Guide to Terrestrial Animal Locomotion
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In general, there are numerous types of locomotion that animals use. Locomotion is not unique to animals, but they are the group of organisms that have developed the most kinds of locomotion. Additionally, all terrestrial animals are capable of some form of powered movement (moving in some direction against the environment). This is different from some aquatic animals like sponges and coral, which have no form of powered locomotion at any point in their lives.
NOTE: Aquatic locomotion will not be covered in this guide.

The Basics:
For terrestrial locomotion, there are three major types of movement. Walking is when there is one foot on the ground at all times. Running is when all feet are off the ground for a brief moment, but most of the time there is at least one foot on the ground. Jumping is when all feet leave the ground at about the same time. Walking is good for using less energy, but is not as fast. Running is very fast, but takes time to reach the fastest speed possible. Hopping is good for quick escapes, but cannot be done for a long time before the individual becomes tired. There are also methods of movement that aren't along the ground. Flying allows a creature to move through the air, but takes energy. Gliding takes no energy, but allows a creature to move less distance than flying would. Parachuting only allows creatures to fall slowly, but is useful for quick escapes.

Quadrapedalism
Quadrapedalism is the ability to move on four legs. Most animals walk this way including amphibians, reptiles, and most mammals. Reptiles move on four legs in a different way than mammals do. Reptiles walk with their elbows pointing away from their bodies and their feet off to the sides. This is called a sprawling gait, and is considered the most primitive form of locomotion. Mammals have all their elbows and feet pointing underneath their bodies, which is called an erect gait. This allows them to take longer strides than a sprawling gait, which helps them move faster and use less energy.
Even though all mammals use erect gaits, not all mammals have the same type of feet. Many mammals, including humans, walk on the flats of their feet. This is called plantigrade motion. It is good for supporting a lot of weight and when having to move long distances. Some other mammals move by walking on the tips of their toes. This is called digitigrade motion. Moving on ones toes allows for quieter motion and longer strides, which means running faster. However, it is only good for sprints, and is less useful for moving long distances. Finally, some mammals use ungulate motion, which means walking on the nails. Animals like deer and horses do this, and it allows them to move really quickly with less energy. Since nails cannot support a lot of weight, all ungulate creatures have a modified nail called a hoof.

Bipedalism
Bipedalism is the ability for an organism to walk on two legs easily. Humans can do this, as can all birds, kangaroos, and some rodents. While it seems really easy, bipedalism is actually really hard to do. Walking on two legs is hard because the organism must balance itself on one leg while it attempts to move the other one, without tipping over. This is accomplished by pushing off the ground with one foot, then letting the force of gravity carry the foot back down. This makes moving on two feet easier because the body will act like a pendulum, swinging one direction and being pulled back before it can tip over.

More Than Four Legs
Creatures with more than four legs must find ways to avoid tripping over their own legs. Insects do this by alternating which foot gets to move. They have six legs, so when one on the right side moves, the next one on the left side moves, then one on the right, and so forth. This means that the feet on the ground will always form a triangle, which helps to prevent them from being pushed over. Spiders have eight legs and move somewhat differently. They extend their legs by pumping their blood (called hemolymph) into their legs, and then they use their leg muscles to pull the legs back to their body. This means that spiders are pulling themselves along the ground, unlike most animals. Centipedes and millipedes have more than ten legs, so they can't use the same methods as insects or spiders. They move by swinging their legs forward, with each one being slightly out of sequence than the one ahead of it. This results in their legs forming a wave-like pattern, called a metachronal rhythm.

No Legs
Creatures with no legs have different problems than creatures with legs. Creatures with legs are always concerned with gravity, while creatures with no legs (or limbless) are less concerned with gravity and more concerned with friction. Snakes are the best example of limbless creatures and they have two major types of locomotion. The first is called serpentine, which is when they make a wave-like motion on the ground. As the left side of one part of their body contracts, it makes a curved shape. By making many of these curved parts and by alternating the sides, a snake can propel itself forward. The other method is called concertina locomotion, which is when the back half of a snake curls up and acts like a spring while the front half moves forward. This is better for moving in tight spaces, but is really slow and hard for the snake to do. Other creatures, like earthworms move by scrunching up parts of their bodies and relaxing the other parts, dragging themselves across the ground as they go.

Climbing
Climbing has a unique set of problems associated with it. Climbing creatures are very concerned with grip and balance, without which the creature may fall. Squirrels get around this by using claws, which they use to grip rough surfaces of tree bark. Squirrels can also rotate their ankles, allowing them to run up and down trees headfirst without falling. Gibbons swing from branch to branch using their arms, which is called brachiating. Humans can brachiate by climbing on monkey bars. Many monkeys have a prehensile tail, which is strong and flexible enough to be used as an extra limb. Slugs use chemical trails which they can stick to and slide on. Many insects have spines on

their legs, which help them grip surfaces that are normally too smooth to hold on to. Geckos have small hairs which attach to surfaces using the van der Wals force. This force behaves much like static electricity does when used to stick a balloon to some ones hair. When climbing rocks, many animals have rubbery feet which increase the force of friction, helping them to stop before they fall off.

Gliding and Parachuting

Gliding and parachuting are useful for traveling between trees and other tall structures. As a general rule, creatures will have methods of gliding or parachuting when the gap between trees is not small enough to jump over. Many gliding or parachuting animals are related to similar species that cannot glide or parachute. Parachuting is the easier of the two. In order to parachute, a creature must have a membrane connecting distant parts of the body, in order to increase the amount of air that can push on them. Parachuting allows for slower falls, which is good for quick escapes off of high places without endangering the animal's life. Gliding requires a stiffer membrane than parachuting. Gliding allows for the creature to travel further distances than parachuting without using the energy of flying.

Flying

Flying is when a creature uses its muscles to actively push the air out of the way, much like swimming pushes against the water. Flying creatures have to worry about wind and gravity, which can throw the animal around and cause it to crash. Four animals have been able to fly, each with a different way of doing it. Insects were the first, and they developed two sets of wings on their backs. The wings are really rigid, which means they can't "flap" like bird or bat wings. Instead, they work more like canoe paddles in the air, pushing backwards then twisting out of the airs way when returning. Pterosaurs were the next to develop flight. They supported a stiff membrane on one finger and used the rest for clinging to surfaces. Birds were next, and they fused all of their fingers together. Instead, they used feathers to increase the surface area of the wing, allowing them to push the air without a membrane. Feathers are also really light, which helps to keep the animal airborne. Finally, bats are the last to develop flight. All of their fingers are used to support the membrane, as well as parts of their legs. This allows them to control the wings shape, which helps them turn in the air really easily.