

## **GIRAFFE (*Giraffa camelopardalis*) CART INVENTORY & TALKING POINTS**

The following items should be on the cart, if they are not let someone in education know. If you discover a new problem with any biofact (broken pieces, loose teeth, etc.), it is your responsibility to let the staff know **and** make a notation with the date, time and your name on the sign out clipboard.

**Note:** Please return all items to their appropriate place on the cart, and make sure lids and bungee cords are secured. Things should be left exactly as you found them.

**Note:** Do not try to open the Lucite containers with the food. We are trying to prevent animals from getting into the bone room.

### **GIRAFFE CART INVENTORY**

- Giraffe skull
- Giraffe pelt
- Fake Giraffe tongue (demonstrates the length)
- Giraffe tail
- Giraffe vertebrae (2)
- Human cervical (Neck) replica on stand
- Giraffe front leg including carpet and:
  - Humerus (upper leg)
  - Radius and ulna (fused foreleg)
  - Metacarpal (fused wrist bones)
- 3 lucite boxes containing giraffe, ostrich and hoofstock food
- Giraffe Resource Notebook

**Note:** In addition you will need a piece of AstroTurf if you intend to use the leg bones. Lay bones on the AstroTurf starting with the scapula; visitors can then lie down next to them to see how tall they are in relation to an adult female giraffe. Please do not put the bones down without AstroTurf. **Be careful letting the public pick up the bones, they are heavy.**

#### **Also Note:**

- Please **Do Not** hang giraffe pelt over edges of cart.
- **Never** tie down pelt with bungee cord.
- Please remind people not to stick their fingers in the eyes. A lot of very thin bone has been broken out.
- The lock on the cart is broken so make sure the leg bones are placed to the back of the shelf so they are not against the door.
- Wrap the vertebrae in bubble wrap and put in canvas bag. Please wrap them separately, put in bag and place in cart **on top** of leg bones.

## **GIRAFFE (*Giraffa camelopardalis*) TALKING POINTS**

The zoo has reticulated giraffes: (*Giraffa camelopardalis reticulata*)

### **GIRAFFE HABITAT:**

Giraffe are well adapted to live in semi-arid, open, wooded savanna that provide access to acacia trees and other food sources.

### **GIRAFFE SKULL**

#### **Adaptations:**

##### 1. Teeth /mouth

- No upper incisors
- Lower incisors pointed outward
- Large, flat pre-molars and molars
- Hard, bony upper palate
- Muscular, tough, flexible upper lip

Adapted to strip, snip and chew tough leaves and plant material

Question (appropriate for children and adults):

- Can you tell what the giraffe eats by looking at its teeth and if so, how?
- What kind of teeth would it have if it hunted and ate meat?

Note: It is interesting to have young children compare their teeth to giraffe teeth

##### 2. Eye sockets

- Sockets indicate large eyes
- Eye placement is on sides of head

**Advantages** of these adaptations: Excellent vision and placement of eyes give giraffe the greatest field of vision of any animal. This is important for surveying habitat, especially for spotting predators, but also for seeing food and water sources.

Questions: (can be used with older children and adults) How does the eye placement help the giraffe? Where would you find the eyes on the face of a lion (use photo if needed)?

Discussion: Giraffe and other animals that are hunted (prey animals) need to be able to see animals that hunt them (predators). Predators have eyes on the front of their faces so they can focus on their prey when hunting.

It is fun to have kids note where their eyes are placed on their faces.

Fun Fact: Giraffes have long, thick eyelashes to help keep dust and bugs out

##### 3. Tongue

- Long (average 18" and up to 21"), tough, prehensile tongue is adapted to help with grabbing and stripping leaves from thorny acacia tree branches. The blue/black color helps to prevent sunburn.
- The long tongue also adds to the adaptive advantage of the height of the giraffe as it extends its reach to higher branches

Fun Fact: Giraffes are able to lick their faces and their ears with their very long tongues.

4. Ossicones (horns)

- Both male and female giraffes have a pair of permanent, bony knobs on their heads called ossicones
- They are not true horns
- They are covered with skin and hair
- In addition, bony knobs may be found on the forehead, particularly in males

**Advantages** of these adaptations: Males use ossicones along with long, flexible necks in sparring (necking) matches with other males over breeding rights. Bony growths add weight to large head.

Fun Facts:

Male ossicones have bare tips (rubbed away from sparring) while female ossicones sport hair tufts.

Ossicones are soft and bent back when giraffe calf is born (made of cartilage). This helps protect the birth canal. They straighten and harden (calcify) as the calf grows.

## **GIRAFFE NECK VERTEBRAE**

It is useful to lead with a question: How many neck bones (or cervical vertebrae with older audience) do you think a giraffe has? How many do you have?

Show giraffe vertebrae and human neck bone replica and discuss differences

**Adaptations:**

- The seven vertebrae found in a giraffe's neck are long and large enough to give the giraffe a neck that is about six feet long. The long neck and very long legs make the giraffe the tallest land animal.
- The giraffe cervical vertebrae have a ball and socket articulation that is different from the human neck (info for older children and adults)
- The neck and shoulders sport very strong muscles, necessary to support the large head

**Advantages** of these adaptations:

- Able to eat food that is too high for other animals to reach, so they have a food source that is not available to other animals
- Allows them to browse in areas where the grasses and lower lying food sources have been depleted
- Adult male giraffes are usually taller than females and thus eat leaves at the highest level, leaving those at a lower level for the females and young
- Ball and socket articulation provides great flexibility in the giraffe neck
- Male giraffes use their long, flexible necks to spar with other males in order to win breeding rights with females (called "necking")

Questions for children (and adults):

How does the long neck help the giraffe?

Even though the giraffe has a very long neck, it cannot easily reach the ground to drink, why?

Fun Facts: The average giraffe neck weighs 600 pounds (about the same as 2-1/2 big football players!)

A giraffe can bend his neck around and clean his chest and belly.

A giraffe could look right into the second floor window of a building.

### **PHOTO OF GIRAFFE TO POINT OUT FEET / LEGS (OR LEG BONES IF USING THEM)**

**Adaptations:** Adult giraffe with very strong legs 6 feet or longer in length and large hooves, 12" across (about the size of your dinner plate)

**Advantages/disadvantages** of these adaptations:

- Able to run 35 MPH for short distances to avoid predators; can cover 15 feet with one stride (useful to use examples like car speed for kids)
- Coupled with long neck, height gives advantage of spotting predators
- Large hooves and strong legs used to kick predators
- Because the legs are so long, the giraffe must splay them outward in order to bend to drink water, making it more vulnerable to predators
- Must fold legs under in order to lie down and in so doing is more vulnerable to predators as giraffe cannot rise to its feet quickly
- The giraffe walking gait is unique; in order to avoid tripping over their long legs and big feet, when walking they move both legs on one side of their body and then both legs on the other side. They run like most other mammals by swinging their rear and front legs in unison.

Fun Facts: Giraffe hooves are about 12" across. This is about as big as a dinner plate.

With each walking stride, the giraffe covers 15 feet.

Questions for children: Why is it useful or important for giraffe to be so tall?  
Why does a giraffe need such big feet?

### **GIRAFFE PELT**

**Adaptations:** Patterns and colors

**Advantage** of these adaptations: They provide camouflage in the dense, dry vegetation of the savanna, helping the giraffe blend in with the grass and leaves and shadows. The reticulated (resembling a net or network) pattern is unique to each giraffe, much like our unique fingerprints. Each giraffe sub-species has a characteristic type of color and pattern.

Fun fact: The age of the giraffe can be established from its spots: the darker the spots, the older the giraffe.



## **GIRAFFE TAIL**

**Adaptation:** Long tail, can reach lengths of 6-8 feet including the wiry, whisk-like hairs at the end.

Question for children: Why is it useful for giraffe to have a long tail with long hairs on the end?  
Of course! It is used to keep biting insects away!

## **GIRAFFE DIGESTIVE SYSTEM/DIET/EATING HABITS** (simplify for younger children)

### **Adaptations:**

- Browses for various vegetation, including the favored acacia leaves (explain difference in browsing and grazing with examples)
- Ruminant digestive system (explain)
- Maintaining large size and weight requires large amount of food – up to 75 pounds per day
- Thick saliva covers mouth and tongue
- The very tough lips and tongue are pretty much impervious to the sharp acacia thorns

### **Advantages** of theses adaptations:

- The giraffe can eat large quantities of food during the day without initially chewing it completely. The four stomach chambers of its ruminant digestive system process the food in a series of stages, including regurgitating the partially digested food for the second chewing of the “cud”. This is useful for a prey animal that can “grab and go” quantities of food and swallow it almost whole if there are predators in the area. The multiple stomach chambers efficiently digest the tough, coarse leaves that are high in cellulose. (Interesting to mention other ruminant animals that are familiar)
- Because the leafy food material is high in water content and also may contain dew drops, the giraffe is able to go several days or even weeks without drinking water. This is important when there is no available water or during periods of drought on the savanna.
- African acacia trees sport large, sharp thorns. Thick saliva in the mouth and on the tongue coats any thorns that the giraffe might swallow, protecting the digestive system.

Question for children: Why do you think that giraffes eat leaves from trees and bushes instead of grass?

Fun Facts: Giraffes have been known to chew on the bones of dead animals, probably for the salt and calcium.

When giraffes do drink water, they can drink up to 10 gallons at a time.

Our Zoo giraffes do not peel banana treats they receive!

## **SYMBIOTIC RELATIONSHIP OF BROWSERS, BITING ANTS AND ACACIA TREES**

Giraffe, elephants and some antelope favor the thorny African acacia tree as a major source of food. The acacia trees display several adaptations that help prevent over browsing, which could kill the trees and giraffe play a role in supporting these adaptations.

- Some acacias produce thorns with bulbous bases that have evolved to provide a home to several ant species. The ants eat nectar produced by glands at the base of the acacia leaves.

- When giraffe or other animals browse the acacia trees that are inhabited by ants, the ants bite their tongues and mouths, thus defending the tree from over browsing by causing the animals to go to other trees.
- If there are no browsers to eat from the trees, the symbiotic relationship suffers as the trees do not need the ants. The trees reduce or eliminate the number of nectar glands they provide for the ants.
- With no nectar, the ants attract parasitic, sap sucking insects (aphids, etc.) that are detrimental to the tree.
- A second line of defense for the trees is used to prevent over browsing. After the giraffe has browsed for a period of time, the tree emits a bitter tasting tannin into its leaves that discourages further browsing.
- Another line of defense appears when a gaseous hormone is emitted from the leaves torn by browsers. This gas is carried by the wind to other trees as a signal to produce the tannin that will thwart foraging.
- Often the giraffe will move upwind to eat from trees that are not warned.
- To complete the picture, the presence of the wind borne hormone scent also attracts lions.

Fun fact: The seeds of some acacia trees will not sprout unless they have passed through the digestive tract of a giraffe.

### **GIRAFFE REPRODUCTION/GESTATION/PARENTAL CARE**

- Breeding can occur anytime throughout the year
- Adult males use their long, strong, flexible necks and heavy, horned heads to strike the necks and bodies of other males in order to secure the rights to a female.
- Gestation is typically 15 months in length.
- More than one offspring born at a time is very rare.
- The pregnant female will leave the group to find a secluded spot to give birth.
- Birth weight can vary from 104 – 220 pounds.
- Birth height varies from 5'6" to 6'6".
- Females give birth standing up and the newborns drop to the ground.
- Newborns are able to stand and walk in an hour or less after birth.
- The mother will leave the calf hidden in tall grasses while she browses.
- Even though giraffe mothers are very protective of their calves, they are very vulnerable to predatory lions, leopards and hyena. The infant mortality rate is 50%
- Weaning is most common between 9 -12 months
- Male calves will leave their mother in about 12 months to join a group of other young males. Female calves will remain with their mother up to 18 months.
- Giraffe females and their calves live in groups that frequently change in composition and size

Questions for children: Why is it important that newborn giraffes are able to stand and walk so soon after they are born?

What other baby animals on the savanna are able to do this?

Fun fact: During the first week of life, a giraffe calf can grow an inch or more a day and grow about four feet in the first year of its life.

## **GIRAFFE CIRCULATORY SYSTEM**

**Adaptations:** (These would need simplification to use with children)

Because the giraffe is so large and the head is so far from the heart it needs special adaptations to get the blood to all the parts of its body, but especially up to the head. Special adaptations also allow the giraffe to deal with the high blood pressure that it requires for its circulatory systems to work. These include:

- Has one of the most powerful hearts of all mammals
- Heart weighs on average 25 pounds and is two feet long
- Blood pressure is twice that of the average human, the highest of any animal
- Heart beats 170 times per minute
- Ventricles have very thick walls
- Complex pressure regulation system in the upper part of their necks to maintain and control blood flow when the head is lowered to drink.
- Elastic blood vessels in their brains that connect to one-way valves in the neck to prevent the head from swelling when they bend over.
- Very tight layer of skin on their legs to maintain pressure and prevent the blood vessels, which are under great pressure, from bursting
- Thick skin and inner fascia prevent excessive bleeding in case the giraffe is cut

Fun Fact: NASA scientists are studying giraffe circulatory adaptations for possible applications in material for astronaut gravity suits.

## **ADDITIONAL INTERESTING GIRAFFE INFORMATION:**

- Giraffe have excellent senses of hearing and smell in addition to their keen eyesight.
- A giraffe can see another giraffe (or other animal) up to a mile away.
- The name "*Giraffa camelopardalis*" means "one who walks quickly, a camel marked like a leopard".
- Giraffes sleep less than 2 hours a day and frequently only 25 – 30 minutes a day; they sometimes lie down to sleep, but also sleep while standing.
- Giraffe do have vocal cords and communicate with bellows, snorts, bleats, hisses and whistles. They also emit moans and low notes that humans cannot hear, but are audible to other giraffes.

## Conservation Talking Points for Giraffe

The San Francisco Zoo's giraffe herd is composed of the sub-species, Reticulated (also called the "netted" or Somali giraffe). While this subspecies is common in zoo worldwide, the wild population is shrinking, to less than 4,700 animals today from over 28,000 only 15 years ago. The other common giraffe seen in zoos is the *endangered* Rothschild giraffe. By keeping and breeding these sub-species in captivity, zoos worldwide are helping to preserve a viable gene pool. Despite these efforts, however, the total population of giraffe is decreasing, as noted below.

The giraffe, a beloved symbol of Africa, is in **sharp decline** across Africa

- In the past fifteen years the giraffe population has declined by over 40%, from over 140,000 animals in 1998 to less than 80,000 today
- Of the nine subspecies existed across the broad arc of sub-Saharan Africa from Niger in the West to Central and East Africa and down to southern Africa, only three subspecies have more than 10,000 individuals today

Subspecies	location	wild population	zoos worldwide
<i>Tippelskirchi</i> (Masai)	Kenya/Tanzania	37,000	100
<i>angolensis</i> (Angolan)	Namibia/Botswana	20,000	20
<i>giraffa</i> (South African)	S. Africa/Botswana	12,000	45
<i>reticulata</i> (Reticulated)	Kenya/Somalia	4,700	450
<i>antiquorum</i> (Kordofan)	Chad/ Central African Rep.	3,000	65
<i>rothschildi</i> (Rothschild)	Uganda/Kenya	1,100	450
<i>thornicrofti</i> (Thornicroft)	Zambia	1,000	0
<i>camelopardalis</i> (Nubian)	Sudan/Ethiopia	650	11?
<i>peralta</i> (Peralta)	W. Africa/Niger	300	0

## Factors at work in decline of giraffe

- Destruction, degradation and fragmentation of habitat as a result of human activity represents primary factor in decline of giraffe
  - Vast areas of savanna grasslands and acacia bush lands and thickets have been disturbed by human encroachment for settlement and for agriculture
  - Clearing land for agriculture, with slash and burn practices particularly harmful
  - Unsustainable water use and irrigation in land use practices

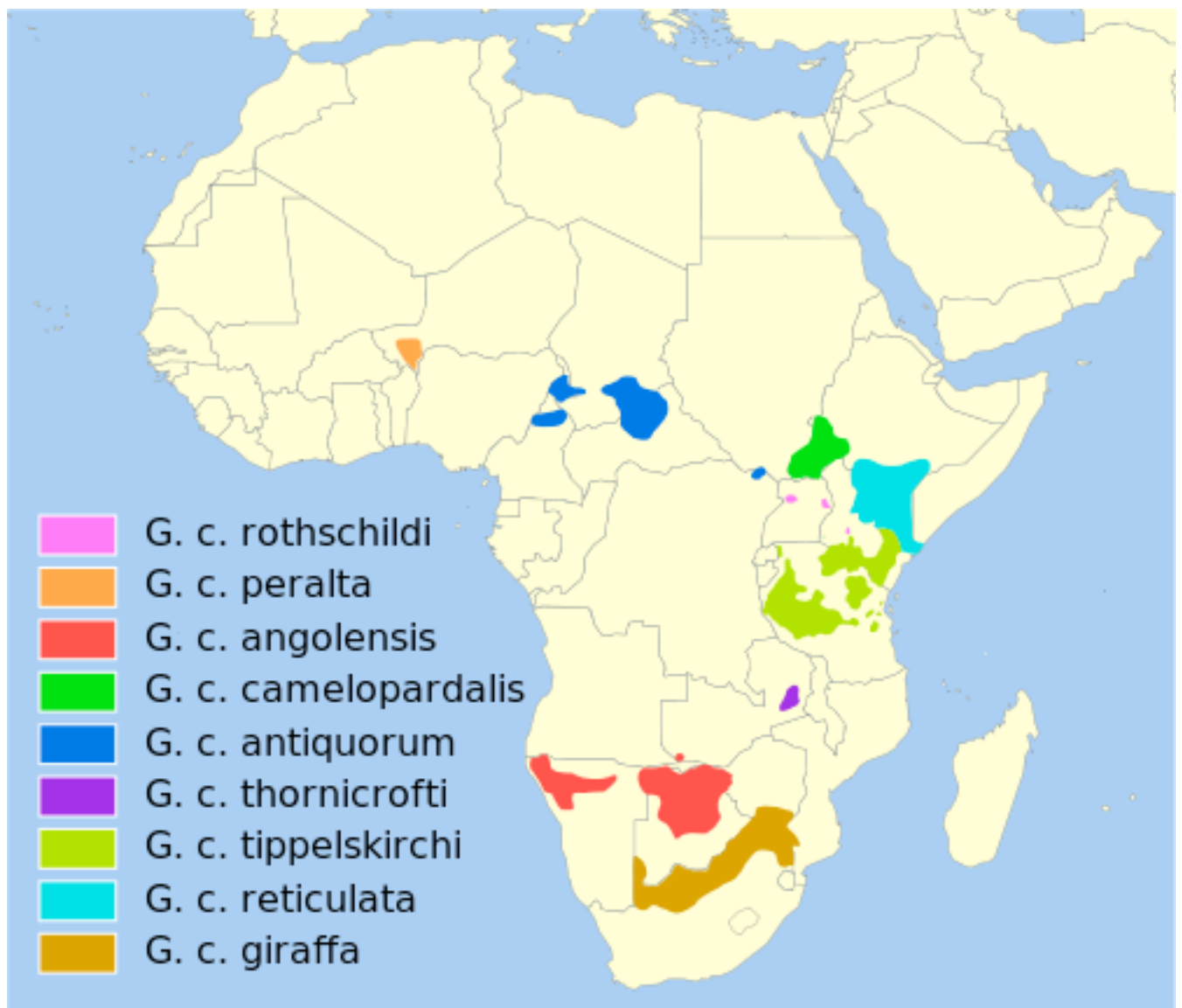
- Harvesting trees for lumber or cooking fuel
- Land use conflicts with pastoralists
- Human settlements in areas once preserved by presence of tsetse fly
- War and civil unrest
- Other human activity adversely affecting giraffe population includes:
  - Poaching, particularly for bushmeat
  - Trophy hunting for pelts, tail (fly whisk), hair for bracelets and other jewelry
- Other factors indirectly related to human activity include:
  - Disease (anthrax and rinderpest) particularly in populations stressed by drought, habitat loss and degradation and inbreeding due to habitat fragmentation and shrinking populations

### **Special Conservation Challenges for Giraffe**

- Despite the visibility of the giraffe, fundamental research is lacking on the giraffe and the subspecies. Baseline knowledge currently being gathered:
  - Historical and current census on numbers and distribution of giraffe in general and subspecies in particular
  - Research on physiology and life cycle in wild to aid in translocation projects
  - DNA analysis of subspecies to determine taxonomy
- Giraffe populations are spread across 21 African countries in a wide range of land-management regimes, from state owned national parks to private and communal lands

### **Contribute to Giraffe Conservation by:**

- Supporting organizations conducting research on the giraffe
- Traveling as an Eco-tourist to national parks and other reserves supporting giraffe
- Supporting organizations working to establish sustainable agricultural practices in Africa
- Boycotting tourist or gift items that use giraffe hair or pelts
- Educating yourself and others on issues facing giraffe today
- Supporting zoos that serve as DNA ark for subspecies and provide opportunities to study physiology of giraffe in accessible setting



**Giraffe Range**  
*Giraffa camelopardis*

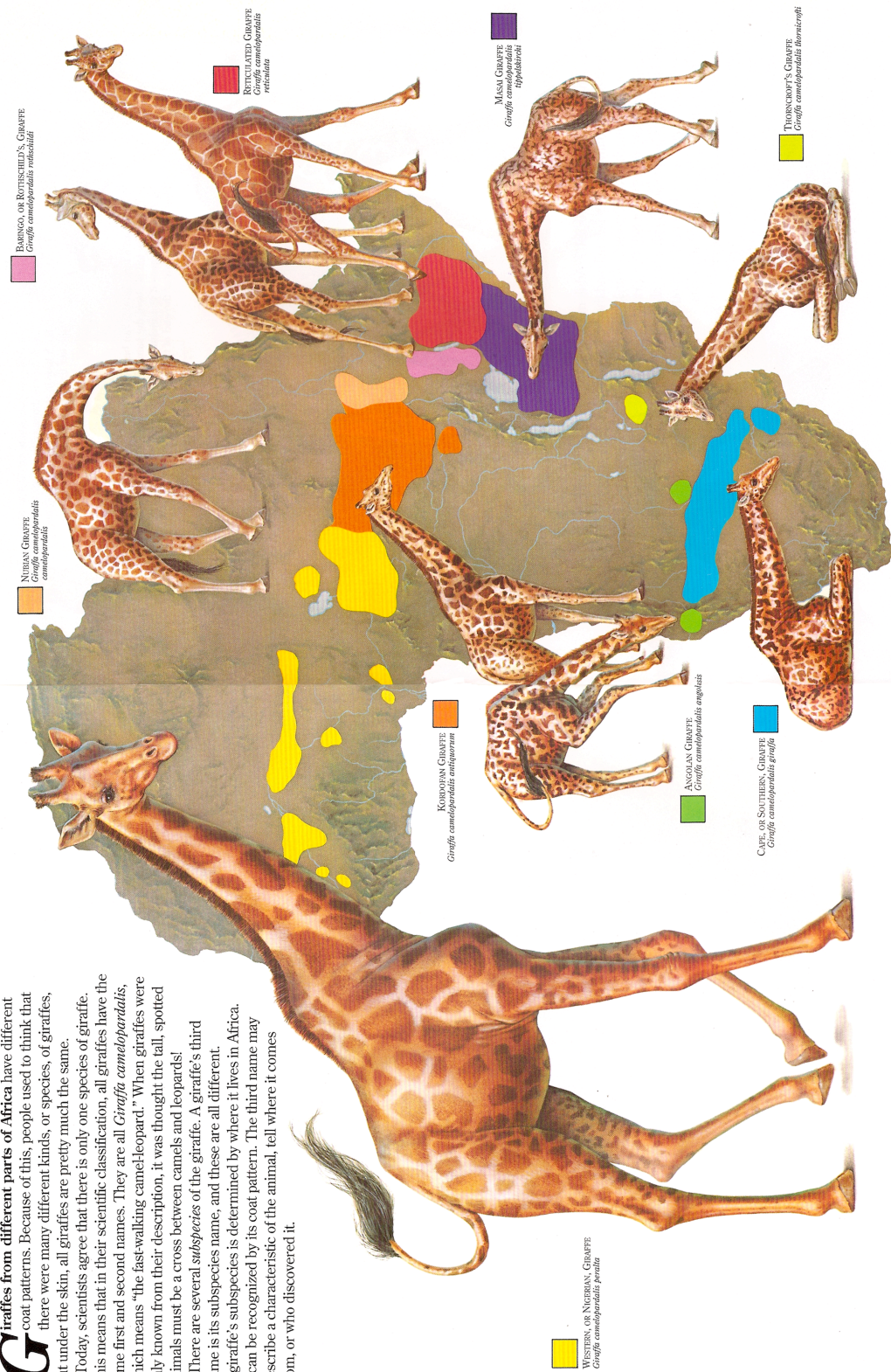
The map displays the distribution of the Giraffe Range of *Giraffa camelopardis* across Africa. The range is indicated by orange-shaded areas, primarily concentrated in the Sahel and East Africa. Key countries within the range include Mauritania, Mali, Niger, Chad, Nigeria, Cameroon, Central African Republic, South Sudan, Ethiopia, Kenya, Tanzania, Mozambique, Zimbabwe, Botswana, Namibia, South Africa, Lesotho, and Swaziland. Major cities such as Cairo, Baghdad, Tehran, and Johannesburg are labeled. The map also shows the Mediterranean Sea, Red Sea, and the Mid-Atlantic Ridge.



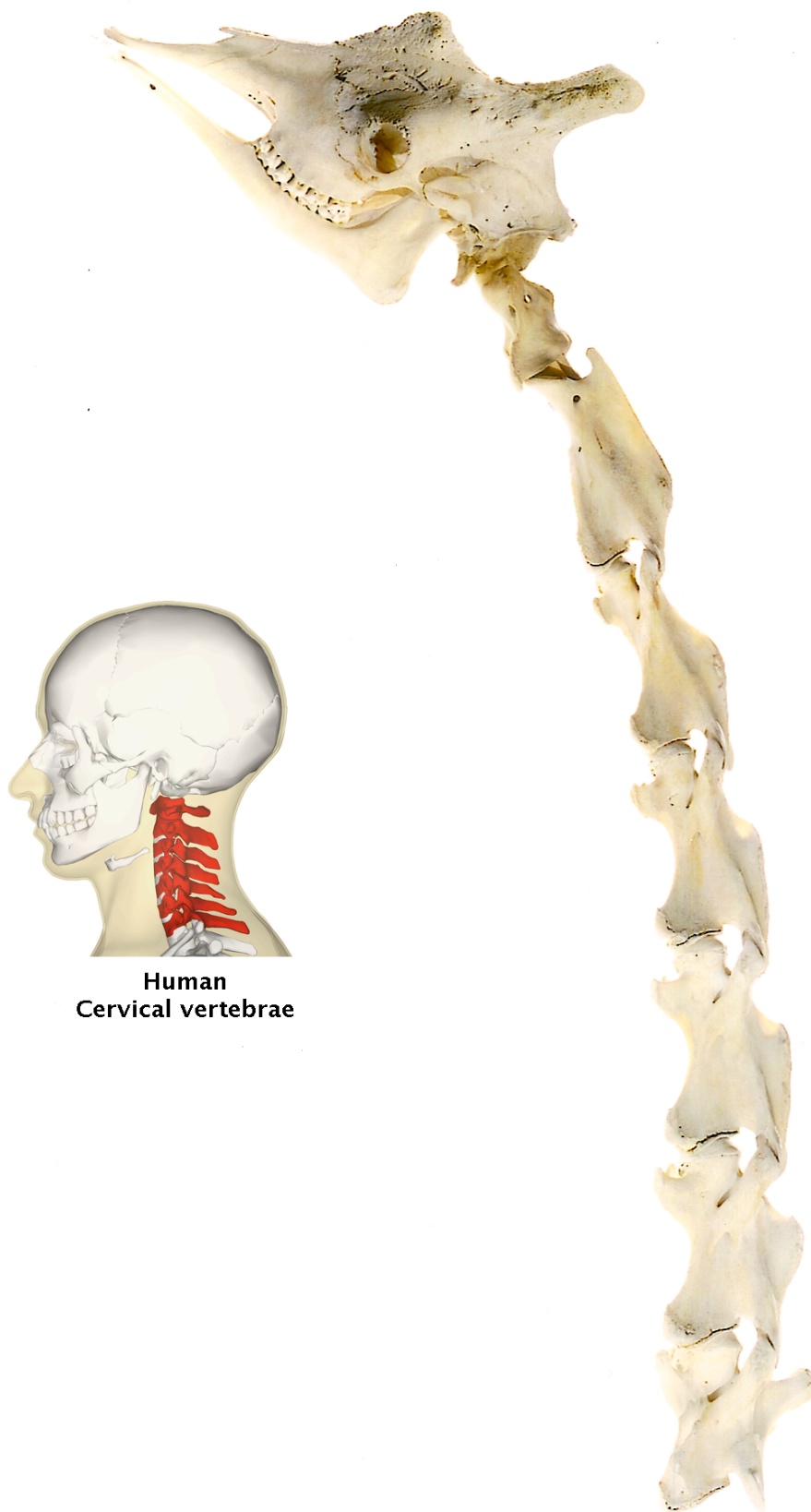
**G**iraffes from different parts of Africa have different coat patterns. Because of this, people used to think that there were many different kinds, or species, of giraffes, but under the skin, all giraffes are pretty much the same.

Today, scientists agree that there is only one species of giraffe. This means that in their scientific classification, all giraffes have the same first and second names. They are all *Giraffa camelopardalis*, which means "the fast-walking camel-leopard." When giraffes were only known from their description, it was thought the tall, spotted animals must be a cross between camels and leopards!

There are several *subspecies* of the giraffe. A giraffe's third name is its subspecies name, and these are all different. A giraffe's subspecies is determined by where it lives in Africa. It can be recognized by its coat pattern. The third name may describe a characteristic of the animal, tell where it comes from, or who discovered it.







Human  
Cervical vertebrae

1 Foot



Giraffe, with head stretched nearly into alignment with its neck, uses its mobile lips to strip foliage (left), (right) uses its long, flexible tongue to select and pluck the most succulent leaves

## Whistling Thorn Acacia *Acacia drepanolobium*

