

Reptiles



Characteristics of a Reptile

- Vertebrate animals
- Lungs
- Scaly skin
- Amniotic egg



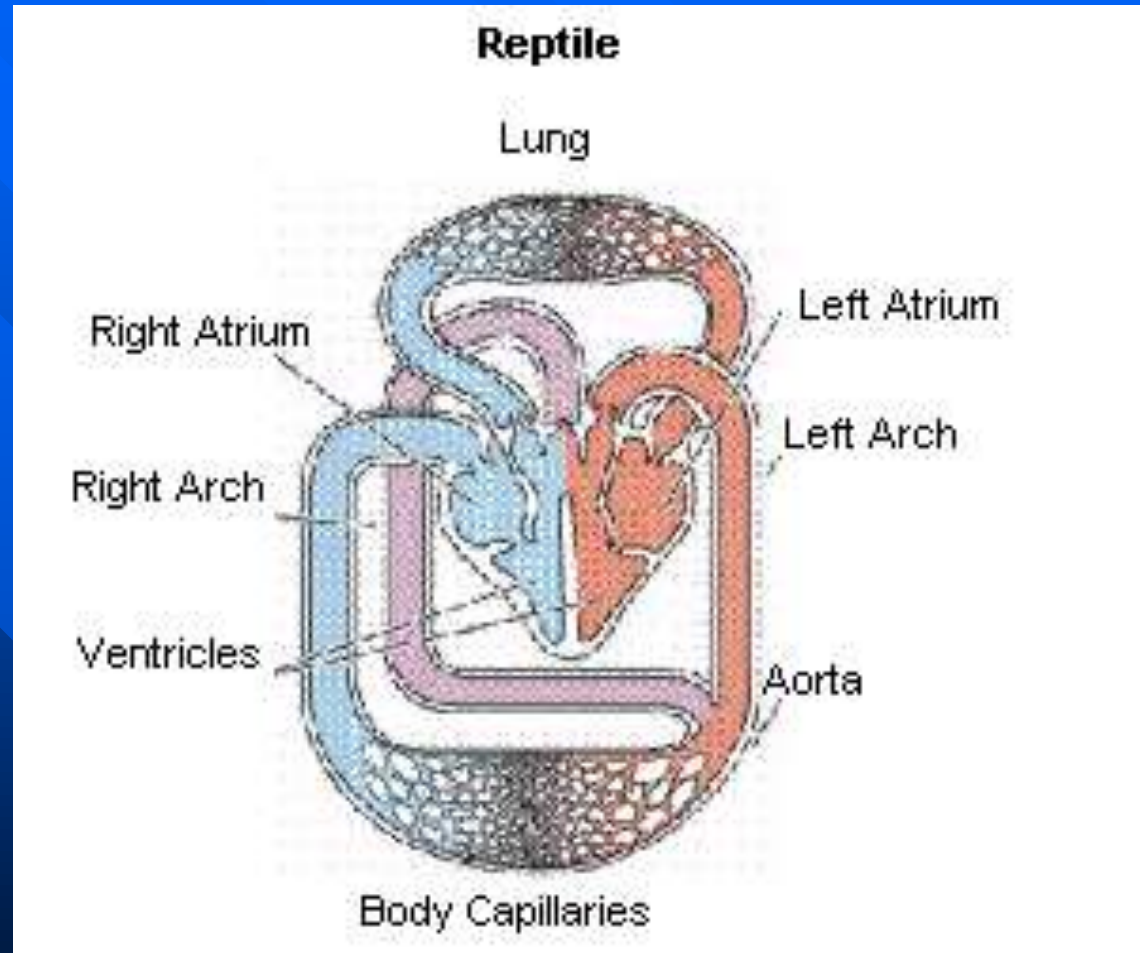
Characteristics of Reptiles – Adaptations to life on land

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



Reptile Lungs- Another Adaptation to Life on Land

- A more efficient respiratory system
- Reptiles use two efficient lungs (except snakes — they only have one long one that fits their bodies)



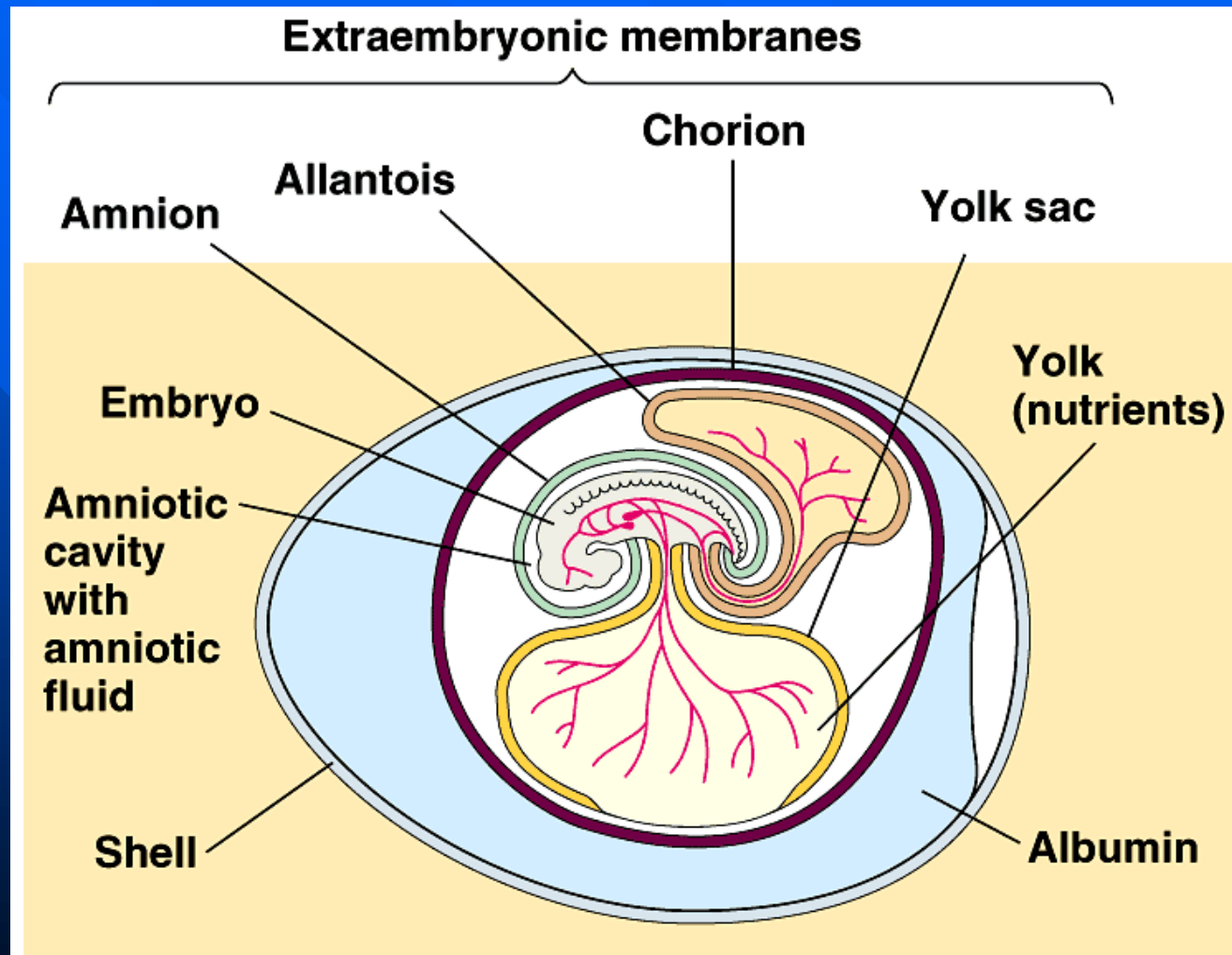
Scaly Skin

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



Amniotic Egg – Reptiles and Birds

- Compared to the development of seeds in plant evolution
- Reptile eggs have leather shell
- Has several membranes
- Contains yolk rich in nutrients for embryo
- Mammals have comparable modified membranes



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

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



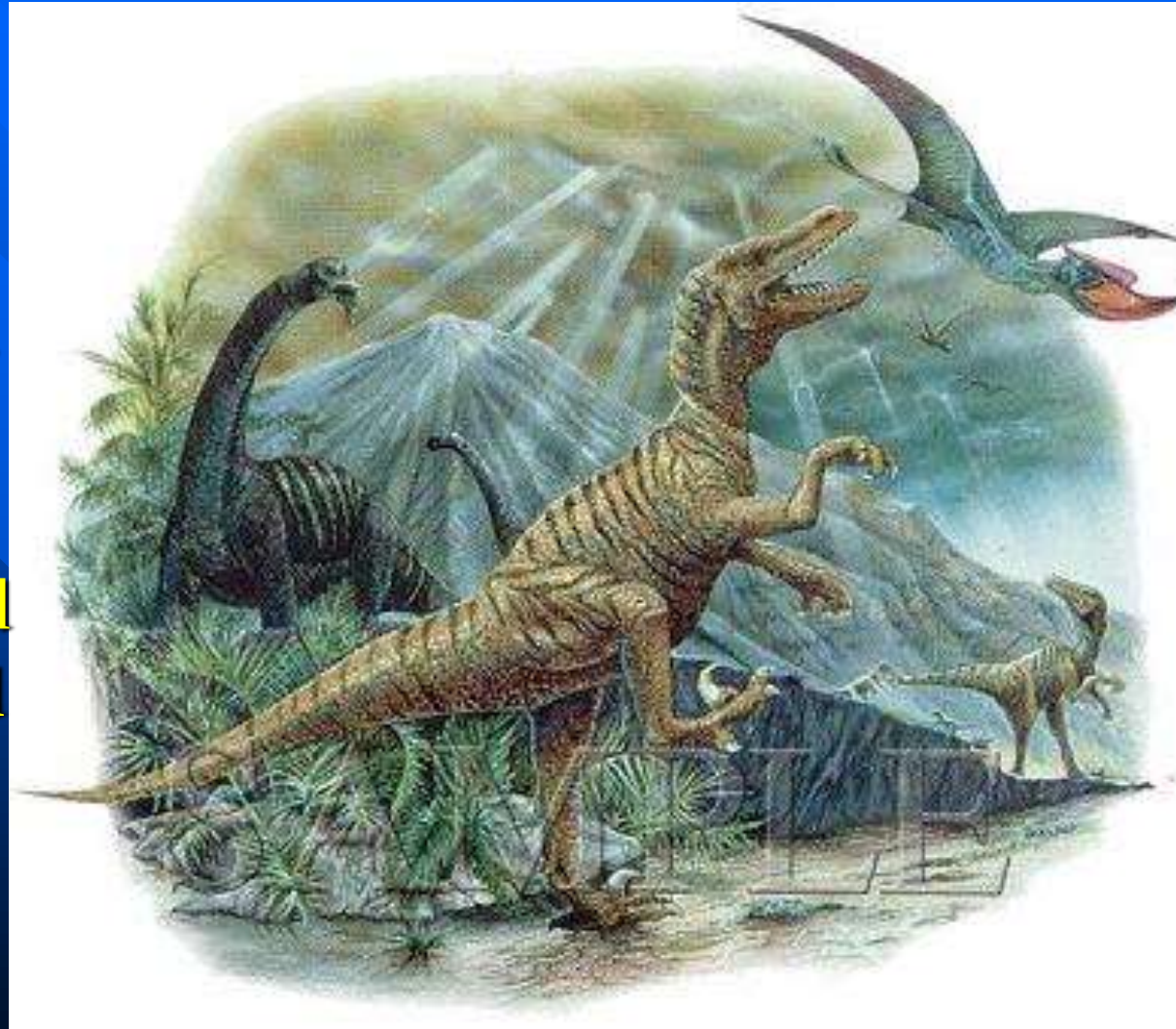
Evolution of Reptiles

- **TRANSITION FOSSILS** show that there was a slow and steady evolution from amphibians to reptiles.



Age of the Large Reptiles

- Approximately 195 million years ago, the mammal-like reptiles that populated the world disappeared and were replaced by the dinosaurs



Mass Extinction – 65mya

- Scientists not sure why the dinosaurs disappeared
- Possibly the world was hit by a meteor
- Only relatively small reptiles were left behind



Reptile Feeding



- Ex. 1: Iguana
- Herbivores – tear plants using teeth and jaws
- Have long digestive systems

© 1999 by Nate Kley

Carnivores



Snakes – have extendible
jaws to swallow their
prey whole.

Carnivores

- Some snakes have a diet of eggs exclusively.
- They swallow the egg whole, pierce the shell with a specialized section of the vertebrate, suck out the insides and spit out the shell!



Carnivores

- The king cobra eats other snakes



Carnivores

- Monitor lizard – kills prey with sharp teeth and powerful jaws



Carnivores

- Chameleons – have long sticky tongue that they flip out to catch flying insects



Reptilian Respiratory System

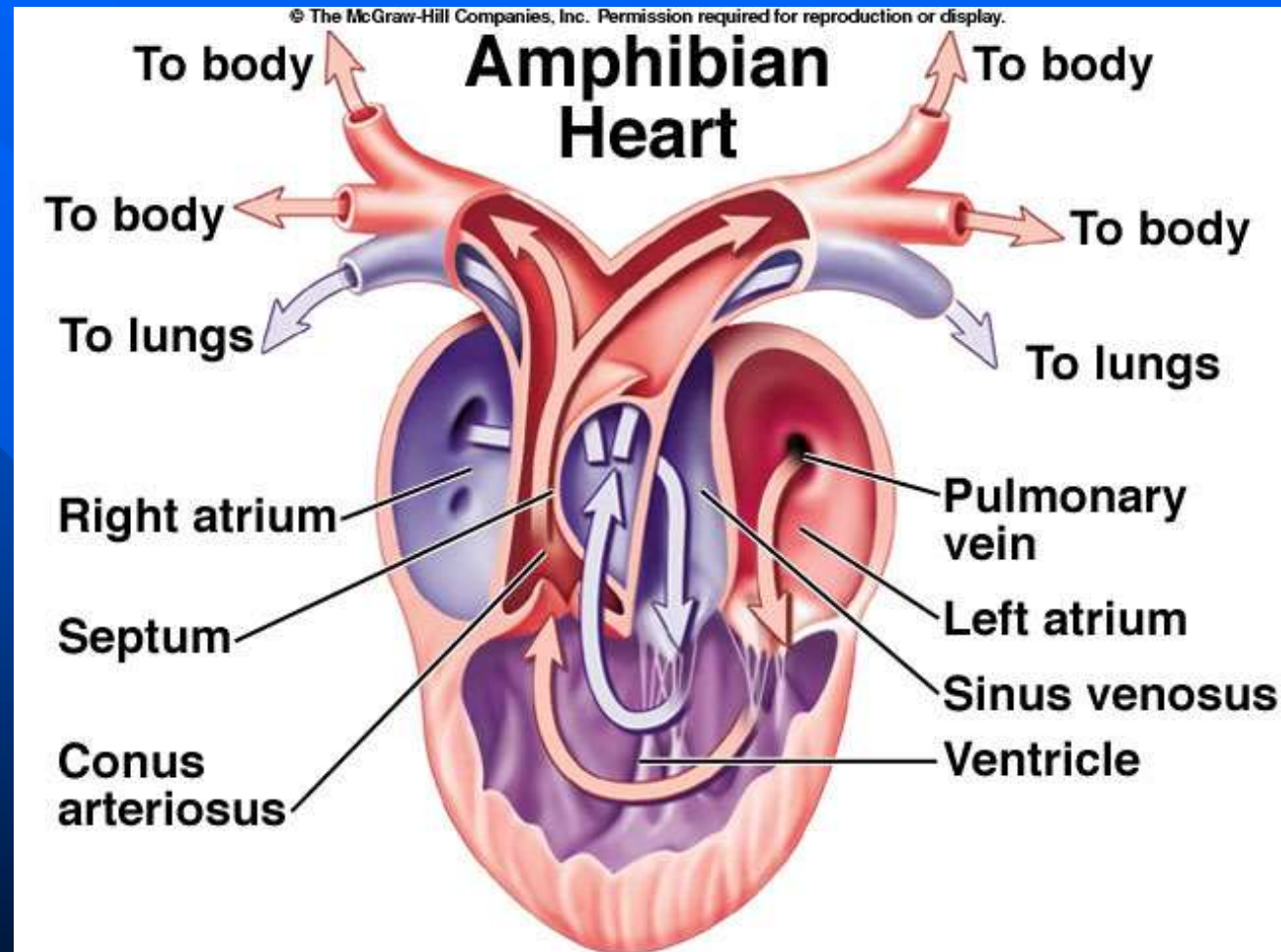
- 
- A green snake is coiled on a large, vibrant green leaf. The leaf is covered in numerous small, clear water droplets, giving it a glistening appearance. The snake's body is a bright green color, and its head is visible on the right side of the frame, facing towards the right. The background is dark, making the green of the snake and leaf stand out.
- 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



Internal Transport

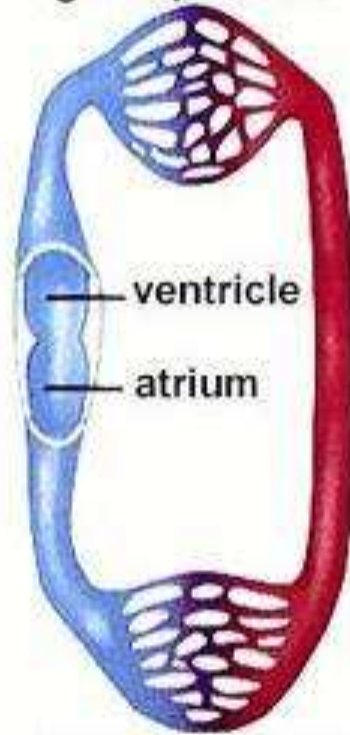
- Double-loop system
- Most reptiles have a $3\frac{1}{2}$ chambered heart (ventricle has a partial septum)
- Crocodiles and Alligators have a 4 chambered heart like ours.



a)

Fish Heart:
One Atrium,
One Ventricle,
"Single Circulation"

gill capillaries

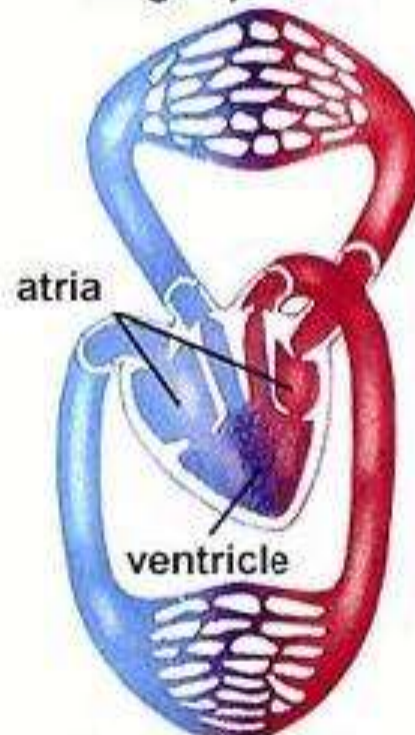


body capillaries
**2 CHAMBERED
HEART**

b)

Reptile/Amphibian Heart:
Two Atria, One Ventricle
(both oxygenated and
deoxygenated blood
are mixed),
"Double Circulation"

lung capillaries

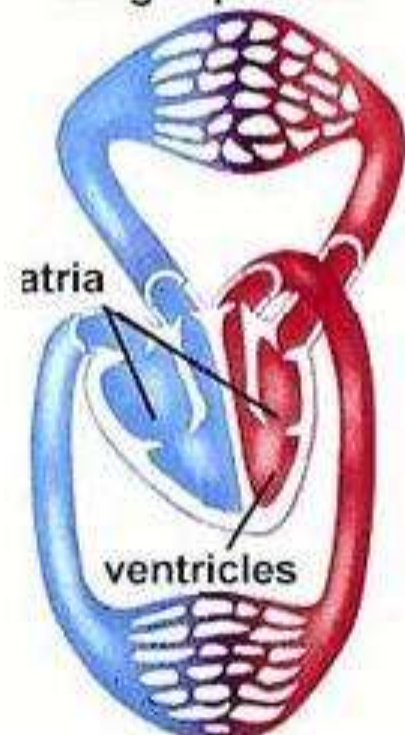


body capillaries
**3 CHAMBERED
HEART**

c)

Mammalian Heart:
Two Atria, Two Ventricles
(oxygenated and
deoxygenated blood
separate),
"Double Circulation"

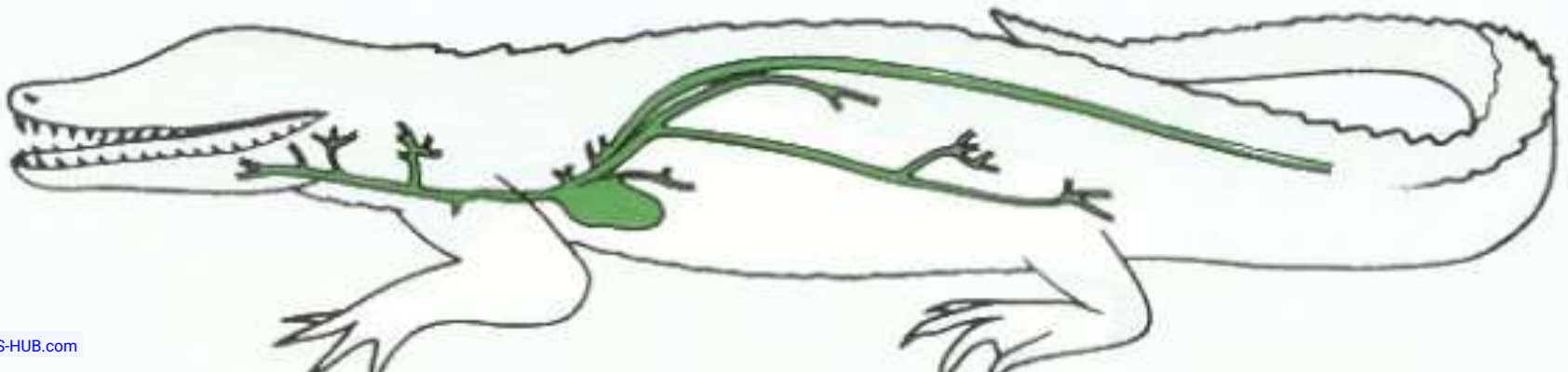
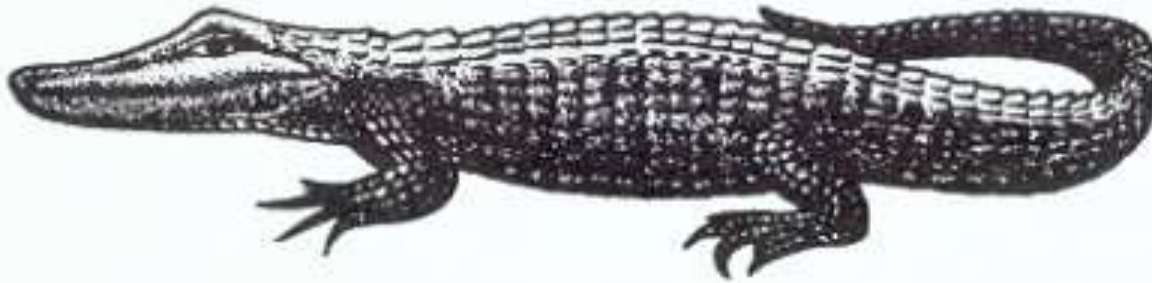
lung capillaries



body capillaries
**4 CHAMBERED
HEART**

The reptile — 4-chambered heart
incompletely separated

- Reptiles need a more efficient system for delivering oxygen since they have dry skin.



Excretion

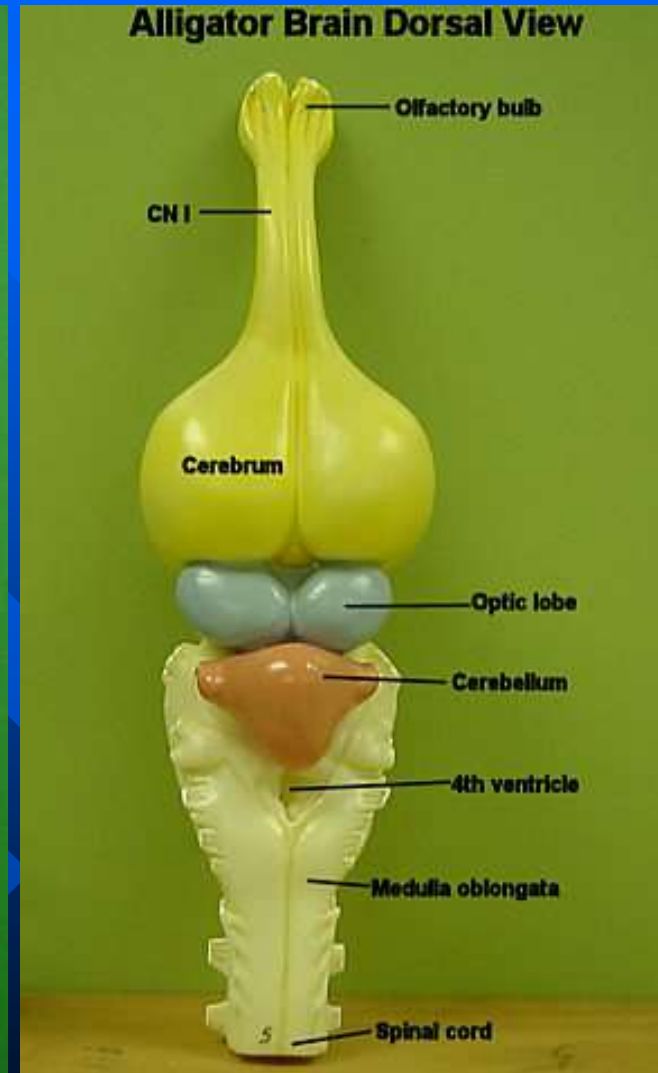
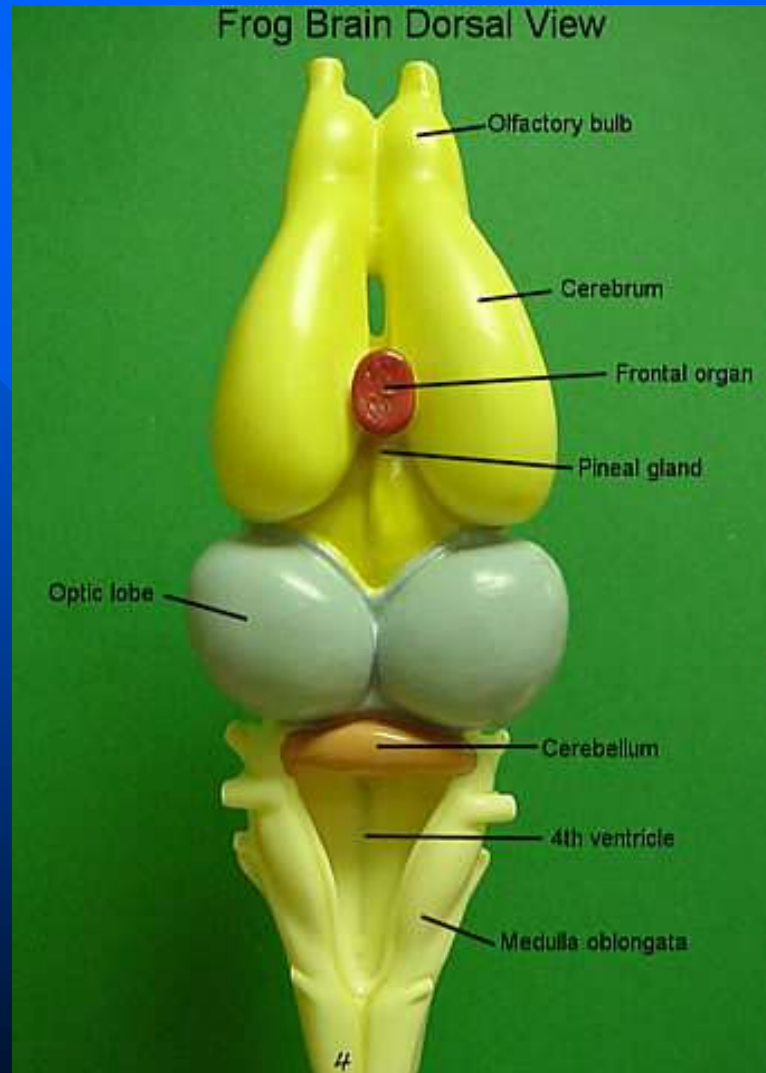
- Kidneys produce urine in the form of uric acid
- Uric acid crystallizes when concentrated, and is eliminated as a white paste (like birds)
- Urine is either passed out directly through the cloaca, or stored in the urinary bladder where water is further reabsorbed



Nervous Systems

Frog Brain

Alligator Brain



- Larger cerebrum/cerebellum than the amphibians
- Daytime reptiles have good color vision: turtles can see color better than humans

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



Hearing

- Most lizards have simple ears like an amphibian: external tympanum, single bone to transfer sound to inner ear . (we have an internal tympanum and 3 bones)
- Snakes have no ears and are deaf – they “hear” the vibrations from the ground



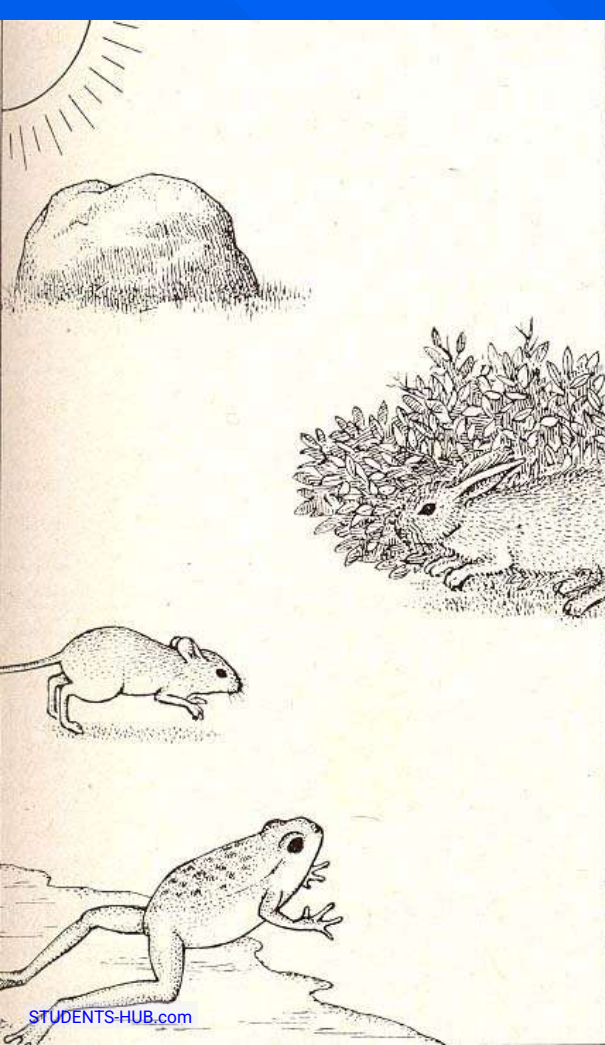
Hearing - tortoises

- Tortoises do not have a tympanum, but have a sound-conducting patch of skin on their head.
- A “Red Ear Slider” turtle



Heat Sensors

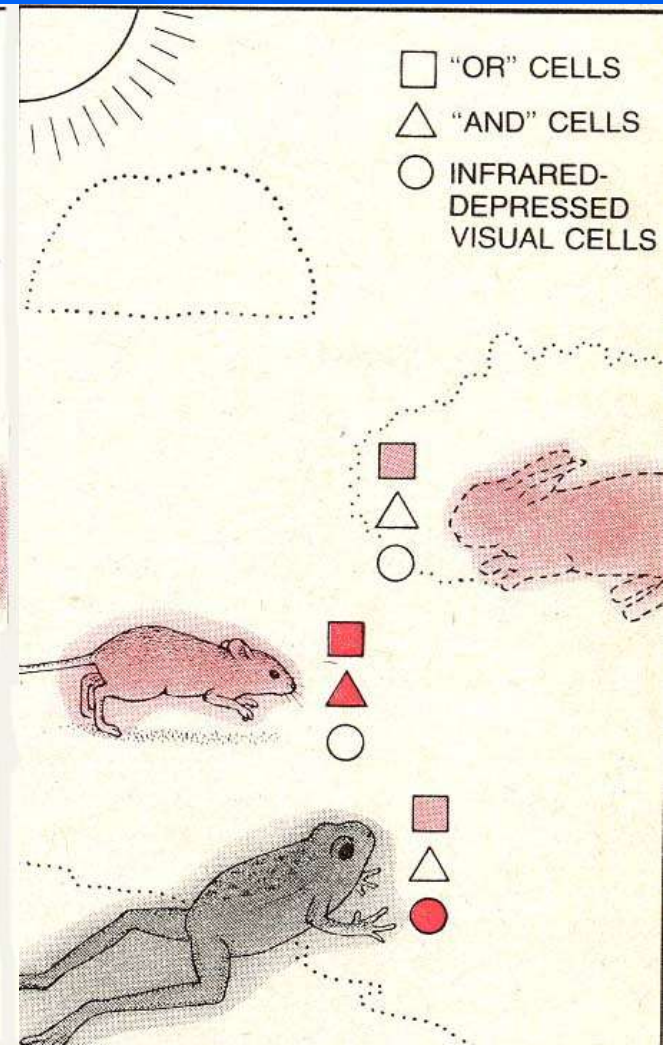
- Pit vipers are able to detect heat, to obtain a temperature image of their environment
- Normal view



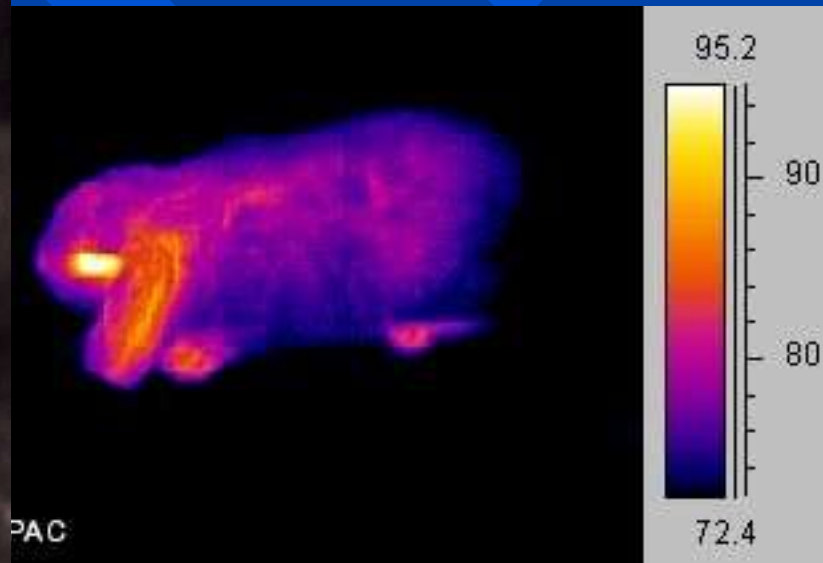
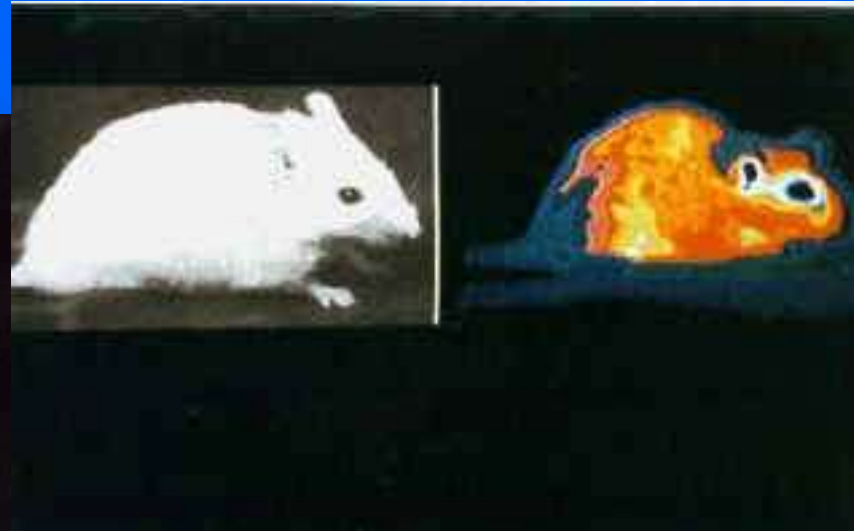
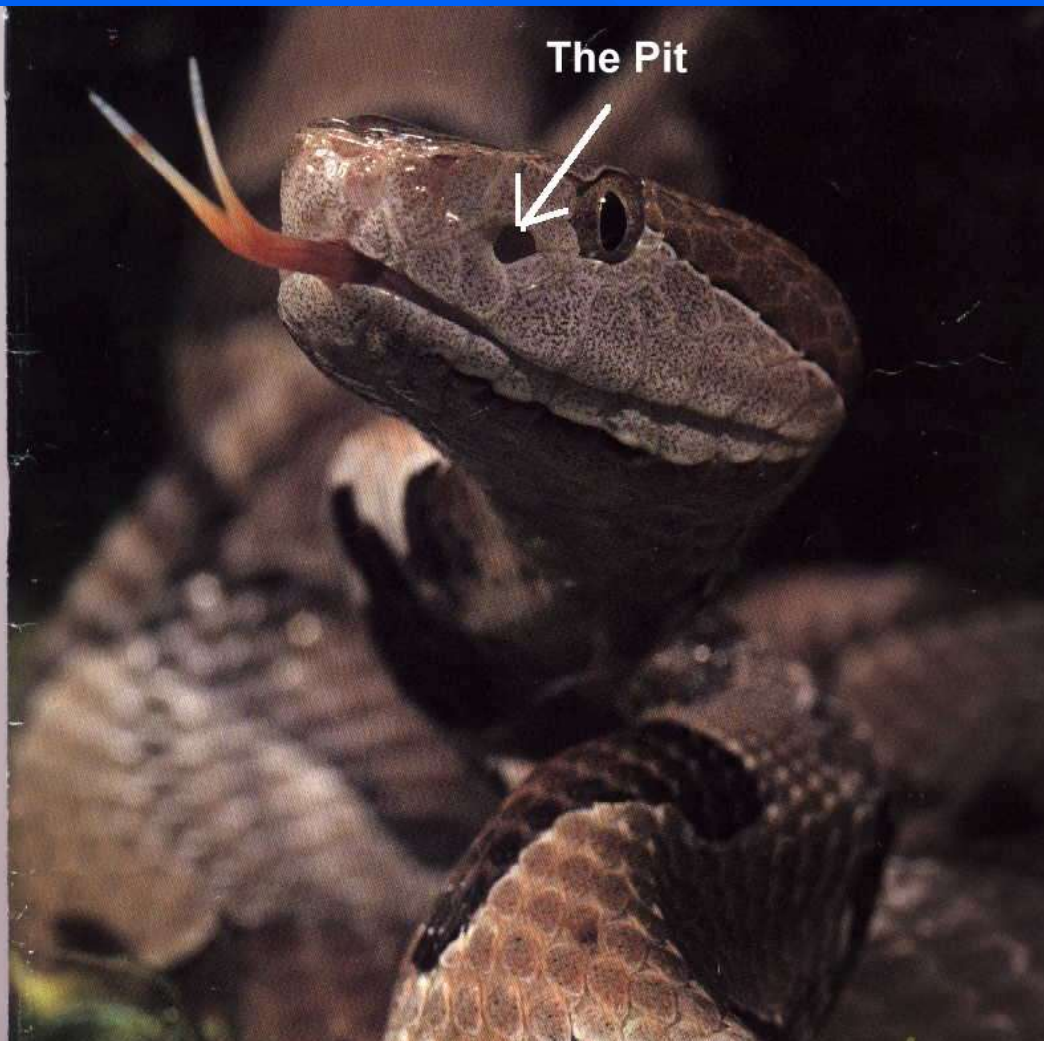
Infrared view



Combined view



Pit vipers



Movement

- Muscle and skeletal systems are more advanced than amphibians



Snakes - movement



- Snakes press their ventral scales against the ground
- Muscles around the ribs expand and contract in waves causing the s-shaped movement



Gecko – suction cup toes

- Geckos have special flaps of skin on its toes – creating very sticky appendages



Reptile Reproduction

- Most have internal fertilization
- Penis delivers sperm into cloaca of female



Reptile Reproduction

- Internal fertilization
- Male inserts penis into female's cloaca
- Female's body coats the embryos in protective shell, with membranes and yolk sac



Reptile Reproduction

- Most reptiles are oviparous
- Some provide minimal care



Tuataras



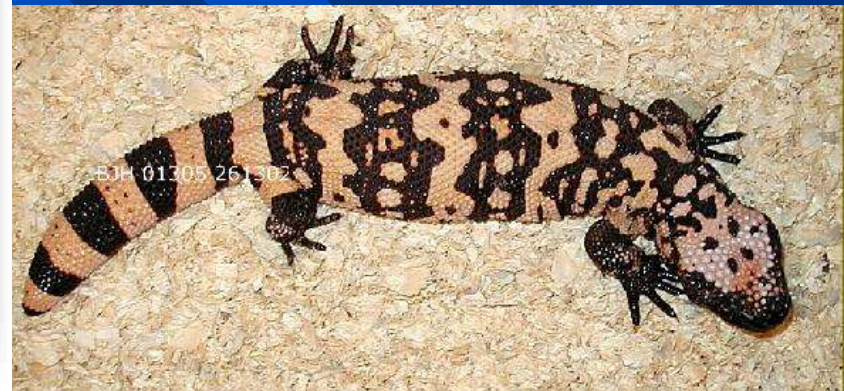
- Resembles small version of reptiles from the dinosaur age
- Only found on small islands off N. Zealand
- Has pineal gland on top of skull detects light – actually determines changes in length of day



Lizards – chameleons



Lizards – Gila Monsters - venomous



Monitor Lizards – may be like dinosaurs were.

- Largest is the Komodo dragon





Ectodermmy – “heat from outside”

- Usually have relatively low resting metabolic rates
- Therefore, they do not generate much body heat
- Body temp. is actually higher than the surroundings
- These animals remain active for short periods of time, then have rests in between activity

Endodermmy – “heat from inside”

- These animals have relatively high metabolic rates
- They use this heat to keep their bodies warm
- Usually have a lower internal temp. than the surroundings
- Endoderms can remain active for longer periods of time
- These animals have greater energy needs – need to eat more food than ectoderms