

26.3 Primate Evolution

-  Identify the characteristics that all primates share.
-  Describe the major evolutionary groups of primates.
-  Describe the adaptations that enabled later hominine species to walk upright.
-  Describe the current scientific thinking about the genus *Homo*.

Lesson Summary

What Is a Primate? In general, a primate is a mammal that has relatively long fingers and toes with nails instead of claws, arms that can rotate around shoulder joints, a strong clavicle, and a well-developed cerebrum.

- ▶ Many primates have eyes that face forward, giving them **binocular vision**, which is the ability to combine visual images from both eyes to provide three-dimensional views.
- ▶ The well-developed cerebrum enables complex behaviors.

Evolution of Primates Humans and other primates evolved from a common ancestor that lived more than 65 million years ago. Early in their history, primates split into two groups:

- ▶ Primates in one group look very little like typical monkeys. This group contains the lemurs and lorises.
- ▶ Primates in the other group include tarsiers and **anthropoids**, or humanlike primates. Monkeys, great apes, and humans are anthropoids. Anthropoids split into two groups about 45 million years ago.
 - The New World monkeys have **prehensile tails**, which can coil tightly around a branch to serve as a “fifth hand.”
 - Old World monkeys do not have prehensile tails. Great apes, also called **hominoids**, include gibbons, orangutans, gorillas, chimpanzees, and humans.

Hominine Evolution The hominoids in the lineage that led to humans are called **hominines**. The skull, neck, spinal column, hip bones, and leg bones of early hominine species changed shape in ways that enabled later species to walk upright.

- ▶ The evolution of **bipedal**, or two-footed, locomotion freed both hands to use tools.
- ▶ The hominine hand evolved an **opposable thumb** that could touch the tips of the fingers, enabling the grasping of objects and the use of tools.
- ▶ Hominines also evolved much larger brains.
- ▶ The oldest hominine fossil may be *Sahelanthropus*, roughly seven million years old.
- ▶ Fossils of one early group of hominines, *Australopithecus*, showed they were bipedal apes that probably spent some time in trees.
- ▶ *Paranthropus* probably had a diet like that of modern gorillas. This species lived two to three million years ago.

The Road to Modern Humans Many species of the genus *Homo* existed before *Homo sapiens* appeared. At least three other *Homo* species existed at the same time as early humans.

- ▶ *Homo neanderthalensis* survived in Europe until 28,000–24,000 years ago. *H. sapiens* coexisted with the Neanderthals for several thousand years.

What Is a Primate?

For Questions 1–4, complete each statement by writing the correct word or words.

1. Primates have _____ on their fingers and toes.
2. Primates are good climbers because they have a strong shoulder joint attached to a strong _____.
3. The ability to combine vision from both eyes is _____ vision.
4. The “thinking” part of the brain is the _____.

Evolution of Primates

For Questions 5–11, write the letter of the correct answer on the line at the left.

- _____ 5. How long ago did the common ancestor of all primates live?

A. 65 million years ago	C. 45 million years ago
B. 56 million years ago	D. 28,000 years ago
- _____ 6. Which of these is NOT an anthropoid?

A. gibbon	C. human
B. orangutan	D. tarsier
- _____ 7. What factor contributed to the split of two groups of anthropoids about 45 million years ago?
 - A. One group developed a prehensile tail.
 - B. The continents where they lived moved apart.
 - C. They diverged from the lemurs and tarsiers.
 - D. The climate changed from warmer to colder.
- _____ 8. Which characteristic distinguishes the New World monkeys from the Old World monkeys?

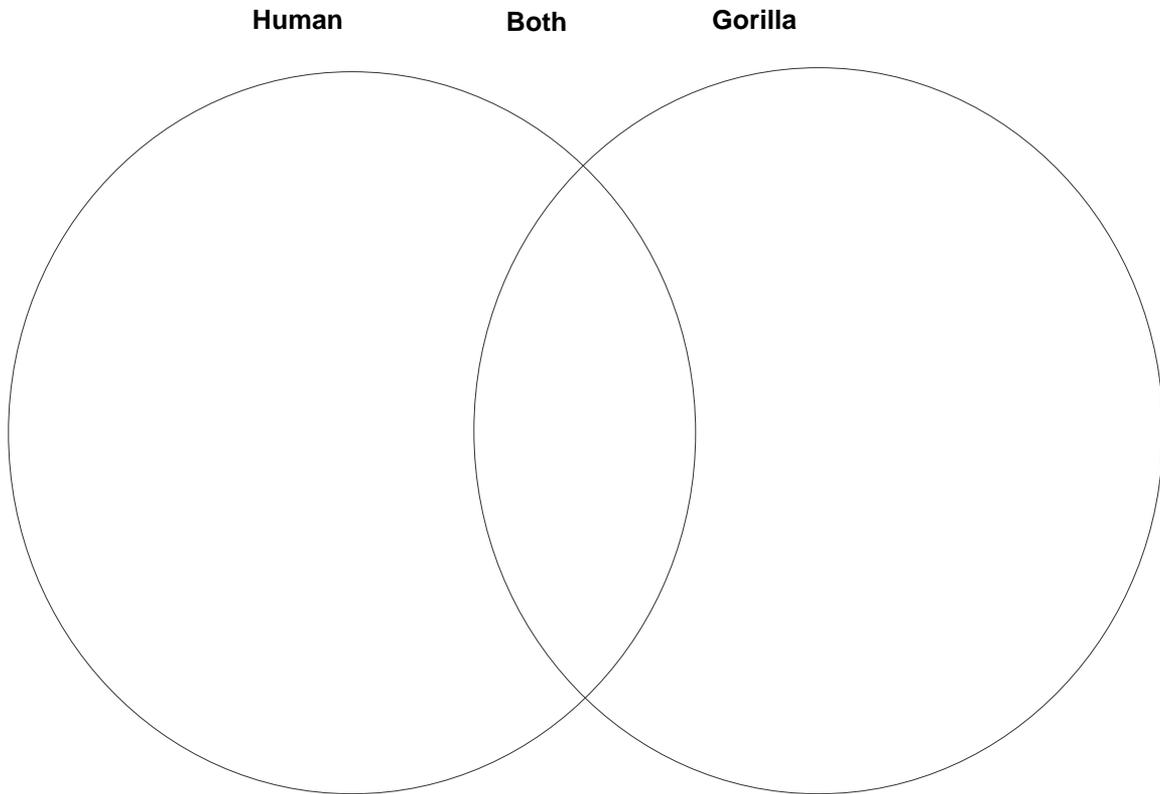
A. prehensile tail	C. binocular vision
B. opposable thumb	D. mammary glands
- _____ 9. Which of these is a hominoid?

A. loris	C. tarsier
B. lemur	D. gibbon
- _____ 10. Which primate is the closest relative of humans?

A. gorilla	C. orangutan
B. gibbon	D. chimpanzee
- _____ 11. How did scientists confirm which primate was the closest primate relative to humans?
 - A. by comparing the skeletons
 - B. by studying behavior
 - C. by using DNA analyses
 - D. by using geographic analyses

Hominine Evolution

12. Complete the Venn diagram to compare human and gorilla skeletons.



13. What do Lucy and the Dikika Baby have in common? Which one is more complete?

14. Why did scientists conclude that *Paranthropus* probably ate a diet that included coarse and fibrous plant foods?

15. Why do we now think about human evolution as a shrub with multiple trunks rather than a family tree?

The Road to Modern Humans

For Questions 16–21, write *True* if the statement is true. If the statement is false, change the underlined word to make the statement true.

- _____ 16. One species of our genus, *Homo*, existed before our species, *Homo sapiens*.
- _____ 17. The earliest fossils that can definitely be assigned to the genus *Homo* are from the species *H. ergaster*.
- _____ 18. Researchers agree that the genus *Homo* originated in Asia and migrated to other parts of the world.
- _____ 19. One way to discover the migration patterns of human ancestors is to compare the mitochondrial DNA of living humans.
- _____ 20. Early *Homo sapiens* lived at the same time as another, closely related species, *Homo neanderthalensis*.
- _____ 21. The only surviving species of the once large and diverse hominine clade is *Homo erectus*.

Apply the Big idea

22. What evidence do scientists use to classify extinct species of the genus *Homo*? How do scientists differentiate extinct species of *Homo* from each other and from the modern species?
