

LESSON:

Mobility 2030: Can We Meet the Goals?

Summary: Students read through several articles in the July 2005 and April 2005 *EHP Student Edition* to identify countries, communities, and organizations that are meeting or attempting to meet the goals outlined in the report *Mobility 2030: Meeting the Challenges to Sustainability*.

EHP Articles: **Primary article:** "Heavy Traffic Ahead: Car Culture Accelerates," *EHP Student Edition*, July 2005, p. A238–A245, <http://ehp.niehs.nih.gov/members/2005/113-4/focus.html>.
Additional articles to complete the lesson:
 "China Goes Retro," *EHP Student Edition*, July 2005, p. A231.
 "Souped-Up Yeast," *EHP Student Edition*, July 2005, p. A231.
 "Vive La Petite Auto!" *EHP Student Edition*, July 2005, p. A231.
 "An End to Idle Threats?," *EHP Student Edition*, July 2005, p. A233.
 "EHPnet—www.fueleconomy.gov," *EHP Student Edition*, July 2005, p. A233.
 "Driving Up the Cost of Clean Air," *EHP Student Edition*, July 2005, p. A246–249.
 "Here Comes Hypercar!" *EHP Student Edition*, July 2005, p. A250–253
 "Decibel Hell: The Effects of Living in a Noisy World," *EHP Student Edition*, April 2005, <http://ehp.niehs.nih.gov/members/2005/113-1/focus.html>.

Objectives: By the end of this lesson, students should be able to:

1. Identify ways countries/communities are meeting or not meeting the seven goals outlined in *Mobility 2030: Meeting the Challenges to Sustainability*.
2. Synthesize their own opinion about the *Mobility 2030* goals and traffic solutions implemented by countries and communities.

Class Time: 90 minutes (120 minutes with discussion). Allow for more time if students do their writing in class instead of as homework.

Grade Level: 9–12

Subjects Addressed: Environmental science, General Science, Social Studies

►Prepping the Lesson (10–15 minutes)

INSTRUCTIONS:

1. Obtain a class set of *EHP Student Edition*, July 2005, or download the articles "Heavy Traffic Ahead: Car Culture Accelerates," "EHPnet—www.fueleconomy.gov," "Souped-Up Yeast," "Vive La Petite Auto!," "Driving Up the Cost of Clean Air," and "Here Comes Hypercar!" at <http://ehp.niehs.nih.gov/science-ed/>.
2. If you have previous copies of the April 2005 *EHP Student Edition*, give them to the students to read the article "Decibel Hell: The Effects of Living in a Noisy World," or download the article at <http://ehp.niehs.nih.gov/members/2005/113-1/focus.html>. One person per six-person group will read this article.
3. Make copies of the student instructions.

MATERIALS (per student):

- 1 copy of *EHP Student Edition*, July 2005, or 1 copy of the following articles: "Heavy Traffic Ahead: Car Culture Accelerates," "EHPnet—www.fueleconomy.gov," "Souped-Up Yeast," "Vive La Petite Auto!," "Driving Up the Cost of Clean Air," and "Here Comes Hypercar!"; 1 copy of "Decibel Hell: The Effects of Living in a Noisy World," *EHP Student Edition*, April 2005, <http://ehp.niehs.nih.gov/members/2005/113-1/focus.html>.
- 1 copy of student instructions.



VOCABULARY:

Decibel
Ethanol

BACKGROUND INFORMATION:

The articles provide sufficient background information for the activity.

RESOURCES:

Environmental Health Perspectives, Environews by Topic page. Choose: International Environmental Health, Trade/Commerce, Transportation/Fuels, Urban Issues, <http://ehp.niehs.nih.gov/topic>

Mobility 2030 Regional Transportation Plan, <http://www.atlreg.com/transportationair/plandocumentation.html>

Implementing the Lesson**INSTRUCTIONS:**

1. Before the students read the articles, review with them the *Mobility 2030* goals (listed in the table on the Student Instructions).
2. Inform the students that while reading the article "Heavy Traffic Ahead: Car Culture Accelerates" they should pay attention to how countries, communities, and organizations are or are not meeting the *Mobility 2030* goals. When they find an example of a goal that is being either met or violated, they should write it down in the table on the Student Instructions.
3. Point out that not all of the table will be filled in from the information in this first article, but that they should try to complete as much of the table as possible. Let the students know that there may also be several possible answers for some of the squares in the table.
4. After the students have read the first article and completed as much of the table as possible, group the students into teams of six. Each person in the team will read additional articles in the *EHP Student Edition*, July 2005 and April 2005 issues and continue to fill out the table. The article assignments are as follows:
 - Student 1: "EHPnet—www.fueleconomy.gov," page A233.
 - Student 2: "Vive La Petite Auto!", "China Goes Retro,". and "An End to Idle Threats?", pages A231 and A233.
 - Student 3: "Driving Up the Cost of Clean Air," pages A246–A249.
 - Student 4: "Souped Up Yeast," page A231.
 - Student 5: "Here Comes Hypercar!", A250–A253.
 - Student 6: "Decibel Hell: The Effects of Living in a Noisy World," *EHP Student Edition*, April 2005
<http://ehp.niehs.nih.gov/members/2005/113-1/focus.html>.

Read section: **Fighting for Quiet**
5. After the students have completed filling in the table, discuss the following points:
 - Is any one country meeting the *Mobility 2030* goals?
 - How does capitalism/consumerism contribute to both meeting and NOT meeting the *Mobility 2030* goals.
 - Reflect upon how your community is or is not meeting the *Mobility 2030* goals. Are there some simple ways in your community to meet at least some of the goals not yet being met?
 - What does the class feel are the most important issues to address first? Does addressing one of the issues naturally address some of the other goals? Try to encourage the discussion to consider the personal (i.e., "How am I affected?"), the community, and the global levels.
6. Assign the writing (Step 5 on the Student Instructions) as homework or provide time in class for students to complete the assignment.

NOTES & HELPFUL HINTS:

This activity is a good opportunity for students to learn or practice skimming techniques to pick out and understand key words and concepts, and getting an overview of the subject.



▶Aligning with Standards

SKILLS USED OR DEVELOPED:

- Communication (note taking, written—including summarization)
- Comprehension (reading)
- Critical thinking and response
- Graph reading
- Table reading

SPECIFIC CONTENT ADDRESSED:

- Vehicle emissions
- Regulations
- Fuel efficiency
- Traffic congestion
- Public transportation
- Alternative fuels
- Environmental health

NATIONAL SCIENCE EDUCATION CONTENT STANDARDS MET:

Science and Technology Standards

- Abilities of technical design
- Understanding about science and technology

Science in Personal and Social Perspectives Standards

- Personal and community health
- Population growth
- Natural resources
- Environmental quality
- Natural and human-induced hazards
- Science and technology in local, national, and global challenges

NATIONAL SCIENCE EDUCATION TEACHING STANDARDS MET:

Plan an inquiry-based science program

- Develop student understanding and nurture community of science learners
- Work within and across disciplines and grade levels

Create learning environments that provide time, space, and resources for learning science

- Make tools, materials, media, and resources available to students
- Use resources outside of the school

Actively participate in the ongoing planning & development of school science program

- Participate in decisions concerning the allocation of time and other resources to the science program



▶ Assessing the Lesson

NOTE: Students' answers may vary some from the examples provided here. Many of the transportation solutions meet more than one goal.

Mobility 2030 Goals	Name of Entity NOT Meeting the Goal	How the Entity Is NOT Meeting the Goal (Problem)	Name of Entity Meeting the Goal	How the Entity Is Meeting the Goal (Solution)
1. Reduce conventional vehicle emissions so that they do not constitute a significant public health concern anywhere in the world.	China, Beijing	Chinese autos emit 10-20 times more pollution than cars currently used in Western countries. "40% of autos and 70% of taxis [in Beijing] fail to meet the most basic Western emissions standards."	France United States Rocky Mountain Institute	Surcharge for large vehicles ("Viva La Petite Auto!") EPA Tier 1 emissions requirements ("Driving Up the Cost of Clean Air") Creation of the Hypercar ("Here Comes the Hypercar"). But the Hypercar not yet in the mass market
2. Limit greenhouse gas emissions to sustainable levels by moving toward hydrogen and bio-based fuels.	China	Some recent regulations have been put into place for newer cars, but many of the cars on China's streets are old and have very high emissions.	logen Rocky Mountain Institute	Ethanol fuel from plant matter ("Souped-Up Yeast"). Currently this is done on a limited scale. Creation of the Hypercar ("Here Comes Hypercar!"). But the Hypercar is not yet in the mass market.
3. Significantly reduce the number of traffic-related deaths and injuries world-wide.	China	Although streets have separate lanes for motorized vehicles and bikes, left-hand turns for bikes are extremely dangerous	Latin America	Bus rapid transit system.
4. Reduce traffic noise. "From The EHP article <i>Decibel Hell: The Effects of Living in a Noisy World</i> at http://ehp.niehs.nih.gov/members/2005/113-1/focus.html ; Section: Fighting for Quiet"	United States	In 1982, the Reagan administration defunded the Office of Noise Abatement and Control, and the Noise Control Act of 1972 is not enforced.	European Union: countries with cities of at least 250,000	Cities are using noise maps to determine noise pollution policies. The map data, which must be finished by 2007 (Paris has maps now), will be fed into computer models that will help test the sound impact of street designs or new buildings before construction begins.



Mobility 2030 Goals	Name of Entity NOT Meeting the Goal	How Entity Is NOT Meeting the Goal (Problem)	Name of Entity Meeting the Goal	How Entity Is Meeting the Goal (Solution)
5. Reduce traffic congestion.	China	Centralizing business districts and people moving to suburbia increases congestion: Increase in individual car ownership increases congestion.	Singapore London	Auto ownership is prohibitively expensive "Congestion pricing," where drivers pay a fee to enter the center of the city.
6. Narrow "mobility divides" between rich and poor people within countries, as well as between rich and poor countries, by improving access to transportation for poor people in rural areas.	Not met by any country that promotes the purchase and use of individual vehicles.		Bogota, Colombia, Curitiba, Kunming, Dehli, Dublin, Paris, Shanghai, and most large cities in the United States	Bus Rapid Transit (BRT) system with a dedicated thoroughfare for the buses. All have some form of BRT. Some also have subway systems.
7. Improve mobility opportunities for the general population so that people don't need to rely on privately owned vehicles.	Not met by any country that promotes the purchase and use of individual vehicles.		Bogota, Colombia, Curitiba (Brazil), Kunming (China), Dehli, Dublin, Paris, Shanghai, and most large cities in the United States	Bus Rapid Transit (BRT) system with a dedicated thoroughfare for the buses. All have some form of BRT. Some also have subway systems.

Students also write a one-page response to the following questions. Check for proper grammar, clear language, and support of statements with logical, thorough arguments.

- Do you agree or disagree with the *Mobility 2030* goals and why?
- Referring to the filled table, which of the solutions did you like the best and why?
- How well does your community meet the *Mobility 2030* goals and why?

► Authors and Reviewers

Author: Stefani Hines, University of New Mexico Center for Environmental Health Sciences

Reviewers: Susan Booker, Liam O'Fallon, Lisa Pitman, Wendy Stephan, Kimberly Thigpen Tart



Mobility 2030: Can We Meet the Goals?

Step 1: Read "Heavy Traffic Ahead: Car Culture Accelerates," *EHP Student Edition*, July 2005, pages A238–A245, <http://ehp.niehs.nih.gov/members/2005/113-4/focus.html>.

Step 2: This article introduces seven goals outlined in a report by the World Business Council for Sustainable Development called *Mobility 2030: Meeting the Challenge to Sustainability*. The goals are described in the table below. As you read the article "Heavy Traffic Ahead: Car Culture Accelerates," categorize the specific actions taken by countries, communities, or organizations (entities) with respect to each of the goals. Is that country, community, or organization meeting a given goal and how? Is that country, community, or organization NOT meeting the goal, and what actions violate that goal?

NOTE: This first article will help you fill out part of the table. Be as thorough as possible, but realize there will still be some blanks in the table until you and your group read additional articles (Steps 3 and 4).

Mobility 2030 Goals	Name of Entity NOT Meeting the Goal	How Entity Is NOT Meeting the Goal (Problem)	Name of Entity Meeting the Goal	How Entity Is Meeting the Goal (Solution)
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2. Limit greenhouse gas emissions to sustainable levels by moving toward hydrogen and bio-based fuels.				
3. Significantly reduce the number of traffic-related deaths and injuries world-wide.				
4. Reduce traffic noise.				



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6. Narrow “mobility divides” between rich and poor people within countries, as well as between rich and poor countries, by improving access to transportation for poor people in rural areas.				
7. Improve mobility opportunities for the general population so that people don’t need to rely on privately owned vehicles.				

Step 3: After reading the first article and completing as much of the handout as possible, your teacher will divide you into teams of six students. Each person in the team will read additional articles in the *EHP Student Edition*, July 2005 or April 2005 issues and continue to fill out the table. The article assignments are as follows:

- Student 1: “EHPnet—www.fueleconomy.gov,” page A233.
- Student 2: “Vive La Petite Auto!”, “China Goes Retro,” and “An End to Idle Threats?”, pages A231 and A233.
- Student 3: “Driving Up the Cost of Clean Air,” pages A246–A249.
- Student 4: “Souped Up Yeast,” page A231.
- Student 5: “Here comes Hypercar!”, A250–A253.
- Student 6: “Decibel Hell: The Effects of Living in a Noisy World,” *EHP Student Edition*, April 2005 <http://ehp.niehs.nih.gov/members/2005/113-1/focus.html>.

Read the section: **Fighting for Quiet**

Step 4: Share any additional information obtained from your assigned article with the group. Once each person in the group has shared one or more examples of how countries, communities, or organizations are either meeting or not meeting the *Mobility 2030* goals, your table should be complete.



Step 5: Write a one-page response to the following questions. Be sure to use good grammar and clear language, and support your statements.

- Do you agree or disagree with the *Mobility 2030* goals and why?
- Referring to the filled table, which of the solutions did you like the best and why?
- How well does your community meet the *Mobility 2030* goals and why?

