

Homo habilis

Transparency 2.2D In this transparency we see the skull of an adult *Homo habilis* male who lived about 2 million years ago. The part of the skull pictured here is about 5 1/2 inches tall. It was found at the Koobi Fora site in Kenya.



What do you see here? In what condition do you think this skull was originally found? What kinds of questions could paleoanthropologists answer by studying this skull? The braincase of this skull is almost 50 percent larger than that of an average *Australopithecus afarensis*. What is the significance of this difference?

Overview In 1964, a British anthropologist named Louis Leakey and his colleagues announced in a scientific article that they had found the remains of the oldest hominids from the genus *Homo* (Latin for "man"). Leakey believed that the stone tools his team had found scattered around the hominid fossils were evidence that the hominids had been intelligent, toolmaking humans. Leakey gave his find the species name *Homo habilis*, or "handy man," in honor of the species' toolmaking ability. *Habilis* lived from about 1.9 million to about 1.5 million years ago, and coexisted with several australopithecine species and one or more other *Homo* species.

Many scientists argue that *habilis* is not its own species. These scientists believe that *habilis* fossils are actually a combination of at least two different species, some belonging to the *Australopithecus* genus and some to the *Homo* genus. As evidence, they point to the fragmentary quality of *habilis*

in 1978 when paleoanthropologist Mary Leakey discovered hominid footprints at the Laetoli site in Tanzania, East Africa. The footprints were 3.6 million years old, and most scientists believe they were made by a group of *afarensis*. While the body of an *afarensis* is similar in many ways to a modern human body, *afarensis* probably lacked the more sophisticated anatomical and mental features necessary to develop a complex spoken language.

Scientists can only guess about the daily lives of Lucy and other *afarensis*. Johanson found the remains of 13 *afarensis* individuals of various ages and both genders jumbled together at Hadar (perhaps the victims of a flash flood). This led him to believe that *afarensis* may have lived in small social groups. Scientists have not discovered any tools from the time period in which *afarensis* lived. However, many scientists believe *afarensis* could have used simple tools, such as digging sticks. Some paleoanthropologists believe that the blunted points, or *cusps*, of *afarensis* teeth prove that *afarensis* ate insects, worms, eggs, fruits, lizards, and other foods that were easy to chew.

Appearance For years, scientists had to guess what *afarensis* heads looked like based on a reconstruction of more than 100 skull fragments from several individuals. Then, in 1992, Donald Johanson's team reported the discovery of a 3-million-year-old *afarensis* skull. The large, apelike head contained a brain one third the size of an average modern human brain (about 410 cubic centimeters). The skull also had a jutting jaw, prominent brow bones, and flared cheekbones. *Afarensis*'s teeth and jaws were a combination of ape and human characteristics.

Scientists continue to debate whether Lucy's hands and feet show more apelike or more humanlike characteristics. Johanson notes the amazing similarities between *afarensis*'s hands and feet and modern human hands and feet. Other scientists point out that *afarensis*'s toes and fingers were long and curved, like those of a tree-climbing ape. Compared to a human, Lucy's arms are long in relation to her legs, but her legs are similar to human legs. Johanson estimates that Lucy would have stood 3 feet 6 inches tall (the height of an average human 6 year-old).

Modern-day anthropological artists use computer technology and their knowledge of anatomy to help them determine the appearance of *afarensis*'s muscles, tissues, and facial features. No one knows for certain the details of *afarensis*'s appearance, such as how much hair it had, how dark its skin was, or how its nose was shaped. Artists base their drawings of hominids on particular scientific hypotheses, or simply make a choice. For example, an artist might depict a female *afarensis* as less hairy than her male companion so that viewers know which one is the female.



Transparency 2.2C In this transparency we see an artist's rendition of australopithecines making the famous footprints at Laetoli about 3.6 million years ago.

What do you see here? Why is the sky beginning to fill with smoke? Why would the footprints left in the volcanic ash by these australopithecines be of interest to paleoanthropologists? What capabilities and skills do these australopithecines exhibit? Which aspects of this image do you think the artist had to guess about when creating it?

Capabilities and Skills Paleoanthropologists can obtain important information about a hominid's capabilities from subtle anatomical details such as the slant of the pelvis, the way a knee joint comes together, or the curve of a finger bone. A year before Johanson discovered Lucy, he found two hominid leg bones at the Hadar site. Together, these leg bones formed a knee joint. Unlike a four-legged ape's knee joint, the knee joint was slanted. This slanted knee joint made it possible for the hominid to walk upright and straight ahead, instead of teetering and swinging from side to side as primates do in order to keep their balance. After discovering and studying Lucy, Johanson and his associates concluded that *afarensis* regularly walked on two feet, or were fully *bipedal* (two-footed). This theory was confirmed

fossils and the huge variations in anatomy among the fossils. One paleoanthropologist dismissed *Homo habilis* as a “wastebasket” species in which paleoanthropologists tossed hominid bones they were unable to classify.

Fossil Discoveries Louis Leakey found his first ancient stone tool at Olduvai Gorge in 1931. The river-carved gorge is located in northern Tanzania. It cuts through land that once held a large lake and attracted ancient animals and hominids. This east African site is ideal for fossil hunting because the river has sliced through 300 feet of earth in which animals, hominids, and tools lay buried for more than a million years. In 1959, Louis and his wife Mary found their first hominid skull at Olduvai. Two years later, the Leakeys’ son, Jonathan, found fragments of a hominid skull and jawbone not far from where the Leakeys had found the first skull. The team later found hominid hand and foot bones at the same site, and two fragmentary skulls at another site that seemed to be of the same species. Based on this evidence, Leakey decided they had found the oldest known species belonging to the human genus: *Homo habilis*.

Another important *habilis* discovery occurred 25 years after the Leakeys had discovered their first *habilis* bones. In 1987, Donald Johanson announced his team’s discovery of a fragmentary *habilis* skeleton that was between 1.9 and 1.8 million years old. They chose to label the find *habilis* based on the shape of the teeth and the palate. The long, apelike limbs of this individual surprised many who expected that a *habilis* skeleton would look more human than australopithecine. This led Richard Leakey, another son of Louis Leakey’s, to question Johanson classifying the specimen as *Homo habilis*.

Appearance Scientists disagree on whether *habilis* is an actual species, and so there is a great deal of uncertainty surrounding many *habilis* fossils. The most complete skull to be labeled *habilis* has a facial structure similar to that of a robust *Australopithecus*, but has smaller back teeth and a larger brain capacity (about 750 cubic centimeters). The only postcranial (below the skull) skeleton to be labeled *habilis* has arms that appear to be slightly more apelike than even *Australopithecus afarensis*. Textbooks have traditionally described the average *Homo habilis* as 5 feet tall and 100 pounds, with females being somewhat smaller. However, the methods scientists have used to estimate *habilis*’s height and weight are inexact. They have either averaged the measurements of all *habilis* fossils or have made guesses based on one fragmentary find. A number of paleoanthropologists assert that they do not yet know enough about *habilis* to conclude anything about its appearance or brain size.



Transparency 2.2E In this transparency we see an artist's rendition of a *Homo habilis* group at a campsite.

What do you see here? What are the hominids in the foreground doing? How are they removing the zebra's skin? In what other kinds of activities are the hominids engaged? Which aspects of this image do you think the artist had to guess about when creating it?

Capabilities and Skills Though scientists have had limited success finding uncontroversial *habilis* bones, they have discovered many stone tools *habilis* apparently left behind. *Habilis*'s stone-tool technology is called the Oldowan industry, taking its name from Olduvai Gorge, where the first stone tools were found. Oldowan tools are the oldest stone tools ever discovered and date back to approximately 2.5 million years ago. Some of the earlier tools predate *habilis*'s existence, and scientists believe the tools may have been created by certain australopithecines. People have found Oldowan tools in parts of Africa and Eurasia.

Habilis made tools by chipping one end of quartz or lava rocks with a hammerstone. They probably used these tools to chop meat or animal bones. They also used sharp stone flakes to cut wood, meat, and soft material such as grass. In addition to stone tools, *habilis* also made tools from animal bones, including antlers. Though *habilis*'s tools were simple compared to those of later species, toolmaking represented a great evolutionary leap. Toolmaking required an ability to plan, imagine, and pass down knowledge. If *habilis* did indeed have larger brains than did the australopithecines, this factor may have facilitated their ability to craft stone tools.

Most scientists agree that early *Homo* ate a diet consisting primarily of fruit and other plants they could gather, but that they also supplemented their diet with meat. In the past, Louis Leakey and other paleoanthropologists argued that *habilis* were hunters who stalked and killed animals for their meat. More recently, this view has been challenged. Many paleoanthropologists now believe that *habilis* watched the skies for vultures or listened for the cackle of hyenas to track down animal carcasses. According to this theory, *habilis* waited until lions, leopards, and other carnivores had killed their prey and had eaten most of the meat from the bones. Then, *habilis* would cut off various bones and take them to a separate area to remove the marrow. This marrow would have provided early hominids with a high-energy food source. Early *Homo* may also have hunted or made traps for small animals and perhaps dug for insects.

While scientists agree that all hominids from the *Homo* genus lived in social groups, they do not know whether *habilis* banded together for safety or for more effective scavenging or hunting. One *habilis* brain cast reveals that the brain contained a segment also found in modern human brains. This area is called Broca's area and manages the muscles related to speech. However, there is no evidence that *habilis* had a complex spoken language like that of modern humans.