The School Breeze

Spring 2006

Hamilton County Environmental Services Air Quality Management Division

Teachers Wanted for HCES' Anti-Idling Campaign

In September of 2006, Hamilton County Environmental Services (HCES) will kick off its "Turn the Key, Be Idle Free" campaign with a focus on reducing car idling at schools and in communities, and we need your help to make the program a success!

HCES is looking for teachers interested in including their classrooms or schools in the free anti-idling campaign. Teachers and students can win prizes while learning and spreading awareness about the effects of idling cars outside of schools and in the community.

HCES will provide participating classrooms or schools with brochures explaining the anti-idling campaign, anti-idling giveaways (such as note pads, zipper pulls and magnets), anti-idling pledge cards (to be signed by students and their parents) and other materials. The pledge cards can be returned to HCES for a chance to win prizes!

Turn The Key

Be Idle Free

Southwestern Ohio Anti-Idling Campaign

The goal of this campaign is to show students and parents that they have the power to take steps to improve their health and their air quality. Small, seemingly insignificant changes in behavior, such as not idling a car, can add up to substantial reductions in air pollution and money spent at the gas pump.

Teachers play an integral role in educating students and their parents about automobile idling and its effects on their health, their finances and the environment. Without your help, HCES

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In This Issue

What is Idling?

Have you ever left a car running while...

- ☑ waiting to pick someone up?
- ☑ running errands?
- ☑ warming up or cooling the interior?

If you said **"yes"** to any of these questions, you've idled your car.

Idling means leaving a vehicle's engine running when it is in park or not in use.

The School Breeze Goes Paperless

Welcome to the first electronic edition of *The School Breeze! The School Breeze* has gone paperless to allow for quick and easy distribution, as well as to create less waste.

The new letter-size format (similar to *The Community Breeze*) enables you to print out pages, as needed, on your regular 8.5 x 11 printer paper. We've also taken this opportunity to redesign the masthead and the graphic style of the newsletter.

Do you have any comments, suggestions or feedback about the new format? If so, please contact Nan McKenna at nan.mckenna@hamilton-co.org or at (513) 946-7754.

HAMILTON COUNTY ENVIRONMENTAL SERVICES
www.hcdoes.org

Our Mission: To protect, preserve and enhance the environmental quality of the community. *The School Breeze* is published by the Hamilton County Air Quality Management Division for Butler, Clermont, Hamilton and Warren counties in Southwest Ohio.

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would not be able to reach nearly as many members of these crucial groups.

We encourage you to incorporate the idling reduction program into a larger study of the environment and to tie it in to other activities for students, to leverage the learning opportunity while allowing them to have an impact on their world. We have resources available to help integrate the anti-idling message into lesson topics such as global warming, smog and acid rain.

Please contact Nan McKenna at 513-946-7754 or at nan.mckenna@hamilton-co.org if you're interested in helping the environment and improving your health and your students' health. If you'd like an HCES staff member to visit your class, your school's staff meeting or your school's PTA meeting to discuss the anti-idling campaign, please contact Nan.

Thank you in advance for your assistance. We look forward to hearing from you!

Anti-Idling Facts

- Each person takes 20,000 breaths each day.
- The average American breathes 3,400 gallons of air a day.
- Children breathe 50 percent more air per pound than adults.
- Vehicle exhaust is the leading source of air pollution in Southwest Ohio.
- Idling consumes ½ gallon to 1 gallon of fuel per hour and wastes more fuel than turning off and on your vehicle engine.
- Idling buses tend to accumulate diesel exhaust, which may be retained during the ride depending upon bus ventilation rates.
- It is more efficient to turn off most warmed-up vehicles than to idle for more than 30 seconds.
- Asthma is the third leading cause of hospitalization among children under the age of 15.
- Exposure to vehicle exhaust increases the risk of death from heart and lung disease and lung cancer.

Idling – What's the Big Deal?

Idling happens without much thought. Many people idle their cars because they think it's easy, convenient and efficient.

But that's wrong! Idling is harmful to our air quality, our health, our cars and our wallets!

Vehicle exhaust, whether from a car or school bus, can have enormous effects on the health of students in your district. Here are some facts about vehicle emissions and idling:

- A single vehicle dropping off and picking up kids at one school puts three pounds of pollution into the air per month.
- Children's asthma symptoms can increase as a result of car exhaust.
- Asthma is the most common chronic illness in children and the cause of most school absences.
- An idling vehicle gets zero miles per gallon – idling wastes gas and money and unnecessarily emits pollution into the air.

Cars are the number one source of air pollution in the Greater Cincinnati area. Like driving, idling releases emissions into the air. Unlike driving, idling is unnecessary.

Car exhaust contains:
nitrogen oxides (NOx),
volatile organic compounds (VOCs),
particulate matter (PM),
carbon monoxide (CO) and
carbon dioxide (CO_2).

PM is the name for tiny particles, such as soot, dust and dirt, found in the air. When inhaled, these small particles travel deep into the lungs and sometimes into the bloodstream. Inhaling PM can:

- aggravate asthma,
- cause coughing or difficult breathing,
- decrease lung function,
- exacerbate cardiovascular problems and
- lead to chronic bronchitis.

CO slows the delivery of oxygen to the body's organs and tissues. Exposure to CO aggravates heart disease and can cause headaches and visual impairment.

Children are especially sensitive to the effects air pollution because they breathe more quickly and take in more air than adults. Children spend more time outdoors than adults, which further increases their exposure to vehicle emissions and air pollution.

Breaking idling habits is an easy and money-saving way to clean up the air. Remember HCES' anti-idling motto:
Turn the Key, be Idle Free!

An hour of automobile idling burns approximately 1/5 of a gallon of gas and releases nearly 4 pounds of CO_2 into the air. Excessive amounts of CO_2 in the atmosphere can increase global warming.

Lesson Plan

4th - 6th grade

Smog in a Bottle

CRITICAL OBJECTIVES

- Recognize that invisible air pollutants and weather conditions are involved in creating smog.
- Understand that not all air pollution is visible.
- Appreciate that human activities can cause air pollution.

SKILLS

- Observing
- Drawing conclusions

DURATION

20 minutes

VOCABULARY

Volatile Organic Compounds
Ozone
Photochemical
Precursor
Smog
Temperature (or thermal) inversion

MATERIALS

- Clean, dry, wide-mouth glass jar (such as a mayonnaise jar)
- Heavy aluminum foil
- Two or three ice cubes
- Ruler
- Scissors
- Stop watch or watch with a second hand
- Matches

BACKGROUND

The expression “smog” was first used in turn-of-the-century London to describe a combination of “smoke” and “fog”. Smog occurred when water vapor in the air condensed on small particles of soot in the air, forming small smog droplets. Thousands of Londoners died of pneumonia-like diseases due to the poisonous air.

Today, smog is produced photochemically, when chemical pollutants in the air (notably nitrogen oxides and volatile organic compounds (VOCs) from automobile exhausts) are baked by the sun and react chemically. Ground-level ozone is produced by a combination of pollutants from many sources such as automobile exhausts, smokestacks and fumes (VOCs) from chemical solvents like paint thinner or pesticides.

When these smog-forming pollutants (called “precursors”) are released into the air, they undergo chemical transformations and produce smog. Weather conditions, such as the lack of wind or rain or a temperature inversion, a condition in which the temperature of the atmosphere increases with altitude instead of decreases, also cause smog to be trapped over a particular area.

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Lesson Plan *continued from pg. 3*

Smog causes health problems such as difficulty in breathing, asthma, reduced resistance to lung infections, colds and eye irritation. The ozone in smog also can damage plants and trees, and the haze reduces visibility. This is particularly noticeable from mountains and other beautiful vistas such as National Parks.

Severe smog and ground-level ozone problems exist in many major cities, including much of California from San Francisco to San Diego, the mid-Atlantic seaboard from Washington, D.C. to southern Maine, and over most major cities of the South and Midwest.

For more background information, read the U.S. EPA's "Ozone-Good Up High, Bad Nearby" and "What You Can do to Reduce Ground-Level Ozone" fact sheets.

WHAT TO DO

1. Explain that the class will perform an experiment in which they will create artificial "smog" in a jar. Make sure that students understand that the jar is only a model, and models by nature are limited. For example, the purpose of this model is to illustrate the appearance and behavior of smog, not the composition or effects. It is important to understand that smog is not just a "smoky fog," but a specific phenomenon.
2. Select students to perform the experiment. Have them cut a strip of paper about 6 inches by 2 inches. Fold the strip in half and twist it into a rope.
3. Have them make a snug lid for the jar out of a piece of aluminum foil. Shape a small depression in the foil lid to keep the ice cubes from sliding off. Carefully remove the foil and set it aside.
4. Have the students put some water in the jar and swish it around to wet all the inside of the jar. Pour out the extra water.
5. Light the paper "rope" with a match and drop it and the match into the damp jar. Put the foil lid back on the jar and seal it tightly. Put ice cubes on the lid to make it cold (the ice cubes will make the water vapor in the jar condense). You must do this step very quickly, perhaps with some assistance.

   Note: DO NOT let anyone breathe the "smog" produced in the experiment, and when the experiment is completed, be sure to release the "smog" outside.
6. Ask students to describe what they see in the jar. How is this like real smog? What conditions in the jar produced "smog"? (e.g. Moisture plus soot particles from the burning matches plus carbon dioxide and other solvent vapors.)
7. Ask the students if they have ever seen smog (not fog). Have they ever breathed air outside that smelled or tasted funny?

SUGGESTED EXTENSIONS (OPTIONAL)

Have students put a glass thermometer (not plastic) into the jar before they do the experiment. Have them record the temperature before proceeding to step 4. Have them record the temperature during step 5. Ask them to describe what the temperature did and why. Let them try it again without adding water.

Web Stuff

The Regional Ozone Coalition

This website provides information about smog in Southwest Ohio. Check out the "Kids' Korner" and find resources for teachers. www.doyourshare.org

Smog City

An interactive website that illustrates how people's choices, weather patterns and land use can contribute to the amount of air pollution in an area. Users can adjust the temperature, emissions levels and population and see the resulting air quality consequences. www.smogcity.com

Ohio EPA's Kids' Zone

The Ohio EPA's website for kids that covers air quality and other environmental issues. Students learn from Simon the Salamander about how to protect the environment. www.epa.state.oh.us/kids