Biology Chapter 31 Reptiles and Birds

Reptile characteristics:
1. dry, waterproof, scaly skin – must be shed with growth
2. lungs
3. terrestrial eggs with several membranes

Factors that contribute to the success of reptiles on land
1. well-developed lungs
2. tough, scaly skin
3. double-loop circulatory system
4. strong limbs
5. internal fertilization
6. terrestrial eggs – most are oviparous

Ectotherm – relies on behavior to help control body temperature – lay in the sun or cool off in water

How does the respiratory system of reptiles differ from amphibians?
- The lungs of reptiles are spongy, providing more gas exchange than amphibians.
- Reptiles cannot exchange gases through their skin; most amphibians can.

How is the circulatory system of reptiles different than amphibians?
- Reptiles have a double loop circulatory system with a loop bringing blood to and from the lungs and another loop bringing blood to and from the rest of the body. Amphibians have a single loop circulatory system

Amniotic egg – egg in which an embryo can develop on land without drying out

Four membranes that surround the developing embryo in an amniotic egg
1. amnion – fluid filled sac that surrounds and cushions the embryo
2. chorion – membrane that regulates the transport of oxygen and carbon dioxide
3. yolk sac – baglike structure containing nutrient-rich food supply for the embryo
4. allantois – structure that stores the waste produced by the embryo

Four surviving groups of reptiles
1. lizards and snakes (Squamata) – scaly reptiles
2. crocodilians (Crocodilia) – alligators, crocodiles, caimans, gavials
3. turtles and tortoises (Testudines)
4. tuatara (Sphenodonta)

Characteristics of lizards
- Legs, clawed toes, external ears, moveable eyelids
Characteristics of snakes
   - Legless, external ears, moveable eyelids,

Characteristics of crocodilians
   - Long and typically broad snout
   - Squat appearance
   - Only live in tropics and subtropics where it is warm year round
   - Caimans ONLY live in fresh water but crocodiles live in fresh and salt water

Alligators vs. Crocodiles
   - Alligator
     - Blackish/Grey Color
     - Wider U-shaped snout
     - Less aggressive
     - Teeth of lower jaw are hidden
     - 30 – 50 year life span
   - Crocodile
     - Olive green/brown color
     - Longer V-shaped snout
     - More aggressive
     - Teeth of lower jaw are visible
     - 70 – 100 year lifespan

Turtles and tortoises
   - Turtles live in water, tortoise live on land, terrapin live in somewhat salty water
   - Shell built into the skeleton
     - Shell has two parts: carapace – dorsal part, plastron – ventral part
   - Lack teeth but having horny ridge on upper and lower jaw
   - Powerful jaws
   - Strong limbs

Bird characteristics
   - Maintains a constant internal temperature
   - Outer covering of feathers
   - Two legs covered with scales
   - Front limbs modified into wings
   - Feathers – protein structures that develop from pits in the bird’s skin and help them fly
     - Two types of feathers
       - Contour feathers – provide lifting force and balance needed for flight
       - Down feather – trap air close to the body to keep the bird warm
   - Barbule – on a contour feather these are the hooks that fit together to hold feathers flat

Bird Adaptations:
   - Highly efficient digestive, respiratory, and circulatory systems
   - Aerodynamic feathers and wings
   - Strong, lightweight bones
   - Strong chest muscles
Endotherms – animals that can generate their own body heat through metabolism

Metabolism – the sum of chemical and physical processes that go on inside the body.

Small birds lose more body heat than large birds. This means small birds must eat more food than larger birds to make up for the lost heat.

Birds beaks are adapted to the food they eat.

Digestive system of a bird
- No teeth so most food is swallowed whole →
- Esophagus → crop (moistens food, stores it, and starts breaking it down) → stomach
- Process is different based on food source
  - Birds that eat insects or seeds → gizzard (muscular organ that grinds food) → rest of the stomach
  - Birds that eat meat, fish, or soft food → expandable stomach (no gizzard)
- From the stomach → small intestine (digestion finishes and nutrients are absorbed) → large intestine (most water is absorbed) → Cloaca (undigested food and waste leaves the body.)

Some species of birds have small stones and gravel the bird swallows in the gizzard.

Respiration
- Inhalation → air sacs in body cavity and bones → lungs → out of the body
- Air goes in a SINGLE direction – only inhaling, no exhaling

Circulation
- Four chambered hearts with two separate circulatory loops
- Two separate ventricles and two separate atrium

Bones
- Many have different shapes
- Many are fused together making the skeleton more rigid than a reptile.
- Internal struts brace bones to make them sturdy enough for flight.
- Air spaces inside the bones make them lightweight

Reproduction
- Reproductive tracts open into the cloaca
- Reproductive organs shrink when not breeding.
- Mating birds have ovaries and testes that grow larger to fertilize.
- Bird eggs are amniotic eggs similar to reptiles but with a hard outer shell.
Groups of birds – almost 30 orders
Largest order of birds – passerines – perching birds including songbirds, larks, sparrows, finches, etc.

Pelicans and relatives – found in aquatic ecosystems, four toes connected by a web

Parrots – colorful and noisy, use feet to hold food

Birds of Prey – “raptors” – fierce predators with hooked bills, large wing spans, and talons

Cavity-nesting birds – multicolored birds that live in holes they make in trees, mounds, or underground tunnels (ex. Toucans, woodpeckers)

Ostriches and their relative – flightless birds that must move by running or swimming

Herons and their relatives – birds adapted to wading in a variety of aquatic habitats.
Amnion
The amnion is a fluid-filled sac that surrounds and cushions the developing embryo. It produces a protected, watery environment.

Chorion
The chorion regulates the transport of oxygen from the surface of the egg to the embryo and the transport of carbon dioxide, one product of respiration, in the opposite direction.

Allantois
The allantois stores the waste produced by the embryo. It also serves as a respiratory organ.

Yolk sac

Shell