

GREEN ANACONDA (*Eunectes murinus*) ADAPTATIONS TALKING POINTS

GREEN ANADONDA INVENTORY

- Green Anaconda shed (laminated)
- Green Anaconda skull
- Anaconda Resource Cards

GENERAL REPTILIAN INFORMATION:

- Reptiles are ectothermic; they are unable to regulate their own body temperature and depend on external sources.
- Reptiles' scales provide them with a tough, protective layer to their skin. They also help to minimize the loss of body moisture. The scales of a reptile consist of keratin.
- Amniotic eggs provide a protective environment in which the embryo can develop and enable reptiles to lay their eggs in dry environments.
- In many reptiles, temperature during incubation determines the sex of their young.
- Modern reptiles are divided into four groups: alligators and crocodiles (Order Crocodilia) lizards and snakes (Order Squamata), the tuatara (Order Tuatara) and lastly the turtles (Order Testudines).
- The Tropical Aviary has the following reptilian species: **Caiman Lizard** (*Dracaena guianensis*), **Plumed Basilisk** (*Basiliscus plumifrons*), **Blue Spiny Lizard** (*Sceloporus serrifer cyanogenys*) **Honduran Spiny Tailed Iguana** (*Ctenosaura palearis*), and the constrictor snakes - the **Green Anaconda** (*Eunectes murinus*), **Emerald Tree Boa** (*Corallus caninus*), **Amazon Tree Boa** (*Corallus hortulanus*), **Red-tailed Boa** (*Boa constrictor*) and the venomous snake - **South American Green Snake or Baron's Racer** (*Philodryas baroni*)

GENERAL GREEN ANACONDA INFORMATION:

A member of the Boidae Family (includes boas and anacondas), South America's green anaconda is the heaviest known snake, but not the longest. It is generally shorter but wider than the reticulated python (world's longest snake at up to 30 feet), but the anaconda is almost twice as heavy. The boids are large, fairly primitive snakes that rely on strength and speed to trap and kill their prey. Other anaconda species, all from South America, are the yellow, dark-spotted, and Bolivian variety; all are smaller than the green anaconda.

GREEN ANACONDA RANGE/HABITAT (see map)

- Range in tropical rainforests of South America, found mainly east of the Andes in Amazon and Orinoco basins, also in Guianas, north to Trinidad
- Habitats include swamps, marshes, and slow-moving streams, mainly in the tropical rain forests
- Anacondas prefer to be in water; on land they can become tick-infested and they cannot move as quickly.

GREEN ANACONDA PHYSICAL ADAPTATIONS

1. Head/Neck/Skull/Dentation (see skull)

- Head is large and narrow and is not distinct from the neck.
- Eyes and nostrils are on top of the head allowing the anaconda to lay in wait for prey while remaining nearly completely submerged when hunting.
- A thin transparent scale (**brille**) protects the anaconda's eyes. The brille helps the anaconda see while submerged and protects the eyes from brush on land. The brille is shed with the skin.
- Six rows of sharp, backwards-pointing teeth, four on the upper jaw and two on the lower. The anaconda uses these teeth to grip its prey and swallow it whole. Teeth are stationary.

2. Size /Weight/Lifespan

- May grow to more than 29 feet (average 17 feet)
- Weighs up to 550 lbs
- Female are significantly larger than the males (**Sexual dimorphism**)
- May measure more than 12 inches in diameter at the center of the body
- Average lifespan 15-20 years (wild), up to 30 years (captivity)

3. General Physical Characteristics

- Snake is dark green with alternating oval black spots. There are similar spots with a yellow-ochre center along the side of the body. This allows anaconda to blend in with the thick, wet vegetation of its habitat.
- Its body is extremely stocky compared to other constrictors and it is extremely muscular.
- The scale patterns on the underside of the lower tail are unique to each snake and may be used for identification.

4. Body/Skin (see snake shed)

- All snakes have scales (or **scutes**) to protect their bodies from the variety of terrain they encounter, aid it in locomotion, and allow moisture to be retained within their bodies.
- **Scutes** are of various shapes and sizes; anacondas have rows of small dorsal (on their back) scales and broad, rectangular ventral (on their stomach) scales.
- The cloaca is the only area that lacks scales.
- A snake's vertebral column consists of between 200 - 400 vertebrae and as many ribs attached. This large quantity of vertebrae gives the snake a high degree of flexibility. Tail vertebrae lack ribs. Each vertebra has projections that provide attachment for strong muscles used for locomotion.
- The ventral scutes line the underside of a snake, corresponding directly with the number of ribs. The bottom edges of the ventral rectangular scales grip the surface, giving the snake traction and propelling the snake forward. The mode of locomotion a snake uses in any particular instance depends on several factors such as the kind of surface it is crawling on and its speed. The Anaconda moves with a serpentine motion. (see "**Four basic methods of Snake movement**")
- Anacondas grow throughout their lifetimes; they shed their skin periodically in response to growth and to ensure a continual protection from the environment. In most cases, shedding (**ecdysis** or molting) is achieved by rubbing its head against a hard object, such as a rock, causing the already stretched skin to split.
- Snake scales are not discrete, but are extensions of the epidermis – therefore, a snake sheds the complete outer layer of skin in one layer. It is akin to a sock being

turned inside out. Conversely, the skins of lizards generally fall off in pieces.

- A snake's molting process serves a number of functions. It permits the replacement of old, worn outer layer of skin, disposal of parasites such as mites and ticks and allows a snake to grow continually throughout its life. Currently, the anaconda at the zoo sheds about 2x/year.

5. Thermoregulation/Senses/Scent Glands/Glands

- Ectothermic - when a snake is too cold, it basks in the sunlight, and if there isn't sunlight available, the snake can also coil up to conserve and maintain its body temperature. The water in its habitat provides the animal with a place to cool down.
- Green anacondas use both sight and smell to detect their prey.
- Anacondas have special heat sensing pits (**labial pits**) that border their mouth; they use these to sense heat emitted by potential prey or predators.
- Hearing is very poor, but the snake is sensitive to vibrations and sense animals moving towards them; bones of the mandible and quadrate bones pick up ground borne vibrations. Because the sides of the jaw can move independently of one another, snakes resting their jaws on a surface have sensitive stereo hearing, which can detect the position of prey.
- Forked tongue is used to test the environment and search for prey. The tongue collects airborne particles and passes them to the **vomer nasal organ (VMO)** or **Jacobson's organ**, in the mouth, where the snake senses taste as well as direction of prey or predators.
- The anaconda's tongue functions efficiently under water.
- Glands around the cloaca emit a foul smelling musk, which is poisonous for small organisms and may prevent ticks and leeches from attaching themselves to the cloaca.

GREEN ANACONDA BEHAVIORAL ADAPTATIONS

1. Life Style

- Nocturnal and usually solitary except during the breeding season
- Semi-aquatic snake - spends much of its time in the water; it is also known as the "water boa." The water helps support the weight of the anaconda.
- Excellent swimmer- swims with grace and agility. The anaconda is capable of surprising speeds both under water and on its surface.
- On land it will usually hang from a tree and grab the prey from above.
- Nonvenomous constrictors. It lies in a murky pool to ambush prey coming to the water to drink. It seizes its prey quickly with its sharp teeth and drags it into the water. It is extremely muscular and squeezes tighter each time the animal breathes out so it cannot breathe again. The prey dies quickly from suffocation and is swallowed whole.
- Anacondas use sharp teeth to latch on to their prey, preventing it from escaping as they wrap their bodies around it and slowly suffocate or crush it to death.
- Anacondas can remain submerged for up to ten minutes at a time and often lie beneath the surface waiting for prey.

2. Diet/Eating Habits/Digestion

- Wild diet consists of wild pigs, capybara, deer, birds, fish, turtles, caiman, dogs and occasionally jaguar. At the Zoo, the anaconda is fed dead rats (1 - 2 /week) and rabbits (3 - 4/year).
- Anacondas are nonvenomous constrictors, coiling their muscular bodies around captured prey and squeezing until the animal asphyxiates. Prey is rarely crushed, simply suffocated.

- Ambush prey – an anaconda usually waits in the water with only its snout extending above the surface; it will grab and constrict prey in the water to suffocate the animal or just drown it.
- Slow acting digestion - after a large meal, the anaconda sleeps for several days as it digests and may not feed again for weeks, months or even up to a year depending on the size of the meal. Anacondas may eat up to 90% of its weight.
- Quadrate bone allows anaconda to open its mouth up to 150 degrees wide. This ability along with elastic ligaments at the front of the lower jaw allow the anaconda to swallow large prey whole, accommodating prey many times the width of the head and body. They **do not** unhinge jaw. (see photos)
- When pregnant, female anacondas do not eat, since they do not want to risk losing their young while hunting.

3. Breeding/Reproduction/Growth/Parental Care

- Females are thought to emit pheromones to attract males. Mating generally occurs during April and May.
- In mating, often up to 12 competing males will cluster into a “breeding ball” by twining around the much larger female. The lucky fellow who manages to shove his competitors aside and actually mate embeds a wax-like “plug” inside his partner’s cloaca, which prevents the other males from fertilizing her.
- Breeding ball can last from two to four weeks.
- After mating, the female may eat one or more of its mating partners. This behavior may help it to survive pregnancy, during which food is not taken for up to seven months.
- Gestation for the anaconda is approximately six to seven months.
- Anacondas are ovoviviparous; females bear anywhere from 20 to 40 live young; young snakes are about two feet long and are precocial; they are able to hunt, feed and swim shortly after birth.
- Young grow rapidly and reach sexual maturity at about 3-4 years old.

4. Predators

- A young anaconda’s predators include foxes, tegu lizards, caimans, birds (like the crested caracara) and adult green anacondas.
- Adult anacondas have no natural predators, because of their size, other than humans. Humans often hunt anacondas for their skin, the illegal pet trade and because they fear and dislike them.

GREEN ANACONDA INTERESTING/FUN FACTS

- The name “anaconda” comes from the Tamil word “anai-koira”, which means “elephant killer”; the snake was originally thought to be a python, an Old World snake, hence the name from Sri Lanka.
- Local names for the Anaconda in South America include the Spanish term ‘matatoro’, meaning ‘bull killer’.
- Eunectus, means “good swimmer”, which the green anaconda definitely is — spending most of its time in the water, so much so that it is sometimes called the “water boa”.
- *Murinus*, means “of mice”, implying that green anacondas eat mice, but they usually go after larger prey.

GREEN ANACONDA CONSERVATION TALKING POINTS

- The green anaconda has no special status and is not considered endangered. All anaconda trade is prohibited in most South American countries. There is some export of live snakes to zoos, research, and the pet trade to fill quotas. Some illegal trade occurs, but their “dull” color isn’t popular.
- Human encroachment is the main problem and they are being hunted for their skin to be used for shoes, handbags, etc.
- Locals usually kill them on sight because they fear and dislike them.
- The Venezuelan Wildlife Department (PROFAUNA), the Convention on International Trade in Endangered Species of Flora and Fauna (CITES), and the Wildlife Conservation Society in a joint effort are conducting the first field study on the anaconda. The main purpose of this study will enable wildlife officials to decide whether or not a conservation program based on commercial harvesting will be viable.

Range Map of the Green Anaconda in South America

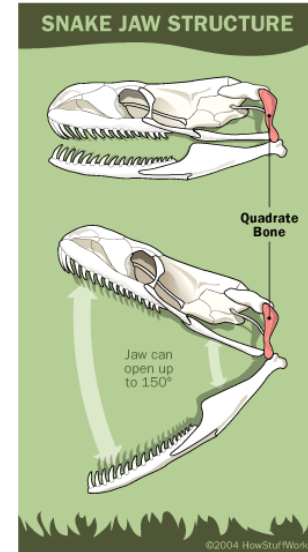
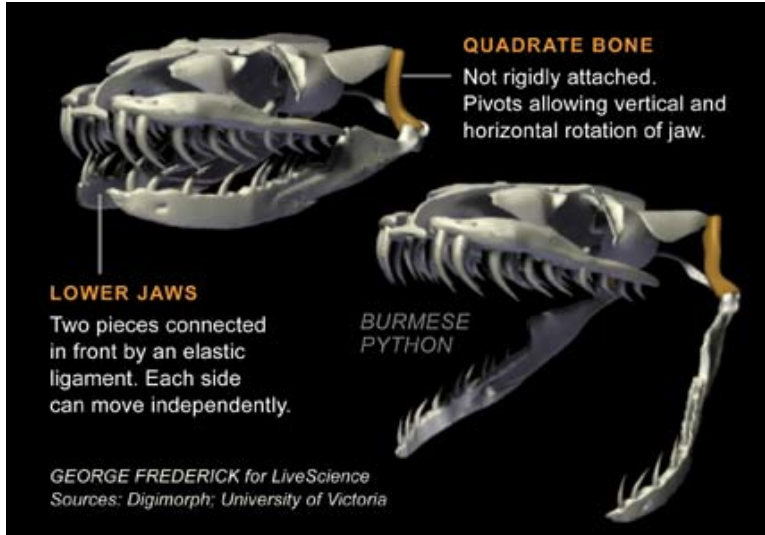
Forked Tongue of Anaconda



Anaconda breedingball

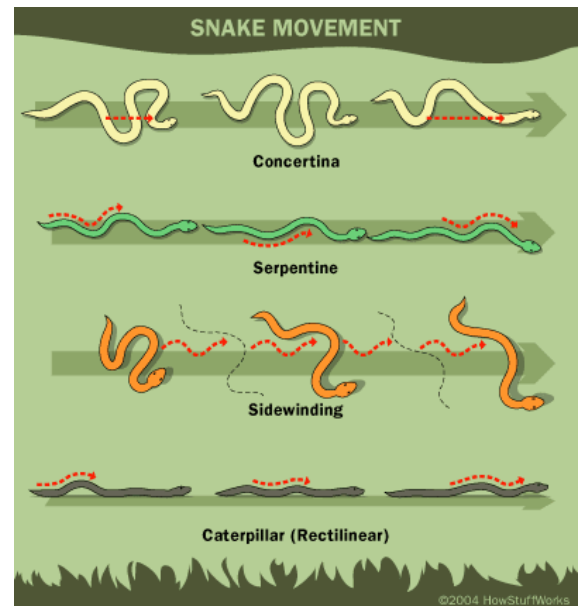


Snake Jaw Structure:



The four basic methods of Snake movement:

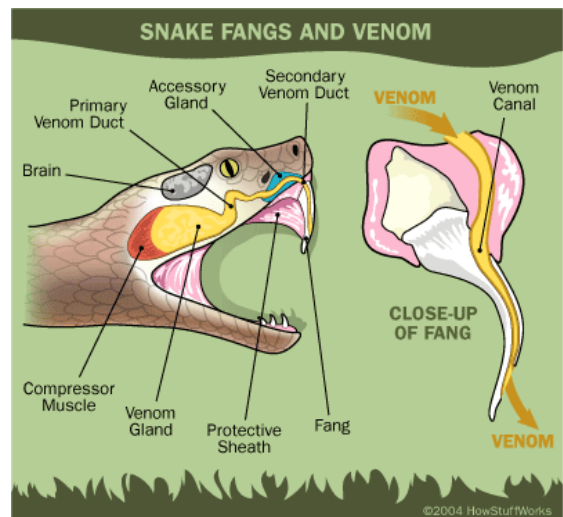
- The **concertina** locomotion is especially helpful in climbing trees. The snake extends its head and the front of its body along the vertical surface and then finds a place to **grip** with its ventral scales. To get a good hold, it bunches up the middle of its body into tight curves that grip the surface while it pulls its back end up; it then springs forward again to find a new place to grip with its scales.
- Serpentine** or **undulatory** locomotion is used both in the water and on land by most snakes. Starting at the neck, a snake contracts its muscles, thrusting its body from side to side, creating a series of S-shaped curves. In the water, this motion easily propels a snake forward because each contraction pushes against the water. On land, the sides of the snake's body thrusts against any ground irregularities such as rocks.



- **Sidewinding** is used mainly by desert dwelling species. By contracting their muscles and flinging their bodies, sidewinders create an S-shape that only has two points of contact with the ground; when they push off, they move laterally. Much of a sidewinding snake's body is off the ground while it moves. This decreases the body contact with the hot sand and keeps the snake from slipping on sand dunes.
- The **caterpillar** or **rectilinear** locomotion is a slow, creeping movement making use of enlarged belly scales that act as anchoring points and provides traction. This technique also contracts the body into curves, but these waves are much smaller and curve **up and down** rather than side to side. When a snake uses caterpillar movement, the tops of each curve are lifted above the ground as the ventral scales on the bottoms push against the ground, creating a rippling effect similar to the locomotion of a caterpillar.

Venomous snakes have two sharp fangs that are hollowed out to allow the poison to pass through. Once a snake strikes, inserting these teeth into its prey, venom is squeezed from a gland under each eye into the venom duct, where it passes more glands that release compounds thought to make the venom more effective, and finally out through the venom canal in the fangs.

In venomous snakes with long fangs, they fold backward into the mouth when not in use. This will prevent the snake from puncturing the bottom of its own mouth. This is in contrast to the constrictor snakes, where the teeth are stationary.



The three most important types of toxins found in snake venom:

- **Neurotoxins** - affect the nervous system by seizing up the nerve centers, often causing breathing to cease
- **Cardiotoxins** - deteriorate the muscles of the heart, causing it to stop beating
- **Hemotoxins** - cause the blood vessels to rupture, resulting in widespread internal bleeding