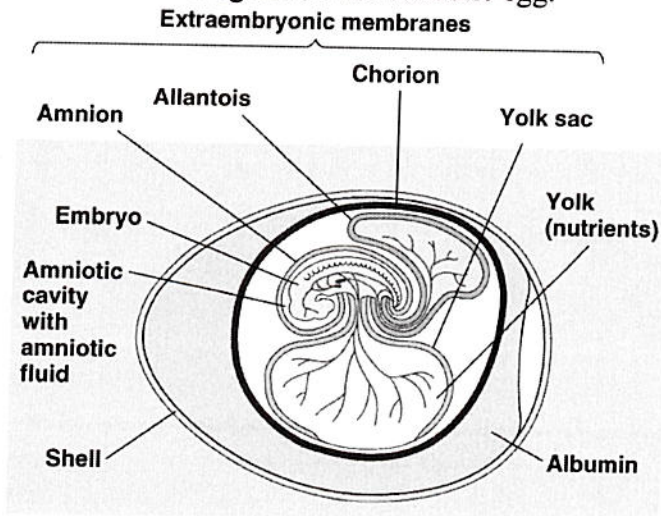


## Ch 32 REVIEW ANSWERS: Reptiles and Birds

1. What are the characteristics that unify reptiles? *Reptiles are vertebrates with lungs, scaly skin, and an amniotic egg.*
2. All of the above characteristics are adaptations for terrestrial life. Explain how this is true for each of the characteristics. *Efficient lungs are necessary for the complete transition to land. The scaly skin is waterproof, so they can protect against desiccation but that means they no longer are able to breathe through their skin. (Therefore, they need a better circulatory system to distribute the oxygen). The amniotic egg is necessary so that the embryo does not dry out while developing. Previously (in the amphibians) the eggs had to be surrounded by water so that they wouldn't dry out. Now the reptiles did not need to return to the water for their young to live.*
3. Label the diagram of the amniotic egg.



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4. What do transition fossils tell us about the evolution of reptiles? *Transition fossils show that there was a slow and steady evolutionary progression from amphibians to reptiles. (Gradualism model).*
5. What is believed to be the cause of the extinction of the dinosaurs? *It is possible that there was a huge meteor that struck the earth, causing many earthquakes, volcanoes, a tsunami, and throwing a layer of dust into the atmosphere that remained a long time, blocking out the sun. The large ectodermic dinosaurs could not survive the new conditions.*
6. How do snakes eat? What enables them to eat that way? *Snakes swallow their food whole, and then take an extended time digesting the carcass. They do not have to eat very often that way. They are able to swallow prey that are larger than their mouth because their jaws can extend a great deal. They also have a breathing tube that extends out their mouth when they are swallowing so that they do not suffocate.*

7. How do snakes breathe when they are eating? *Through the breathing tube described above.*
8. How do chameleons eat? *Chameleons have long sticky tongues that they flick out at their flying prey.*
9. How are reptilian lungs better developed than amphibians? What other improvement to the respiratory system makes it work better than the amphibians? *Reptilian lungs have a greater internal surface area for exchange of gases. They also have muscles in their ribcages so that they are able to pull in air (like we do, except we also have a diaphragm.)*
10. What type of circulatory system do reptiles have? *Reptiles have a “double loop system”.*
11. What types of hearts do reptiles have? Describe them. *Reptiles have either 3 ½-chambered hearts or 4-chambered hearts (crocodiles and alligators). The additional chambers come when the ventricle is separated, either completely (4 chambers) or partially (3.5 chambers) by a septum. This septum serves to separate the oxygenated blood coming from the lungs from the deoxygenated blood coming from the body. When the ventricle is divided completely into 2 chambers, the cells are sent blood that is fully oxygenated. If the septum only goes part of the way across, as in the 3.5 chambered heart, some mixing of the oxygenated and deoxygenated blood occurs, sending only partially oxygenated blood to the body cells. The 4-chambered heart is most efficient for this reason.*
12. Label the diagram of the turtle.
 

<i>a. mouth</i>	<i>g. large intestine</i>
<i>b. larynx</i>	<i>h. cloaca</i>
<i>c. trachea</i>	<i>i. Small intestine</i>
<i>d. bronchi</i>	<i>j. pancreas</i>
<i>e. stomach</i>	<i>k. gall bladder</i>
<i>f. bladder</i>	<i>l. liver</i>
	<i>m. esophagus</i>
13. How do reptiles get rid of their metabolic wastes? *They excrete nitrogenous wastes in the form of uric acid crystals – they exit through the cloaca with the other solid waste.*
14. What is the function of the cloaca – especially in desert-dwelling animals? *The cloaca re-absorbs water from the solid wastes and the nitrogenous wastes (the uric acid).*
15. What is the difference between uric acid and ammonia? What is better for terrestrial animals to excrete? Why? *Uric acid is not as toxic as ammonia, so the body can handle it in a more concentrated form. When it is concentrated, uric acid crystallizes to a white paste. Ammonia must be eliminated with lots of water to ensure it does not reach toxic concentrations in the body. (humans use urea – it is in-between ammonia and uric acid as far as toxicity goes).*
16. How is the reptilian brain different from the amphibian brain? *The cerebellum and the cerebrum are larger and more developed in the reptile compared to the amphibian.*
17. Describe the sense organs present in a snake. (hearing, smelling/tasting, heat sensors) *Snakes have no ears, but are able to detect the vibrations in the earth if*

- something is approaching. They have excellent senses of taste and smell. They can smell as we do, with chemoreceptors in their nose, but they also have special organs on the roof of their mouth for tasting. The tongue gathers airborne chemicals and brings them in to the organ. Some snakes also have heat sensors, and are able to “see” an image created by the heat emitted from other animals.*
18. Describe the ears of a lizard. How are they like ours? *The ears of lizards have an external eardrum (tympanum); we have an internal eardrum. The lizards have one small bone that conducts the vibrations from the eardrum to the inner ear; we have three small bones doing the same thing. The reptiles ears are similar, just more simple versions of our own.*
  19. How do tortoises hear? *Tortoises have a large patch of skin on their heads that functions as an eardrum.*
  20. Compare the movement of an amphibian with that of a reptile and that of a mammal. Discuss the alignment of their limbs in the explanation. *There is a trend in evolutionary progress regarding the alignment of limbs; in amphibians, the limbs stick out the side of the bodies, so that they are not able to lift themselves off of the ground very far, and they have to wiggle their bodies back and forth as the walk (almost like a fish swims). Amphibians limbs are aligned more underneath their torso – they do not have to wiggle-walk quite a much as amphibians. Mammals have their limbs directly under their bodies (think if a horse) and do not wiggle from side to side when they walk. Instead, they flex their vertebrate up and down as the run fast. (picture a cheetah as it runs).*
  21. How do reptiles reproduce? How do they develop their zygotes (most). *Reptiles have internal fertilization. The male has a penis that deposits the sperm in the females cloaca. The zygotes are then covered in a leathery shell and most will lay the eggs. (they are oviparous).*
  22. What is of interest to palaeontologists about tuataras? *They are the most ancient class of reptiles and they have retained some of the features that were present in dinosaurs.*
  23. What is the pineal gland of a tuataras? What is it being used for? *It is a part of the brain, but in the tuataras, it is on the top of the skull. It detects light and is used to determine the change in day length.*
  24. List some common (or infamous) examples of lizards. *The frilled lizard, Gila monsters, Komodo dragons, chameleons, iguanas, snakes.*
  25. What are the two parts of a turtle shell? *The dorsal (back) is the carapace, and the ventral (belly) is called the plastron.*
  26. Lizards and snakes don't look anything like one another. Why are they in the same class? *Snakes are lizard that have lost their legs through evolution. They were specially adapted at burrowing.*
  27. What is the difference between turtles and tortoises? *Turtles usually live in the water; tortoises are land dwellers.*
  28. What does ectoderm mean? *“Heat from outside”*
  29. Why do ectoderms not generate as much heat inside their bodies as endoderms? *Ectoderms have low metabolic rates compared to endoderms, and are not active for long periods of time.*

30. Why are endoderms able to hold on to the heat they generate better than ectoderms? *Endoderms use fur, feathers, hair and sub-cutaneous fat for insulation.*
31. What is one disadvantage to ectoderm? How do reptiles overcome this disadvantage? *Ectoderms cannot be active for long periods of time without overheating their bodies. They overcome this by having short spurts of activity followed by rest periods to cool off.*
32. What is a disadvantage to endoderm? *Endoderms need a lot of food to keep their internal temperatures the same all day and night. Endoderms have to eat more than an ectoderm of the same size. In the tropics, this is an unnecessary waste of energy.*
33. Why are there not many larger reptiles in colder climates? *Larger reptiles are not able to stay warm long enough – it takes too long for the outer heat to reach the inner body of a larger reptile.*
34. What are the characteristics that unify birds? *Birds are endothermic, reptile-like, have feathers, two legs, and wings (that don't have claws at the ends).*
35. Describe the difference between contour, down and powder feathers. *Contour feathers are either body feathers or flight feathers. They have barbules that hook onto barbs, keeping their shape and structure. They are longer than the other feathers, and are stiff. Down feathers are the small fluffy feathers closest to the skin. They are used for warmth/insulation. The powder feathers produce a powder that is water repellent – keeping the down feathers dry.*
36. What is a second way that ducks “waterproof” themselves? *Ducks produce and oil that they rub over themselves when they are preening.*
37. What features does the fossils of *Archaeopteryx* exhibit that make palaeontologists believe it was one of the “in-between” species in the evolution of reptiles to birds? *Archaeopteryx looks just like a reptile, with teeth in its beak and toes and claws on its wings. However, the fossils clearly show the imprint of feathers – something dinosaurs did not have.*
38. Why do birds have to eat a lot of food compared to other animals their size? *Birds have a very high metabolism, and their heart beats incredibly fast. Their wing muscles take a lot of energy!*
39. What is the function of the trachea, crop, gizzard, and ureter in a bird?  
*The trachea is the windpipe (just like ours).*  
*The crop is an enlarged section of the esophagus for food storage. Food from here can be regurgitated for the young.*  
*The gizzard is a muscular part of the stomach that grinds the food. The bird will swallow small pieces of gravel and use this gravel in the gizzard to help grind.*  
*The ureter is the tube that carries urine (in the form of uric acid) from the kidney to the bladder or cloaca. (we have a ureter as well, from the kidneys to the bladder.)*
40. Describe how the bird's lung works. *The presence of air sacs in the respiratory system of a bird allows for one-way flow of air through the lungs. The air circulates through the trachea and into the air sacs. It shuttles across the lungs and into other air sacs and then is exhaled. In this fashion, the lung never has “used” air in it.*

41. Why is this a more efficient lung than ours? *Oxygen can be absorbed during inhalation and exhalation in a bird. Ours only absorbs during inhalation.*
42. What is the second function of the air sacs? *They lighten the bones and provide extra buoyancy, making flight easier.*
43. What type of heart does a bird have? *Birds have a 4-chambered heart.*
44. How do birds eliminate their nitrogenous wastes? *Birds eliminate nitrogenous wastes in the form of uric acid using their kidneys. The cloaca re-absorbs most of the water from the uric acid, leaving behind uric acid crystals that are white and pasty.*
45. How is the cloaca involved in excreting the nitrogenous wastes? *The cloaca re-absorbs water, concentrating the uric acid so that it comes out of solution and forms a white, pasty crystal.*
46. How do marine birds deal with the excess of salt in their diet? *Marine birds have an extra excretory gland near their eyes that excretes excess salt when necessary.*
47. How do bird brains compare to reptile brains? *Compared to reptiles, birds have a larger cerebrum to deal with their complicated behaviours and a larger cerebellum to coordinate flight.*
48. What senses do birds use for migration? *Some birds have a magnetic sense that helps them with direction. It works like a compass. Others use eyesight, instinct navigate by the sun and the stars when migrating.*
49. Describe the structure of bird's bones. *Bird's bones are almost hollow, with internal struts that reinforce them for strength. They will sometimes have air sacs protruding into them as well.*
50. What adaptations do birds have to decrease the amount of weight they carry? *They have hollow bones, air sacs and some will reduce the size of their reproductive structures when it is not mating season.*
51. How are the muscles for flight attached to the skeleton? *The flight muscles are attached to the keel. The keel is attached to the breastbone (sternum), which is attached to the ribcage.*
52. How do birds mate? *Birds press their cloacas together and the male transfers sperm to the female. Fertilization occurs in the cloaca, and the embryos are coated with the eggshell to protect them.* How do bird's eggs differ from reptile eggs? *Bird's eggs have a hard, brittle shell, while reptile eggs have a leathery shell.*
53. How do some male birds attract females for mating? *Some birds will have very bright contour feathers. Others will try to sing a song, or build a very large nest*
54. Label the diagram of the internal structures of a bird. Be sure to know the functions of each of the structures.
- |              |                     |                     |               |                     |
|--------------|---------------------|---------------------|---------------|---------------------|
| <b>Bird:</b> | <i>a. esophagus</i> | <i>g. pancreas</i>  | <b>LUNGS:</b> | <i>a. trachea</i>   |
|              | <i>b. trachea</i>   | <i>h. cloaca</i>    |               | <i>b. bronchus</i>  |
|              | <i>c. crop</i>      | <i>i. Ureter</i>    |               | <i>c. air tract</i> |
|              | <i>d. heart</i>     | <i>j. intestine</i> |               | <i>d. air sac</i>   |
|              | <i>e. liver</i>     | <i>k. kidney</i>    |               | <i>e. lung</i>      |
|              | <i>f. gizzard</i>   | <i>l. lung</i>      |               |                     |
55. Label the diagram of a bird's lung.