ACTIVITY GUIDE

SETTING THE STAGE FOR AIR POLLUTION EDUCATION

About the Activity Guide

This activity guide is intended to be used after an interactive *Ozone Theater* theatrical game. The hands-on activities in the guide are designed to help reinforce and expand upon the lessons learned during the game. The activities are based on air pollution issues in the Houston region, but they can be adapted for other locations. The activity guide includes an Ozone Overview, Teacher-Guided Activities, Individual Activities and Resources.

The **Ozone Overview** is a detailed look at ozone air pollution. It is designed to give educators a more in-depth perspective on ozone, plus background information on why air pollution education is important. Educators who have already participated in the *Ozone Theater* theatrical game can use this as a refresher. It can also be used to develop additional lessons.

Teacher-Guided Activities include science experiments that demonstrate characteristics of air pollution and that show how it affects cities and the health of living things. Each activity includes the appropriate grade level, a list of materials needed, and a step-by-step procedure. Some activities are best done in groups and are so indicated in the procedure.

Individual Activities reinforce new vocabulary through puzzles and games. Several creative activities encourage children to use their imaginations to further explore the concepts and to make social change.

The **Resources** section includes an answer key for the individual activities, a list of internet resources, an annotated book list, the TEKS alignment for the *Ozone Theater* theatrical game and a glossary. All these resources are designed to help teachers locate even more information on air quality so they can get the most out of the *Ozone Theater* program.

Authors: Jane L. Laping and Cheryl L. Kaplan

Many thanks to Mothers for Clean Air intern Carolyn Paramo, reviewer Laurie Haffelfinger and designer Bryce Bartley for their contributions to this project.

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

About *Ozone Theater*

Ozone Theater is an educational program that uses an interactive theatrical game and hands-on activities to educate elementary students about air pollution. With this interesting and innovative approach, kids move around and perform while they learn what causes air pollution and how it affects their health. Students not only have fun, but they discover actions they can apply in their lives.

The program was developed through a partnership between Mothers for Clean Air (MfCA) and the Theater Outreach and Education (TOE) program at the University of Texas Medical Branch Office of Community Outreach. The theatrical game and the components in this activity guide can be used at schools, camps, libraries, after-school programs, scout groups, clubs, and special events.

The theatrical game is conducted by a trained leader and takes about 35 minutes. The theatrical game for students in grades 3-5 is called "Good Ozone, Bad Ozone" or "GOBO." By participating in the game, students learn the difference between the ozone layer and ground-level ozone. They also learn how to interpret the federal government's Air Quality Index (AQI), a color-coded health chart. As part of the game, students will act out safe activities they can do at times when ozone levels are high.

The theatrical game for students in pre-K through grade 2 is called "Pesky Polluters." By participating in this game, students learn about the sources of air pollution. They also learn the difference between dirty air and clean air. As a part of the game, students will act out sources such as a bus, a car, a plane, a train, a ship, a factory or a gas station.

About the Partners

Theater Outreach and Education (TOE) is an initiative of the University of Texas Medical Branch Office of Community Outreach. TOE uses theater as an educational tool to raise awareness of environmental health science and medical humanities issues within the university and the community. TOE encourages both youth and adults to learn about what affects their health by means of an enjoyable, imaginative, interactive and, of course, entertaining educational forum.

Mothers for Clean Air (MfCA) is a local, non-profit organization concerned about air pollution in the Houston-Galveston area and its effects on health, particularly in children. MfCA educates the public, in Harris County and the seven counties that touch it, about air quality and about what people can do as individuals and as communities to prevent air pollution and reduce exposure.

To find out more about *Ozone Theater,* or to schedule this free program for your group, contact:

Mothers for Clean Air
3100 Richmond, Suite 309 • Houston, TX 77098
Phone: 713-526-0110 • Fax: 713-526-0550
www.mothersforcleanair.org • *mfca@mothersforcleanair.org*

Ozone Overview

Air pollution, or smog, is a common problem in major metropolitan areas in the United States. Ozone is the primary component of smog. This corrosive gas is considered a major pollutant. It can contribute to numerous health problems, particularly among children and other sensitive people.

Ozone, which is composed of three molecules of oxygen, is colorless and has a distinct smell. It occurs naturally in Earth's upper atmosphere, where it protects us from the sun's harmful rays. This ozone layer is known as "good ozone." However, when ozone is found in the lower atmosphere, it is primarily a result of man-made pollution and it is harmful to living things. It is known as "bad ozone" or "ground-level ozone."

Ground-level ozone forms most easily on warm, sunny days when winds are light. During these conditions, volatile organic compounds (VOCs) readily react with nitrogen oxides (NOx) to form ozone. Common sources of VOCs and NOx emissions include:

- large industries like refineries, chemical manufacturers and power plants;
- small industries such as gas stations and printshops;
- exhaust from airplanes, trains and construction equipment;
- exhaust from automobiles, trucks, and buses; and
- consumer products such as paints and solvents.

Too much ozone in the air we breathe can cause coughing, wheezing, shortness of breath, watery eyes and scratchy throats. It can also trigger asthma attacks and intensify allergic reactions. Children are particularly susceptible to ozone-related health problems, and are considered a sensitive group. That's because:

- their lungs and immune systems are still developing;
- pound for pound, they breathe in 50% more air than adults;
- they spend more time outdoors than adults, especially in summer, when ozone levels are highest; and
- they tend to participate in more vigorous outdoor activities than most adults.

Air Quality Messages in Texas

Since you can't always see or smell air pollution, the Texas Commission on Environmental Quality (TCEQ) conducts daily ozone forecasts. When the forecast indicates that conditions are conducive to the formation of high levels of ozone, TCEQ issues an ozone watch. When ozone reaches unhealthy levels in monitored areas, TCEQ issues an ozone warning. The system is similar to the alert system used for weather forecasting, which includes tornado watches and warnings.

To make ozone warnings easy for the public to understand, TCEQ uses the Air Quality Index, a color-coded tool the U.S. Environmental Protection Agency developed for reporting daily air quality conditions. The AQI also provides guidance on actions people can take to protect their health. For details, visit *http://airnow.gov.*

Ozone Formation in the Houston-Galveston Region

Industry is the largest source of air pollution in Houston and the surrounding region. That's because Houston is home to the largest petrochemical complex in the nation. In most other cities, the biggest contributor to air pollution is vehicle emissions. Unfortunately, Houston's industry emissions are not just the largest air pollution source; they also cause unusually rapid ozone formation. As a result, ozone levels can change from low levels to unacceptable levels over the course of just a few hours.

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

OZONE THEATER:
Setting the Stage for Air Pollution Education
Table of Contents

Share the Air

Grade Level: Pre-K – 2

OVERVIEW

Air is all around us. Most of the time, we cannot see the air, we cannot feel the air, and we cannot smell the air. Yet we know it is there, and we need it there to breathe. Air is everywhere, and it is the only air we have. We can't go to the store to buy more air if our air is dirty. We need to take care of our air and keep it clean.

In this activity, children will pretend to inhale the same air that was exhaled by a plant, an animal, or their teacher.

PURPOSE

To show that all living things breathe the same air.

MATERIALS

None needed.

PROCEDURE

1. Have all the children stand in a big circle.
2. Demonstrate taking a deep breath and exhaling.
3. Tell the children to take a deep breath and then tell them to let it out.
4. Tell them to breathe in again, but this time, breathe out on their hands. Ask them what they feel.
5. Discuss where the air goes after it leaves their bodies. Say that it mixes with the rest of the air. Tell them the air they are breathing used to be in other people's bodies.
6. Ask if animals have to breathe. Ask if plants have to breathe. Say that when we breathe we are also breathing in air that used to be in other animals and plants.
7. Lead children in a game of breathing in the air from an animal or plant and sending it to another animal or plant.
8. Remind children that we are connected to all the animals and plants because we breathe each other's air.

GAME

Let's breathe in the air of the squirrel, let's send it to the trees.
Let's breathe in the air of the flowers, let's send it to the turtles.
Let's breathe in the air of the _____ (ask a child to answer) and let's send it to _____ (ask another child to answer).

EXTENSION

Ask children what happens when cars, trucks, trains, planes and factories make the air dirty. Does that dirty air get mixed with the clean air we breathe? Do we also breathe the dirty air? Do the plants and animals also breathe the dirty air?

What Color Is Air Pollution?

Grade Level: K – 5

OVERVIEW

Air pollution comes from many different sources, including industry, transportation, power plants, and gas stations. In most cities, road transportation sources such as cars, trucks, buses, and motorcycles contribute the most to air pollution. However, the Houston-Galveston area is unique because most air pollution in this area comes from industry. In our region, oil refineries, chemical manufacturing plants, plastic factories and power plants contribute more to air pollution than all other sources of air pollution combined.

Other transportation sources that contribute to air pollution include trains, ships, planes, and construction equipment. These vehicles often run on diesel fuel and create a very harmful kind of air pollution. Gas stations, dry cleaners, and paint and body shops also contribute to air pollution.

In this activity, students will think of different sources of air pollution and assign them a color. Food coloring will be used to tie-dye paper towels to show how air pollution moves and mixes.

PURPOSE

To demonstrate that air pollution spreads and doesn't stay where it is emitted and to show that air pollution from different sources mixes to make a new kind of air pollution (e.g., ground level ozone).

MATERIALS

Package of Green Forest recycled paper towels (or other brand)
Package of 4 small bottles of food coloring (red, blue, yellow and green)
Small, empty margarine tubs (4 per station)
Water
Waterproof markers (Sharpie)
Newspapers
Clothesline
Clip clothespins (1 per student)
12" green pipe cleaners (1 per student – for Extension Activity)
Rubber bands (1 per student – for Extension Activity)

PREPARATION

1. Determine how many stations you will set up. The activity works best with four students per station but it can be done with just one station, if necessary.
2. Prepare each station by covering a table with several layers of newspapers. Set out four margarine tubs, each filled one-quarter full with water.
3. Add 10 drops of food coloring to the water in each tub. Use a different color for each tub, so that when you are finished, each station has tubs of red, blue, yellow and green.
4. Hang a clothesline outside. If it is necessary to hang the clothesline inside, then place newspapers underneath to catch drips.

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

PROCEDURE

1. Give each of the children a paper towel. Each child should write his or her name on a corner of the paper towel using a waterproof marker.
2. Show the children how to fold a paper towel into a small square (2" x 2"). You can do this by folding a paper towel in half, four times.
3. Ask the children to think about places where they have seen smoke. Discuss different sources of air pollution (see activity overview for examples). Ask the class to name four sources of air pollution, and assign each source to one of the tubs of colored water.
4. Have the children briefly dip one corner of their folded paper towels into a tub of colored water. Remind them of the pollution source for that color. Have them watch the "pollution" spread from the corner. Discuss with the children that air pollution doesn't stay where it comes out of the smokestack or tailpipe, either.
5. Repeat with the other paper towel corners in the other "pollution" colors.
6. Once all four corners have been dipped, have the children carefully unfold their paper towels on the newspaper-covered table.
7. Ask the children if they see any colors other than the four they used. Point out orange and purple and ask how they got those colors. Tell them that when air pollution from different sources mixes together (e.g., factories and gas stations), you can make a new kind of air pollution (e.g., ground-level ozone).
8. Have the children carefully remove their dyed paper towels from the table and use clothespins to hang them on the line to dry.

EXTENSION

Once each paper towel is dry, it can be made into a flower or butterfly. Remind the students that flowers and butterflies need clean air to breathe, just like people do.

<u>To make the flower</u>

1. Cut a tie-dyed paper towel into four squares (about 5" X 5").
2. Stack the squares on top of each other, staggering the corners of the squares.
3. Put the tip of your index finger in the middle of the stack.
4. Grab the stack from underneath with your other hand and wrap it around your index finger.
5. Twist the center of the paper towel squares and pull them off your finger.
6. Take the center of a green pipe cleaner and wrap it around the "base" of the flower.
7. Twist the rest of the pipe cleaner to make a stem.
8. Spread the squares apart and arrange them so they look like the petals of a flower.

<u>To make a butterfly</u>

1. Lay the tie-dyed paper towel flat.
2. Gather the paper towel in loose folds from the top to the bottom.
3. Bend a pipe cleaner in half and put it around the middle of the gathered paper towel.
4. Twist the two halves of the pipe cleaner together at a place about 3" from the bend. This makes the body. Curl the two ends of the pipe cleaner to look like antenna. Straighten out the "wings."
5. Attach a rubber band to the center of the body and "bounce" the butterfly to make it flutter.

Catching the Dirt About Air Pollution

Grade Level: K – 5

OVERVIEW

Very tiny pieces of dirt and soot in the air make up a kind of air pollution called particulate matter or particles. Particles are what you see in smoke from fires and in exhaust from big diesel trucks. Particles come in different sizes. Some are so small that you cannot see them without a microscope. These particles are so small that you can breathe them in through your nose and into your lungs. If they get into your lungs they can cause breathing difficulties and other health problems. In this activity, students will collect tiny pieces of dirt, dust and soot from the air and examine the pieces with a magnifying glass.

PURPOSE

To capture, compare and contrast particulate air pollution.

MATERIALS

Index cards (4 per group)
String cut into 12" lengths (4 per group)
Double stick tape cut into 3" lengths (8 per group)
Pen or felt tip marker (1 per group)
Hole punch (1 per group)
Magnifying glass (1 per group)

PROCEDURE

This activity works best in groups of four.

1. Put students in groups and have each group decide on a name. Give each group four index cards and have the students label them “inside,” ”outside 1,” “outside 2,” and “outside 3” with a pen or felt tip marker. They should also include their group name on each card.
2. Ask students to punch a hole on one edge of each index card.
3. Have students tie a piece of string through the hole of each index card.
4. Students should stick two 3" pieces of double stick tape on the unlabeled side of each index card.
5. Help the groups hang their “inside” cards in the classroom (from a light fixture, for example).
6. Each group will hang its other three cards outside (from a tree, fence, lamppost or gutter, for example). Make sure the students write down where they hang each of their cards.
7. After 48 hours, students can take the cards down and look at them using a magnifying glass. They should compare and contrast what they observe on each card.
8. Have each group answer the following questions:
   Which card had the most dirt particles?
   Why do you think this card had more particles than the others?
   Are the particles different sizes? If yes, why do you think they are different sizes?
   Where do you think the dirt particles came from?

EXTENSION

Ask the students if they can see dirt particles in the air without a magnifying glass. Then demonstrate how you can sometimes see dirt in the air with a flashlight, or when light comes in through a window.

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

Count on Breathing

Grade Level: 3 – 5

OVERVIEW

Breathing is something we do naturally, even without thinking. We breathe air in (inhale) and we breathe air out (exhale). Air is made of many kinds of gases. When we inhale, our body only uses a gas called oxygen from the air. When we exhale we breathe out carbon dioxide and the rest of the air that our body didn't need.

When you are resting, you breathe in and out about 20 times in one minute. When you are exercising your body needs more oxygen to give you energy, so you breathe faster to take in more air containing oxygen.

In this activity, students will compare their breathing rates when resting and when exercising.

PURPOSE

To demonstrate that our bodies take in more air when we exercise than when we are resting.

MATERIALS

Stopwatch or clock with second hand
Blackboard or pencil and paper
Drinking straws (1 per student – Extension #2)

PROCEDURE

1. Have all the children sit in a big circle, in chairs if practical.
2. Have them each take a deep breath and remind them that their bodies will use oxygen from the air. Then have them exhale that deep breath and ask them what they are breathing out.
3. Tell the kids to count the number of breaths they take. They should count the inhalation and exhalation as one breath. Practice counting with them (inhale and exhale), several times.
4. Time the students for 30 seconds while they count their breaths. When you say time is up, they should stop counting and remember the number.
5. Each student should write down his or her number on the blackboard or a piece of paper. Ask a few kids their numbers. Resting breathing rate should be about 10 breaths in 30 seconds.
6. Have the kids stand up, spread out and practice doing jumping jacks. Time them for one minute while they do jumping jacks.
7. Have the students count their breaths again while you time them for 30 seconds. Remind them that each inhale and exhale count as one breath. Each student should write down his or her breathing rate.
8. Have the kids compare their numbers and ask how many got a lower number the second time. Ask how many got a higher number. Breathing rate should increase with exercise because the body needs more oxygen to make energy.

EXTENSIONS

1. Exercising and Air Pollution

Ask the kids if they were breathing in more or less air while they exercised. Discuss what other things might be in the air besides oxygen and carbon dioxide. Ask them how pollution sources such as cars, trucks, factories, power plants and forest fires might affect the air we breathe. Ask the following questions: When people exercise, are they breathing in more pollution as well as more air? If so, what conclusions can they make about exercising when pollution levels are high? Explain that people do breathe in more pollutants during exercise, and for that reason, it's a good idea to limit exercise when pollution levels are high.

2. Experiencing Asthma

Give each child a straw. Have the students do jumping jacks for one minute. When you stop them, ask them to pinch their noses closed with one hand and put the straws into their mouths with the other hand. Ask them to breathe through the straws for as long as they can. Explain that this is what it feels like to have asthma. Kids with asthma can have a hard time breathing when air pollution levels are high, even if they are not exercising. Ask if anyone in the class has asthma. If so, ask the child if he or she would describe what it feels like to have an asthma episode. Ask the following questions: How does air pollution affect people's health? Can air pollution affect the breathing of kids who don't have asthma? Explain that air pollution can cause breathing problems even for healthy people. Tell them that all active children are considered to be a sensitive group and should not exercise outdoors when air pollution levels are high.

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

Smog in a Jar

Grade Level: 3 – 5

OVERVIEW

The word smog was created about 100 years ago to describe the air pollution that is created when smoke and fog mix. The word is literally a combination of the words smoke and fog. Smoke is made of millions of very tiny pieces of dirt and soot, called particles. Fog is made of millions of very small droplets of water.

Today, smog is a term usually used to describe a brownish-yellow haze of air pollution that you can see. Smoke is often one of the ingredients, and fog may also be present. However, there are many other kinds of pollutants in smog, such as ground-level ozone. Smog is common in big cities, especially in the summer when it is sunny and warm, because that is when ozone can form most easily. Smog does not form easily if it is windy or if it is raining. In this activity, students will observe how smoke and fog combine to form a very simple type of smog.

PURPOSE

To demonstrate how smog is formed from smoke and fog.

MATERIALS

Clean, wide-mouth glass jar (mayonnaise jar)
Heavy-duty aluminum foil to cover jar opening
6" x 2" strip of paper, folded in half and tightly twisted
Matches
2-3 ice cubes

PROCEDURE

This activity should be performed by the teacher. Students will observe only.

1. Make a tight-fitting lid for the jar out of the aluminum foil, shaping a small depression in the jar opening.
2. Remove the foil lid and set it aside.
3. Wet the inside of the jar with water and pour out the remaining.
4. Put the foil lid back on the jar, and place the ice cubes in the small depression in the lid. Let it sit for several minutes. This will form fog, though it may be difficult to see.
5. With a match, light the twisted paper. Quickly remove the lid and then drop the paper and the match into the wet jar.
6. Quickly put the foil lid back on the jar and seal it, keeping the ice cubes in the lid.
7. Ask the students to watch closely and describe what happens in the jar as the smoke and fog mix.

CAUTION

Always be careful with matches. Do not breathe the "smog." When finished, release the "smog" outside.

Lung in a Bottle

Grade Level: 3 – 5

OVERVIEW

All living things need air to breathe. The air is made of several kinds of gases, but the most important is oxygen. When humans and other land animals fill up their lungs with oxygen and other gases we call it inhaling. When we breathe out other gases from our lungs, including carbon dioxide, we call it exhaling.

However, lungs have no muscles of their own, so how do they move the air in and out? They do it with the help of your diaphragm, a muscle located at the bottom of your ribcage. When you inhale, this muscle tightens and makes the space inside your chest larger. This opens up space in your lungs for the air to rush in. When you exhale, the diaphragm relaxes and the space inside your chest becomes smaller. This causes the lung to be squeezed and the air is pushed out.

Breathe in and visualize your diaphragm getting tighter, creating space in your chest and allowing air in. Then breathe out and visualize your diaphragm relaxing, making the space in your chest smaller and pushing the air out of your lungs. In this activity, students will make a working model of a lung and demonstrate the purpose of the diaphragm.

PURPOSE

To demonstrate how the lung uses muscles in the chest to take in air.

MATERIALS

Clear, empty, 16.9-ounce plastic water bottles (1 per student)
Medium-sized balloons (2 per student)
Scissors (1 per student)

TEACHER PREPARATION

Using scissors or a knife cut an inch or two off the bottom of each bottle, being careful not to leave any sharp points. Discard the bottoms. The remaining tops of the bottles should be about 6 inches tall.

PROCEDURE

This activity works best in pairs, so the students can help each other with the balloons.

1. Have students make the "lung" by pushing a balloon, closed end first, partway into the mouth of the bottle. They should stretch the open end of the balloon over the top edge of the bottle.
2. Students should tie a knot on the open end of the second balloon. Then, they should cut a slice off the top of the balloon. This will allow them to stretch the cut end of the second balloon around the open bottom of the bottle. This creates the "diaphragm."
3. Pull down carefully on the bottom balloon to tighten the "diaphragm." What happens to the "lung" balloon when you increase the space inside the bottle? The same thing happens when you breathe in.
4. Now, gently squeeze the sides of the bottle and gently push the bottom balloon up into the bottle. What happens to the "lung" this time, when the "diaphragm" is relaxed?
5. Sometimes, when we breathe in dust or dirt, we sneeze or cough to clean out our lungs. Push up harder on your "diaphragm" to make your lung model cough or sneeze.

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

Do the Smog Stretch

Grade Level: 3 – 5

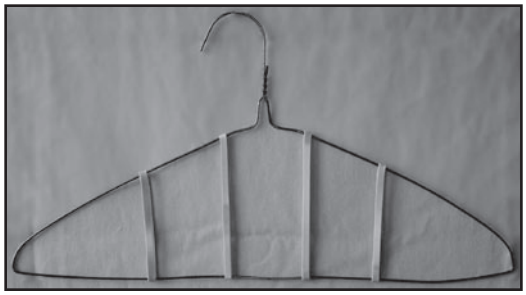
OVERVIEW

Smog is the brownish-yellow haze that we sometimes see in cities, especially when the temperature is warm. Smog gets its color from pollutants called nitrogen dioxides. Smog also contains pollutants that have little or no color, such as ozone. Ozone is a corrosive gas that can harm the health of humans and animals. It can also cause damage to plastics, rubber, concrete, and metal.

In this activity, students will examine the effects that air pollution has on rubber bands. (Note: This experiment is best done in late spring, summer or early fall when ozone levels are higher.)

PURPOSE

To demonstrate physical damage caused by smog.



MATERIALS

Rubber bands (8 per group)
Wire coat hangers (2 per group)
Magnifying glass (1 per group)

PROCEDURE

This activity works well in groups of four, though you may also choose to do just one experiment for the entire class.

1. Have the students stretch 4 rubber bands over each of their wire coat hangers until they are tight. They may need to bend the hanger to make the rubber bands fit tightly.
2. Ask the students to hang one coat hanger outside in the shade.
3. Have the students hang the other coat hanger in the classroom.
4. After two weeks, students should take the hangers down and examine the rubber bands using a magnifying glass.
5. Have students answer the following questions:
   Do the rubber bands on the two hangers look the same? What is different?
   Do the rubber bands on the two hangers feel the same? What is different?
   What do you think happened to the rubber bands that were put outside?

EXTENSION

Plastic, concrete and metal are other materials that can also be damaged by smog. Ask the students to name some structures or objects they see every day that are made of these materials. If these structures or objects are damaged by smog like the rubber bands were, how might this affect your city?

Flagging Air Quality

Grade Level: 3 – 5

OVERVIEW

Red and green mean more than "stop" and "go" in the Air Quality Index (AQI). The AQI uses colors (green, yellow, orange, red, purple) to represent the quality of outdoor air and associated health messages.

The AQI levels are based on health standards for ozone and other common pollutants. An AQI level of over 100 for any pollutant means that it exceeds those health standards. For every color on the AQI, there is a corresponding health message. For example, when the AQI is green (0-50), the air quality is considered good for all groups. When the AQI is orange (101-150) the air quality is considered "unhealthy for sensitive groups" (Table 1).

In this activity, students will learn about the warning colors in the Air Quality Index, which was developed by the U.S. Environmental Protection Agency. They will also set up a flag system to inform their school mates about daily air quality levels.

Table 1. The Air Quality Index uses colors to indicate the health quality of outdoor air.

COLOR	INDEX	AIR QUALITY	HEALTH MESSAGE
Green	0 to 50	Good	No health problems; it is safe to go outside
Yellow	51 to 100	Moderate	Unusually sensitive people need to use caution because some people may have problems.
Orange	101 to 150	Unhealthy for sensitive groups	People in sensitive groups* should limit outdoor activity.
Red	151 to 200	Unhealthy	People in sensitive groups should avoid outdoor activity.
Purple	201 to 300	Very unhealthy	Everyone should avoid outdoor activity.

** Children are considered a sensitive group.*

PURPOSE

To raise awareness about the Air Quality Index and its associated health messages.

MATERIALS

Set of 5 colored flags (green, yellow, orange, red, purple)**
Computer with Internet access

*** If a set of Air Quality Index flags was not supplied by Mothers for Clean Air, you can make a set using 18" x 18" pieces of colored felt and 3 foot lengths of ¼" dowel rod. Sew a 5/8" sleeve on one side of the felt and insert the wooden dowel.*

PREPARATION

1. The procedure below for checking ozone levels is specific to the Houston area. If you live in Texas, but in a different metropolitan area, use the state website (see step 5 of the procedure) to find your local air monitors before you begin this activity. If you don't live in Texas, try visiting *http://airnow.gov*. The website posts real-time AQI conditions for more than 300 cities across the U.S., and provides links to more detailed state and local air quality websites.

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

2. You can view a kid-friendly, full-color version of the AQI at the AIRNow website. You might want to consider printing a copy or making an overhead to use with your students. To get there:
   - Go to *http://airnow.gov.* In the menu at left, click "Teachers."
   - Under "Activities," click "Air Quality Index Teacher's Materials."
   - The first item in the list is the "Teacher's Reference." Click to download the PDF.
   - Go to page 11 to see the AQI for ozone in color with the associated health messages. (Check out the other pages as well!)

PROCEDURE

1. Review the Air Quality Index with students. For this project, they will use the computer to check local ozone levels several times each day. Using this information, they will display the appropriate AQI flag at your school to help inform other students and teachers about the daily air quality.
2. Find a location at your school to hang your AQI flag. Ask students for their suggestions. The flag should be placed in an area where most of the children will see it. A position near the outside play area, or the door leading to the area, is preferable.
3. Inform staff and students about the meaning of the flags and their colors. You could have students help with this by making morning announcements.
4. During the peak ozone season, which is March through November in the Houston area, have the students check local ozone levels several times each day using the Internet.
5. For Houston, Texas, follow the instructions below to check ozone levels. You may want to check the procedure before trying it with your students, as Internet links are subject to change.
   - Go to the website of the Texas Commission on Environmental Quality (TCEQ) at *http://www.tceq.state.tx.us/*.
   - Under "Subject Index," click on "Air." Under "Air Monitoring" click "Ozone Data and Current Levels." Then click "Current Texas Ozone Levels."
   - Scroll down to the map, and then click on one of the boxes in the Houston area. Two maps of the Houston region should come up. Book mark this page.
   - Find the monitor nearest your school. Monitors are represented by numbered squares. This monitor is the one you will look at each day to determine your school's air quality. The color of the monitor square is the color of flag you should display. (If you want to see more information on the monitor you've chosen, click the square.)
5. After the students view the data, they should put out the appropriate flag.

EXTENSION

(Note: This extension is specific to the Houston area. Your area may or may not have an ozone alert system.) In addition to having the students view the ozone data every afternoon, you can sign the class up to receive ozone warnings by e-mail. (If you choose, you could let the students check the e-mail daily in place of viewing the TCEQ data.) To sign up for ozone warnings:

- Go to *http://www.hcoem.org.*
- Click on "subscribe to ozone alerts" in the menu at left.
- Enter your contact information.
- Select "Receive Warnings for Individual Sites" and click "subscribe."
- When the map comes up, choose the three monitors closest to your school and then click "complete."

FIND THE DIRTY AIR WORDS

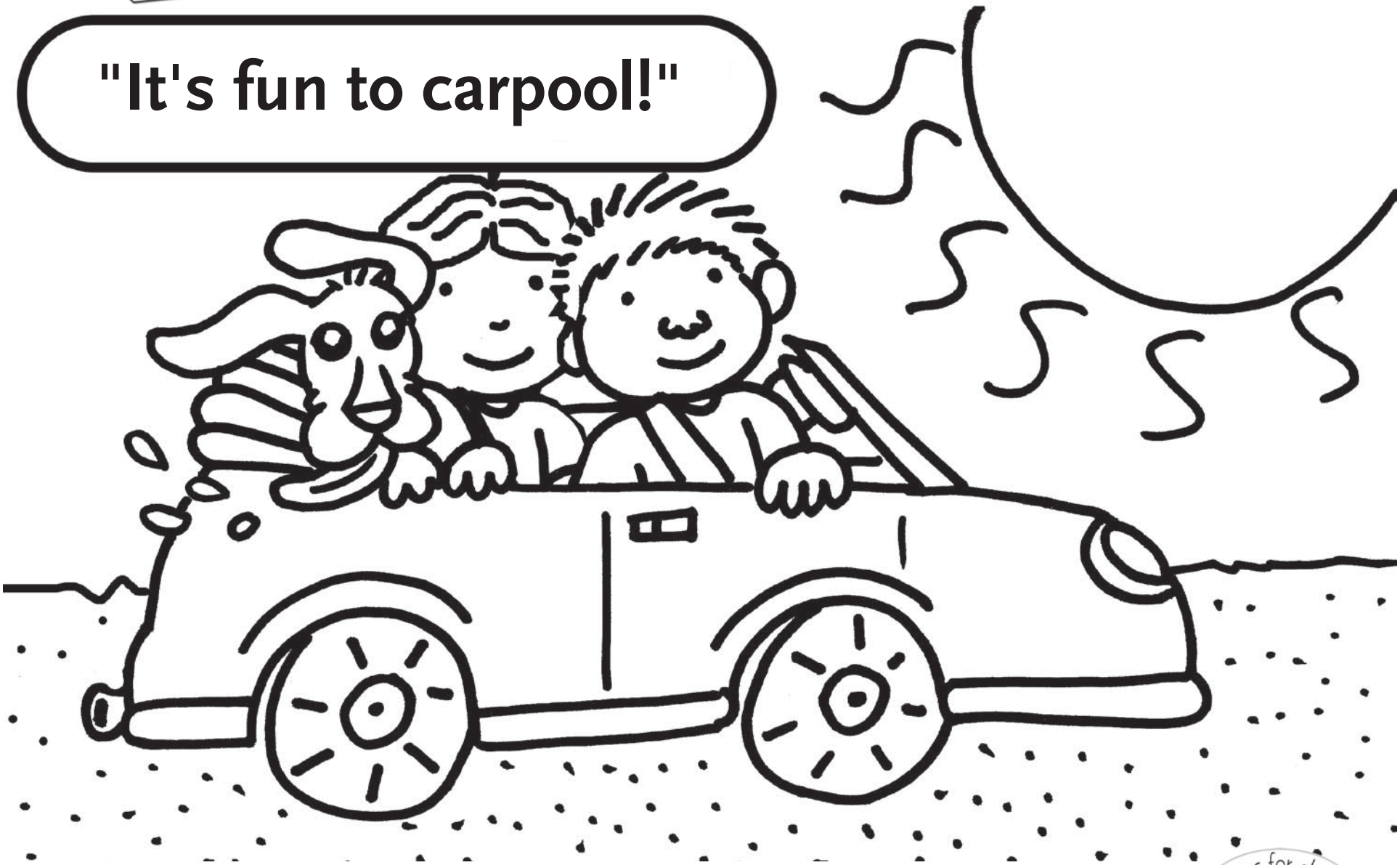
Find all the words from the word bank in the puzzle below.
Words are across, down, and diagonal.

G	A	S	S	T	A	T	I	O	N
Q	I	W	E	R	R	T	Y	E	D
F	R	U	I	A	O	S	P	X	I
A	P	A	S	I	D	H	F	H	R
C	L	E	A	N	A	I	R	A	T
T	A	W	A	L	K	P	G	U	Y
O	N	A	G	B	I	K	E	S	A
R	E	H	U	J	U	K	L	T	I
Y	Z	X	C	T	V	S	B	N	R
C	A	R	P	O	O	L	M	Q	W

Word Bank

- Clean Air
- Auto
- Airplane
- Walk
- Bike
- Dirty Air
- Exhaust
- Train
- Ship
- Carpool
- Bus
- Factory
- Gas Station

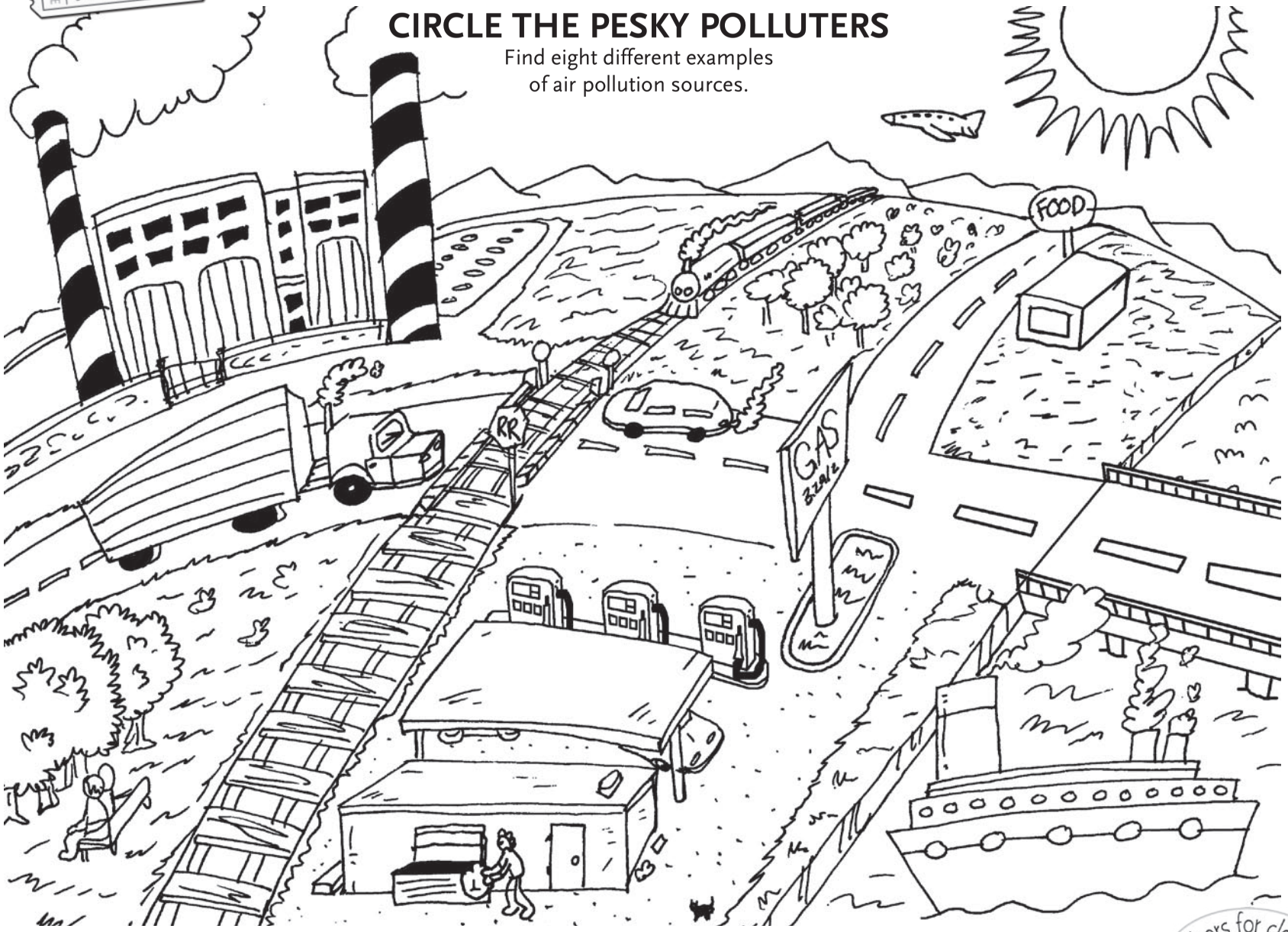
3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*



3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

CIRCLE THE PESKY POLLUTERS

Find eight different examples
of air pollution sources.



3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

DRAW YOUR OWN AIR POLLUTION BEAST

You have learned about different things that make our air dirty.
Use your imagination to draw an **Air Pollution Beast!**
BE CREATIVE AND HAVE FUN!

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

CREATE YOUR OWN COMIC STRIP

Draw your own characters and illustrate how they react to air pollution.
Make sure you have a title for your comic strip. Be creative and have fun!

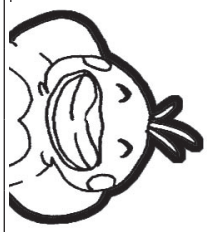
		THE END 

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

WHAT'S THE WORD ON OZONE?

Find all the words from the word bank in the puzzle below.
Words are across, down, and diagonal.

T	A	W	E	R	T	Y	U	I	G	O	P
R	S	D	F	B	A	D	O	Z	O	N	E
A	G	P	O	L	L	U	T	I	O	N	H
N	I	J	E	K	L	Z	X	C	D	S	C
S	N	R	V	O	B	N	M	Q	O	U	W
P	D	E	Q	R	P	T	Y	U	Z	N	I
O	U	O	P	U	A	L	S	D	O	L	F
R	S	G	H	J	A	K	E	L	N	I	Z
T	T	X	C	V	B	L	N	M	E	G	Q
A	R	W	E	R	T	Y	I	U	I	H	O
T	Y	P	A	S	D	F	G	T	H	T	J
I	U	N	H	E	A	L	T	H	Y	K	L
O	Z	O	N	E	W	A	R	N	I	N	G
N	Z	X	C	V	B	N	M	Q	W	E	R



WORD BANK

- POLLUTION
- AIR QUALITY
- OZONE WARNING
- GOOD OZONE
- UNHEALTHY
- INDUSTRY
- BAD OZONE
- SUNLIGHT
- TRANSPORTATION
- PEOPLE

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

COLOR YOUR OWN AIR QUALITY INDEX

Color in the OZONE WARNING box with the colors listed in the key at the bottom of the page. Then draw an ACTIVITY that you can do during that ozone warning.

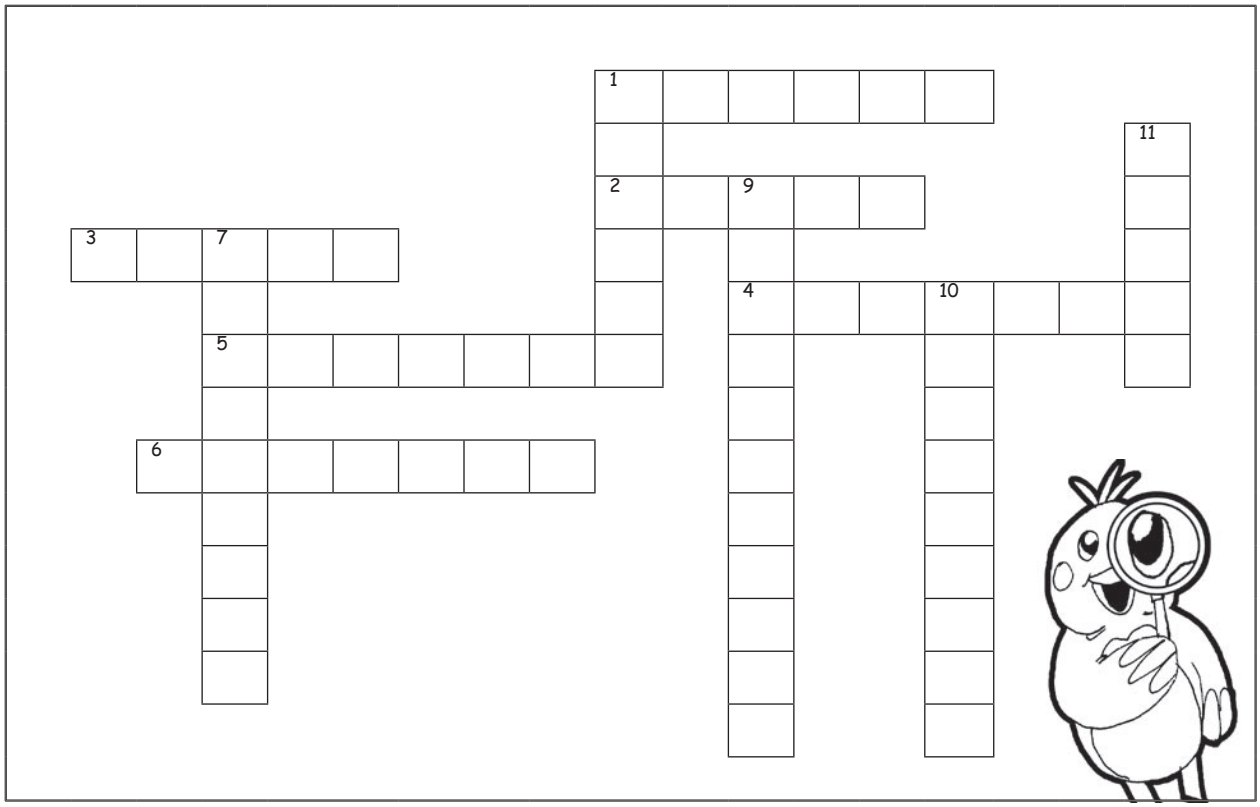
OZONE WARNING	ACTIVITY
VERY UNHEALTHY	
UNHEALTHY	
UNHEALTHY FOR SENSITIVE GROUPS	
MODERATE OR USE CAUTION	
GOOD	

KEY:

VERY UNHEALTHY = PURPLE (example: board game)
UNHEALTHY = RED (example: sitting at bus stop)
UNHEALTHY FOR SENSITIVE GROUPS = ORANGE (example: limited walking)
MODERATE OR USE CAUTION = YELLOW (example: short jog)
GOOD = GREEN (example: baseball)

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

DETECT THE OZONE WORDS



ACROSS

1. You may _____ or make a whistle sound if you breathe high ozone.
2. When you have been outside during high ozone your chest may feel _____.
3. Running outside during high ozone can make you _____.
4. Ozone warning color red means try not to go _____.
5. When the ozone warning color is green, it is very _____ to breathe the air outside.
6. When the ozone warning color is yellow, you may go outside with _____.

DOWN

1. High ozone may give you _____ eyes.
7. When the ozone warning color is purple, it is very _____ to breathe the air outside.
9. _____ ozone is the bad ozone created from air pollution and sunlight.
10. Ozone warning color orange is unhealthy for _____ groups.
11. The ozone _____ is the good ozone found in the Earth's upper atmosphere.

WORD BANK

SENSITIVE	WATERY	OUTSIDE	UNHEALTHY
TIGHT	LAYER	GROUND-LEVEL	HEALTHY
WHEEZE	CAUTION	COUGH	

DECODE THE AIR QUALITY COLORS

Unscramble the given words below and decode the secret message. Use the clue bank to help you.

1. REGEN _____ (10)
2. LOYLEW _____ (4)
3. DRE _____ (3)
4. RNAEGO _____ (2)
5. UPLEPR _____ (9)
6. OODG ZONOE _____ (6)
7. DBA ZONOE _____ (5)
8. POLOLTNIU _____ (7, 11)
9. ZONOE TSACEROF _____ (1, 8)

CLUE BANK

1. Good, healthy to breathe the air outside
2. Take caution
3. Unhealthy to breathe the air outside
4. Unhealthy for sensitive groups
5. Very unhealthy to breathe the air outside
6. The ozone layer
7. Ground-level ozone
8. Dirty air
9. An educated guess about today's air quality.

Secret Message

" _____ _____ (1 2 3 4 2 5 6 7 8) "

_____ _____ (1 9 4 2 10 2 11 3)

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

WRITE A LETTER

Write a letter to the President about why kids need clean air.

DEAR PRESIDENT _____,

I am in the _____ grade at _____

_____

_____

_____

_____

_____

_____

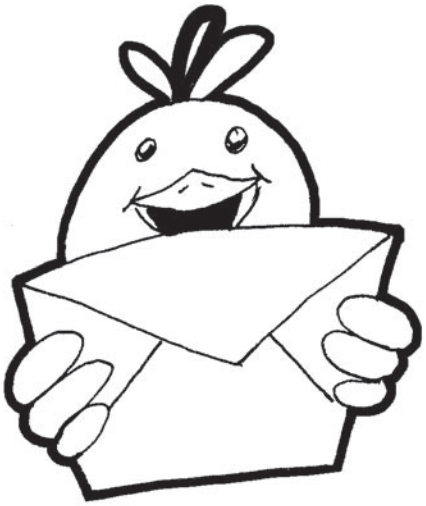
_____

_____

_____

_____.

Sincerely,



Helpful Hints:

- Write about how much you like to play outside
- Describe how you feel when the air is polluted and dirty
- Explain how your lungs need clean air to grow healthy and strong

Internet Resources

Activities and Curricula

Educational Resources Related to Air
The teacher's page on the Mothers for Clean Air website has a good list of links to lesson plans and activities on the internet, especially those that deal with air quality issues.
http://www.mothersforcleanair.org/aqinfo/teachers.html

Andy Airedale Posters and Lessons
The City of Forth Worth has links to posters featuring Andy Airedale, the Air Quality Watch Dog, who was created by the Houston-Galveston Area Council. The city also has an activity book featuring the character, as well as coloring pages and lessons.
http://www.fortworthgov.org/DEM/kids_andy.htm

Project A.I.R.E and More
The Environmental Protection Agency website hosts a list of curriculum that deal specifically with air quality issues. One good resource is Project A.I.R.E., a comprehensive air pollution curriculum guide that includes activities for students in elementary through high school. Check out the others as well.
http://www.epa.gov/teachers/curric-air.htm

Air Quality Index Games and Lessons
The AIRNow website was developed through collaboration between numerous federal, state and local government agencies. Under Activities, check out the Air Quality Index Kid's Page for fun games for elementary students, and also check out the Air Quality Index Teacher's Materials.
http://www.airnow.gov/index.cfm?action=static.resource

Smog City Interactive Game
http://www.smogcity.com/welcome.htm
On this website from the Sacramento Metropolitan Air Quality District, students can play Smog City, an interactive game about ozone air pollution. Though the information does not correlate exactly to emissions conditions in Houston, kids will enjoy manipulating winds, temperatures and sunlight to see the effect on ozone formation.

Organizations

University of Texas Medical Branch, Office of Community Outreach, Theater Outreach and Education (TOE)
TOE uses theater as a tool for education to raise awareness of health science issues within the university and the community.
http://www.utmb.edu/outreach/Programs/CommunityHealth.asp

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

Mothers for Clean Air (MfCA)
This local organization is concerned about Houston-Galveston air quality and its effects on health, particularly to children.
http://www.mothersforcleanair.org

Clean Air Action (CAA)
A program of the Houston-Galveston Area Council, CCA provides information on the area's air quality to the public.
http://www.cleanairaction.org

Galveston-Houston Association for Smog Prevention (GHASP)
GHASP is a community-based environmental organization that is dedicated to improving the quality of our region's hazardous air.
http://www.ghasp.org

Houston-Galveston Citizen Air Monitoring Project (H-GCAMP)
This coalition of private citizens in the Houston-Galveston area worked with government agencies to collect air samples and have them analyzed.
http://www.epa.gov/earth1r6/6lab/hgcamp/hgcamp.htm

Citizens' League for Environmental Action Now (CLEAN)
CLEAN informs and educates citizens about environmental abuses so that they will take action to protect their children, future generations and endangered species.
http://www.cleanhouston.org

Citizens' Environmental Coalition (CEC)
This group serves as the umbrella organization for 91 non-profit environmental organizations in the 13-county Gulf Coast region.
http://www.cechouston.org

Publications and Information

Ozone Alerts via E-mail
This system, which is maintained by the Harris County Office of Emergency Management, uses TCEQ data to generate ozone alerts. Citizens can sign up to receive all e-mail ozone watches and warnings, or they can select specific monitoring sites.
http://ozone.hcoem.org/ozone_subscribe.php

Environmental Health Houston
This website, created by Baylor College of Medicine, provides information about environmental health issues in Houston. It is geared for adult readers. Part of the website deals specifically with air issues, and would be good background for teachers.
http://www.envirohealthhouston.org/

Texas Commission on Environmental Quality
This website has a wealth of information on air quality, from current air quality measurements in the state to educational resources.
http://www.tceq.state.tx.us

AIRNow
A coalition of federal, state, and local government agencies developed the AIRNow website to provide the public with easy access to national air quality information. The website offers daily AQI forecasts as well as real-time AQI conditions for over 300 cities across the US, and provides links to more detailed state and local air quality websites.
http://www.airnow.gov

2002 Air Quality Reference Guide for the Houston-Galveston area
This guide, produced by the Houston-Galveston Area Council, was designed to provide citizens and groups with accurate information about air pollution problems in the Houston region.
http://www.cleanairaction.org/pubs/pdfs/2002/2002aqrg.pdf

Guidance on Ozone Pollution and Physical Activities
The City of Houston developed this publication to provide school administrators with guidance on limiting outdoor physical activities during ozone warnings.
http://www.cleanairaction.org/pubs/pdfs/old_pubs/schoolguidance.pdf

Managing Asthma and Ozone in the Houston Area: A Guide for People with Respiratory Sensitivities
This publication, by Mothers for Clean Air, provides information on how to avoid exposure to air pollution, especially ozone.
http://www.mothersforcleanair.org/aqinfo/ozone.pdf

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

Books

Kindergarten – 2nd grade

Little Factory by Sarah Weeks, illustrated by Byron Barton, 1998, Harpercollins Juvenile Books, New York.
ISBN 0-06-027429-8
Summary: There was a little man who ran a little factory. But as the factory grows bigger and bigger, the little workers begin to cough and choke on the smoke from the factory chimneys. It's up to the little man to save the day.

Cars and Trucks and Things that GO by Richard Scarry, 1998, Golden Books.
ISBN 0307157857
Summary: This llustrated book of all kinds of transportation vehicles includes imaginative creations such as the picklemobile. Older children can be challenged to find the hidden imaginary character, Goldbug, on every page.

Just a Dream by Chris Van Allsburg, 1990.
ISBN 0395533082
Summary: A boy's dream of the future is not what he expects.

The Lorax by Dr. Seuss, 1971, Random House.
ISBN 0394823370
Summary: Although published in the 1970s, The Lorax is an ecological warning of greed and environmental destruction that is still true today. The lovable Lorax tries to save the Truffula Forest and the creatures that live there from disaster caused by the greedy and cantankerous Once-ler.

Michael Bird-boy by Tommy DePoalo, 1999.
ISBN 083351377X
Summary: Michael shows a polluting factory how to make a natural product with no pollution.

Smoke by Ib Spang Olsen.
ISBN 0698200187
Summary: A family goes to the country for a picnic, but turns around to do something about the smoke.

3rd – 5th grade

Air Pollution (A New True Book) by Darlene R. Stille, 1990, Childrens Press, Chicago.
ISBN 0-516-01181-2
Summary: This book discusses the benefits of air and the causes of air pollution. It also explains the harmful effects of air pollution and ways of avoiding them.

Air Pollution: Our Impact on the Planet (21st Century Debates) by Matthew Chapman and Rob Bowden, 2002, Steck-Vaughn Company.
ISBN 0-7398-4874-7
Summary: This book describes the air pollution problem on a local, national and international level and discusses what can be done about it and who is responsible. Useful facts, differing viewpoints and issues for debate are highlighted in boxes. It is filled with color photos.

Atmosphere in Danger (Man-made Disasters) by Jane Walker, 1993, Gloucester Press.
ISBN 0-531-17425-5
Summary: This book discusses the long-term damage humans are causing to the atmosphere. It describes global warming, acid rain, depletion of the ozone layer, and poisons in the air.

Clean Air (Earth at Risk) by Edward Edelson, 1992, Chelsea House Publishers.
ISBN 0-7910-1582-3
Summary: This book explores the devastating effects of population growth and industry on air quality; the different types of pollutants that can be found in the atmosphere; the health and economical effects of pollution; and ways to clean up the air.

Polluting the Air (Save Our Earth Series) by Tony Hare, 1992, Gloucester Press, New York.
ISBN 0-531-17346-1
Summary: This book examines the causes and effects of air pollution and explores methods to combat this threat.

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

Alignment with Texas Essential Knowledge Skills (TEKS) Grades K-6

These TEKS alignments apply to the *Ozone Theater* interactive theatrical games, "Pesky Polluters" and "Good Ozone, Bad Ozone (GOBO)".

Lesson	Grade Level	Theatre	Health	Science	Language Arts
Pesky Polluters	K	K.1, K.2, K.3, K.4	K.1, K.2, K.3, K.4	K.1, K.2, K.3	K.1, K.2, K.3
	1	1.1, 1.2, 1.3, 1.4	1.1, 1.2, 1.3, 1.4, 1.6, 1.8	1.1, 1.2, 1.3, 1.5	1.1, 1.2, 1.3
	2	2.1, 2.2, 2.3, 2.4	2.1, 2.2, 2.3, 2.7, 2.8	2.1, 2.2, 2.3, 2.5	2.1, 2.2, 2.3
Good Ozone, Bad Ozone (GOBO)	3	3.1, 3.2, 3.3, 3.4	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8	3.1, 3.2, 3.3, 3.4, 3.5, 3.6	3.1, 3.2, 3.3
	4	4.1, 4.2, 4.3, 4.4	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.11	4.1, 4.2, 4.3, 4.4, 4.6	4.1, 4.2, 4.3, 4.4, 4.6
	5	5.1, 5.2, 5.3, 5.4	5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9	5.1, 5.2, 5.3, 5.4, 5.5, 5.6	5.1, 5.2, 5.3, 5.4, 5.5, 5.6
	6	6.1, 6.2, 6.3, 6.4	6.1, 6.2, 6.3, 6.4, 65, 6.6, 6.8	6.1, 6.2, 6.3, 6.4	6.1, 6.2, 6.3, 6.4, 6.5

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

GLOSSARY

Air Pollution – The presence of contaminants or pollutant substances in the air; it interferes with human health or welfare and/or produces other harmful environmental effects.

Air Quality – The status of the air, indicated by the presence of potential pollutants.

Air Quality Index (AQI) – A color-coded index developed by the U.S. Environmental Protection Agency to facilitate the reporting of daily air quality levels and health messages to the public.

Asthma – A chronic inflammatory disease of the lungs characterized by symptoms such as wheezing, coughing, breathlessness and chest tightening.

Atmosphere – The mixture of gases surrounding the Earth.

> **Lower Atmosphere** – A layer of atmosphere (called the troposphere) that extends up approximately eight miles from the Earth's surface; all weather takes place here.
>
> **Upper Atmosphere** – Generally used to refer to all levels of the atmosphere above the troposphere; includes the stratosphere, where the ozone layer is found.

Carbon Dioxide – A colorless, odorless gas that is found in the air; it is absorbed by plants and exhaled by humans and animals.

Emissions – Pollution discharged into the atmosphere from sources such as industry and transportation.

Exhaust – Gases emitted as waste products, usually from engines.

Nitrogen Oxides (NOx) – Refers to the family of oxides of nitrogen, which are often produced in combustion processes; vehicles and industry are common sources.

Nitrogen Dioxide – A toxic gas that is a major component of smog; many of the other nitrogen oxides are colorless, but nitrogen dioxide has a brownish color.

Ozone – A colorless, corrosive gas composed of three molecules of oxygen.

> **Good, or Stratospheric Ozone** – A layer of ozone that is found in the upper atmosphere; it blocks 99% of the sun's harmful ultraviolet light.
>
> **Bad, or Ground-Level Ozone** – Ozone that is formed at ground level by the reaction of chemicals and sunlight; it is a major component of smog and a health hazard.

Ozone Forecast – A report that indicates whether or not ozone levels are expected to exceed federal health standards on a particular day.

Ozone Warning – A notice that ozone levels have exceeded federal health standards; warnings are issued based on hourly air quality data.

Ozone Watch – A notice issued when conditions are conducive to the formation of ozone and ozone levels are predicted to exceed federal health standards.

Particulate Matter – Fine particles of matter, such as dust, dirt, soot and smoke, which are found in the air or in emissions.

Pollutant – Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.

Sensitive Group – A category used in the Air Quality Index to describe people who are especially vulnerable to air pollution; includes children and people with asthma or other respiratory diseases.

Smog – Air pollution that is formed by the reaction of chemicals and sunlight; it is often seen as a brownish-yellow haze.

Soot – Carbon dust formed by incomplete combustion.

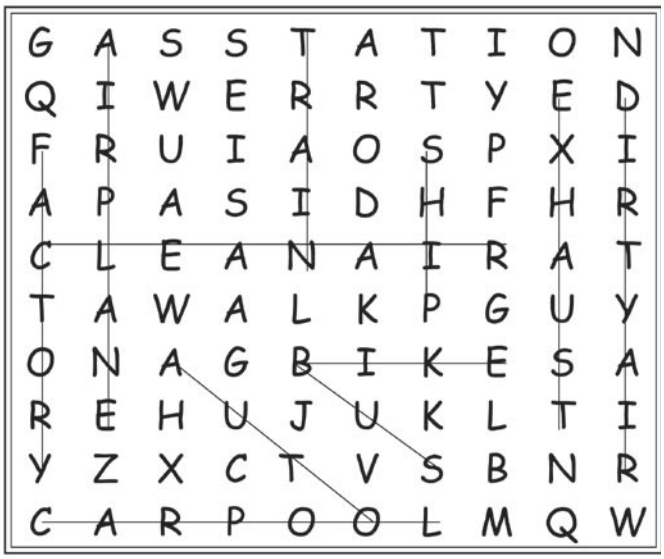
Source – A place, object, process or activity that releases pollutants; vehicles and industry are examples.

Volatile Organic Compounds (VOCs) – Hydrocarbon compounds, such as gasoline and benzene, that readily produce vapors; they often have an odor and may be toxic.

3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110 · **Fax:** 713-526-0550
Website: *www.mothersforcleanair.org* · **Email:** *mfca@mothersforcleanair.org*

ANSWER KEYS

FIND THE DIRTY AIR WORDS (page 12):



CIRCLE THE PESKY POLLUTERS (page 14):

People
Truck
Car
Train
Ship
Airplane
Factory
Gas Station

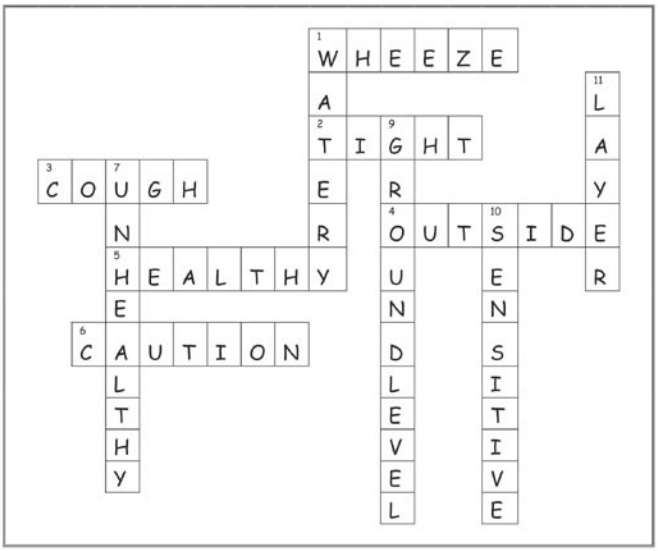
DECODE THE AIR QUALITY COLORS (page 20):

Answer Key: 1-Green, 2-Yellow, 3-Ozone, 4-Orange, 5-Purple, 6-Good Ozone, 7-Bad Ozone, 8-Pollution, 9-Ozone Forecast

Special Message: "Care about clean air"

WHAT'S THE WORD ON OZONE (page 17):

DETECT THE OZONE WORDS (page 19):



Mothers for Clean Air
3100 Richmond, Suite 309 Houston, TX 77098
Phone: 713-526-0110
Fax: 713-526-0550
www.mothersforcleanair.org
Email: *mfca@mothersforcleanair.org*