

Please note – These are extracts from one student’s response

Gases are exchanged during respiration in all living things, especially the exchange of oxygen and carbon dioxide between an organism and its environment.

Cells need energy to stay active, grow and divide. This energy comes from the oxidation of glucose in respiration. All cells must have a constant supply of oxygen to survive.

3

Gas exchange is not the same as respiration. It is the process by which oxygen gets into cells and carbon dioxide is removed. Respiration creates the constant demand for oxygen and a constant release of carbon dioxide.

Gas exchange surfaces are needed to exchange the gases. They allow the diffusion of gases into and out of cells and are the gills in fish (tracheae in insects and lungs in mammals.) These surfaces in fish gills have a large area. They are thin and kept moist as fish live in water.

1

2

Fish live underwater and have no problem in removing carbon dioxide because it dissolves very easily in water. The amount of oxygen dissolved in the water depends upon the water temperature but, in general, there is about 30 times more oxygen in the air than in water.

2

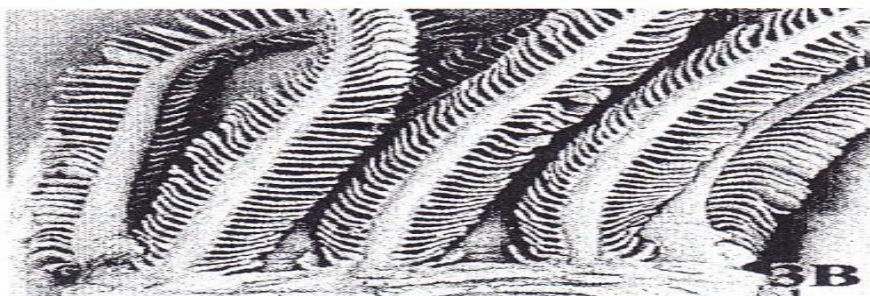
Gills in fish are internal and covered by an operculum. To get enough oxygen the fish must make water flow across its gills. The gills come in several layers. Fish carry out gas exchange in a different way to mammals. They use gills and the flow of water over their gills to take in O_2 and to remove CO_2 . A fish breathes as it swims by opening its mouth and allowing water to flow over the gills.

1

The gills of a fish have fine filaments, which comb through the water. On the filaments are lamellae. The blood flows against the flow of water, so that they are flowing in opposite directions.

1

2



Microscope image of gills (Radboud University,

When the water is forced over the gills small pointy structures called gill rakers get rid of small food particles and foreign materials from the water. This adaptation gets rid of all materials that may damage the gills. The water passes over the gill arches. The gill arch is the bony support structure for the gills.

1