

Animal Biology Review

1. Which organism below does not have radial symmetry?

- A) Sea Star
- B) Hydra
- C) Squid**
- D) Sea Cucumber

2. The factors listed below were all important steps in the diversity of the animal kingdom. Which of the factors can be contributed to the development of bilateral symmetry?

- i) Development of paired appendages
- ii) Development of radial symmetry
- iii) Development of a complex brain
- iv) Development of lungs

- A) I, ii
- B) I, iii**
- C) I, ii, iii
- D) All of the factors

3. Which of the following characteristics separates simple invertebrates from complex invertebrates?

- A) One way digestive system
- B) Bilateral symmetry
- C) Triploblastic tissue development
- D) Coelom**

4. Which group most likely evolved first?

- A) Arthropoda
- B) Annelida
- C) Platyhelminthes
- D) Cnidaria**

5. One characteristic unique to animals is...

- A) Protostome development**
- B) Sperm with flagella
- C) Heterotrophic nutrition
- D) Multicellularity

6. Vertebrates and tunicates share:

- A) A vertebral column
- B) High degree of cephalization
- C) Notochord and dorsal hollow nerve cord**
- D) An endoskeleton with a skull

7. Which of the following vertebrate classes has a 3 chambered heart with an incomplete septum (wall) in the ventricle?

- A) Class Reptilia**
- B) Class Amphibia
- C) Class Chondrichthyes
- D) Class Aves

8. Which class of vertebrates could fully adapt and evolve to life on land (i.e. to not be tied to water for reproduction)?

- A) Class Reptilia**
- B) Class Amphibia
- C) Class Aves
- D) Class Mammalia

9. The class from question 8 was able to do this due to the development of...

- A) Four limbs
- B) Dry Scales
- C) Amniotic Egg**
- D) Hair
- E) Endothermy

10. Which of the following could be considered the most recent common ancestor of living tetrapods?

- A) A sturdy-finned shallow water lobe finned fish with skeletal supports similar to those of terrestrial vertebrates**
- B) An early ray-finned fish that developed bony skeletal supports in its paired fins
- C) A salamander that had legs supported by a bony skeleton but moved with a side-to-side bending

11. Which of the following phyla is characterized by animals that have a segmented body?

- A) Cnidaria
- B) Platyhelminthes
- C) Porifera
- D) Arthropoda**
- E) Mollusca

12. Which of the following combinations of phylum and descriptions is *incorrect*?

- A) Echinodermata – bilateral and radial symmetry, coelomate
- B) Nematoda – round worms, pseudocoelom
- C) Cnidaria – Radial symmetry, polyp and medusa form
- D) Porifera – Gastrovascular cavity, choanocytes**
- E) Platyhelminthes – acoelomate, two-way digestive system

13. Which phylum does not have a two-way digestive system?

- A) Porifera (none)**
- B) Cnidaria
- C) Platyhelminthes
- D) Nematoda (one-way)**

14. Although a diverse group, all cnidarians are characterized by...

- A) Stinging cells called cnidocytes**
- B) An alteration between medusa and polyp form
- C) Some degree of cephalization
- D) Complete absence of asexual reproduction

15. Which phylum has members which exhibit a form of asexual reproduction called parthenogenesis?

- A) Echinodermata
- B) Annelida
- C) Arthropoda**
- D) Mollusca

16. Which of the following phyla are the most closely related?

- A) Cnidaria and Nematoda
- B) Echinodermata and Chordata
- C) Annelida and Mollusca**
- D) Porifera and Platyhelminthes

17. What is a coelom?

- A) A body cavity partially lined with mesoderm
- B) A body cavity completely lined with mesoderm**
- C) A space between the mesoderm and endoderm
- D) A space completely within the endoderm

18. What was the initial benefit of the development of jaws in vertebrates?

- A) Allowed for more efficient breathing**
- B) Allowed for ripping and tearing of meat and flesh
- C) Allowed for the development of a complete stomach
- D) Allowed for more efficient digestion

19. Which was the first group to develop a one-way digestive system?

- A) Phylum Platyhelminthes
- B) Phylum Nematoda**
- C) Phylum Mollusca
- D) Phylum Annelida

20. What is one digestive structure found in rats that humans do not have?

- A) Rumen
- B) Cecum**
- C) Appendix
- D) Gizzard
- E) Crop

21. Which best describes the structure above?

- A) A dead end off the intestine filled with bacteria that breakdown cellulose so the mammal can get nutritional benefit from it**
- B) A second stomach that contains enzymes that breakdown cellulose in herbivores
- C) One of the three liver lobes that secrete excess bile to deal with higher fat levels
- D) A section of the colon involved with excretion of excess plant material.

22. Which of the following is a vestigial structure found in Kingdom Animalia?

- A) Gall Bladder in humans
- B) Pseudocoelom in nematodes
- C) Radial symmetry in echinoderms
- D) Hip bones in whales**

Written Questions:

1. List three benefits of coelom development. Be sure to describe *how* these benefits are related to the coelom.

Ecology Review

1. Two organisms interacting with each other and living in a close relationship is called:

- A) Mutualism
- B) Symbiosis**
- C) Commensalism
- D) Parasitism

2. Which best describes organisms in the Kingdom Fungi?

- A) Unicellular, decomposer
- B) Multicellular, Heterotrophic
- C) Multicellular, Autotrophic
- D) Multicellular, Saprotrophic**

3. Keystone predators maintain species diversity in a community by:

- A) Competitively excluding other predators
- B) Preying on the community's dominant species**
- C) Allowing immigration of other predators
- D) Coevolution with their prey

4. A parasite evolving along side their host is an example of:

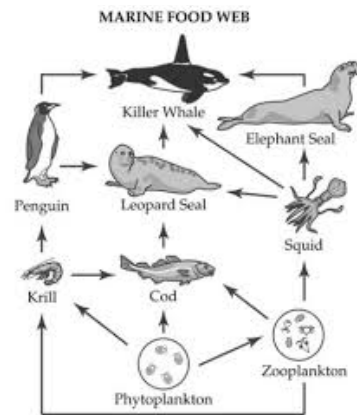
- A) Speciation
- B) Coevolution**
- C) Convergent evolution
- D) Divergent evolution

5. Which of the following organisms is *incorrectly* paired with its trophic level?

- A) Phytoplankton – Primary Producer
- B) Grasshopper – Primary Consumer
- C) Shark – Tertiary Consumer
- D) Lion – Primary Consumer**

6. Which group of organisms is responsible for maintaining an ecosystem – a self-sustaining organization of life consisting of abiotic and biotic factors – through recycling of nutrients?

- A) Decomposers**
- B) Consumers
- C) Producers
- D) Herbivores



7. Which of the following correctly traces the energy transfer through the trophic levels of the marine food web?

- A) Zooplankton -> Cod -> Leopard seal -> Squid
- B) Elephant seal -> Squid -> Zooplankton -> Phytoplankton
- C) Phytoplankton -> Zooplankton -> Squid -> Elephant Seal**
- D) Phytoplankton -> Cod -> Squid -> Killer Whale

8. In an ecosystem, mussels eat the phytoplankton producers. Local people noticed that the mussels drastically lowered the concentration of phytoplankton in the area and led to issue of anoxia (not enough oxygen). Sea stars were brought into the area and the local people immediately noticed the phytoplankton populations increased. Which must be true about the sea stars?

- A) They compete with the mussels for phytoplankton and drive the population of mussels down
- B) Sea stars are carnivores**
- C) Sea stars inhibit the growth of zooplankton
- D) Sea stars are decomposers that recycling nutrients in the ecosystem

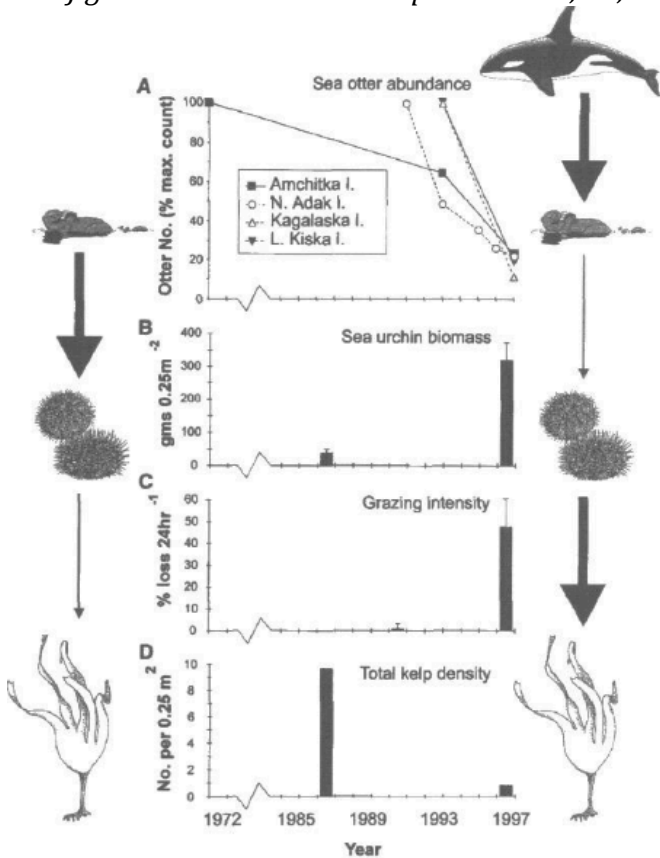
9. A clownfish lives in the stinging cnidocytes of a sea anemone which provides protection for the clownfish. This relationship is an example of:

- A) Mutualism
- B) Commensalism**
- C) Parasitism
- D) Endosymbiosis

10. Which best describes **biomagnification**?

- A) The increase of a substance (such as a pollutant) in a particular organism
- B) The increase in the concentration of a substance at a particular trophic level**
- C) The contamination of a pollutant in an ecosystem
- D) The use of magnification in the field of biology

Use figure 1 below to answer questions 11, 12, 13.



Since 1972, Dr. Jim Estes had been studying a food chain of kelp -> urchins -> sea otters, and then in the early 1990s orcas began eating the sea otters. The data collected by Dr. Estes are shown. Panel A shows sea otter abundance around four different islands from 1972 to 1997. Panel B shows the amount of sea urchins (sea urchin biomass) in 1987 and 1997. Panel C shows the amount of kelp that sea urchins ate over a 24-hour period (grazing intensity) in 1991 and 1997. Panel D shows the number of kelp plants within a specific area (density of kelp) in 1987 and 1997. The thickness of the

arrows illustrates the strength of the effect one species has on the species below it in the food web.

11. In 1997, which species is the apex predator in the food chain?

- A) Killer whales**
- B) Sea otters
- C) Sea urchins
- D) Kelp

12. Which of the following statements describes the data in Figure 1?

- A) An increase in sea urchin biomass is associated with more intense grazing.**
- B) An increase in sea urchin biomass is associated with greater kelp density.
- C) Predation of sea otters by killer whales is associated with greater kelp density.
- D) Sea otter abundance was relatively stable from 1972 to 1997.

11. Complete the following sentence. Figure 1 illustrates that when orcas started eating sea otters, the sea otter population _____, the urchin population _____, and the kelp population _____.

- A) decreased, decreased, decreased
- B) decreased, increased, decreased**
- C) increased, decreased, increased
- D) increased, increased, increased

Written:

1. As we go up each trophic level the populations that can be supported decrease. Describe the relationship between energy production, energy flow, and populations.

Life Sciences 11: Practice Exam

Big Idea: Life is a result of interactions at the molecular and cellular levels.

- The capsid of a virus is made out of which of the following types of molecules?**
 - Lipids
 - Proteins**
 - Sugars
 - Carbohydrates
 - Nucleic Acids
- What organism cannot be genetically modified?**
 - Plants
 - Animals
 - Bacteria
 - Protists
 - All can be**
 - All can be, except animals
- Which of the following is a major difference between a lysogenic and a lytic cycle in bacteriophages?**
 - Viral DNA becomes a physical part of the bacterial chromosome only in a lysogenic cycle**
 - The bacteriophage attaches to the bacterial surface proteins only in a lysogenic cycle.
 - Viral DNA is inserted into the bacterial cell only in a lytic cycle.
 - Only lytic cycles can be caused by DNA-containing bacteriophages
- Which is *not* a feature of prokaryotic cells?**
 - Ribosomes
 - A circular chromosome
 - Plasmids with extra DNA
 - Mitochondria**
- Which of the following organelles would be most affected by a drop in oxygen?**
 - Nucleus
 - Mitochondria**
 - Lysosome

D) Golgi apparatus

6. Where does cellular respiration take place?

- Mitochondria
- Nucleus
- Cytoplasm
- Both A and B

E) Both A and C

7. The goal of the Krebs's Cycle is to...

- Create ATP
- Create NaDH**
- Create Pyruvic acid
- Pass electrons along the mitochondrion membrane

8. Which is *false* about fermentation?

- It creates ATP from glucose in the absence of oxygen
- It only occurs in anaerobic organisms**
- Glycolysis occurs in fermentation and cellular respiration
- The Electron Transport Chain and Krebs Cycle do not run in fermentation

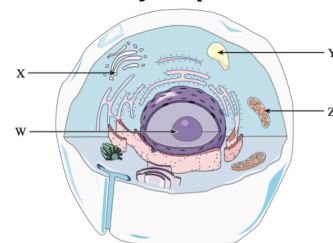
Use the diagram for question 9



9. The diagram shows a white blood cell ingesting a bacterium. By what process does the bacterium enter the white blood cell?

- Pinocytosis
- Phagocytosis**
- Active transport
- Diffusion

Use the diagram below for questions 10 and 11



10. Which of the organelles in the diagram

packages proteins for secretion?

- A) W
- B) X**
- C) Y
- D) Z

11. The cell above is eukaryotic. Which is true about eukaryotic cells?

- A) They can be specialized for different roles**
- B) They have a large mass of DNA and protein called a nucleoid
- C) They evolved before prokaryotic cells
- D) They are found in every Kingdom except for Archaeobacteria

12. Which kingdoms have photosynthetic members?

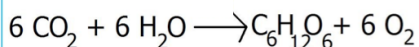
- A) Plantae
- B) Plantae and Fungi
- C) Plantae and Protista**
- D) Plantae, fungi, and protista

13. Which are not part of the adaptive immune response?

- A) Memory cells
- B) Release of histamines**
- C) Lymphocytes
- D) Antibodies

14. Where might you find an obligate anaerobe living?

- A) Deep in a thick muddy bog**
- B) In the mouth and nasal cavities of a human
- C) On the toilet bowl
- D) In the cells on a rat or other disease vector



15. The equation above shows...

- A) Cellular respiration
- B) Glycolysis
- C) Fermentation
- D) Photosynthesis**

Big Idea: Organisms are grouped based on common characteristics.

16. If humans and pandas belong to the class mammalia, then they must also belong to the same:

- A) Order
- B) Phylum**
- C) Family
- D) Genus

17. The Brown Rat belongs to all of the following taxa. Assuming you had access to textbooks or other scientific literature, knowing which of the following should provide you with the most specific information about the Brown Rat?

- A) Class Mammalia
- B) Order Rodentia
- C) Family Muridae**
- D) Domain Eukarya
- E) Subphylum Vertebrata

18. If you were constructing a cladogram, which of the following would make the best outgroup?

- A) Lion
- B) Domestic Cat
- C) Wolf**
- D) Tiger
- E) Leopard

19. Generally, within a lineage, the largest number of shared derived characters should be found among two organisms that are members of the same

- A) kingdom
- B) class
- C) domain
- D) family**
- E) order

20. Which shows a correctly ordered hierarchical organization of life?

- A) Phylum -> Order -> Class -> Genus
- B) Organism -> Community -> Population -> Biosphere
- C) Cell -> Organ System -> Population -> Community**

D) Domain -> Phylum -> Family -> Order

21. What sort of characters are useful in constructing phylogenetic trees?

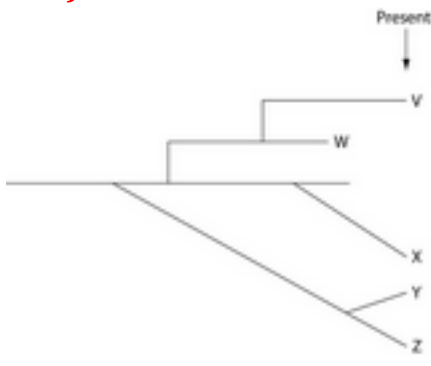
- A) Homologous traits
- B) Analogous traits
- C) Derived characters
- D) All of the Above

E) A and C

22. A cladogram or phylogenetic tree...

- A) is a hypothesis about the evolutionary relationships among a group of animal taxa
- B) is a diagram in which the sequence of branching illustrates the historical chronology of evolutionary event
- C) reflects the hierarchical classification of taxonomic groups nested within more inclusive groups.

D) All of the above



23. Which species is most closely related to species Y?

- A) Z is most closely related to species Y.**
- B) X is most closely related to species Y.
- C) Y and W are equally closely related to .
- D) It is not possible to say from this tree.

24. Which species is least expected to have a good record of transitional fossils; in other words, which species' fossils, if present at all, are expected only in relatively superficial (i.e., shallow) strata?

- A) V**
- B) W
- C) X
- D) Y
- E) Impossible to tell

25. What do the members of Domain Archae have in common?

A) Prokaryotic, no peptidoglycan in their cell wall

- B) Eukaryotic, no peptidoglycan in their cell wall
- C) Prokaryotic, peptidoglycan in their cell wall
- D) Eukaryotic, peptidoglycan in their cell wall

26. A node on a cladogram indicates...

- A) A speciation event
- B) A shared common ancestor of each of the new branches
- C) A change in clade
- D) Both A and B**
- E) All of A, B, and C

27. What kind of evidence has recently made it necessary to assign the prokaryotes to either of two different domains, rather than assigning all prokaryotes to the same kingdom as in the past?

- A) molecular**
- B) behavioral
- C) nutritional
- D) anatomical
- E) ecological

28. Arthropods are grouped together due to their...

- A) Jointed, paired limbs
- B) Segmentation
- C) Exoskeleton
- D) Both A and C
- E) All A, B, and C**

29. Which of the following includes only groups with triploblastic tissue?

- A) Cnidaria, Nematoda, Annelida, Chordata
- B) Porifera, Platyhelminthes, Arthropoda, Echinodermata
- C) Platyhelminthes, Mollusca, Arthropoda, Chordata**
- D) Nematoda, Annelida, Echinodermata, Cnidaria

30. According to the concept of punctuated equilibrium, the "sudden" appearance of a new species in the fossil record means that

- A) the species is now extinct.
- B) speciation occurred instantaneously.
- C) speciation occurred in one generation.
- D) speciation occurred rapidly in geologic time.**
- E) the species will consequently have a relatively short existence, compared with other species.

Big Idea: Evolution occurs at the population level

31. The upper forelimbs of humans and bats have fairly similar skeletal structures, whereas the corresponding bones in whales have very different shapes and proportions. However, genetic data suggest that all three kinds of organisms diverged from a common ancestor at about the same time. Which of the following is the most likely explanation for these data?

- A) Forelimb evolution was adaptive in people and bats, but not in whales.
- B) Natural selection in an aquatic environment resulted in significant changes to whale forelimb anatomy.**
- C) Genes mutate faster in whales than in humans or bats.
- D) Whales are not properly classified as mammals.

32. DNA sequences in many human genes are very similar to the sequences of corresponding genes in chimpanzees. The most likely explanation for this result is that

- A) humans and chimpanzees share a relatively recent common ancestor.**
- B) humans evolved from chimpanzees.
- C) chimpanzees evolved from humans.
- D) convergent evolution led to the DNA

similarities.

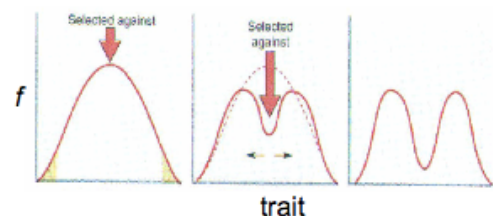
33. The smallest biological unit that can evolve over time is:

- A) A cell
- B) A species
- C) A community
- D) A population**

34. Which of the following is not an observation or inference on which Natural Selection is based:

- A) There is heritable variation among individuals
- B) Poorly adapted individuals never produce offspring**
- C) There is a struggle for limited resources and only a fraction of offspring survive
- D) Individuals whose characteristics are best suited to the environment generally leave more offspring than those whose characteristics are less suited

35. _____ selects for individuals that are at the two ends of a population distribution (see graph below). For instance, in a hypothetical population of birds with different wing sizes, this type of selection selects for individuals with large and small wings.



- A) Directional selection
- B) Disruptive selection**
- C) Stabilizing selection

36. Beginning with the first appearance of each of the following, what is the correct sequence for evolution of the amniotic egg, jaws, notochord, and tetrapod condition?

- A. amniotic egg, notochord, jaws, tetrapod

- B. jaws, notochord, amniotic egg, tetrapod
- C. notochord, jaws, amniotic egg, tetrapod
- D. **notochord, jaws, tetrapod, amniotic egg**
- E. tetrapod, jaws, notochord, amniotic egg

37. **Developmentally, the blastopore becomes the anus in which taxa?**

- A) annelids, arthropods, and molluscs
- B) echinoderms and chordates**
- C) flatworms, annelids, arthropods, and molluscs
- D) only echinoderms
- E) all protostomes

38. **What is true of macroevolution?**

- A) It is the same as microevolution, but includes the origin of new species.
- B) It is evolution above the species level.**
- C) It is defined as the evolution of microscopic organisms into organisms that can be seen with the naked eye.
- D) It is defined as a change in allele or gene frequency over the course of many generations.

39. **Analogous structures are evidence that two organisms.**

- A) Share a recent common ancestor
- B) Share a trait that is no longer useful to one species
- C) Share the same or a similar environment**
- D) Share similar traits by coincidence

40. **Homologous structures are evidence that two organisms...**

- A) Share a recent common ancestor**
- B) Share a trait that is no longer useful to one species
- C) Share the same or a similar environment
- D) Share similar traits by coincidence

41. **Which of the following indicate ways that bacteria can gain resistance to antibiotics?**

- A) Through conjugation
- B) Through mutation during DNA replication
- C) Through exposure to antibiotics

- D) A and B**
- E) A, B, and C

42. **Which group taxonomic group has two-chambered hearts with single loop circulation?**

- A) Subphylum vertebrata
- B) Class Amphibia
- C) Class Cephalopoda
- D) Class Osteichthyes**
- E) Class Reptilia

43. **Ascaris using humans to reproduce and complete their life cycle is an example of...**

- A) Commensalism
- B) Mutualism
- C) Parasitism**
- D) Divergent evolution

44. **Which of the following pairs are the best examples of homologous structures?**

- A) Whale hips and fish fins
- B) Hawk wing and dragonfly wing
- C) porcupine quill and cactus spine
- D) Dolphin fins and a bat wing**
- E) Shark fins and whale fins

45. **Which is false about speciation?**

- A) Adaptive radiation can lead to speciation
- B) A single mutation may result in speciation
- C) Many changes need to occur to lead to speciation**
- D) Speciation can occur in *divergent* or *convergent* patterns

Big Idea 1 - /15

Big Idea 2 - /15

Big Idea 3 - /15