Snakes, Reptiles & Amphibians 101:

Introduction to pet snakes; now including reptiles and amphibians!

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Who are we:

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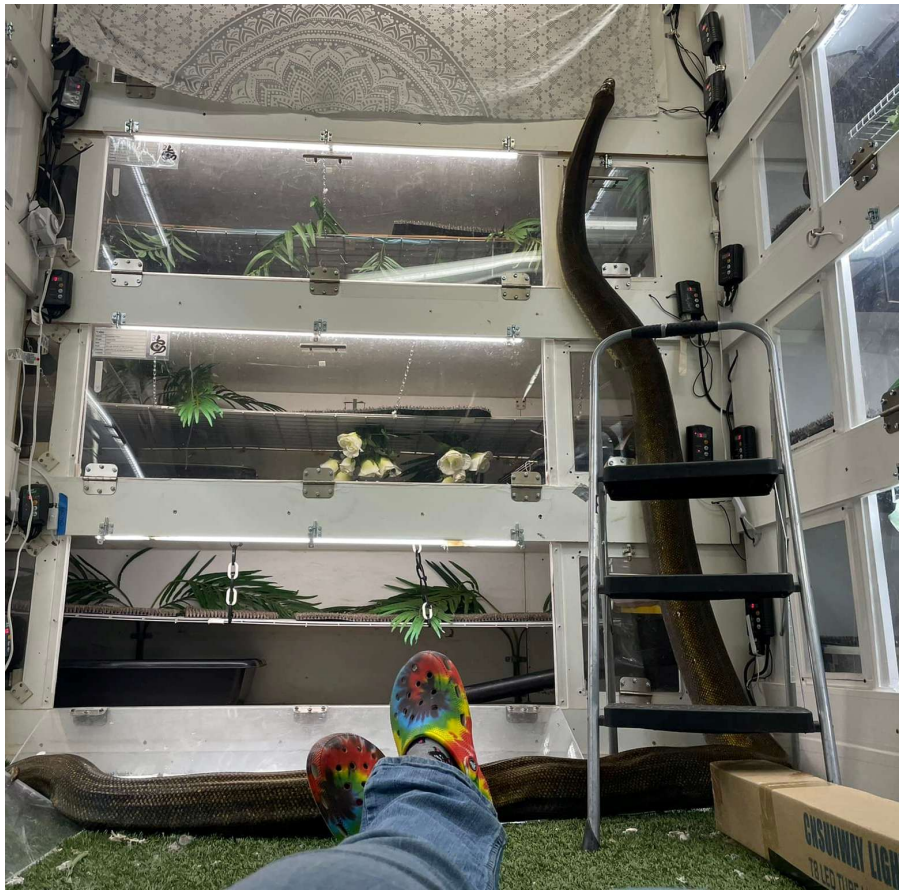
Additional helpers
- Animal Handler: Jeanette McLeese, LVT
- Camera: John Manthey

Who do we do:

Giants



Behavioral

Medical

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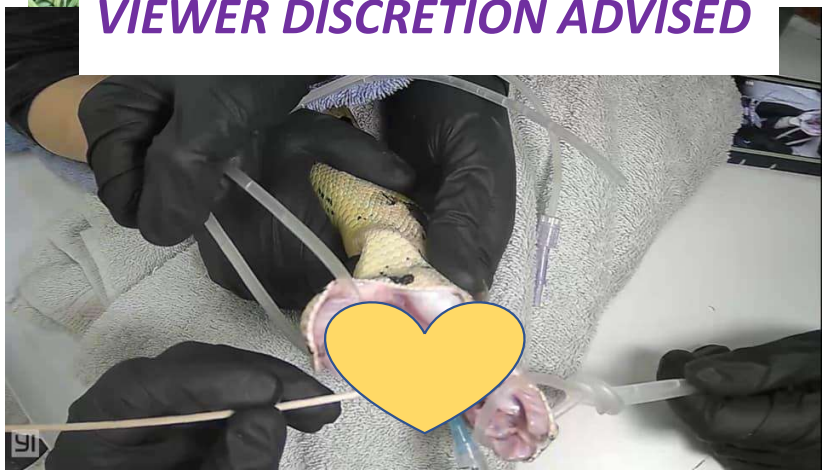


Surgical

Topics: reptiles & amphibians

1) How are these animals unique: special anatomy and physiology

2) Behavior: understand them better

3) Husbandry and basic care

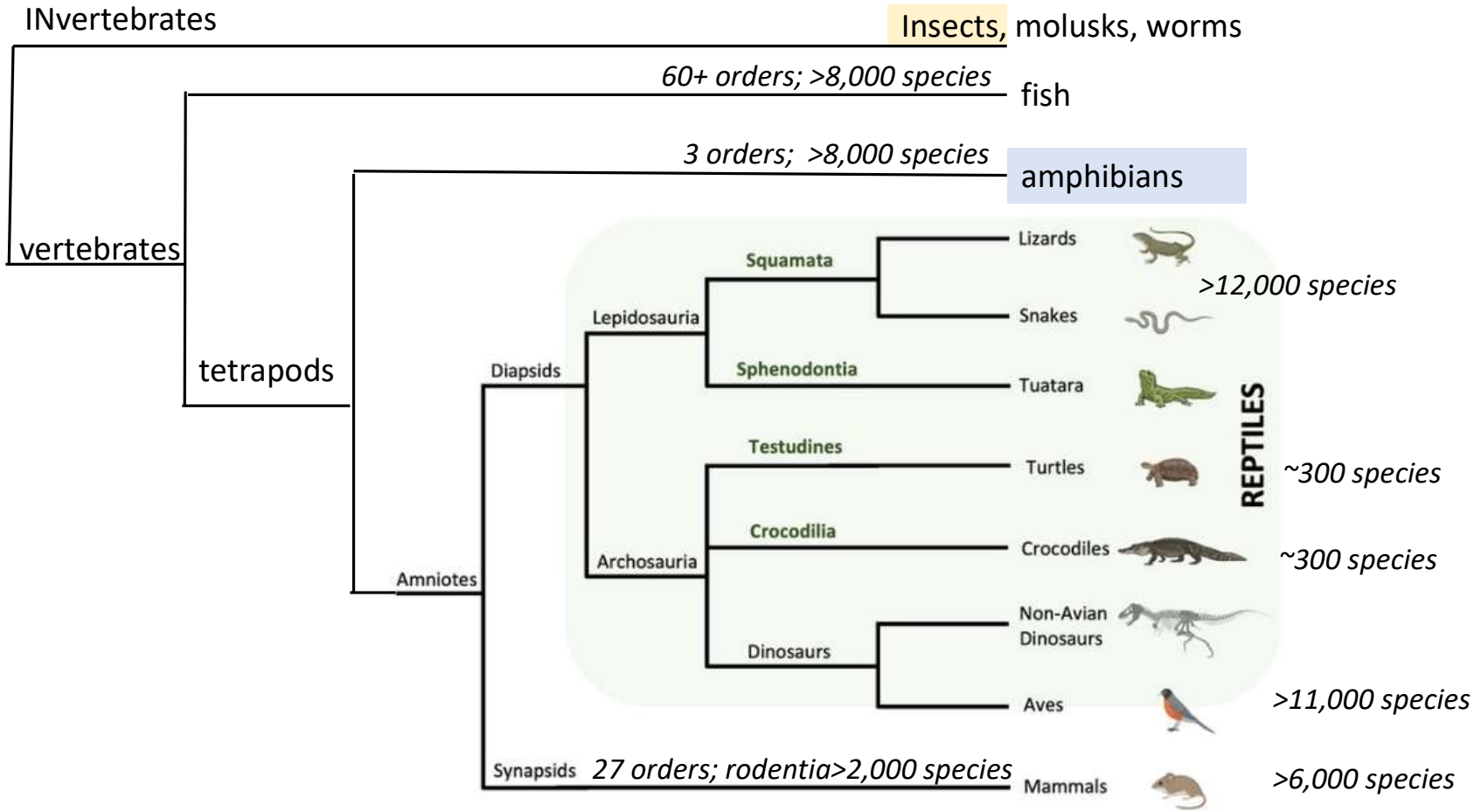
4) When and how to intervene

5) Types of snakes, reptiles, and amphibians: common pets, identification, and behavior

→ LIVE ANIMALS at the end

Questions welcome!

Topic 1: How are these animals unique?



Topic 1: How are they unique?

Reptilia

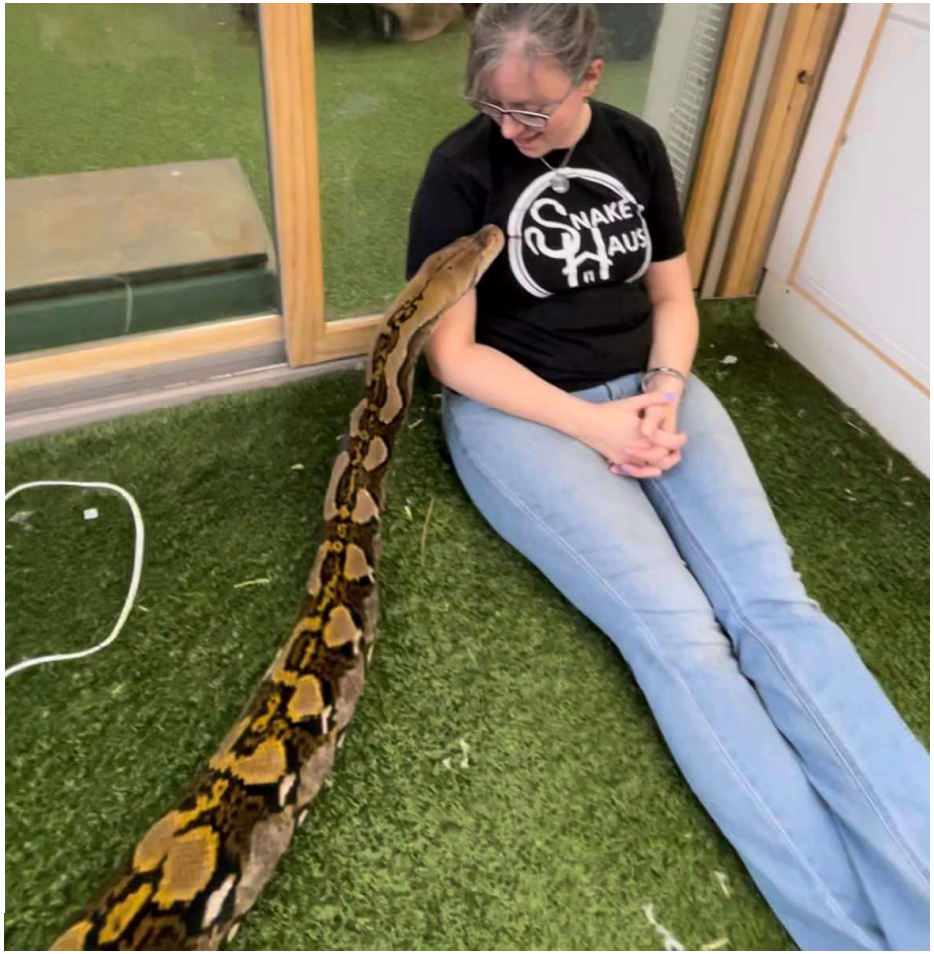
- **Squamata** – snakes and lizards
  - have ***scales*** so they must molt to grow and have stronger muscle attachments for the jaw (diapsid)
  - 2° largest order of living vetebrates after fish
- **Rhynchocephalia** – Only one left
- **Testudines** – a shell as part of their skin
- **Crocodilia** – semi-aquatic predatory repitles
  - scales are more intricate and develop/adapt in response to their invironment
  - Closest living relative to birds

Amphibia

- **Frogs, salamanders, etc** – require water for at least part of their life cycle

So many amazing adaptations

- **Ectotherms:** solar powered
- **Thermoreception:** heat pits
- **Special anatomy:**
  - No eyelids or ears
  - Shed cycle
  - Flexible jaw and airway
  - Smell with their tongue
  - No legs? ribs & spurs!
- **Organs:**
  - One lung and no diaphragm
  - Renal portal system
  - No urinary bladder?
- **Amphibian skin**
- **Turtle shells**
- **Autonomy**
- ***Venomous vs Poisonous***



Ectotherms: solar powered

An energy saving adaptation that gives them the ability to feed infrequently

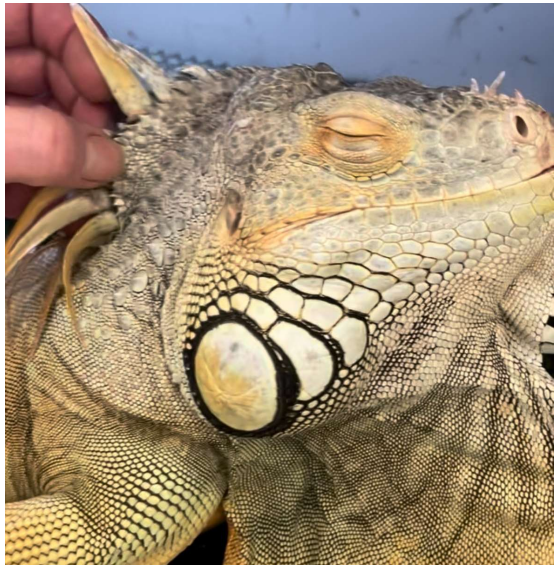
Large body surface area needs to be exposed to heat

- **Ectotherms:** require external heat source for metabolism and other bodily functions – ***most reptiles***
- **Poikliotherm:** adapted to temp variations – ***amphibians***, marine life, desert species, camel
- **Homeotherm:** requires stable temps - most mammals, ***birds***

Ears: where are they?

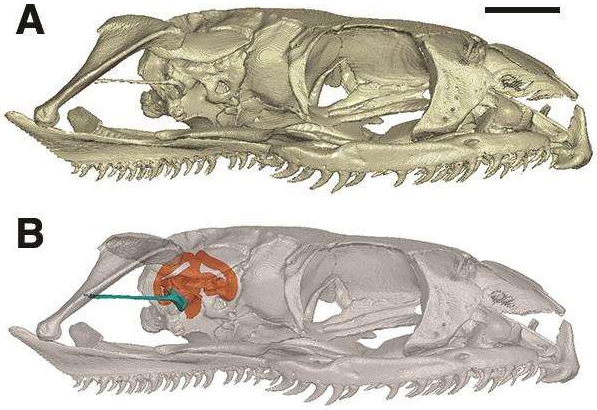
Lizards & Amphibians – TM only

- No pinna but they do have a tympanic membrane



Snakes – do they have them?

- No pinna, No tympanic membrane
- Inner ear senses vibrations

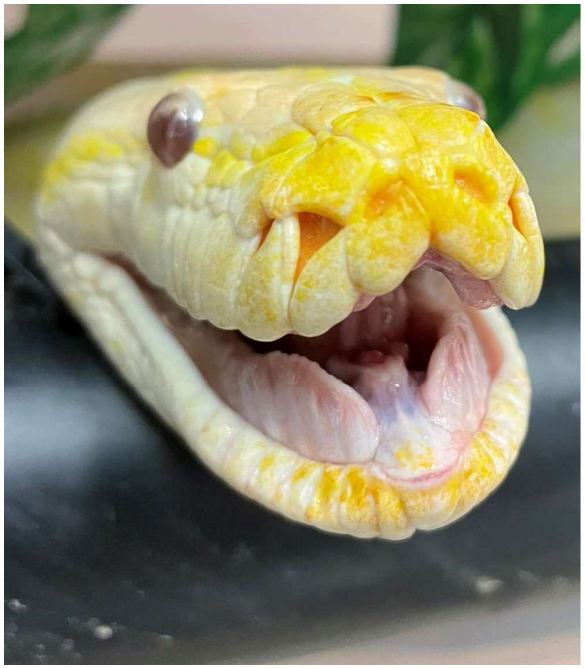


Source: https://www.eurekalert.org/multimedia/877311

Why is this important to us? *Enclosure location and communication*

Thermoreception: Snakes have heat pits

- Special nerve cells that sense infrared radiation
- Directional distance receptors



Why is this important to us? *They see heat more than visual cues*

Special anatomy: No eyelids in snakes!

Spectacle – this is a modified scale that acts like a contact lens and protects the eye instead of lids.

Why is this important to us? *Sleep with their eyes open*

Special anatomy: 3rd eyelid in lizards & amphs!

Nictitating membrane – this is a modified eyelid that in some animals acts like goggles to protect the eye and to clear away debris

Shed cycle: a squamata super power!

- Skin does not stretch and grow
- Scales do not stretch and grow
- New scales are not added with growth – scale counts remain the same for life

→ so how does a snake grow??

Shed cycle: growing an entire new layer of skin and shedding the old.

Without doing this they would be trapped in the skin as they grow.

Why is this important to us? *Requires correct humidity but allows for incredible healing abilities*

Vomeronasal Organ

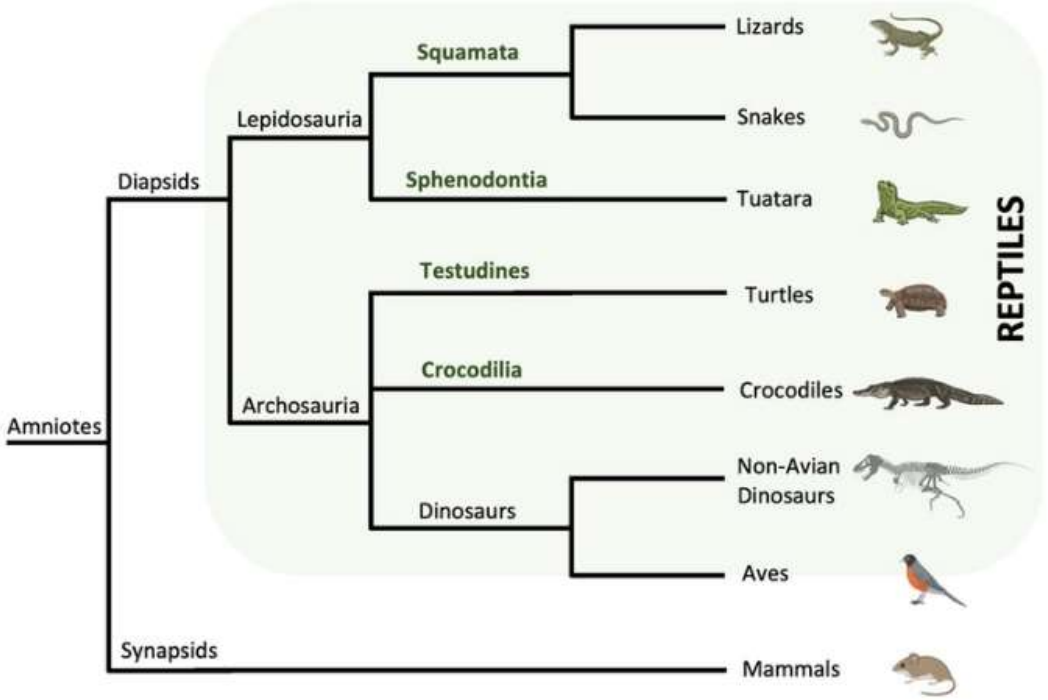
- Snakes & lizards – the tongue
- Cats – the “stinky face”
- Bats, Rats, Dogs
- Primates: vestigial in humans

Why is this important to us? *Nothing sinister; NOT indicative of impending bite*

Mobile jaw and airway

Diapsid, anapsid, synapsid:

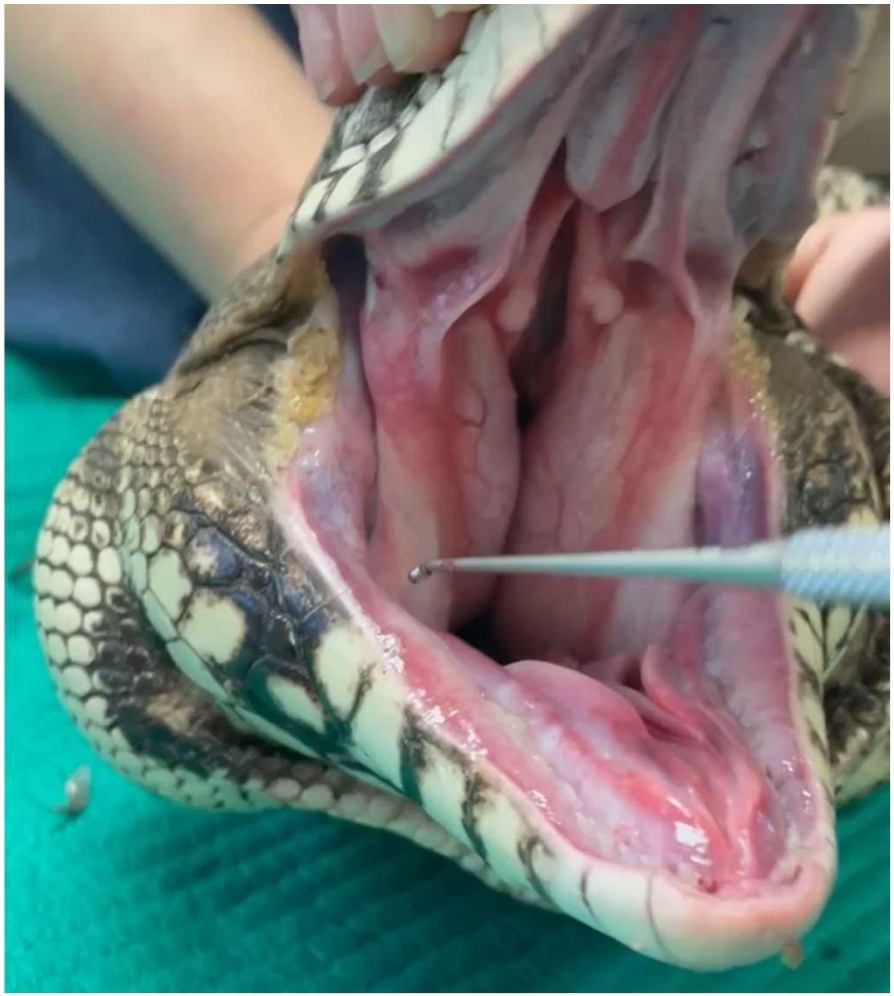
- different muscle attachment points in all squamates
- maxillary and mandibular symphysis and the TMJ are open in snakes



Why is this important to us? Lizards have a stronger bite*, snake jaws are easily injured, easy to intubate and tube feed. Anapsids are super difficult!*

Mobile jaw and airway

Epiglottis location: in the base of the tongue means the opening of the airway is mobile and can be changed positionally when eating large items.



Why is this important to us?
Easily injured, easy to intubate and tube feed

Respiratory system

Snakes: One lung

- The left lung is vestigial or absent. No second lung to assist if the primary lung is injured
- No bronchiole ciliary bodies (mucous elevator)
- Right lung is very long but only half of it participates in gas exchange – air sac

Reptiles and amphibians (except crocs): No diaphragm

Coelom is the combined chest cavity and abdominal cavity

- Active respiration driven by rib movement
- Not very good at coughing
- Thoracic and abdominal cavities communicate

Amphibians: Skin participates in respiration

Respiratory system

Why is this important?

- **One lung -** Respiratory illness can be extreme and recovery is much more difficult

- **No diaphragm:** Coelom is the combined chest cavity and abdominal cavity
  - Respiration can be inhibited by things like obesity, injury, arthritis, body position, restraint, and activity level.
  - Very difficult for them to expel resp secretions
  - Any fluid in the abdomen will also surround the lung/s and prevent inflation
  - Abdominal wounds that enter the coelom can prevent the vacuum effect that allows for respiration

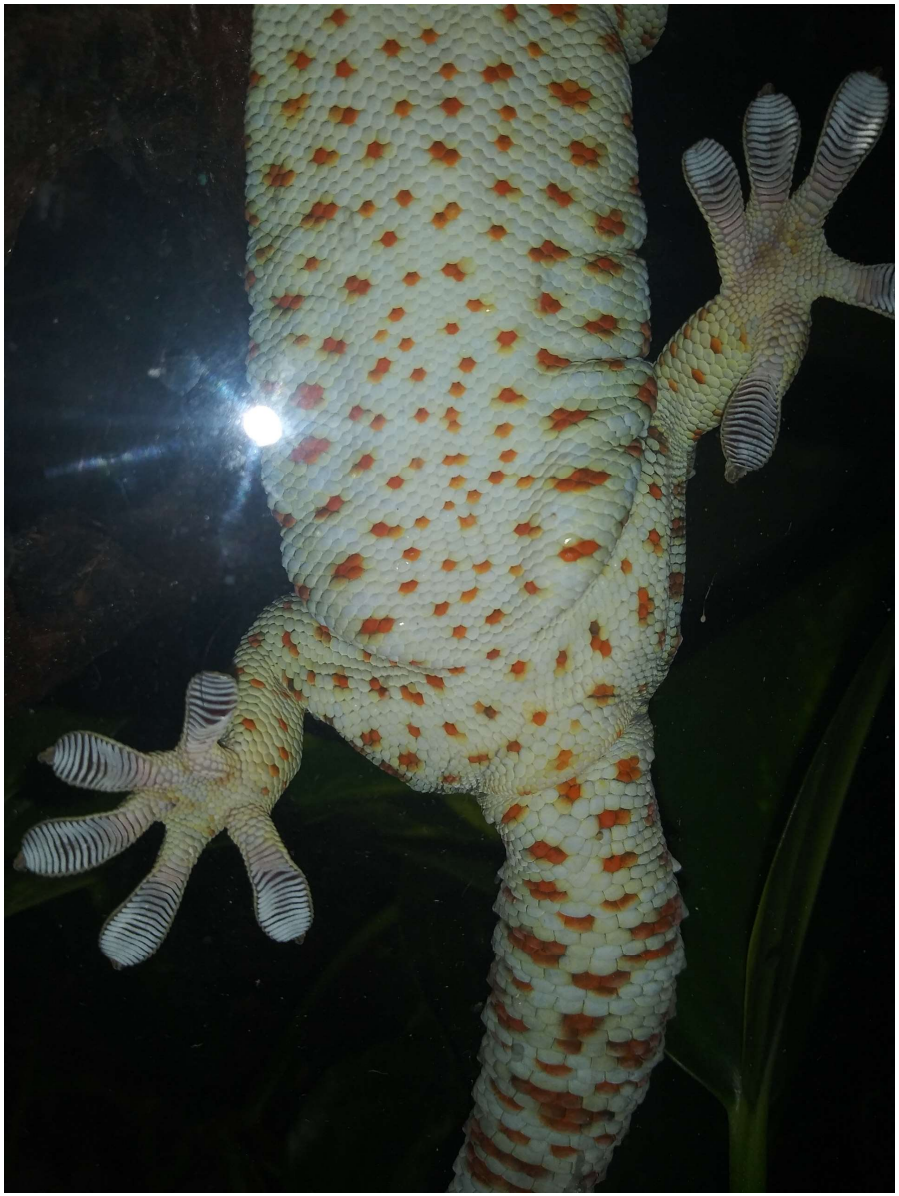
- **Amphibians:** very sensitive to the oils on your skin – wash hands BEFORE handling them

Amphibian skin

- **Permeable to gasses and water**
  - Cutaneous respiration
  - Water absorption
- **Lack outer keratin layer**
- **Specialized glands produce mucous and/or toxins**

Sticky feet

Geckos, some anols, and tree frogs have special microscopic hair like structures that stick to smooth surfaces with static – *van der waals forces*



Ribs instead of legs!

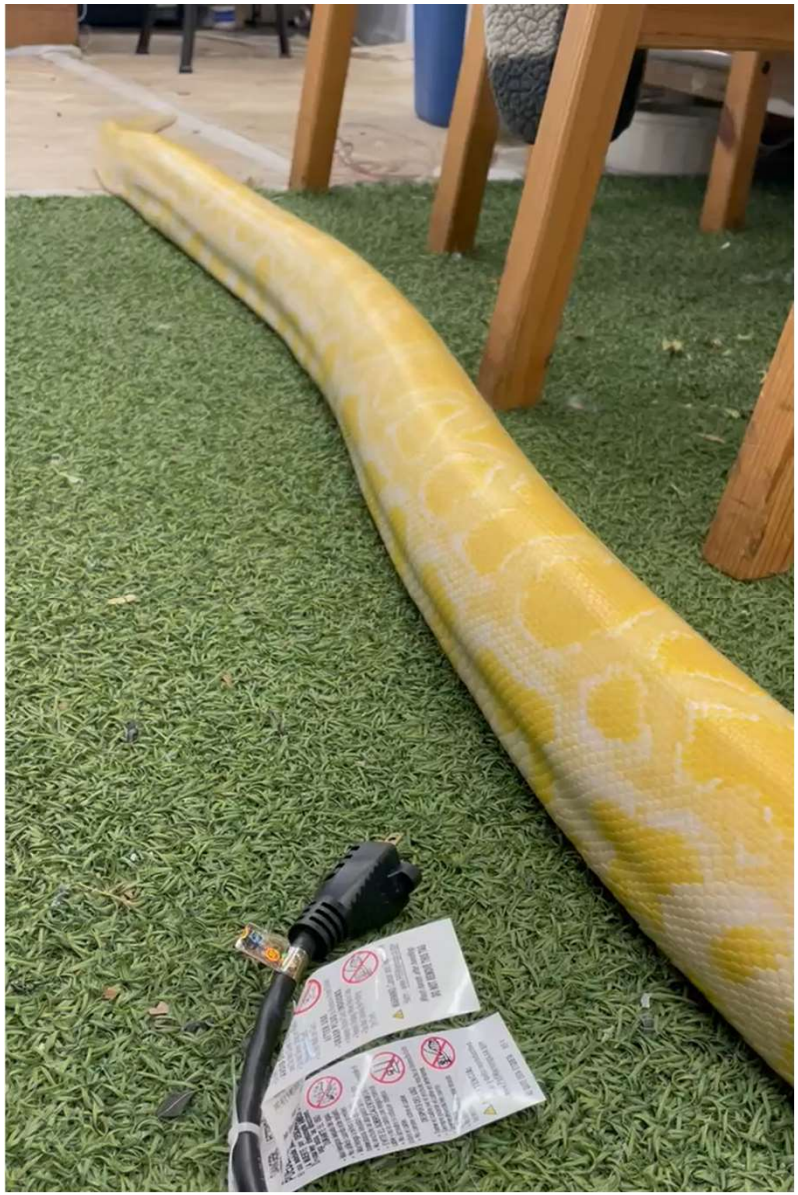
- Snakes use their ribs to push themselves along
- Strong
- Efficient
- Fast
- Collapsible

→More agile and mobile than other types of animals but can be injured in obese animals

Spurs: vestigial legs

Why is this important to us?

No anatomical markers for internal organs and limited sites for blood draws and IVC



Renal system (urinary)

- **Renal portal system:** Prevents kidney damage during periods of water deprivation. Low blood volume and/or low blood pressure in mammals can result in renal ischemic necrosis. Snakes and some lizards are able to shunt blood to the kidneys before the rest of the body to maintain adequate perfusion.

- **No urinary bladder:** Snakes and some lizards rid their body of nitrogenous wastes via uric acid solids rather than liquid urine. This is another adaptation for water conservation as their kidneys are able to conserve much more water than mammals can.

Why is this important?

- Visible dehydration is much more severe and prolonged than with mammals
- Injections are given in the cranial half of the body

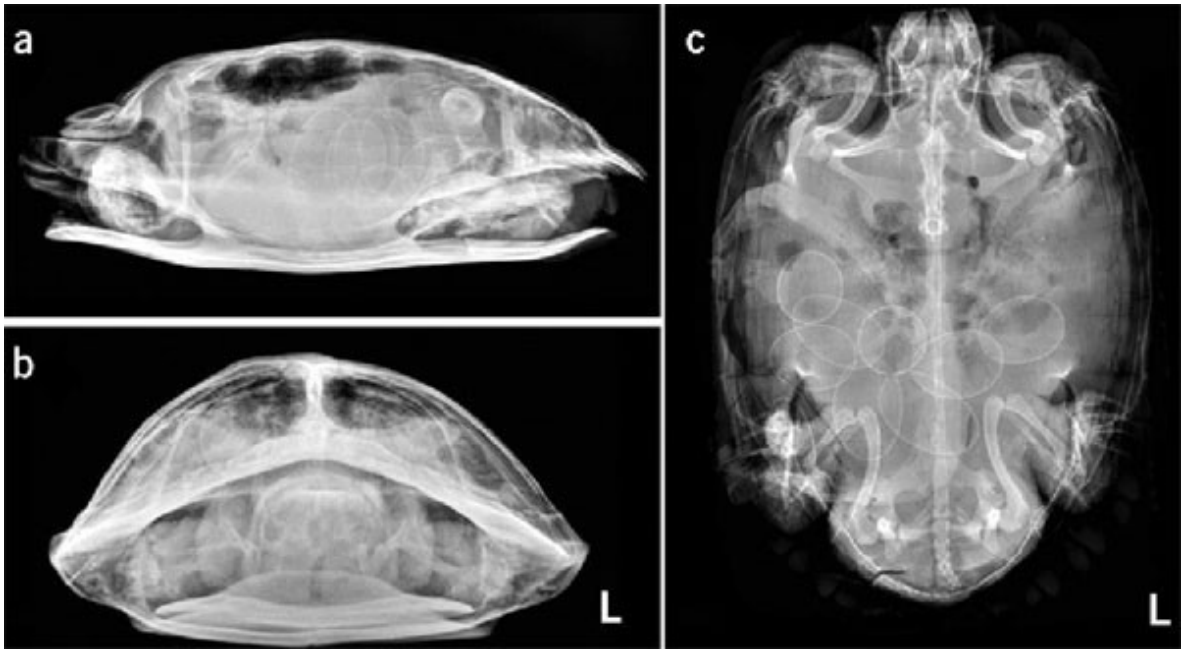
Tail Autonomy

- **Some lizards are able to drop their tail if grabbed by a predator –** iguanas, skinks, geckos, anoles, some monitors, tegus

Why is this important? The tail is not a handle

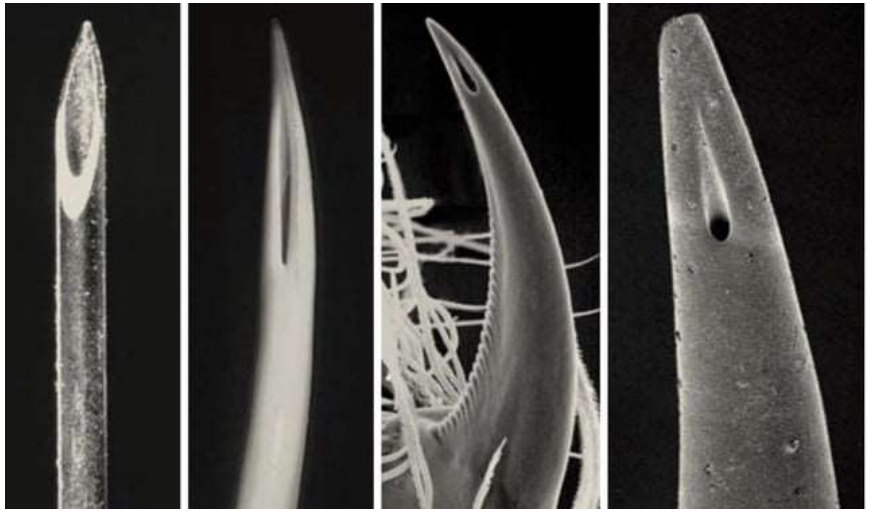
Turtle shells

- **The shell is live tissue** – it includes their spine, ribs, and specialized skin.



Why is this important? Handle a turtle shell like you would skin. Handle it like you would someone's spine.

Venomous vs Poisonous



Venom is **INJECTED** Poison is INGESTED

Snakes: front fangs are hollow

Lizards and rear fang snakes: grooved teeth

(Gila monster, Mexican beaded lizard, Komodo; some monitors have mild venom)

How **NOT** to tell if a snake is venomous:

- Triangle head? Pythons and boas have fat heads too
- Elliptical pupils? Cobras and black mambas are round
- Color? Mimicry
- Tail rattle? Defense mechanism, corn snakes

These don't work!

The only way to tell: take photos and compare to a reputable resource for snake identification

Illegal reptiles: front fang venomous, water species, or native

- **RCW 16.30.010**
- **Definitions.**

(1) "Animal control authority" means an entity acting alone or in concert with other local governmental units for enforcement of the animal control laws of the city, county, and state and the shelter and welfare of animals.

(2) "Potentially dangerous wild animal" means one of the following types of animals, whether bred in the wild or in captivity, and any or all hybrids thereof:

(a) Class mammalia

(i) Order carnivora

(A) Family felidae, only lions, tigers, captive-bred cougars, jaguars, cheetahs, leopards, snow leopards, and clouded leopards;

(B) Family canidae, wolves, excluding wolf-hybrids;

(C) Family ursidae, all bears;

(D) Family hyaenidae, such as hyenas;

(ii) Order perissodactyla, only rhinoceroses;

(iii) Order primates, all nonhuman primate species;

(iv) Order proboscidae, all elephants [elephant] species;

(b) Class reptilia

(i) Order squamata

(A) Family atractaspidae, all species;

(B) Family colubridae, only dispholidus typus; **- The Boomslang** *(the only rear fang on this list)*

(C) Family **elapidae,** all species, such as **cobras, mambas, kraits, coral snakes, and Australian tiger snakes**;

(D) Family hydrophiidae, all species, such as sea snakes;

(E) Family varanidae, only **water monitors and crocodile monitors**;

(F) Family **viperidae**, all species, such **as rattlesnakes, cottonmouths, bushmasters, puff adders, and gaboon vipers;**

(ii) Order **crocodilia**, all species, such as crocodiles, alligators, caimans, and gavials.

(3) "Person" means any individual, partnership, corporation, organization, trade or professional association, firm, limited liability company, joint venture, association, trust, estate, or any other legal entity, and any officer, member, shareholder, director, employee, agent, or representative thereof.

(4) "Possessor" means any person who owns, possesses, keeps, harbors, brings into the state, or has custody or control of a potentially dangerous wild animal.

(5) "Wildlife sanctuary" means a nonprofit organization, as described in RCW **84.36.800**, that cares for animals defined as potentially dangerous and:

(a) No activity that is not inherent to the animal's nature, natural conduct, or the animal in its natural habitat is conducted;

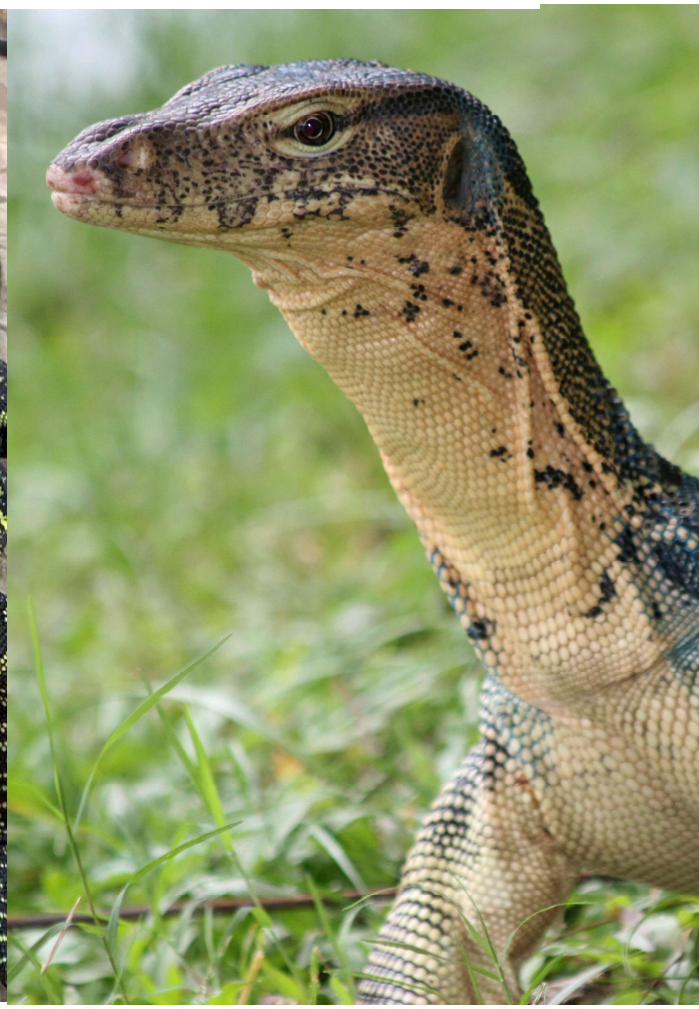
(b) No commercial activity involving an animal occurs including, but not limited to, the sale of or trade in animals, animal parts, animal by-products, or animal offspring, or the sale of photographic opportunities involving an animal, or the use of an animal for any type of entertainment purpose;

(c) No unescorted public visitations or direct contact between the public and an animal; or

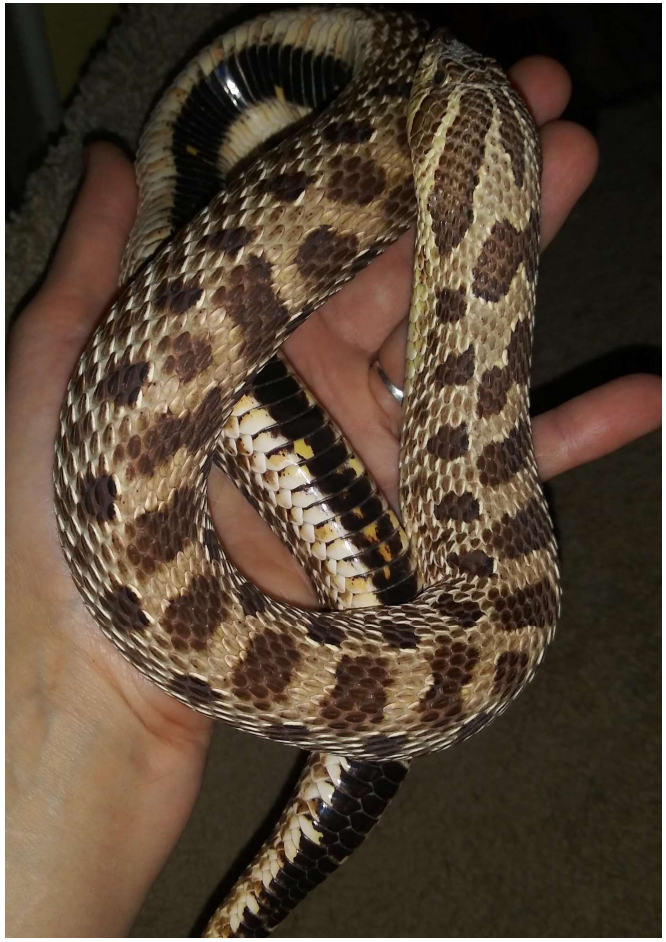
(d) No breeding of animals occurs in the facility.

MOST CITIES – size restrictions

Which one is legal in Washington?



Who here is venomous?
Who here is illegal in Washington?



Topic 2: Behavior

Habituated vs Domesticated

- Have learned to tolerate us
- Not social animals
- Will avoid you unless they sense food
- Give them an escape route instead of cornering them

Fight or Flight: give them the option to flee and they will take it

Snake Bites: no big deal. . .

Lizard Bites: can be much worse

Photo credit: Tom Cruchfield
Croc monitor

Snake Bites: what to do

Types of Bites:

- **Defense:** false strike or strike and let go
  → Back off and give animal somewhere to hide

- **Food:** strike, hold on, and wrap
  → Hold still; do not pull your hand back
  → Hand sanitizer
  → Hold head behind the neck once they let go
  → Cover the snake with a towel
  → Unwrap backwards from the tail up

- **Fight Mode:** some males will fight via a bite delivery that can cause lacerations
  → Requires gentle handling! Don't push back just try to steer them.
  → Respond better to female handlers

Handling basics

Snakes - Size Matters

One person for every 6’ of snake

Respect the animal:

- Wash your hands FIRST so you don’t smell like food
- Say hello first; make sure they are awake
- Give them time to look around and think
- Invite them out; must give them somewhere to go
- Avoid the head and tail
- Be strong but gentle

No snake scarves: one shoulder only

Handling basics

Lizards:

Don't get bit by a large one! – wear leather gloves if in doubt.

Iguana skin – wear long sleeves

Claws – wear long sleeves

Respect the animal:

- Say hello first; and let them see you and judge your smell
- Wash your hands FIRST so you don't smell like food
- Watch body posture
- Avoid the head and tail
- Shoulder and pelvic girdles are your handles
- Be strong but gentle

Videos:

1)Bad Leeroy

2)Hungry Hector

3)Good Icky

BAD Leroy

HUNGRY Hector

GOOD Icky

Handling Tools

Snakes

- Hook
- Hide
- Towels
- Thin gloves
- Plastic tub
- Clean hands
- Time and patience
- Close observation and flexibility

Hook Training Video

*Training should not start until the animal feels safe inside their enclosure

Hook

A communication tool:

- Ambush predators - Break the food drive, smell and heat signature
- Applied behavioral pressures: elicit a desired response and reward
- Redirection: steering rather than forced movement

Fight or flight – they will want to move AWAY from you so use an object that extends your reach to direct them into a safe zone, box, or catch bin.

Hides

Positive thigmotaxis

- security blanket for the animal
- Reward for redirection w/ hook
- Elicits cooperation from the animal
- Vital for moving giants around
- Feeding bin – CAUTION – not the same thing!

Fight or Flight – remember they need somewhere to flee so offering something as simple as a cardboard box can be very helpful.

Gloves

Towel

Topic 3: Husbandry & Basic Care

- **Heat:** cold blooded - can not survive long without heat (80-95 degrees)
- **Water:** needs clean water for bathing and for drinking
- **Contained:** can not survive out of its enclosure
- **Clean:** it does not have the ability to get away from its own excrement
- **Hides:** positive thigmotaxis; sensitive and needs to feel safe
- **Substrate:** must be present and clean
- **Food:** mice, rats, rabbits, chickens, guinea pigs – pre-killed or frozen/thawed

Exam questions:

1) Which TWO things are most important for REPTILE husbandry?

2) Which TWO things are most important for AMPHIBIAN husbandry?

Enclosures: size

Foot print vs Height

Most snakes, even the arboreal ones move, sleep, stretch, breath, and eat laterally. Which means the size of the enclosure foot print is more important than height.

A tall narrow enclosure is not ideal.

Snakes: Enclosure Length + width ≥ length of the snake

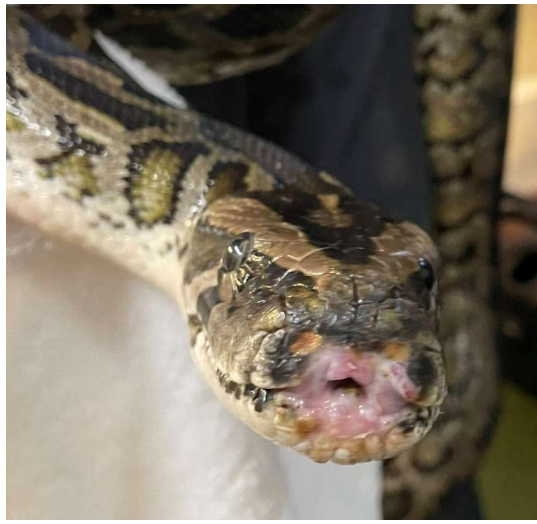
Lizards: Enclosure Length = 3 x length of the animal

Screen Top Aquariums: bad for snakes

- **Humidity control:** heat rises and take water vapor with it
- **Temperature regulation:** heat exits out the top
- **Scale rot and respiratory disease:** evaporation from dirty substrate
- **Feeling of exposure:** clear on all sides
- **Nose damage:** trying to get out the top
- **Handling from above:** predators approach from above – stress
- **Inappropriate dimensions:** too narrow front to back, too tall
- **Danger from other animals:** cats, dogs, etc

This is the most common type of enclosure used. It can be done but requires significant work to be done well.

Reading material: Snakes in Tanks



How to improve a Screen Top Aquarium

- **COVER THE TOP WITH FOIL:**
  - **Humidity control:** www.snakehaus.com/frontpage/education/humidity-control/
  - **Temperature regulation:** www.snakehaus.com/frontpage/education/climate-control/
  - **Nose damage:** trying to get out the top

- ADD thermostats and belly heat – probe placement is important though
- ADD digital thermometers

- **COVER THE SIDES WITH PAPER:**
  - **Feeling of exposure:** clear on all sides

- **CLEAN IT!**
  - **Scale rot and respiratory disease:** evaporation from dirty substrate

- **TURN IT ON ITS SIDE:** www.snakehaus.com/frontpage/education/enclosures-2/aquariums/
  - **Handling from above:** predatrs approach from above – stress
  - **Inappropriate dimensions:** too narrow front to back, too tall
  - **Danger from other animals:** cats, dogs, etc

Better Enclosure options

- Animal Plastics: https://apcages.com
- Boaphile: https://boaphileplastics.com/
- Vision cages: https://www.visionproducts.us
- Reptilekages https://reptilekages.com
- Zen Habitats: https://www.zenhabitats.com
- Reptile Basics: https://www.reptilebasics.com/racks-cages/
- Apex Reptile: https://apexreptile.com/
- Black Box Cages: https://www.blackboxcages.com/collections/cages
- Dubia: https://dubiaroaches.com/collections/reptile-enclosures
- Focus Cubed Habitats: https://focuscubedhabitats.com/
- Cornel's World: https://www.cornelsworld.com/
- Build your own: https://www.snakehaus.com/.../build-your-own-enclosure/
- Snakes in Tanks: https://www.snakehaus.com/.../snakes-in-tanks-please-stop/

***NOTE* some of these come with SCREEN TOPS and will need to be modified; screen tops are really dangerous for many reasons.**
Please read the article listed as the last link for more details on that topic.

Topic 4: When to intervene

- Neglect
  - Too cold
  - No water
  - Extremely dirty
  - Live food should NEVER be left in enclosure
- Injured
  - Wounds: bites, burns, or rubs
- Other illness
  - Skin dz
  - Mites
  - Respiratory dz
  - Mouth rot
  - Eyes
  - Spinal deformities

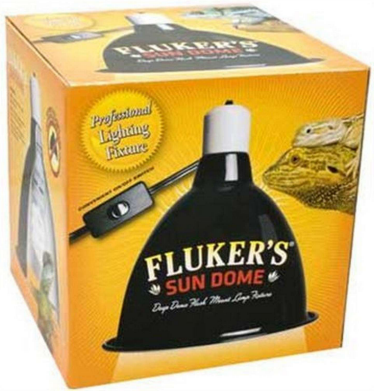
Neglect– basic husbandry is lacking

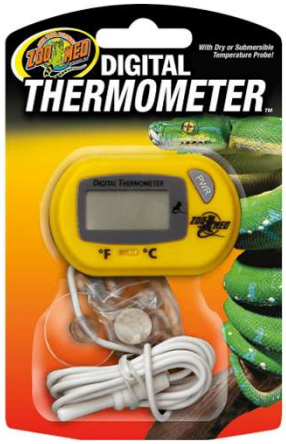
- Old poop
- Broken items
- Shed skin
- No heat
- Dirty water or no water

Heat? Water? Contained? Clean? Hides? Substrate? Food?

When to intervene: NO heat

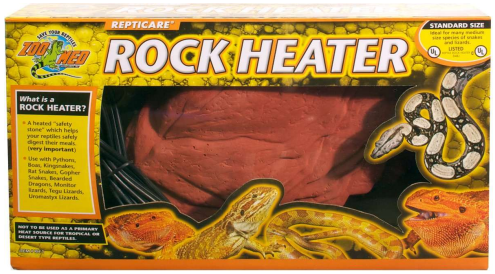
→immediate husbandry change needed





When to intervene: DANGEROUS heat

→immediate husbandry change needed



Thermostat probe placement significantly affects internal environment. We need to make sure our heat translates to a warm snake and not just a warm enclosure.

When to intervene: poor BCS or dehydration → neglect

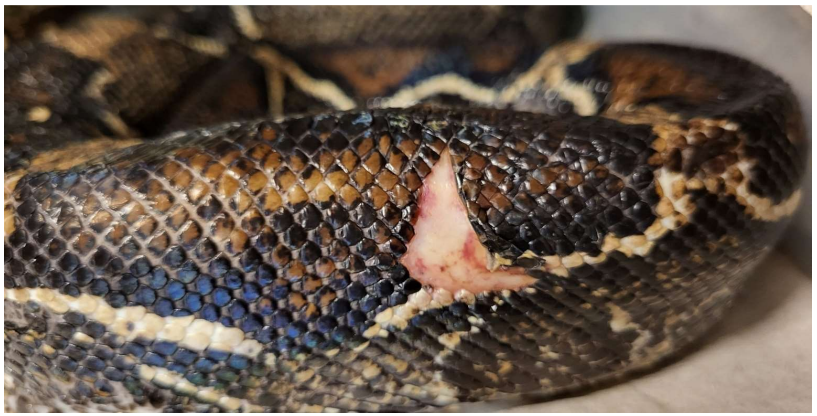
When to intervene: poor BCS or dehydration → neglect

When to intervene: injuries → husbandry changes + vet visit

Burn

Scale Rot, Poor skin health, behavior

Rub spot – stuck shed or behavioral



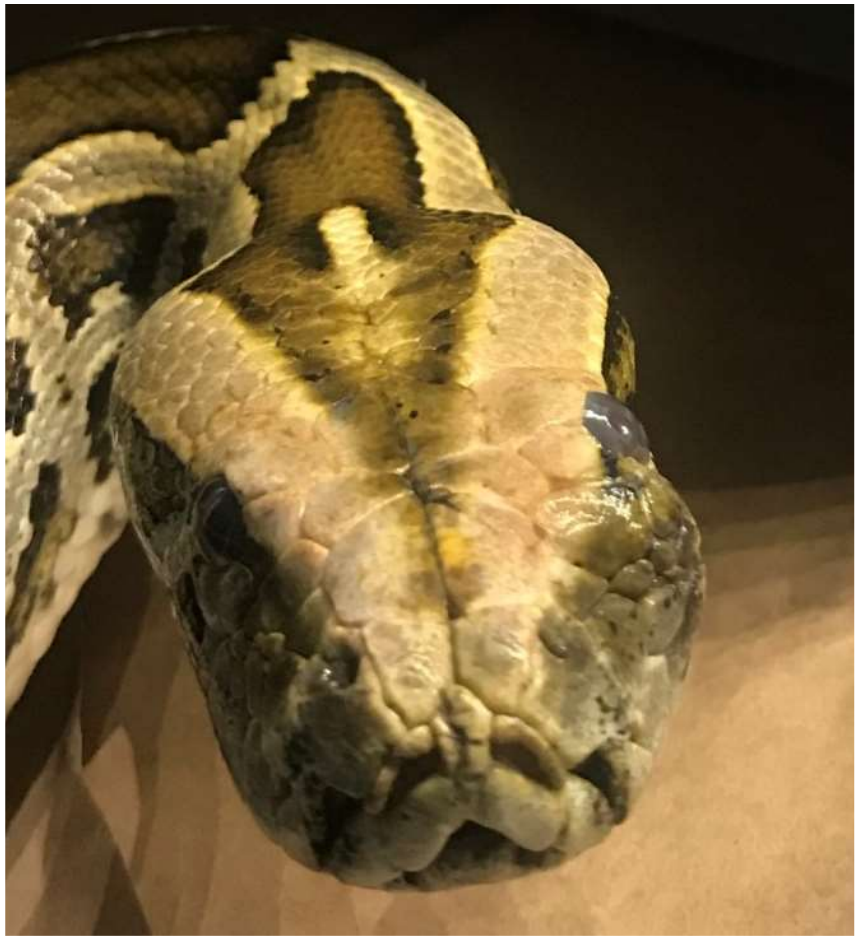
Laceration – partial or full thickness

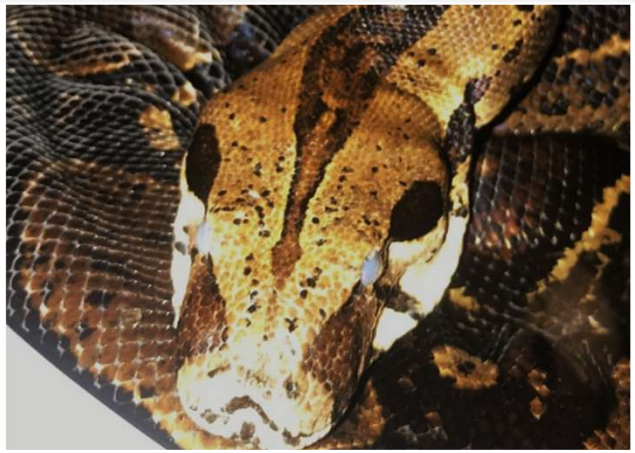
SCARS: healed

no treatment needed

When to intervene: eye infections

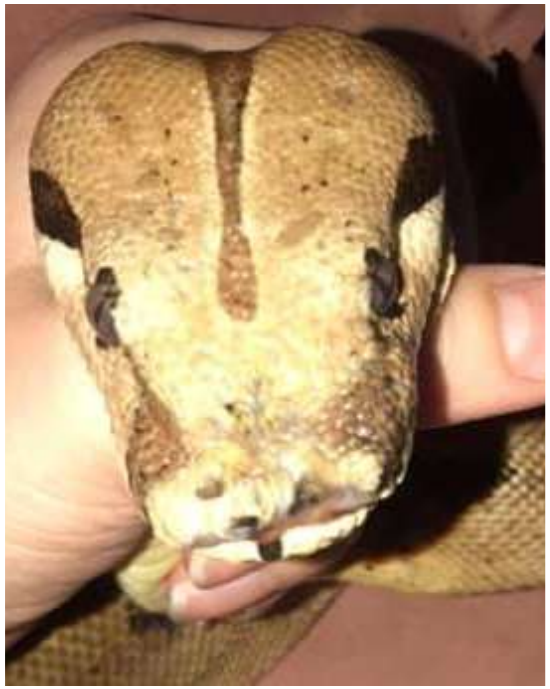
→ can you tell which one needs a vet visit?

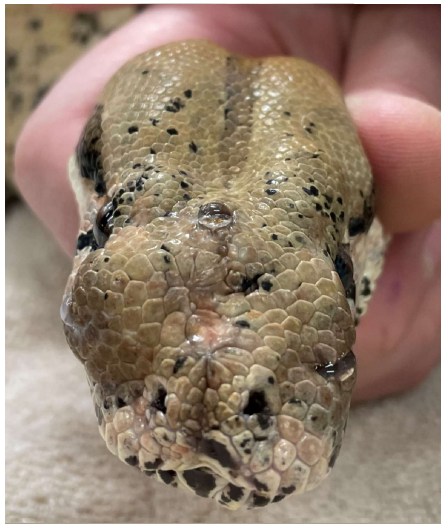


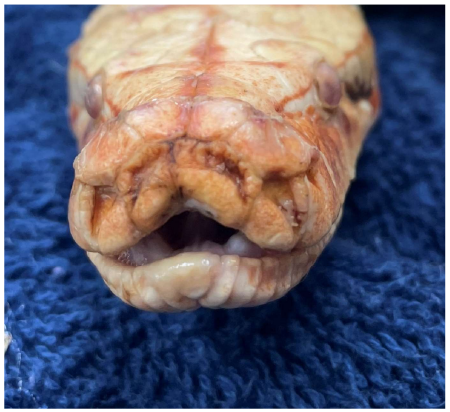


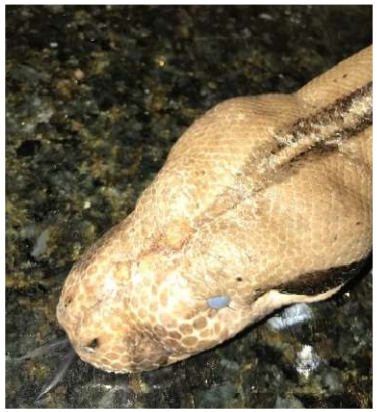
When to intervene: mouth injury or infection

Immediate husbandry changes
AND
vet visit





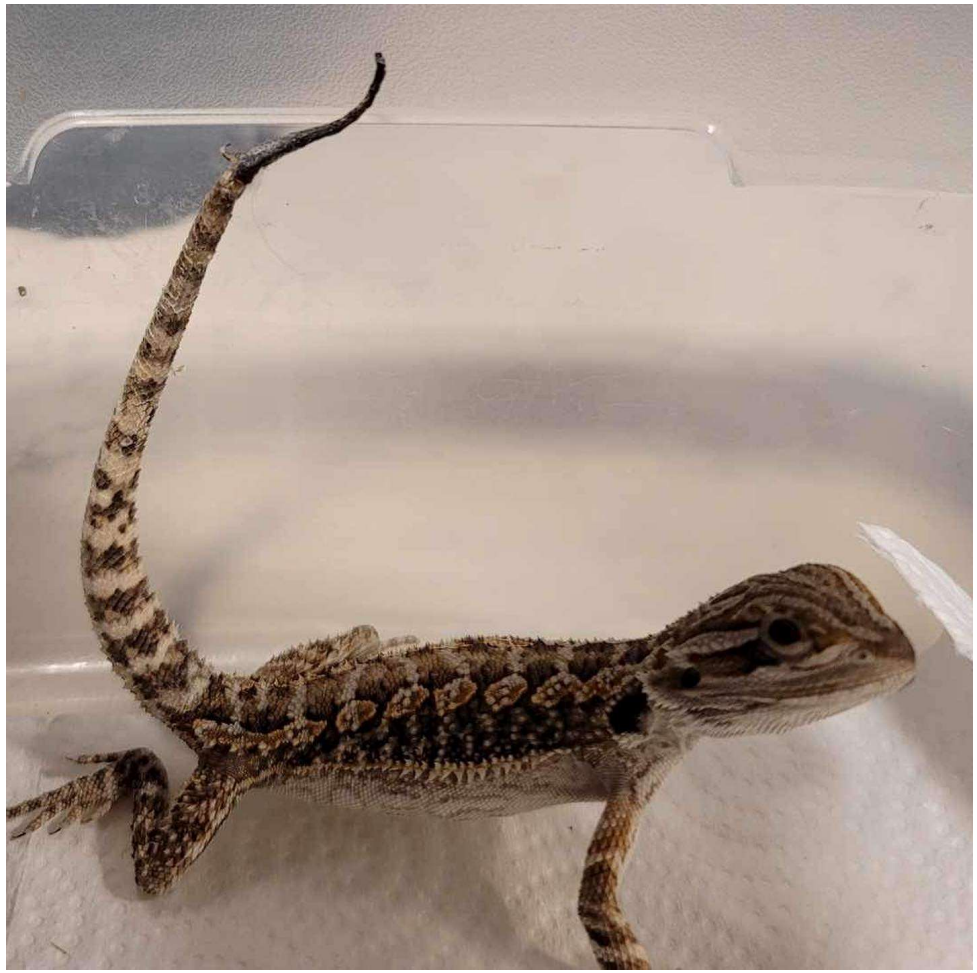




When to intervene: retained shed → husbandy

When to intervene: retained shed → husbandy

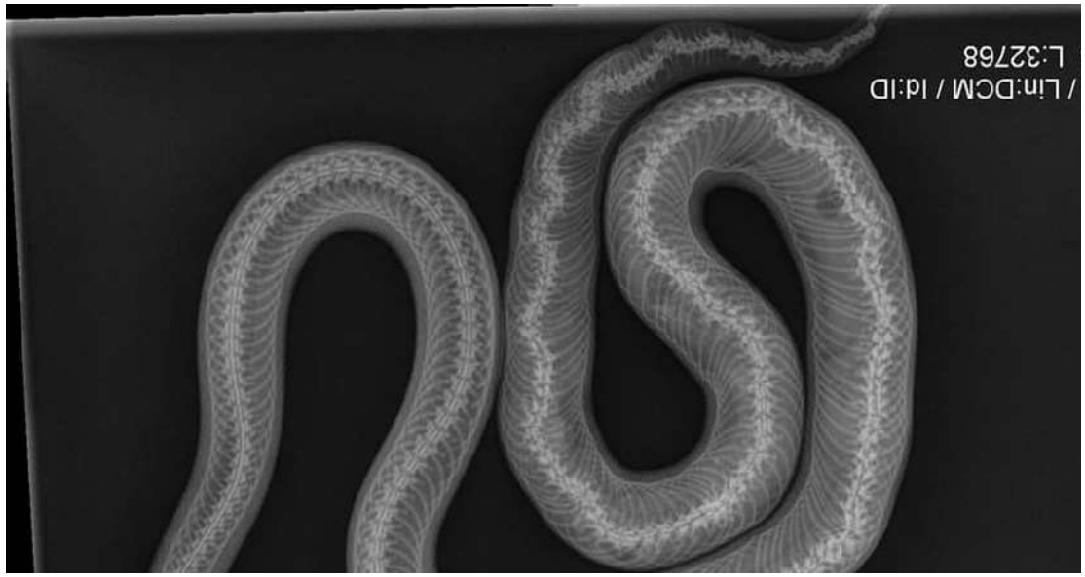
When to intervene: reta



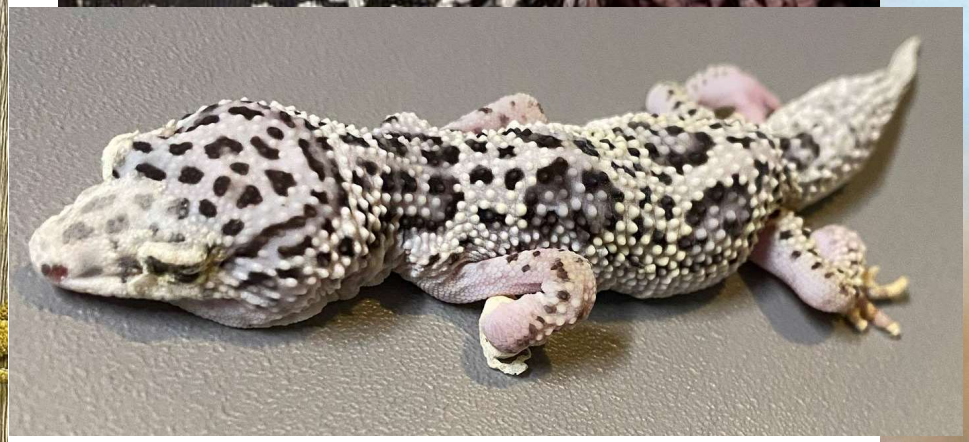
When to intervene: retained shed → husbandy

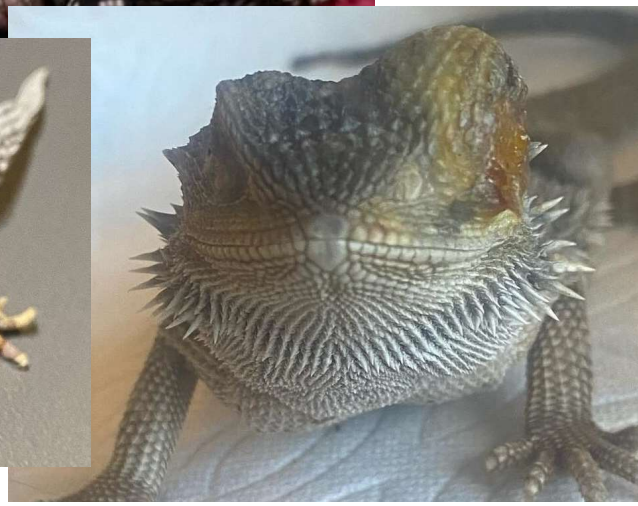
When to intervene: lumps and bumps → chronic illness

When to intervene: lumps and bumps → chronic illness



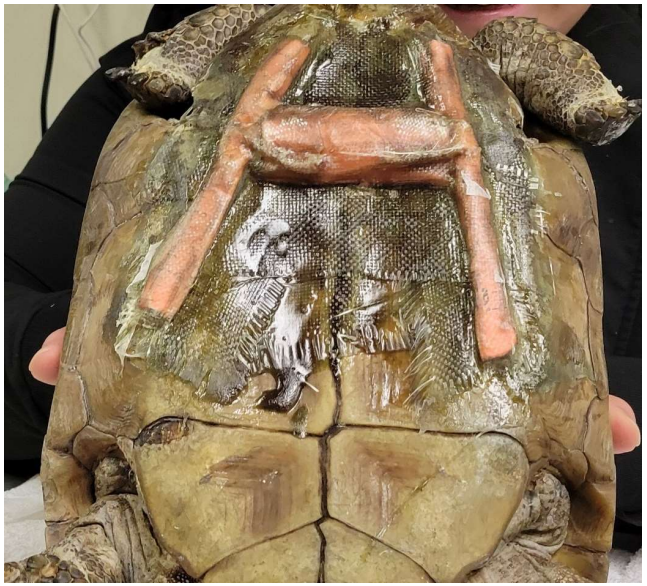
When to intervene: lumps and bumps → chronic illness

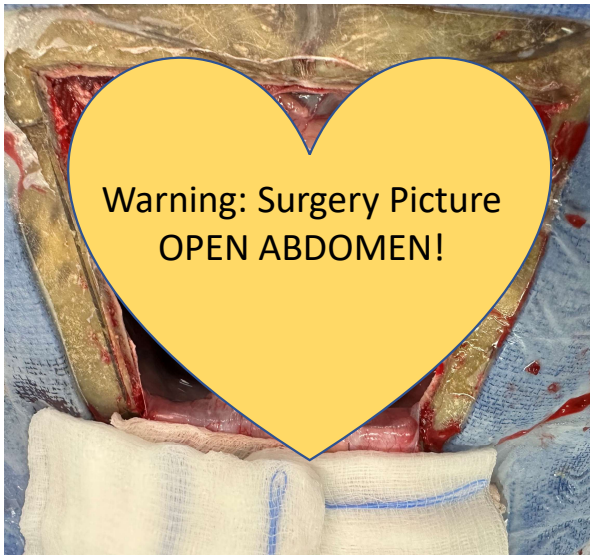




When to intervene:

painted, deformed or injured shell





When to intervene: LIVE FOOD

→ immediate husbandry change; PLEASE PREVENT THIS!

VIEWER DISCRETION ADVISED

How to intervene: Confiscation vs In home Coaching

There is NO WHERE for these animals to go:

- Rescues are full
- Zoos do not want them
- More babies are being produced than there are homes for
- Shelters are ill equipped to house reptiles

Local Reptile Facebook groups:

Puget Sound Reptiles
Oregon and Washington Reptiles for Adoption
Seattle/Washington Reptile and Invertebrate enthusiasts
Northwest Reptile and Aquatic Enthusiasts
New Ball Python Keepers
DIY Reptile Enclosures
Reptile Lighting
Reptile Enrichment and Training
The Burmese Python Society
Constrictors as Pets

Recommended Veterinarians:

Seattle: Bird and Exotic Clinic of Seattle
Bothell: Center for Bird and Exotic Animal Medicine
Maple Valley: Pine Tree Veterinary Hospital
Tacoma: Blue Pearl Avian and Exotics
Pullman: Exotics ward
Olympic Peninsula: Uptown Animal Hosp & Urgent Care

Local Rescue: Pacific Northwest Aquatics & Exotics
In home coaching: sara@snakehaus.com
Home to Home Surrender Program

Exam question: What is the best way to help a pet reptile/amphibian in need?

→ Owner education & support

How to intervene

Emergency Enclosure:

Locking plastic tote - https://a.co/d/6PsFeEX
Heat pad – https://a.co/d/h2p5y9n
Thermostat - https://a.co/d/2S7nR2m
Papertowel, p.pads, cardboard box, dog dish

Heat
Water
Contained
Clean
Hides
Substrate
~~**Food**~~

Topic 5: Common Pet Reptiles & Amphibians

Common Pet Reptiles

- Beardies
- Leopard geckos, crested, mourning, house, tokey, leichianas, gargoyles
- Turtles Red ear sliders, box turtles
- Tortoise Russians leopard sulcatta, hermans
- Igaunas – green, rhinoceros, rock
- Chameleons – panther, rhinoceros
- Enols, uromastix, skinks
- Tegus – red, argentine
- Monitors – savanah, ackies, nile
- Northern alligator lizard, western fence lizards

Amphibias

- Frog – af giant bull frog, tree frogs (dumpy), florida greens, African clawed frog (illegal big vs dwarf), pacman, tomato frogs
- Salamanders & newts ***– keep in mind wild ones are common here***
- Axlotl

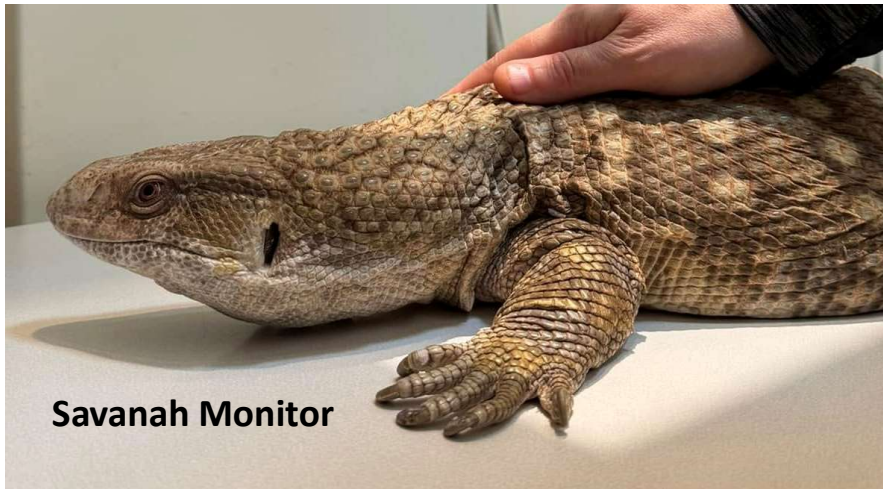
Common Lizards


Panther Chameleons

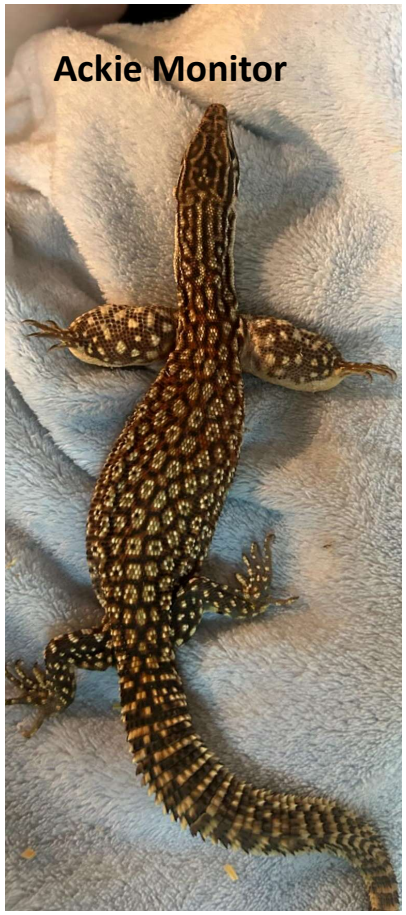

Green iguana


Leopard Gecko


Bearded Dragon


Savanah Monitor

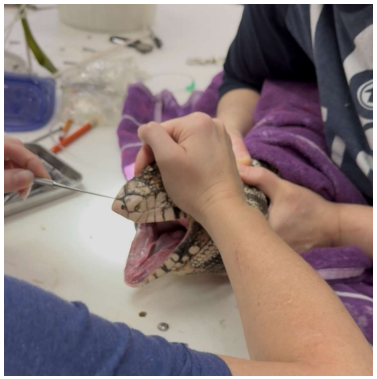
Less Common Lizards



Common Turtles/Tortoises

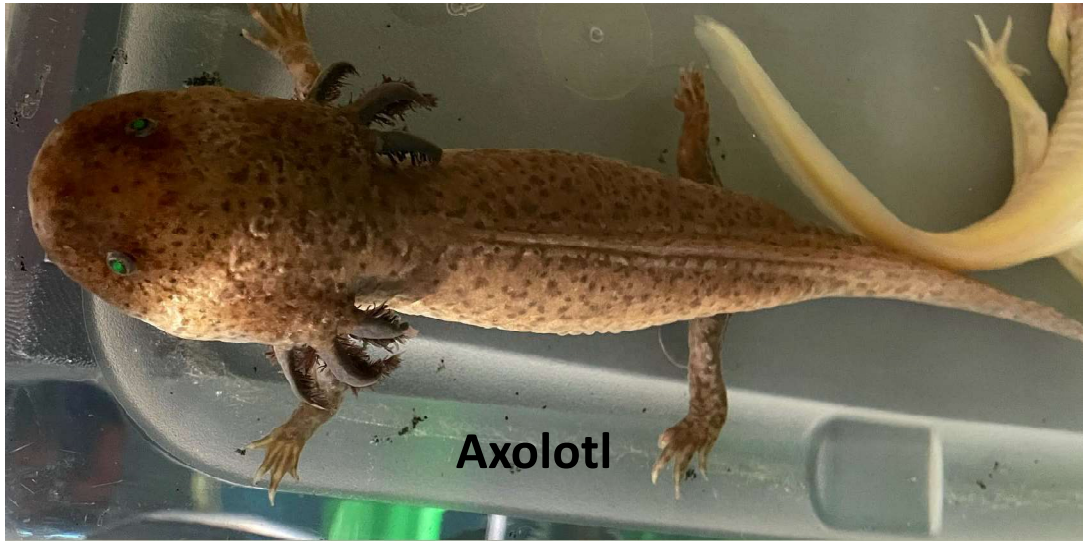
- Turtles Red ear sliders, box turtles
- Tortoise Russians leopard sulcatta, hermans

Meet Icarus! – he's a train wreck



Common amphibians


Salamander


Axolotl


Giant African Bullfrog


Australian Green Tree Frog
Dumpy Frog

Common Pet Snakes

Common Pet Snakes

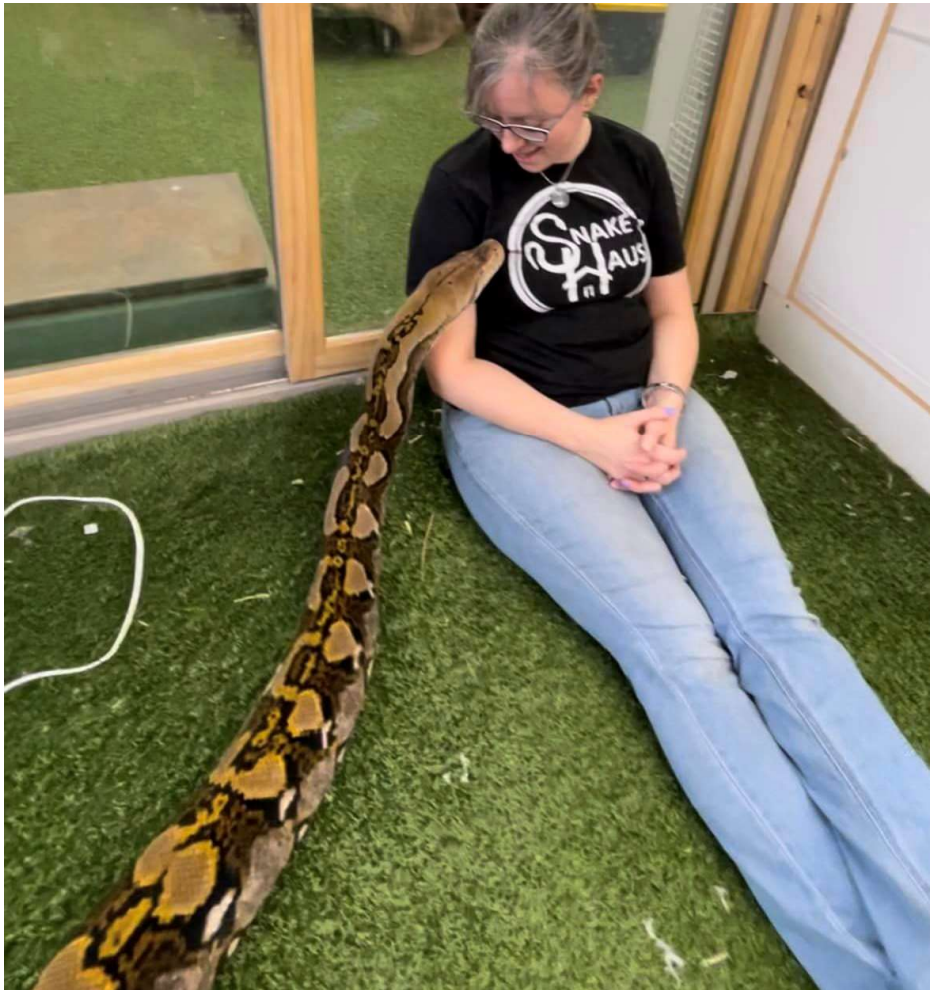
- Colubrids
- Ball Pythons
- Carpets, Bloods

Giants

- Boas (the BCC's and the Colombians)
- Reticulated Python
- Burmese Python
- Anacondas

Venomous *NOT COVERED*

- **Rear fang:** Mangrove, Asian Vine Snake, False Water Cobra, Garter Snake, Hog Nose, Boomslang
- **Front fang:** Copperhead, Vipers Cobra, Rattlesnake, etc



Basic Identification

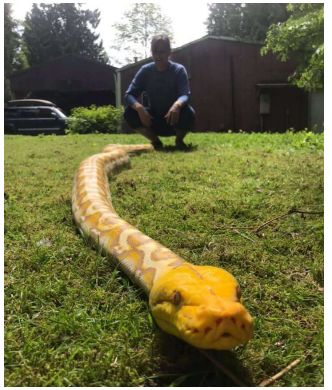
Colubrids:

Corns, Kings, Rats, Milk

(The largest snake family)

Pythons:

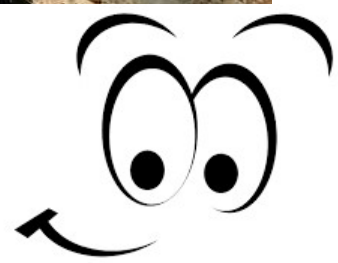
Balls, Burms, Retics,
Blood, Carpets



Boas: Red Tails, Brazilian
Rainbows, Anacondas

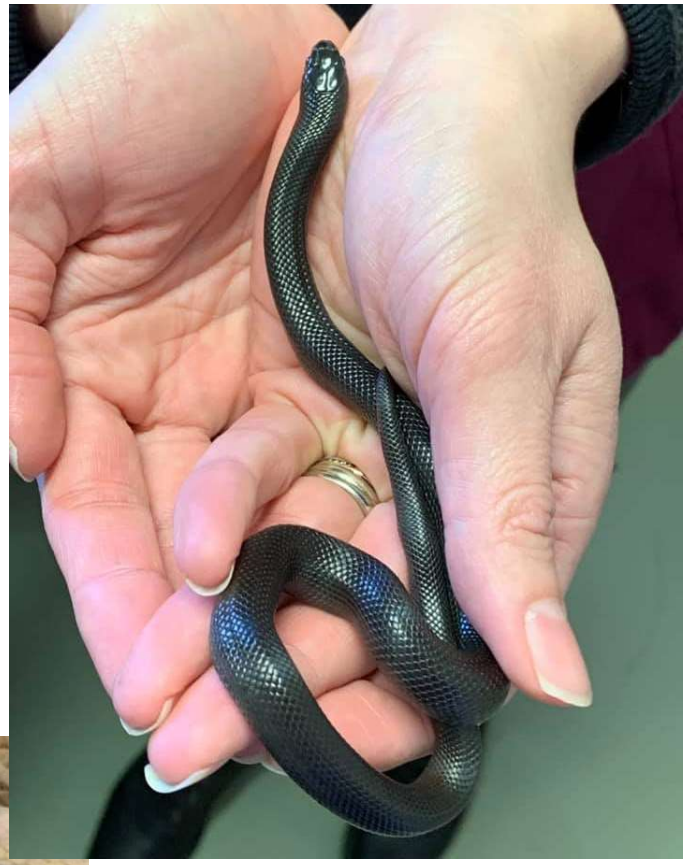
Colubrids – small and fast

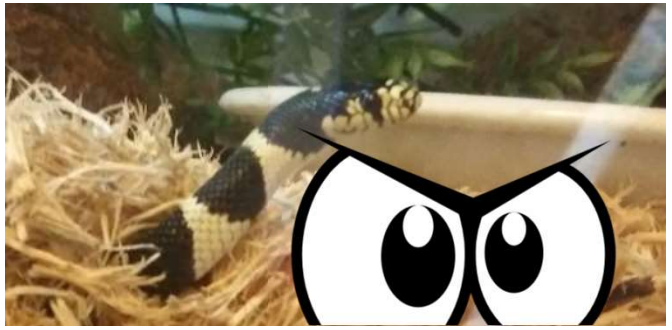
Corn Snake



Colubrids – small and fast

King Snake



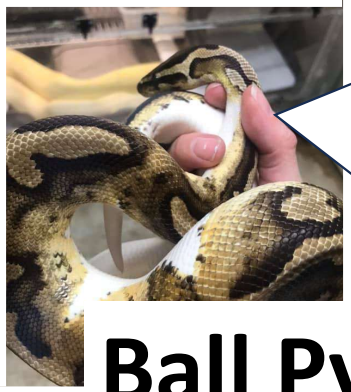


Pythons – tremendous variation










Ball Python

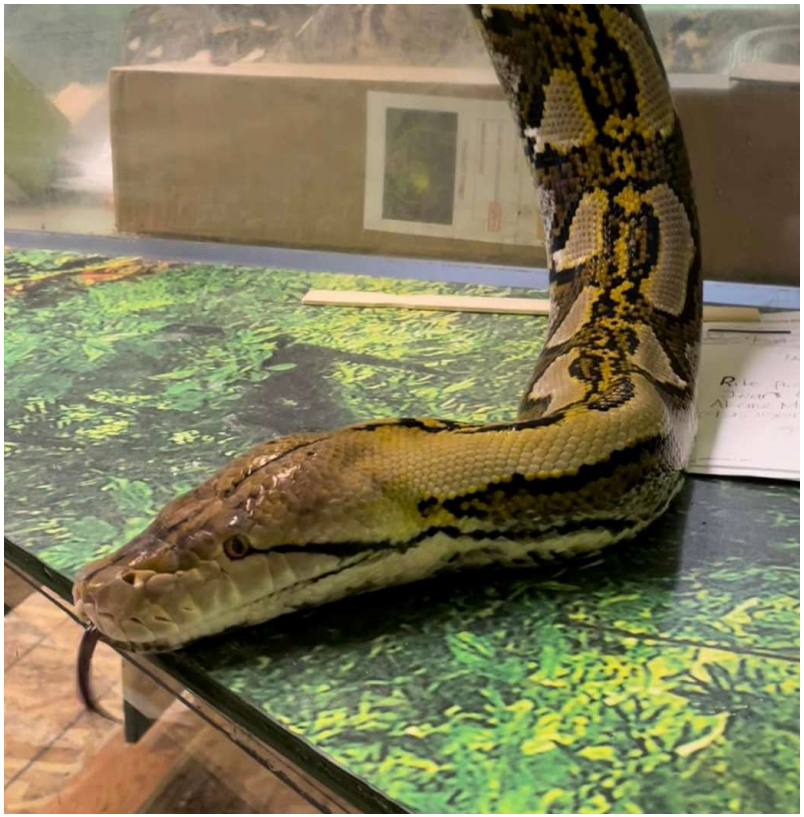
Pythons – tremendous variation

Carpet Python

Pythons – tremendous variation

Blood Python

Pythons – tremendous variation



Reticulated Python

Burmese Python

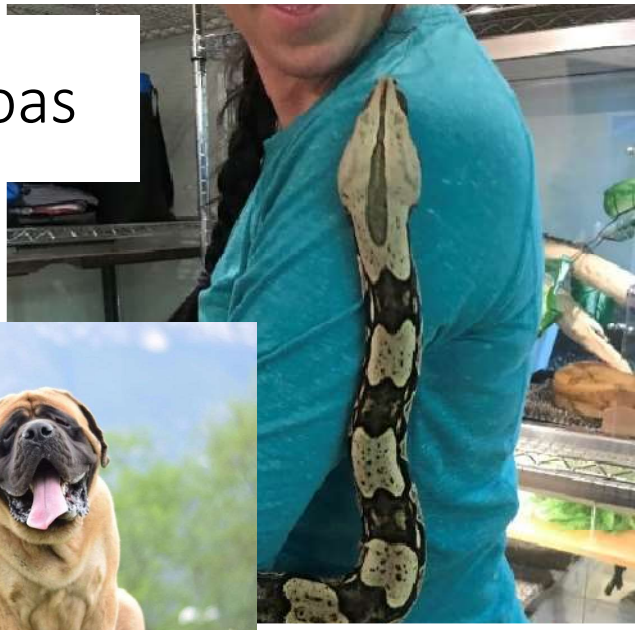
Pythons – tremendous variation

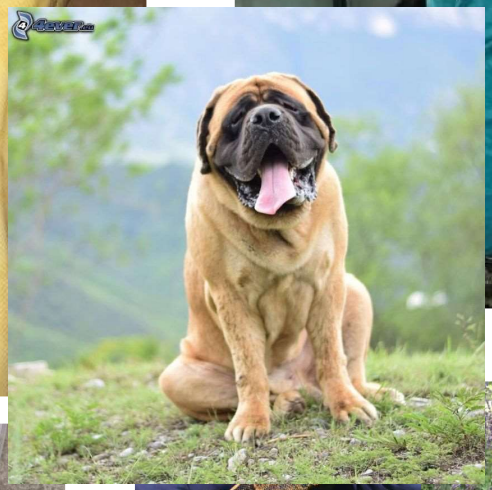
Reticulated Python

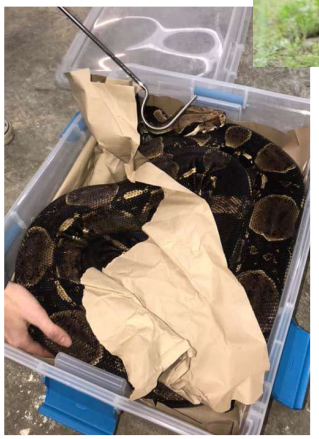
Burmese Python

Boas – Red Tails and Common Boas

Boas – Red Tails and Common Boas







Boas – other boas

Green Anaconda

Dumerils Boa

Dumerils Boa

Sand Boa

Yellow Anaconda

Argentine Boa

Brazilian Rainbow Boa

Meet the Giants!

- **Jade –** reticulated python
- **Etna –** Burmese pyton

Thank You for caring about snakes!

Website:

www.snakehaus.com

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https://www.facebook.com/snakehaus

YouTube:

https://www.youtube.com/@snakehaus

Email:

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