Name: _____ Date: _____ Class: ____

The Earliest Humans: Outline

I. First theories of human evolution

- a. Charles Darwin
  - i. *On the Origin of Species* (1859)
    1. First to link biological diversity to evolution
  - ii. *The Descent of Man, and Selection in Relation to Sex* (1871)
    1. Described human evolution
    2. Saw aesthetic factors ("looks") as sexual attractors
- b. Thomas Huxley
  - i. *Evidence as to Man's Place in Nature* (1863)
    1. First book to describe human evolution
- c. These scientists wrote about human evolution before human fossil evidence was ever discovered

II. Fossil evidence for evolution

- a. Paleontology
  - i. Study of prehistoric life of all forms, typically using fossils
- b. Paleoanthropology
  - i. Study of prehistoric human life (and human ancestry), typically using fossils
- c. Mary and Louis Leakey
  - i. Lifetimes dedicated to finding fossil evidence of human ancestors in Africa
  - ii. Olduvai Gorge
    1. "The Cradle of Mankind"
    2. Great Rift Valley in eastern Africa (Tanzania)
    3. Erosion reveals layers of datable artifacts, bones, and fossils going back 2,000,000 years

III. Hominid evolution

- a. Hominids = "great apes"
  - i. Chimpanzees, gorillas, humans, orangutans
- b. Numerous intermediary fossils have been found
  - i. But scientists disagree on which are human ancestors and which are evolutionary dead ends
    1. *Homo habilis* ↘
       - a. *Homo erectus*
         - i. *Homo sapiens neanderthalensis*
         - ii. *Homo sapiens sapiens* (us)

IV. Human evolution

- a. *Homo habilis*
  - i. 2.4 to 1.4 million years ago
  - ii. Fossils found in southern and eastern Africa
  - iii. Used simple bone and stone tools
  - iv. Nicknamed "handy man"
- b. *Homo erectus*
  - i. 1.8 million years ago to 70,000 years ago
  - ii. First human ancestor to walk fully upright
  - iii. Some made complex stone tools
  - iv. Example – "Peking Man"
  - v. Descendants were humans and Neanderthals

V. Neanderthals

- a. *Homo sapiens neaanderthalensis*
- b. Circa 400,000 to 30,000 years ago

c. Lived in Europe and Asia
d. Archaeogenetics – analysis of ancient and modern DNA
    i. Comparison of human and Neanderthal DNA shows that humans probably do not have Neanderthal ancestry
    ii. Genes reveal that Neanderthals had red hair and fair skin
        1. Fair skin developed among humans and Neanderthals to aid in the absorption of Vitamin D from the sun in areas far north of the equator
        2. Convergent evolution – different species (such as humans and Neanderthals) developing the same characteristic(s)

VI. Humans – *Homo sapiens*

a. "Homo" (Latin) means "man" or "human"
b. "Sapiens" (Latin) means "wise" or "intelligent"
c. "Homo sapiens" = "wise man" or "intelligent human"
d. Humans and Neanderthals both considered "sapiens"
e. Anatomically modern humans in Africa by 200,000 years ago
    i. Middle Paleolithic period

VII. Mitochondrial "Eve"

a. Mitochondrial DNA
    i. DNA that is passed from women
        1. Grandmother → Mother → Daughter
b. Mitochondrial "Eve"
    i. Lived 60,000 to 250,000 years ago
    ii. Most recent common female ancestor of all living humans
    iii. Lived in or around modern-day Tanzania in Africa
    iv. She was part of a group of early humans
        1. But only her mitochondrial DNA survives today

VIII. Y-chromosomal "Adam"

a. Y-chromosome
    i. DNA that is passed from men
        1. Grandfather → Father → Son
b. Y-chromosomal "Adam"
    i. Circa 60,000 years ago
    ii. Most recent common male ancestor of all living humans
    iii. Lived in Africa
    iv. He lived as part of a group of early humans
        1. But only his Y-chromosome survives today

IX. Humans – *Homo sapiens sapiens* – "us"

a. Fully modern humans (like us) in Africa by around 60,000 years ago
    i. Descendants of Mitochondrial Eve and Y-chromosomal Adam
    ii. Culture, language, music, etc.
b. "Out of Africa" theory
    i. Archaeogenetics (analysis of ancient and modern DNA) shows that humans began spreading throughout, and out of, Africa beginning around 60,000 years ago
c. Early human migrations
    i. Humans left southeastern Africa and spread throughout the continent
    ii. Humans traveled along the Indian Ocean to reach Australia
    iii. By 10,000 years ago, modern human beings had spread all over the globe

X. Review questions

a. Who was the first person to link biological diversity to evolution?
b. What family of paleontologists dedicated their lives to finding the fossils of human ancestors at Olduvai Gorge in Africa?
c. What was archaeogenetics told us about Neanderthals?
d. Who was Mitochondrial Eve?
e. Who was Y-chromosomal Adam?
f. Describe the "Out of Africa" theory.
g. What parts of the world were the first to be settled by modern humans? The last?