Class Reptilia

The Reptiles

Adaptations for Terrestrial Life

- Amphibians are adapted to live on land part-time
- Reptiles are adapted to live on land full-time

- What are the challenges to living on land full time?

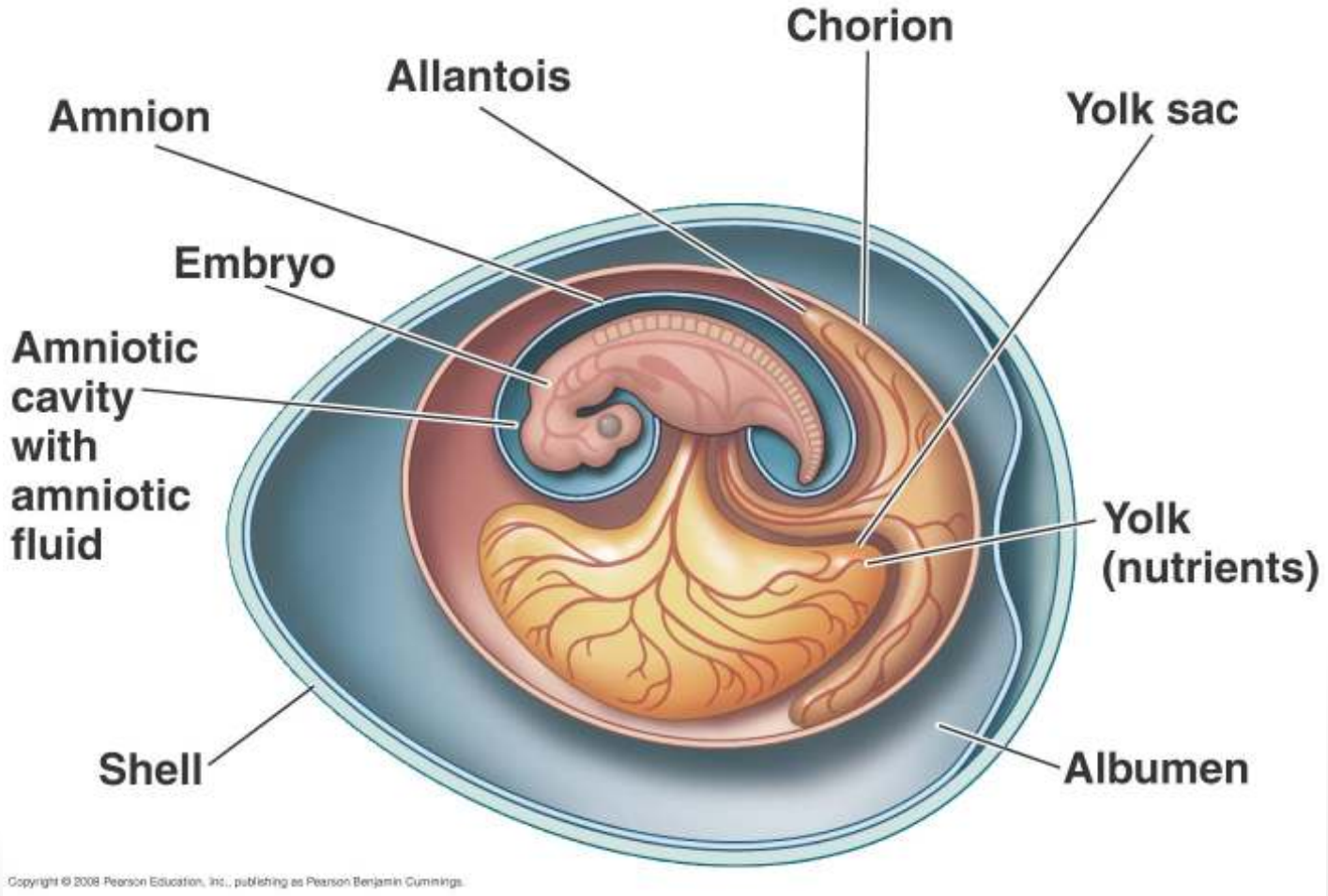
- What changes needed to occur?

Adaptations for Terrestrial Life

- Impervious skin
- Horny nails- digging and movement
- Kidneys that conserve water
- Enlarged lungs
- Aestivation
- And….

The Amniotic Egg

- What is it and how is it different?

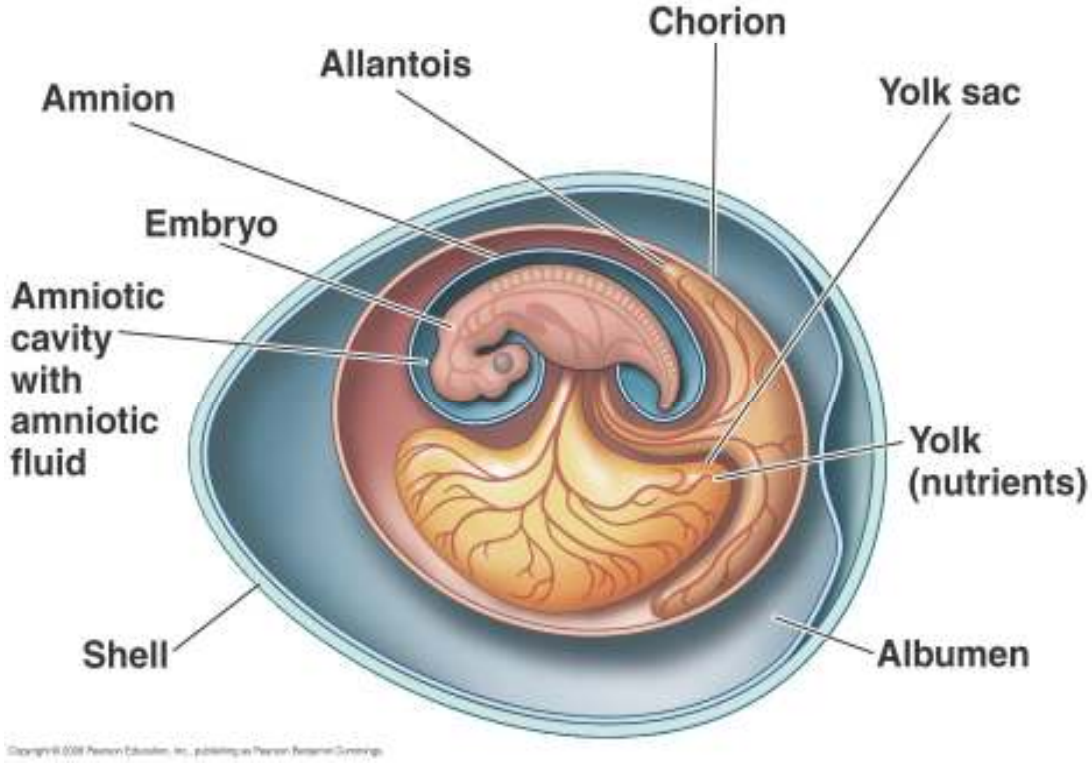


Key Characteristics of Reptiles

1. Dry skin with scales
2. Lungs
3. Metanephric kidneys
4. Amniotic egg
5. Internal fertilization

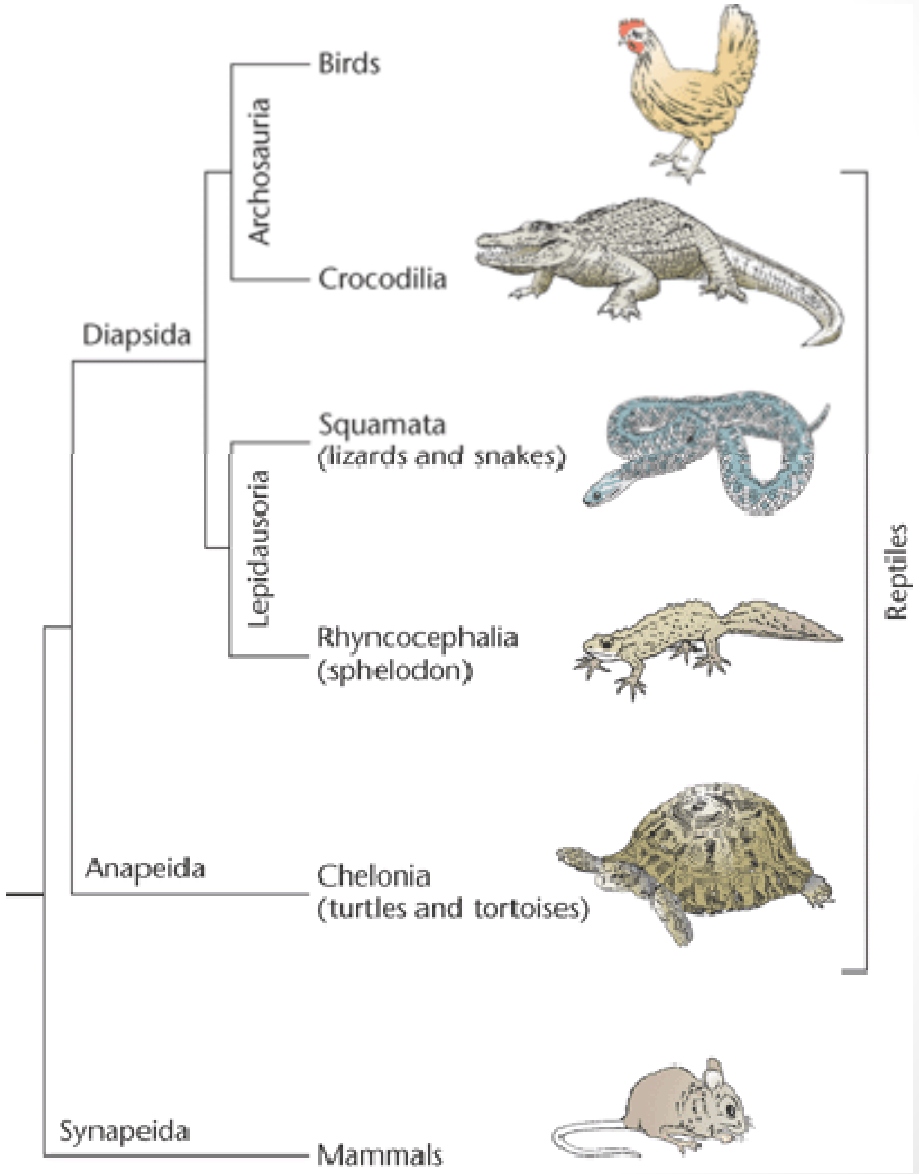
The Amniotic Egg

- Hard or leathery shell= protection
- Membranes prevent desiccation, cushion the embryo and promote gas exchange
- Yolk- food supply
- Albumin- provides cushion, moisture and nutrients



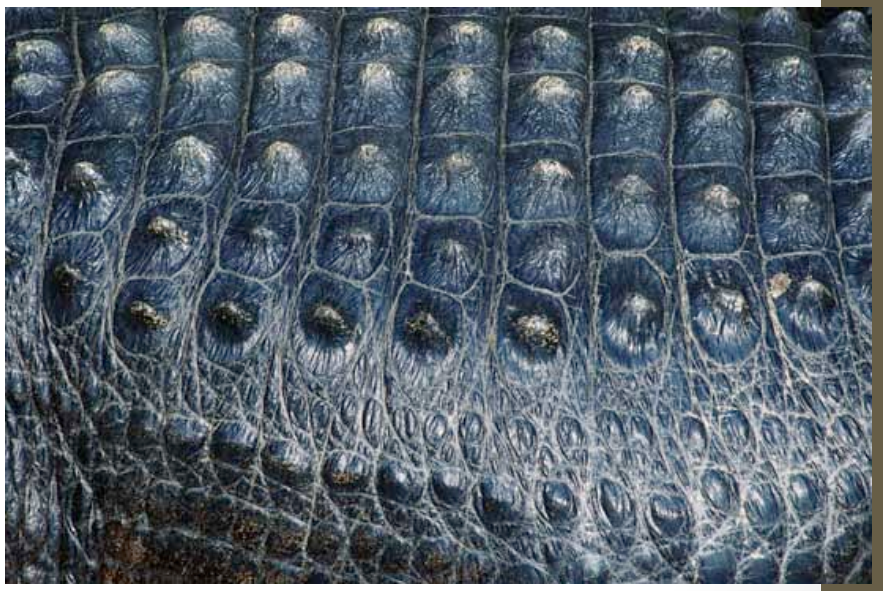
The Amniotic Egg

- Birds and mammals share these characteristics with reptiles



External Structure

- Dry thick, keratinized skin- forms scales



External Structure

- Ecdysis- molting
- Color for camouflage, mimicry and warnings

Nutrition and Digestion

- Reptiles are carnivores
  - Turtles are omnivores

Nutrition and Digestion

- Tongue for swallowing
  - Some sticky for catching prey
- Have a secondary palate
  - Allows breathing when mouth is full

Nutrition and Digestion

Adaptation Example

- Snake jaws – can be unhinged
  - Teeth prevent animal escape

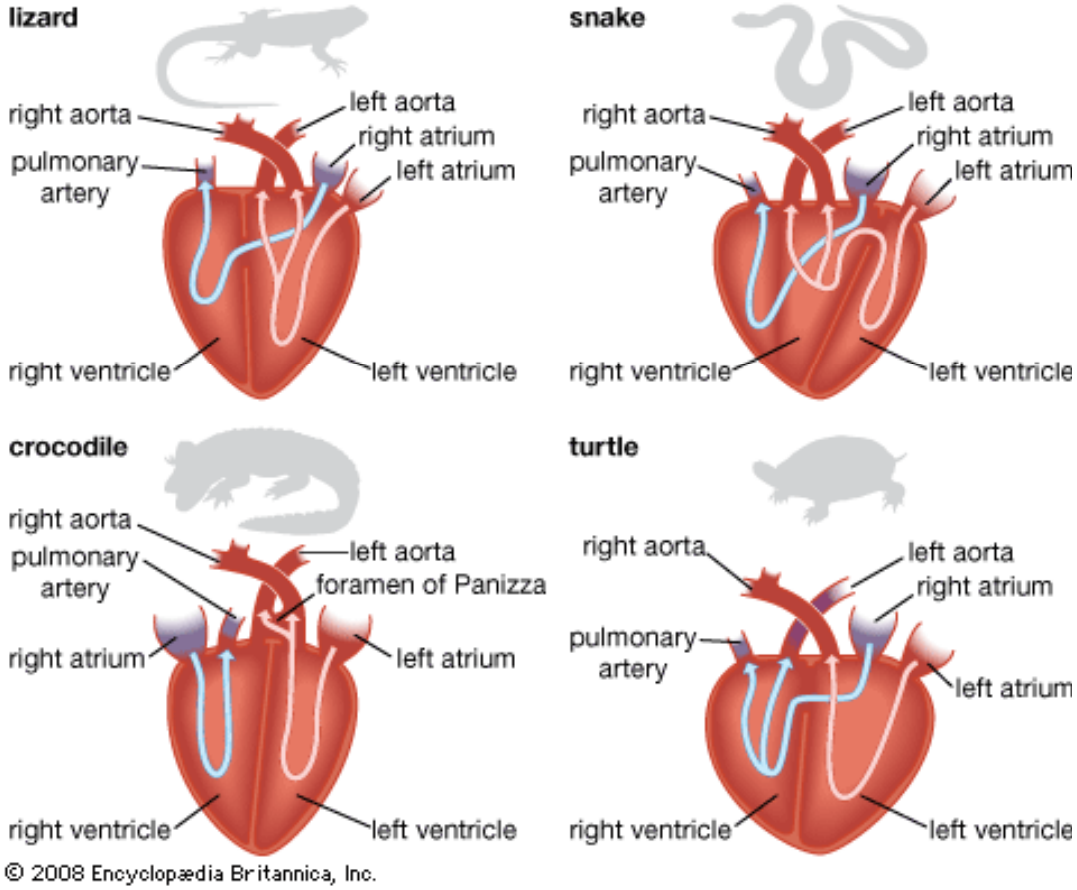
Nutrition and Digestion

Adaptation Example

- Vipers with fangs- hinged, hollow,
  - Modified saliva – neurotoxin or hemotoxin

Circulation, Respiration and Temperature Regulation

- 4 chambered heart
  - Right and left systemic arteries
  - Most reptiles can suspend breathing - heart diverts blood from lungs
- Lungs fill and empty with body cavity movements



Circulation, Gas Exchange and Temperature Regulation

- **Why is temperature regulation so important for terrestrial animals?**

Circulation, Gas Exchange and Temperature Regulation

- Reptiles are ectotherms (cold-blooded)
  - Rely on the environment to provide body heat
- Behavioral temperature regulation
  - Examples?
  - Blood can be shifted to surface or core
  - Wintertime torpor
    - Hibernaculum

Support and Movement

- Body low to the ground, stocky appendages

Support and Movement

- More cervical (neck) vertebrae = more movement

Support and Movement

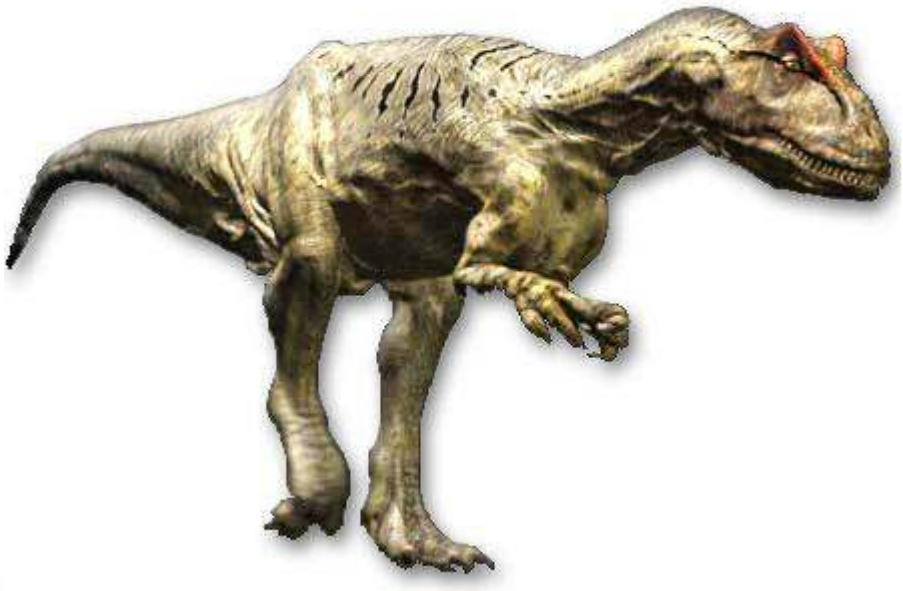
- Modified ribs- turtles, snakes

Support and Movement

- Tail regeneration in some
  - Bone plate severed

Support and Movement

- Some prehistoric reptiles were bipedal- modified pelvis and tail for balance, appendages for eating



Nervous and Sensory

- Larger brain = better vision, smell and muscle coordination
- Well developed color vision
- Upper and lower eyelids, nictitating membrane

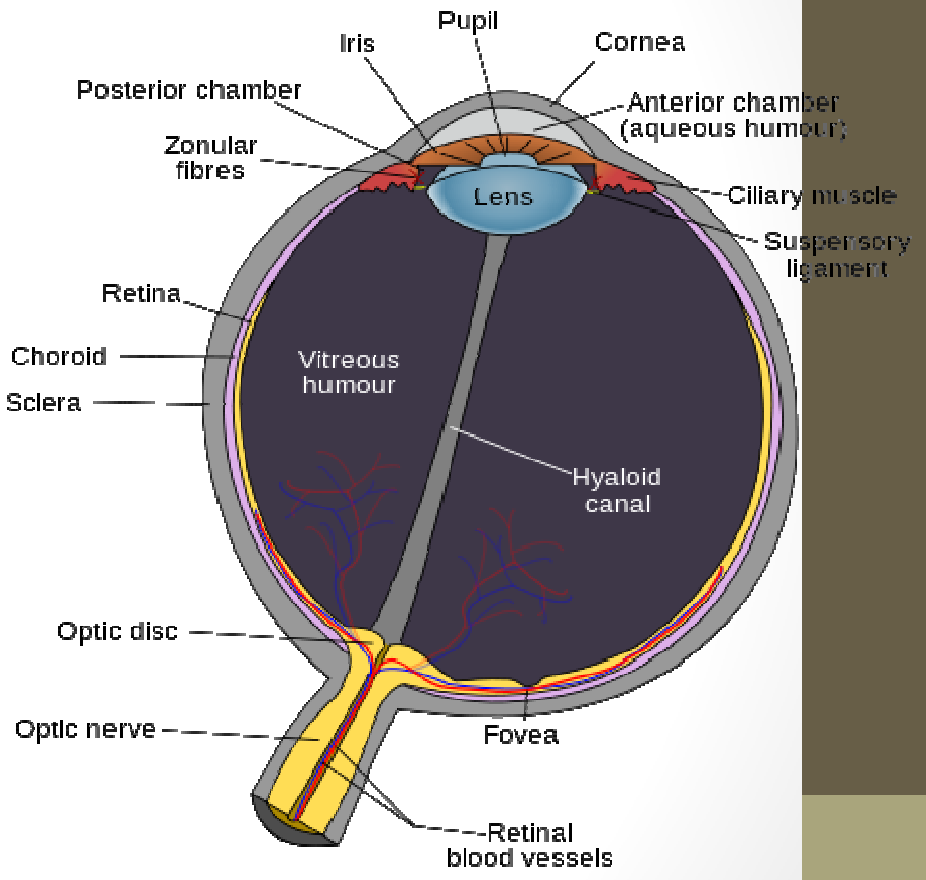
Nervous and Sensory

- Parietal eye- sense light, covered by skin
  - Tuatara- lens and retina

Nervous and Sensory

- Adaptation Example – Reptile vision
- Vision is their dominant sense
- Most reptiles focus by changing the shape of the eye's lens
- Snakes focus by moving the lens back and forth

http://video.nationalgeographic.com/video/animals/reptiles-animals/snakes/king-cobra-vs-water-snake-predation/



Nervous and Sensory

- Adaptation Example – Reptile vision
- Chameleon has independently moving eyes
- Focus on separate picture but then unite in binocular vision to capture prey
- Video http://www.youtube.com/watch?v=ebfrbV46bzE

Nervous and Sensory

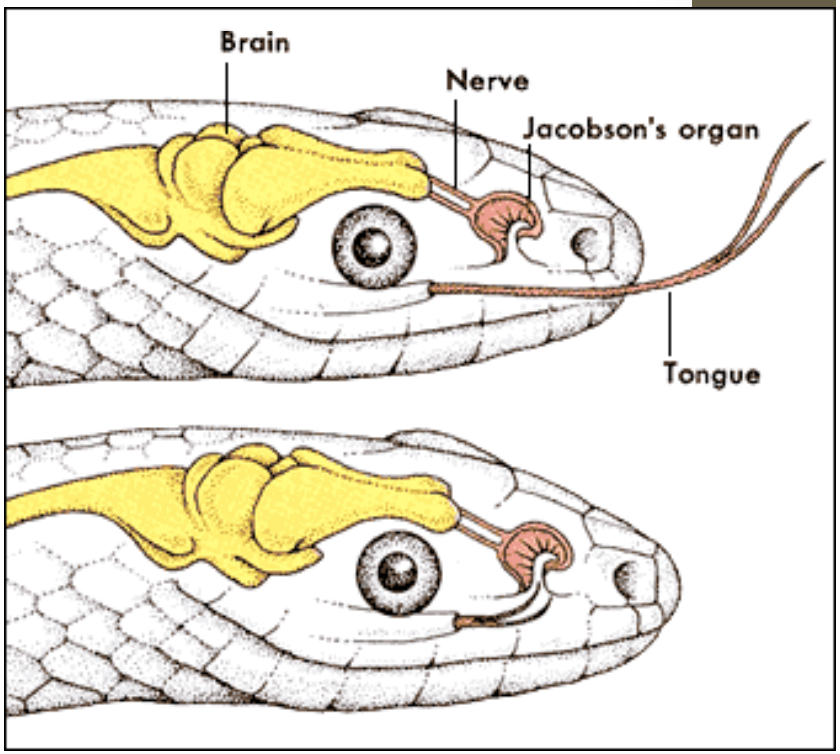
- Adaptation Example- Reptile eyes
- A blood sinus fills with blood to – used to force debris out of the eye
- Horned lizards can rupture the sinus and squirt blood as a defense
- Video:http://video.nationalgeographic.com/video/animals/reptiles-animals/lizards/weirdest-horned-lizard/

Nervous and Sensory

- Hearing with inner ear
  - Snakes sense ground vibrations

Nervous and Sensory

- Smell- Jacobson's organ and increased palate area
- Forked tongue brings chemicals bring to the organ

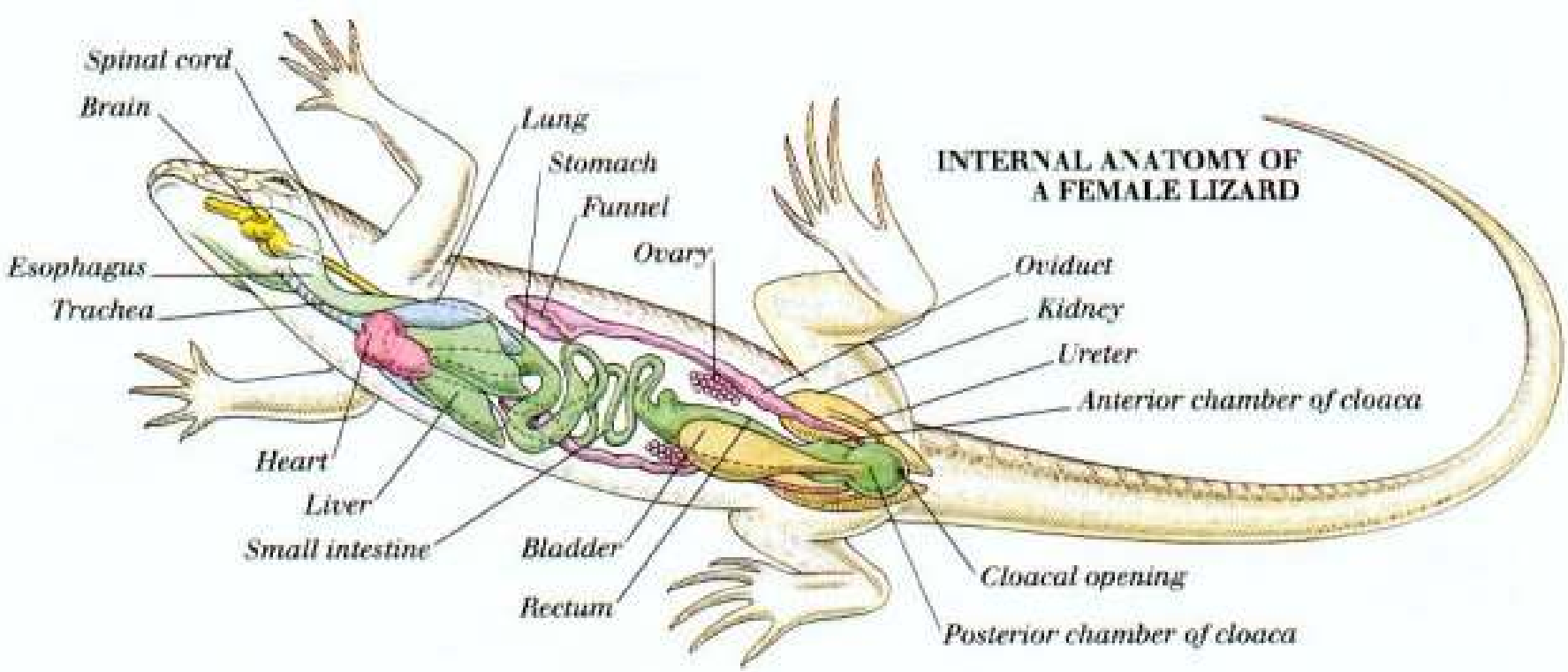


Nervous and Sensory

- Adaptation Example- Specialized senses
- Vipers have pit organs on their heads
- These organs sense heat so the animal can find prey
- http://video.nationalgeographic.com/video/animals/reptiles-animals/lizards/cobra_repelsmonitorlizard/

Excretion and Osmoregulation

- Kidney with many nephrons- conserves water and filters waste
- Bladder can store and reabsorb water
- Waste is uric acid, secreted as a paste



Excretion and Osmoregulation

- Impermeable skin surface
- Osmoregulation by behavior

Reproduction and Development

- Full-time land life made possible by amniotic egg and internal fertilization
  - Organ required for internal fertilization - hemipenes
- Courtship rituals
  - Head bobbing, color revealing, tail waving,
- Most have no vocal cords
  - Crocodiles can roar

Reproduction and Development

- Eggs: Most are abandoned but some have parental care during and afterwards
  - Incubation maintains humidity
  - Hard but flexible shell
  - Large yolk for long development

Reproduction and Development

- Adaptation Example: Alligators and parenting
- Make mound nests and lay eggs in them
  - Temperature determines the gender
- Mother helps the babies out of the nest – they call
- Transports them to water,
- May live together for up to 2 years

Reproduction and Development

- Example – Reproductive adaptations
- Parthenogenesis
  - Some reptile populations have no males
  - Some reptile populations have females that can produce fertilized eggs
- Why is this an advantage?
- Why is this a disadvantage?