

Sample Essay Questions for BIOL 404 Ichthyology

Exam #1 – Introduction and Basic Anatomy

- 1) Name two of North America's early ichthyologists and describe their contributions to advancing the study of fishes.
- 2) Compare and contrast ostracoderms and placoderms.
- 3) Describe the significance of the Sarcopterygii branch of the fish family tree. What present-day fish belong to this group?
- 4) Describe the differences in fish belonging to the Chondrostei, Holostei, and Teleostei.
- 5) List and describe the six types of caudal fins found in different fishes.
- 6) Describe the variations in paired fins (types, missing fins, placement) found in different fishes.
- 7) Compare and contrast two different fish body types. Include a general description of each type/shape, fish lifestyle that benefits from that shape, and at least one fish that has each body type.
- 8) Compare and contrast the four major types of fish scales.
- 9) Describe the various barbels that are present in fishes. Provide examples of fish that have each type.
- 10) If fish don't use their nostrils for respiration, what good are they (the nostrils, not the fish)?!
- 11) Compare and contrast skull structure in hagfish, lampreys, sharks, and perch.
- 12) Describe the structure of a fish vertebra with ribs to a vertebra without ribs. What parts do they have in common? How are they different?
- 13) List the 5 regions of a bony fish skull and describe two of the regions (location, main role or function).
- 14) How are the pectoral fins of an advanced fish attached to the fish skeleton?
- 15) Describe the basic arrangement of segmental muscles in a fish, and differentiate the locations of white versus red muscle.
- 16) Outline the basic, 9-part plan for a fish digestive system.
- 17) Differentiate between gill rakers and pharyngeal teeth by describing their locations and roles in fish feeding.
- 18) How do lamprey and shark intestine differ from the "normal" fish model?
- 19) Describe the basic pathway of blood flowing through a fish's body. Include heart chambers, gas exchange sites, and a general route.
- 20) How do the respiratory anatomies of a hagfish or lamprey differ from those of a shark or a perch?
- 21) Compare the reproductive anatomy of a hagfish and an advanced bony fish.

Terminology

Aristotle
Peter Artedi
Carolus Linneaus

Georges Cuvier
Constantine Rafinesque
Louis Agassiz
Johannes Muller
Albert Gunther
David Starr Jordan
Carl Hubbs
Chordata
Deuterostome
notochord
dorsal, hollow nerve cord
pharyngeal gill slit
postanal tail
Urochordata
Cephalochordata
Vertebrata
tunicates
lancelets
ostracoderms
Agnatha
placoderms/Placodermi
Chondrichthyes
Elasmobranchii
Holocephali
Osteichthyes
Sarcopterygii
Actinopterygii
coelocanth
lungfish
cartilaginous ganoids
bony ganoids
medial fin
adipose fin
pectoral fin
pelvic fin
heterocercal
protocercal
homocercal
diphycercal
modified heterocercal
hypocercal
fusiform
rover-predator
lie-in-wait
surface-oriented
bottom rover

bottom clinger
flatfish
rattail fish
deep-bodied
eel-like
placoid
ganoid/rhomboid
elasmoid
cycloid
ctenoid
barbels
maxillary
nasal
mandibular
mental
terminal
superior
inferior
subterminal
gill slits/openings
spiracles
nostrils
lateral line
branchial basket
chondrocranium
pectoral, pelvic girdles
urostyle
hypurals
vertebra
neural arch/spine/canal
hemal arch/spine/canal
neurocranium
suspensorium
jaws (maxilla, premaxilla, dentaries)
opercular bones
branchiohyoid apparatus (branchiostegal rays)
fin rays
radial bones
scapula, coracoid
cleithrum
basipterygial bone
epaxial, hypaxial muscles
myotomes
mouth (jaw teeth, oral valves)
oral cavity (vomarine, palatine teeth)
pharynx (pharyngeal teeth)

esophagus
stomach
pylorus (pyloric valve, caeca)
small intestine
large intestine/cloaca
anus
gill rakers
gill filaments/lamellae
spiral valve
typhlosole
sinus venosus
atrium
ventricle
conus arteriosus/bulbus arteriosus
gill pouch
septa
septate/aseptate gills
lungs
cutaneous respiration
suprabranchial arborescent organs
vascularized gill chambers, diverticula
pronephros kidney
mesonephros kidney
ureter/urinary bladder
monoecious/hermaphroditic
oviparous
ovoviviparous
viviparous
testes/ovaries
pelvic claspers
dioecious
breeding/nuptial tubercles