PROFILES

Professional Reflection-Oriented Focus on Inquiry-based Learning and Education through Science

PROFILES IBSE Teaching/Learning Materials for Students

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

Developed by: Birgit Kirschenmann, Claus Bolte (2007)
Institution: Department of Chemistry Education, Freie Universität Berlin – Germany
Homepage: www.chemie.fu-berlin.de/didaktik - Mail: didaktik@chemie.fu-berlin.de

Outline

In the PROFILES module "Renewable energy sources – how can experts' reports lead astray?" you will have the opportunity to deal intensively with the opinions, ideals and judgments of other people on the topic of renewable energy, in this case bioenergy. With the help of detailed instructions, you will compare and evaluate two fuel types, biodiesel and diesel, in a systematic manner. By following the recommendations of this module, you will learn how experts come to their conclusions and formulate scientific reports. You will also find out how different experts can come to different conclusions and, as a result, why even experts' reports can lead astray. The following worksheets will help you in completing the exercises in the module.

Acknowledgement:

These materials are taken from the Teaching-Learning Materials Tool compiled by the PARSEL Consortium (namly by Kirschenmann, & Bolte, 2007) as part of the EC FP6 funded PARSEL Project (SAS6-CT-2006-042922-PARSEL) and adapted by the FUB-PROFILES Working Group – Member of the PROFILES Consortium. For further information see: www.parsel.eu.

Science in a Class of Its Own: Renewable Energy Sources – "How Can Experts' Reports Lead Astray?"

These worksheets belong to: . . . . . .

Coming to Your Own Expert's Report

Carry out your own assessment of the two fuels, biodiesel and diesel; first on your own and afterwards in groups.

1. **Write down ten criteria which are important for your assessment of both kinds of fuels, i.e. biodiesel and diesel.**

1.	**6.**
2.	**7.**
3.	**8.**
4.	**9.**
5.	**10.**

2. **Form a group together with two or three other class members. Now, select only five of the ten criteria which you and your group want to use for the assessment. Determine the "importance" and a "weighting factor" for each criterion by allocating 20 points all together to the five chosen criteria.**

Criterion	**Weighting factor**
A	
B	
C	
D	
E	
Sum of the five weighting factors	**20**

Assessment of the Fuel Biodiesel:

3. List your selection of criteria and the respective weighting factors.

3.1 Assess biodiesel for each criterion and allocate grades to it:
1 = very good to 5 = inadequate.
Calculate the "weighted grades" by multiplying the grade of the respective criterion with the weighting factor. Then add the single "weighted grades". In order to calculate the final grade, divide the sum of the "weighted grades" by 20.

Biodiesel			
Criterion	**Weighting factor**	**Grade**	**"weighted grade"**
A			
B			
C			
D			
E			
Sum	**20**		_____
			: 20
Final grade			_____

Assessment of the Fuel Diesel

4. Use the same principle as with the fuel biodiesel.

Biodiesel			
Criterion	**Weighting factor**	**Grade**	**"weighted grade"**
A			
B			
C			
D			
E			
Sum	**20**		_____
			: 20
Final grade			_____

Reflections on other Experts' Opinions and Arguments

Plan a role play within your group and then perform it in front of class.

Frame: Group size: 4-5 students; preparation time: approx. 30-45 minutes; performance time: approx. 10-15 minutes

Scenario: In the last few years, more and more biogas plants have been built in agricultural areas. One is also planned for the village Pyritz. The village's population sees the proposed plans with mixed opinions.

1. Planning phase

Before you start planning your role play, you have to decide together how you want to organise your scenario. To help you, here are a few ideas to keep in mind:

- Think of a setting for the scene (council meeting, discussion amongst panel, television show?)
- What kind of pro and con arguments are there?
- Think of possible roles. Distribute the roles in your group so that there are an equal number of pro and con positions.
- Think of how you want to present your role play (seated or standing discussion group? Will the debate end with a vote?...)
- Choose one member of the group who will briefly present the debate to the audience, introduce the discussion members and then lead the debate.

2. Preparation phase

- Develop your roles and argument positions.
- Plan the order or events in the scene.
- Make sure you can perform the scene within 10-15 minutes.

3. Performance phase

Having planned and prepared each role play, all the groups perform in front of class. Pay particular attention to the arguments brought forward by your fellow students. Are they the same arguments or points of view that feature in your role play? In what way do differences in opinion, controversies and/or similarities in opinion play a part?