

**08 AMPHIBIANS & REPTILES (B) AND HERPETOLOGY (C)**  
**TRAINING HANDOUT**  
**By Karen L. Lancour**

This event will test knowledge of amphibians, turtles, crocodiles & reptiles.

**The Official National List will be used for taxonomy questions.**

**Event Parameters:** Teams may bring The Official National List, one field guide (published or student prepared). No other resources will be allowed. Students may not use any electronic devices.

**Event Format:** Timed stations will be used for the competition. Specimens/pictures will be lettered or numbered at each station. Each specimen will have one or more questions accompanying it on some aspect of its life history, distribution, etc. No more than 50% of the competition will require giving common or scientific names (class, order, genus, species).

**Suggested Resources:**

- *A Field Guide to Reptiles & Amphibians: Eastern and Central North America*, by Roger Conant and Joseph T. Collins (1998),
- *A Field Guide to Western Reptiles and Amphibians*, by Robert C Stebbins (2003)
- *The National Audubon Society Field Guide to North American Reptiles and Amphibians* by John L. Behler and F. Wayne King.
- For additional information on Herp taxonomy, see <http://www.cnah.org/>

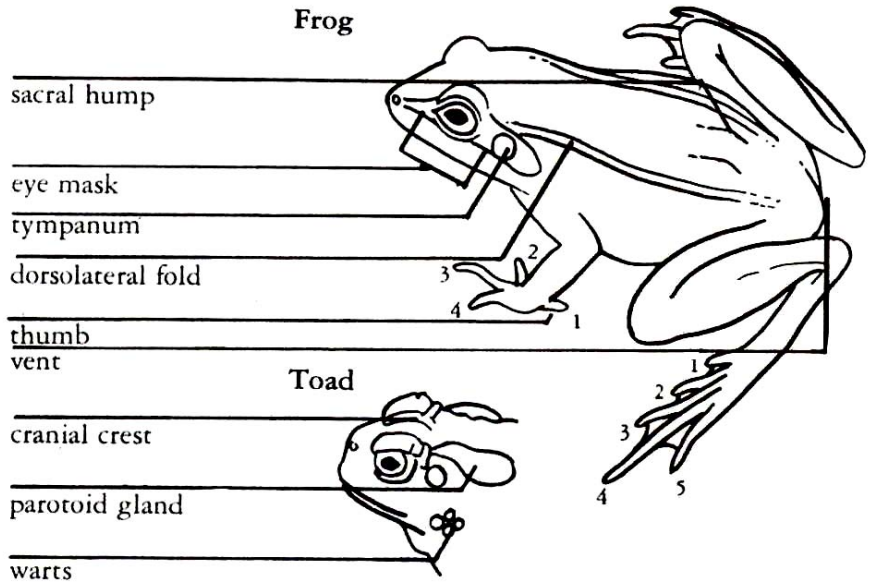
**Amphibians:**

- Four limbs without claws on digits (toes)
- Lungs instead of gills
- Both internal & external nares (nostrils)
- Three chambered heart (two atria & one ventricle)
- Double loop blood circulation to lungs & rest of body cells
- Necks help them to more easily see & feed
- Most with smooth, moist skin to take in dissolved oxygen
- Some with oral glands to moisten food they eat
- Webbed toes without claws
- Ectothermic - body temperature changes with environment
- Show dormancy or torpor (state of inactivity during unfavorable environmental conditions)
- Hibernate in winter and aestivate in summer
- Aquatic larva called tadpole goes through metamorphosis to adult Metamorphosis
- External fertilization with amplexus (male clasps back of female as sperm & eggs deposited into water)
- Eggs coated with sticky, jelly like material so they attach to objects in water & do not float away
- Eggs hatch into tadpoles in about 12 days
- Males with vocal sacs to croak
- Digested system adapted to swallow prey whole
- Well developed muscular system

# Toads and Frogs



- Frog skin smooth & moist for cutaneous respiration
- Toads is rough & warty with poison glands



## Amphibians – Hind Feet

- a. True frogs – webbed toes
- b. Tree frogs – toe pads & webbing
- c. Toads – tubercles & no webbing
- d. Spadefoot Toads – thorny projections(spade) and reduced webbing

## Characteristics of Frogs and Toads

- Both terrestrial & freshwater species
- Tadpole with tail, gills, & two-chambered heart
- Adults without a tail, four limbs, & lungs
- Long hind limbs for jumping
- Long, forked tongue hinged at front of mouth

## Salamanders and Newts



- Have elongated bodies with a tail & 4 limbs

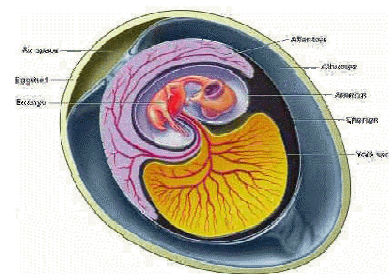
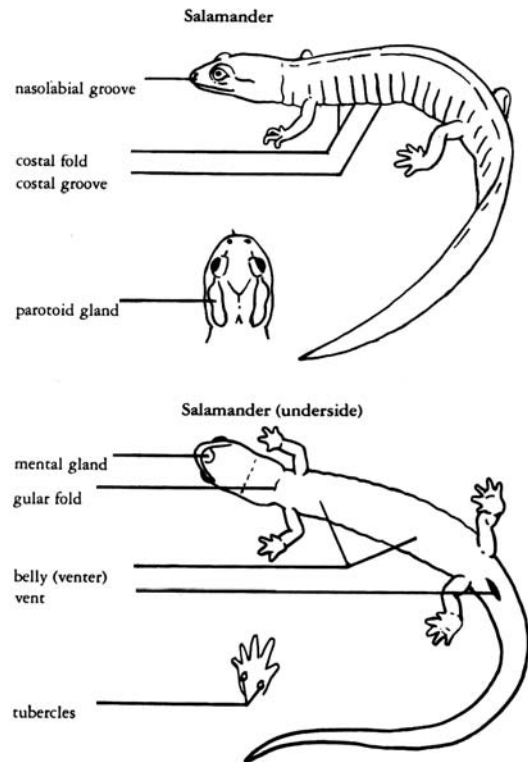
- Smooth, moist skin for cutaneous respiration
- Less able to stay on dry land than frog and toads
- Nocturnal when live in drier areas
- Newts are aquatic species

## Reptiles

- Dry, watertight skin covered by scales made of a protein called keratin to prevent desiccation (water loss)
- Toes with claws to dig & climb
- Geckos have toes modified into suction cups to aid climbing
- Snakes use scales & well developed muscular & skeletal systems to move
- Lungs for respiration
- Double circulation of blood through heart to increase oxygen to cells
- Partial separation in ventricle to separate oxygenated & deoxygenated blood
- Ectothermic - body temperature controlled by environment
- May bask or lie in sun to raise body temperature or seek shade to lower body temperature; known as thermoregulation
- Water conserved as nitrogen wastes excreted in dry, paste like form of uric acid crystals

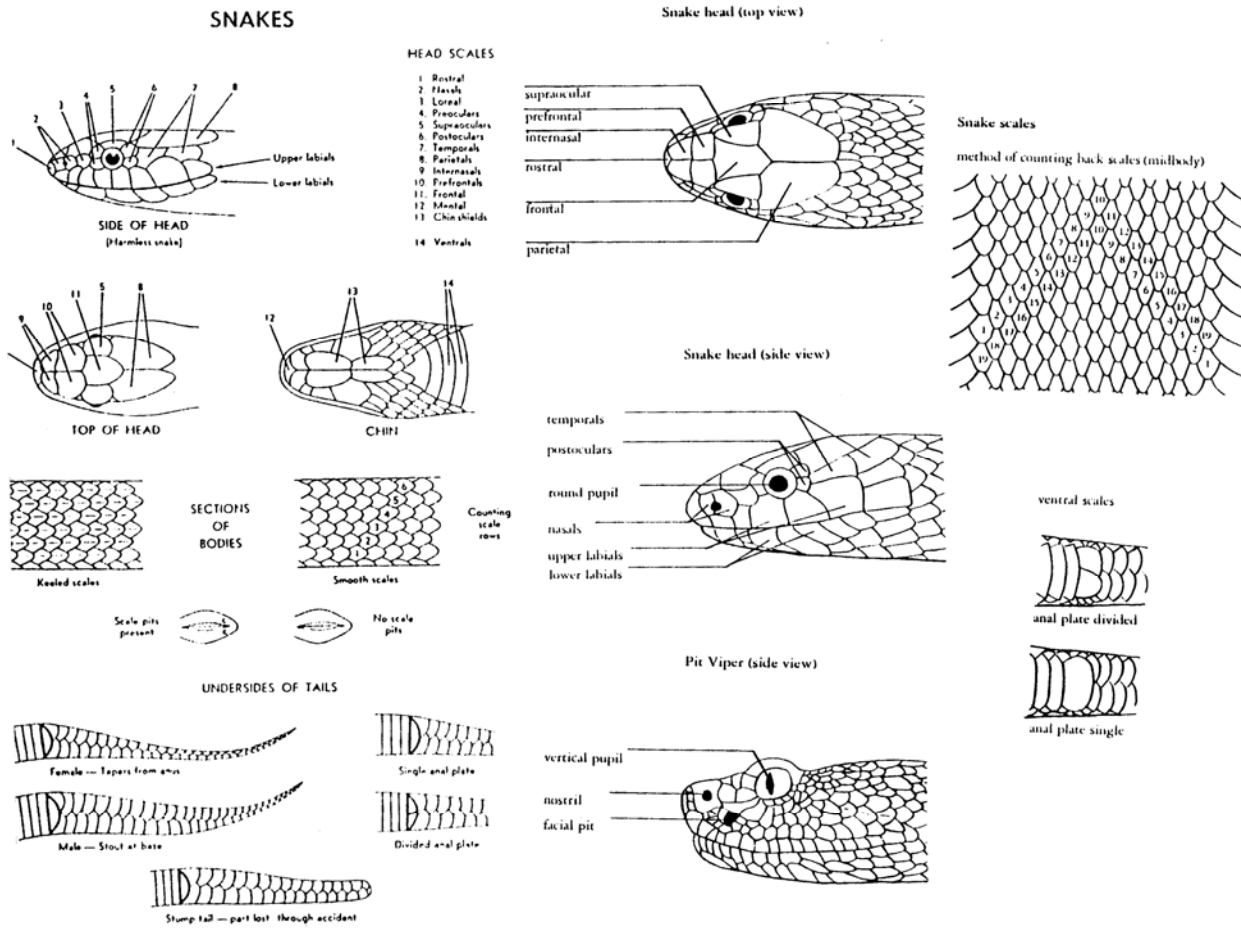
## Reproduction Advance

- Amniotic Egg
- Protective membranes & porous shell around embryo
- Shell leathery & waterproof
- Internal fertilization before shell is formed



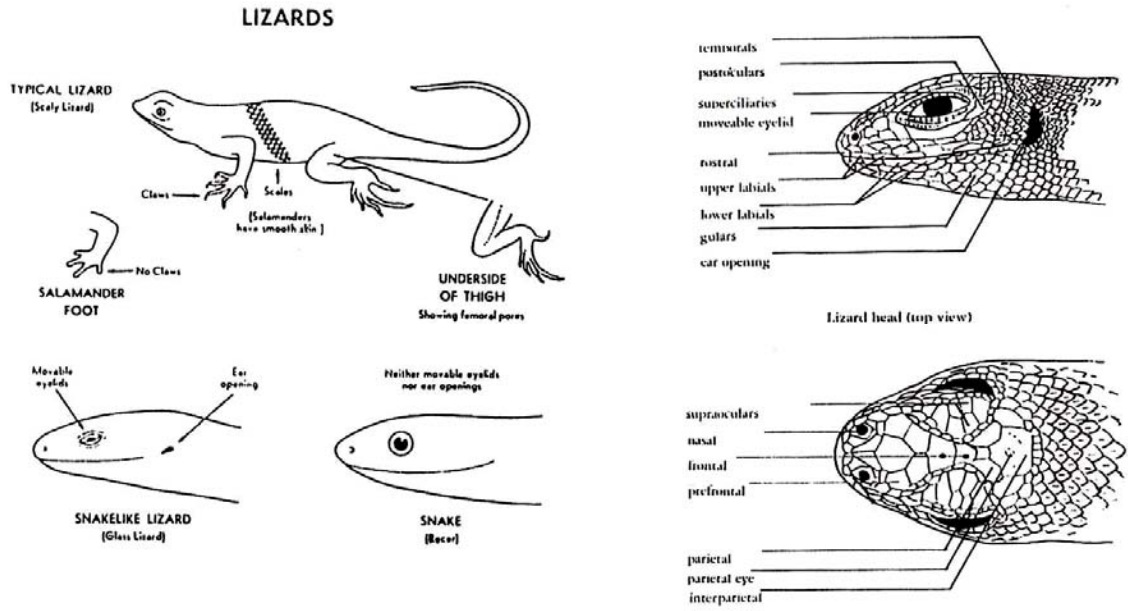
# Snakes:

## SNAKES



- 100 – 40 vertebrae each with a pair of ribs & attached muscles for movement
- Move in 3 ways – lateral, rectilinear, & side winding
- Lateral undulations most common
- Sight and hearing is poor-locate prey with chemical scents using forked tongue
- May inject venom or poison – Hemotoxin (rattle snake & water moccasin) or neurotoxin (coral snake)
- Constrictors wrap body around prey and squeeze to death
- Swallow prey whole – jaws unhinge from mouth to stretch

**Lizards:** Includes iguanas, geckos, skinks, chameleons, etc



- Four limbs
- Rely on speed, agility, & camouflage to catch prey
- Feed on insects & small worms
- Some, such as anole & chameleon, can change colors for protection
- May use active displays such as squirting blood, hissing, or inflating bodies
- Some show autotomy (breaking off tail to escape predators)
- Two poisonous U.S. species include Gila Monster & Beaded Lizard



**Turtles**

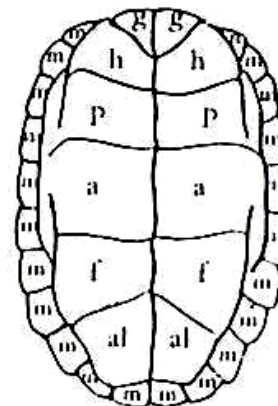
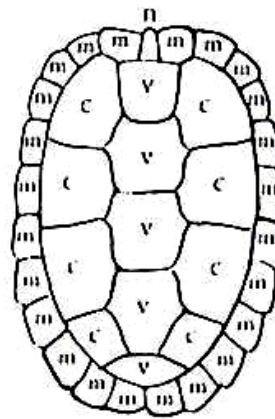
**Turtle**

Scutes

carapace (upper shell)

plastron (lower shell)

- a-abdominal
- al-anal
- c-costal
- f-femoral
- g-gular
- h-humeral
- m-marginal
- n-nuchal
- p-pectoral
- v-vertebral





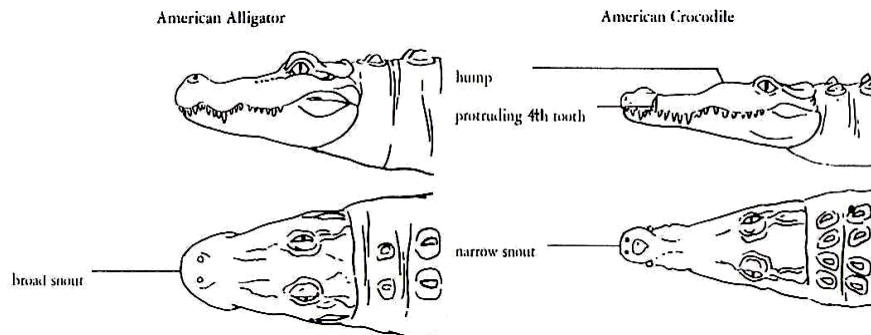
Galapagos Tortoise



Spotted Turtle

- Dome shaped shell helps to retract head & limbs in tortoises
- Water-dwelling turtles have streamline, disk shaped shell to rapidly move in water
- Aquatic, but lay eggs on land
- Body covered with shell composed of hard plates & tough, leathery skin
- Carapace or dorsal surface of shell fused with vertebrae & ribs
- Plastron is ventral shell surface
- Shape of shell modified for habitat
- Dome shaped shell helps to retract head & limbs in tortoises

## Crocodiles



- Carnivorous (wait for prey to come near & then aggressively attack)
- Eyes located on top of head so they can see when submerged
- Nostrils on top of snout to breathe in water
- Valve in back of mouth prevents water from entering airway when feeding underwater
- No parental care of young in most species except Nile crocodile that carry young in their jaws & guards nest
- Crocodiles are tropical or subtropical, usually nocturnal

### **Ecological Impacts**

- Importance of ectothermy
- Economic value
- Bio-indicators
- Functional role in ecosystems
- Longevity of some species – 50 yrs
- Status and conservation
- Habitat destruction

### **Decline of Amphibians**

- Their highly permeable skin is more immediately sensitive to changes in the environment, including changes to freshwater and air quality
- Air and water pollution
- Habitat are being destroyed for human development
- Consumer demand

### **Decline of Reptiles**

- Habitat loss & degradation
- Invasive Species
- Environmental Pollution
- Unsustainable use
- Global climate change
- Life history – some do not reproduce until later in life – some turtles 18 yrs.
- Top of food pyramid – indicators of environmental health.