

**Q1:** Human origins expert Chris Stringer says that there are still questions about the early part of the human family tree. What is the important question he is asking?

**Hint:** Audio/slideshow: Our family tree > Beginning the human line

**Q2:** Geography question: name two continents where *Homo ergaster* and *Homo erectus* fossils have been found.

**Hint:** Audio/slideshow: Our family tree > Much more human

**Q3:** What species does Chris Stringer believe is the most recent common ancestor of modern humans and Neandertals?

**Hint:** Audio/slideshow: Our family tree > Ancient Europeans

**Q4:** What is another name for the members of early *Homo sapiens* that lived during the Ice Age?

**Hint:** Audio/slideshow: Our family tree > Modern humans: a late arrival

**Q5:** How long ago do scientists believe "The Missing Link" between modern humans and chimpanzees existed?

**Hint:** Text: Comparisons > Bones > Looking at the bones of our living relatives

**Q6:** What is a major difference between a human foot and a chimpanzee foot?

**Hint:** Animation: Comparisons > Bones > Becoming bipedal: walking upright > Comparing humans and chimps

**Q7:** Where does the name Neandertal come from?

**Hint:** Text: Comparisons > Bones > Bones from an ancient human

**Q8:** According to Chris Stringer, our line of evolution diverged from the Neandertals during the middle Pleistocene period. When was the middle Pleistocene period?

**Hint:** Video: Comparisons > Bones > Bones from an ancient human > How closely related

**Q9:** Which four Neandertal fossil finds were mainly used in the first reconstruction of an adult Neandertal skeleton?

**Hint:** Text: Comparisons > Bones > Reconstructing the past

**Q10:** Name three major differences between the Neandertal skull and the modern human skull.

**Hint:** Animation: Comparisons > Bones > Reconstructing the past > Comparing humans and Neandertals

**Q11:** Compared with most other hominid species, the Neandertals were probably quite intelligent. How can scientists tell this?

**Hint:** Video: Comparisons > Bones > Reconstructing the past > The Neandertal head: Part 1

**Q12:** In the DNALC's first-ever reconstruction of a full Neandertal skeleton, the cast for the hyoid bone came from which fossil?

**Hint:** Slideshow: Comparisons > Bones > Reconstructing the past > Making of the Neandertal

**Q13:** To study thinking and language, geneticist Svante Pääbo's group compares the genes of which two organisms?

**Hint:** Text: Comparisons > Behavior > Language and communication

**Q14:** What is the name of the first "language" gene found, where mutations in that gene affect language ability and speech?

**Hint:** Video: Comparisons > Behavior > Language and communication > Chimps, humans, and language

**Q15:** In which two countries have researchers found what they think are the two earliest *Homo sapiens* deliberate burial sites?

**Hint:** Video: Comparisons > Behavior > Burying the dead > Ancient human burials

**Q16:** Approximately how long ago did the Neandertals go extinct?

**Hint:** Text: Comparisons > Behavior > Surviving in a changing world

**Q17:** In 1967, Allan Wilson and Vince Sarich published their estimate of when the human lineage separated from the great apes. What was this estimate?

**Hint:** Text: Comparisons > DNA > Molecular comparisons

**Q18:** On average, how many differences are there between humans and chimps in a 379-nucleotide part of the mtDNA control region?

**Hint:** Animation: Comparisons > DNA > Molecular comparisons > Chimp and human (mtDNA)

**Q19:** Which technique did Mary-Claire King use to infer that human and chimpanzee DNA differ by only one percent (1%)?

**Hint:** Text: Comparisons > DNA > Of apes and humans

**Q20:** When did Mary-Claire King compare the DNA of chimpanzees and humans?

**Hint:** Video: Comparisons > DNA > Of apes and humans > Shared genetic materials

**Q21:** Under ideal conditions, how long can DNA remain intact?

**Hint:** Text: Comparisons > DNA > Ancient DNA

**Q22:** In 1997, German scientists were able to extract DNA from 30,000 year-old Neandertal fossils. From which part of the cell did this DNA come from?

**Hint:** Text: Comparisons > DNA > Of Neandertals and humans

**Q23:** On average, how many differences are there between two modern human beings in a 379-nucleotide part of the mtDNA control region?

**Hint:** Animation: Comparisons > DNA > Of Neandertals and humans > Human mtDNA variation

**Q24:** What is the function of the mitochondria in the cell?

**Hint:** Text: Gene genealogy > Mitochondrial DNA > Looking at mitochondrial DNA (mtDNA)

**Q25:** How is the Y chromosome inherited?

**Hint:** Text: *Gene genealogy* > The Y chromosome

**Q26:** Name the two classes of markers found on the Y chromosome, that scientists use to trace genetic origins?

**Hint:** Video: *Gene genealogy* > The Y chromosome > Markers on the Y chromosome

**Q27:** What does Kenneth Kidd's lab study that few other researchers currently research?

**Hint:** Video: *Gene genealogy* > Other genome regions > Integrating new information

**Q28:** Name two ways mutations can naturally occur in DNA.

**Hint:** 3D animation: *Gene genealogy* > A molecular clock > Mutations and the molecular clock > DNA mutations

**Q29:** What are the two factors that Michael Hammer says control the amount of diversity in a population?

**Hint:** Video: *Gene genealogy* > A molecular clock > Mutations and the molecular clock > Measuring age by mutation

**Q30:** In 1987, a Californian research team used mitochondrial DNA (mtDNA) to construct a human family tree. To where and when did these scientists trace the most recent common ancestor of all living human beings?

**Hint:** Text: *Gene genealogy* > Tracing Ancestries > Tracing our maternal lineage

**Q31:** According to Jaume Bertranpetit, studies on which unique group of people in Europe can show a correlation between genes and language?

**Hint:** Video: *Gene genealogy* > *Tracing Ancestries* > *Some interesting histories*> *The Basques*

**Q32:** Why are the San, sometimes referred to as the African "Bushman", interesting to geneticists?

**Hint:** Video: *Gene genealogy* > *Tracing Ancestries* > *Some interesting histories*> *An ancient lineage: the San*

**Q33:** Which chromosome did Michael Hammer study to confirm that the Jewish tradition of passing the priesthood from father to son, a cultural characteristic, has been carefully followed for thousands of years?

**Hint:** Video: *Gene genealogy* > *Tracing Ancestries* > *Some interesting histories*> *Genetics and culture: the Cohenim*

**Q34:** Approximately how long did *Homo erectus* live on earth, and to how many continents did that species spread?

**Hint:** Animation and text: *Migrations* > *Follow the paths* > *Homo erectus* > *What's happening?*

**Q35:** If the *Australopithecines* are quite ape-like, what is the major difference between these species and modern apes that makes scientists believe they may be early ancestors to modern humans?

**Hint:** Video: *Our Family Tree* > *Apelike hominids that walked upright*

**Q36:** Sometimes *Homo rudolfensis* and *Homo habilis* are called the earliest humans? Why?

**Hint:** Video: Our Family Tree > The earliest humans?

**Q37:** What is it about the Chimp's skeletal structure that makes it difficult for them to walk around on two legs like human beings?

**Hint:** Animation: Comparisons > Bones > Becoming bipedal: walking upright > Comparing humans and chimps

**Q38:** Name five ways Neandertal skulls differ from modern human skulls.

**Hint:** Videos: Comparisons > Bones > Reconstructing the past > The Neandertal head: Pt 1 and Pt 2

**Q39:** Scientists believe the common ancestor of chimps and modern humans may have been adapted for which environment?

**Hint:** Text: Comparisons > Bones > Becoming bipedal: walking upright

**Q40:** How could you describe the shape of the Neandertal ribcage?

**Hint:** Animation: Comparisons > Bones > Reconstructing the past > Comparing humans and Neandertals

**Q41:** To which type of environment were the Neandertals most likely adapted?

**Hint:** Video: Comparisons > Bones > Reconstructing the past > The Neandertal body

**Q42:** Name three of the behavioral differences that set modern humans apart from the other hominids 40,000 years ago.

**Hint:** Text: Comparisons > Behavior > Human behavior

**Q43:** What does human origins expert Chris Stringer speculate may be the reason for the Neandertals' extinction?

**Hint:** Video: Comparisons > Behavior > Surviving in a changing world > Coping with rapid change

**Q44:** What does the ritual of ceremonial burial suggest about early human behavior?

**Hint:** Text: Comparisons > Behavior > Burying the Dead

**Q45:** If humans and chimps are 99/98% the same genetically, why are they still classified in different taxa, or different animal families?

**Hint:** Video: Comparisons > DNA > Of apes and humans: Anatomy, behavior, and genes.

**Q46:** King and Wilson suggested a reason for why a small amount of genetic difference could account for the major physical differences between humans and chimps. What was their theory?

**Hint:** Text: Comparisons > DNA > Looking directly at genes



**Q47:** Svante Pääbo studied the activity of genes expressed in various tissues of chimps, humans and orangutans. Which tissue type was found to have gene activity, which is unique to the human line of evolution?

**Hint:** Video: Comparisons > DNA > Looking directly at genes > Comparing chimp and human genes

**Q48:** Genetically, what accounts for the differences in the sense of smell between people?

**Hint:** Video: Comparisons > DNA > Looking directly at genes > Losing our sense of smell

**Q49:** Why does Svante Pääbo believe that is probably impossible to isolate DNA from dinosaur fossils?

**Hint:** Video: Comparisons > DNA > Ancient DNA > Isolating ancient DNA

**Q50:** Why does the DNA in bones and teeth stay preserved longer than the DNA in other tissues?

**Hint:** Video: Comparisons > DNA > Ancient DNA > Preservation of ancient DNA

**Q51:** Approximately how many genes in the human genome are related to our sense of smell, and, of those, how many are inactive?

**Hint:** Video: Comparisons > DNA > Looking directly at genes > Human smell receptors

**Q52:** What is the name of the modern tool used to profile the activity of genes in a cell?

**Hint:** Text: Comparisons > DNA > Looking directly at genes

**Q53:** Does mtDNA have a higher or lower mutation rate than sites in the rest of the genome?

**Hint:** Text: *Gene Genealogy* > Mitochondrial DNA (mtDNA) > Looking at mitochondrial DNA (mtDNA)

**Q54:** All living men today can trace their Y chromosome back to a single man. Does this mean this one man was the only man around at that time? Why or why not?

**Hint:** Video: *Gene Genealogy* > The Y chromosome > The Y chromosome and ancestry

**Q55:** How does Douglas Wallace ensure that he is working with the correct population that represents the genetic lineage for a particular geographic region?

**Hint:** Video: *Gene Genealogy* > Tracing ancestries > Some interesting histories > Studying indigenous populations

**Q56:** Why does author Steve Olson believe it's a very exciting time in using genetics to look at the history of human populations?

**Hint:** Video: *Gene Genealogy* > Other genome regions > Using chromosomes 1-22 > A wealth of information

**Q57:** Why is the mtDNA inherited exclusively from the mother?

**Hint:** Video: *Gene Genealogy* > Mitochondrial DNA (mtDNA) > Looking at mitochondrial DNA (mtDNA) > Inheriting mtDNA

**Q58:** Why does Michael Hammer say that there are many stories being told when we trace ancestry in the autosomal chromosomes?

**Hint:** Video: *Gene Genealogy* > Other genome regions > Using chromosomes 1-22 > Genes: a mosaic of histories

**Q59:** How do researchers attach a time scale to the molecular clock?

**Hint:** Text: *Gene Genealogy* > A molecular clock? > How fast does the molecular clock tick?

**Q60:** Why when scientists use the "molecular clock" to trace ancestry is the number of differences that we count an underestimate of the number of mutations that have actually occurred.

**Hint:** Video: *Gene Genealogy* > A molecular clock? > How fast does the molecular clock tick? > Counting DNA Mutations

**Q61:** How does the phylogenetic tree created by Mark Stoneking and other scientists using mtDNA comparisons from people around the world, suggest that modern humans evolved in Africa?

**Hint:** Video: *Gene Genealogy* > Tracing ancestries > Tracing our maternal lineage > Constructing our family tree

**Q62:** When scientists compare phylogenetic trees created using mtDNA data to trees created using Y-chromosome data, they find that the trees differ. How do scientists account for these differences, and what does it tell us about the movement of early human beings?

**Hint:** Video: *Gene Genealogy* > Tracing ancestries > Using genetic tools together > Male and female migration patterns

**Q63:** According to human origins expert Chris Stringer what's wrong with this picture?

(classic picture of ape crouched over then slightly less crouched hominids then upright human)

**Hint:** Video: *Our Family Tree* > Overview

**Q64:** In which direction is the human femur angled and how does this help us walk?

**Hint:** Animation: *Comparisons* > Bones > Becoming bipedal: walking upright > Comparing humans and chimps

**Q65:** Which of the following is most likely to have the smallest pelvis?

- a. Modern *Homo sapiens* female
- b. Neandertal male
- c. Modern *Homo sapiens* male.
- d. Neandertal female.

**Hint:** Animation: *Comparisons* > Bones > Becoming bipedal: walking upright > Comparing humans and chimps

**Q66:** What did Svante Pääbo's group discover about the *FOXP2* gene that may help us understand more about the evolution of human beings 200,000 years ago?

**Hint:** Video: Comparisons > Behavior > Language and communication > Chimps, humans, and language

**Q67:** There is debate in the scientific community over whether or not Neandertals buried their dead. Explain the major arguments on both sides of this debate.

**Hint:** Video: Comparisons > Behavior > Burying the dead > Neandertal Burials

**Q68:** How do we know that Neandertals did not contribute any mitochondrial DNA to people living in Europe today?

**Hint:** Video: Comparisons > DNA > Of Neandertals and humans > Analyzing Neandertal DNA

**Q69:** Explain the concept of the molecular clock.

**Hint:** Text and video: *Gene Genealogy* > A molecular clock? > Mutations and the molecular clock

**Q70:** Svante Pääbo hopes that in the next two years or so, scientists will be able to make a schedule or timeline of significant selective sweeps in the genes of evolving humans. How does he believe we will be able to do this?

**Hint:** Video: Comparisons > DNA > Looking directly at genes > Future comparisons

**Q71:** Why does the use of red ochre indicate to scientists that an early human population may have exhibited symbolic behavior?

**Hint:** Video: Comparisons > Behavior > Human behavior > Early humans

**Q72:** What does Sally McBrearty mean when she says we should try not to be "ethnocentric" when studying the behavior of prehistoric people?

**Hint:** Video: Comparisons > Behavior > Human behavior > What is human behavior?

**Q73:** Why do mitochondria have their own DNA separate from the rest of the DNA in the cell?

**Hint:** Video: Gene genealogy > Mitochondrial DNA (mtDNA) > Looking at mitochondrial DNA (mtDNA) > A closer look at mtDNA

**Q74:** Why do researchers usually consider chromosomes 1-22 as a series of structural "haplotype blocks"?

**Hint:** Text: Gene genealogy > Other genome regions > Using chromosomes 1-22

**Q75:** How much faster does mitochondrial DNA mutate than nuclear DNA?

**Hint:** Text: Gene genealogy > A molecular clock? > How fast does the molecular clock tick?

**Q76:** Who was "Mitochondrial Eve"?

**Hint:** Video: Gene genealogy > Tracing ancestries > Tracing our maternal lineage > Mitochondrial Eve