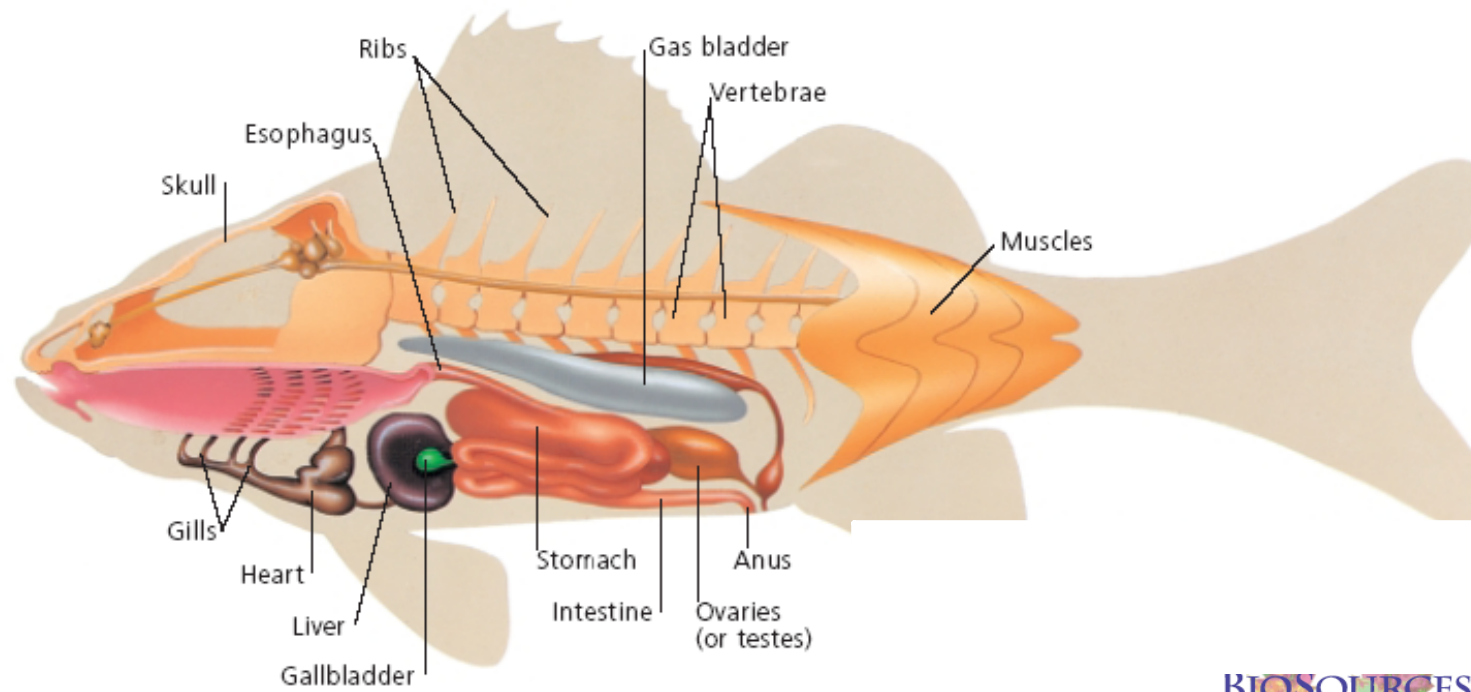


What characteristics make a fish recognizable?

Scales
gills

live in water

bony
cartilaginous fins
external fertilization









“Fish” refers to anything in the three categories

Agnatha (jawless fishes)

Chondrichthyes (cartilaginous fishes)

Osteichthyes (bony fishes)

Major Groups of Fishes

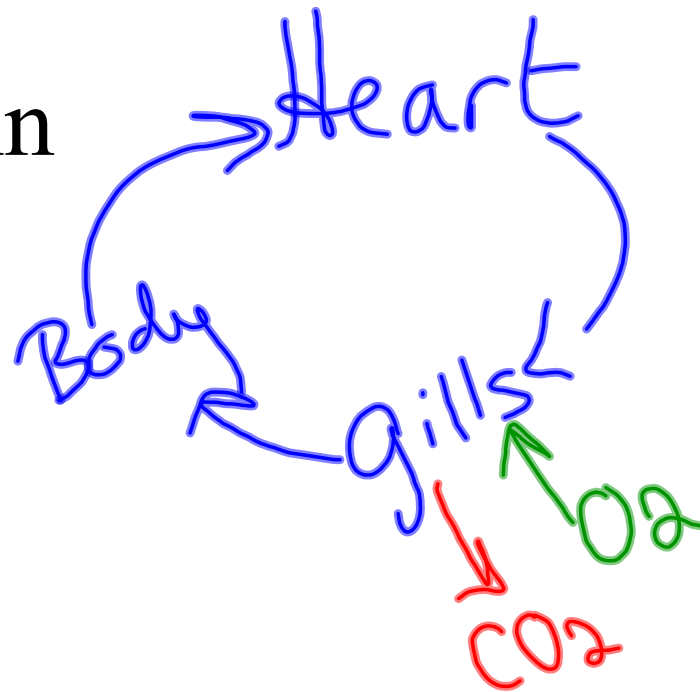
Class	Number of modern species	Description	Examples
Agnatha	81	No jaws; no paired appendages	Lampreys, hagfishes 
Acanthodii	Extinct	Jaws; spiny, paired fins	Acanthodians 
Placodermi	Extinct	Jaws; paired fins; bony armor	Placoderms 
Chondrichthyes	850	Jaws; paired fins; skeleton of cartilage; no swim bladder; spiracle; internal fertilization	Sharks, skates, rays 
Osteichthyes	21,000	Jaws; paired fins supported by bony rays; bony skeleton; most have swim bladder	Ray-finned fishes 
	7	Jaws; paired lobed fins; bony skeleton; extinct forms are ancestors of amphibians	Lobe-finned fishes 

Key Characteristics

Gills

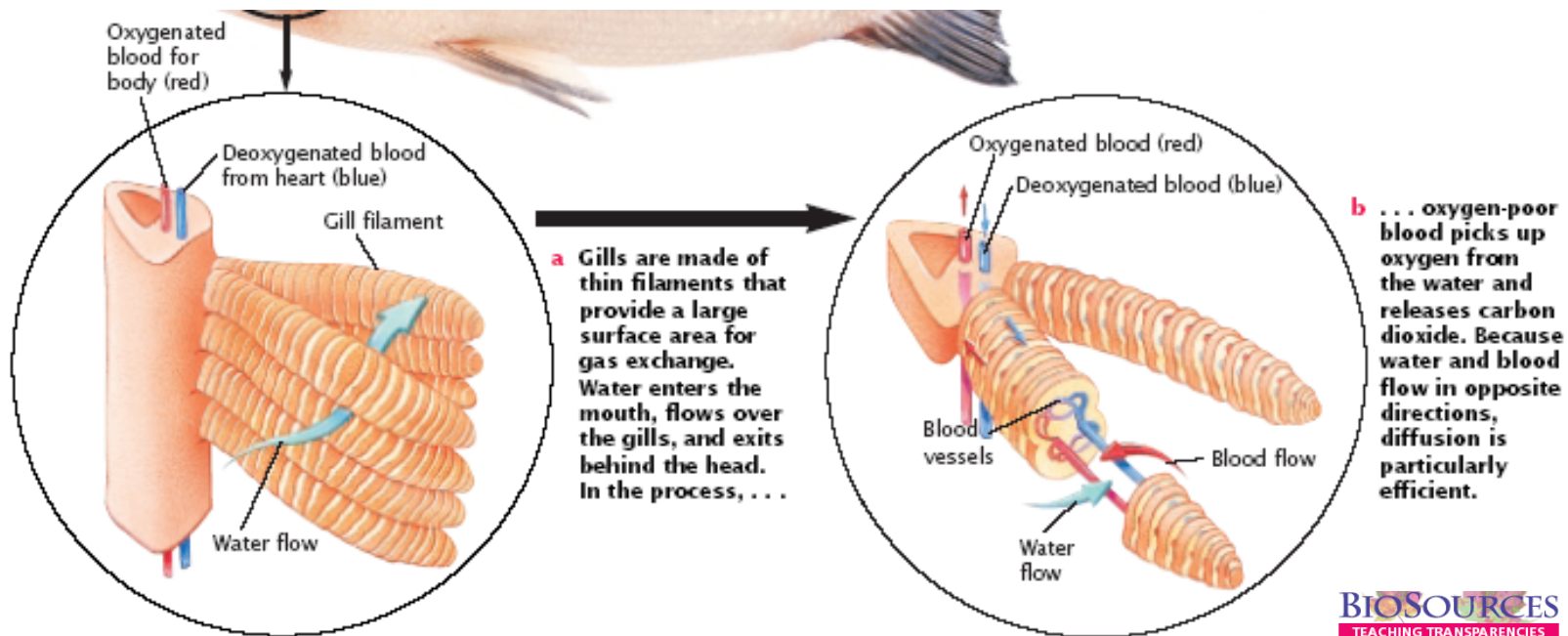
Single-loop blood circulation

Vertebral Column



Gills are made up of gill filaments (finger-like projections by which gases enters and leaves the blood)

Gill slits are where the H₂O exits the



Fish Heart

1. Sinus Venosus- the collection Chamber that acts to reduce the resistance of blood flow into the heart

2. Atrium- Chamber is large and has thin, muscular walls

3. Ventricle- thick walled pump
with enough muscle to contract
strongly

4. Conus arteriosus- a 2nd pump
that smoothes the pulsation and adds
more force

Salt
The concentration of salt in the sea water
is 3 times that of the tissues of the
fish

The fish always then lose water
through OSMOSIS

They need to constantly drink water

Freshwater fish tend to take in water by osmosis and this dilutes the ions so they need to take them from their environment

Kidneys are made of thousands of nephrons (tubelike units that regulate the body's salt and water)

Spawning- male and female gametes are released near one another in the water.