Osmeriformes

Taxonomy: Superclass Osteichthyes  
Order Osmeriformes (smelts)  
Families Alpocephalidae (slickheads), Argentinidae (herring smelts), Bathyragidae (deep sea smelts), Galaxiidae, Lepidogalaxiidae (salamander fish), Leptophilichthyidae, Microstomatidae (pencil smelts), Opisthoproctidae, Osmeridae (smelts), Platyroctidae (tube shoulders), Plecoglossidae (ayu fish), Retropinnidae (New Zealand smelts), Salangidae (icefishes or noodlefishes)  
74 genera, ~236 species

Description: Usually very small to small fishes ranging in size from 3-70cm. The maxilla is usually included in the gape of the mouth. Radii are absent on scales and there is a loss of basisphenoid and/or bitosphenoid bones. Many species have fingerlike filaments that project from the pyloric region of the stomach (pyloric ceca) which aid in digestion. Most are elongate and silver in color, but some can be brown to olive with different colored stripes and bands.

Habitat: Very variable habitat with species being found in slow flowing rivers, fast moving streams, ponds, lakes, shallow inshore marine habitats and in depths of up to 3,000m in the open ocean. Osmeriformes are anadromous and also inhabit brackish waters.

Distribution: Osmeriformes are excluded from some freshwater habitats in the lower latitudes of Africa, the Americas, the Indian subcontinent and Australia. Otherwise, they are found everywhere.

Ecology and life history: The diet of these fishes is quite variable with some eating small arthropods and others eating other fishes, crustaceans, mollusks and worms. All Osmeriformes spawn in freshwater with the exception of Argentinoidae, Osmerus eperlanus, and a few Salangids. Most breeding situations consist of males pressing against females until they release their eggs, whereupon the males release their sperm. The exception to this is the salamander fish (Lepidogalaxias salamandroides) who uses internal fertilization.

Additional details: Many species smell of cucumber instead of fish. The mirrorbelly (Opisthoproctus grimaldii) feeds on the stinging cells and tentacles of jellyfish.

References used:  
http://www.answers.com/topic/osmeriformes  
Salmoniformes

Taxonomy:  
Superclass **Gnathostomata** – jawed fishes  
Class **Actinopterygii** – bony fishes  
Order **Salmoniformes** – salmons  
Family Salmonidae (Salmonids) – trouts  
10 or 11 genera, ~66 – 190 species  
VT species:  
- *Coregonus* – angle-eye  
- *Oncorhynchus* – hooked snout  
- *Prosopium* – mask (referring to the prominent bones near the eyes)  
- *Salmo* – salmon  
- *Salvelinus* – char

Description:  soft ray-finned fishes, body and fins are streamlined, symmetrical body shape, cycloid scales, dorsal fin midway along the body, pelvic fins directly beneath the dorsal fin, adipose fin present, anal fin beneath the adipose fin, swim bladder connected to the gut

Habitat:  most have an anadromous life cycle, others live entirely in freshwater, and some spawn in the intertidal zone never having contact with freshwater

Distribution:  found mostly in cool/cold waters in the Northern Hemisphere such as the Arctic Ocean, Gulf of California, Europe, Asia, and many other parts of the world

Ecology and life history:  some have a diet that consists of plankton and benthic invertebrates, others are top predators (piscivorous), they migrate up rivers and streams from salt water to freshwater to breed/spawn, they lay eggs that are fertilized externally, the amount of nutrients contributes greatly to the egg’s size (the more nutrients in the water the larger the egg size)

Additional details:  they have been known to leap over obstacles as high as 10 feet tall, the vast majority can return to the stream or place of their birth after migrating thousands of miles in the ocean (a behavior known as homing), they have osmotic regulation to deal with salinity changes, they are economically important, they are fished for both sport and commercial uses

References used:  
http://www.answers.com/topic/salmoniformes
Stomiiformes

Taxonomy:
- **Superclass:** Gnathostomata
- **Class:** Actinopterygii
- **Order:** Stomiiformes
- **Families (4):** Gonostomatidae (bristlemouths), Phosichthyidae (lightfishes), Sternoptychidae (marine hatchetfishes), Stomiidae (barbeled dragonfishes and loosejaws)
- ~50 genera, 320 species

Description: Luminescent organs (photophores) present that emit lights ranging from light yellow, white, violet, or red; chin barbel sometimes present, teeth in premaxilla and maxilla in gape of mouth; when scales present, scales are cycloid and easily lost; pectoral, dorsal, or adipose fins absent in some; ventral adipose fin present in some; most are dark brown to black in color with some being silvery; range from 2-50 cm in length.

Habitat: most live in the open ocean 660-3,300 feet, but some live deeper than 3,300 feet

Distribution: marine, tropical to temperate, may be present in subarctic and arctic temperatures, mostly deep-sea

Ecology and life history: Feed on other fishes, shrimp, and squid. Some feed on plankton. Lay eggs in deep seas, but eggs float towards surface where they hatch. After going through metamorphosis, larvae descend to deep ocean. Some genera can change sex during their life (male to female). Remain in deep water during the day and then follow the dimming sunlight near to the surface. Individuals hunt and feed in the upper regions and then return to the deep water when the sun rises.

Additional details: The light emitted from the fish is usually invisible to their prey; genus Cyclothone in Gonostomatidae is thought to be the most abundant vertebrate genus in world

References used:
- www.fishbase.com
- www.animals.jrank.org
- www.zipcodezoo.com
Atelopodiformes

Taxonomy:  
**Superclass** Gnathostomata – jawed fishes  
**Class** Actinopterygii – Ray-finned fishes  
**Subclass** Neopterygii  
**Order** Atelopodiformes  
**Families** Atelopodidae (jellynose or tadpole fishes)  
4 genera, ~12 species  
**VT Species:** none, is an order of marine organisms

**Description:** Caudal fin reduced, ventral, united with elongate anal fin; adults with single-rayed pelvic fin on throat (in juveniles and *Guentherus* with several-rays); short, anterior dorsal fin with 3-13 rays; skeleton mostly cartilaginous; snout bulbous; 7 branchiostegal rays present; pseudobranchiae absent; mouth subterminal and protrusible; gas bladder absent; maximum length ~2 m; body generally light brown to purplish brown; fins dark brown to black except for pelvic fins which are white.

**Distribution:** Caribbean Sea, eastern Atlantic, Indo-West Pacific, and eastern Pacific off Panama and Costa Rica (Nelson 1994).

**Habitat:** Marine, tropical and temperate waters of moderate depths.

**Ecology and Life History:** In the nonguarder reproductive guild. Otherwise, little information exists about ecology of life history, possibly because only deceased specimen have been studied.

**Additional details:** Thought by Olney et al. (1993, as cited in Nelson 1994) that the phylogenetic placement of this order forms an unresolved trichotomy with stomiiforms and eurypterygians. Bond (1996) states that Nelson (1994) elevates the group to ordinal status. Several cranial bones absent in this order, including the orbitosphenoid and basisphenoid.

**References Utilized:**  
**Aulopiformes**

**Taxonomy:**  
*Superclass- Gnathostomata (jawed fishes)*  
Class- Actinopterygii (ray-finned fishes)  
Order- Aulopiformes (grinner fishes)  
Families (13)- Alepisauridae (lancetfishes), Anotopteridae (daggertooth), Aulopodidae (threadsails), Chlorophthalmidae (greeneyes), Evermannellidae (sabertooth fishes), Giganturidae (telescopefishes), Ipnopidae, Notosudidae (waryfishes), Omosudidae (hammer jaw), Paralepididae (barracudinas), Pseudotrichonotidae, Scopelarchidae (pearleyes), Synodontidae (lizardfishes)  
**Noted species:**  
Ipnopidae- *Bathypterois grallator* (Tripodfish)  
Alepisauridae- *Alepisaurus ferox* (Longnose Lancetfish)  
42 genera, 219 species

**Description:** The species in this order are classified by both primitive and advanced characteristics. Primitive characteristics are abnormal pelvic fins, adipose fin, absence of fin spines and cycloid scales. Advanced characteristics are a swim bladder without a duct, maxillary jaw not at the edge of jaw, have advanced and highly modified eyes, extensive metamorphism, specialized gill arches and hermaphroditism (self fertilization). They have slender elongated bodies.

**Habitat:** Marine- species are benthic, pelagic and bathypelagic; some species are found in and estuaries.

**Distribution:** Atlantic, Pacific, and Indian Oceans, with the exception of most polar waters.

**Ecology and Life History:** Aulopiformes are predacious, feeding on small fishes and small crustaceans. Benthic species such as the lizardfish burry themselves in the sand and ambush their prey; bathypelagic species are thought to use their highly modified eyes to detect and ambush prey as they pass in the dark. Pelagic species, such as lancetfishes and daggertooths, actively hunt for their prey in the water column. A number of species in this order are hermaphrodites and are able to self fertilize. Those in the family of lizardfishes and waryfishes spawn releasing gametes into the water, the pelagic young which are scaleless and typically transparent become part of the zooplankton population as they go through metamorphosis.

**Additional details:** The smallest species is 7cm (pearlfish) largest is 2m (lancetfish). Up until recently the larvae of telescopefishes were thought to be a separate family. Barracudinas swim vertically, with their tails down and their heads up. Telescope fishes and pearleyes have specialized tubular eyes that act as telescopes.

**References used:**  
http://www.answers.com/topic/aulopiformes
Myctophiformes

Taxonomy:  
Superclass Gnathostomate  
Class Actinopterygii – ray-finned fishes  
Order Myctophiformes  
Family Myctophidae – Lanternfishes  
Neoscopelidae - Blackchins  
32 Genera, 235 Species

Description:  Typically a slender, compressed body, a large bluntly rounded head. Large elliptical eyes and a terminal mouth. Their jaws have closely set rows of small teeth. They have a single dorsal fin and a forked caudal fin. Below the adipose fin is a cartilaginous supporting plate, some genera have a small supramaxilla. There is a subocular shelf present. The anal fin is slightly behind the dorsal fin base. Their head and body have groups and rows of small photophores (light-producing organs). There are cycloid scales, ctenoid in 4 species. Usually a swim bladder is present. These are small fish usually 2-30cm.

Habitat:  Exhibit diel vertical migration; peak abundance is 300-1200 m during the day and 10-100 m at night.

Distribution:  Marine found in all oceanic waters except the Arctic Ocean, remain near to the coast, over the continental slope.

Ecology and life history:  Account for as much as 65% of all the deep sea fish biomass. They are said to do this migration to avoid predation and following the zooplankton which they feed on. Non-guarders of young. They lay their eggs in the food-rich shallowsurface waters.

Additional details:  Lanternfish are named this because of their use of bioluminescence by the photophores. They emit a weak blue, green or yellow light and are known to be arranged in species-specific patterns. The arrangement of their photophores could play a role in their communication and camouflage. They are heavily preyed on by many marine fishes and mammals.

References used:  
www.fishbase.com  
www.wikipedia.com
Lampridiformes

**Taxonomy:**
- Superclass Osteichthyes
- Class Actinopterygii – Lobe-Finned Fishes
- Subclass Neopterygii
- Order Lampridiformes – Tube-eyes and Ribbonfishes
- 12 genera, 21 species

**Description:** Bony skeleton fishes, that live in the deep sea. Mouths are unique in that they extend with a sliding mechanism connected to the premaxilla. Pelvic fins have between 0 and 17 rays. Have a gas bladder that they can inflate using a gas gland to increase buoyancy. Marine only. Extremely rare and charismatic. Biggest of the order can get up to 17 meters (*Regalecus glesne*)

**Habitat:** All.

**Distribution:** Marine, all oceans and all regions of the oceans except the polar region. Some (*Velifers*) have been found between 130 and 360 feet, others have been found hundreds of feet deep.

**Ecology and life history:** Probably broadcast spawners. Not known for sure. Eggs incubate in surface waters for roughly 3 weeks. Larvae feed on plankton once hatched from eggs. Some have drastic change from larvae to juvenile form.

**Additional details:** Much of the information about this order is spotty at best, due to the extreme difficulty finding live samples of this order. The majority of biological information about these fishes is from dead organisms that washed onto shore.

First fossil evidence: Late Cretaceous, ~145.5 – 65.5 MYA

**References used:**
- Fishbase.org
Polymixiformes

**Taxonomy:**
- **Superclass**: Osteichthyes
- **Class**: Actinopterygii – Ray-finned fishes
- **Order**: Polymixiformes
- **Family**: Polymixiidae - beardfishes
- **1 genus 10 species**

**Description:**
Elongate and compressed moderately; pair of barbels on hyoid; continuous dorsal fin; 4-6 spines, 26-38 soft rays; anal fin has 4 short spines, and 13-17 soft rays; subabdominal pelvic fin with 1 spinelike ray and 6 soft rays; caudal fin has 16 branched rays; 33-38 scales in lateral line; banchiostegal has 4 rays; 11-21 gillrakers; 2 supramaxillae; 3 epurals; subocular shelf, ortbitosphenoid, and basisphenoid present; usually 29 or 30 vertebrae; and a maximum length at 38 cm

**Habitat:** Believed to be bottom dwellers of marine waters

**Distribution:** Atlantic, Indian, and Western Pacific; tropical and subtropical; usually found in depths between 180 and 640 m

**Ecology and life history:** Their eggs and reproduction are relatively unknown; feed on crustaceans, squid, and small fishes

**Additional details:** named for their hyoid barbells; Have minimal commercial importance

**References used:**
www.fishbase.com
**Percopsiformes**

**Taxonomy**
Superclass- Gnathostomata  
Class- Actinopterygii (ray-finned fishes)  
Order- Percopsiformes (trout-perches, pirate perches, cave fish)  
Family- Amblyopsidae, Aphredoderidae, Percopsidae  
Species- 6 genera and 9 species

**Description**- A small fish with a nonprotractile premaxilla. Dorsal fin contains weak spines. They range from 5 to 20 centimeters in length. Pelvic fins with 3-8 rays. Many species have ctenoid or cycloid scales. Adipose fin present in percopsidae.

**Habitat**- Found in freshwater swamps, caves, and lakes.

**Distribution**- Freshwater of North America

**Ecology and Life History**- Little is known about the species in these orders because they are generally “insignificant” to humans, although two species are known to be nocturnal. These fish are opportunistic predators that eat a large variety of foods including insects and other small organisms. These oviparous fish spawn in the spring and tend to have low fecundity.

**Additional Details**- Some species have been used as aquarium fish. Being small fish, human interaction with the species tends to be minimal.

**References**

Ophidiiformes

**Taxonomy:**
Superclass:
Class: Actinopterygii (ray-finned fishes)
Order: Ophidiiformes (cusk eels, pearlfishes, brotulas)
Family: Carapidae- 7 genera, 31 species (pearlfishes)
   Ophidiidae- 50 genera, 240 species (cusk eels)
   Bythitidae- 36 genera, 110 species (brotulas)
   Aphyonidae-6 genera, 22 species
   Parabrotulidae- 2 genera, 3 species
~ 5 families, 101 genera, and about 406 species

**Description:** Most species have slender bodies and small heads, ranging from 2 inches in length to about 6.5 feet. They either have smooth scales or do not have any scales. This order typically has pelvic fins with 0-2 soft rays at the level of the preopercle or more anterior. The dorsal fin is long and the anal fin commonly joins with the caudal fin. The pterygiophores on the dorsal and anal fins are more extensive than those on adjacent vertebrae and their nostrils on each side are paired. The family Aphyonidae does not have a swim bladder while there is one present in the family Bythitidae.

**Habitat:** These fishes live mostly in marine but can also be found in freshwater or brackish waters. Several species live in deep water but there are also many that live along coral reefs in shallow water.

**Distribution:** They are typically seen in the Atlantic, Indian, and Pacific Ocean, and especially in tropical or subtropical waters.

**Ecology and Life History:** These fishes eat a wide variety of invertebrate and fish prey like worms, crustaceans, echinoderms, and small bottom fishes like gobies and flatfishes. Since they are mostly nocturnal bottom-dwellers it is thought that they forage for benthic organisms during the night. In the Carapidae family, species can be free-living, commensal, or parasitic and live with shallow-water invertebrate hosts (like starfishes, holothurians, and bivalves) in coral-dominated communities. Species under the order Ophidiiformes are commonly the prey for larger predators like skates, rays, sharks, eels, cod, goosefishes, flounders, and even wading birds. Some species in this order are viviparous (give birth to live young) but others are oviparous, like pearl-fishes and cusk-eels.

**Additional Details:** This order consists of many deep-sea species and contains the deepest-living species, *Abyssobrotula galatheae*, averaging 27,500 ft in the Puerto Rico Trench. Others live near coral reefs in shallow waters so this order has a huge range of depth.

**References:**
www.fishbase.org
www.wikipedia.com
Gadiformes

Taxonomy:  
- **Superclass Gnathostomata** – jawed fishes  
- **Class Actinopterygii** – ray-finned fishes  
- **Order Gadiformes** - cods

**Families**  
- Muraenolepididae (eel cods), Moridae (morid cods or moras), Melanidae (pelagic cods), Euclichthyidae (eucla cod), Bregmacerotidae (codlets), Gadidae (cods), Merlucciidae (merluccid hakes), Steindachneriidae (luminous hake), Macrouridae (rattails or grenadiers), Ranicipitidae (tadpole cod), Phycidae (phycid hakes), Macruroidae (southern hakes)  
- **12 families, 85 genera, 482 species**

**Description:** Disagreement about the relationships within the order, when present pelvic fins are thoracic or jugular (inserted below or in front of pectorals) with up to 11 rays, no true spines in fins, most with long dorsal and anal fins, usually cycloid scales (rarely ctenoid), premaxilla forms the entire margin of the upper jaw (protractile in some), swim bladder without pneumatic duct, relatively unique otolith, range in size from codlets that can be as little as 7 centimeters as adults, to Atlantic cod which can reach 2 meters in length

**Habitat:** Varying levels of the water column depending on the family and species

**Distribution:** Found chiefly in cool waters, generally at higher latitudes, mostly marine with few exceptions, marine species can be found in the Arctic, Atlantic, and Pacific oceans, can also be found in freshwater and brackish water

**Ecology and life history:** Many species are piscivorous (but there are exceptions), many species contain barbels to assist in search for food in the substrate, generally produce masses of eggs and are oviparous, produce an enormous number of eggs (among the most of any fishes)

**Additional details:** Important to humans as a food resource (especially the family Gadidae), compromise over one quarter of the world’s marine fish catch,

**References used:**  
www.fishbase.com
Batrachoidiformes

**Superclass:** Gnathostomata  
**Class:** Actinopterygii (ray-finned fishes)  
**Order:** Batrachoidiformes

**Family (only one):** Batrachoididae, which contains three subfamilies  
19 genera, 64 (Bond) or 69 (fishbase) species

**Description:** 3 pairs of gills (lower metabolic rate allows them to get by with one fewer pair than most bony fish). Flattened cranium, ribs absent, usually scaleless, eyes more dorsal. Many can produce sounds using special muscles which vibrate the swim bladder. The subfamily Batrachoidinae (toadfishes) have no venom or photophores. Three spines in the first dorsal fin. Can be camouflaged or colorful. The subfamily Porichthyinae (midshipmen) have two spines on first dorsal fin, some have venom glands. Have multiple lateral lines and some can produce light. The subfamily Thalassophryninae (venomous toadfishes) have 2 sharp, hollow spines on 1st dorsal fin and one on the operculum, which have venom glands. No photophores, lateral line single or lacking.

**Habitat/Distribution:** Bottom dwellers, favor sandy or muddy substrates  
Batrachoidinae: shallow water, marine, found in most tropical and temperate seas  
Porichthyinae: Marine, found on continental shelf of North and South America.  
Thalassophryninae: Marine, found in Central/South America, a few freshwater species in the Amazon

**Ecology and life history:** Primarily carnivorous, feeding on crustaceans, mollusks, and other fish.  
Ambush prey from rock crevices or dens they build in the sediments. Males make nests, attract females by making sounds. Eggs are sticky, so they attach to the nest. Males may attract several females, so eggs in nest may not have the same mother. Parental care exclusively by male (very unusual). He guards the nest and doesn’t leave it even to hunt or eat. Eggs develop into embryos very rapidly, and after hatching they hide around the male until larger and able to fend for themselves.

**Additional details:** Order etymology: batrachos = frog, forma = shape. Fossil record dates to the middle Miocene.

Lophiiformes

Taxonomy:  
Superclass Gnathostomata  
Class Actinopterygii  
Order Lophiiformes (Anglerfishes)  
Families: Lophiidae, Antennariidae, Tetrabrachiidae, Lophichthyidae, Brachionichthyidae, Chaunacidae, Ogcocephalidae, Ceratiidae, Neoceratiidae, Linophrynidae, Aceratiidae, Photocorynidae, Caulophrynidae, Melanocetidae, Himantolophidae, Oneirodidae, Diceratiidae, Gigantactinidae, Thaumichthyidae, Centrophrynidae  
64 genera, 290-300 species

Description:  This order consists of advanced teleost fishes. The anglerfishes differ significantly from most other fish in the position and development of the first 2-3 rays of the dorsal fin. These first few rays are separated from the rest of the fin and are located in a more forward position on the top of the head. The foremost ray is used as a lure to attract prey. Characterized by a huge gape (mouth opening). Very large pectoral fins are located low on the body and most have elongated bases. Caudal fin is fixed on a single hypural. They are similar to toadfish and clingfish in that they have no ribs and reduced gill openings.

Habitat:  Mostly benthic species that feed in shallow temperate waters. There is, however, numerous anglerfish that live in deep sea habitats.

Distribution:  This diverse group can be found all over the world, but with a greater density in tropical and temperate waters.

Ecology and Life History:  This order is unique in the lure that it uses to attract prey to them. Through this adaptation, anglerfish conserve a great amount of energy with their very sedentary hunting techniques. Most species blend in with the sea floor and their lure sticks up from the floor to attract prey. With their large mouth openings they are able to pump a significant amount of water through their gills and suck prey into their mouth in the matter of 1/100th of a second. This large mouth opening also allows them to take large prey, primarily other fish. These fish lay their eggs in a large, free-floating, gelatinous mass that can be up to 12 meters long and hold as many as 3 million eggs.

Additional details:  Due to their sedentary hunting behavior and sparse populations some deep sea angler fish have established a sexual dimorphism in which the males lack a lure and have feeble jaws with to teeth. This adaptation forces the male to seek out a female in which he attaches to her side and becomes a parasite nourished by her blood supply until they mate.

References used:  
Mugiliformes

**Taxonomic Status:**
*Superclass: Osteichthyes, Class: Actinopterygii, Order: Mugiliformes*
*There is 1 representative family: Mugilidae (mullets), and 18 genera (Mugil-gray mullets, Agonostomus-mountain mullet)

**Description:**
*Regular fusiform body type, maximum length never exceeding 90 cm
*Spinous (1 spine) and soft rayed (5 rays) dorsal fins widely separated
*Toothless or possessing very small teeth
*Long gill rakers, muscular stomach with a very long intestine, 24-26 vertebrae

**Habitat:**
*Chiefly a marine species occupying coastal waters. They also venture into brackish estuaries, and some species occupy fresh water lakes and rivers.

**Distribution:**
*All tropical and temperate seas

**Ecology/Life History:**
*Travel in small to large schools
*Planktonic feeders, consuming fine algae, diatoms, and the detritus of bottom sediments
*There are an important food fish for several predatory species

**Additional Details:**
*Some representative species, such as the striped mullet (*Mugil cephalus*), are adept and enthusiastic jumpers that often leave the water for no apparent reason.

References:

[www.fishbase.com](http://www.fishbase.com)


[www.animaldiversity.edu](http://www.animaldiversity.edu) (University of Michigan Museum of Zoology)
Atheriniformes

**Taxonomy:**
- **Superclass:** Osteichthyes (Bony fishes)
- **Class:** Actinopterygii (ray-finned fishes)
- **Order:** Atheriniformes: Silversides
- **Families:** Atherinopsinae, Notocheiridae, Melanotaeniidae, Atherionidae, Phallostethidae, Atherinidae
- **Genera/Species:** 49/315, not limited to Rainbowfishes & Silversides

**Description:** The typical Atheriniform is laterally compressed & elongated, has two dorsal fins and an anal fin with a spine, usually cycloid scales, and although it lacks a lateral line, it may exhibit a mid-lateral stripe. Rainbowfishes may exhibit sexually dimorphic color patterns and finnage, with the male being brighter in color and/or possessing of elongated anal and dorsal fins. At one extreme, Priapium fishes have genitalia that are located ventral to the throat.

**Habitat:** Marine species inhabit coastal temperate seas all over the world, while tropical species occur in freshwater lakes & streams.

**Distribution:** Rainbowfish are primarily Australian in origin, although other freshwater Atheriniformes may be found globally. One genus is native to Madagascar.

**Ecology & Life History:** Many Atheriniformes regularly form schools, which may number as high as in the 1,000s. Silversides may be attracted to bright light at night and thus caught and used as bait when fishing for larger fish. In general, Atheriniformes are omnivorous, but marine species tend to depend on zooplankton and small crustaceans. Melanotaenid Rainbowfish have a preference for ants. Large schools of marine Atheriniformes may attract predators of commercial importance, and in a tropical environment they are preyed upon by birds, mammals, and other fish.

**Additional Details:** Interesting reproductive fact: The Grunion (*Leuresthes tenuis* and *L. sardina*) time their spawning on tidal events, and only spawn for ~6 nights a month. Male Phallostethids ram females during intercourse, and become physically attached to the female for the duration of copulation.

**References:**
- [http://www.answers.com/topic/atheriniformes](http://www.answers.com/topic/atheriniformes)
Beloniformes

Taxonomy:

Class Actinopterygii
Order Beloniformes

5 Families Adrianichthyidae (ricefish and medakas), Belonidae (needlefish), Exocoetidae (flyingfishes), Hemiramphidae (halfbeaks), and Scomberesocidae (sauries).

38 Genera
186 Species

Description: Streamlined, medium-sized fishes, with the exception of the Adrianichthyidae family. Interesting jaw morphologies: ricefishes and halfbeaks- elongated lower jaw in juveniles and adults. Needlefish and sauries- both jaws are elongated in the adults; while the juveniles of most species develop through a "halfbeak stage" before both jaws elongate. Flyingfishes- the elongated lower jaw is lost in adults and most juveniles.

Habitat: Mostly marine. A few needlefish and halfbeaks inhabit brackish and fresh waters.

Distribution: India to Japan and out into the Indo-Australian Archipelago and Sulawesi. Flying fish are found in all of the major oceans, particularly warm tropical and subtropical waters of the Atlantic, Pacific, and Indian oceans.

Ecology and life history: Live close to water’s surface. Feed on algae, plankton, or smaller animals including other fishes. The halfbeaks are show a wide range of reproductive modes including- egg-laying, ovoviviparity, and true vivipary where the mother is connected to developing embryos by a placenta-like structure. In some livebearing species, developing embryos exhibit oophagy (intrauterine cannibalism) where developing embryos feed on eggs or other embryos within the uterus.

Additional details: Originally, Adrianichthyidae were included in Cyprinodontiformes and assumed related to the killifish. Closer relationship to the beloniforms is now indicated by characteristics including the absence of the interhyal. This results in the upper jaw being fixed or nonprotrusible. Halfbeaks are not commercially important themselves, but they support artisanal fisheries and local markets worldwide. They are also fed upon by commercially important predatory fishes (billfishes, mackerels, and sharks). Some halfbeaks are maintained as aquarium fish.

References used:
http://en.wikipedia.org/wiki/Beloniformes
www.fishbase.org
Cyprinodontiformes

**Taxonomy**

- **Class:** Actinopterygii  
- **Order:** Cyprinodontiformes  
- **Family:** Anablepidae  
- **Genus:** Anaplebs  
- **Species:** anaplebs  
- **Common name:** Largescale foureyes  
- **Discoverer:** Linnaeus, 1758

**Description**

Eyes elevated above head, divided longitudinally into upper and lower portions giving two pupils on each side. This allows them to keep one eye above water, one below and simultaneously focus the images. Rounded caudal fin, Anal rays 3-6, dorsal fins 7-10. Pectoral fins 20-26. Scales in lat lines 50-96. 45-54 vertebrae. Maximum length 32cm. Females much larger than males. Pelvic fins behind pectoral fins. Low pectoral girdle.

**Habitat**

Freshwater and brackish water. Rarely coastal marine.

**Distribution**

Southern Mexico to southern South America.

**Ecology and life history**

Gonopodium in both males and females only move to either left or right, not both. It is thought that they must mate with their opposite, i.e. left male with right female. Sexes are divided equally between dextral and sinistral. Internal fertilization, viviparous (live birth).

**Additional details**

Popular tank fish. Used for subsistence fishing.

**Refs:**

[www.fishbase.com](http://www.fishbase.com)
Stephanoberyciformes

**Taxonomy:**
- **Superclass**  Gnathostomata
- **Class**  Actinopterygii (ray-finned fishes)
- **Order**  Stephanoberyciformes
- **Family**  
  - Gibberichthyidae - gibberfishes
  - Hispidoberycidae – spiny-scale pricklefishes
  - Melamphaidae – bigscale fishes
  - Stephanoberycidae - pricklefishes
  - Rondeletiidae - whalefishes
  
  **19 genera, 74 species**

**Description:** Body varied from elongate to roundish. Toothless palate. Skull bones are exceptionally thin. Have a single dorsal fin set well back on the body in most species; dorsal spines if present are weak. Pelvic fins in various places anywhere from abdominal to jugular. Lack orbitosphenoid, subocular shelf, and supramaxillaries. 2.1-43 cm in length, but most are less than 10 cm.

**Habitat:** Marine fishes. Some live in the deep sea in the bathypelagic regions. Only juveniles have been caught closer to the surface.

**Distribution:** Found in all major oceans, but have not been recorded in the Mediterranean Sea or the Arctic.

**Ecology and life history:** Have been known to vertically migrate from deeper to shallower waters. Little is known about their life history and reproductive patterns. All assumed to be oviparous with planktonic eggs and larvae.

**Additional details:** Families within order are heavily debated whether or not to remain in the order or create a new one. Rondeletiidae largest family in order.

References Used:
“Order Summary for Stephanoberyciformes”. Retrieved from Fishbase.org on 2/7/09
Beryciformes
Zeiformes

Taxonomy:
- **Superclass Gnathostomata** – jawed fishes
- **Class Actinopterygii** – ray-finned fishes
- **Order Zeiformes**

Families
- Cyttidae
  - 1 genus, 3 species
- Grammicolepididae (tinselfishes)
  - 3 genera, 3 species
- Oreosomatidae (oreos)
  - 4 genera, 9 species
- Parazenidae (parazen)
  - 1 genus, 1 species
- Zeidae (true dories)
  - 2 genera, 6 species
- Zenionidae
  - 3 genera, 7 species
- Caproidae (boarfishes)
  - 2 genera, 12 species

Description: Pelvic fin with or without a spine and 5-10 soft rays; caudal fin usually with 11 branched rays (13 in grammicolepidids); single dorsal fin present with spines as well as anal fin; un-branched fin rays; body usually thin and deep in compressiform shape; microscopic scales, jaws usually greatly distensible (highly expandable); no orbitosphenoid; simple post temporal fused to skull; swim bladder present; branchiostegal rays 5-8; vertebrae 21-46 (varies by family with Caproids having the lowest number of vertebrae and grammicolepidids the highest)

Habitat: All species are marine, most are in the deep sea

Distribution: marine, bathypelagic (deep ocean), Indian, Atlantic, and Pacific Ocean with concentrations in the Southern Hemisphere; found at depths of usually around 1,000 meters (3300 feet).

Ecology and Life History: Little is known of the behavior of dories; behavior ranges from adult John dories which are mainly solitary to buckler dories which tend to live in small groups. Female dories grow larger than males. Dories apparently are oviparous. Like most marine fish, the larvae are part of the ichthyoplankton. Juveniles feed exclusively on zooplankton while adults are voracious predators, feeding on active schooling fish (porgies, young mackerel, sardines, etc.) benthic fish (gobies, flatfish etc.) and occasionally cephalopods.

Additional Details:
- Name is derived from Zeus, the Greek god of thunder and Champion of Olympus.
- Some species are very large and showy; some appear to be naked because of microscopic scales.
- Some species are highly prized food fishes and are harvested with deep sea trawling.
- First fossil record: Late Tertiary to middle Miocene (65-23 MYA); sister to Gasterosteiformes (sticklebacks).

References:
- http://www.fishbase.org/Summary/OrdersSummary.cfm?order=Zeiformes
**Gasterosteiformes**

**Taxonomy:**
- Superclass: Gnathostomata (jawed fishes)
- Class: Actinopterygii (ray-finned fishes)
- Order: Gasterosteiformes
- Families: 5 families, 257 species
  - Aulorhynchidae - Tubesnouts
  - Gasterosteidae - Sicklebacks and Tubesnouts
  - Hypoptychidae - Sand eel
  - Indostomidae - Armored Sickleback
  - Pegasidae - Seamoths

**Description:**
Pelvic girdle not attached to the cleithra. Supramaxillary, orbitosphenoid and basisphenoid absent. Brachiostegal rays 1-5. Body often with armor. Usually have small mouth and often a long tubular snout. Has soft fin rays and pelvic fins on the abdomen. Gill structures are somewhat degenerate.

**Habitat:**
They live in coral reefs, sea grass meadows, kelp forests, tide pools, bays, lagoons and estuaries.

**Distribution:** In fresh water and Salt water. Widely distributed.

**Ecology and life history:**
Most in this order eat small invertebrates and the larvae of other fishes some of the larger species eat other fishes. Most sicklebacks, seahorses and other groups suck in their prey by opening their mouths to produce an inward current. Little is known of the life cycle of many of the order. They produce eggs that are often cared for in clusters by the male. They breed 9 months out of the year.

**Additional details:**
Male sicklebacks build nests of plant material cemented together with mucus secretions. Male pipefish and sea horses brood the eggs.

**References:**
- [FishBase](http://www.fishbase.org/summary/ordersSummary.cfm?order=Gasterosteiformes)
- [Animal Diversity](http://animaldiversity.ummz.umich.edu/site/accounts/pictures/Gasterosteiformes.html)
- [Britannica](http://www.britannica.com/EBchecked/topic/226692/gasterosteiform)
- [Jrank](http://animals.jrank.org/pages/2139/Sticklebacks-Seahorses-Relatives-Gasterosteiformes.html)
- [Jrank](http://animals.jrank.org/pages/2133/Sticklebacks-Seahorses-Relatives-Gasterosteiformes-HABITAT.html)
Synbranchiformes

Taxonomy:  
- Class Actinopterygi- ray finned fishes  
- Order Synbranchiformes- swamp eels  
- 3 Families: Chaudhuriidae (spineless eels), Mastacembelidae (spiny eels), Synbranchidae (swamp eels)  
- 12-15 genera, 87-109 species

Description: Anguilliform body shape lacking pelvic fins and pelvic girdle. Pectoral girdle is set far back and not connected to the bones of the head. Caudal fin, if present, is small. Synbranchidae also lack pectoral fins and have rayless ridges for dorsal and anal fins. If scales are present, they are cycloid. Premaxillary is not protrusible. Gill openings generally on bottom half of body. Maximum length is less than one meter.

Habitat: Tropical and subtropical freshwater and occasionally brackish water.

Distribution: Regions of Asia, Africa (Synbranchidae and Mastacembelidae only) and Central and South America (Synbranchidae only).

Ecology and Life History: Generally live in caves, pools, and swamps. Some burrow. Many are able to remain out of water for extended time and travel between bodies of water. Some species depend in part on the air for oxygen. Most are nocturnal. They feed on benthic invertebrates and fishes. Generally about 40 eggs per clutch. Most probably mature within the first year and reproduce only once.

Additional details: Some species of swamp eels and one species of spiny eel are valued as a food source in parts of Asia. One species in Southeast Asia can live in holes in swamps to wait out the dry season.

References used:  
www.fishbase.com  Accessed 2/9/09  

Synbranchidae  Chaudhuriidae  Mastacembelidae
Scorpaeniformes

Superclass: Gnathostomata
Class: Actinopterygii
Order: Scorpaeniformes
Families: disputed, but around 30.
Species: ~1000

**Description:** the single unifying characteristic of the scorpionfishes that is also entirely derived is the suborbital stay, a bony extension that extends underneath the eye from the circumorbital bone of the skull to the anterior aspect of the preopercule. They are generally considered to be colorful, globular, and spine-covered, but this is actually an order in which form ranges from taeniform to sagittaform to fusiform to globiform. They generally tend to have truncate fins. Many do have poisonous spines.

**Habitat:** most live near or on the bottom in shallow marine water, although some families reside in fresh water, and some inhabit the deepest parts of the ocean.

**Distribution:** freshwater in every continent except Antarctica, marine distribute is from Antarctica to the arctic.

**Ecology and Life History:** they are generally oviparous. So families, such Cottidae, are known to stay with and protect the eggs until they hatch. A few are viviparous. They tend to be both piscivorous and Moluscivorous.
Many fresh-water species are threatened with habitat loss. None in marine habitats are threatened.

**Additional details:** There is tremendous plasticity in their use of fins, and the spines (some poisonous) in the fins as well. This group includes some of the most poisonous species of fish on the planet, including stonefishes (Genus *Synanceia*) and turkeyfishes (Genus *Dendrochirus*).

References Used:
Perciformes: Labridae

**Taxonomy:**
Order: perciformes  
Class: Actinoptyerygii  
Suborder: labroidei  
Family labridae - wrasses  
~ 60 genera, 500 species

**Description:** Many are brightly colored, quite small and shape is variable. They have protrusible mouths and cycloid scales which are large to moderate. Maximum length about 2.3 m

**Habitat:** entirely marine, found in shallow water such as coral reefs living close to the substrate.

**Distribution:** occur in the Atlantic, Indian, and Pacific Oceans.

**Ecology and life history:** Most species are sand burrowers, feeding on benthic invertebrates. Some are also planktivores. Most species change color and sex with growth and males dominate several females

**Additional details:** Popular for aquariums. Medium to large species are important food fishes. They are second largest family of marine fishes. One species Conniella apterygia, is so small that it lacks even pelvic fins and a supporting skeleton.

Perciformes: Scaridae

**Taxonomy:**
Order: perciformes  
Class: Actinoptyerygii  
Suborder: labroidei  
Family scaridae - parrotfish  
~ 9 genera, 83 species

**Description:** have parrot ‘like’ dentition, the parrot like beak is formed from numerous teeth tightly packed together on the outside of the jaw bones. And also have a pharyngeal apparatus. Have large cycloid scales and the dorsal fin has nine spines and ten soft rays.

**Habitat:** marine, mostly tropical, shallow water near coral reefs

**Distribution:** Read Sea, Atlantic, Pacific and Indian oceans

**Ecology and life history:** Primarily herbivorous, use their beaks to rasp algae of coral. Ingest rocks to help with the digestion of algae.

**Additional details:** exhibit several types of complex mating systems that vary more by geographic location than by species. One system includes primary males, which are born male and secondary males which are females who have morphed into males. Each phase can be determined by a distinct coloration. At night, some species rest enveloped in their mucoid secretion.
Perciformes: Pomacentridae

Order: Perciformes
Class: Actinopterygii
Suborder: Labroidei
Family Pomacentridae - damselfishes, clownfishes
   ~ 28 genera, 321 species

Description: small, brightly colored, laterally compressed. One nostril on each side of head, body is deep and compressed, small mouth, no palatine teeth but the floor of the mouth contains a pharyngeal plate which is a triangular fused tooth plate.

Habitat: Exclusively marine, inhabit tropical reef

Distribution: found throughout the world in tropical and warm temperate marine waters with the majority in Indo-west and central Pacific region.

Ecology and life history: Many species are highly territorial herbivores, omnivores, or planktivores. They lay elliptical demersal eggs that are guarded by the males. This family include anemonefishes which live in sea anemones. Have a wide range of reproductive behaviors such as polygynous, promiscuous, polyandrous, and monogamous. Adult males tend to be larger than adult females

Additional details: very popular aquarium fish, Anemonefishes spend their entire adult lives with a single host.

Resources:

Perciformes - Cichlidae

Taxonomic status:
Superclass  Gnathostomata
Class Actinopterygii
Order  Perciformes
Family  Cichlidae
105 genera, 1300-1900 species
   Examples: Oreochromis (blue tilapias), Cichlasoma (American cichlids)

Description: varied body shape and appearance depending on habitat but usually ovate and slightly laterally compressed, mostly small (2-10 cm in length) but can get up to 1m in length (Boulengerochopmis microlepis), interrupted lateral line, several types of jaw/mouth configurations allowing to a varied diet, characteristic pharyngeal jaw (second set of teeth in the throat), most species are quite colorful
**Habitat:** mainly in lowland freshwater tropical and subtropical waters however some species live in brackish waters, found in lakes and slow-moving river drainages

**Distribution:** Central and South America, Africa, Madagascar, southern India, West Indies

**Ecology:** breeding activities are highly organized and parental care comes in three forms (mouthbrooding, substratebrooding, and a combination of the two), sexes differ in color and size (female is usually smaller), mating systems vary depending on the ecological condition (monogamy, polygamy, polyandry), most species feed on invertebrates, plankton, insect larvae, algae and plant matter,

**Additional details:** highest diversity found in the deep lakes of Eastern Africa (900 valid species, estimated more than 1300), most of the African species are endemic to their specific lake (no genera occur on more than one continent), there is one native species in the lower Rio Grande (Texas), very popular aquarium fish due to their bright colors and interesting shapes

**References:**
FishBase. [www.fishbase.org](http://www.fishbase.org)
University of Michigan Animal Diversity Web. [www.umz.las.umich.edu/](http://www.umz.las.umich.edu/)

[Angelfish (Pterophyllum scalare)](http://www.fishbase.org)
Perciformes

Taxonomy:

- **Superclass** – Gnathostomata (jawed fishes)
- **Class** – Actinopterygii (ray-finned fishes)
- **Order** – Perciformes (perch-like fishes)
- **Families** – Percidae (perches), Centrarchidae (sunfishes), Sciaenidae (drums or croakers), Moronidae (temperate bass)
- **Genera** – 9 in Percidae, 8 in Centrarchidae, 70 in Sciaenidae, 2 in Moronidae
- **Species** – 159 in Percidae, 27 in Centrarchidae, 270 in Sciaenidae, 6 in Moronidae

Description: Percidae maximum length is 100cm. Centrarchidae maximum is about 83cm. Moronidae usually grow to about 125cm, but have been found in excess of 175cm. Percidae dorsal fins are separate or only narrowly joined. Centrarchidae have separate gill membranes, and have at least three anal spines. Sciaenidae dorsal fin is long, with spinous and soft-rayed parts and a deep notch separating the two portions. Moronidae have two dorsal fins, with the first being spinous and the second having only one spine with 10-13 soft rays.

Habitat: All four families occur in fresh water; all but Centrarchidae occur in brackish environments, while Sciaenidae and Moronidae also occur in marine environments. All species are in shallow water.

Distribution: Percidae occur all over the northern hemisphere. Centrarchidae occur only in North America. Sciaenidae occur in the Atlantic, Indian, and Pacific oceans, while Moronidae occur in North America around the Atlantic and Gulf drainages, and also in Europe and northern Africa.

Ecology and Life History: Percidae reproduction and rearing techniques vary. In most Centrarchidae the males build and guard a nest. Sciaenidae and Moronidae are nonguarders. Most species in these families are carnivores, feeding on smaller fishes and insects, and some larger members feed on frogs and the occasional small low-flying bird. Sciaenidae are bottom-dwelling, but still carnivorous.

References Used:

- Fishbase
Perciformes

Taxonomy:
- **Superclass** – Gnathostomata (jawed fishes)
- **Class** – Actinopterygii (ray-finned fishes)
- **Order** – Perciformes (perch-like fishes)
- **Families** – Gobiidae (gobies), Blenniidae (combtooth blennies), Cichlidae (cichlids)
- **Genera** – 212 in Gobiidae, 53 in Blenniidae, 105 in Cichlidae
- **Species** – Around 1800 in Gobiidae, 420 in Blenniidae, at least 1300 in Cichlidae

Description:
Gobiidae are usually less than 10cm, maximum of 50cm. Blenniidae are usually less that 15cm, maximum of 54cm. Cichlidae sizes vary, but more are in the 10-20cm range. In Gobiidae the pelvic fins, when well developed, are fused into a single adhesive “sucker” disk. Blenniidae have pelvic fins in all but two species. Cichlidae vary greatly in body shape, but most are somewhat deep and compressed.

Habitat:
Gobiidae and Blenniidae occur mostly in marine environments; Gobiidae also occurs commonly in brackish environments while Blenniidae occurs rarely in those locations. Cichlidae is exclusively a fresh water family, also occurring in brackish environments. Gobiidae and Blenniidae also occur in fresh water, though not as often as they do in marine.

Distribution:
Gobiidae and Blenniidae are mostly distributed in tropical and subtropical marine environments, while Cichlidae has species in Central and South America, the Caribbean, Africa, Madagascar, Syria, Israel, Iran, Sri Lanka, coastal southern India, and one species occurs in Texas.

Ecology and Life History:
Gobiidae and Blenniidae are primarily bottom feeding carnivores of small invertebrates, some species are planktivores. Some also act as cleaners, eating things off the skin of other fish. Cichlidae have a wide variety of diets, including those mentioned above, and include eating plant materials and parasites. Reproduction generally involves nest-breeding, with either the males or both parents guarding the nest for varying lengths of time depending on the species.

References Used:
- Fishbase
Pleuronectiformes

**Taxonomy:**

Superclass Acanthopterygii  
Class Actinopterygii -- ray-finned fishes  
Order Pleuronectiformes -- flatfishes  
**Families 11** - Achiridae, Achiropsettidae, Bothidae, Citharidae, Cynoglossidae, Paralichthyidae, Pleuronectidae, Psettodidae, Samaridae, Scophthalmidae, Soleidae  
**118 genera ~ 572 species**  
VT species- None Present

**Description:** Adults not bilaterally symmetrical, with one eye migrating to the other side of the head, dorsal and anal fins with long bases, dorsal fin base overlapping at least the neurocranium except in *Psettodes*, body highly compressed, somewhat rounded on eyed side and flat on blind side, eyes can protrude above body surface allowing fish to see when buried in the substrate, usually six or seven branchiostegal rays, rarely eight, body cavity small, adults almost always without swim bladder, scales cycloid, ctenoid, or tuberculate, about four species probably occur in freshwater, while another 20 species that are normally marine occasionally enter freshwater.

**Habitat:** Pleuronectiformes can be found in fresh, salt, and brackish water.

**Distribution:** They are found all over the world.

**Ecology and life history:** They are born symmetrical. Over the course of their life, one eye migrates to the other side of their head. Also, they are born with a swim bladder, which disappears as the eyes migrate because they go blind on one side and eventually are located on the bottom of the water column.

**References used:**

Tetraodontiformes

**Superclass-** Gnathostomata  
**Class Actinopterygii-** ray finned fishes  
**Order Tetraodontiformes-** Molas, boxfish, puffers  
**Families (10):** Aracanidae , Balistidae , Diodontidae , Molidae , Monacanthidae , Ostraciidae , Tetraodontidae , Triacanthidae , Triacanthodidae , Triodontidae  
**106 Genera, ~360 species**

**Description:** all have a small, terminal mouth with strong jaws and incisors or a sharp beak. Have a reduced number of vertebrae. Many have sharp spines that can lock in place and hard, bony carapaces; the ability to inflate, and others possess toxic secretions. Some species have redeveloped cartilaginous tissues.

**Habitat:** Found on and around coral reefs around the world, some such as the Molidae are pelagic.

**Distribution:** Mostly found in tropical salt water, but some species found in temperate areas, as well as fresh water. Usually found in less than 50m of water but some species as deep as 900 meters.

**Ecology and Life History:** Some carnivorous, omnivorous, and herbivorous. Feed on a wide array of food sizes. Oviparous. The Molas have been known to lay up to 300,000,000 eggs.

**Additional Notes:** Some species consumed by humans mostly in the Asian countries. Have a very compressed genome.

Reference:  
www.fishbase.org  