

Sample Essay Questions for BIOL 404 Ichthyology

Exam #2 – Physiology and Genetics

- 1) Differentiate among sustained, prolonged, and burst swimming with respect to speed, oxygen requirements, and situations during which they are used.
- 2) What are the four (4) primary forces involved in fish swimming.
- 3) Compare and contrast three (3) different styles of swimming exhibited by fishes. Include an example of a fish that uses each type.
- 4) There are four (4) main categories of drag reduction features used by fish to swim better. Pick one category and explain the various methods used by different fishes to accomplish this “feature”.
- 5) Differentiate between static and dynamic lift in fishes and explain in general terms how most fish generate lift.
- 6) A longnose gar is a classic, lie-in-wait ambush predator, feeding on other fishes. Consider how a gar might optimize its feeding behavior to deal with potential prey which vary in size, shape, and speed.
- 7) How does relative gut length vary based on a fish’s diet?
- 8) Compare the gastric (stomach) and intestinal anatomy and physiology of a common carp and a channel catfish.
- 9) How are the various food breakdown products absorbed in a typical fish intestine?
- 10) Why are fish more efficient than other vertebrates in digesting and absorbing their food?
- 11) Explain how a typical fish pumps water over its gills (double-pump system).
- 12) What is ram ventilation?
- 13) A fish “decides” to float 3 m higher in the water column in Lake Winona. What adjustments does it make to its swim bladder, and how are these accomplished?
- 14) Describe how osmoregulation differs between bony fishes in marine and freshwater habitats.
- 15) Differentiate between fractional and batch spawners.
- 16) How does semelparity differ from iteroparity? Give an example of a fish that displays each type.
- 17) Contrast a guarder reproductive strategy with a bearer reproductive strategy. Use specific examples.
- 18) How are synchronous hermaphrodite fishes different from consecutive hermaphrodite fishes? Provide examples.
- 19) Explain the roles of sneakers and satellite males in reproducing populations of bluegill.
- 20) Briefly explain the differences among indirect, intermediate, and direct development in fishes.
- 21) Explain three (3) ways in which a fish eye differs from a typical vertebrate eye.

- 22) List and briefly describe the five (5) uses of olfaction in fishes.
- 23) What is happening when a walleye “bumps” live bait at the end of a fishing line. Why and how can it do this?
- 24) Explain the basic structure and use of the lateral line in fishes.
- 25) What is polyploidy and how and why can it be induced in some fishes?
- 26) Compare natural versus artificial hybridization in fishes. Give examples of each type.
- 27) How is sex (gender) determined in fishes? Provide at least two (2) exceptions to the typical approach.

Terminology

Sustained swimming
Burst swimming
Prolonged swimming
Thrust
Drag
Lift
Anguilliform
Carangiform
Ostraciform
Amiiform
Labriform
Thunniform
Fusiform
Microprojections
Fairings
Boundary layer
Static lift
Dynamic lift
Physostomous
Physoclistous
Herbivores
Detritivores
Relative gut length
Proteases
Amylases
Chitinases
Lipases
Zymogens
Gastrin
Pepsinogen
Chyme
Cellulase
Passive diffusion
Active transport

Pinocytosis
Ram ventilation
Countercurrent flow
Respiratory pump
Swim bladder
Gas gland
Rete mirabile
Ovale
Osmoregulation
Osmoconformers
Osmoregulators
Urea
Ammonia
Filtration
Kype
Fecundity
Fractional spawners
Batch spawners
Semelparity
Iteroparity
Pelagic spawners
Benthic spawners
Brood hiders
Nest builders
External bearers
Internal bearers (facultative, obligate)
Superfetation
Hermaphrodites (synchronous, consecutive)
Protandrous
Protogynous
Parthenogenesis
Gynogenesis
Hybridogenesis
Jacks
Sneakers
Satellite males
Larva
Juvenile
Binocular, monocular vision
Olfaction
Taste buds
Lateral line
Mechanoreceptors
Ampullae of Lorenzini
Alleles
Homozygous

Heterozygous
Polyploidy (triploid, tetraploid)
Autopolyploidy
Allopolyploidy
Induced polyploidy
Hybridization
Introgression
Heterogametic
Homogametic
Transgenic fish