

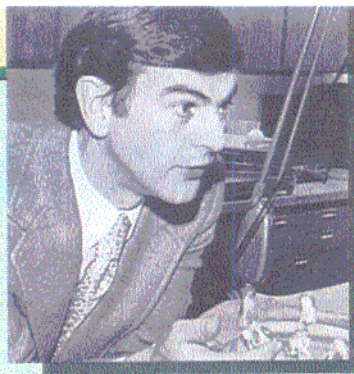
DIGGING UP THE PAST

No one knows how Lucy died. She apparently died quietly. If she had been killed by a lion or a leopard, her bones probably would have been splintered and crushed. She had not been scavenged by hyenas, or her skeletal parts would have been scattered over a wide area. Instead, she died by the edge of an ancient lake and was covered by mud and sand, where she remained buried for almost 3.5 million years.

Lucy lived in what is today the Afar desert, a remote region of northeastern Ethiopia in East Africa (see map in Figure 2.1). The large lake that once existed there has long since dried up, and the area is now hot and desertlike. Even though she was fully grown and probably in her twenties when she died, Lucy stood only three and one-half feet tall. Her head was a bit larger than a softball, and her brain could not have been much larger than that of a modern chimpanzee. The shapes of her knee joint and pelvis bones indicate that she walked upright on two legs. For more than 3 million years, Lucy remained buried in the ancient lake bed.

In 1973 Donald Johanson, pictured above, a young anthropologist from the United States, arrived in Ethiopia to look for fossils. Working with two Frenchmen, Maurice Taieb and Yves Coppens, Johanson found a primitive primate knee joint that had washed out of a slope during a rain. It seldom rains in the Afar desert, but when it does, the rain is torrential, cutting gullies into the gravel and bare rock. On very rare occasions, these rains uncover ancient fossils, and as luck would have it, such a rain occurred not long before Johanson's find. This fossil knee joint was intriguing because it was about 3 million years old, and its structure indicated that this individual had walked erect. Because of this find, Johanson decided to return to the same ancient lake bed the following year to continue the search. If any more humanlike fossils were embedded in the ground, they might be of a similar age. Johanson and his colleague, Tom Gray, had been searching all fall with no success when they parked their vehicle on the slope of a gully on the morning of November 30, 1974.

The temperature had reached 43°C (110°F), and they were about to return to camp when Johanson noticed part of a fossilized arm bone lying on the ground partway up the slope of a gully. As he searched further, he found pieces of a skull, thighbone, and pelvis, along with other skeletal parts but no evidence of any tools. Remarkably, the skeletal parts all seemed



to be from one individual, and a very humanlike individual at that. The two scientists barely could contain their excitement. They named the skeleton "Lucy," after a song that was popular at the time. This skeleton (shown in the opening photo) has become one of the most famous fossils found of an early

humanlike animal.

What did this new find mean in terms of human origins? Did gradual changes in animals such as Lucy eventually lead to modern humans? Some of the answers had to wait until Johanson returned to his lab at the Cleveland Museum of Natural History. There, he and his colleagues spent many months in painstaking detective work, comparing Lucy with other fossils of more recent human ancestors as well as with modern human and ape skeletons. Johanson's conclusions sharpened the debate within the scientific community about exactly when the human line split from the ape line, but most scientists agree that at a very early time, there was a single primate ancestor to both modern humans and modern apes. The controversy about when the split occurred still is not resolved.

Will more fossil remains of the links between humans and our most ancient ancestors be discovered, and if so, will they help to resolve the dispute about this timing? Perhaps a future anthropologist will discover more clues to clarify further the details of our origins.

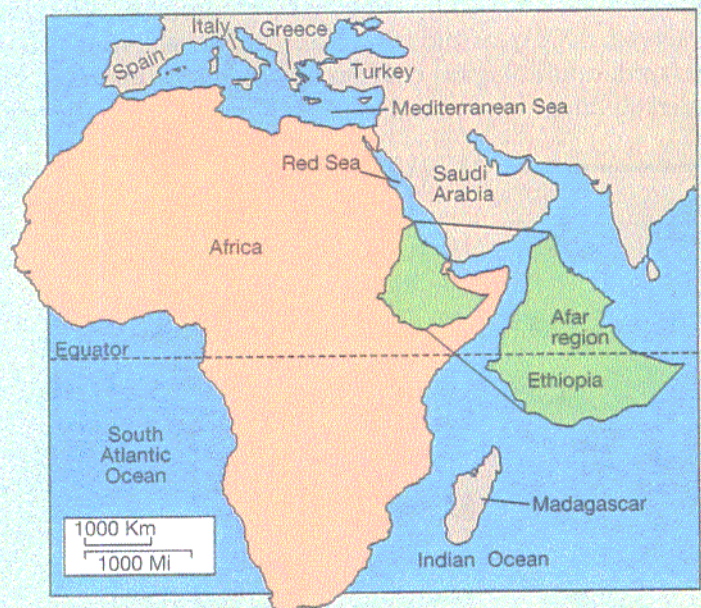


Figure 2.1 Map of the Afar region in Ethiopia

LUCY

Since the mid-1800s, scientists have been piecing together the puzzle of human evolution. Some of the most important pieces of this complex puzzle are the fossilized skeletal remains of individuals who lived millions of years ago. Dated at about 3.5 million years old, Lucy is one of the oldest and most complete hominid fossils (hominids are erect-walking primates that include modern humans, earlier human species, and early humanlike species).

In this activity you will think about how Lucy may have looked and behaved while she was alive, and you will begin to appreciate how much humans have changed across time.

Engage

Process and Procedures

1. Describe in your journal how Lucy may have looked and some of her physical behaviors.

Use the photograph of the fossil skeleton on the opening pages of this chapter and your notes from Chapter 1 to help you develop your description. In your description, pay particular attention to Lucy's hands, feet, posture, and way of moving. Try to describe how she may have communicated with family members and others living in her group.

2. Consider the following question and record your answer in your journal.

How might Lucy bridge the gap between modern humans and early nonhuman primates?

Analysis

Use the information from your description to answer the following questions as part of a class discussion.

1. Comparing hominids from Lucy's lifetime to your own, do you think there have been more changes in physical characteristics of the body (such as hands, feet, head, posture) or more changes in how hominids lived (types of shelter, ways of getting around, ways of gathering food)?
2. Use the paragraph below to help you answer these questions:
 - a. Which aspects of your description were based on evidence?
 - b. Which aspects of your description were inferences related to evidence?
 - c. Which aspects of your descriptions were guesses?

When scientists find skeletal remains, they work carefully to gather as much information as possible from their findings. Often the skeletal remains are incomplete, but such remains are **evidence** from which the scientists can draw conclusions about the individual. Conclusions that follow logically from some form of direct evidence are known as **inferences**. (Conclusions that do not follow logically from evidence are just guesses; guessing is not an acceptable way to draw scientific conclusions.) For example, scientists have made inferences based on skeletal evidence about how tall an individual was

Major Concepts: Change in humanlike organisms

Overview

The purpose of this activity is to engage the learners as they think about the concept of change across time. We ask the learners to look at the specific example of the fossil hominid Lucy. The students later will learn that, in biology, change often is a synonym for evolution, but because this is an engage activity, it is not necessary at this point to describe the change in hominids as evolution. Rather, the students should begin to think about the idea that living things do change across a long period of time.

Preparations

You may find it useful to review human evolution in a general sense as well as Lucy's place in the picture. Bernard G. Campbell's book, *Humankind Emerging* (1992, New York: HarperCollins Publishers, Inc.), now in its sixth edition, provides a well-rounded discussion of human evolution and presents various scientific points of view.

Outcomes and Indicators of Success

The following indicators allow you to assess the students' level of success with the activity and to assess their process of learning.

By the end of this activity, the learners should become aware that the fossil Lucy helps build a case for ideas about how hominids have changed across time.

They will show their awareness by

- describing how Lucy may have looked and behaved,
- speculating on how Lucy might bridge the gap between modern humans and early nonhuman primates,
- participating in a discussion comparing early hominids to modern humans, and
- identifying the role of evidence and inference in formulating their discussions.

Strategies for Guiding Learners

Process and Procedures

Step 1

Encourage students to use the photograph of Lucy and the story to complete their journal entries. They should develop descriptions that indicate what Lucy might have looked like and how she might have behaved. If they are including only physical characteristics, ask the learners to consider other types of characteristics as well, such as whether they imagine that early hominids lived in naturally occurring shelters or in constructed shelters. This will get students to begin considering differences other than physical ones. Encourage the students to build on the concepts from Chapter 1 about the distinguishing characteristics of humans.

