Teaching Material on Biodiversity Conservation (TMBC)

Plan for the lesson about eutrophic and oligotrophic lakes

Title: Eutrophic und oligotrophic lakes
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Level: Secondary level I (10th grade)/ Secondary level II (11th grade)
Materials: worksheet 1+2, trio-game, blackboard
Aims: The students learn the difference between hypertrophic, eutrophic, mesotrophic and oligotrophic lakes.

The students should already have learned about the following topics: lake structure and specific layers of lakes (pelagic and benthic); wind-induced seasonal water circulation; and density differences in lakes. Furthermore, students should be familiar with water quality tests.

Lesson plan

1. Introduction: approx. 25 min.
Each student is given **worksheet 1**. After reading the text in the class, they work on exercise one and two using the "Think-Pair-Share" method (first on their own, then in pairs and in the end as a group of four). The students' assumptions about the biological reasons will be discussed, written down and collected on the board. After that, the teacher will lead into the game by mentioning that apart from the visible differences there are also measurable differences.

2. Game: approx. 10 min.
The students, still in pairs, play the trio-game (quartet). Version: They have to ask their partner about the data for a chosen category- the person with the better data wins both cards- now it's his/ her turn. During the game the students have to pay attention to the different categories/ indicators and their data. The students themselves decide who has the better card! They should be told that it is not always the highest data that wins!

3. Game – Reflection: approx. 15 min.
The teacher asks questions, for example which categories/indicators have been used in many cases or which of the categories/indicators required the highest or lowest data to win. In order to find out if the student's evaluation was reasonable, they have to put the game cards in order. The correct order of the cards reveals the word "trophic state". The teacher asks further questions about the similarities of the game cards (letters in the upper right corner). After that the teacher classifies the cards into four groups, introducing the four trophic states (oligotrophic, mesotrophic, eutrophic and hypertrophic).

4. Worksheet 2: approx. 15 min.
The students work on the exercise on the second worksheet.

5. Plenary: approx. 25 min.
The class talks about the conditions of the two lakes introduced at the beginning. Based on their new knowledge the students try to find out the trophic states of these lakes. The teacher repeats the assumptions about the Königssee and Mr. Müller's favourite lake- assumptions will be compared with the chart on worksheet 2 and then confirmed or rejected. Once more, the given data for the categories/indicators have to be discussed in class, with respect to the "quality" of a lake. The teacher gives instructions and explanations about the correct biological background.

6. Homework: Collect information about “eutrophication”. Create a schematic figure!