

Fish

- **Fishes** — aquatic vertebrates; axial skeleton only
 - Closed, single-circuit circulatory system
- Class- **Aganatha** — jawless fishes
- Class- **Chondrichthyes** — cartilaginous fishes
- Class- **Osteichthyes** — bony fishes

Axial endoskeleton of a bony fish

**Axial skeleton:
Cranium & vertebral column**

Figure 3.02

Locomotion with an axial skeleton

- Inner layer of mesoderm becomes skeletal **vertebrae**
- Outer layer becomes **myomere** (muscle band)

- Proximal edge of myomere attaches to vertebrae
- Distal edge of myomere projects posteriorly-laterally to insert into connective tissue of skin
- ∴ Contraction of muscle → lateral flexing body

Fishes

Class- **Aganatha** — jawless fishes

- ~120 extant species (lampreys; hagfish)
- Cartilaginous skeleton
- Jawless, suctorial mouth with many teeth & protrusible toothed tongue
- Medial fin fold; No lateral (paired) fins

a Hagfish

b Lamprey gill openings (seven pairs)

Fishes

Class- **Chondrichthyes** — cartilaginous fishes

- Cartilaginous skeleton, but unique bone tissue present
- Semi-rigid paired lateral fins connected across ventral body wall

Subclass- Holocephali — ~ 40 spp. (chimeras)

Subclass- Elasmobranchii — ~1,000 spp. (sharks; rays)

- 5–7 gill slits [elasma-branch: “strap gills”]
- Protrusible upper jaw not fused to skull
- Thick skin with dermal denticles

External characters of sharks

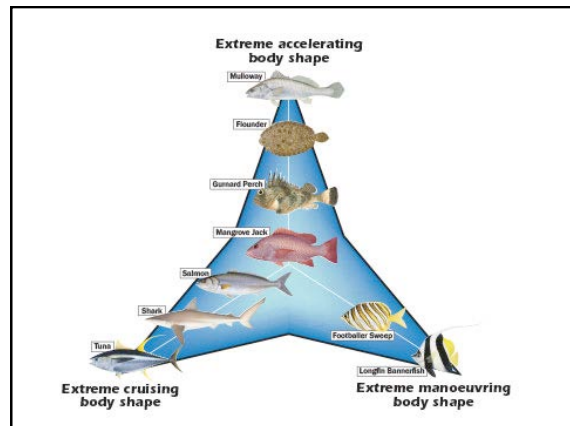
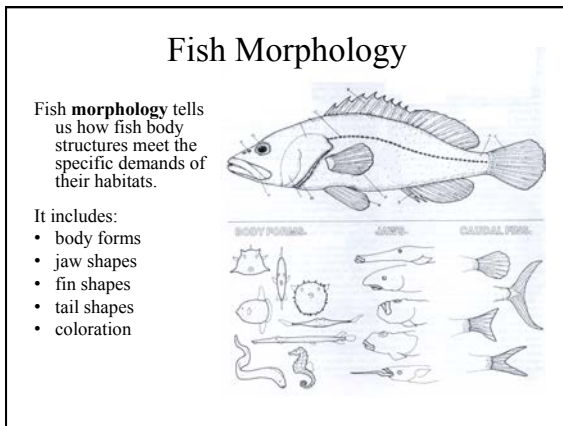
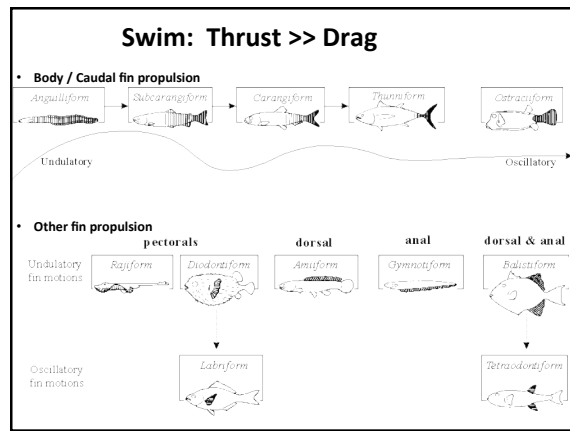
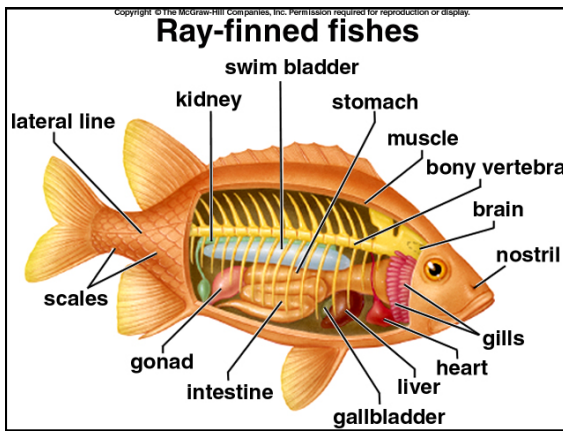
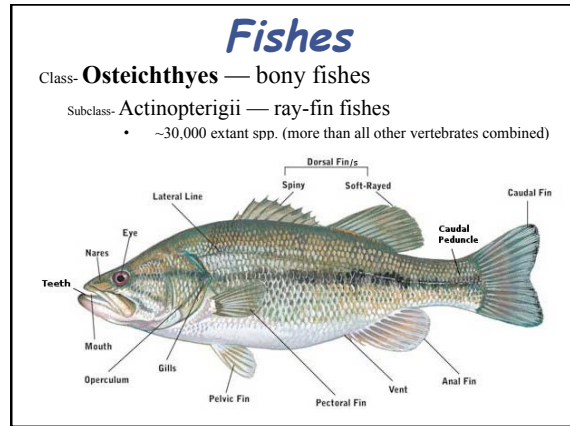
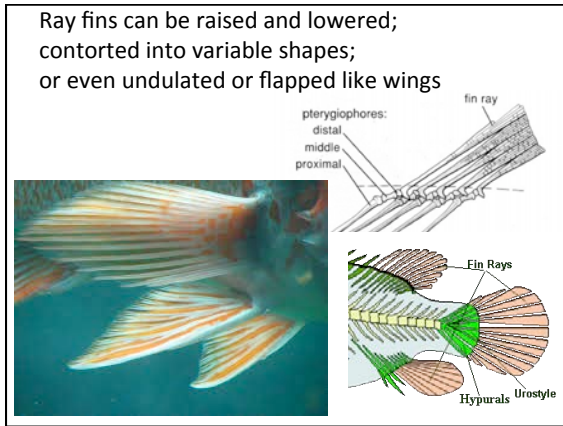
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Fishes

Class- **Chondrichthyes** — cartilaginous fishes

- Cartilaginous skeleton, but unique bone tissue present

Fins supported by cartilagenous rods



Fish Form & Function

1. Perciform: “perch form” — generalist

Fish Form & Function

2. Fusiform: bullet-shape; extremely streamlined; low turbulence; efficient long-distance cruiser; not so maneuverable

Fish Form & Function

3. Sagitiform: “arrow form” — elongated, cylindrical body; broad tail — fast acceleration, but high drag — burst predator

Fish Forms & Function

4. Compressiform: laterally compressed; oval profile — slow but highly maneuverable reef fish

Fish Forms & Function

5. Depressiform: dorso-ventrally flattened; usually with large pectorals & upturned mouth — bottom dwellers

Fish Forms & Function

6. Taeniform: “ribbon form” — (anguilliform) elongated, laterally compressed body; usually with continuous fin fold and reduced/absent paired fins

- i. Crevice dwellers
- ii. Low energy, slow undulating swimming in low food systems