

**CHAPTER REVIEW QUESTIONS FOR “TEACHING ORIGINS IN SCIENCE CLASS”  
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**CHAPTER 1 REVIEW QUESTIONS ANSWER KEY**

1. Creation implies that the universe, earth, and life began in a COMPLEX condition. Later changes could have produced diversification within limits, but would display an overall trend toward deterioration.
2. The two main variations of creation are YOUNG and OLD earth.
3. Evolution implies that the universe, earth, and life began in a DISORGANIZED condition. Later changes could have produced unlimited diversification. Evolution would display an overall trend toward increasing complexity.
4. What is the difference between theistic and materialistic evolution?  
THEISTIC SAYS SOME SORT OF GOD DIRECTED EVOLUTION. MATERIALISTIC SAYS THAT EVOLUTION HAPPENED BY PURELY NATURAL PROCESSES.
5. What are the two main variations of evolution as it is believed to have happened to living things?  
NEO-DARWINISM and PUNCTUATED EQUILIBRIA
6. What does Punctuated Equilibria mean?  
THERE WERE PERIODS OF EQUILIBRIUM WITH LITTLE CHANGE FOR MILLIONS OF YEARS, PUNCTUATED BY CATASTROPHIC EVENTS SUCH AS VOLCANOES THAT CAUSED EVOLUTION TO OCCUR RAPIDLY.
7. Creation could be summarized as COMPLEX to SIMPLE.
8. Evolution could be summarized as SIMPLE to COMPLEX.
9. What characteristics would have to be true of either God or Random Chance?
  - a. INVISIBLE
  - b. SUPERNATURAL
  - c. ETERNAL
  - d. OMNIPRESENT
  - e. OMNIPOTENT
  - f. SELF-EXISTENT
10. What are four potentially valid ways to know things?
  - a. SENSES
  - b. AUTHORITY
  - c. LOGIC
  - d. INTUITION
11. Why is inductive logic called *a posteriori*? CONCLUSIONS ARE REACHED AFTER EVIDENCE IS EXAMINED.
12. Why is deductive logic called *a priori*? ASSUMPTIONS ARE MADE BEFORE EVIDENCE IS EXAMINED.
13. Which kind of logic depends most heavily on presuppositions (also called postulates or axioms) being true? DEDUCTIVE
14. Evolution assumes that every natural phenomenon must have a NATURAL cause.
15. Creation allows for the possibility that some physical phenomena may not have a natural cause but were directly brought into existence by GOD.
16. Since no major type of animal or plant has ever been seen to evolve to a different major type within recorded human history, every variation of evolution requires that the earth must be BILLIONS of years old.

17. Since creationists believe God could work as fast or as slow as He wanted to, young-earth creation allows for the possibility that the earth may only be **THOUSANDS** of years old.
18. Every version of evolution denies that there has ever been a worldwide **FLOOD**.
19. Evolution says that similarities between animals and plants that are not considered closely related must be the result of common **ANCESTRY** or random mutations that happened to produce similar results.
20. Creation says that similarities between animals and plants that are not considered closely related are likely the result of common **DESIGN**.
21. Give an example of an area of science that routinely involves searching for indications of design.  
**ARSON & PLANE CRASH INVESTIGATION, SETI, ARCHEOLOGY, ETC.**
22. Explain the difference between laws, hypotheses, theories, and models.  
 Hypothesis: **TENTATIVE EXPLANATION FOR WHY SOMETHING HAPPENS**  
 Law: **A STATEMENT OF WHAT HAPPENS, WITH NO KNOWN EXCEPTIONS**  
 Theory: **A WELL-TESTED EXPLANATION FOR WHY SOMETHING HAPPENS**  
 Model: **A DESCRIPTION, OBJECT, DRAWING, ETC. THAT HELPS US VISUALIZE SOMETHING WE CANNOT DIRECTLY OBSERVE**
23. Referring to evidence, explain why we can never be certain that we completely right about anything in science. **WE CAN NEVER BE COMPLETELY SURE THAT WE HAVE NOT OVERLOOKED SOMETHING.**

## CHAPTER 2 REVIEW QUESTIONS ANSWER KEY

1. The concept of creation leads us to believe that the universe began in a   **MORE**   complex condition than at present. There should be an overall trend toward   **DECREASING**   complexity and organization.
2. The concept of evolution leads us to believe that the universe began in a   **LESS**   complex condition than at present. There should be an overall trend toward   **INCREASING**   complexity and organization.
3. Observations have shown that unless forced to do otherwise, energy tends to flow from   **GREATER**   to   **LESSER**   concentration.
4. A system into which energy can enter or from which it can exit is called an   **OPEN**   system.
5. What conditions must be met in order for entropy to decrease in an open system?
  - a. Supply of   **USABLE**   energy.
  - b. A   **CONVERSION**   mechanism to allow the energy to be used by the relevant parts of the system.
  - c. Before the energy can be used properly, there must be pre-existing   **INFORMATION**   to guide the increasing organization in the open system.
  - d. In order for entropy to decrease in the open system, it must   **INCREASE**   at the source of the energy.
6. Why is the formation of ice crystals in an open system not an example of increasing information?   **THERE IS NO MORE INFORMATION IN ICE THAN LIQUID WATER. CRYSTALS FORM BECAUSE THE STRUCTURAL INFORMATION OF WATER MOLECULES IS DETERMINED BY THE ATOMS THAT COMPOSE THEM. THIS INFORMATION IS ALWAYS PRESENT. IT ONLY BECOMES VISIBLE WHEN THEY SLOW DOWN ENOUGH TO LINK TOGETHER.**
7. Both Initial Complexity and Initial Disorganization rest on the belief that matter and energy came into existence as a result of   **UNKNOWN**   processes, whether natural or non-natural.
8. How does the Second Law of Thermodynamics imply that the universe could not be infinitely old?   **ENTROPY (RANDOMNESS) CONTINUALLY INCREASES. THERE WOULD HAVE HAD TO BE A TIME WHEN THE ENTROPY OF THE UNIVERSE WAS ZERO. KNOWN NATURAL LAWS WOULD NOT HAVE APPLIED BEFORE THEN.**
9. If the universe is four dimensional, what would this imply about gravity pulling it back together into a “Big Crunch”?   **A FOUR DIMENSIONAL UNIVERSE WOULD NOT HAVE A CENTER OF MASS FOR GRAVITY TO PULL TOWARD.**
10. How does the First Law of Thermodynamics conflict with the Steady State Universe model?   **THE STEADY STATE MODEL SAYS THAT NEW MATTER AND ENERGY MUST BE COMING INTO EXISTENCE IN UNOBSERVABLE REGIONS OF SPACE. THE FIRST LAW SAYS THAT MATTER/ENERGY CANNOT BE CREATED OR DESTROYED.**

11. Scientists use the technique of SPECTROSCOPIC analysis to determine which elements are present in distant stars.
12. The fact that there are no known stable isotopes with mass numbers five or eight means that these masses would have been unavailable for use as BUILDING BLOCKS for heavier elements.
13. If the universe started as hydrogen only, what would have been the heaviest element that could have been produced in a Big Bang? HELIUM OR POSSIBLY LITHIUM
14. How many times has the “Triple Alpha” process that would have been needed to produce carbon in the interior of stars been observed? NEVER
15. Do all stars go through a supernova phase? NO
16. Some believe that heavier elements were formed by exploding supernovas. If this is the case, the spectra of the oldest stars that did not have time to go through a supernova phase should only show the presence of HYDROGEN, HELIUM, and possibly LITHIUM.
17. Out of all the stars whose spectra have ever been examined, how many have a spectrum that shows only the presence of these elements? FEW or NONE.
18. We have to appeal to an UNKNOWN process, whether natural or non-natural, to explain the existence of all the elements heavier than lithium.

### CHAPTER 3 REVIEW QUESTIONS ANSWER KEY

1. The idea that life could have arisen from non-living chemicals is called **ABIOTIC**.
2. Give the symbols of the six elements that are essential for any known type of life to exist.  
**C H N O P S**
3. The Oparin-Haldane Hypothesis said that the early earth must have had an atmosphere that furnished four of these six elements. What were the gases used in Miller's experiment designed to test this hypothesis? **METHANE** (CH<sub>4</sub>), **AMMONIA** (NH<sub>3</sub>), water vapor (**H<sub>2</sub>O**), and H<sub>2</sub> (**HYDROGEN**).
4. What elements essential to life were missing from the experiment? **SULFUR** and **PHOSPHORUS**.
5. What very common element has been excluded from origin-of-life experiments?  
**OXYGEN**
6. Does geology indicate that there was zero oxygen in the early atmosphere? **NO**
7. Where have traces of the primordial soup been found? **NOWHERE**
8. Why are living things able to overcome the reactivity of oxygen so as to produce useful results instead of garbage compounds? **DNA CONTAINS THE INFORMATION TO ALLOW THE PROPER REACTIONS TO OCCUR DESPITE THE PRESENCE OF OXYGEN.**
9. If there were no oxygen and thus no ozone layer in the atmosphere, what would happen to single celled carbon-based life forms such as bacteria? **THEY WOULD BE KILLED BY UV RADIATION IN A MATTER OF SECONDS.**
10. What trapping mechanisms have been identified in nature capable of protecting stages such as amino acids and proteins considered intermediate on the way to becoming alive ?  
**NONE ARE KNOWN**
11. What is the source of most fixated nitrogen in the atmosphere? **BACTERIA**
12. Would this source have existed before anything became alive? **NO, BECAUSE BACTERIA ARE ALIVE THEMSELVES**
13. One of the main problems with the origin of cells is that the **PROBABILITY** of them having all left-handed amino acids and right-handed sugars by random chance is essentially zero.
14. When a great many positively and negatively charged materials are randomly mixed together, there are a great many interfering **CROSS REACTIONS**.
15. If amino acids were able to link up into proteins and come alive, some sort of information storage system such as DNA would be needed in order for it to **REPRODUCE**.
16. Describe the interdependence between DNA and enzymes. **DNA IS NEEDED TO MAKE ENZYMES, AND ENZYMES ARE NEEDED TO MAKE DNA.**
18. What determines the location and construction of the ion channels / gateways through the cell membrane? **INFORMATION (CODING) IN THE DNA**

19. What would happen to the cell if there were no gateways/ion channels through the membrane around it? **\_\_RAW MATERIALS NEEDED FOR REPRODUCTION COULD NOT GET IN. THE CELL WOULD DIE.** \_\_\_\_\_
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20. What crucial substance are scientists referring to when they talk about the “Goldilocks zone” in reference to suspected planets outside the solar system? **\_\_LIQUID WATER (NOT TOO COLD, NOT TOO HOT, BUT JUST RIGHT.)** \_\_\_\_\_
21. Why is it so important that this substance be available in the liquid phase? **\_\_IT IS NEEDED TO CARRY IN NUTRIENTS AND CARRY OUT WASTES.** \_\_\_\_\_
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22. From a Christian perspective: If there is intelligent life in space, what would this imply concerning Jesus coming to earth to die for our sins? **\_\_JESUS IS CALLED THE “LAST ADAM.” HE CAME TO EARTH TO DIE ONCE AND FOR ALL FOR OUR SINS. IF OTHER BEINGS IN OUTER SPACE ALSO SINNED, EITHER JESUS WOULD HAVE TO GO DIE ON THOSE PLANETS TOO, OR ELSE GOD WOULD BE TREATING THOSE BEINGS UNFAIRLY BY NEVER GIVING THEM THE CHANCE TO BE REDEEMED.** \_\_\_\_\_

## CHAPTER 4 REVIEW QUESTIONS ANSWER KEY

1. According to creation (initial complexity) the first representatives of every “kind” had **MORE** genetic information than any one member of the kind has today.
2. According to evolution (initial disorganization) the first identifiable representatives of each major type (e.g., dogs and cats) had **LESS** genetic information than any one member of the kind has today.
3. Though most mutations are known to be harmful, there would have had to be a large number of **BENEFICIAL** mutations to add genetic information to each evolving line.
4. In every known case where mutations have conveyed a benefit to individuals, what effect have they had on the species? **HARMED THE SPECIES**
5. What sort of evolutionary pattern is there in the number of base pairs in the DNA of organisms considered simplest such as bacteria, as compared to those considered higher that are believed to have evolved from them? **NO PATTERN**
6. How many cases are known where duplication of genes or chromosomes are known to have benefited a species? \_\_\_\_\_
7. What is the difference between mitosis and meiosis? **MITOSIS - CELL MAKES A COPY OF ITSELF.**  
**MEIOSIS - TWO PARENTS EACH FURNISH HALF THE DNA OF THE NEW CELL.**
8. In general, what do enzymes do that enables living things to survive? **THEY SPEED UP CHEMICAL REACTIONS SO THEY HAPPEN MILLIONS OR BILLIONS OF TIMES FASTER THAN THEY WOULD ON THEIR OWN.**
9. Because cytosine and guanine as well as adenine and thymine match up on DNA due to their matching numbers of hydrogen bonding sites, the rate of insertion errors is only about one in **100,000**.
10. After the step of proofreading exonuclease has corrected many mismatches between A/T and C/G, the frequency of errors is reduced to about one in **10 MILLION**.
11. After DNA polymerases finish the process of error correcting, the rate of copying errors is reduced to about one in **10 BILLION**.
12. Does the error correcting mechanism tend to cause or prevent evolution at the cellular level? **PREVENT**
13. Those who reject the possibility that the error correcting mechanism is the result of design must believe that the error correcting mechanism is the result of **ERRORS** that were not **CORRECTED**.
14. If sexual reproduction is the result of errors slipping through the correction mechanisms, each evolving type would have had to have a male and female who acquired mostly identical mutations, but also a great many **COMPLEMENTARY** mutations so that their reproductive systems could continue to work together.
15. According to Initial Complexity, it would make sense for the more complex organisms to be made of the same materials as the less complex ones so they could use them as **FOOD**.

16. When some part of the cell needs a specific protein, the first step is to send some sort of chemical signal (e.g., a hormone) to the **DNA**.
17. Next, the relevant part of the DNA strand has to temporarily **UNWIND**.
18. Enzymes known as RNA polymerases assemble **MESSENGER** RNA.
19. The mRNA attaches to **RIBOSOMES** which are fastened to the endoplasmic reticulum, where protein manufacturing is actually done.
20. The type of RNA that brings each correct amino acid into its proper place on the newly forming protein strand is called **TRANSFER** RNA, or **t** RNA.
21. Each tRNA molecule contains three nucleotides (called a **TRIPLET** (or codon) and temporarily attaches to a group of three complementary nucleotides on the mRNA.
22. Once each tRNA molecule has brought and released a specific amino acid, it is free to be **RECYCLED**.
23. The nucleotides A, C, G, and T on DNA can combine into **64** distinct triplets or codons, but DNA only codes for how many specific amino acids used in the proteins of every known living thing? **20**
24. The combinations of A, C, G, and T that code for specific amino acids are commonly known as the **GENETIC** code.
25. Several triplets can code for the same acid. This allows DNA to be read from **BOTH** directions with the same results.
26. From organisms that are considered the simplest to those that are considered the most advanced, what difference is there in the way the genetic code and the protein manufacturing system work? There is **NO** **DIFFERENCE**.



## CHAPTER 5 REVIEW QUESTIONS ANSWER KEY

1. Does an object necessarily have to be any particular age to be a fossil? NO
2. The ability to BREED with each other defines whether two organisms belong to the same genus.
3. If life began in a complex condition (Initial Complexity), how many of the higher taxa such as kingdoms, phyla, and classes would have been present from the beginning of life? ALL or MANY.
4. According to Initial Complexity, how would the number of higher taxa have changed through time? It would have DECREASED DUE TO EXTINCTION.
5. If life began in a disorganized condition (Initial Disorganization), how many of the higher taxa such as kingdoms, phyla, and classes would have been present from the beginning of life? Only ONE.
6. According to Initial Disorganization, how would the number of higher taxa have changed through time? It would have INCREASED DUE TO EVOLUTION OF NEW TYPES.
7. The geologic time scale as seen in textbooks is based on the assumption that strata represent TIME PERIODS.
8. Where is the most complete section of the geologic column in the world found? The GRAND CANYON.
9. Most of the names of strata in the Paleozoic and Mesozoic were based on the PLACE/LOCATION where the suite of fossils were first identified.
10. Darwin said that the fossil record was the most obvious and serious OBJECTION to his theory of evolution.
11. In the 160 or more years since Darwin published the *Origin of Species*, the fossils have been classified into about 250,000 species.
12. If evolution (Initial Disorganization) is correct, there should be many more fossil TRANSITIONS than terminal (final) types.
13. If Initial Complexity is correct, there should be VERY FEW types of fossils that could be claimed to be transitional.
14. What is the principal argument against Neo-Darwinism? FOSSILS CLAIMED TO BE TRANSITIONS ARE EXTREMELY RARE.
15. Give an example showing that Pre-Cambrian sediments were capable of preserving soft bodied invertebrates. FOSSIL JELLYFISH
16. How does Punctuated Equilibria explain the rarity of fossils claimed to be transitional? EVOLUTION HAPPENED IN SUDDEN JUMPS THAT WERE TOO RAPID FOR FOSSILS TO FORM ON A SCALE LARGE ENOUGH FOR THEM TO BE EASILY FOUND.
17. How does Initial Complexity explain the rarity of fossils claimed to be transitional? THEY HAVE NOT BEEN FOUND BECAUSE THEY NEVER EXISTED.
18. In general, rock strata are identified according to the groups or SUITES of fossils they contain.

19. What is uniformitarianism? THE UNTESTABLE DOCTRINE THAT PRESENT PROCESSES AT PRESENT RATES ARE RESPONSIBLE FOR THE EARTH'S ENTIRE GEOLOGIC RECORD. OFTEN EXPRESSED AS "THE PRESENT IS THE KEY TO THE PAST."
20. How long did it take the initial mudflow at Mt. St. Helens to deposit tens of thousands of thin laminated layers? ONE DAY
21. What event happened later that allowed a network of canyons to be eroded in a single afternoon? A SECOND MUDFLOW SEVERAL YEARS LATER BROKE THROUGH WEAK SPOTS IN THE FIRST ONE TO CARVE THE CANYONS ON THE TOUTLE RIVER.
22. Would the 700 foot deep "Step Canyon" at Mt. St. Helens normally be expected to form in a short or long time? LONG Why? IT GOES THROUGH SOLID GRANITE (HARD ROCK).
23. What is the most common evolutionary scenario for how a dead animal would turn into a fossil? AN ANIMAL DIES NEXT TO A LAKE OR STREAM AND FALLS IN. IT IS COVERED BY SEDIMENT. OVER MILLIONS OF YEARS IT TURNS INTO A FOSSIL. IT IS EVENTUALLY EXPOSED BY EROSION.
24. What would have to happen to produce large scale fossil graveyards in this scenario? THOUSANDS OF ANIMALS WOULD HAVE TO DIE AND FALL IN AT THE SAME TIME.
25. What have laboratory experiments shown about the time necessary to turn small bones into mineralized fossils? IT CAN HAPPEN IN JUST A FEW YEARS.
26. How much time have experiments required to turn cow manure into crude oil? AS LITTLE AS 20 MINUTES.
27. Since fossils were formed before humans began to write historical records, explain why they are not evidence for either creation or evolution. EVIDENCE MUST BE INTERPRETED. BOTH SIDES USE THE SAME EVIDENCE, BUT EACH INTERPRET IT ACCORDING TO OUR PRESUPPOSITIONS.
28. Initial Complexity (creation) says the suites of fossils are best interpreted as ecological communities or BIOMES similar to those in the world today.
29. Initial Disorganization (evolution) says the suites of fossils represent TIME PERIODS.
30. According to the most common evolutionary scenario (the Oparin-Haldane Hypothesis) the oldest living things would have come to life at or near SEA LEVEL.
31. The Pre-Cambrian fossils supposed to be oldest are believed to have lived at the bottom of the OCEAN.
32. Creation leads us to expect that the first living things appeared SUDDENLY.
33. Evolution leads us to believe that they developed GRADUALLY.
34. Creation leads us to believe that fossils should show a RESISTANCE to basic change (stasis) from lower to higher strata.

35. Evolution leads us to believe that fossils should gradually and CONTINUALLY change from lower to higher strata.
36. The Punctuated Equilibria model of evolution was proposed because of the EXTREME RARITY OF PROPOSED TRANSITIONAL FOSSILS.
37. The Ediacaran Fauna (animals) are COMPLEX invertebrates.
38. What known connections are there between the Ediacaran animals and those of the Cambrian? NONE ARE KNOWN
39. The common term for the sudden appearance of thousands of types of fossils in the Cambrian is the Cambrian EXPLOSION.
40. How many types of fossils have been proposed as possible transitions from reptiles of the Triassic to the first mammals? ONE (MORGANUCODON)
41. How many types of fossils have been proposed as transitions between the five Mesozoic orders of mammals? NONE

## CHAPTER 6 REVIEW QUESTIONS ANSWER KEY

1. Cladograms are based on the assumption that all the different types of animals and plants are the result of EVOLUTION.
2. How many proposed transitional fossils are required in order to produce a cladogram? NONE
3. What is the lowest geologic stratum known to contain fossil amphibians? DEVONIAN
4. Which Devonian fish looked more like an amphibian than any other fish did? EUSTHENOPTERON
5. Which Devonian amphibian looked more like a fish than any other amphibian did? ICHTHYOSTEGA
6. What is the most common scenario for how ancient fish might have evolved into amphibians? THERE WERE PERIODIC DROUGHTS. FISH THAT HAD STRONGER FINS USED THEM TO SLITHER FROM ONE BODY OF WATER TO THE NEXT. THOSE ABLE TO BREATHE AIR SURVIVED, BUT THOSE THAT COULD NOT DIED. EVENTUALLY, THE FINS DEVELOPED INTO LEGS.
7. According to our present understanding of genetics, why are features that are enhanced or diminished due to use and disuse of body parts not passed on to the next generation? THERE IS NO CHANGE IN THE DNA SO THEY ARE NOT PASSED ON
8. What type of fish formerly thought to be extinct is the most commonly proposed as a possible ancestor of amphibians? COELACANTHS
9. Features of coelacanths that make them unlikely ancestors of amphibians:  
At what depth do they live? DEEP OCEAN - HUNDREDS OF FEET DOWN  
Do they ever use their lung-like swim bladders for breathing? NO - ONLY FOR BUOYANCY  
Do they ever use their fins for walking on the ocean bottom? NO - ONLY FOR MANEUVERING
10. What type of *shallow water* fish have been proposed as possible ancestors of amphibians? LUNGFISH
11. The information in DNA determines the physical structures of every known living creature.
12. Almost all vertebrates begin their development with a flexible notochord. With very few exceptions, this develops into a bony segmented spine. Two exceptions relevant to the proposed evolution of amphibians never develop a segmented spine but maintain a flexible notochord throughout their lives. What are these exceptions? COELACANTHS and LUNGFISH.
13. In every known amphibian that has legs, the legs are attached to the backbone by means of a PELVIC GIRDLE.
14. Do any known fish, living or extinct, have a pelvic girdle? NO

15. In amphibians with forelimbs, the pectoral girdle is attached to the backbone so that they have necks. Do any known fish have a neck? NO
  16. Amphibians propel themselves primarily with their LEGS. Fish propel themselves with their BODY and TAIL.
  17. Besides developing legs instead of fins, evolving amphibians would also need much stronger MUSCLES to support their weight if they crawled out onto land.
  18. We have never observed ancient fish breed, but living coelacanths and lungfish fertilize their eggs INTERNALLY.
  19. Every known amphibian except those without legs fertilizes EXTERNALLY. Their ancient ancestors would have had to acquire mutations in their DNA to switch from internal to external fertilization.
  20. Most amphibians (except newts) undergo metamorphosis. Do living lungfish or coelacanths go through metamorphosis? NO
  21. Do the fossils of coelacanths or lungfish give any indication that they went through metamorphosis? NO
  22. Does our present understanding of biology indicate that the information in the newly evolving DNA of the first amphibians could have been added as the result of fish slithering across land in response to droughts? NO
  23. *Tiktaalik* and *Panderichthys* are commonly proposed as transitions from fish to amphibians. How many specimens are known with a complete backbone? NONE
  24. According to standard geologic dating, *Tiktaalik* is dated at 383 million years ago (MA). Fossilized tracks of tetrapods (four-limbed creatures) dated as far back as 395 MA have been identified in multiple places around the world. How is this a problem for the evolution of amphibians? **\_\_THERE ARE NO TETRAPOD FISH. THE TRACKS HAD TO BE MADE BY AMPHIBIANS THAT LIVED 12 MILLION YEARS BEFORE TIKTAALIK.**
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25. How many other orders of Paleozoic amphibians are known besides labyrinthodonts such as the ichthyostegids? SIX How many modern orders are known? THREE
  26. Rhachitomous vertebrae (multi-part centrum) are considered more advanced than lepospondylous (one-part centrum). Which type was present in the fossils of the amphibians supposed to be earliest, which would be expected to be more primitive? RHACHITOMOUS
  27. Which fossils show a transition between lepospondylous and rhachitomous vertebrae? NONE
  28. Modern amphibians are dated hundreds of millions of years after those that had rhachitomous vertebrae and are supposed to be the oldest. What type vertebrae do modern amphibians have? LEPOSPONDYLOUS

**AMPHIBIANS TO REPTILES.**

29. It is difficult to tell the difference between the *skeletons* of adult amphibian and reptiles. What is the difference in their skin?

Amphibians: **\_DO NOT HAVE SCALES, BUT MANY HAVE BUMPY SKIN. NEED TO STAY NEAR WATER TO PREVENT SKIN FROM DRYING OUT. (EVEN TOADS HAVE GLANDS TO KEEP THEIR SKIN MOIST.)** \_\_\_\_\_

Reptiles: **\_DRY, SCALY SKIN. DO NOT NEED TO LIVE NEAR WATER.** \_\_\_\_\_

30. What is the obvious difference between the changes that newly hatched amphibians go through on their way to adulthood as compared to reptiles?

Amphibians compared to adults: **\_DRASTIC CHANGE FROM EMBRYOS (E.G., TADPOLES) TO ADULTS.** \_\_\_\_\_

They go through **\_METAMORPHOSIS** \_\_\_\_\_ before maturing into adults.

Reptiles compared to adults: **\_NEWLY HATCHED REPTILES ARE A MINIATURE VERSION OF ADULTS.** \_\_\_\_\_

The only thing reptiles do that could be considered a form of metamorphosis is that they shed their **\_SKIN** \_\_\_\_\_ as they grow larger. However, they do not change shape.

31. How do reptiles fertilize their eggs? **\_INTERNALLY** \_\_\_\_\_

32. How do all amphibians except caecilians (legless forms) fertilize their eggs?  
**\_EXTERNALLY** \_\_\_\_\_

33. Describe the difference in eggs between amphibians and reptiles.  
Amphibians: **\_CLEAR GELATINOUS EGGS WITH ONLY A FEW DIVISIONS (DOMAINS)** \_\_\_\_\_

Reptiles: **\_HARD OR LEATHERY SHELLS WITH OVER A DOZEN DIVISIONS INCLUDING THE AMNIOTIC SAC FROM WHICH THE EGG TYPE DERIVES ITS NAME** \_\_\_\_\_

34. How does the number of divisions in the amphibian egg compare to the amniotic egg of reptiles, mammals, and birds? **\_\_\_\_ ONLY A FEW DIVISIONS IN AMPHIBIAN EGG COMPARED TO OVER A DOZEN DIVISIONS IN AMNIOTIC EGG** \_\_\_\_\_

35. Referring to DNA, explain why it would be a biological problem for a female amphibian to begin laying amniotic eggs. **\_THE DIFFERENT DIVISIONS IN THE EGG EACH HAVE THEIR OWN FUNCTION, SPECIFIED BY THE INFORMATION IN DNA. A SINGLE FEMALE WOULD HAVE TO UNDERGO A LARGE NUMBER OF BENEFICIAL MUTATIONS ALL AT ONCE (ONLY ONE GENERATION) TO BE ABLE TO PRODUCE FUNCTIONAL AMNIOTIC EGGS.** \_\_\_\_\_

36. What else would be required for the first reptiles to evolve from amphibian egg laying ancestors?  
**\_\_ REPTILES CANNOT FERTILIZE AMPHIBIAN EGGS AND VICE VERSA. A MALE HATCHING AT THE SAME TIME AND PLACE AS THE SINGLE FEMALE LAYING THE NEW TYPE OF EGG WOULD HAVE TO ACQUIRE A LARGE NUMBER OF BENEFICIAL MUTATIONS TO BE ABLE TO FERTILIZE THE NEW EGGS. HE WOULD ALSO HAVE TO ACQUIRE THE INSTINCT TO PERFORM INTERNAL FERTILIZATION FOR THE FIRST TIME.** \_\_\_\_\_
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37. What is the assigned age of *Seymouria*, supposed to be the ancestor of the reptile *Diadectes*?  
**\_\_ 280-270** \_\_\_\_\_ MA
37. What is the assigned age of *Diadectes*? **\_\_ 290** \_\_\_\_\_ MA
38. What is the assigned age of *Hylonomus*, said to be the earliest undisputed reptile?  
**\_\_ 315** \_\_\_\_\_ MA
39. How are these ages difficult to reconcile with the concept of evolution from amphibians to reptiles? **\_\_ THE AMPHIBIAN SEYMOURIA, SUPPOSED TO BE THE ANCESTOR OF THE REPTILE DIADECTES, APPEARS 10 MILLION YEARS AFTER ITS SUPPOSED DESCENDANT.** \_\_\_\_\_  
**\_\_ HYLONOMUS, AN UNDISPUTED REPTILE, APPEARS 25 MILLION YEARS BEFORE ITS SUPPOSED AMPHIBIAN ANCESTOR SEYMOURIA.** \_\_\_\_\_
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## CHAPTER 7 REVIEW QUESTIONS ANSWER KEY

1. What is the most reliable body structure to show whether a fossil was a reptile or a mammal?  
\_\_\_ **THE JAW** \_\_\_\_\_
2. What body structure shows us which of the two main types of dinosaur an animal was? \_\_\_\_\_  
\_\_\_ **THE PELVIS (HIPS)** \_\_\_\_\_
3. Cladograms are drawn according to the features the \_\_\_ **ARTIST/AUTHOR** \_\_\_\_\_  
thinks are most significant.
4. Neo-Darwinism says fossils claimed to be transitions are extremely rare because evolution  
occurred too \_\_\_ **SLOWLY** \_\_\_\_\_.  
Punctuated Equilibria says fossils claimed to be transitions are extremely rare because evolution  
occurred too \_\_\_ **RAPIDLY** \_\_\_\_\_.  
Creation says fossils claimed to be transitions are extremely rare because the transitions  
\_\_\_ **NEVER** \_\_\_\_\_ **EXISTED** \_\_\_\_\_.
5. Like mammals, “mammal-like reptiles” (included among synapsids) were animals that had how  
many openings in the skull behind the eyes? \_\_\_ **ONE** \_\_\_\_\_
6. Which type of reptiles is considered more advanced: mammal-like synapsids, or dinosaurs?  
\_\_\_ **MAMMAL-LIKE SYNAPSIDS** \_\_\_\_\_
7. In what strata are the synapsids considered the oldest found? \_\_\_ **PENNSYLVANIAN** \_\_\_\_\_  
and \_\_\_ **PERMIAN** \_\_\_\_\_
8. How does the age assigned to these strata compare to the age assigned to dinosaur bearing strata?  
\_\_\_ **THEY ARE DATED AS OLDER THAN THE DINOSAURS** \_\_\_\_\_
9. How does the age assigned to the supposedly advanced synapsid *Asaphestera* compare to the  
age assigned to the supposedly oldest known reptile, the anapsid *Hylonomus*? \_\_\_ **ABOUT**  
**THE SAME - ABOUT 312-315 MA** \_\_\_\_\_
10. Amphibians are supposed to have come out of the water and evolved legs to replace their fins.  
Ichthyosaurs, sauropterygians, and mosasaurs are supposed to have gone \_\_\_ **BACK** \_\_\_\_\_  
\_\_\_ **INTO** \_\_\_\_\_ **THE** \_\_\_\_\_ **WATER** \_\_\_\_\_ and evolved  
\_\_\_ **FINS** \_\_\_\_\_ to replace their \_\_\_ **LEGS** \_\_\_\_\_.
11. Are marine reptiles considered a transition between fish and reptiles? \_\_\_ **NO** \_\_\_\_\_
12. Are marine reptiles considered dinosaurs? \_\_\_ **NO** \_\_\_\_\_
13. What fossils are considered transitional between land and marine reptiles? \_\_\_ **NONE** \_\_\_\_\_
14. What common ancestors are known for the marine reptiles? \_\_\_ **NONE** \_\_\_\_\_
14. What fossils are considered transitional between land and flying reptiles? \_\_\_ **NONE** \_\_\_\_\_
15. Are flying reptiles considered transitions to birds? \_\_\_ **NO** \_\_\_\_\_
16. The thecodonts are often considered the ancestors of the other archosaurs because there are  
\_\_\_ **NO** \_\_\_ **OTHER** \_\_\_\_\_ **CANDIDATES** \_\_\_\_\_.
17. What type of pelvis did the dinosaurs of Order Saurischia have? \_\_\_\_\_ **LIZARD** \_\_\_\_\_  
\_\_\_ **TYPE** \_\_\_\_\_
18. What type of pelvis did the dinosaurs of Order Ornithischia have? \_\_\_\_\_ **BIRD** \_\_\_\_\_  
\_\_\_ **TYPE** \_\_\_\_\_



19. List the six strata known to contain dinosaur fossils.  
 \_\_\_ **UPPER TRIASSIC** \_\_\_ \_\_\_ **LOWER JURASSIC** \_\_\_  
 \_\_\_ **MIDDLE JURASSIC** \_\_\_ \_\_\_ **UPPER JURASSIC** \_\_\_  
 \_\_\_ **LOWER CRETACEOUS** \_\_\_ \_\_\_ **UPPER CRETACEOUS** \_\_\_
20. Why can we not be sure if two dinosaur fossils belonged to the same genus?  
 \_\_\_ **GENUS IS DEFINED BY ABILITY TO BREED. WE CANNOT DO BREEDING EXPERIMENTS ON FOSSILS.** \_\_\_
21. Since fossils of dinosaurs are usually fragmentary, it is possible that some of the names assigned to dinosaurs are \_\_\_ **DUPLICATES** \_\_\_.
22. What is one of the main factors that limits the size to which modern reptiles can grow? \_\_\_ **LEGS ARE SPREAD OUT TO THE SIDE. IF THE ANIMAL GETS TOO LARGE IT CANNOT MOVE.** \_\_\_
23. Among the possible hundreds of types of dinosaurs in Triassic, Jurassic, and Cretaceous rocks, how many show evolution from one rock layer to another? \_\_\_ **NONE** \_\_\_
24. How does the number of genus names assigned to dinosaurs compare with the number of genus names assigned to birds? \_\_\_ **FEWER DINOSAURS / MORE BIRDS** \_\_\_
25. Is there any indication of evolution (simple to complex) within the living genera of birds? \_\_\_ **NO** \_\_\_
26. Is there any indication of evolution (simple to complex) within the named genera of dinosaurs? \_\_\_ **NO** \_\_\_
27. Why would it be difficult for a large dinosaur to survive and grow if it were warm blooded? \_\_\_ **IT WOULD HAVE A HARD TIME GETTING ENOUGH FOOD DOWN ITS THROAT TO MAINTAIN ITS METABOLISM.** \_\_\_
28. Give an example of a living fish \_\_\_ **GREAT WHITE SHARK** \_\_\_ and a reptile \_\_\_ **ARGENTINE BLACK AND WHITE TEGU LIZARD** \_\_\_ that regulate their body temperature rather than matching the temperature of their surroundings.
- QUESTIONS ABOUT DINOSAURS WITH RELIGIOUS IMPLICATIONS.**
29. Evolution says the dinosaurs died off \_\_\_ **MILLIONS** \_\_\_ of years ago. Young earth creation implies that most of them have died in Noah's Flood, \_\_\_ of years ago.
30. Creation allows for the possibility of \_\_\_ **ASTEROID** \_\_\_ impacts as a contributing factor in extinction of the dinosaurs.
31. The element iridium found in Cretaceous rocks is also known to occur naturally in the eruptions of \_\_\_ **VOLCANOES** \_\_\_.
32. Which animal in the book of Job is thought by some to possibly be a sauropod dinosaur? \_\_\_ **BEHEMOTH** \_\_\_
33. What type of living animal defends itself by using chemical reactions to blast a boiling hot liquid out of swiveling tubes? The \_\_\_ **BOMBARDIER BEETLE** \_\_\_ (**BRACHINUS TSCHERNIKHI**) \_\_\_
34. Old Bible translations use the word "unicorn." What does the word mean? \_\_\_ **"ONE HORN"** \_\_\_

35. What does the presence of mosaics resembling ceratopsian dinosaurs in Zippori, Israel and carvings resembling stegosaurids at the Ta Promh Temple in Cambodia imply about the extinction of dinosaurs? **\_\_ THE FACT THAT SOMEBODY SAW THEM AND MADE DRAWINGS AND CARVINGS IMPLIES THAT THEY LIVED TO WITHIN HUMAN TIMES.**\_\_\_\_\_
36. Using Biblical dimensions, how would Noah’s Ark compare to a railroad boxcar? **\_\_ ABOUT AS MUCH CAPACITY AS 522 BOXCARS**\_\_\_\_\_
37. Since a Biblical “kind” can include multiple genera, how many animals would be required in order for two of every kind to go on board the Ark? **\_\_ NO MORE THAN A FEW TENS OF THOUSANDS**\_\_\_\_\_
38. All but about two dozen genera of dinosaurs are believed to have eaten **\_\_ PLANTS**\_\_\_\_\_ rather than meat.
39. Why would a large dinosaur not have been able to run very fast? **\_\_ TOO MUCH IMPACT ON ITS LEG BONES. THEY WOULD HAVE BROKEN.**\_\_\_\_\_
40. Which types of dinosaurs show evolution from one stratum to the next? **\_\_ NONE**\_\_\_\_\_
41. Which type of pelvis is found in the order of dinosaurs that is supposed to be the ancestor of *birds*? **\_\_ LIZARD**\_\_\_\_\_ type
42. In reptiles and mammals, gases are exchanged with the bloodstream in **\_\_ SACS**\_\_\_\_\_ inside the lungs.
43. In birds, gases are exchanged with the bloodstream in air **\_\_ CAPILLARIES**\_\_\_\_\_ that extend deep throughout the body, even the brain.
44. In order to be able to individually control their feathers, birds have a more highly developed cerebellum and cerebral hemisphere in the **\_\_ BRAIN**\_\_\_\_\_ than any other known animals.
45. At least **\_\_ 12**\_\_\_\_\_ different types of feathers are known.
46. How does the date assigned to the rocks in which *Protoavis* is found compare to the date of *Archaeopteryx*? **\_\_ 75 MILLION YEARS OLDER**\_\_\_\_\_
47. What does this imply about *Archaeopteryx* being the ancestral bird? **\_\_ COULD NOT BE - OCCURS TOO LATE**\_\_\_\_\_
48. How many genera of modern birds are known? **\_\_ OVER 2800**\_\_\_\_\_
49. If evolution is correct, what are some of the groups of living birds that would have to be descended from a common ancestor? **\_\_ OSTRICHES, EAGLES, PENGUINS, HUMMING-BIRDS, DUCKS, VULTURES, WOODPECKERS, MANY OTHERS.**\_\_\_\_\_
50. What intermediate forms are known leading to these groups from a common ancestor, or leading from one major type to another? **\_\_ NONE**\_\_\_\_\_
49. What do dinosaur fossils show about evolution? **\_\_ NOTHING**\_\_\_\_\_

## CHAPTER 8 REVIEW QUESTIONS ANSWER KEY

1. Creation postulates that similarities in organisms not considered closely related are due to common **DESIGN**.
2. Evolution postulates that similarities in organisms not considered closely related are due to common **ANCESTRY** or parallel random mutations.
3. In paleontology, the prefix *anthropo* indicates that a fossil is similar to **HUMANS**.
4. What do monkeys have that apes do not? **TAILS**.
5. The syllable *sim* indicates that a fossil is similar to **MONKEYS**.
6. The prefix or suffix *pithecus* indicates that a fossil is similar to **APES**.
7. According to evolution, the error correcting mechanism in cells was not present in the first living things but was added later as the result of **ERRORS** that were not corrected.
8. What is the lowest geologic stratum known to contain amphibians? **DEVONIAN**.
9. Which fossil from the Triassic/Jurassic boundary in the Mesozoic is claimed to be the very first mammal? **MORGANUCODON**.
10. What are primates? **MONKEYS, APES, HUMANS, LEMURS, LORISES, AND SIMILAR TYPES**.
11. Which is the lowest layer that contains undisputed primate fossils? **EOCENE**.
12. Which is the lowest layer that contains undisputed human fossils? **PLEISTOCENE**.
13. What are the most obvious differences in reproduction between amphibians and reptiles?  
Eggs: **AMPHIBIAN EGGS ARE SOFT AND GELATINOUS WITH UP TO SIX LAYERS. REPTILE EGGS HAVE A LEATHERY OR HARD SHELL WITH OVER A DOZEN DIVISIONS.**  
Method of fertilization: **AMPHIBIANS USE EXTERNAL FERTILIZATION. REPTILES FERTILIZE INTERNALLY.**
14. What are the four major types of skulls in early reptiles, and how are they classified according to the openings behind the eyes?
  1. **ANAPSID - NO OPENINGS**
  2. **SYNAPSID - ONE OPENING**
  3. **DIAPSID - TWO OPENINGS, ONE ABOVE THE OTHER**
  4. **EURYAPSID - ONE OPENING, NEAR THE TOP OF THE SKULL**
15. What problem is there with the dating of the proposed transitional forms *Seymouria* and *Diadectes* as compared to the dating of the “stem reptiles” such as *Hylonomus* and *Paleothyris*?  
**SEYMOURIA AND DIADECTES ARE DATED TENS OF MILLIONS OF YEARS LATER THAN THE STEM REPTILES SUPPOSED TO BE DESCENDED FROM THEM**

16. Which fossils have been proposed as possible ancestors of the earliest reptiles, the anapsids *Hylonomus* and *Paleothyris*? **\_\_ WESTLOTHIANA AND POSSIBLY SEVERAL OTHER OBSCURE TYPES \_\_**
17. What would be two major problems in the evolution of *Westlothiana* into reptiles?  
**1. \_\_ EGG TYPE UNKNOWN - WOULD HAVE TO CHANGE TO AMNIOTIC. \_\_**  
**2. \_\_ WOULD HAVE TO EVOLVE REPTILIAN (RHACHITOMOUS) VERTEBRAE INSTEAD OF AMPHIBIAN (LEPOSPONDYLOUS). \_\_**
18. What types of fossils have been proposed as transitional forms connecting the anapsids with other types of reptiles? **\_\_ NONE \_\_**
19. Give three possible explanations for the missing transitions between ancient types of reptiles.  
**1. \_\_ YOUNG EARTH CREATION : THE DATING IS WRONG AND THE TRANSITIONS NEVER EXISTED. \_\_**  
**2. \_\_ OLD EARTH CREATION: THE DATING IS RIGHT BUT THE TRANSITIONS NEVER EXISTED. \_\_**  
**3. \_\_ THE TRANSITIONS EXISTED BUT WERE NOT FOSSILIZED. \_\_**
20. What is one of the most obvious changes that would be necessary in the DNA of fish that came out of the water to turn into amphibians? **\_\_ WOULD HAVE HAD TO PRODUCE LEGS INSTEAD OF FINS \_\_**
20. What are some of the changes that would be necessary in the DNA of reptiles that went back into the sea? **\_\_ LOSE LEGS AS THEY TURN BACK INTO FINS, LOSE STRENGTH FORMERLY NEEDED TO SUPPORT BODY ON LAND \_\_**
22. “Mammal-like reptiles” are now known as non-mammalian synapsids or **\_\_ PELYCOSAURS \_\_**.
23. What fossil ancestors have been proposed for pelycosaurs? **\_\_ NONE ARE KNOWN \_\_**
24. What fossils have been proposed as transitions from pelycosaurs to mammals? **\_\_ NONE ARE KNOWN \_\_**
25. List several features found in mammals but not in reptiles. **\_\_ MATERNAL BEHAVIOR (MILK), WARM BLOODEDNESS, HAIR, DIFFERENT JAW STRUCTURE, DIFFERENT EAR STRUCTURE, DIAPHRAGM FOR BREATHING \_\_**
26. The two living types of monotremes are **\_\_ PLATYPUS \_\_** and **\_\_ ECHIDNA \_\_** (spiny anteater).
27. What is the most obvious feature found only among monotremes out of all the mammals? **\_\_ THEY LAY EGGS \_\_**
28. Why are marsupials not considered placentals? **\_\_ THEY ONLY RELY ON A PLACENTA FOR A VERY SHORT TIME, BETWEEN CONCEPTION AND BIRTH \_\_**

29. What would be required in order for some common ancestor to all the mammals to diversify into at least 32 different orders? **\_\_ THERE WOULD HAVE TO BE THOUSANDS OF BENEFICIAL MUTATIONS THAT SLIPPED THROUGH THE ERROR CORRECTING MECHANISM IN THE CELL**\_\_\_\_\_
30. Which two bones in the lower jaw and skull of adult mammals interact to form the jaw joint? **\_\_ DENTARY**\_\_\_\_\_ and **\_\_ SQUAMOSAL**\_\_\_\_\_
31. What are the three bones in the middle ear of all adult mammals?  
 (1) **\_\_ MALLEUS HAMMER**\_\_\_\_\_,  
 (2) **\_\_ INCUS (ANVIL)**, \_\_\_\_\_,  
 3) **\_\_ STAPES STIRRUP**\_\_\_\_\_
32. Which two major types of mammals are born or hatched without these bones being fully developed? **\_\_ MARSUPIALS**\_\_\_\_\_ and **\_\_ MONOTREMES**\_\_\_\_\_
33. What structure is present in the hearing mechanism of every known mammal but is not present in the hearing mechanism of any known reptile? **\_\_ ORGAN**\_\_\_\_\_ of **\_\_ CORTI**\_\_\_\_\_
34. What are the three bones in the lower jaw of reptiles? (1) **\_\_ DENTARY**\_\_\_\_\_,  
 (2) **\_\_ ANGULAR**\_\_\_\_\_, (3) **\_\_ ARTICULAR**\_\_\_\_\_
35. The jaw joint of reptiles occurs where the articular interacts with the **\_\_ QUADRATE**\_\_\_\_\_
36. What is the only bone in the middle ear of reptiles? **\_\_ COLUMELLA**\_\_\_\_\_
37. In order for reptiles to evolve into mammals, the transitional stage would have required **\_\_ TWO**\_\_\_\_\_ bones in both the middle ear and in the jaw.
38. If there were a transition between reptiles and mammals, the angular and articular would have had to move across the **\_\_ EARDRUM**\_\_\_\_\_ to develop into the malleus and incus.
39. The Organ of Corti, one of the most mechanically complex structures in mammals, would have had to evolve on transitional steps. What fossils have been proposed to show its gradual development? **\_\_ NONE ARE KNOWN**\_\_\_\_\_
40. In the course of evolving from the reptilian to the mammalian jaw, some intermediate form would probably have had a **\_\_ DOUBLE**\_\_\_\_\_ jaw articulation.
41. Which group of fossils has been proposed to show such a double jaw articulation?  
**\_\_ MORGANUCODONTS**\_\_\_\_\_ (named for the genus *Morganucodon*).
42. The great majority of fossils of the morganucodonts are what body parts?  
**\_\_ TEETH**\_\_\_\_\_
43. How many complete body fossils are known for *Morganucodon*? **\_\_ NONE**\_\_\_\_\_
44. How many skulls are known for *Kuehnotherium*? **\_\_ NONE**\_\_\_\_\_
45. How many complete skulls are known for *Morganucodon*? **\_\_ NONE**\_\_\_\_\_
46. Monotremes are the only type of mammal known to lay **\_\_ EGGS**\_\_\_\_\_.
47. During embryonic development, the monotremes goes through a transitional stage with a double **\_\_ JAW**\_\_\_\_\_ articulation that disappears in adulthood.
48. In one of the monotremes, the **\_\_ PLATYPUS**\_\_\_\_\_, embryonic development continues for up to 120 days (4 months) after after hatching.
- 49 Meanwhile, the **\_\_ BONES**\_\_\_\_\_ in the platypus move from the lower jaw to the middle ear.

50. Both marsupials and monotremes temporarily use the middle ear bones to support the articulation of the jaw until it is complete in the ADULT stage.
51. We cannot tell at what age the individuals whose jaw and middle ear bones are used for reconstructions were BURIED (FOSSILIZED), whether adult or juvenile.
52. There are two possibilities:  
(1) The morganucodonts were really TRANSITIONS from reptiles to mammals,  
or (2) They were some extinct type with many characteristics found in living MONOTREMES.
53. According to the geologic time scale, other proposed transitions such as *Liaconodon* and *Hadrocodium* appear MILLIONS of years too late to be the ancestors of the earliest mammals.

## CHAPTER 9 REVIEW QUESTIONS

1. The only mechanism known that would cause one type of organism to evolve into another would be MUTATIONS in DNA.
2. How many mutations are known to increase the amount of genetic information in DNA? NONE
3. The only way we could be sure that two fossils belonged to the same genus would be if we could do BREEDING experiments.
4. Out of perhaps billions of primates that have ever lived, their fossils number only in the THOUSANDS
5. The evolutionary explanation for the scarcity of primate fossils is that they were formed by ACCIDENT.
6. The young-earth creation explanation for the scarcity of primate fossils is that most were formed by a WORLDWIDE FLOOD

### RECAP OF PROPOSED ANCESTORS OF LOWEST PRIMATES.

7. What is the lowest geologic layer that contains undisputed primate fossils? EOCENE
  8. In which geologic strata have all the *Morganucodon* fossils found so far been located? TRIASSIC and JURASSIC
  8. What structure is found in the inner ear of every mammal but in no reptiles? The ORGAN of CORTI.
  9. Why are the known *Morganucodon* fossils not sufficient to conclusively show whether or not it was a mammal? THERE ARE VERY FEW FOSSILS. NO COMPLETE SKULLS SHOWING THE JAW JOINT, MIDDLE EAR, OR ORGAN OF CORTI.
  10. What are the types of *monotremes* known in the world today? PLATYPUSES and four types of ECHIDNAS (SPINY ANTEATERS).
  11. Which major type of *placental* mammal is found in the lowest geologic strata? RODENTS
  12. Are any *multituberculates* known in the world today? NO
- ### PALEOCENE (EARLY CENOZOIC) MAMMALS
14. Which geologic layer is the lowest known to contain *plesiadapiformes*? PALEOCENE
  15. Rather than primates, plesiadapiform fossils are generally accepted as being closer to rodents or Scandentians such as tree SHREWS or Dermopterans such as COLUGOS (“flying lemurs,” which are not lemurs and do not fly).
  16. Rather than ancestors of primates, Apatotherians are considered to be a specialized SISTER taxon of plesiadapiformes
  17. True primates include monkeys, apes, humans, and prosimians. The latter group includes LEMURS, LORISES, and aye-eyes.

18. What is the relative position of the first prosimians on the geologic time scale compared to the groups they are supposed to have evolved from: lagomorphs (rabbits and similar types), dermopterans (colugos), and scandentians (tree shrews)? Prosimians occur in the same or earlier STRATA (LAYER), THE EOCENE
19. How many candidates have been proposed as the common ancestor of primates among the lagomorphs or dermopterans? NONE
20. Tupaiid, lemur, loris, and tarsier fossils all first occur in the EOCENE stratum of the geologic column.
21. What fossil has been proposed as the common ancestor of strepsirrhines (prosimians) and haplorrhines (anthropoids)? NONE
22. How many fossil types have been proposed as the common ancestor (parent taxon) of tarsiers and anthropoids? NONE
23. Eosimiids are not universally accepted as ancestors of other primates because there is so little FOSSIL evidence.
24. Omomyids, adapoids, and eosimiids are generally accepted as SISTER taxa with no known common ancestors.
25. *Cantius* is generally accepted as some sort of prosimian very similar to a LEMUR.  
MEANS OF DISPERSAL ACROSS OPEN WATER.
26. Many creationists believe that animals spread across open water after Noah's Flood by means of floating RAFTS of vegetation. Though evolutionists reject the idea of a worldwide flood, many have also accepted the idea of floating rafts.
- MODERN MONKEYS
27. The two major groups of modern monkeys are CATARRHINES (Old World from Africa, Asia, and Europe) and PLATYRRHINES (New World from South America).
28. What kind of fossils are accepted as showing the transition from prosimians to catarrhines? NONE
29. What kind of fossils are accepted as showing the transition from African to Asian monkeys? NONE
30. How many complete and intact fossil monkeys have been found at the Fayum excavations in Egypt? NONE
31. Which Fayum fossil is called the "oldest creature we know that is in the direct ancestry of man?" AEGYPTOPITHECUS How many complete skeletons do we have of it? NONE
32. For which Kenyan monkey do we have the greatest amount of fossil evidence? VICTORIAPITHECUS
33. The date assigned to *Victoriapithecus* is 15 MILLION years later than the date of the hypothetical Last Common Ancestor (LCA) of apes and Old World monkeys.
34. *Branisella* is considered to be a SISTER taxon of the unknown common ancestor of New World monkeys (Platyrrhines).



35. How much fossil evidence is available for *Perupithecus/Ucayalipithecus*, proposed as a hypothetical common ancestor for the New World monkeys? **\_\_ ONE COMPLETE AND TWO INCOMPLETE UPPER MOLARS AND ONE COMPLETE LOWER MOLAR.**

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DIFFERENCES FROM PROSIMIANS AND TARSIERS TO MONKEYS.

36. What would have had to happen to the DNA of owl monkeys compared to any other type of monkeys to explain the differences in their corneas? **\_\_ IT WOULD HAVE HAD TO BE THE ONLY TYPE OF MONKEY THAT DID NOT EXPERIENCE MUTATIONS CAUSING THE CORNEAS TO BE SMALLER, AS THEY ARE IN ALL OTHER MONKEYS.**

37. What would have had to happen to the DNA of New World monkeys (except marmosets) compared to Old World monkeys to explain the differences in their dental formulas? **\_\_ MARMOSETS WOULD HAVE HAD TO BE THE ONLY TYPE OF NEW WORLD MONKEYS THAT DID NOT EXPERIENCE MUTATIONS CAUSING A CHANGE IN DENTAL FORMULA.**

38. What would have had to happen to the DNA of male New World monkeys (except howler monkeys) compared to Old World monkeys to explain the differences in their color vision? **\_\_ THE MALE HOWLER MONKEYS (NOT THE FEMALES) WOULD HAVE HAD TO BE THE ONLY PLATYRRHINES THAT DID NOT EXPERIENCE MUTATIONS TO CAUSE A CHANGE FROM THREE TO TWO TYPES OF CONES IN COLOR VISION.**

39. Why did *Darwinius* attract so much attention when it was announced? **\_\_ IT IS THE MOST COMPLETE PRIMATE FOSSIL SKELETON KNOWN (THOUGH IT IS NOT CONSIDERED THE OLDEST).**

40. How much fossil evidence is there for *Amphipithecus*? **\_\_ TWO PIECES OF JAWS, TWO TEETH, SEVERAL OTHER FRAGMENTS OF MAXILLAE (LOWER JAWS), AND THE FRONT OF A SKULL.**

41. What type of fossil is widely accepted as the common ancestor for the group supposed to have diversified into monkeys, apes, and humans? **\_\_ NONE**

42. *Apidium* and *Saadanius* are considered **\_\_ SISTER** taxa to the monkeys rather than ancestors.

43. Is the fossil record of primates compatible with Initial Complexity (Creation)? **\_\_ YES**









