

Lesson 10- Prevention

How Green Are We?

Background Information

Air pollution has become a major problem in many areas of the United States. Even though some of this pollution comes from natural sources, such as volcanoes, forest fires, and other natural occurrences, much of it can be traced to man-made sources. Air pollution from human sources is the result of our increasing use of large quantities of fuel to produce electricity and to power automobiles, trucks, and other vehicles. Many of these air pollutants come from burning coal, oil, wood, and other fuels used to run factories, cars, and the power plants that generate heat and light for our homes.

Many air pollutants are not only harmful but also tend to be concentrated in urban areas where industrial activity is greatest and energy use by the community is highest. Even though these areas are affected the most by pollutants, there are things that individuals and families, schools, and communities can do to reduce this effect.

Individuals and families can play a role in cutting down on air pollution by cutting electrical and fuel costs. Electrical costs can be reduced by using fluorescent or compact fluorescent bulbs in the home, adjusting the setting of the thermostat during the summer and winter, turning off appliances when they are not in use, and using alternative sources for accomplishing tasks that traditionally use electricity such as drying clothes outdoors instead of always using the clothes dryer. Other measures can be taken such as using sunlight instead of electricity for warmth and light, buying appliances with low wattages and favorable efficiency ratings, and keeping filters clean on furnaces, air conditioners, and refrigerators. Fuel costs can be reduced by walking or driving instead of using the car or by consolidating

errands so that only one trip needs to be made to accomplish everything.

Schools can cut down on electrical and fuel costs by taking similar measures that individuals can take in the home. Turning off lights at night, using solar energy instead of electricity to heat the homes, and keeping temperatures at 68 degrees Fahrenheit in the winter and 77 degrees Fahrenheit in the summer are just a few measures they can take to conserve energy. In addition, they can alter bus routes to accommodate more students so that fewer buses are on the road and encourage their employees to use public transportation, walk, bike, or carpool to get to work.

Communities can help cut down on air pollution by participating in the "Green Lights" program, which is a "clean-air" effort sponsored by the EPA. The program works with business and industry to help them reduce electricity usage and save money. The program focuses on upgrading lighting systems and encourages the use of fluorescent and compact fluorescent light bulbs which last ten times as long as traditional incandescent bulbs and emit more light per watt. The direct result is improved lighting and cost savings for participating businesses, as well as a reduction in air pollution. Communities can also reduce air pollution by promoting the use of public transportation, designating High-Occupancy Vehicle lanes on major roads during rush hour, improving bus routes to reach more citizens, and designating bike routes to encourage the use of bikes instead of cars. This could reduce harmful emissions from cars, as well as heavy congestion on major roads.

The focus of this exercise is to learn about energy conservation practices in the home and to have the students investigate how energy efficient their families are. To do this, the students will compile an audit. This audit will be conducted by completing the student worksheet on conservation practices in the home. It is important to emphasize that the point of the audit is to discover ways in which we can all take action to improve air quality rather than to criticize anyone's home energy usage or transportation choices.

Objectives

After completing the lesson, the students will be able to:

1. Understand the importance of energy efficiency in connection with air pollution.
2. Communicate with families and peers about ways to more effectively contribute to the reduction of air pollution.
3. Demonstrate safe, environmentally appropriate, and ethical practices.

Materials Needed

1. Copies of "Student Worksheet 1" for all of the students.

Procedure

1. Discuss with the students the causes of air pollution and how air pollution can be reduced through the use of energy efficient appliances and light bulbs and fuel-efficient cars.
2. Introduce the exercise by telling the students that they will be conducting an audit. Explain to them that the audit will be a formal examination of each student's home and family practices related to energy use. Data will be collected and observations will be recorded on the student worksheets.
3. Hand out "Student Worksheet 1" with specific instructions to answer all of the questions. Explain to the class that data collected from the audit will be used as part of a future in-class discussion to assess the energy efficiency of their homes and to discuss the importance of energy conservation.
4. Give the students one week to complete the audit of their homes. Be sure to tell them that they should feel free to make

additional observations and to collect data related to energy use that is not necessarily on the student worksheets.

5. After a week, meet with the class to discuss the data collected from their audits.
6. Discuss the importance of energy conservation and how it relates to the reduction of air pollution. Explain to the students that there are many measures their families can take to conserve energy. Give examples of those measures.
7. Explain how energy conservation measures not only reduce air pollution but save money as well.
8. Discuss the importance of fuel conservation and how it relates to air pollution.
9. Discuss how car emissions contribute to air pollution but that this can be combated by more people using public transportation, carpools, and biking or walking.
10. Have the class tally answers and ascertain the high values, low values, and median values for the class.
11. Go over each value, encouraging students to discuss why some homes are low and others are high in that value and to postulate what additional energy conservation habits they can practice.

Extensions

1. Have the students complete "Student Worksheet 2" and "Student Worksheet 3." These worksheets can be completed as a class with questions assigned to different students. The students can spend time in class and at home researching the answers. Discuss the answers to the questions and have the students suggest additional ways that the school and community can conserve energy and reduce air pollution.

2. Using "Student Worksheet 2", have the students create a " Air Pollution Reduction Plan" for the schools. The class can present their plan to the school superintendent and other district administrators. They can even create an Air Pollution Committee in the school. The committee can meet often to discuss and implement plans to reduce air pollution.

Sources

"How Green Are We?" *Tulsa Outdoor Air Curriculum*, 200

STUDENT WORKSHEET 1
HOW GREEN ARE WE?
HOME AUDIT

1. How many light bulbs do you have in your home? _____

2. How many are fluorescent or compact fluorescent bulbs?

3. What is the total wattage of all the bulbs in your home?

4. What temperature does your family set your thermostat set at
in the winter? _____ Summer? _____

5. Is your home properly insulated to help keep the house warm
in the winter and cool in the summer? _____

6. What locations in the house should be insulated the most?

7. Does your family wait until there is a full load of laundry to
wash clothes? _____

8. Do you dry washed clothes outside or use a clothes dryer?

9. How many miles per gallon does you family's car get?

10. How many gallons of gas does your car use in a week?

11. What kind of gas does your family use in their car?

12. How often do you walk, ride your bike, or use public
transportation instead of riding in a car per month?

STUDENT WORKSHEET 2
HOW GREEN ARE WE?
SCHOOL AUDIT

1. How long do the lights stay on in the school after the students have left for the day? _____
2. Who is responsible for turning off the lights?

3. Do you ever see the lights turned on in the evening hours?

4. What kinds of light bulbs are used in the lighting fixtures at school? _____
5. Are the windows in the school properly insulated? (Hold a tissue next to the windows.) _____
6. How can the windows be fixed?

7. Who is responsible for getting this done?

8. How do you and your friends get to school each day?

9. Does the bus reach enough students so that no one has to rely on other transportation? _____
10. If a parent drives you, do other students ride with you?

11. What other modes of energy-efficient transportation could students use to get to school? _____
12. How do most teachers and other school personnel get to school each day? _____
13. How else may teachers travel to and from school each day?

14. Do you see parents picking up children from school?

15. If so, do they leave their car running while they wait?

16. What measures could the school take to discourage drivers from doing this? _____

STUDENT WORKSHEET 3
HOW GREEN ARE WE?
COMMUNITY AUDIT

1. What industries in your community are major polluters?

2. What federal regulations that relate to air pollution affect their business?

Do they abide by these regulations? _____

What local regulations affect their business?

3. What other businesses in your community indirectly contribute to air pollution? _____

4. What measures do these companies take to reduce air pollution? _____

5. Are there enough buses to help people get around town easily without having to get into a car? _____

Could the routes be changed to accommodate more people?

6. Do major streets have bicycle lanes to make it easier for people to ride bikes as an alternative to driving their car?

7. Does the community sponsor a car pool program?

How many people are participating? _____

8. Do the major roads in your community encourage carpooling by designating High-Occupancy Vehicle (HOV) lanes during rush hour? _____

9. Are traffic signals timed to reduce the amount of time that cars sit at lights? _____

10. Are gas stations required to install special devices on pumps to capture gas fumes that can be released into the atmosphere causing air pollution? _____

11. Does your community require emissions inspections for all registered vehicles? How often are these inspections required?
