

PRIMATES



Basic Concepts

- Primates have a combination of features that are unique to their group.
- Their anatomy is well adapted to an **arboreal** (tree-dwelling) lifestyle.
- They possess:
 - Superior intelligence
 - Often complex social behavior
 - A highly developed problem solving ability

PROSIMIAN CHARACTERISTICS

1. More Primitive; Similar to the earliest primate ancestors.
2. Greater reliance on the sense of smell
3. Elongated snout; Large olfactory bulbs; Rhinarium
4. Small body size.
5. Often lacking some typical primate characteristics.
6. Lack color vision; Lack bony cups around eyes; Claws instead of nails on some digits.
7. Usual mode of locomotion is vertical clinging and leaping (VCL).
8. Sometimes nocturnal.
9. Tapetum lucidum.
10. Often solitary.
11. Possess a tooth comb.

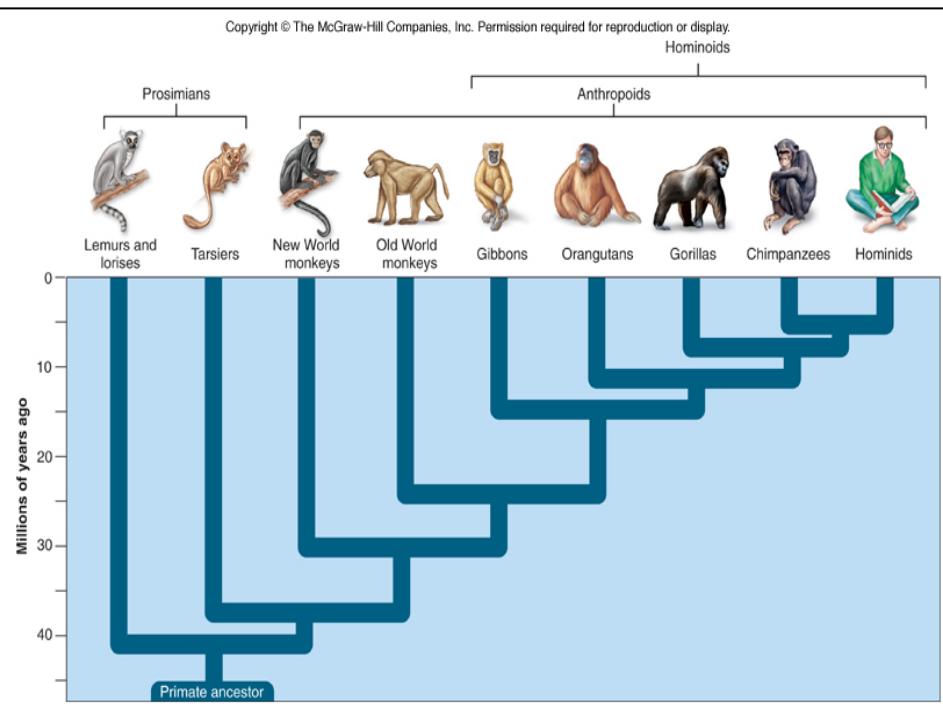
PRIMATE LOCOMOTION

The way animals move, varies between primate species. The way in which primates move around can be divided into several major categories:

- a) Leaping, running, arboreal and terrestrial quadrupedalism (four limb walking),
- b) Suspensory climbing, brachiating (swinging with the arms),
- c) Knuckle walking (four limb walking with the front hands curled up to protect the digits - fingers - while walking),
- d) Bipedalism (habitually walking on two legs).

Some distinguishing characteristics of primates include:

- Forward-facing eyes for binocular vision (allowing depth perception)
- Increased reliance on vision: reduced noses, snouts (smaller, flattened), loss of vibrissae (whiskers), and relatively small, hairless ears
- Color vision
- Opposable thumbs for power grip (holding on) and precision grip (picking up small objects)
- Grasping fingers aid in power grip
- Flattened nails for fingertip protection, development of very sensitive tactile pads on digits
- Primitive limb structure, one upper limb bone, two lower limb bones, many mammalian orders have lost various bones, especially fusing of the two lower limb bones
- Generalist teeth for an opportunistic, omnivorous diet; loss of some primitive mammalian dentition, humans have lost two premolars
- Progressive expansion and elaboration of the brain, especially of the cerebral cortex
- Greater facial mobility and vocal repertoire
- Progressive and increasingly efficient development of gestational processes
- Prolongation of postnatal life periods
- Reduced litter size—usually just one (allowing mobility with clinging young and more individual attention to young)
- Most primates have one pair of mammae in the chest
- Complicated social organization



VISION:

BINOCULAR AND STEREOSCOPIC VISION

- Primates tend to have eyes positioned relatively close together on the front of the head, reducing their visual field, but giving them excellent stereoscopic vision and depth perception. This is important in localizing objects and an animal jumping from limb to limb obviously must be able to detect the position of the next limb with considerable accuracy.
- In species with laterally placed eyes, each eye covers a different visual field and is effective for locating predators or prey. However, it does not help in depth perception which underlies the primate ability to catch hold of leafy twigs and branches during locomotion and to locate, seize, examine, and prepare food items.
- Eyes in front of the head – each eye collects slightly different visual information from nearby objects, the area of overlap is automatically analyzed by visual centers in the brain to produce a 3 dimensional picture.
- Binocular vision permits depth perception and the ability to judge distances between objects and the observer. This is because of the peculiar way in which the nerve fibres connect between the retina and the brain.
- In a non-primate all optic nerve fibres from the right eye go to the left side of the brain, and vice-versa. In Primates, the fibres from the left half of each retina go to the left side of the brain and vice-versa. Thus the left side of both retinas, and similarly for the right side, an arrangement which would seem to be more efficient than in non-primates.
- Therefore, Primates can better judge distance because each side of the brain receives input from both eyes.

HIGH VISUAL ACUITY.

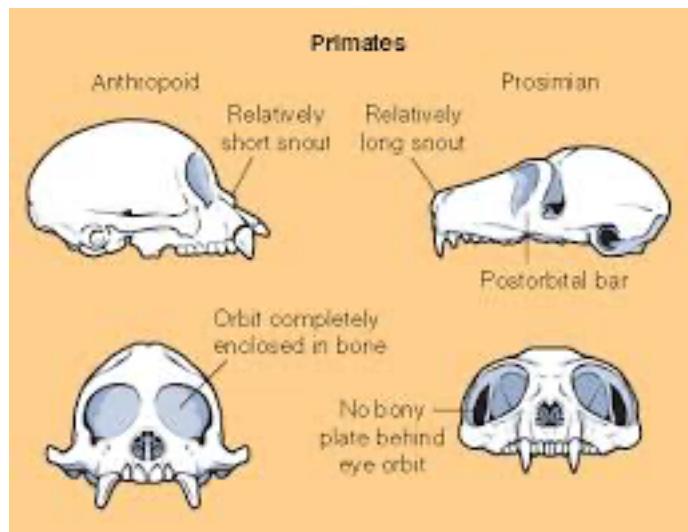
- Unlike other mammals, monkeys and apes have a small sensitive spot or fovea at the rear of the retina containing only cones.
- In the fovea, each cone connects with its 'own' optic nerve fibre to the brain.
- Through this enables fine detail to be seen, but it results in loss of sensitivity in dim light. Over the rest of the retina each optic fibre receives input from many photoreceptors giving greater sensitivity in dim light.
- Hence the retina of monkeys and apes has a dual purpose- the central fovea being used for seeing detail in bright light, and the more peripheral areas being used for seeing in dim light.

COLOUR VISION.

- Monkeys and apes have highly developed colour vision.
- This is due to the presence in the retina of photoreceptors called cones, besides rods that all mammals have.
- Whereas there is only one kind of rod, there are 3 kinds of cones, each maximally sensitive to a different wavelength of light (blue, green and red)
- Colour vision is associated with the fact that in most primates, Fruit forms a significant part of the diet and is an indicator of ripeness and species.

Postorbital Bar

The **postorbital bar** is a bone which, with the exception of [Tarsiers](#) runs around the eyesocket of most [Prosimians](#). This is in contrast to the higher primates, [Anthropoids](#), who have evolved fully enclosed sockets to protect their eyes.



"Social organization"

"Social organization" tends to be all-encompassing and a rather vague concept. Social organizations among primates vary primarily on the basis of the following factors:

1. Group Size
2. Group Composition
3. Mating Systems
4. Social Roles - especially for adult females and males
5. Various Types of Dominance
6. Permanence versus Instability of Group Membership
7. Tendency to Aggregate into Larger Social Groups
8. Presence of only Heterosexual Reproductive Units, All-Male Groups or All-Female Groups, or Single Individuals
9. Patterns of Interactions.

