



# STUDY MATERIAL

## VIVEKANANDA COLLEGE THAKURPUKUR

NAAC ACCREDITED GRADE—'A'

**Subject:Zoology**  
**Topic:Arboreal adaptation in Sloth**

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## Arboreal adaptation in Sloth

Class: Mammalia. Order: Pilosa. Family: Megalonychidae. Other names: southern two-toed sloth or unau (*Choloepus didactylus*)

Class: Mammalia. Order: Pilosa. Family:Bradypodidae. Other names three-toed sloth (*Bradypus tridactylus*)

Physical Description: Often called the world's slowest mammal, the sloth, is covered with a long (6-18 inches), bristly coat of hair that covers an undercoat of shorter finer hair. They can be grey-brown to beige in coloration, often having a greenish cast due to algae growth in the fur. They have a flattened, hairless face with small eyes that are set in black rings. The ears are small and hidden under the coat. They have no tail or very short tail. There are 2 toes on the front feet and 3 on the back in two-toed sloth while three-toed sloth have three claws in each feet. The claws are 3-4 inches in length. They are 21-29' long and weigh 9-18 pounds.

Habitat & Range: tropical moist lowland & montane forest of S. America-Venezuela, Brazil, Ecuador, Peru.

## Physical Adaptations:

- Greatly camouflaged, sloths are so slow that algae grow on their grooved fur; looks like the trees.
- Climb at speeds of 6-8' per minute, slow movement conserves energy and avoids detection.
- **Elongated limbs and trunk are adaptations to acrobatic, hanging lifestyle.** Forelimbs are longer, proximal and middle segments are more or less equal, hindlimbs are not much longer like forelimbs but are large for holding the branch.
- To gain strength with a wide range of flexibility, the heads of the humerus and femur are spherical.
- To ensure maximum pronation and supination of the forelimbs, radius and ulna are free and almost equally developed, the proximal end of radius is round and a styloid process at the distal end of ulna usually forms a pivot around which the corpus turns freely, similarly fibula is free and relatively large.
- Both the **pectoral and pelvic girdles** are so designed that they provide highest level of flexibility for swinging from the tree branch. Scapula and clavicle are modified to allow freedom of limb movement and thus highest degree of swinging capacity.
- Muscle and muscle attachment are not very strong as sloth does not need much strength. Bones are light and slender which help in arboreal mode of life.

- As muscles are less developed the olecranon process of forelimbs are very short.
- In inverted posture, the extensor muscles do not oppose gravity so they are less developed.
- They move through the tree branches and even mate and give birth while hanging upside down aided by the sickle-shaped claws of their four limbs and hairless foot pads.
- The fur is parted on the belly and curves across the back, allowing rain to run off.
- Lowest (besides echidna) and most variable body temperature of any mammal (74-92°F). This causes them to have a slow metabolism that allows them to survive injuries that would kill other mammals. Their body temperature depends on the weather and the time of day.
- Have 18 simple, peg like teeth which grow constantly; get worn down by eating.
- Their teeth lack enamel.
- Two large, blade like teeth in front for biting which sharpened by rubbing against lower teeth.
- Hardened lips to allow them to grasp and eat leaves more easily.
- Food is digested slowly and remains in their large, four chambered stomach for as long as one month; descending from a tree every 4-8 days to urinate and defecate at the base.
- Large thick tongue, densely covered with sharp, minute, backward-directed spines.
- Near sighted, rely little on vision to carry out normal patterns of behaviour due to poor vision.
- Great sense of smell (Olfactory bulbs extremely well-developed), and a poorly developed hearing.

### **Behavioral Adaptations:**

- Nocturnal, sleeping for 15-20 hours during the day and waking during the night only to feed.
- Solitary.
- Arboreal; staying high in the canopy most of the time, protection from big cats and snakes.
- They often remain motionless, even when awake.
- Sometimes fall from the trees into water, but they are very good swimmers (three-toed sloth). Long arms are important for swimming in flooded condition of rain forest.
- If caught on the ground they have no protection.
- Generally silent; hiss in defence; low bleats in distress.

### **Reproduction and Development:**

- Males scent mark on tree branches from a gland near the anus.
- Little is known about courtship in this species.
- After a gestation period of 5-6 months the female gives birth (while hanging upside down) to a single, well-developed young born 10 inches long, weighing 12-16 oz.
- Young are carried on the mother's body for six to nine months, hooking itself securely into her breast fur to remain hidden.
- By about one month it begins to take leaves chewed by the mother and after a further month it can pick its own leaves from those it can reach while hanging onto its mother's fur, becoming independent at about 9 months.
- Sloth infants separated from their mothers will let out a loud bleat lasting 30-90 seconds.
- Reaches adult size between 2-3 years old.
- Females reach sexual maturity at 3 years of age; males reach sexual maturity between 4- 5.

## **Camouflage**

Three-toed sloths have tan coats, while two-toed sloths usually have grey-brown fur. While these tones match tree trunks and branches, the animals have another layer of camouflage: Green algae grow from their hair, enabling them to better blend into the leaves and vines of the treetop canopy. Their extremely slow movements might also help conceal them from predators that rely on vision to hunt.

## **Defence**

With their slow speed, sloths might seem like easy prey for anacondas, boas, wild cats, eagles and hawks. However, they use their long, sharp claws -- normally used for suspension and to hold onto branches -- and very sharp teeth to fiercely defend themselves. When they're in the trees, special adaptations help them spot potential threats. Two-toed sloths can tilt their heads 45 degrees backward to watch for predators. Three-toed sloths have nine cervical vertebrae -- four more than their relatives -- that enable them to rotate their heads 270 degrees to scan for threats.

## **Weather Adaptations**

Sloths' thick, dense coats help keep them dry during the rainy season. An undercoat guards their skin, while the longer, outer hairs hang down at an angle, providing a natural path for water to flow off the animal. Two-toed sloths can vary their body temperature from 75 to 91 degrees Fahrenheit, allowing them to adapt to various weather conditions. Three-toed sloths raise their body temperature by basking.

## Metabolism

Both two- and three-toed sloths have extremely slow metabolism, enabling them to remain in the same tree for several days before descending to seek more food. They sleep 15 to 20 hours daily and spend the rest of their time foraging for leaves or traveling between trees. They also come down to defecate but only need to do that once every eight days, allowing them to save valuable energy and time.

### Additional Information:

- The two-toed sloth is larger and faster than the three-toed.
- They cannot shiver to stay warm.
- Almost all their liquid requirements are met through the juicy plants they eat.
- They have the lowest muscle mass relative to overall body weight of any mammal.
- By defecating at the base of their host tree, the sloth provides the tree with fertilizer

**Conservation Status:** Least Concern, threats to populations include habitat destruction and hunting for their meat, fur, and claws. Because of their slow nature, sloths are also frequently hit by cars in places where roads have been cut through the forest.

## References:

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3. Sloth Mammal: Alfred L. Gardner Encyclopaedia Britannica