

● Before You Read

Have you ever watched a monkey or an ape in a zoo or on television? On the lines below, list some humanlike behaviors you might have observed. Then read the section to learn some traits you share with your fellow primates.

MAIN Idea

Primate characteristics indicate that primates evolved from a common ancestor.

What You'll Learn

- characteristics of primates
- similarities and differences among major primate groups

● Read to Learn

Characteristics of Primates

Primates are a group of mammals that includes humans, apes, monkeys, and lemurs. Primates have a high level of manual dexterity. Manual dexterity enables primates to grasp objects and move them around in their hands. Primates have well developed eyesight, long mobile arms, and large brains. Primates with the largest brains can reason.

Why is an opposable first digit important?

The hands and feet of all primates have five digits. Most have flat nails and sensitive areas on the ends of their digits. The first digit on the hands of most primates and the first digit on the feet of many primates are opposable. An **opposable first digit**, either a thumb or a toe, is set apart from the other digits. This digit can be brought across the palm or foot to touch or nearly touch the other digits. This action allows primates to grasp objects.



Study Coach

Create a Quiz After you read this section, create a five-question quiz from what you have learned. Then, exchange quizzes with another student. After taking the quizzes, review your answers together.

Picture This

1. **Label** the opposable first digit in the picture.



Organize Information

Use two sheets of notebook paper to make a layered Foldable. As you read about primates, use your Foldable to organize the main ideas and vocabulary.

Primates
Characteristics
Groups
Evolution

How do forward-looking eyes benefit primates?

Most primates rely more on vision than on smell. Their eyes are on the fronts of their faces. This creates overlapping fields of vision called **binocular vision**. Forward-looking eyes provide depth perception and enable primates to judge distance and movement of an object.

Most primates are **diurnal** (di YUR nul) which means they are active during the day. Many diurnal primates also have color vision. **Nocturnal** (nahk TUR nul) primates are active at night. They see only black and white colors.

With smaller snouts, primates have a reduced sense of smell. Their flattened faces aid binocular vision. Their teeth are unspecialized, enabling them to eat a variety of foods.

How do primates move?

Primates rely on hind limbs for movement. Most primates live in trees. Their flexible shoulders enable easy movement from branch to branch. On the ground, all primates except humans walk on four limbs most of the time.

What are characteristics of a primate brain?

Primates have large brains. More areas of their brains are dedicated to vision and fewer to smell. Large areas of their brains are dedicated to memory and to arm and leg movement. Many primates are able to solve problems and engage in social behaviors. Primates have complex ways of communicating with each other, including facial expressions.

What is the reproductive rate of primates?

After a long pregnancy, primates give birth usually to one infant. Newborn infants depend on their mothers for a long time. This allows infants to learn complex social interactions. The low reproductive rate, however, combined with loss of habitat and human predation, has threatened primates.

Primate Groups

Most primates are **arboreal** (ar BOHR ee uhl), or tree-dwelling, and live in tropical and subtropical forests. Scientists classify primates into two subgroups. The strepsirrhines (STREP sihr ines), or “wet-nosed” primates, are the earliest and most basic primates. Most members of this group are lemurs. Haplorhines (HAP lohr ines), or “dry-nosed” primates, include the **anthropoids** (AN thruh poydz), or humanlike primates, as well as a unique primate called the tarsier (TAR see ur).

✓ Reading Check

2. **Identify** the two subgroups of primates.

Strepsirrhines





The table below lists characteristics of some strepsirrhines. Strepsirrhines are the only primates that rely mostly on smell for hunting and social interactions. They have large eyes and ears.

Strepsirrhines live in tropical Africa and Asia. Most are found only in Madagascar and nearby islands. Scientists hypothesize that these animals evolved in isolation when Madagascar drifted away from the African mainland.

Picture This

3. Draw Conclusions

Look at the picture of each animal. What feature suggests that these animals are nocturnal?

Strepsirrhine Group	Lemurs	Aye-Ayes	Lorises	Galagos (ga LAY gohs)
Example				
Active Period	large—diurnal small—nocturnal	nocturnal	nocturnal	mostly nocturnal
Range	Madagascar	Madagascar	Africa and Southeast Asia	Africa
Features	<ul style="list-style-type: none"> vertical leapers use long bushy tail for balance herbivores and omnivores 	<ul style="list-style-type: none"> tap bark, listen, fish out grubs with long third finger 	<ul style="list-style-type: none"> small; slow climbers; solitary lack tail some have toxic secretions 	<ul style="list-style-type: none"> small; fast leapers no opposable digit long tail

Haplorhines

Tarsiers, monkeys, and apes are all members of the large group called haplorhines. Apes include gibbons, orangutans, gorillas, chimpanzees, and humans.

The tarsier lives only in Borneo and the Philippines. This small nocturnal animal has large eyes and lives in trees. It can turn its head halfway around.

Anthropoids are generally larger than strepsirrhines. They have larger brains for their body size. Most are diurnal and have color vision. Anthropoids have complex social interactions. Anthropoids are split into the New World monkeys and the Old World monkeys. New World refers to the Americas. Old World refers to Africa, Asia, and Europe.

Think it Over

4. Apply Howler monkeys live in Central and South American rain forests. Is the howler an Old World monkey or a New World monkey?

Picture This

5. **Explain** how a prehensile tail might benefit a monkey.

What traits do New World monkeys share?

New World monkeys live in the tropical forests of Mexico, Central America, and South America. New World monkeys include marmosets and tamarins. These unique primates do not have fingernails or opposable digits. Some squirrel monkeys and spider monkeys do have opposable digits.

Most of these monkeys are diurnal and live together in social bands. Their **prehensile** (pree HEN sul) tails work like a fifth limb. The tail can grasp tree limbs and support the monkey's weight.



What features distinguish Old World monkeys?

Old World monkeys live in a wide variety of habitats throughout Asia and Africa. Macaques and baboons belong to one subgroup. Colobus and proboscis monkeys belong to another subgroup.

Old World monkeys are diurnal and live in social groups, like New World monkeys. However, Old World monkeys have narrower noses and larger bodies. They spend more time on the ground. Old World monkeys do not have prehensile tails. Some do not have tails. Most have opposable digits.

How do apes differ from monkeys?

Only a few ape species exist today. They have larger brains than monkeys. Their arms are longer than their legs. Apes have barrel-shaped chests, no tails, and flexible wrists. They are highly social and make complex sounds.

Apes are classified into two subgroups: lesser apes and great apes. The lesser apes include gibbons and siamangs. The great apes include orangutans, gorillas, chimpanzees, and humans.

How do lesser apes travel through the trees?

Gibbons and siamangs are gymnasts of the trees. Although they can walk, they often move quickly from branch to branch using a hand-over-hand swinging motion called brachiation.

Reading Check

6. **Name** the ape subgroup to which you belong.

How do great apes walk?

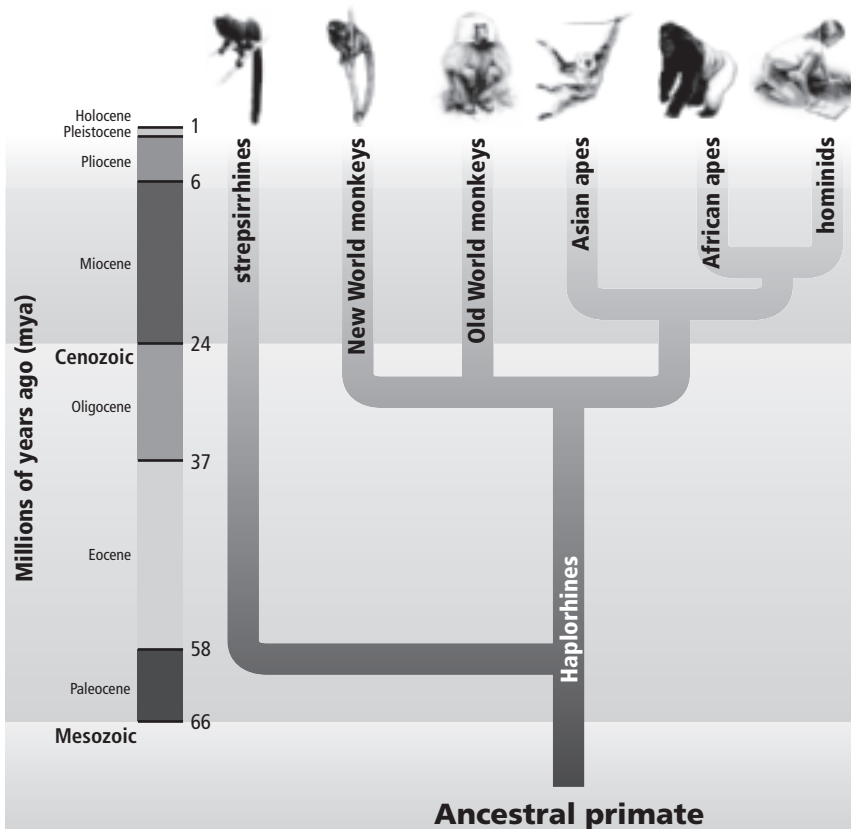
Orangutans are the largest arboreal primates, but the large males spend more time on the ground than in trees. Orangutans are the only great ape species that lives exclusively in Asia.

Gorillas are the largest primates. Like most of the great apes, they spend most of their time on the ground. They walk on all four limbs, using their front knuckles for support. They use sticks as simple tools. In captivity, they have been taught to recognize written characters and numbers.

Chimpanzees and bonobos are also knuckle-walkers. They have well-developed communication and social systems. They are more like humans in their physical structure and behavior than any other primate. ✓

To what category do humans belong?

Humans are part of the great ape family. Humans are classified as hominins. **Hominins** are humanlike primates that appear to be more closely related to present-day humans than they are to present-day chimpanzees and bonobos. Many species of hominins have existed on Earth. However, humans are the only species of hominins that survives today. The figure below illustrates primate evolution.



✓ Reading Check

7. **Identify** the ape that is most closely related to you. (Circle your answer.)
- a. gorilla
 - b. orangutan
 - c. bonobo

Picture This

8. **Study** the evolution of primates, and explain it to another person.

Primate Evolution

Most primates today are arboreal. Prehensile tails, long limbs, binocular vision, brachiation, and opposable toes and thumbs are all traits that help primates live in trees.

How might primates have become arboreal?

Some scientists suggest that primates evolved from ground-living animals that gathered food in top branches of shrubbery. This suggests that the flexible hand and opposable toes and thumbs might have evolved to catch insects rather than to grasp tree branches. Primates then evolved to fill other niches in trees. Other scientists suggest that the rise of flowering plants provided new niches. Arboreal adaptations then enabled primates to gather fruits and flowers of trees.

When did the first primates appear?

The first primates probably lived alongside dinosaurs about 85 mya. One of the earliest fossil primates, called *Altiatlasius* (al tee aht lah SEE us), was a small, nocturnal animal that used its hands and feet for grasping. About 50 mya, anthropoids branched off from tarsiers. By the end of the Eocene, 35 to 30 mya, anthropoids had evolved widely.

About this time, many early strepsirrhines appear to have become extinct. Extinction might have been caused by a cooling climate or competition from the larger, bigger-brained anthropoids.

When did different lines of monkeys diverge?

Monkeys first appeared at the end of the Eocene between 35 and 25 mya. By this time, Africa and South America had separated into two continents. Some scientists think that New World monkeys evolved from a group of Old World monkeys that drifted to South America on rafts of vegetation. Other scientists think that New World monkeys branched from anthropoids that traveled to South America earlier when sea levels were lower.

What animal might have given rise to apes?

Many anthropoid fossils have been found in the Fayum Basin in Egypt. *Aegyptopithecus* (ee gypt oh PIH thuh kus), or the dawn ape, is the largest—about the size of a house cat. Some scientists think this animal might have been part of the anthropoid line that split from Old World monkeys. This line led to orangutans, gorillas, chimpanzees, and humans.

Reading Check

9. **Name** a key competitive advantage that anthropoids had over early strepsirrhines.

Reading Check

10. **Explain** the importance of *Aegyptopithecus*.
