**Gas Exchange in Insects**

Air, close, Tracheae, oxygen, cuticle, open, tracheoles, walls, gases, CO2, spiracles, opposite, internal muscles, abdomen, contractions, haemolymph, O2, internal muscles

The breathing tubes or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ make up a branching system carrying \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the atmosphere to all parts of the insect’s body. They are lined with a thin layer of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, thickened in spiral bands, this thickening keeps them \_\_\_\_\_\_\_\_\_\_\_\_\_ against the internal pressure of the body fluids. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ branch repeatedly until they end in very fine tubes or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which penetrate the tissues of the body. The \_\_\_\_\_\_\_\_\_\_\_\_ of the tracheae and tracheoles are permeable to \_\_\_\_\_\_\_\_\_\_\_\_\_\_, oxygen can diffuse through them to reach the cells and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can diffuse in the reverse direction into the tubes.

The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ open to the atmosphere by pores called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Often there is one \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on each side of every segment of the body, but in some insects there are only one or two on either side. The entrance to the \_\_\_\_\_\_\_\_\_\_\_ is usually supplied with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which enable it to open and close. The spiracles \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when the insect is not active and therefore needs little \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and this closure helps to reduce the loss of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by evaporation from the internal tissues.

The movement of oxygen from the atmosphere through the breathing tubes to the tissues and of carbon dioxide in the\_\_\_\_\_\_\_\_\_\_\_\_ direction, can be accounted for by simple diffusion. In active insects however there is often a ventilation process, which exchanges up to 60% of the air in the tracheal system. Ventilation is brought about by rhythmic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the abdomen, produced by the contraction and relaxation of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The compression of the abdomen brings about a rise in pressure in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which squeezes the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. When the muscles relax, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ spings back into shape, and the trachea expand and draws in\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

