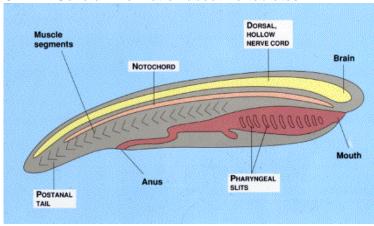
Ch 12:1 General Information about Vertebrates



Mr. Galloway

<u>Vertebrates</u> – a subphylum of the phylum <u>Chordata</u>.

Vertebrates have a backbone that is part of an endoskeleton.

The <u>endoskeleton</u> supports, protects, and gives shape to the body. Most fishes, amphibians, and reptiles are **ectotherms**.

Mammals and birds are **endotherms**.

<u>Chordata</u> – This is the phylum whose members have a notochord, a nerve cord, and slits in their throat area at some point in their lives.

**Notochord** – a flexible rod that supports a chordate's back

Cartilage – connective tissue that is more flexible than bone, and gives support to body parts

Vertebra – the bones that make up the backbone of an animal, which protects the spinal cord.

Ectotherm – an animal whose body does not produce much internal heat

<u>Endotherm</u> – an animal whose body controls and regulates its temperature by controlling the internal heat it produces. The internal body temperature does not change much when the external environmental temperature changes.

### 12.2 Fishes

Heart: only two chambers

Most are ectotherms.

Obtain oxygen through gills. (Oxygen and Carbon Dioxide gases exchange through the blood vessels)

Most use external fertilization.

- Female releases eggs in the water.
- Male spreads a cloud of sperm over the eggs as they are released.

### Three Major Groups:

- Jawless Fish (Sea Lamprey)
- Cartilaginous Fish (Sharks, Sting Rays)
- Boney Fish (Gold Fish, Bass, Trout, etc.)

# **Swim Bladder** = an organ found in most boney fishes

= gas filled sac that stabilizes the fish at different depths

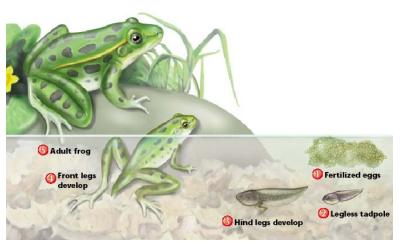
Bouyant force = the force water exerts upward on any object under the water.

If the bouyancy force is greater than the weight of the object then it floats. If not, then it sinks.

If they are equal, then the object stays at whatever depth in which is laying.

# 12.3 Amphibians

# Frog Metamorphosis



<u>Examples</u> = frogs, toads, salamanders (including Amphiumas like "Owen")

Toads have dry bumpy skin. Frogs have smooth moist skin.

Heart: Three chambers

Ectothermic with an endoskeletons

"Amphibian" means "double-life" (live on land and water)

Life Cycle: Metamorphosis

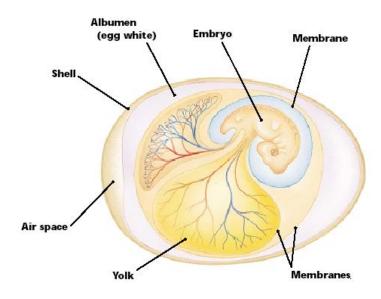
Egg (usually laid in water)

- Larvae (in water with gills)
- Adult (on land and breathe using lungs and moist skin that absorbs oxygen)

Amphibian's thin, moist skin not only absorbs oxygen, but also pollution. So, they are very sensitive to environmental changes.

# 12.4 Reptiles

# A Reptile Egg



Gators and Crocs are the largest lizards living today. Komodo Dragons are almost as big as Gators. **Examples** = snakes, lizards, turtles, alligators, etc.

**Ectothermic** vertebrate with well developed lungs and dry, scaly skin.

Can spend their whole life on land:
- Their soft leathery eggs, skin, and kidneys are designed for land.

Gecko toes can hold onto even super smooth glass, by using millions of microscopic "spatulae" to actually cling to the individual molecules of the glass.

Chameleon tongues in the Garden of Eden may have been designed to collect ripe, berries that wiggled in the wind.

Lizards are different from snakes, because lizards have legs (except for a few like the glass lizard). <u>Dinosaurs</u> just one kind of extinct reptile. \* Remember that most cultures on earth had stories and drawings of giant reptiles that look just like extinct dinosaurs. This, along with much more evidence recently discovered, indicates that they were still living on earth only thousands of years ago and were seen (drawn) by people. (see Mr. Galloway's 400 slide power point on Creation vs. Evolution at www.SoulCare.ORG)

<u>Sedimentary Rock</u> is a type of rock that forms when particles from other rocks or the remains of plants and animals are pressed and cemented together

Fossil are the preserved remains or traces of an organism that lived in the past

Fossils are found primarily in sedimentary rock.

Scientists study fossils to learn about animals that died.

Fossils are imprints of animal bones and sometimes the actual calcified bones themselves.

Fossils do not tell us much about the skin texture, nothing about the color, etc.

So the drawings of extinct, fossilized creatures are from the artists' imaginations.

Most of the fossils, rock layers, and deep canyons were produced during the catastrophic, global flood during Noah's time, about 4,500 years ago.

For more information on the assumptions and inaccuracies involved in Carbon 14 and other radiometric dating methods, see <a href="https://www.answersingenesis.org">www.answersingenesis.org</a>.

#### 13.1 Birds

Birds are the only animals with feathers.

Birds disperse seeds they eat.

It is impossible for bird feathers to have evolved from reptile scales for many reasons:

- Reptiles do not have the DNA coded information for feathers and mutations never create new code.
- Scales and feathers are made of different materials.
- Scales are simple folds of skin. Feathers are highly complex structures.

# **Special Design Features:**

- 1. <u>Air sacs</u> help provide the rich supply of oxygen needed for the intense activity of flight. Warm air in these structures adds buoyancy to the bird's body.
- 2. <u>Hollow Bones</u> help reduce weight for flight, and increase amount of oxygen available for working the flight muscles.
- 3. **Contour feathers** interlock to give a bird its smooth, streamlined shape.
- 4. Because birds have no teeth, they rely on their **gizzards** to grind food into a paste.
- 5. As in mammals, a bird's <u>heart</u> keeps oxygen-rich blood separate from oxygen-poor blood, ensuring that blood reaching the tissues carries the most oxygen possible.
- Birds' <u>bills</u> or <u>beaks</u> are strongly adapted to their food supply. Different species may use this
  organ to catch insects, crack seeds, scoop fish, tear meat, or drill holes in trees, to name a few
  uses.
- 7. **Perching** birds have feet that are adapted to lock onto branches.

# 13.2 The Physics of Bird Flight

### 13.3 Mammals

Four chambered heart.

Endothermic.

Feed offspring with milk.

Fur is designed for warmth, so they can live in cold climates.

Canine teeth (the long fang-like teeth of tigers and pandas) were originally designed for God's Garden of Eden, to pierce and open large, hard plant material. Pandas today have the same type of canine teeth as a tiger, but they eat giant bamboo.

# 13.4 Mammal Diversity

Some rare mammals lay eggs, such as the Echidna and the Duck-billed Platypus.

Bats are the only mammal to fly.

Whales and Dolphins are mammals.

Opossums are the only "Marsupials" in North America. Marsupials carry their babies in pouches (kangaroos, etc.)