

# Workshop 7

## Chemistry and the Environment

**Classroom Climate:** This program introduces the chemistry of the environment. It addresses selected topics such as water quality and purification, recycling, and the hole in the ozone layer. Bringing the students to awareness of these topics helps them understand important issues in the world around them. In studying chemistry, environmental studies or anything else, the classroom climate is an important issue as well, and the teacher can influence it to a great extent.

### Learning Objectives

- To introduce chemical principles which are important for the environment
- To emphasize classroom climate as a factor in effective teaching

### Pre-Workshop Preparation

1. Read the following: "Classroom Climate," by Dorothy Gabel, in *ChemSource*, version 2.1 (Orna, Mary Virginia, O.S.U.; Schreck, James O. & Heikkinen, Henry, eds.), vol. 1, PEDTA, pp: 9–10, 1998 (in the Appendix of this guide). What are important factors which influence classroom climate? How does it affect the students? Bring your own examples.
2. List several topics in environmental chemistry that you find most related to the chemistry curriculum. Explain how you would incorporate one everyday environmental-conservation issue into your teaching and which chemical principles would follow.
3. Enter the teachers' guide in the Globe Web site: [http://archive.globe.gov/sda-bin/wt?ghp/tg+L\(en\)](http://archive.globe.gov/sda-bin/wt?ghp/tg+L(en)). Choose an activity from the teachers' guide in there that you could incorporate into your curriculum. Write in your journal about what you have to do in order to implement this activity into your own classroom. Write down all stages: from the decision about where in your teaching you would conduct the activity, what your goals would be, and what preparation you would need in order to implement it in your classroom (time schedules, buying materials, doing the activity before, topics to concentrate on).

# Workshop Session (On-Site)

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## Getting Ready (30 minutes)

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Discuss the importance of dealing with environmental issues in the chemistry curriculum. What topics would you introduce and where in the curriculum would you introduce them? Do you implement new activities in relation with new environmental topics that arise, such as recycling, pollution, glacier melting, the hole in the ozone layer, etc.? How do you approach the implementation of new activities? Present your homework assignments and give examples from your own classroom.

## Watch the Workshop Video (60 minutes video/60 minutes discussion)

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### Focus

The emphasis of this workshop is on the world's climate as well as on the climate of the classroom. Both climates affect the people within.

### Unit 7.2. Solutions

*Stop the video after the slide about methane production in cattle.*

Mr. DeGennaro says: "The one thing that dawned on me is that kids don't like when you give them problems, which are essentially: I know something that you don't know, and if you can't guess it, that's bad. This ought to be something that we are all approaching together, and kids are a lot more receptive to that." Discuss the climate in Mr. DeGennaro's classroom. What is the basis for his interaction with the students? How does he use humor in the classroom? What other methods does he use?

### Unit 7.3. The Chemistry in Earth's Water

*Stop the video after Ms. Berry's water sampling laboratory.*

"That's one thing about teaching environmental science, is that we don't have control over the situation and sometimes we are both looking for the answer." Is this a difficult situation in teaching, or can it be used as a trigger for students' curiosity? What does collaboration between teachers and students do to the classroom climate?

### Unit 7.5. Water Purification

*Stop the video after the slide about mercury poisoning of hatters.*

Ms. Baptiste chooses to teach about water purification as a means of attracting the students to chemistry, "without them even knowing that they are doing chemistry." In which stages of teaching can you incorporate this experiment? What are possible implications of the experiment to the chemistry curriculum and to the understanding of environmental issues? Relate also to Prof. Collins's interview about water disinfection.

### Unit 7.6. Recycling Aluminum

What are the roles of metals in the environment, which are reflected in this and in other segments of the program? How does recycling affect the conservation of their natural balance? What are major points in the recycling laboratory that Mr. DeGennaro relates to?

## Going Further (30 minutes)

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Discuss the classroom climate in the filmed segments. Compare to class climates in earlier programs that you have observed and to everyday examples from your own or your peers' teaching in your school. What ways do teachers use to create a good climate in class and still create an effective learning environment? What are the main obstacles to doing that?

# Between Sessions (On Your Own)

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## Homework Assignments

1. Comment on the safety precautions that Mr. DeGennaro takes in the Recycling Aluminum Laboratory. How can the teacher create the basis for understanding of safety issues as part of a comfortable classroom climate?

The issue of conserving the delicate balance of the atmospheric gases can only be thoroughly understood through the chemistry of the processes that influence it. Refer to Dr. Geller's quotes in the Appendix and to other references in this workshop, in order to write a lesson plan about the chemistry of the cycle of interaction: Mankind → Atmosphere → Mankind (for example: we release CO<sub>2</sub> → the greenhouse effect → heating up the Earth). What are your main objectives in this lesson? How can you work them out with your students (demos, skits...)?

2. Go to <http://www.soton.ac.uk/~engenvir/>. Play the game "Escape," and write in your notebook the decisions that you make on the way. Mark them as right or wrong, and count how many points you have at the end. Also, enter "case study" on the home page, and explain your solutions to the problems which are presented, and why you chose to act this way.

For additional information and activities about industrial inorganic chemistry, go to the ChemSource Web site at <http://intro.chem.okstate.edu/ChemSource/chemsource.html>.

In particular, go to the Concept/Skills Development section at <http://intro.chem.okstate.edu/ChemSource/Industrial/Industrial.html> and try the Physical and Chemical Examination of Soils activity [*ChemSource*, version 2.1 (Orna, Mary Virginia, O.S.U.; Schreck, James O. & Heikkinen, Henry, eds.), vol. 2, INDL, pp: 5-13, 1998].

# Notes

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