

Vertebrates



Vertebrates

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# Basics

Vertebrates are the most advanced organisms on Earth. The traits that make all of the animals in this section special are:

their spinal cords  
vertebrae  
and notochords

## Vertebrate Basics

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# Fish

1. Fish are cold-blooded, aquatic vertebrates.
2. Their skin is generally covered with scales.
3. Their limbs are modified into fins for swimming.
4. They breathe with gills.
5. They lay eggs that must be in water.



Fish

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# Amphibians

1. Amphibians are ectothermic vertebrates.
2. Their skin lacks scales, hair, and feathers, and is either smooth (like a frog) or rough (like a toad). They are dependent upon moisture and subject to desiccation; their skin must remain moist to aid in breathing.
3. They lay eggs in water, which hatch into an intermediate life form (tadpole or larva) that usually breathes with gills, and change into the adult form that breathes air and can live outside water.
4. They have three-chambered hearts.
5. They lack claws on their toes.



Amphibians

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# Reptiles

1. Reptiles are ectothermic vertebrates.
2. Their skin has scales, but no hair or feathers.
3. They have three-chambered hearts (except for alligators and crocodiles, which have four-chambered hearts).
4. They have claws on their toes (except those which do not have legs, such as legless lizards).
5. They are the first animals, in evolution, to develop the amniotic egg. This allows reptiles to lay eggs on land.



# Reptiles

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# Birds

1. Birds are warm-blooded vertebrates.
2. Their skin is covered with feathers.
3. They have four-chambered hearts.
4. Their bones are lightweight and usually hollow.
5. Their forelimbs are modified as wings.
6. They lay eggs.



Birds

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# Mammals

- 1. Mammals are warm blooded vertebrates.
- 2. They have hair, which varies greatly among species.
- 3. Most have sudoriferous (sweat) glands.
- 4. They have mammary (milk-secreting) glands.
- 5. They have sebaceous (fat-secreting) glands.
- 6. They have heterodont dentition (different types of teeth).

