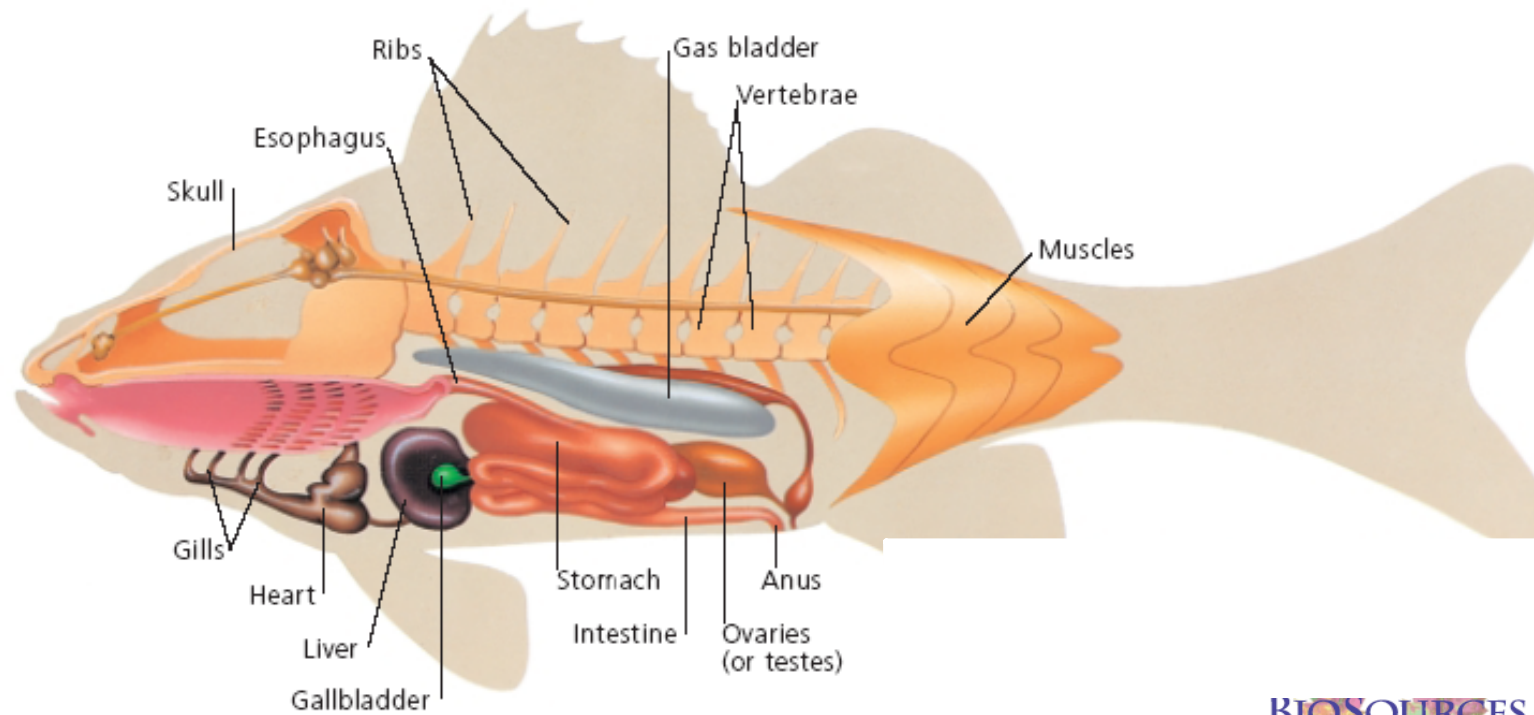What characteristics make a fish recognizable?

Ribs

Gas bladder

Esophagus

Vertebrae

Skull

Muscles

Gills

Heart

Liver

Gallbladder

Stomach

Intestine

Anus

Ovaries
(or testes)

"Fish" refers to anything in the three categories

Agnatha (_____ fishes)

Chondrichthyes (cartilaginous fishes)

Osteichthyes (_____ fishes)

Major Groups of Fishes

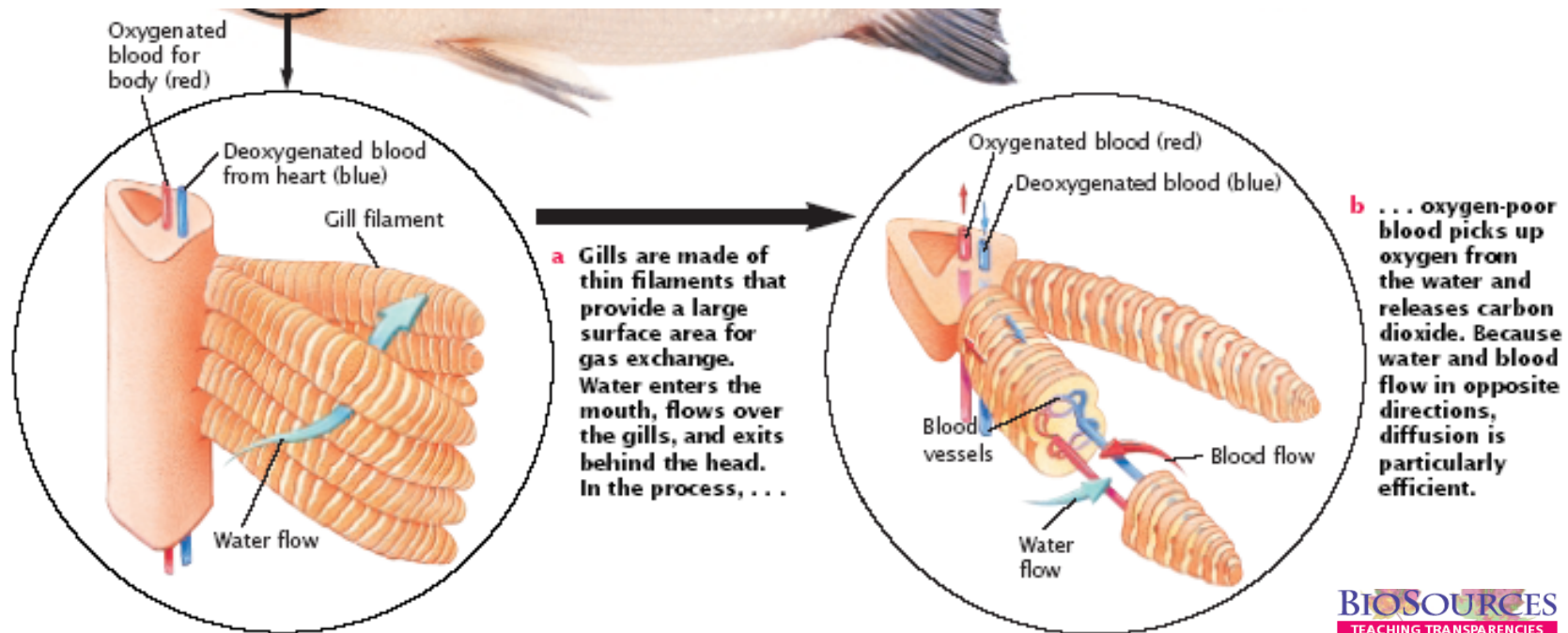| Class	Number of modern species	Description	Examples
Agnatha	81	No jaws; no paired appendages	Lampreys, hagfishes
Acanthodii	Extinct	Jaws; spiny, paired fins	Acanthodians
Placodermi	Extinct	Jaws; paired fins; bony armor	Placoderms
Chondrichthyes	850	Jaws; paired fins; skeleton of cartilage; no swim 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 _____ circulation

Vertebral Column

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

Gill slits are where the _____ exits the

Oxygenated blood for body (red)

Deoxygenated blood from heart (blue)

Gill filament

Water flow

a Gills are made of thin filaments that provide a large surface area for gas exchange. Water enters the mouth, flows over the gills, and exits behind the head. In the process, . . .

Oxygenated blood (red)

Deoxygenated blood (blue)

Blood vessels

Blood flow

Water flow

b . . . oxygen-poor blood picks up oxygen from the water and releases carbon dioxide. Because water and blood flow in opposite directions, diffusion is particularly efficient.

BioSources
TEACHING TRANSPARENCIES

6

Fish Heart

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

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

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

4. Conus arteriosus- a _____ pump that smoothes the pulsation and adds more _____

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

The fish always then _____water through _____

They need to constantly _____ water

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

_____

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

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