, 45k -- Carved ochre, 75k

Question:

- Why is the populating of Australia important to understanding cultural change in human evolution?

Question:

- Why is the populating of Australia important to understanding cultural change in human evolution?

- because they were clearly modern human - - can't always tell if modern from behavior

Question:

- The atlatl and other tools changed human evolution because they allowed _____.

- One sign of modern behavior in non-utilitarian products such as _____.
- These start to appear around _____kya.

Question:

- The atlatl and other tools changed human evolution because they allowed __distance hunting__.

- One sign of modern behavior in non-utilitarian products such as _ornamentation_.
- These start to appear around _50-30k_kya.

Question

- T / F Modern behavior appears suddenly around 50,000 years ago. There was no evidence of complex behavior before that.

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After modernity

- What happened in human evolution after 25,000 years ago?
- How did humans change in the last 25,000 years?
    - Anatomically?
    - Behaviorally?
        - How did their technology change?

Peopling of the New World

- When and how did people come to the New World?
- Why is understanding the peopling of the New World important for understanding human evolution?

Neolithic Revolution

- What was the Neolithic revolution?
- What is domestication?
- How did domestication of plants and animals change the lifeways of Neolithic people?
- How did domestication of plants and animals affect the evolutionary paths of Neolithic peoples who adopted this way of life?

Question:

- People got to the New World around _____ definitely and possibly by _____.
- The relative isolation of these populations from those in the old world suggests that, really, very little _____ is necessary to maintain species.

Question:

- People got to the New World around _20 kya_ definitely and possibly by _12 kya__.
- The relative isolation of these populations from those in the old world suggests that, really, very little _gene flow_ is necessary to maintain species.

Question:

- T / F Evolution stopped after people became modern humans 25,000 years ago.

Question:

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Question:

- T / F The human genome has changed more in the last 10,000 years than in the million years before that.

- Why?

Question:

- T / F The human genome has changed more in the last 10,000 years than in the million years before that.

- Why?
- more mutations to choose from

Question:

- Stone tools of the Upper Paleolithic differ from previous because they
  - A. show greater variety
  - B. show cultural traditions
  - C. are often smaller and more task specific
  - D. All of the above
  - E. A and C only

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Question:

- Name two examples of how domestication of plants and animals genetically changed people as well.

Question:

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- lactose tolerance and sickle cell

Evolutionary Models

- What are the major theories regarding the last million years of human evolution and the origins of modern humans?

- What are the data that each use to support the theory?

- What are the relative impacts of gene flow and local selective forces in each theory?

- In each theory, how are archaic humans, Neandertals, *Homo erectus*, and Flores regarded?

Question:

- Which of the following best describes the "lumpers' perspective"?
  - a. Neandertals represent one of many distinct Middle Paleolithic hominid species
  - b. archaic *H. sapiens* are actually members of the species *H. heidelbergensis*
  - c. Neandertals and archaic *H. sapiens* were all part of one potentially interbreeding species
  - d. Neandertals and archaic *H. sapiens* could not and did not interbreed

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Question:

- In the "Splitter" analysis of human evolution, modern humans came from _____.

Question:

- In the "Splitter" analysis of human evolution, modern humans came from _a population within africa that became modern_.

Question:

- The replacement model, the splitter model, takes evidence from _____ to support the theory.

Question:

- The replacement model, the splitter model, takes evidence from _mitochondrial DNA_ to support the theory.

Question:

- Continuity of traits within a geographic region is used as evidence to support the (Out of Africa / Multiregional Evolution) theory.

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Question:

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Question:

- Possible evidence of interbreeding between Neandertals and moderns can be found in _____ individuals, who might show features of each.

Question:

- Possible evidence of interbreeding between Neandertals and moderns can be found in _hybrid_ individuals, who might show features of each.

Last time...

- What are the major evolutionary trends that define humans?

- Which came first?
    - In what species and population?
    - Why?

Brains....

- When did brain size really start to expand?
- How do we measure brain size? What is EQ?
- Why would larger brain size be selected for?
- What are the advantages of larger brains? What are the disadvantages?
- What is a possible selective advantage to larger brain size?

Language

- When does language evolve?
- How can we identify in the fossil or archaeological records the presence or possibility for language?
- What makes language different from the communication seen in other animals ?
- What are some of the selective advantages of language?

Culture

- What is culture?
- How can we identify it in the fossil or archaeological record?
- When do we first see clear evidence of cultural behavior in human evolution?
- Does is appear all at once or develop gradually over time?

Question

- The measurement of brain size relative to body size is called the _____.

Question

- The measurement of brain size relative to body size is called the EQ (encephalization quotient).

Question

- Name one advantage and one disadvantage of big brains.

Question

- Name one advantage and one disadvantage of big brains.
- better problem solving, takes lots of energy

Question

- Where in the anatomy can we look for evidence of language?

Question

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- hyoid, mouth, spinal column, brain

Question:

- The four defining aspects of human evolution are?
- Each appears first at about?

Question:

- The four defining aspects of human evolution are?
- Each appears first at about?
  - bipedalism - 5 mya
  - brains - 2 mya
  - language - 150 kya?
  - culture <100 kya