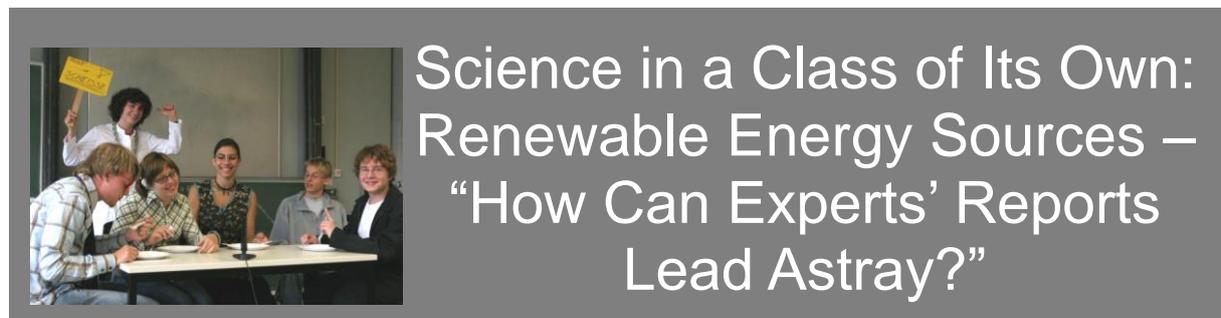




## PROFILES IBSE Teaching/Learning Materials for Teachers

compiled by the PROFILES Working Group of the Freie Universität Berlin – Germany



### Science in a Class of Its Own: Renewable Energy Sources – “How Can Experts’ Reports Lead Astray?”

A Module for Science Instruction –  
especially Chemistry – for Grades 8 to 12

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## Module Content

In this module the students have to deal intensively with the opinions, ideals and judgments of other people on the topic of renewable energy, namely bioenergy. With the help of detailed instructions, the students should be able to compare and evaluate the two fuel types biodiesel and diesel, for example.

In order to complete this exercise the students have to, on the one hand, use the knowledge they have gained in theory and in practice. On the other hand, the students have to question their individual ideals. The aim of the exercise is not just the result of the evaluation itself but, more importantly, the process of the evaluation and the students’ reflection of this process in the group.

The actual evaluation is carried out in small groups. The participants receive a worksheet on which the evaluation process is split into four parts. This structured evaluation process allows a standardised procedure for the evaluation of two or more alternatives. While the students carry out this process of evaluation, they are sensitised as to how varied individual evaluation of the different alternatives can be. The students have to talk with each other about how they assess the importance of the different criteria. They also have to consider whose ideals are meaningful. Together they have to find a consensus, which is something that can happen very differently depending on the group:



In some groups the participants go into great detail about the different criteria and their weighting, and every decision is contemplated on very carefully; in other groups it may be the case that all the participants agree on almost everything because seemingly only a few arguments are needed to come to a decision.

Having completed the evaluation of the two fuel types, the students present their findings to the other groups. While doing so, the students will realise that although there is a standardised evaluation procedure, the different expert groups evaluate the two fuel types completely differently. Each group explains which arguments are necessary to underline the rating for each fuel type. The students will realise that different ideals lead to each of the group-internal evaluations. In spite of the differences in the results for each fuel type, the grades given have to be plausible for the others.

Because the process is so transparent, the students can reflect on the evaluation process and each evaluation step individually. How were decisions made in the group? Was the atmosphere for communication open and was it possible to deal with the issues democratically, or were there group members who claimed leadership and influenced the group's opinion. Following the evaluation process the students spoke about these types of situation with hindsight and were able to analyse them. The participants can see, then, that even scientific facts are rated and weighted individually, depending on subjective ideals, and that in a larger group it can be difficult to come to a united decision. They can also understand the problem that expert groups often come to different, in part even contradictory, results, e.g. when analysing the ecobalance of the same products.

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