1. CLASS PISCES

HABITAT

Fish are aquatic vertebrates that live in water. They have representation both in fresh waters and in marine waters.

LOCOMOTION

They perform locomotion through fins. Fins are paired appendages. Unpaired fins are also present. Fins help in balancing during swimming.

RESPIRATION

They respire through gills varying from 5 to 7 on each side.

DIVERSITY

Fish are the largest group of vertebrates and constitute about 48% of the total vertebrates. The number of living fish species is more than 29000. Only 5,000 fish species are found in seas. The rest are found in rivers, lakes and ponds.

SCALES

Their body is covered by dermal scales. The scales provide them protection. Scales of fish arise from the dermis layer hence are deep seated. (Some e.g class ~~Ag~~ cyclostomata)

CIRCULATION

Fish have two chambered (one auricle, one ventricle) heart and there is a single circulation of blood.

SKELETON

Internal skeleton is either cartilagenous or bony.

OVIPOROUS

They are oviporous animals ie they lay eggs.

COLD-BLOODED (Poikilothermous)

They are cold-blooded animals i.e they lack the capacity to regulate their body temperature ~~change with respect to their surrounding~~.

CLASSES

They are divided into three classes:

1. Class Cyclostomata or Agnatha (Jawless Fish)
2. Class Chondrichthyes (Castilagenous Fish)
3. Class Osteichthyes (Bony Fish)

1. CLASS CYCLOSTOMATA OR AGNATHA

These are the most primitive jawless fishes having circular mouths. These fish have a long, eel like body.

ABSENCE OF SCALES / PAIRED FINS

Skin is naked i-e without scales. They lack paired fins.

ECTOPARASITES

All living members of Class Cyclostomata are ectoparasites (lives on the outside of its host) on some fishes. They donot possess a stomach bcz of their parasitic way of life.

GILLS

Seven pairs of gills are found which open separately to the outside and are not covered with operculum. (gill covering)

SKELETON

Their skeleton is of lower grade, fibrous cartilage. ~~Cranium and vertebral column are cartilagenous.~~

HABITAT

Cyclostomes are marine but migrate for spawning (release or deposit eggs) to fresh water. After spawning, within a few days, they die. Their larvae, after metamorphosis return to the ocean.

MOUTH

They have not evolved any sort of jaw, instead using a circular, sucker like

mouth to latch onto and suck the blood of their prey.

EXAMPLES

Examples are Petromyzon marinus (lamprey), Maxine glutinosa (hagfish) and eels.

2. CLASS CHONDRICHTHYES (CARTILAGENOUS FISHES)

They are marine animals with streamlined body and have cartilagenous endoskeleton. Mouth is located ventrally.

PLACOID SCALES

Their body is covered with minute and numerous placoid scales and give the skin a touch of sand paper.

CIRCULATION

Circulatory system is with many pairs of aortic arches. Heart is two chambered (one auricle and one ventricle).

GILL SLITS

Gill slits are separate and are not covered with operculum (gill covering).

TAIL

They have heterocercal tails in which dorsal lobe is longer than ventral lobe.

RESPIRATION

Respiration takes place through 5-7 pairs of gills.

CARNIVORES

Most of them are carnivorous and sharks are very active hunters. Cartilagenous fish are often predators, and can be found in oceans throughout the world.

ABSENCE OF AIR BLADDER

Due to absence of air bladder, they have to swim constantly to avoid sinking.

SPECIAL ORGANS

Some of them have electric organs (e.g Torpedo) and some possess poison sting (e.g Trygon).

FERTILIZATION

Sexes are separate. They have internal fertilization and many of them are viviporous (give birth to young ones).

EXAMPLES

Examples are sharks, rays, skates, chimeras etc.

3. CLASS OSTEICHTHYES (BONY FISHES)

These fishes have a skeleton made of bone hence called bony fishes. They are the most successful group of fishes and inhabit all types of aquatic habitats.

SCALES

Their body is covered with scales of different types

FINS

Median fins i-e dorsal fins, anal fins, caudal fin and Paired fins i-e pectoral and pelvic fins are present in bony fishes.

SWIM BLADDER

A specific organ swim bladder is found which is hydrostatic in function and provides buoyancy to the fish in water.

GILLS

Respiration is through well developed gills which are covered with a bony cover

called operculum. Bony fishes can breathe without swimming because of the operculum.

JAWS

Jaws may be with or without teeth.

BRAIN

Brain is developed with 10 pairs of cranial nerves.

CIRCULATION

Heart consists of an auricle and a ventricle. Blood contains haemoglobin as respiratory pigment and its colour is read.

REPRODUCTION

Sexes are separate and except few species the fertilization is external. Majority of bony fishes are oviparous but some are ovoviviparous and viviparous.

SENSES

Unlike cartilagenous fishes, bony fish have a a good eyesight which is very poor in cartilagenous fish.

EXAMPLES

Flying fish, Seahorse, Angel fish, etc. Salmon, trout, electric fish etc.

HOW DO GILLS FUNCTION

Haemoglobin is a protein in blood that binds readily with oxygen. The blood moving in the capillaries in the blood is very low in oxygen. There is a higher concentration of oxygen in the surrounding water than in capillaries. Oxygen diffuses across the membranes of the gills into the capillaries.

MORE INFO

* CARTILAGENOUS FISHES

The fish belonging to this group have a bone-less skeleton supported by strong, flexible tissues called cartilage. They are long and heavy but they can swim very fast. They are considered the most lethal animals of the sea.

* BONY FISH

Bony fish form the biggest group in terms of number.

* JAWLESS FISH

These fish have a backbone while the rest of the body is very soft. These fish are attached to big fish and feed on their leftovers.

* SECRETION OF SKIN

Fish excrete a jelly-like substance from their skin which protects them from

disease and helps them float in water. A live fish tends to slip out of the hands bcz of this substance.

* PROTECTIVE SHIELD

Most fish have their bodies, especially gills, covered with scales that protect them from injury. So it can be said that scales serve as a protective shield for fish. Between the scales is a special line-shaped sense organ called lateral line. A fish finds it way in the dark or hunts its prey with the help of its lateral line. These tissues are linked directly to the brain through veins.

* THE FISH WITH ELECTRIC SHOCK

Some species have an electrical organ i-e special cells which produce electricity. Such fish give frequent electric shocks to their prey so that it becomes unconscious and an easy victim. The most dangerous among this fish is the Electric Eeel which has not one, but 3 electrical organs.

* THE FLYING FISH

The flying fish is a masterpiece of nature. In fact, the fins of this fish are very long with which it catches flying insects or protects itself from predator fish by flying in the air. A flying fish swims very fast and jumps into the air by spreading its fins. It can fly upto 160 feet above water.

WARM BLOODED VS. COLD BLOODED ANIMALS

WARM BLOODED OR ENDOTHERMS OR HOMOIOTHERMOUS ANIMALS

INTERNAL BODY TEMPERATURE

1. They maintain a constant internal body temperature irrespective of external environment. Can regulate their body temperature by generating their own heat when they are in a cooler environment, and by cooling themselves when they are in a hotter environment

SURVIVAL:

2. They can survive in a wide range of environments as they are able to regulate their body temperature.

CONSUMPTION OF FOOD

3. They require a lot of food for their survival. Most of the food consumed is utilized to maintain a constant body temperature.

EFFECT OF WARM AND COLD ENVIRONMENT

4. They are active in both warm and cold environments.

REGULATION OF TEMPERATURE

5. To stay cool, warm blooded animals usually sweat. Animals like elephants use their ears to cool their body (large, thin ears which lose heat quickly).

Some warm-blooded animals, especially birds, migrate from cold to warmer regions in the winter.

Mammals have hair, fur and birds have feathers to keep them warm.

Warm blooded animals can also shiver to generate more heat when they get too cold.

PARASITIC INVASIONS

6. Constant body temperature provide a nice warm environment for viruses, bacteria and parasites to live in.

REPRESENTATIVE ANIMALS

7. All mammals and birds with few exceptions are warm blooded (Bats, Echidnas, Mole Rats etc can't regulate their body temperature).

COLD BLOODED OR ECTOTHERMS OR POIKILOTHERMOUS ANIMALS

1. Their body temperature changes according to their external environment. (If a cold blood animal is taken to the equator its body temperature increases and if taken to the poles its body temperature decreases).

2. They cannot survive in a wide range of environments (Tropical animals can't survive

in the polar region and vice versa)

3. Most of food consumed is converted into body mass. So they need less food as compared to warm blooded animals.

4. They are active in warm environments and are very sluggish in cold environments.

5. Cold-blooded animals often like to bask in the sun to warm up and increase their metabolism.
Some cold blooded animals, such as bees or dragonflies, shiver to stay warm when in a cold environment.

6. Constantly changing body temperatures makes life more difficult for the parasites.

7. All reptiles, insects, arachnids, amphibians and fish are cold blooded animals.