


Classification

■ Kingdom	■ Animalia
■ Phylum	■ Chordata
■ Class	■ Reptilia


Class Reptilia
 Order Testudines – turtles, terrapins, tortoises
 Order Crocodylia – crocs & gators
 Order Squamata – snakes & lizards
 Order Sphenodonta – tuatara

Characteristics of a Reptile



- Vertebrate animals
- Lungs
- Scaly skin
- Amniotic egg

Characteristics of Reptiles – Adaptations to life on land



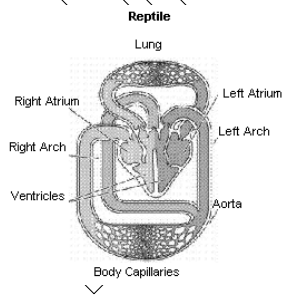
- More efficient lungs and a better circulatory system were developed for life away from water
- Uric acid as waste
- Scaly skin provided protection against the elements and desiccation
- The amniotic egg protected against desiccation
- Leg Placement

Movement: Limb powered



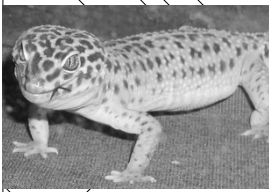
Reptile Lungs- Another Adaptation to Life on Land

- A more efficient respiratory system
- Reptiles use two efficient lungs
- Cant use skin anymore to supplement lungs – lung/heart have to rock

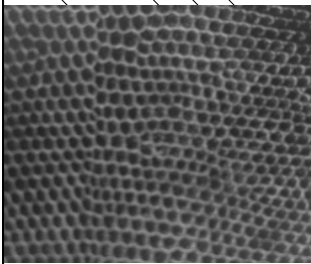


Reptile Legs

- Short tetrapods for walking
- Positioning of the legs more directly under the animal. This position provided more support than the splayed arrangement of the Amphibian legs.



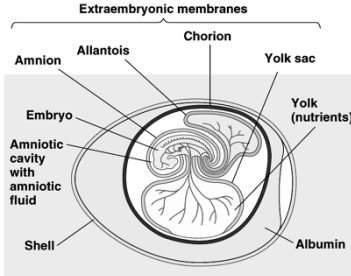
Scaly Skin



- An adaptation to life out of water
- Waterproof
- Dry, leathery
- Protective scales
- Must be molted

Amniotic Egg – Reptiles and Birds

- Reptile eggs have leather shell
- Has several membranes
- Contains yolk rich in nutrients for embryo
- Mammals have comparable modified membranes
- Reason:
 - Holds in moisture
 - Don't have to rely on water for reproduction




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Amniotic Egg Structures & Functions

- **Chorion** provides a special hard covering that is permeable to respiratory gases (O_2 and CO_2) while being impermeable to water vapor.
- **Allantois** is a storage reservoir for metabolic waste products such as nitrogenous compounds.
- **Amnion** is a fluid filled sac that acts as a cushion for the embryo and also prevents desiccation.
- **Yolk sac** contains food for the embryo, thus eliminating the need for a larval stage.

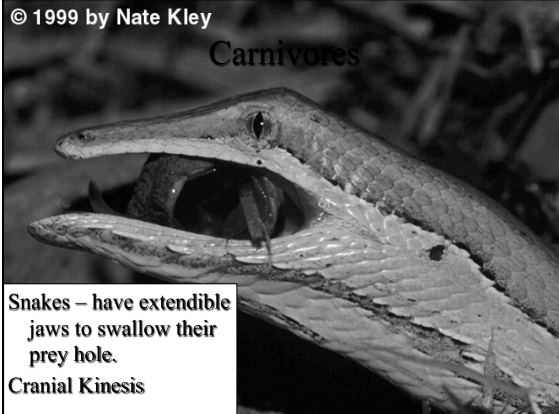
The Amniotic Egg – adaptation to life on land

- Amphibians were not able to move away from the water because their eggs would desiccate
- Reptiles eggs prevent desiccation



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Carnivores



Snakes – have extendible jaws to swallow their prey whole.
Cranial Kinesis

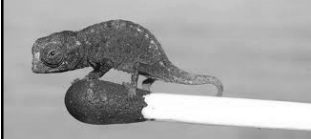

Carnivores

- Chameleons – have long sticky tongues that they flip out to catch flying insects
 - Projectile tongues with a bone in it!

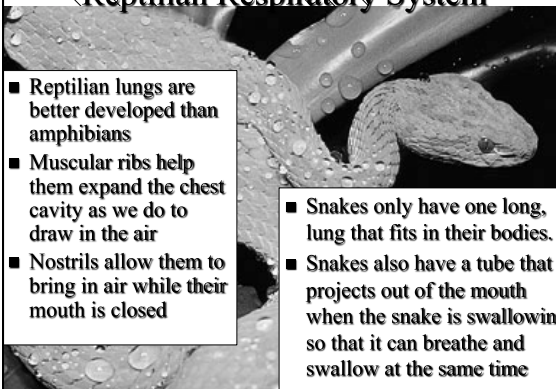


Herbivores

- Many large lizards eat only plant matter – Ex Marine Iguana

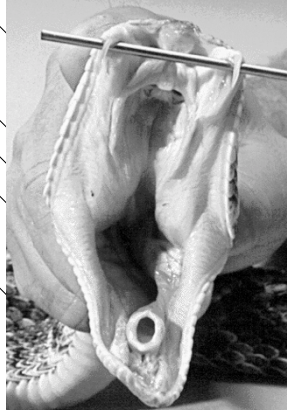



Reptilian Respiratory System

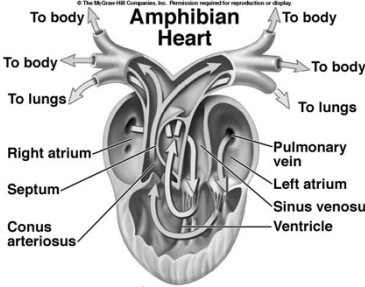


- Reptilian lungs are better developed than amphibians
- Muscular ribs help them expand the chest cavity as we do to draw in the air
- Nostrils allow them to bring in air while their mouth is closed
- Snakes only have one long, lung that fits in their bodies.
- Snakes also have a tube that projects out of the mouth when the snake is swallowing so that it can breathe and swallow at the same time

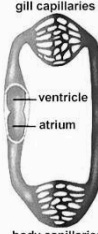
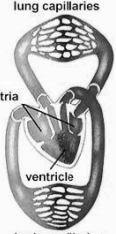

- **Breathing Tube**
– Reinforced with cartilage so it won't collapse
- **Why is it so far forward?**
- _____
- _____
- _____



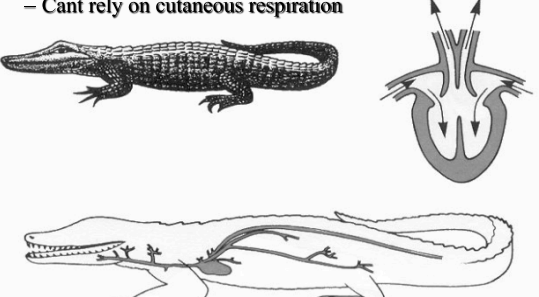
Internal Transport



- Most reptiles have a 3 ½ chambered heart (ventricle has a partial septum)
- Crocodiles and Alligators have a 4 chambered heart like ours.

<p>a) Fish Heart: One Atrium, One Ventricle "Single Circulation"</p>  <p>gill capillaries</p> <p>body capillaries</p> <p>2 CHAMBERED HEART</p>	<p>b) Reptile/Amphibian Heart: Two Atria, One Ventricle (both oxygenated and deoxygenated blood are mixed) "Double Circulation"</p>  <p>lung capillaries</p> <p>atria</p> <p>ventricle</p> <p>body capillaries</p> <p>3 CHAMBERED HEART</p>	<p>c) Mammalian Heart: Two Atria, Two Ventricles (oxygenated and deoxygenated blood separate) "Double Circulation"</p>  <p>lung capillaries</p> <p>atria</p> <p>ventricles</p> <p>body capillaries</p> <p>4 CHAMBERED HEART</p>
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- Reptiles need a more efficient system for delivering oxygen since they have dry skin.
- Cant rely on cutaneous respiration

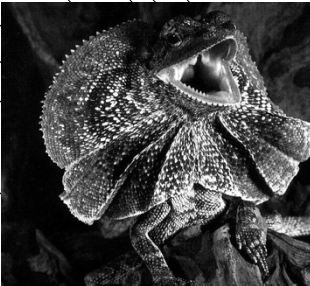


chambered heart completely separated

Adaptations to prevent water loss

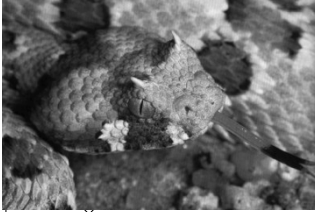
Excretion

- Kidneys produce urine in the form of uric acid
- Uric acid crystallizes when concentrated, and is eliminated as a white paste (like birds)
- Urine is either passed out directly through the cloaca, or stored in the urinary bladder where water is further reabsorbed

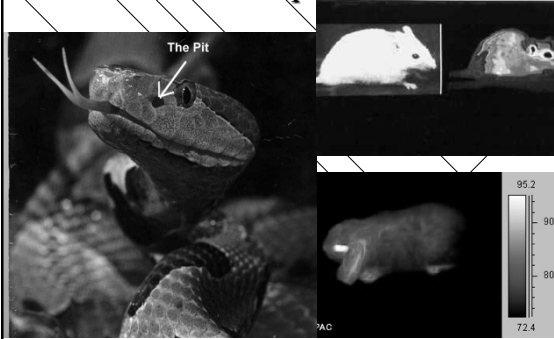


Excellent Sense of Smell - Snakes

- Have pair of nostrils
- Also have special organs (vomeronasal organs) on roof of mouth
- Tongue picks up chemicals and brings them to the vomeronasal organs to "taste" the air
 - Jacobson organ




Pit vipers



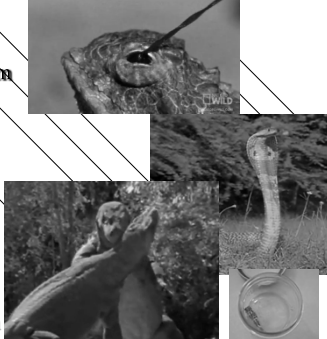
Heat Sensors

- Pit vipers are able to detect heat, to obtain a temperature image of their environment
- Normal view Infrared view Combined view



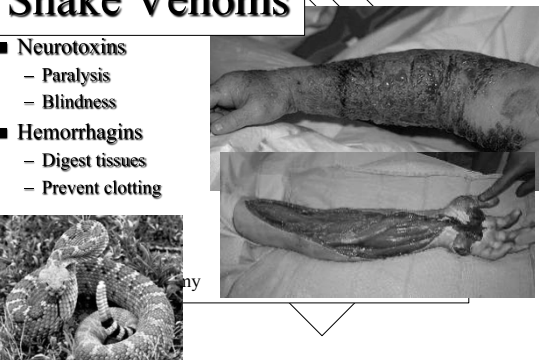
Reptilian Defenses

- Lizard AKA Horned Toad sprays blood from its eye
- Venom in snakes
 - Hypodermic needle injection
 - Spitting
- Bacteria/venom Komodo dragon/ Monitor Lizard
- Tail Loss = distraction




Snake Venoms

- Neurotoxins
 - Paralysis
 - Blindness
- Hemorrhagins
 - Digest tissues
 - Prevent clotting






Reptile Reproduction

- Amniotic eggs with shell
- Internal fertilization
 - » Penis delivers sperm into cloaca of female
- Oviparous, ovoviviparous, viviparous (few)
- Direct development





Reptile Reproduction

- Most reptiles are oviparous
- Some provide minimal care

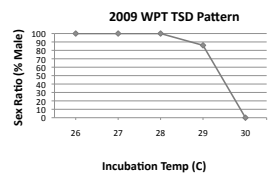




Maternal Care

Temperature Dependent Sex Determination (TSD)

- Turtles
 - » Males develop at low temps
 - » Females develop at higher temps
- Crocodilians
 - » Males develop at higher temps
 - » Females develop at lower temps



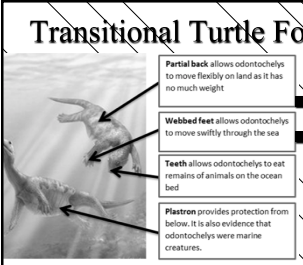
How would climate change effect this?

Transitional Turtle Fossil: Odontochelys

■ 220 MYA

■ Turtle Like:

- Well developed plastron (bottom shell) to better defend from attacks from below.
- Fits perfectly with the embryology: modern turtles form the plastron first, and the carapace second. (ref)



Big Deal

- Amniotic Eggs allow reproduction on land
- 3.5 chambered heart for better O2 separation
- Scales for desiccation resistance