



Modeling processes

Modeling can be used to understand complex processes. Students may learn to link a problem to a qualitative or quantitative model. Understanding a model helps a student to fully understand the cohesion between the different factors.

Oxygen concentration in a pond

In and around a pond live different organisms. Think about reed, algae, duckweed, fish and insects. Oxygen plays an important role in the lives of these aquatic organisms. Sufficient oxygen in the water will include a healthy aquatic ecosystem.

Oxygen deficiency can mean a reduction in the water quality due to the bacterial activity decreases, additionally, it may provide (acute) fish mortality.

The oxygen concentration will depend on a number of factors:

- The water temperature, the higher the water temperature, the lower the oxygen concentration.
- Air pressure, the lower the air pressure, the less there is diffusion of oxygen to the water.
- Plants, plants provide fluctuations in the oxygen concentration. In the morning the oxygen concentration is lower due to oxygen consumption and at the end of the day, the oxygen concentration is higher due to photosynthesis. The amount of plants influences the oxygen concentration as well.
- Organic material, large amounts of organic material provide a decrease in the oxygen concentration. Bacteria that convert organic material, consume a lot of oxygen during this process.
- Flow, moving water creates a larger oxygen uptake from the air than stagnant water.

The current model just include a small number of factors that influence the oxygen concentration. In order to make the relation between photosynthesis and respiration of plants and animals visible.

The model can possibly be made more realistic by adding some of the factors above in the model.