

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

In fish, gases are exchanged during respiration. The diffusion of gases happens from an area of higher concentration to an area of lower concentration, especially the exchange of oxygen and carbon dioxide between fish and its environment.

3 If cells in fish are to stay active, grow and divide they need energy. This energy comes from the oxidation of glucose in respiration. All respiration involves oxidation reactions, which means that all cells must have a constant supply of oxygen.

Gas exchange surfaces are found in the gills of fish. They have a large surface area, are thin and have a moist surface. Gases can dissolve first before they diffuse in our out. They are able to maintain the diffusion gradient down which the gases can diffuse.

2 Fish live underwater so have no problem in removing carbon dioxide because it dissolves very easily in water. Their problem is how to get enough oxygen. There is 30 times more oxygen in the air than in water. Animals which swim a lot need a considerable amount of oxygen to make the muscles work.

The gills are covered by a flap called the operculum. To get enough oxygen the fish must make water flow across its gills. The fish does not breathe water in and out of its mouth. The water gives oxygen to the blood in the gill filaments and receives carbon dioxide in exchange.

Finally, the water passes out from under the operculum. The fish's gills are feathery, made of gill filaments which give them a large surface. The gills also come in several layers.

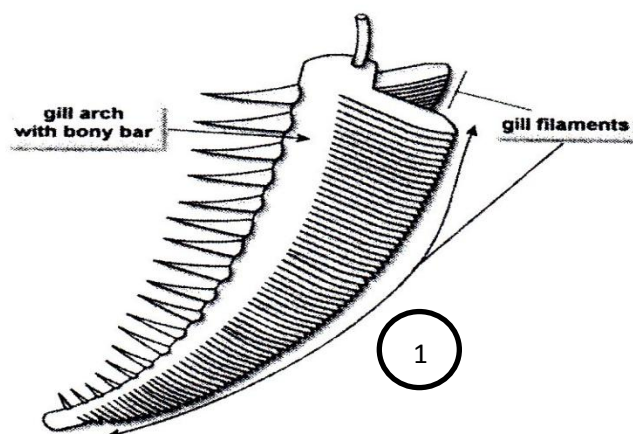


Fig 1.2- The structure of the gill filaments

(Google images, 2012)

Gill filaments are supported by gill arches. Fish suffocate when they are taken out of water. This isn't because they cannot breathe oxygen in air, but the gill arches collapse. It is also possible for a fish to suffocate in water. This may happen when the oxygen in water has been taken up by something else.