Recreation: Where Will We Play?

What do you think of when you hear the words “Great Lakes region”? Many people think of beautiful shorelines, shipping and cities such as Cleveland and Chicago. Another thought that comes to the minds of many people is recreation: boating, fishing, swimming, skiing, snowmobiling, hiking, camping, hunting, and birding.

The economy of the Great Lakes region depends heavily on travel and tourism; therefore, any factor that affects recreation in the area could potentially affect the economy there. If global warming occurs, the Great Lakes region will undergo longer summers and shorter winters. Water temperatures are expected to increase up to 5° C, the amount of snow would decrease, and lake levels would drop (up to 3 meters). The impacts of these changes could shape the future of recreation in the Great Lakes. The health of the recreation industry, in turn, affects the region in other ways, including:

- **Economic Growth.** Tourist dollars create jobs and bring in new businesses.
- **Amenities.** Hotels are not just for tourists. They bring in conferences and meetings.
- **Social Impacts.** Tourism brings diversity, in people and ideas, to an area. Also, popular tourist areas often encourage second homes — thus helping the local economy.
- **Preservation.** Well-planned and organized tourism can aid in the preservation of local historic and natural attractions.

The above-listed effects are positive ones. Tourism, however, can also have negative effects:

- **Change.** Tourism brings in new people and demands. If the changes take place too quickly and development gets out of control, an area can quickly become a “tourist trap.”
- **Environmental Degradation.** Like any development activity, tourism can lead to pollution and destruction of local ecosystems.
- **Crowding.** Congestion and destruction to the infrastructure can result from increased human density and activity.

This set of activities considers present recreational activities in the region and how they might be affected by climate change.
Activity A: How might global warming affect recreation around the Great Lakes?

Earth System Understandings
This activity focuses on ESU #1 (aesthetics and value), #2 (stewardship), #4 (interactions) and #7 (careers and hobbies). Refer to the introduction of this book for a full description of each understanding.

Scenario Reference
#8. What could happen to Great Lakes recreation?

Objectives
Students who have completed this activity should be able to:

- Discuss the implications of global warming for recreation in the Great Lakes region.

- Identify and debate possible ways that recreation managers can deal with the global warming challenge.

Materials
- Before beginning this activity, collect recreation and travel information from your Department of Natural Resources, automobile clubs, visitor bureaus and travel agents. A list of potential sources appears at the end of this activity.

- Transparent copies of the outline maps of the individual Great Lakes (two identical ones per team)

Procedure
Prelab: Have students read the recreation scenario #8 before they begin the activity. Make transparencies of the provided Great Lakes outline map for the lake nearest you, or for all lakes (see #1 below).

1. Divide the class into groups for study of the nearest Great Lake and its recreation facilities. Alternatively, assign each group of students a different Great Lake and allow time for comparison.

2. Review maps and travel brochures from your Great Lake. What seem to be the three most popular recreation activities in the region? How do they depend on the four conditions above? How do other (less popular) activities differ on these conditions?

Answers
2. Answers will vary by lake. For each popular activity, students should be able to tell if it depends on geography (some special natural feature), demographics (close to population centers or popular with all ages), economics (not too expensive for anyone to enjoy, or not too expensive to develop) and environmental quality (good, clean places for the activity). Those less popular may be too expensive, too far away, infrequently available, or other variation of the conditions.
3. If global warming occurs, the temperature of the region's lakes is expected to rise and water levels are expected to fall. Of the species of fish currently in your lake, which ones would most likely be affected? If they live in Lake Ontario, could they migrate and escape the problems? Where would they need to go? If they lived in Lake Superior, could they migrate? Where would they go? In what ways would a change in your local fish species affect the fishing industry?

4. What other Great Lakes recreation activities would be likely to decline or move to another part of the region? Which ones would expand?

5. On one transparency, students in a group should indicate the location of major recreation areas and businesses as they exist today. Construct a key so that all groups use similar symbols to stand for recreation types. For example, use a snowflake to designate a ski area. On a second transparency, groups indicate the location and types of recreation as they project they will exist 50 years from now.

6. For one of the recreation types, list the types of jobs within the industry and supported by it. Ask participants in the recreation if your list is complete, and add other jobs they suggest. Then determine if those jobs are flexible enough to change if climate changes. How much demographic and social change would you expect if the recreation type changes?

7. Pretend that your group represents a consulting organization, hired to suggest to a panel of Great Lakes recreation managers ways that they can prepare and adjust for global warming. What businesses would you recommend to expand their operations? Which ones would you advise to either relocate or change their focus? What are your predictions overall for the health of the recreation industry in the Great Lakes region?

3. Answers will vary by lake. Typically, fish requiring cold water to live in, or shallow waters to spawn, may be affected by loss of those habitats. To escape temperature problems in the lakes, fish could go to colder waters, but in Lake Ontario they can't go upstream because of Niagara Falls. They can't go far downstream because the waters eventually become brackish (salty) in the St. Lawrence River. They would have to go up rivers, but waters there would be low. In Lake Superior, upstream means up the rivers, and downstream would not solve the problems. In all cases the fishing industry could lose valuable species from the lakes where they were accustomed. If the fishers could not shift to new species because of customer preference or different types of gear needed, they would go out of business. To find temperature preferences of fish, consult the Activity "How will global warming affect Great Lakes Fish" in this book. Natural history guides and experienced anglers would also be useful resources.

4. Decline or a move could be predicted for the cold weather/cold water recreation forms — skiing, ice fishing, ice boating and the like. Expansion of warm weather/warm water recreation is in order: water sports, camping, etc., although new access to water would have to be developed at its lowered levels. Students will have other ideas based on their own experiences. Many answers are acceptable.

5. Be sure students include state, provincial and national parks, resorts, amusement parks, and a wide range of other recreation forms.

6. For example, sport fishing supports manufacture of fishing gear, sales of the gear, sales of auxiliary equipment like tackle boxes and personal flotation devices, bait production and sales, boat sales and service, gasoline sales, food and beverages for fishing trips, motels and campgrounds staffing and maintenance, charter boat booking, captain services, fish cleaning, etc. Some of these jobs are flexible because they serve others besides fishers (check the flexible ones!). There could be significant changes in lakeside communities that serve the sport fishing public. Students should be able to imagine many differences.

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Teacher's Note

Students should think broadly about what constitutes outdoor recreation. Remember to include the following types, and add local pursuits as well.

- boating
- swimming
- camping
- gardening
- water skiing
- snow skiing
- ice fishing
- bungee jumping
- parasailing
- team games (baseball, hockey etc.)
- individ. games (goal, tennis, etc.)
- birdlife & birdwatching
- racing (cars, horses etc.)
- landscape painting
- sky or water diving
- fishing
- hiking
- biking
- hunting
- jogging
- running
- sightseeing
- nature crafts
- jet skiing

Review Questions

1. In general, what types of recreation are likely to be affected by global climate change? Will effects be positive or negative?

2. Recommend ways the recreation industry could prepare to accommodate or adapt to the changing climate.

Extensions

Activity B will give students an idea of the decision making process that will face the recreation industry as it prepares for the future.
### Sources of Recreation Information

**Illinois**  
Department of Energy and Natural Resources  
325 W. Adams St., Rm. 300  
Springfield, IL 62704-1892

**Indiana**  
Department of Natural Resources  
402 W. Washington St., Rm. C256  
Indianapolis, IN 46204-2212

**Michigan**  
Department of Natural Resources  
Box 30028  
Lansing, MI 48909

**Minnesota**  
Department of Natural Resources  
500 Lafayette Rd.  
St. Paul, MN 55155-4001

**New York**  
Department of Environmental Conservation  
50 Wolf Rd.  
Albany, NY 12233

**Ohio**  
Department of Natural Resources  
Fountain Square  
Columbus, OH 43224

**Ontario**  
Ministry of Natural Resources  
Toronto, Canada M7A 1W3

**Pennsylvania**  
Department of Environmental Resources  
Public Liaison Office  
PO Box 2063  
Harrisburg, PA 17120

**Wisconsin**  
Department of Natural Resources  
PO Box 7921  
Madison, WI 53707

### Other References


Activity B: Should we develop winter or summer recreation?

Climate change, if it occurs, will very likely shape the Great Lakes environment in such a way as to impact the recreation industry. Increased temperatures could result in increased rainfall, but also an increase in evaporation rates that would result in a net loss of water in the region. Water levels would lower, with several important implications for the region’s recreation industry:

- Adjacent marshes and swamps in the region could dry up if lake levels drop, affecting bird and fish breeding sites. Recreational activities associated with wetlands, such as hunting, fishing and birdwatching would suffer.
- Receding water levels could potentially move shorelines, affecting hiking trails, campsites and other areas whose uses are enhanced by proximity to the water.
- Boating would suffer if water levels are lowered. Channels would have to be dredged to allow boats access to docks.
- Concentrations of pollutants would increase if water volumes decrease. Water quality would then become a greater concern.

Resource managers need to anticipate possible changes in the travel industry. However, facts, not theory, are needed before potentially expensive changes are made. If global change accompanied by longer summers occurs, larger numbers of people may vacation in the region. Along with economic benefits, they would bring with them problems such as in increased potential for impact to the region’s ecology. Planning needs to be done now to both accommodate them and moderate their impacts.

Earth Systems Understandings

This activity focuses on ESU #1 (aesthetics and value), #2 (stewardship), #4 (interactions) and #7 (careers and hobbies). Refer to the introduction of this book for a full description of each understanding.

Scenario Reference

#8. What could happen to Great Lakes recreation?

Materials

- role-playing name cards and descriptions for each participant
- props optional for role play
- background information and resource materials for use in preparing presentation.

Objectives

When students complete this activity, they should be able to:

- Realize that an environmental issue can be viewed from more than one perspective.
- Evaluate potential changes in recreational opportunities in the region.
- Describe the possible influence of global warming on the economy.
PROCEDURE

This role-playing activity demonstrates differing views about global climate change and the effect on recreation in the Georgian Bay area. Some people claim that global warming will occur, causing the climate in the Bay area to change, therefore influencing recreation. Others disagree with this viewpoint and argue that global warming will not occur and therefore not affect the climate and recreation in the region.

1. Establish the situation: the Georgian Bay Development Company is at a crossroads in light of the possibility of global warming. As it considers the future, the Board of Directors will decide whether to build a summer or a winter resort. Provide students with background information about the values of the recreation industry and the potential changes expected with global warming. (See Scenario and Introduction to "Where will we play?")

2. Distribute role-playing name cards and descriptions to every student. An odd number of students should be chosen as Board members. There should be an equal number of students designated for both points of view. The remainder should have roles which could choose either point of view (community members). The names suggested can be altered to match the gender of the role players assigned.

Location of Georgian Bay, a section of Lake Huron. Longitude range is 80-84° W and latitude is 44-46° N. The Bay freezes over in winter with current climate conditions.
3. Have students form groups according to their point of view to plan the strategy for their presentation. Allow time for students to find information and props to prepare for their roles.

4. Arrange the classroom to represent a meeting room at the Georgian Bay Development Company.

5. On the day of the meeting, students role play their positions and make presentations to the Board of Directors. After the presentations, the Board of Directors makes a decision based on the information presented, and states the rationale for its decision.

6. Following the decision, have a class discussion to summarize the issues that emerged during the presentations and the implications of the Board’s decision.

**SAMPLE ROLE PLAY DESCRIPTIONS:**

*Board of Directors:*
- *Pat O'Million*, CEO
- *Char Mann*, Chairman of the Board
- *Dennis Wexler*, Company President

*Summer Resort Supporters:*
- *Bill Par*, local golf pro
- *Shawn Snorkel*, owner of scuba diving business
- *Jo Fisher*, owner of fishing equipment manufacturing company
- *Mark Airmass*, meteorologist who believes global warming is in progress

*Winter Resort Supporters:*
- *Tony Toboggan*, winter sports enthusiast
- *Adrienne Rink*, professional skater and owner of ice rink
- *Chris Breezy*, meteorologist who debunks global warming ideas
- *Frances Towrope*, owns controlling interest in ski equipment company

*Other Community Members:*
- *Sandy Realtor*, local real estate agent
- *Reggie Racer*, owns new & used car sales company
- *Terry Woodwork*, owns a large construction company
- *Cam Tabletop*, owns local restaurant
REVIEW QUESTIONS

1. It has been said that global climate change will have both winners and losers. Discuss how recreation facilities and surrounding communities might view the changes from other perspectives.

2. Would you vote to build a winter or summer resort in the Georgian Bay area? Make a list of important factors to consider, and rank them from most to least important.

EVALUATION

As members of the tourism industry, develop promotional materials for recreational opportunities in the Georgian Bay region as they might appear in the year 2055.

EXTENSIONS

1. Repeat the role play, but choose a different Board of Directors and exchange students’ roles so that they have to argue from the opposite point of view.

2. Investigate the influence of global climate change on the climate, and physical and ecological characteristics of Georgian Bay. Determine if and how the shoreline would be altered and how existing recreation opportunities in the Georgian Bay might be impacted. Debate, with another meeting, where to build a summer resort in the Bay region and what types of recreation should be included at this resort.

3. List recreational opportunities in your local community and determine what impact global climate change could have on these.

References


Environmental Response

Activity A: What should people do about global change in the Great Lakes?

There are three possible responses to global change. People can *abate* the situation (stop the changes from happening), they can *adapt* to the changes, or they can *accept* them and do nothing. The option chosen depends on many factors. In 1986, researchers at Southern Illinois University pulled together all the existing studies on responsible environmental behavior. They developed the model below to show how the factors influencing this behavior might fit together (see Figure 1). The model isn’t perfect, but it does remind us of some things that might encourage people to be environmentally responsible. For instance, if people learn about a problem, and are shown some things they can do to help solve it, they will be less likely to feel helpless and do nothing.

![Diagram](image)

*Figure 1. The Hines Model of Responsible Environmental Behavior (1986/87)*
One way people learn about topics they can act upon is through advertising! Advertisers want people to know about the value of vitamins, biodegradable bags for lawn clippings, etc., and they want to sell people products that will enable them to act on their new knowledge. Of course, whether people act on their knowledge will depend on situational factors such as ready cash, availability of the product and other things. Advertisers try to overcome as many barriers to action (buying) as they can by preparing very appealing ads.

In 1991–92, the American Academy of Advertising and the INAME Foundation sponsored a student competition for ads relating to the environment. Samples of their winning entries are shown here:

- **Solution for Pollution**
  - *Quiz* #3
  - We all know that cars have a serious impact on the environment. Because they emit harmful gases, which is the way to reduce those gases?
  - a) Put less gas in the gas tank
  - b) Keep the car tuned up
  - c) Wash the car
  - d) Drive in the car pool lane

- **The Senior Class Found a Way To Remove 45 Pounds of Carbon From the Air.**
  - These students are helping to reduce global warming, helping to prevent acid rain and helping to remove carbon dioxide from the atmosphere. What are they doing? They're planting a tree.
  - Trees remove carbon from the air, reducing global temperature. They help prevent flooding and cut erosion. By replacing trees, schools, buildings and reduce energy consumption by up to 10%. And they also provide us with fruits, nuts and aesthetic beauty. But think how barren and unattractive the planet would be without them.
  - Trees are necessary for our survival. But that's not the only reason the senior class chose this planting as their graduation gift to the school. They wanted to leave a living reminder of where the class began. Something that will grow and reach out, as they will, in the world.

**Earth System Understanding**

This could involve any of the understandings depending on the subject matter chosen. Refer to the introduction of this book for a full description of each understanding.

**Scenario Reference**

Varies by choice of subject.

**OBJECTIVES**

After successfully completing this activity you will be able to:
- Give examples of behavior that can accept, adapt to or abate global change.
- Use advertising to make people aware of things they can do about global change.
PROCEDURE

1. Decide what you or your team want people to know and do about global change in the Great Lakes. List ideas. You may want them to conserve water because there will be less to spare. You may want them to switch from fossil fuels to alternative energy sources. You may just want to encourage them to wear hats and sunglasses.

2. Decide whether these responses are examples of acceptance, adaptation or abatement. Which category of response is easiest for students to act upon? For parents?

3. Use the word processor and art supplies to develop a one-page ad to convince people to perform an environmentally conscious behavior.

4. Make a display or booklet using your ads. Offer some to local news media.

Materials

For this activity you will need:
• marking pens
• paper
• photos or line art
• word processor (optional)

Save...

When you’re putting that extra little something into your savings account, what are you thinking about? A new car? A new home? That vacation you’ve always wanted? Did you ever think you might not be around to spend it? Or your family be around to spend it? Or anyone around at all? Did you ever think, during all your work and running around, about the most important thing concerning you? Your world: the air you breathe, the water you drink, and the ground you stand on. Is it safe? If you don’t know, find out. Call your local and state governments to learn your part in environmental safety. Pollution control is at your command.

Alliance for Environmental Education
Activity B: How do energy use decisions influence global change?  
(Cars on Trial)

This activity encourages discussion about energy use decisions, greenhouse gases, and global warming. In it, a trial is held in which automobiles are accused of emitting a dangerous gas (carbon dioxide) into the atmosphere. The students (jury) must decide how harmful they think automobiles really are and what, if anything, should be done about them.

Carbon dioxide is a greenhouse gas. When it accumulates in the atmosphere it traps heat from the sun, warming our biosphere like the glass of a greenhouse traps heat in the enclosed space. The Earth’s atmosphere is largely composed of nitrogen and oxygen. These molecules are transparent to visible light and infrared radiation while they absorb some ultraviolet wavelengths. Greenhouse gases (carbon dioxide, nitrous oxide, ozone, water vapor, and methane) each absorb infrared radiation (heat). If the Earth’s atmosphere only contained nitrogen and oxygen the surface air temperatures would be about negative 18°C. However, the world has a mean surface air temperature of about 15°C because of the presence of the greenhouse gases in the atmosphere. These gases act as a blanket, keeping us warm, just as ozone acts as a shield in the stratosphere, protecting us from ultraviolet rays.

The burning of fossil fuels, such as gasoline, releases carbon dioxide into the atmosphere. Some interesting statements concerning gasoline, cars and CO₂ emissions include the following. These facts and additional information can be found in the 1991-92 Green Index, Worldwatch Institute Papers 98 and 100, and the 1994 World Almanac.

- The U.S. contains about 5 percent of the world’s population and owns a third of the world’s cars. Americans drive as many miles as the rest of the world combined.
- American cars and trucks cover more than two trillion miles a year, the equivalent to a trip to Pluto and back every day.
- In France and Italy, the average driver gets 34 miles per gallon of gas, while U.S. drivers average 18 miles to a gallon.
- Passenger cars account for more than 13 percent of the total carbon dioxide emitted from fossil fuels worldwide, or more than 700 million tons of carbon dioxide annually.
- In the U.S., where fewer than 10 percent of employees pay for parking, employers can deduct the expense of providing parking from their taxes.
- Of the top 50 U.S. industrial exporters listed in the 1994 World Almanac, General Motors is number 2, Ford is number 5 and Chrysler number 6.
- Oil use as of 1990 averaged 4.5 barrels per person worldwide, with the U.S. at 24 barrels per person.
- The U.S. government subsidizes oil. If we paid the full price of extracting, importing, refining, and cleaning up after oil, the cost would probably exceed $4.00 a gallon.
OBJECTIVES

Students will:
- Be able to list several pros and cons regarding the use of automobiles in America (or Canada).
- Think critically about the complexity of reducing the amount that Americans (or Canadians) drive cars.
- Understand the basic effect of CO₂ in the atmosphere.

PROCEDURE

1. Decide who will play which role. Students without specific roles will be part of the jury.

2. Give lawyers and witnesses their cards and some time to prepare for their role (preferably overnight). They should be made aware of courtroom procedures. The lawyers should also read all of the witness cards prior to the trial and will want to talk to their respective witnesses regarding the questions they will ask. The witnesses for the prosecution are the air and the CO₂ expert. The witnesses for the defense are the car and the teenager.

Courtroom Procedure

4. The bailiff announces the judge: “All rise, the Honorable Judge . . . is presiding”

5. The judge enters, calls the court to order and introduces the case with the following statement: “Today, all of the cars in this nation are on trial. They are accused of emitting harmful CO₂ into the atmosphere, causing global warming.”

6. The judge then introduces the defense and prosecuting lawyers who give their opening statements.

7. Prosecution calls its first witness (the CO₂ expert) to the stand for questions. Following this the defense lawyer may cross examine the witness.

8. The prosecution then gets to call a second witness (the air). Again the defense may cross examine.

9. Next, the defense may call its first witness to the stand (teenage driver). The prosecution may cross examine.

10. Defense may then call their second witness (the car). The prosecution may cross examine.

Earth Systems Understandings

This activity focuses on ESUs #2 (stewardship), #3 (science methods and technology), and #7 (careers and hobbies). Refer to the introduction of this book for a full description of each understanding.

Scenario Reference

#5. Will it affect airborne circulation of toxins?

Materials

- any props useful for the trial, such as a gavel for the judge, professional clothes for the lawyers, etc.
- resource materials so that the lawyers and the witnesses can research global warming, carbon dioxide levels, the role of greenhouse gases, the use of automobiles in America, and other related topics.
- the prosecution may want to use other materials from this book, such as the chart of average world temperatures and the demonstration of how CO₂ traps heat with Activities A and C under Global Climate Change.

The cast includes

Bailiff: Strong silent type
Judge: The teacher is the ideal person for this role to help steer the discussions in productive ways as well as retaining order.
Prosecuting lawyer:
Opinion is that CO₂ is made by cars; therefore, cars are responsible for global warming.
Defense lawyer:
Opinion is that automobiles offer benefits to humanity overriding concerns about CO₂ and global warming.
Air: Prosecution witness
Car: Defense witness
CO₂ expert:
Prosecution witness
Teenager with license:
Defense witness
Scribe:
This person records the decision of the jury, and he or she should be a part of the jury.
Jury (rest of the class):
Determines the verdict

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11. After the lawyers and witnesses have finished, the judge asks the jury if there are any questions.

12. It is now time for the jury to decide the verdict (remedy). The judge should remind them that they must keep the good and safety of society in mind. Is the automobile a menace to society or a useful convenience?

13. Lawyers and witnesses may not interrupt or take part in this discussion. If a clarification of a particular detail is needed, questions may be asked by the jury to the appropriate party.

14. Have one member of the jury write up the conclusions of the jury. Once the jury has agreed on a conclusion, it should be read aloud to the entire courtroom.

**REVIEW QUESTIONS**

1. What do the students think is an environmentally responsible way to use vehicles (keep in mind that we live on a planet where the population is constantly expanding).

2. Is it fashionable/popular/cool to use automobiles in an environmentally safe manner? Why or why not?

3. What factors are barriers to implementing the decision of the jury? How feasible would the jury’s decision really be? How many people in the population would agree with the jury’s decision?

4. What will happen if no action is taken and the automobile industry continues to grow and prosper while the price of gas remains affordable.

5. What do students predict will most realistically happen to the way Americans use cars?

6. There has been an increase over the past several years in the percentage of cars that are luxury cars. What would make it fashionable to drive an economical car?

7. Brainstorm which things society has at one time esteemed as being “the in things to do” but are generally thought of as in bad taste now because of environmental or health reasons?

8. On a worldwide level, the United States has significantly more emissions than developing countries. Some people believe that the goal of these countries is to attain the U.S. life-style. What should happen if they all did? What would we recommend to them.

9. Is a more affluent life-style always better? What sorts of life-styles do the students hope to create for themselves some day? Would any students prefer a house or car that is not luxurious over one that is? What is ideal?
CHARACTER CARDS

JUDGE
The role of the judge is to keep the trial running smoothly and to keep order in the courtroom. The judge may stand at a podium with the courtroom procedures in front of him or her to make sure they are followed. The judge has the ability to make the trial as humorous or as serious as desired.

PROSECUTION LAWYER
It is your job to make sure that the jury understands the serious negative consequences of carbon dioxide emissions, especially at its present rates which are constantly increasing. Your argument is that cars are polluting our air and having serious negative global effects. You think that society must concern itself with this problem soon before more serious damage is done, especially with the ever growing world population. Feel free to state statistics regarding the environmental harm that cars cause in order to impress that point upon the jury. Your opening statement should include the main points that you hope to prove during the trial. You must be ready with good questions to ask of the witnesses.

DEFENSE LAWYER
Your job is to help the jury see how important and beneficial cars are to our society. Your opening statement should include the main points that you hope to prove during the trial. Some arguments you may want to incorporate into your defense are the following: (think up your own also).

• You may question the assertion that CO₂ is actually harmful in the atmosphere by claiming that the scientists have greatly exaggerated the consequences of CO₂ emissions in order to scare the public. You also are aware that scientists disagree on the subject of global warming. You want to know how the scientists who argue for global climate change got their data. Claim that no decision should be made until the data are verified and irrefutable.
• The economy of our society depends on cars. The automobile industry employs thousands of people: engineers, designers, mechanics, gas station attendants, factory workers, salespeople, advertisers, etc. We also export a significant number of cars.
• In America we greatly value our freedom to go where we want whenever we want without having to wait for a bus or travel with strangers. This depends on the ongoing use of personal vehicles.
• Ask the jury if they would want to wait for a bus or walk to the subway if any emergency happened. Cars can be lifesavers.
• American life would change dramatically without cars; they have become a symbol of the way we live. We are independent, free and have abundant resources.

Be ready with good questions for each of the witnesses when it is your turn to question them.
WITNESSES

CAR

You are on trial, and are being accused of emitting CO₂ into the atmosphere which causes global warming. You must answer any questions truthfully to the best of your ability but one argument you might make on your behalf is that you perform a useful function in society. You can bring up the point (feel free to interrupt the lawyers whenever you want to) that your only purpose on this planet is to serve the public, the very members of the jury, so you are amazed that these same people could be attacking you. You might remind them that you don’t drive on icy roads and through potholes for your own good, but that you would rust yourself out driving people anywhere they wanted to go. Has the jury ever noticed how cars are treated in the movies — they’re demolished. Remind them that if someone told you to drive over the cliff, you would do it as long as you’re able, without even a question. The jury has a lot of nerve to blame you for causing them trouble. You may want to ask the jury how many of them hope to own a vehicle someday. Ask them how many of them rode in a vehicle today and how their parents would get to work without a car? Not only that, but you produce CO₂ which plants need in order to grow and produce oxygen. Feel free to really let the audience know how you feel.

CO₂ EXPERT

You have an extremely vital role in this trial. You represent the scientific community and present all (or most) of the actual data used this activity. Your job is to explain how CO₂ works as a greenhouse gas. You may want to do the demonstration located in Global Climate Change Activity C which shows how CO₂ holds in heat. (It takes some advance preparation.) You also need to describe the levels of CO₂ in the atmosphere and how they are steadily increasing. In this activity book is a chart of global temperatures (Global Climate Change Activity A). The defense lawyers may try to question your authority, so be sure of your facts! Bring in books and notes — you are the educated member in the court. You do not necessarily have an opinion about cars, you just present the facts as you know them.

DRIVING TEENAGER

Your job as a witness is to convince the jury that owning and using a car is a necessity in our society. For instance, you can talk about the job you have delivering pizzas and how you could not imagine doing it without your car. You don’t think you could deliver pizzas by bus, subway or bicycle. You also work part-time on the weekends cleaning people’s carpets — imagine carrying all those supplies and that equipment around on public transportation. You also go grocery shopping often for your family; without a car, you wonder how you would get 10 bags of groceries home. More importantly, you think that cars are fun. Driving is great; you can “blast” your music, you can take your friends wherever you want to go, like to the beach or the countryside, places off the beaten track. Your car is like your personality. Of course rush hour is bothersome and makes you nauseous but you think it would be a tragedy to lose any of the freedom that driving gives you.
AIR

You are vehemently against cars. You may want to claim that you are vital to the health of the planet. In fact, you keep the jury (and everyone else) alive from minute to minute, so they ought to be concerned with your health. You feel that automobiles are poisoning you. In some places of this country, people aren't supposed to go outside during times of the day because of the air pollution. You feel that drastic measures are needed to stop air pollution. You are retaining heat and think that this will have serious negative consequences. None of the jury can afford for things to become worse.

EXTENSIONS

1. Have students investigate the car that they ride in the most. What is its gas mileage? What will happen to it when it is time for it to be discarded? What happens to used oil after it is changed? Why was that particular car purchased? Was the environment one of the buyer’s concerns?

2. How would people’s life-styles change if society started using more public transportation or bicycling to work?

REFERENCES


For more information contact:
Worldwatch Institute, 1776 Massachusetts Ave. NW, Washington, D.C. 20036

Specific titles related to this activity include:


![CO2 Concentration Chart]

Figure 1. Monthly average CO₂ concentration at Mauna Loa Observatory, Hawaii

Reproduced from Reporting on Climate Change: Understanding the Science, Environmental Health Center of the National Safety Council.
Global Change in the Great Lakes Scenarios

The Ohio Sea Grant Education Program has produced a series of short publications designed to help people understand how global change may affect the Great Lakes region. By explaining the possible implications of global change for this region of the world, it is hoped that policy makers and individuals will be more inclined to make responsible decisions about global change policy issues. The scenarios describe the scientific community’s prevailing interpretations of what may happen to the Great Lakes region in the face of global warming. The scenarios are written in terms the general public can understand, they include the most recent information available on a variety of subjects, and their content has been reviewed for accuracy by a panel of experts.

Introduction  Understanding Climate Models
Scenario #1  How Will Water Resources in the Great Lakes Region be Affected?
Scenario #2  Will Biological Diversity in the Great Lakes Region Suffer?
Scenario #3  What Could Happen to Great Lakes Shipping?
Scenario #4  How Will Agriculture in the Great Lakes Region be Affected?
Scenario #5  Will it Affect Airborne Circulation of Toxins?
Scenario #6  What are the Implications of Low Water Levels in Great Lakes Estuaries?
Scenario #7  Will it Speed Eutrophication in the Great Lakes?
Scenario #8  What Could Happen to Great Lakes Recreation?
Scenario #9  How could Fish Populations in the Great Lakes be Affected?
Scenario #10  How Will Forests in the Great Lakes Region be Affected?

Additional Resources Available from The Ohio Sea Grant Education Program

Oceanic Education Activities for Great Lakes Schools (OEAGLS)

OEAGLS (pronounced "eagles") are designed to take a concept or idea from the existing school curriculum and develop it into an oceanic and Great Lakes context, using teaching approaches and materials appropriate for children in grades five through nine. Investigations are characterized by subject matter compatibility with existing curriculum topics, short activities lasting from one to three classes, minimal preparation time, minimal equipment needs, standard page size for easy duplication, student workbook plus teacher guide, suggested extension activities for further information or creative expression, teachability demonstrated by use in middle school classrooms; and content accuracy assured by critical reviewers. Each title consists of a student workbook and a teacher guide and costs $3.00 for the publication, postage, and handling. If ordering EP-026, add an additional $4.00 to cover the cost of the computer disk.

These publications are currently being revised and all titles may not be available.

Ancient Shores of Lake Erie .............................................................. (EP-003) Knowing the Ropes .............................................................. (EP-018)
How to Protect a River ....................................................................... (EP-004) Getting to Know Your Local Fish ..................................................... (EP-019)
Erosion Along The Great Lakes ......................................................... (EP-006) We have Met the Enemy ............................................................... (EP-021)
Coastal Processes and Erosion ............................................................. (EP-007) It's Everyone's Sea: Or is it? .............................................................. (EP-022)
Evidence of Ancient Seas in Ohio ......................................................... (EP-010) Storm Surges .............................................................................. (EP-025)
To Harvest a Walleye ........................................................................... (EP-011) River Trek (with computer program) ............................................. (EP-026)

OEGALets

In the primary grade range we have three activities. All use Lake Erie information applied to all primary subject areas.

Lake Erie — Take a Bow .................................................................................. (EP-031) $5.00
Build a Fish to Scale ....................................................................................... (EP-032) $5.00
A Day in the Life of a Fish ............................................................................... (EP-033) $5.00

Additional Educational Materials

Supplemental Curriculum activities to Accompany Holling C. Holling's Paddle-To-The-Sea ..................................................... (EP-076) $10.00
Holling C. Holling’s Paddle-To-The-Sea ....................................................... (EP-076/B) $10.00
The Ohio Sea Grant Education Program: Development, Implementation, Evaluation ..................................................... (EP-075) $8.00
Sea Grant’s Marine Education Bibliography ................................................ free
Abstracts of Research in Marine and Aquatic Education: 1975-1990 ................................................................................ (EP-077) $4.00
Great Lake Erie .............................................................................................. (EP-079) $10.00

Make payment payable to The Ohio State University in U.S. dollars.
Mail your request and payment to:
Ohio Sea Grant Publications, The Ohio State University, 1314 Kinnear Road, Columbus, OH 43212-1194