

# BIOLOGY OF FISHES: FISH/BIOL 311

<http://fish.washington.edu/classes/fish311>

Ted Pietsch

## Laboratory Activities and Demonstrations

Thursday/Friday January 8, 9	Organization and purpose of the laboratory portion of the course. Introductory video on the "Fish." Hierarchy in scientific nomenclature and the use of Latinized scientific names. The University of Washington Fish Collection: current activities, plans for the future, and tour of the facility. Hierarchy in scientific nomenclature and the use of Latin names.
Tuesday/Wednesday January 13, 14	External and internal anatomy: Definitions; body form; fin structure and placement; rays, spines, and spinous rays; caudal fin design and terminology. Demonstration of trends in body form.
Thursday/Friday January 15, 16	Examination of integumentary structures of fishes: Scales and their derivatives. Microscopic demonstration of vertebrate skeletal tissues: cartilage, bone, notochord, dermal and epidermal derivatives. Techniques for preparing skeletons. Begin clearing and staining.
Tuesday/Wednesday January 20, 21	Dissection of locomotory musculature: Epaxial and hypaxial body musculature; musculature of fins and fin supports. Comparison of red and white body musculature. Demonstration of swimming types.
Thursday/Friday January 22, 23	Identification of functional units of the skeleton; examination and comparison of skeletal systems of major fish taxa continued. Continue clearing and staining. Dissection and comparison of swimbladders in physostomous and physoclistous fishes.
Tuesday/Wednesday January 27, 28	A phylogeny from the fish up: An exercise designed to teach the essentials of phylogenetic systematics. The parsimony criterion and inference of a phylogeny based on analysis of morphological characters described from selected fish taxa; exploration of computer-based phylogenetic methods; and a tutorial on other phylogenetic methods and the analysis of molecular data.
Thursday/Friday January 29, 30	Fish biodiversity I and II: Myxinids, petromyzontids, chondrichthyans, and primitive bony fishes; lecture and slide presentation. Examination of extant jawless fishes (i.e., hagfishes and lampreys); representative taxa of sharks, rays, and holocephalans; and chondrosteans, ginglymoids, and halecomorphs ( <i>Polypterus</i> , <i>Calamoichthys</i> , <i>Acipenser</i> , <i>Polyodon</i> , <i>Lepisosteus</i> , and <i>Amia</i> ).
Tuesday/Wednesday February 3, 4	Otolith structure and function: Dissection and removal of otoliths; otolith terminology; keys to fishes based on otoliths; their use in paleoichthyology, prey identification, and feeding studies.

Thursday/Friday February 5, 6	Dissection of rockfish heads to reveal the musculature and dual biomechanical coupling responsible for the feeding and respiratory movements of the head, jaws, and pectoral girdle. Demonstration of feeding structures and adaptations in the major extant taxa of fishes.
Tuesday/Wednesday February 10, 11	<b>Midterm Laboratory Examination</b>
Thursday/Friday February 12, 13	Fish biodiversity III: Pre-acanthomorph teleosts; lecture and slide presentation; examination of osteoglossomorphs, elopomorphs, and clupeomorphs ( <i>Osteoglossum</i> , <i>Elops</i> , and <i>Clupea</i> ); Ostariophysi, Salmoniformes, Stomiiformes, Scopelomorpha, and Paracanthopterygii.
Tuesday/Wednesday February 17, 18	Fish biodiversity IV: Percomorph fishes and derivative orders; lecture and slide presentation; examination of Atherinomorpha, Lampriformes, Beryciformes, Zeiformes, Gasterosteiformes, Synbranchiformes, and Scorpaeniformes.
Thursday/Friday February 19, 20	Dissection of the reproductive system of a gravid female <i>Squalus acanthias</i> ; dissection of surfperch (Embiotocidae) to demonstrate viviparity in fishes. Demonstration of the diversity of reproductive structures and behavioral strategies in fishes, e.g., internal fertilization and adaptations for parental care; sex determination.
Tuesday/Wednesday February 24, 25	Gill arch evolution relative to respiration and feeding: Dissection of gills of <i>Squalus acanthias</i> to convey concepts of gill arch derivatives in higher vertebrates. Functional shifts in visceral arch derivatives in fishes and higher vertebrates; dissection and demonstration of pharyngeal jaws of teleosts.
Thursday/Friday February 26, 27	Fish biodiversity V and VI: Derived acanthopterygian and sarcopterygian fishes; lecture and slide presentation; examination of orders Perciformes, Pleuronectiformes, and Tetraodontiformes; examination of lungfishes. Use of dichotomous keys for identifying fishes; keying families of local marine fishes.
Tuesday/Wednesday March 3, 4	Examination of early life history stages of various teleost species: Eggs, larvae, and juveniles; stages of development and terminology; demonstration of various specialized and unique stages; methods of identification; methods of preservation and long-term storage of eggs and larvae; the significance of early life history stages to systematic studies of fishes.
Thursday/Friday March 5, 6	Examination and demonstration of deep-sea fishes, reproductive strategies, bioluminescence, videos of live specimens, the "pop-up net," etc.
Tuesday/Wednesday March 10, 11	Morphological and meristic measurements: microscopic examination of cleared and stained specimens; vertebral and fin-ray counts. Demonstration of the camera lucida.
Thursday/Friday March 12, 13	<b>Final Laboratory Examination</b>

