

Question 25 (5 marks)

What is the relationship between dissolved oxygen and biochemical oxygen demand and why is it important to monitor both in natural ways?

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Dissolved oxygen is the amount of molecular oxygen dissolved in a water sample, while biochemical oxygen demand (BOD) measures the capacity of microbes in the water ~~to consume~~ ^{to consume} this oxygen.

Hence, these two indicators of water quality are linked, since to measure BOD, one must also measure DO. To measure DO, one could use an oxygen sensor probe or undertake the Winkler titration. To measure BOD, one would ~~measure~~ take two water samples in ~~two~~ ^{two} test tubes: one test tube has its DO measured as above while the other is incubated in the dark at 25°C for 5 days and then has its DO measured. The difference in the two DO values is the BOD value. It is important to monitor both in natural waterways, since they are indicators of water pollution by a variety of factors, including heat and micro-organisms. DO reflects water pollution since an abnormally low amount of it suggests that conditions are not suitable to sustain life, since underwater plants and animals use DO ~~for~~ for photosynthesis and respiration, respectively. Low values of DO could indicate thermal pollution or the presence of too many microbes that use up the DO. This is linked with ~~the~~ BOD, which measures the extent to which the DO is consumed by micro-organisms in the water, where a high BOD indicates water pollution as they use up the DO in the water. ~~This is linked with~~