

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

1. Creation implies that the universe, earth, and life began in a _____ 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 _____ and _____ earth.
3. Evolution implies that the universe, earth, and life began in a _____ 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?

5. What are the two main variations of evolution as it is believed to have happened to living things?
_____ and _____
6. What does Punctuated Equilibria mean?

7. Creation could be summarized as _____ to _____.
8. Evolution could be summarized as _____ to _____.
9. What characteristics would have to be true of either God or Random Chance?
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
 - f. _____
10. What are four potentially valid ways to know things?
 - a. _____
 - b. _____
 - c. _____
 - d. _____
11. Why is inductive logic called *a posteriori*? _____

12. Why is deductive logic called *a priori*? _____

13. Which kind of logic depends most heavily on presuppositions (also called postulates or axioms) being true? _____
14. Evolution assumes that every natural phenomenon must have a _____ cause.
15. Creation allows for the possibility that some physical phenomena may not have a natural cause but were directly brought into existence by _____.
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 _____ 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 _____ of years old.
18. Every version of evolution denies that there has ever been a worldwide _____.
19. Evolution says that similarities between animals and plants that are not considered closely related must be the result of common _____ 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 _____.
21. Give an example of an area of science that routinely involves searching for indications of design.
- _____
- _____
22. Explain the difference between laws, hypotheses, theories, and models.
- Hypothesis: _____
- Law: _____
- Theory: _____
- Model: _____
- _____
23. Referring to evidence, explain why we can never be certain that we completely right about anything in science. _____
- _____

CHAPTER 2 REVIEW QUESTIONS

1. The concept of creation leads us to believe that the universe began in a _____ complex condition than at present. There should be an overall trend toward _____ complexity and organization.
2. The concept of evolution leads us to believe that the universe began in a _____ complex condition than at present. There should be an overall trend toward _____ complexity and organization.
3. Observations have shown that unless forced to do otherwise, energy tends to flow from _____ to _____ concentration.
4. A system into which energy can enter or from which it can exit is called an _____ system.
5. What conditions must be met in order for entropy to decrease in an open system?
 - a. Supply of _____ energy.
 - b. A _____ 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 _____ to guide the increasing organization in the open system.
 - d. In order for entropy to decrease in the open system, it must _____ at the source of the energy.
6. Why is the formation of ice crystals in an open system not an example of increasing information? _____

7. Both Initial Complexity and Initial Disorganization rest on the belief that matter and energy came into existence as a result of _____ processes, whether natural or non-natural.
8. How does the Second Law of Thermodynamics imply that the universe could not be infinitely old? _____

9. If the universe is four dimensional, what would this imply about gravity pulling it back together into a “Big Crunch”? _____

10. How does the First Law of Thermodynamics conflict with the Steady State Universe model? _____

11. Scientists use the technique of _____ 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 _____ 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? _____
14. How many times has the “Triple Alpha” process that would have been needed to produce carbon in the interior of stars been observed? _____
15. Do all stars go through a supernova phase? _____
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 _____, _____, and possibly _____.
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? _____ or _____.
18. We have to appeal to an _____ process, whether natural or non-natural, to explain the existence of all the elements heavier than lithium.

CHAPTER 3 REVIEW QUESTIONS

1. The idea that life could have arisen from non-living chemicals is called _____.
2. Give the symbols of the six elements that are essential for any known type of life to exist.

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? _____ (CH_4), _____ (NH_3), water vapor (_____), and H_2 (_____).
4. What elements essential to life were missing from the experiment? _____ and _____.
5. What very common element has been excluded from origin-of-life experiments?

6. Does geology indicate that there was zero oxygen in the early atmosphere? _____
7. Where have traces of the primordial soup been found? _____
8. Why are living things able to overcome the reactivity of oxygen so as to produce useful results instead of garbage compounds? _____
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? _____

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? _____

11. What is the source of most fixated nitrogen in the atmosphere? _____
12. Would this source have existed before anything became alive? _____

13. One of the main problems with the origin of cells is that the _____ 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 _____.
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 _____.
16. Describe the interdependence between DNA and enzymes. _____

18. What determines the location and construction of the ion channels / gateways through the cell membrane? _____

19. What would happen to the cell if there were no gateways/ion channels through the membrane around it? _____

20. What crucial substance are scientists referring to when they talk about the “Goldilocks zone” in reference to suspected planets outside the solar system? _____

21. Why is it so important that this substance be available in the liquid phase? _____

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? _____

CHAPTER 4 REVIEW QUESTIONS

1. According to creation (initial complexity) the first representatives of every “kind” had _____ 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 _____ 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 _____ 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? _____
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? _____
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? _____

8. In general, what do enzymes do that enables living things to survive? _____

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 _____.
10. After the step of proofreading exonuclease has corrected many mismatches between A/T and C/G, frequency of errors is reduced to about one in _____.
11. After DNA polymerases finish the process of error correcting, the rate of copying errors is reduced to about one in _____.
12. Does the error correcting mechanism tend to cause or prevent evolution at the cellular level?

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 _____ that were not _____.
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 _____ 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 _____.

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 _____.
17. Next, the relevant part of the DNA strand has to temporarily _____.
18. Enzymes known as RNA polymerases assemble _____ RNA.
19. The mRNA attaches to _____ 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 _____ RNA, or _____ RNA.
21. Each tRNA molecule contains three nucleotides (called a _____ (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 _____.
23. The nucleotides A, C, G, and T on DNA can combine into _____ distinct triplets or codons, but DNA only codes for how many specific amino acids used in the proteins of every known living thing? _____
24. The combinations of A, C, G, and T that code for specific amino acids are commonly known as the _____ code.
25. Several triplets can code for the same acid. This allows DNA to be read from _____ 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 _____.

CHAPTER 5 REVIEW QUESTIONS

1. Does an object necessarily have to be any particular age to be a fossil? _____
2. The ability to _____ 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?
_____ or _____.
4. According to Initial Complexity, how would the number of higher taxa have changed through time? It would have _____
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 _____.
6. According to Initial Disorganization, how would the number of higher taxa have changed through time? It would have _____
7. The geologic time scale as seen in textbooks is based on the assumption that strata represent _____.
8. Where is the most complete section of the geologic column in the world found? The _____.
9. Most of the names of strata in the Paleozoic and Mesozoic were based on the _____ where the suite of fossils were first identified.
10. Darwin said that the fossil record was the most obvious and serious _____ 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 _____ species.
12. If evolution (Initial Disorganization) is correct, there should be many more fossil _____ than terminal (final) types.
13. If Initial Complexity is correct, there should be _____ types of fossils that could be claimed to be transitional.
14. What is the principal argument against Neo-Darwinism? _____
15. Give an example showing that Pre-Cambrian sediments were capable of preserving soft bodied invertebrates. _____
16. How does Punctuated Equilibria explain the rarity of fossils claimed to be transitional? _____

17. How does Initial Complexity explain the rarity of fossils claimed to be transitional? _____

18. In general, rock strata are identified according to the groups or _____ of fossils they contain.

19. What is uniformitarianism? _____

20. How long did it take the initial mudflow at Mt. St/ Helens to deposit tens of thousands of thin laminated layers? _____
21. What event happened later that allowed a network of canyons to be eroded in a single afternoon? _____

22. Would the 700 foot deep “Step Canyon” at Mt. St. Helens normally be expected to form in a short or long time? _____ Why? _____
23. What is the most common evolutionary scenario for how a dead animal would turn into a fossil? _____

24. What would have to happen to produce large scale fossil graveyards in this scenario? _____

25. What have laboratory experiments shown about the time necessary to turn small bones into mineralized fossils? _____
26. How much time have experiments required to turn cow manure into crude oil? _____

27. Since fossils were formed before humans began to write historical records, explain why they are not evidence for either creation or evolution. _____

28. Initial Complexity (creation) says the suites of fossils are best interpreted as ecological communities or _____ similar to those in the world today.
29. Initial Disorganization (evolution) says the suites of fossils represent _____
_____.
30. According to the most common evolutionary scenario (the Oparin-Haldane Hypothesis) the oldest living things would have come to life at or near _____.
31. The Pre-Cambrian fossils supposed to be oldest are believed to have lived at the bottom of the _____.
32. Creation leads us to expect that the first living things appeared _____.
33. Evolution leads us to believe that they developed _____.
34. Creation leads us to believe that fossils should show a _____ to basic change (stasis) from lower to higher strata.

35. Evolution leads us to believe that fossils should gradually and _____ change from lower to higher strata.
36. The Punctuated Equilibria model of evolution was proposed because of the _____
- _____
37. The Ediacaran Fauna (animals) are _____ invertebrates.
38. What known connections are there between the Ediacaran animals and those of the Cambrian.
- _____
39. The common term for the sudden appearance of thousands of types of fossils in the Cambrian is the Cambrian _____.
40. How many types of fossils have been proposed as possible transitions from reptiles of the Triassic to the first mammals? _____
41. How many types of fossils have been proposed as transitions between the five Mesozoic orders of mammals? _____

CHAPTER 6 REVIEW QUESTIONS

1. Cladograms are based on the assumption that all the different types of animals and plants are the result of _____.
2. How many proposed transitional fossils are required in order to produce a cladogram? _____
3. What is the lowest geologic stratum known to contain fossil amphibians? _____
4. Which Devonian fish looked more like an amphibian than any other fish did? _____
5. Which Devonian amphibian looked more like a fish than any other amphibian did? _____
6. What is the most common scenario for how ancient fish might have evolved into amphibians? _____

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? _____
8. What type of fish formerly thought to be extinct is the most commonly proposed as a possible ancestor of amphibians? _____
9. Features of coelacanths that make them unlikely ancestors of amphibians:
At what depth do they live? _____
Do they ever use their lung-like swim bladders for breathing? _____
Do they ever use their fins for walking on the ocean bottom? _____
10. What type of *shallow water* fish have been proposed as possible ancestors of amphibians? _____
11. The information in _____ 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? _____ and _____.
13. In every known amphibian that has legs, the legs are attached to the backbone by means of a _____.
14. Do any known fish, living or extinct, have a pelvic girdle? _____

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? _____
16. Amphibians propel themselves primarily with their _____. Fish propel themselves with their _____ and _____.
17. Besides developing legs instead of fins, evolving amphibians would also need much stronger _____ 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 _____.
19. Since every known amphibian except those without legs fertilizes _____, 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? _____
21. Do the fossils of coelacanths or lungfish give any indication that they went through metamorphosis? _____
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? _____
23. *Tiktaalik* and *Panderichthys* are commonly proposed as transitions from fish to amphibians. How many specimens are known with a complete backbone? _____
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? _____

25. How many other orders of Paleozoic amphibians are known besides labyrinthodonts such as the ichthyostegids? _____ How many modern orders are known? _____
26. Rhachitinous 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? _____
27. Which fossils show a transition between lepospondylous and rhachitinous vertebrae? _____
28. Modern amphibians are dated hundreds of millions of years later than those that had rhachitinous vertebrae and are supposed to be the oldest. What type vertebrae do modern amphibians have? _____

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: _____

Reptiles: _____

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: _____

They go through _____ before maturing into adults.

Reptiles compared to adults: _____

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

31. How do reptiles fertilize their eggs? _____

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

33. Describe the difference in eggs between amphibians and reptiles.

Amphibians: _____

Reptiles: _____

34. How does the number of divisions in the amphibian egg compare to the amniotic egg of reptiles, mammals, and birds? _____

35. Referring to DNA, explain why it would be a biological problem for a female amphibian to begin laying amniotic eggs. _____

36. What else would be required for the first reptiles to evolve from amphibian egg laying ancestors?

37. What is the assigned age of *Seymouria*, supposed to be the ancestor of the reptile *Diadectes*?

_____ MA

37. What is the assigned age of *Diadectes*? _____ MA

38. What is the assigned age of *Hylonomus*, said to be the earliest undisputed reptile?

_____ MA

39. How are these ages difficult to reconcile with the concept of evolution from amphibians to reptiles? _____

CHAPTER 7 REVIEW QUESTIONS

1. What is the most reliable body structure to show whether a fossil was a reptile or a mammal?

2. What body structure shows us which of the two main types of dinosaur an animal was? _____

3. Cladograms are drawn according to the features the _____ thinks are most significant.
4. Neo-Darwinism says fossils claimed to be transitions are extremely rare because evolution occurred too _____.
Punctuated Equilibria says fossils claimed to be transitions are extremely rare because evolution occurred too _____.
Creation says fossils claimed to be transitions are extremely rare because the transitions _____.
5. Like mammals, “mammal-like reptiles” (included among synapsids) were animals that had how many openings in the skull behind the eyes? _____
6. Which type of reptiles is considered more advanced: mammal-like synapsids, or dinosaurs?

7. In what strata are the synapsids considered the oldest found? _____
and _____
8. How does the age assigned to these strata compare to the age assigned to dinosaur bearing strata?

9. How does the age assigned to the supposedly advanced synapsid *Asaphestera* compare to the age assigned to the supposedly oldest known reptile *Hylonomus*? _____

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 _____
_____ and evolved _____ to replace their _____.
11. Are marine reptiles considered a transition between fish and reptiles? _____
12. Are marine reptiles considered dinosaurs? _____
13. What fossils are considered transitional between land and marine reptiles? _____
14. What common ancestors are known for the marine reptiles? _____
14. What fossils are considered transitional between land and flying reptiles? _____
15. Are flying reptiles considered transitions to birds? _____
16. The thecodonts are often considered the ancestors of the other archosaurs because there are _____.
17. What type of pelvis did the dinosaurs of Order Saurischia have? _____

18. What type of pelvis did the dinosaurs of Order Ornithischia have? _____

19. List the six strata known to contain dinosaur fossils.

20. Why can we not be sure if two dinosaur fossils belonged to the same genus?

21. Since fossils of dinosaurs are usually fragmentary, it is possible that some of the names assigned to dinosaurs are _____.

22. What is one of the main factors that limits the size to which modern reptiles can grow? _____

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? _____

24. How does the number of genus names assigned to dinosaurs compare with the number of genus names assigned to birds? _____

25. Is there any indication of evolution (simple to complex) within the living genera of birds? _____

26. Is there any indication of evolution (simple to complex) within the named genera of dinosaurs?

27. Why would it be difficult for a large dinosaur to survive and grow if it were warm blooded? _____

28. Give an example of a living fish _____ and a reptile _____ 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 _____ 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 _____ 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 _____.

32. Which animal in the book of Job is thought by some to possibly be a sauropod dinosaur?

33. What type of living animal defends itself by using chemical reactions to blast a boiling hot liquid out of swiveling tubes? The _____

34. Old Bible translations use the word "unicorn." What does the word mean? _____

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? _____

36. Using Biblical dimensions, how would Noah's Ark compare to a railroad boxcar? _____

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? _____

38. All but about two dozen genera of dinosaurs are believed to have eaten _____ rather than meat.
39. Why would a large dinosaur not have been able to run very fast? _____

40. Which types of dinosaurs show evolution from one stratum to the next? _____
41. Which type of pelvis is found in the order of dinosaurs that is supposed to be the ancestor of birds? _____ type
42. In reptiles and mammals, gases are exchanged with the bloodstream in _____ inside the lungs.
43. In birds, gases are exchanged with the bloodstream in air _____ 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 _____ than any other known animals.
45. At least _____ 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*? _____
47. What does this imply about *Archaeopteryx* being the ancestral bird? _____

48. How many genera of modern birds are known? _____
49. If evolution is correct, what are some of the groups of living birds that would have to be descended from a common ancestor? _____

50. What intermediate forms are known leading to these groups from a common ancestor, or leading from one major type to another? _____
51. What do dinosaur fossils show about evolution? _____

CHAPTER 8 REVIEW QUESTIONS

1. Creation postulates that similarities in organisms not considered closely related are due to common _____.
2. Evolution postulates that similarities in organisms not considered closely related are due to common _____ or parallel random mutations.
3. In paleontology, the prefix *anthropo* indicates that a fossil is similar to _____.
4. What do monkeys have that apes do not? _____
5. The syllable *sim* indicates that a fossil is similar to _____.
6. The prefix or suffix *pithecus* indicates that a fossil is similar to _____.
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 _____ that were not corrected.
8. What is the lowest geologic stratum known to contain amphibians? _____
9. Which fossil from the Triassic/Jurassic boundary in the Mesozoic is claimed to be the very first mammal? _____
10. What types of animals are included in the primates? _____

11. Which is the lowest layer that contains undisputed primate fossils? _____

12. Which is the lowest layer that contains undisputed human fossils? _____

13. What are the most obvious differences in reproduction between amphibians and reptiles?
Eggs: _____

Method of fertilization: _____

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. _____
 2. _____
 3. _____
 4. _____
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*?

16. Which fossils have been proposed as possible ancestors of the earliest reptiles, the anapsids *Hylonomus* and *Paleothyris*? _____

17. What would be two major problems in the evolution of *Westlothiana* into reptiles? _____
1. _____
2. _____
18. What types of fossils have been proposed as transitional forms connecting the anapsids with other types of reptiles? _____
19. Give three possible explanations for the missing transitions between ancient types of reptiles.
1. _____
2. _____
3. _____
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? _____

21. What are some of the changes that would be necessary in the DNA of reptiles that went back into the sea? _____

22. “Mammal-like reptiles” are now known as non-mammalian synapsids or _____.
23. What fossil ancestors have been proposed for pelycosaurs? _____
24. What fossils have been proposed as transitions from pelycosaurs to mammals? _____

25. List several features found in mammals but not in reptiles. _____,
_____, _____,
_____, _____
26. The two living types of monotremes are _____ and _____
(spiny anteater).
27. What is the most obvious feature found only among monotremes out of all the mammals?

28. Why are marsupials not considered placentals? _____

29. What would be required in order for some common ancestor to all the mammals to diversify into at least 32 different orders? _____
30. Which two bones in the lower jaw and skull of adult mammals interact to form the jaw joint? _____ and _____
31. What are the three bones in the middle ear of all adult mammals?
- (1) _____,
- (2) _____,
- (3) _____
32. Which two major types of mammals are born or hatched without these bones being fully developed? _____ and _____
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? _____ of _____
34. What are the three bones in the lower jaw of reptiles? (1) _____,
- (2) _____, (3) _____
35. The jaw joint of reptiles occurs where the articular interacts with the _____
36. What is the only bone in the middle ear of reptiles? _____
37. In order for reptiles to evolve into mammals, the transitional stage would have required _____ 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 _____ 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? _____
40. In the course of evolving from the reptilian to the mammalian jaw, some intermediate form would probably have had a _____ jaw articulation.
41. Which group of fossils has been proposed to show such a double jaw articulation? _____ (named for the genus *Morganucodon*).
42. The great majority of fossils of the morganucodonts are what body parts? _____
43. How many complete body fossils are known for *Morganucodon*? _____
44. How many skulls are known for *Kuehnotherium*? _____
45. How many complete skulls are known for *Morganucodon*? _____
46. Monotremes are the only type of mammal known to lay _____.
47. During embryonic development, the monotremes goes through a transitional stage with a double _____ articulation that disappears in adulthood.
48. In one of the monotremes, the _____, embryonic development continues for up to 120 days (4 months) after after hatching.
49. Meanwhile, the _____ in the platypus move from the lower jaw to the the middle ear.

50. Both marsupials and the monotremes temporarily use the middle ear bones to support the articulation of the jaw until it is complete in the _____ stage.
51. We cannot tell at what age the individuals whose jaw and middle ear bones are used for reconstructions were _____, whether adult or juvenile.
52. There are two possibilities:
- (1) The morganucodonts were really _____ from reptiles to mammals, or
 - (2) They were some extinct type with many characteristics found in living _____.
53. According to the geologic time scale, other proposed transitions such as *Liaconodon* and *Hadrocodium* appear _____ 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 _____ in DNA.
2. How many mutations are known to increase the amount of genetic information in DNA?

3. The only way we could be sure that two fossils belonged to the same genus would be if we could do _____ experiments.
4. Out of perhaps billions of primates that have ever lived, their fossils number only in the _____.
5. The evolutionary explanation for the scarcity of primate fossils is that they were formed by _____.
6. The young-earth creation explanation for the scarcity of primate fossils is that most were formed by a _____.

RECAP OF PROPOSED ANCESTORS OF LOWEST PRIMATES.

7. What is the lowest geologic layer that contains undisputed primate fossils? _____
8. In which geologic strata have all the *Morganucodon* fossils found so far been located?
_____ and _____
8. What structure is found in the inner ear of every mammal but in no reptiles? The _____ of _____.
9. Why are the known *Morganucodon* fossils not sufficient to conclusively show whether or not it was a mammal? _____

10. What are the types of *monotremes* known in the world today? _____ and four types of _____.
11. Which major type of *placental* mammal is found in the lowest geologic strata?

12. Are any *multituberculates* known in the world today? _____

PALEOCENE (EARLY CENOZOIC) MAMMALS

14. Which geologic layer is the lowest known to contain *plesiadapiformes*? _____
15. Rather than primates, plesiadapiform fossils are generally accepted as being closer to rodents or Scandentians such as tree _____ or Dermopterans such as _____ (“flying lemurs,” which are not lemurs and do not fly).
16. Rather than ancestors of primates, Apatotherians are considered to be a specialized _____ taxon of plesiadapiformes
17. True primates include monkeys, apes, humans, and prosimians. The latter group includes _____, _____, and aye-ayes.

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 _____.
19. How many candidates have been proposed as the common ancestor of primates among the lagomorphs or dermopterans? _____
20. Tupaiid, lemur, loris, and tarsier fossils all first occur in the _____ stratum of the geologic column.
21. What fossil has been proposed as the common ancestor of strepsirrhines (prosimians) and haplorrhines (anthropoids)? _____
22. How many fossil types have been proposed as the common ancestor (parent taxon) of tarsiers and anthropoids? _____
23. Eosimiids are not universally accepted as ancestors of other primates because there is so little _____ evidence.
24. Omomyids, adapoids, and eosimiids are generally accepted as _____ taxa with no known common ancestors.
25. *Cantius* is generally accepted as some sort of prosimian very similar to a _____.

MEANS OF DISPERSAL ACROSS OPEN WATER.

26. Many creationists believe that animals spread across open water after Noah's Flood by means of floating _____ 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 _____ (Old World from Africa, Asia, and Europe) and _____ (New World from South America).
28. What kind of fossils are accepted as showing the transition from prosimians to catarrhines? _____
29. What kind of fossils are accepted as showing the transition from African to Asian monkeys? _____
30. How many complete and intact fossil monkeys have been found at the Fayum excavations in Egypt? _____
31. Which Fayum fossil is called the "oldest creature we know that is in the direct ancestry of man?" _____ How many complete skeletons do we have of it? _____
32. For which Kenyan monkey do we have the greatest amount of fossil evidence? _____
33. The date assigned to *Victoriapithecus* is _____ 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 _____ 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? _____

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? _____

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? _____

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? _____

39. Why did *Darwinius* attract so much attention when it was announced? _____

40. How much fossil evidence is there for *Amphipithecus*? _____

41. What type of fossil is widely accepted as the common ancestor for the group supposed to have diversified into monkeys, apes, and humans? _____

42. *Apidium* and *Saadanius* are considered _____ taxa to the monkeys rather than ancestors.

43. Is the fossil record of primates compatible with Initial Complexity (Creation)? _____

CHAPTER 10 REVIEW QUESTIONS

1. Evolution (initial disorganization) says that all living things evolved from a Last Universal Common Ancestor, or _____.
2. Creation (initial complexity) implies that there would be many “sister” taxa in the fossil record, but no “_____”.
3. Initial complexity says that similarities between groups that do not belong to the same “kind” are most likely due to common _____.
4. Initial disorganization says that similarities between groups not considered to be closely related may be due to common _____.
5. The other alternative for similarities, according to initial disorganization, is parallel or _____ evolution.
6. The arms, legs, digestive system, teeth, and so on would have to evolve separately by independent yet parallel _____ mutations.
7. In each evolving species that reproduced sexually, at least one male and one female would have had to acquire many identical mutations and also many complementary ones so that their _____ systems could still work together.
8. Many followers of Initial Complexity interpret the rock strata as representing ecological _____.
9. Followers of Initial Disorganization (as well as anyone who believes in an old earth) believe that the rock strata represent _____.
10. Included in the belief in an old earth is the belief that there has never been a worldwide _____.
11. How does Initial Complexity explain the scarcity of primate fossils? _____

12. How does Initial Disorganization explain the scarcity of primate fossils? _____

EOCENE AND OLIGOCENE HIGHER PRIMATES.

13. What is one structure present in apes but not in monkeys? _____
14. What is one structure present in monkeys but not in apes? _____
15. The digestive system of the colobine leaf-monkeys works similarly to that of ruminants such as _____. Are they considered closely related? _____
16. Are any Paleocene animals widely accepted as ancestors of all later primates (those in the Eocene and above)? _____
17. What does LCA stand for? _____

18. How would Initial Disorganization explain the fact that there are no apes known from the Eocene or lower? _____

19. How would Initial Complexity explain the fact that there are no apes known from the Eocene or lower? _____

20. Rather than being apes themselves, *Aegyptopithecus*, *Propliopithecus*, *Rukwapithecus*, and *Nsungwepithecus* are generally considered to be extinct _____ taxa to the apes.

21. Which fossils are generally accepted as representing transitions from the Oligocene primates to those of the Miocene? _____

MIOCENE HIGHER PRIMATES.

22. How many Miocene primates are known from a complete skeleton? _____

23. What body parts represent the great majority of Miocene ape fossils? _____ and _____ fragments.

24. The two major types of hominoids are the lesser apes such as _____ and the great apes such as _____.

25. Hominids/hominins are considered to be in the human lineage. They do not include the _____ apes.

26. What fossil is widely accepted to represent the LCA of greater and lesser apes? _____

27. What is the only Miocene primate considered to have a strong link to any of the Oligocene forms? _____ Which Oligocene type is it considered close to? _____

28. *Victoriapithecus* is claimed to be close to the LCA of apes and Old World monkeys. How does its assigned date compare to the date of the hypothetical LCA? _____

29. *Afropithecus* is considered to be an evolutionary _____ branch leading to a dead end.

