

### ● Before You Read

When you think of “cave men,” what image comes to mind? On the lines below, describe your idea of early humans and their behaviors. Then read the section to learn about your cave-dwelling ancestors.

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### ● Read to Learn

#### The *Homo* Genus

The genus *Homo* includes living and extinct humans. Members of this genus first appeared in Africa between 3 and 2.5 mya. Scientists think they evolved from an australopithecine ancestor.

*Homo* species had bigger brains than the australopithecines. They also had lighter skeletons, flatter faces, and smaller teeth. *Homo* species were the first to control fire and to use stone tools. As they evolved, they developed language and culture.

#### How did *Homo habilis* differ from its ancestors?

The first *Homo* species for which fossils exist is *Homo habilis*. *Homo habilis*, which means “handy man,” used stone tools. The *Homo* traits of *H. habilis* included a larger brain, smaller brow and jaw, flatter face, and more humanlike teeth. Like its australopithecine ancestors, however, *H. habilis* was small, had long arms, and could climb trees. ✓

Another species, *Homo rudolfensis*, might have lived at the same time. However, few fossils of this species exist. Scientists are uncertain about how *H. rudolfensis* relates to the *Homo* line.

### MAIN Idea

Tracing the evolution of the *Homo* genus is important for understanding humans.

#### What You'll Learn

- the Out-of-Africa hypothesis
- similarities and differences between Neanderthals and modern humans

### Mark the Text

#### Read for Understanding

As you read this section, highlight any sentence that you do not understand. When you finish the section, go back and reread the sentences you highlighted.

### Reading Check

1. **Describe** two ways in which *H. habilis* was more like apes than like humans.

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## Think it Over

2. **Explain** why *H. ergaster* might have followed migrating animals.

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## Reading Check

3. **Describe** the types of fossils that are classified as *Homo heidelbergensis*.

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## Why is *Homo ergaster* important?

The next species, *Homo ergaster*, appeared only briefly in the fossil record. It had a larger brain than *H. habilis*. It was also taller and lighter with longer legs and shorter arms. Scientists think that *H. ergaster* had the first humanlike nose (with nostrils facing downward).

**Tools** *H. ergaster* made hand axes and other tools. This species might have been a hunter or a scavenger. The tools might have been used to scrape meat off scavenged bones.

**Migration** *H. ergaster* appears to be the first African *Homo* species to migrate to Asia and Europe, possibly following migrating animals. Forms of *H. ergaster* in Europe and Asia are called *Homo erectus*. Scientists believe that *H. ergaster* is an ancestor to modern humans.

## What skills did *Homo erectus* have?

In Europe and Asia, *Homo erectus* evolved from *H. ergaster*. This species includes “Java Man,” discovered in Indonesia, and “Peking Man,” discovered in China. Unlike earlier species, *H. erectus* adapted to many types of environments.

*H. erectus* was taller than *H. habilis*. It had a bigger brain and more humanlike teeth. *H. erectus* featured a long skull, low forehead, and a thick brow ridge. This species made advanced tools, used fire, and sometimes lived in caves.

## What is the significance of *Homo floresiensis*?

Most scientists believe that *H. erectus* went extinct about 400,000 years ago. Fossils discovered in 2004 on Flores island, Indonesia, suggest otherwise. This species, called *Homo floresiensis* (flor eh see EN sus), descended from *H. erectus* or another hominin. It existed until 12,000 years ago. Nicknamed “The Hobbit,” *H. floresiensis* was only about 1 m tall. Basic stone tools were found with its fossils.

## What traits did *Homo heidelbergensis* display?

The transition from *H. ergaster* to modern humans occurred gradually. Many fossils display a mix of traits of *H. ergaster* and modern humans. Some scientists classify these diverse fossils as *Homo heidelbergensis*. Others put them in a broader category called *Homo sapiens*. These humans had larger brains and thinner bones than *H. ergaster*, but they still had thick brow ridges and small chins.

## Are Neanderthals our ancestors?

The **Neanderthals**, or *Homo neanderthalensis*, were a species that evolved only in Europe and Asia. They likely evolved from *H. erectus* or a *Homo* species of the transition period. Neanderthals were larger than humans and had large brains. They had thick skulls and brow ridges, large noses, and heavy muscles attached to their thick bones. ✓

Neanderthals lived near the end of the Pleistocene ice age. They hunted, used fire, and made complex shelters. Evidence suggests that they cared for their sick and buried their dead.

In some areas, Neanderthals overlapped with modern humans. However, DNA tests on fossil bones show that Neanderthals were not part of the human gene pool. They were a different species. Neanderthals went extinct about 30,000 years ago.

## Emergence of Modern Humans

The thinner skeletons of *Homo sapiens* give them a more slender appearance than other *Homo* species. They have rounder skulls and smaller faces with an obvious chin. *H. sapiens* first appeared in what is now Ethiopia about 195,000 years ago. Early members of this species chipped stones to make hand axes and other tools. The table below compares *Homo* species.

Species	Time in Fossil Record	Characteristics
<i>Homo habilis</i>	2.4 to 1.4 million years ago	<ul style="list-style-type: none"> <li>• average brain size: 650 cm<sup>3</sup></li> <li>• used tools</li> </ul>
<i>Homo ergaster</i>	1.8 to 1.2 million years ago	<ul style="list-style-type: none"> <li>• average brain size: 1000 cm<sup>3</sup></li> <li>• had thinner skull bones</li> <li>• had humanlike nose</li> </ul>
<i>Homo erectus</i>	1.8 to 400,000 years ago	<ul style="list-style-type: none"> <li>• average brain size: 1000 cm<sup>3</sup></li> <li>• had thinner skull bones</li> <li>• used fire</li> </ul>
<i>Homo neanderthalensis</i>	200,000 to 30,000 years ago	<ul style="list-style-type: none"> <li>• average brain size: 1500 cm<sup>3</sup></li> <li>• buried their dead</li> <li>• possibly had language</li> </ul>
<i>Homo sapiens</i>	195,000 years ago to present	<ul style="list-style-type: none"> <li>• average brain size: 1350 cm<sup>3</sup></li> <li>• does not have brow ridge</li> <li>• has a small chin</li> <li>• has language and culture</li> </ul>

### ✓ Reading Check

**4. Generalize** How did the Neanderthal body differ from the human body?

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### Picture This

**5. Describe** the trend in brain size as evolution progressed from earlier species to more recent species.

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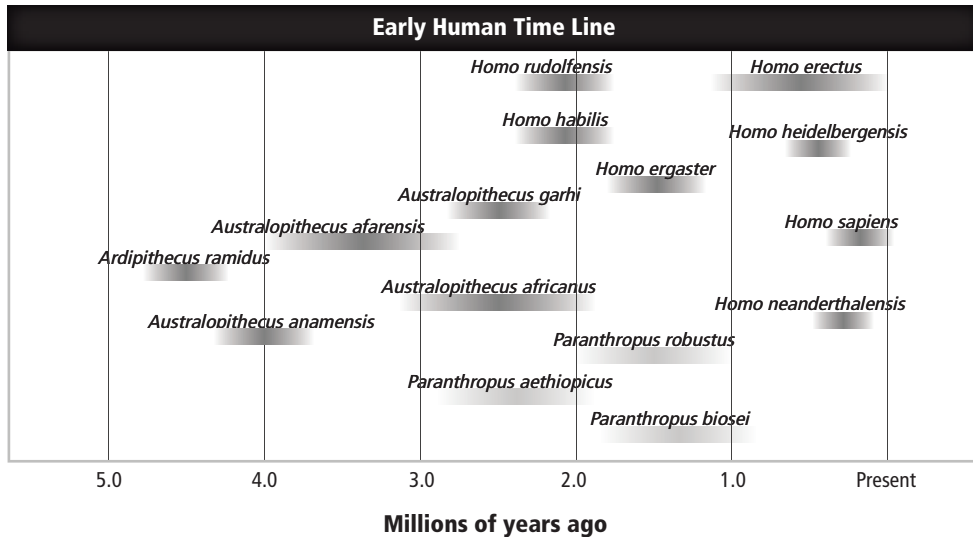
## Picture This

**6. Highlight** Use a marker to highlight the direct ancestor of today's human beings.

## What is the “Out of Africa” hypothesis?

As shown in the figure below, many hominin species overlapped until about 30,000 years ago. Then, only modern humans remained.

Some scientists believe that modern humans evolved at the same time in different areas of the world. Most scientists, however, support the “Out of Africa” hypothesis. This view suggests that humans evolved only once, in Africa, and then migrated to all parts of the world, replacing other hominins.



## Think it Over

### 7. Draw Conclusions

Scientists found the widest variation in mitochondrial DNA in Africans. What conclusion could they draw from this finding?

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## How did DNA support this hypothesis?

Mitochondrial DNA analysis of today's humans supported this hypothesis. Mitochondrial DNA changes very little over time. As a result, scientists reasoned that populations with the most variation in this DNA must have existed the longest time. They found the widest variation among Africans.

Mitochondrial DNA is inherited only from the mother. Therefore, this analysis suggested that *H. sapiens* emerged in Africa about 200,000 years ago from a hypothetical “Mitochondrial Eve.”

## What evidence of human culture appeared?

Unlike Neanderthals, early modern humans expressed themselves using symbols and art. They drew on cave walls and decorated objects, and developed complex tools and weapons. They were the first to fish, make clothing, and raise animals. Cultural expressions such as these marked the first fully modern humans. Some people consider **Cro-Magnons** to be the first hunter-gatherers.