

## Life Science - Mr. Galloway

Chapters 12-13

### Vertebrates:

*Fish, Amphibians,  
Reptiles, Birds, Mammals*

**Recommended Websites:**

[www.soulcare.org](http://www.soulcare.org)

[www.icr.org](http://www.icr.org)

[www.answersingenesis.org](http://www.answersingenesis.org)

## Ch 12:1 What is a Vertebrate?

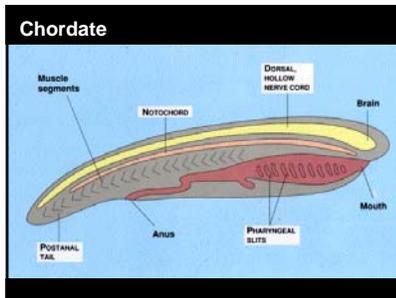
Google the definition and images

**Chordate** - the phylum whose members have a notochord, a nerve cord, and slits in their throat area at some point in their lives. (*Not "gills" in a human embryo, as some once thought.*)

**Vertebrates** - a subphylum of the phylum Chordates.

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

**Cartilage** - connective tissue that is more flexible than bone, and gives support to body



**Vertebra** - the bones that make up the backbone of an animal

**Ectotherm** - an animal whose body does not produce much internal heat (**cold-blooded**).

**Endotherm** - an animal whose body controls and regulates its temperature by controlling the internal heat it produces (**warm-blooded**).

**Vertebrates** have a backbone that is part of an endoskeleton.

The **endoskeleton** supports, protects, and gives shape to the body.

Most fishes, amphibians, and reptiles are **ectotherms**.

Mammals and birds are **endotherms**.

**What about Dinosaurs?**

**Fossil** = 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. Most of the fossils are of animals that died in the global flood 4,500 years ago.

**Sedimentary Rock** - a type of rock that forms when particles from other rocks or the remains of plants and animals are pressed and cemented together.

### 12.2 Fish

Fish are vertebrates which live in water and have fins. Most are ectotherms. Obtain oxygen through gills. (*Oxygen and Carbon Dioxide exchange in gill blood vessels*)

Most use external fertilization.  
- Female releases eggs in the water.  
- Male spreads a cloud of sperm over the eggs.

**Three Major Groups:**  
- Jawless Fish (Lampreys)  
- Cartilaginous Fish (Sharks, Rays)  
- Boney Fish (Trout, Bass, 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.

Sea Lamprey – Jawless fish  
 Google images .....

**Deep Sea Earthquake**

- Created a massive shock wave
- Called a Tsunami (Tidal Wave)
- It forced deep sea creatures up to the surface and onto the land
- **Google images .....**

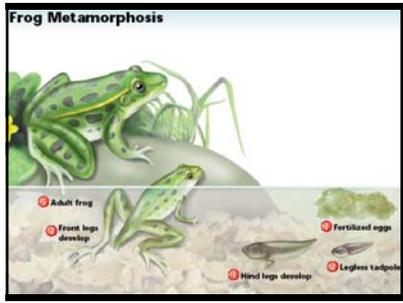
**12.3 Amphibians**

Examples = salamanders, frogs, toads, etc.  
 Ectothermic with an endoskeletons

“Amphibian” means “double-life” (land and water)

**Life Cycle: Metamorphosis**

- Egg (usually laid in water)
- Larvae (in water with gills)
- Adult (on land with lungs)



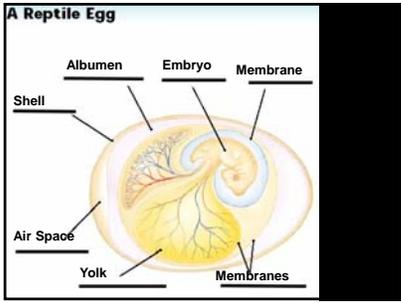
**12.4 Reptiles**

Examples = snakes, lizards, turtles, alligators, etc.

Ectothermic vertebrate with lungs and scaly skin.

They can spend their whole life on land:  
 - Their eggs, skin, and kidneys are designed to live mainly on land

Specific Characteristics:  
 Snakes – no legs, hinged jaw, poisonous fangs  
 Lizards – four legs, scales  
 Turtles – external shell, webbed feet



Creation “Magnifying the LORD!”  
 How does a Gecko walk on smooth glass?  
[https://www.youtube.com/watch?v=lkV1zMh\\_GQk](https://www.youtube.com/watch?v=lkV1zMh_GQk)

**Google images .....**

**God's awesome design defies evolution:**

- Each **toe** has thousands of setae.
- Each **seta** has thousands of spatulae.

Each **spatulae** is able to adhere (stick) to the molecules of any substance.

- “**Van der Waals**” forces are the forces that hold each spatulae to the molecules.

**Gators:**

Transparent third eyelid gives underwater protection.  
 80 teeth; 40 top, 40 bottom  
 Teeth used for grabbing and holding, not for cutting.  
 Young alligators can replace teeth every year or so.  
 Mother 'gators care for their young for up to 2 years.  
 Use feet to keep balance in water; tail to swim fast  
 4-chambered heart.  
 Special sense organs on jaws, nose, around eyes and on upper palate



**Comparing Circulatory Systems  
(Blood flow)**

**Fish, Amphibian, Reptile, Bird, Mammal**

**View the diagram at the link below:**

<https://www.youtube.com/watch?v=922029q4w60&list=PL1205793211>

**Closed Circulatory Systems (Blood Loops)**

**Fish (One loop)**  
- Heart to gills to body to heart

**Amphibians**  
- Larvae (one loop)  
- Adult (two loops)  
\* Heart to the lungs and back to the heart  
\* Heart to the body and back to the heart

**Reptiles (two loops – three chambered heart)**  
**Birds (two loops – four chambered heart)**  
**Mammals (two loops – four chambered heart)**

**Did reptiles evolve into birds?**

Evolutionists claim that they did.

They once claimed that the extinct bird, "Archaeopteryx", was an ancestor of modern birds.

But new evidence has caused even leading evolutionists to stop making this claim about "Archaeopteryx".

Yet, your textbook and others still promote this error.

**How are birds adapted for flight?**

Air sacs help provide the rich supply of oxygen needed for the intense activity of flight. Warm air in these structures add buoyancy to the bird's body.

Contour feathers interlock for smooth, streamlined shape.

Gizzards grind food into a paste, because birds have no teeth.

Heart keeps oxygen-rich blood separate from oxygen-poor blood, ensuring that blood reaching the tissues carries the most oxygen possible.

Bills or beaks are adapted to their food supply.

## The Science of Bird Flight

see the diagram at the link below

[http://howtosavetheworld.ca/images/wing\\_diagram.gif](http://howtosavetheworld.ca/images/wing_diagram.gif)

NOW TRY THE PAPER & AIR FLOW EXPERIMENT

## Mammals

Google images of the diversity of mammals:  
especially bats, dolphins, whales, apes, etc...

### Mammal Characteristics:

1. Bear live young
2. Maintain a constant body temperature (warm blooded)
3. Differentiated teeth (canines, incisors, premolars, molars)
4. Will have two sets of teeth in their life
5. Will have four limbs (two legs, two arms, fins and flippers)

### Examples of Animals in the 11 Mammal Groups:

- |                 |   |
|-----------------|---|
| 1. Egg-laying   | (duck-billed platypus, spiny echidna)         |
| 2. Flying       | (bat)   |
| 3. Toothless    | (armadillo, anteater, sloth)                  |
| 4. Marsupials   | (kangaroo, koala, opossum, wallaby)           |
| 5. Carnivores   | (dog, cat, bear)                              |
| 6. Insectivores | (mole, shrew, hedgehog)                       |
| 7. Rodents      | (mouse, rat, squirrel, chipmunk, beaver)      |
| 8. Ungulates    | (cow, sheep, goat, pig, camel, giraffe, deer) |
| 9. Trunk-nosed  | (elephant)                                    |
| 10. Marine      | (whale, dolphin, manatee)                     |
| 11. Primates    | (monkey, ape, lemur, gorilla)                 |

Think of how many new bits of genetic (DNA) information makes this "mammal" able to fly so awesomely.

• And don't forget that bats use sonar to fly in total darkness!

• Then remember that no mutation ever produces new genetic information.

• Therefore, bats must have been created from the beginning with the ability to fly.

How much new DNA would have been required to make a **mammal** from a **microbe**?

## The DUCKBILL PLATYPUS

Every evolutionists worst nightmare – impossible to explain!

GOOGLE photos and then diagrams of the platypus parts