GVZ 2023 Review Questions Set 1 Test 2

1 List and describe synapomorphies for Chondrichthyes, Batoidea, Amphibia, Gymnophiona, Anura, Testudines, Squamata, Lepidosauria, Serpentes.

2 How (from what structures) and when (in evolutionary time) did jaws evolve? What kinds of jaw attachments are present in Chondrichthyes?

3 What is streptostyly?

4 How do gills work?

5 What kinds of scales are found in sharks and ray-finned fish?

6 Describe breathing, taxonomy (are they fish? Tetrapod?) and activity of mudskippers.

7 Describe feeding approaches in sharks and ray-finned fish.

8 What traits are associated with the evolutionary transition to land by tetrapods?

9 How does the circulatory system (heart, blood vessels) of a goldfish differ from the circulatory system of a lizard?

10 Describe the discovery of each species of coelacanth.

11 Do (all) lungfish have lungs? Gills?

12 *Acanthostega, Pederpes,* and *Icthyostega* are amphibians. True or false? (explain your answer).

13 Describe the transition from finned limbs in 'fish' to 5-digit limbs in tetrapods.

14 What areas of the world (countries, regions) have the greatest number of amphibian species?

15 Describe the phylogenetic distribution and diversity of poisons in amphibian skin.

16 What role do eyes play when frogs swallow?

17 Discuss the history of studies of the phylogeny of the three major amphibian clades (frogs, salamanders, caecilians).

18 Describe regeneration in salamanders.

19 Describe reproduction in salamanders.

20 Describe the life cycle of newts (Salamandridae).

21 Devise a valid node-based definition for the name Tetrapoda.

22 Describe jaw-closing mechanisms in caecilians.

23 Describe parental care in caecilians.

24 Are there venomous caecilians? If so, describe the anatomy involved.

25 Describe the ecology/habitat use of caecilians.

26 Describe modes of feeding in frogs.

27 Contrast feeding/swallowing modes in Alethinophidians (most snakes) and scolecophidians.

28 What is a hemipenes (function, species distribution and anatomy)?

29 How do geckos cling to smooth surfaces?

30 What is a dewlap? What clades have a dewlap?

31 We have discussed several vertebrates that glide. Describe the anatomy involved with gliding in each lineage where gliding occurs.

32 How frequently has limblessness evolved in squamates (once? twice? ~20x? ~200x? never?).

33 Describe the anatomy and function of the turtle shell.

34 Describe respiration in turtles. How does the shell affect respiration?

35 What sorts of communications are used by crocodylians? Under what circumstances do crocs communicate?

36 List genera of crocodylians.

37 Crocodylian populations have made a remarkable comeback from their status decades ago when nearly all species were considered endangered. Describe the conservation measures that have aided the recovery of species in this clade.

38 Describe parental care in *Alligator mississippiensis*.

39 Give examples of cooperative feeding in crocodylians.

40 Give a node-based definition for the taxon name Crocodylia, a group that includes all extant species of crocodylians. Also give a stem-based definition for the name Crocodylomorpha, which includes Crocodylia and its extinct close relatives.

41 Describe anatomical traits in turtles associated with terrestrial ecology, and anatomical traits associated with aquatic ecology.

42 Describe conservation threats in turtles.

43 Describe modes of locomotion in crocodylians. Are all your listed modes used by all crocodylian species?

44 Do crocodylian parents respond differently to calls from the young of other species versus calls from their own young? Do crocodylian parents respond differently to calls from small versus large young? In each case, describe evidence that addresses these questions.

45 Describe the anatomy of coelacanths.

46 Compare and contrast (anatomy, biomechanics) tongue projection in frogs and salamanders.

47 Categorize the following lineages as using internal or external fertilization, and identify intromittent structures in the case of internal fertilizing species: bullfrogs, salmon, sharks, *Plethodon, Ascaphus, Typhlonectes*. Discuss the distribution of internal and external fertilization in the lineages we have studied.

48  What morphologies are expected to exist in burrowing frogs? For arboreal (tree) frogs?

49  List some frog genera that are aquatic. What characteristics do these species share?

50  How does a caecilian consume prey that is larger than itself?

51  What types of habitats are used by caecilians? by frogs? by salamanders?

52  Give vertebrate examples of homology in behavior, morphology, and molecules.

53  Give vertebrate examples of convergence/homoplasy in behavior, morphology, and molecules.

54  List clades of tetrapods that include species that display temperature dependent sex determination. What patterns of Temperature dependent sex determination are seen in amniote taxa? What is the Charnov-Bull hypothesis for the evolution of TSD? How did Werner and Shine test this hypothesis? What did they find?

55 Describe the natural history of tuataras, and how they differ anatomically from members of Squamata.

56 Compare and contrast skull fenestration patterns in amniotes. Which taxa possess which skull types?

57 What squamate species/genus can run across water? How (anatomically) is this possible?

58  Discuss tongue anatomy and function in squamates.

59 List some genera of squamates. Tell something interesting/unusual about each one (e.g.: adult *Amblyrhynchus* [marine iguanas] forage for seaweed in the ocean).

60 What is caudal autotomy? What are the (evolutionarily) selective advantages and disadvantages of this approach?

61  Amphibians are ancestors of lizards. True or false? Explain your answer.

62  Which of the following is the most primitive species?

a  human

b  coelacanth

c  lamprey

d  none of the above

Explain your answer.

63 Venomous coral snakes and harmless king snakes live in the same areas and both display similar external color patterns of red, yellow, and black rings around the body. How would you test whether this is a case of Batesian mimicry? What results would support the idea of Batesian mimicry? (hint: how did Shawn Kuchta test for Batesian mimicry in salamanders?)

64 What is paedomorphosis? Give an example of paedomorphosis in salamanders. Can you think of any examples of paedomorphosis outside of salamanders? What is 'facultative' versus 'obligate' paedomorphosis?

65  Describe how fish overcome drag. (What is drag?)

66 True or false: bluegill sunfish (a teleost fish) are more closely related to humans than they are to sharks. Explain your answer. Use this information to argue why it is or is not appropriate to include sharks and teleosts in a taxonomic group (e.g., 'Pisces,' 'fish') separate from humans

67  Rank the following groups in terms of number of species:

lungfish, *Latimeria*, *Ascaphus*, Gymnophiona, frogs, Caudata, Chondrichtyes.

68  Describe the reproductive biology of the anglerfish.

69  What search techniques allowed researchers to discover the first named species of Chikilidae?

70 Describe the structure and function of the liver of a shark.

71 Describe feeding strategies in Great White Sharks and Basking Sharks.

72 Describe the anatomy and function of a 'clasper' in Chondrichthyes.

73 How can you distinguish a lamprey from a frilled shark?

74 List some species of rays and sharks (common names are OK).

75 Describe the evolution of the axial skeleton (i.e., the vertebral column); mention differences between lampreys, cephalochordates, and sharks.

76 What's a spiracle? (describe structure, function, and phylogenetic distribution)

77 How does the cookie-cutter shark feed?

78 What characteristics would allow you to distinguish a ratfish (chimaera, holocephalian) from a shark or ray?

79 Describe 'hyostylic' jaw attachment. Contrast this type of jaw attachment with 'holostylic' jaws. List taxa that display each type of jaw attachment.

80 Describe the sensory systems of sharks, including any specialized cells and anatomical structures.

81 Compare and contrast the skull structure in chondrichthyan and actinopterygiian fish.

82 Discuss threats to the survival of shark populations/species, and progress and approaches in shark conservation.

83 Describe anatomical approaches to maintaining buoyancy in sharks and ray-finned fish.

84 Compare and contrast venom delivery systems in squamates.

85 How have snakes and amphisbaenids evolutionarily converged? How do snakes and amphisbaenids differ?

86 Describe modes of locomotion in snakes.

87 True or false: Venomous snakes are a major health crisis in the United States. Explain your answer.

88 Draw a tree showing the phylogenetic relationships of *Ascaphus, Hyla, Typhlonectes,* tuatara, *Iguana, Crotalus,* nurse shark, and carp.

89 Describe topics and arguments in the following papers: Casane and Laurenti (coelacanth status), Joven (salamander regeneration), Lynch (frog diversity), Jared (caecilian natural history), Crews and Fitzgerald (whiptail reproductive behavior).

90 What turtle species are found in the UNM duck pond?