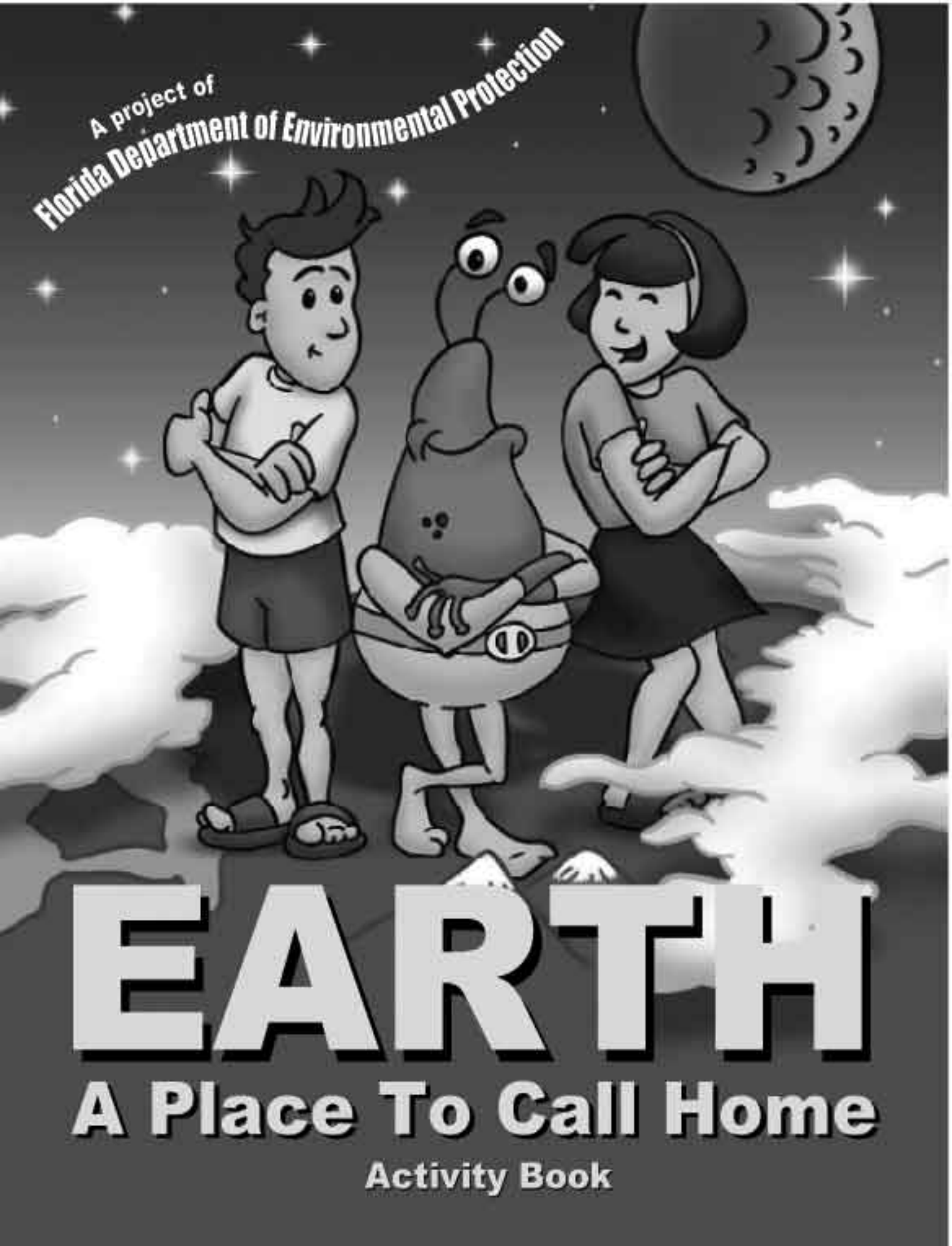

A project of
Florida Department of Environmental Protection
EARTH
A Place To Call Home
Activity Book

This Book Belongs to:

Florida Air ...
Let's Keep It Clean

Florida Department of Environmental Protection
Division of Air Resource Management
2600 Blair Stone Rd., M.S. 5500
Tallahassee, FL 32399
(850)488-0114
www.dep.state.fl.us/air/

Hi!
I'm Ed, and I was sent to Earth to learn all about the air and to share my knowledge with you! Join me in these neat activities and have fun coloring the pictures!

All About Air

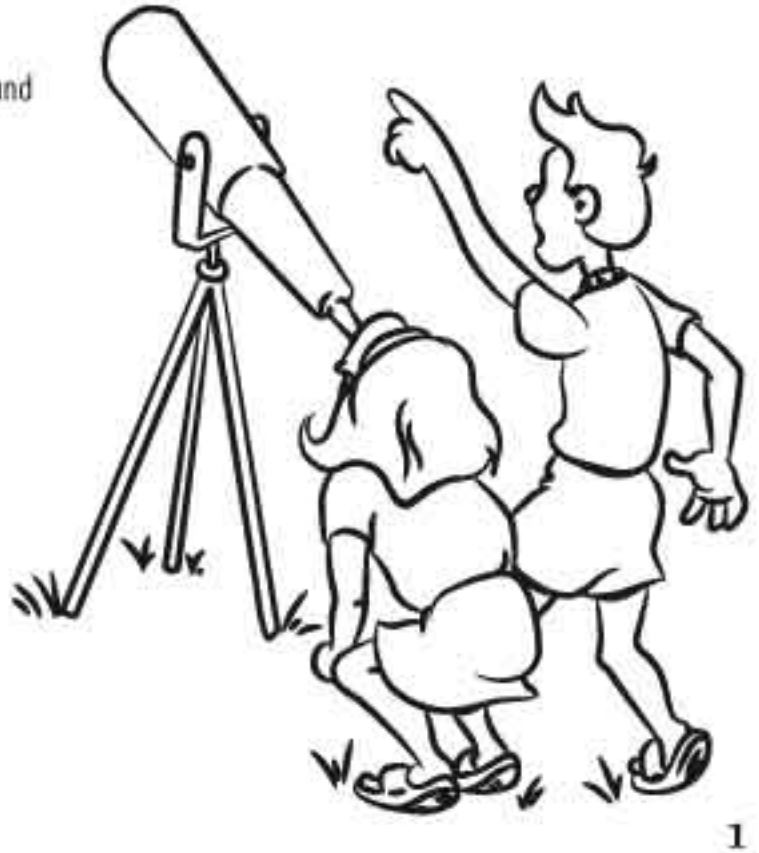
It probably seems like there is an unlimited supply of air. The Earth is surrounded by what seems like a huge ocean of air. Actually, a huge band of air stretches from the ground upwards to about 500 miles. This band of air is called the atmosphere (at-mo-sfear).

Air is a mixture. It contains many things – mostly gases we can't see. Gases are neither solid nor liquid. They move around and do not have shape. Adults breathe in about 35 pounds of air a day. One fifth of this is oxygen (21%) and the rest is nitrogen (78%) and small amounts of argon, carbon dioxide and other gases and water vapor (1%).

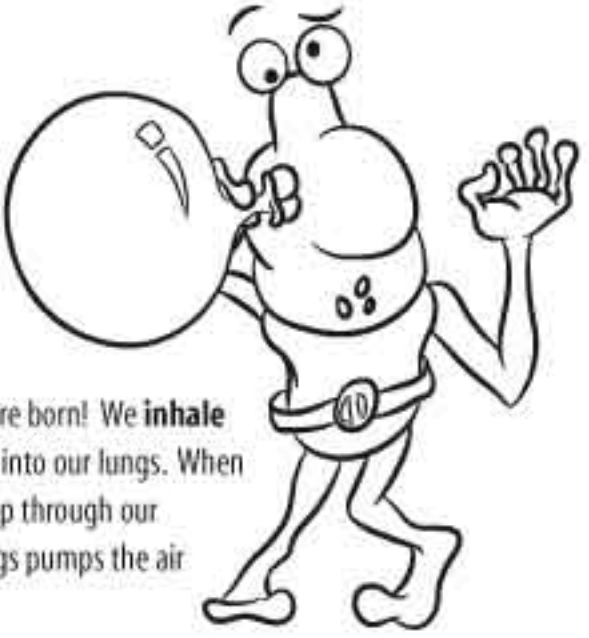
The most important gas in air that people and animals use is oxygen. Oxygen has no color or smell. People and animals need to breathe oxygen in order to live. Here on Earth, plants help us breathe by giving off oxygen. As people and animals exhale, they give off carbon dioxide. This is what plants "breathe". It is a very unique relationship we share with plants. Plants take in what we exhale (carbon dioxide) and we inhale what plants give off (oxygen). Plants and people and animals need each other to survive!

Here's your chance to show what you know about the air around us. Answer these questions in complete sentences.

1. What is atmosphere? _____
   _____
2. What is air made up of? _____
   _____
3. How much of the air is oxygen? _____
   _____
4. What do plants give off? _____
   _____
5. What do people and animals exhale? _____
   _____



How Do I Breathe?



Air is made up of different gases and one of them is oxygen. We get our needed oxygen by breathing in air.

You are already an expert at **breathing**; you've been doing it since you were born! We **inhale** air into our mouth and nose, down through our windpipe in our throat and into our lungs. When exhaling we do the opposite. We **exhale** carbon dioxide out of our lungs, up through our **windpipe**, and out of our mouth and nose. A strong muscle under our lungs pumps the air in and out. This muscle is called the **diaphragm**.

Another word for breathing is **respiration**. All of the parts of our body that help us breathe make up our respiratory system.

We've listed the words in bold from above. Look them up in the dictionary and write in the definitions.

Breathing _____

Inhale _____

Exhale _____

Windpipe _____

Diaphragm _____

Respiration _____

Dot-to-Dot

Draw a picture of the respiratory system by connecting the dots. Then write the correct name that corresponds to the body part.

N_ _ _E

M_ _ _T_

W_N_ _ _ _ _E

_ _ _ _G_

D_ _ _P_ _ _ _ _M

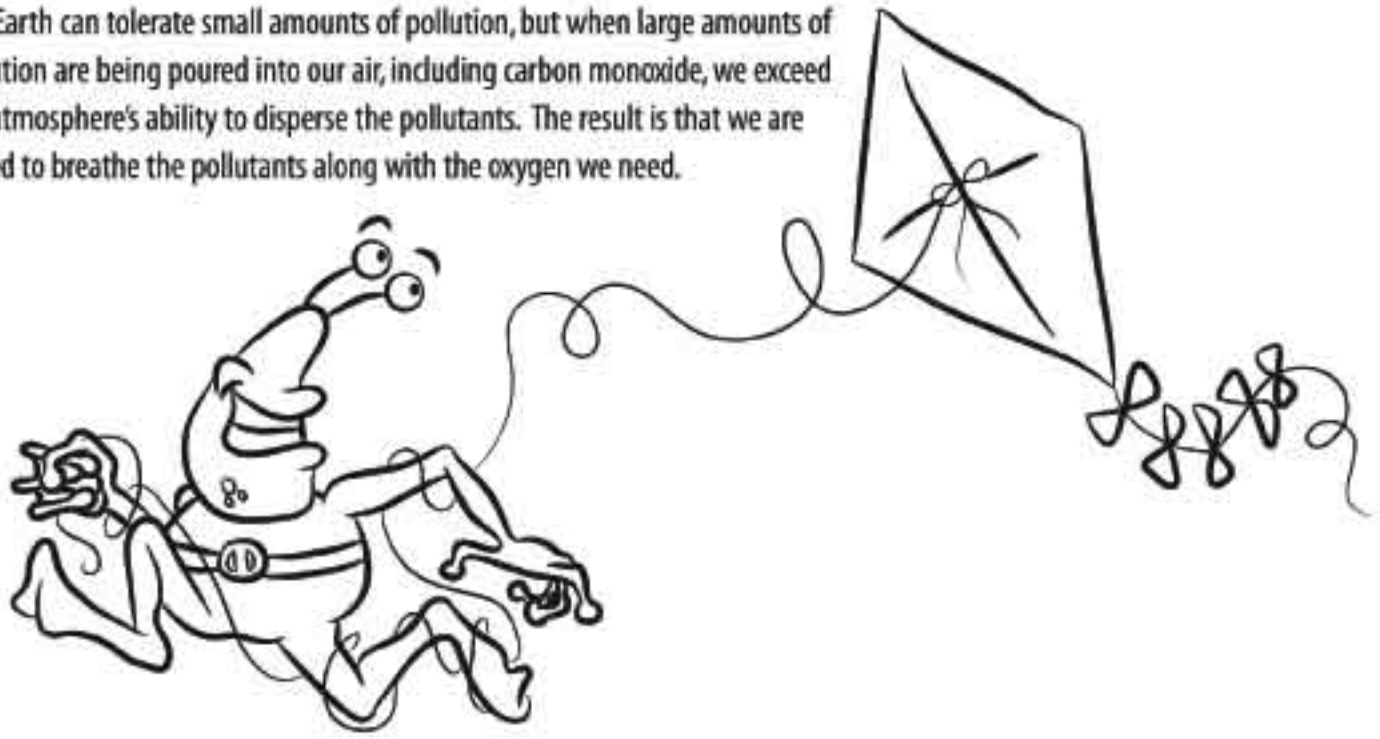
What is Air Pollution and Where Does It Come From?

Air pollution is what occurs when our air is mixed with contaminants – smoke, dust, dirt, and gases such as carbon monoxide. Sometimes you can see air pollution, but often it is invisible!

Much of our air pollution comes from burning. For example, when we burn gasoline to operate motor vehicles a contaminant, carbon monoxide, is released into the air. Carbon monoxide is an odorless and colorless gas, but it can be very harmful to our health when there is enough of it in the air we breathe.

In the winter, we have a special problem with pollution caused by woodstoves. Tiny smoke particles are released into the air, and inhaled by people and other living things. Toxic or poisonous gases, such as carbon monoxide, and particles make it difficult for people and other living things to breathe.

The Earth can tolerate small amounts of pollution, but when large amounts of pollution are being poured into our air, including carbon monoxide, we exceed the atmosphere's ability to disperse the pollutants. The result is that we are forced to breathe the pollutants along with the oxygen we need.

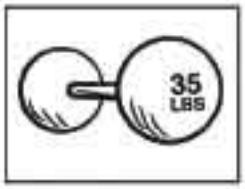


List three things that people do every day that cause air pollution, but may be hard to live without. Number one would be the easiest thing you could live without, number two would be harder and number three would be the hardest.

1. _____
2. _____
3. _____

How could you reduce the amount of pollution from these things?

Did You Know?



Each day, a person breathes about 35 pounds of air and takes about 20,000 breaths!

Making new aluminum cans from recycled cans reduces air pollution by 95%.

Driving on unpaved dirt roads contributes to our dust pollution problem.

A 3% to 5% reduction in the earth's protective ozone layer is detected each winter.

When inhaled, fine particles (mostly from dust and smoke) enter our lungs and over time can damage lung tissue.

Getting a regular tune-up for your car helps reduce air pollution.

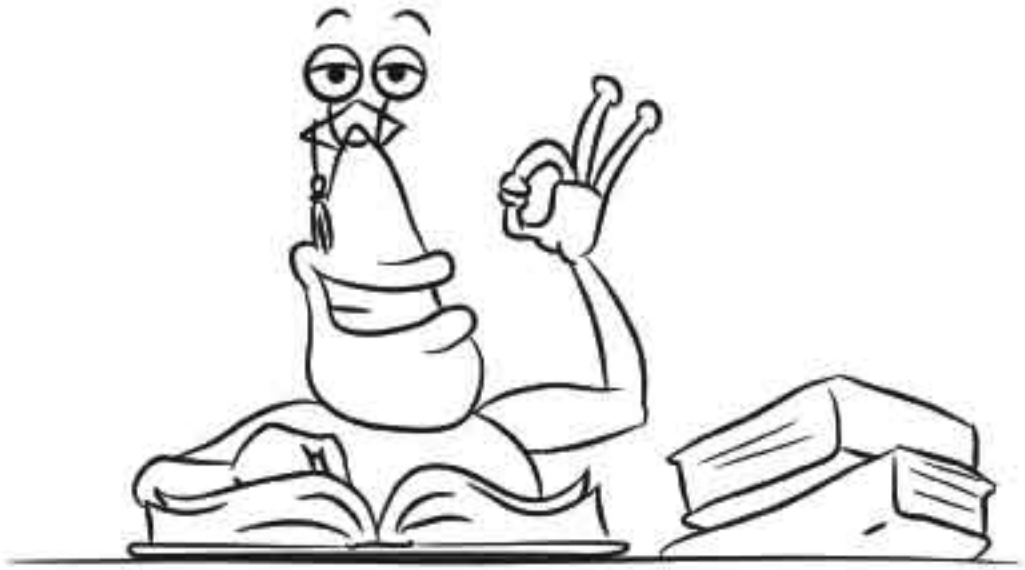
Taking a bus, bicycling and walking are great options for getting where you need to go instead of in a car.

Recycling paper results in a 75% reduction in air pollution.

To reduce air pollution, we should compost our leaves and grass clippings instead of burning them.

A smokey chimney means the fire is not burning cleanly.

30% of all personal auto mileage is from driving back and forth to work.



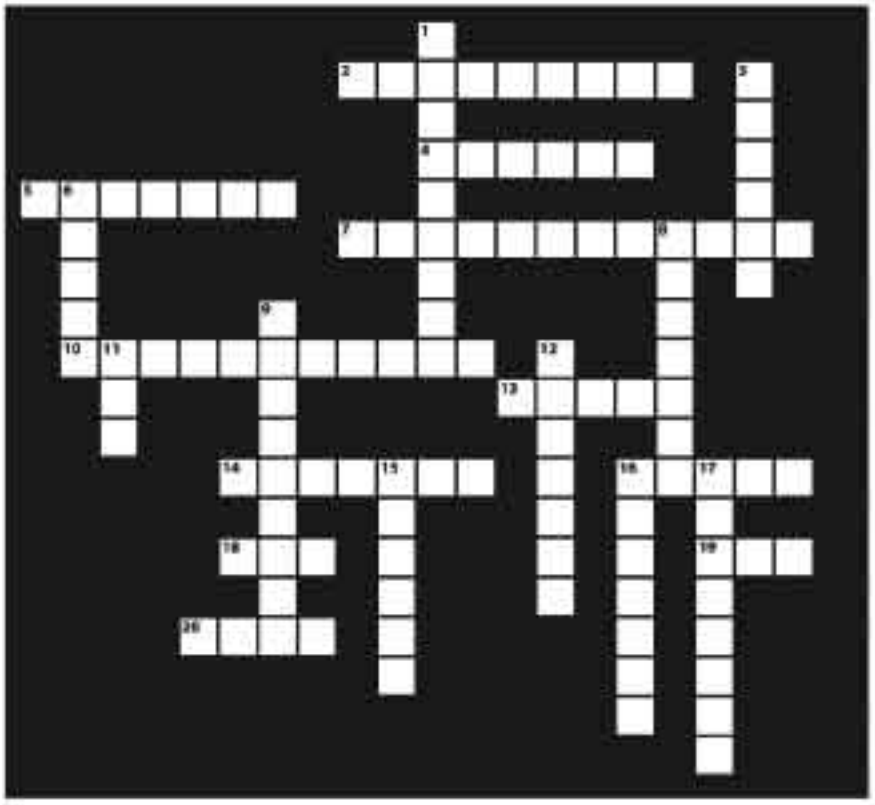
Word Search

Find the 25 words listed below that are often used in connection with air pollution:

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

1. air
2. dust
3. oxygen
4. particulates
5. inversion
6. breathe
7. eyes
8. pollution
9. smoke
10. carbon monoxide
11. bus
12. fresh
13. sick
14. woodstove
15. ozone
16. car
17. lungs
18. truck
19. dirty
20. emissions
21. haze
22. nose
23. carpool
24. atmosphere
25. environment

Crossword Puzzle



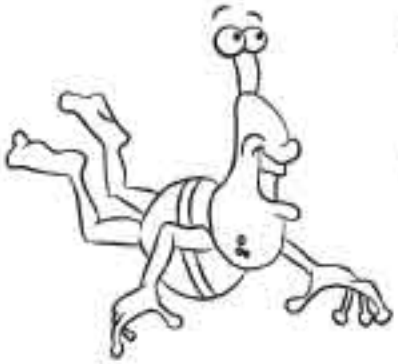
Down

1. _____ trees are green all year long.
3. Plants give off _____, which people and animals need to breathe.
6. The protective layer in the Earth's atmosphere is called the _____ layer.
8. An _____ spray can adds to air pollution.
9. Driving on unpaved roads creates dust which adds to our air _____.
11. Whether or _____ we care makes a difference.
12. Plants take in carbon _____ and turn it into oxygen.
15. Automobiles left _____ create unnecessary pollution.
16. If we are going to the same place as our friends, we should see if we can _____.
17. To help reduce air pollution, we should set good _____ for our friends and families.

Across

2. Some air pollutants are _____, like carbon monoxide.
4. We can help _____ air pollution if we try.
5. To reduce air pollution, we should _____ our leaves and grass clippings instead of burning them.
7. Some air pollution is caused by woodstoves. Tiny _____ are released into the air and inhaled by people and other living things.
10. The air, water and land around make up our _____.
13. If we want to help reduce pollution, we can ride our _____ instead of going in a car.
14. A smokey chimney means the fire is not _____ cleanly.
16. In 1970, congress passed the _____ Air Act, to control air pollution in the United States.
18. Individual actions can help keep our _____ clean and healthful.
19. _____ of us should help prevent air pollution.
20. Getting a regular _____–up for your car helps reduce air pollution.

Mixed Up!



Unscramble these words associated with air quality.

1. CAATEPRUSTLI

(CLUE: Another term for dust and smoke particles.)

_ _ _ _ _ _ _ _ _ _ _

2. LITOPONUL RAI

(CLUE: Any visible or invisible particle or gas found in the air that is not part of the natural composition of air.)

_ _ _ _ _ _ _ _ _ _ _

3. NOOZE

(CLUE: In the upper atmosphere it protects us from the sun's harmful rays, but at ground-level, it is hazardous to our health.)

_ _ _ _ _

4. NOISSSIME

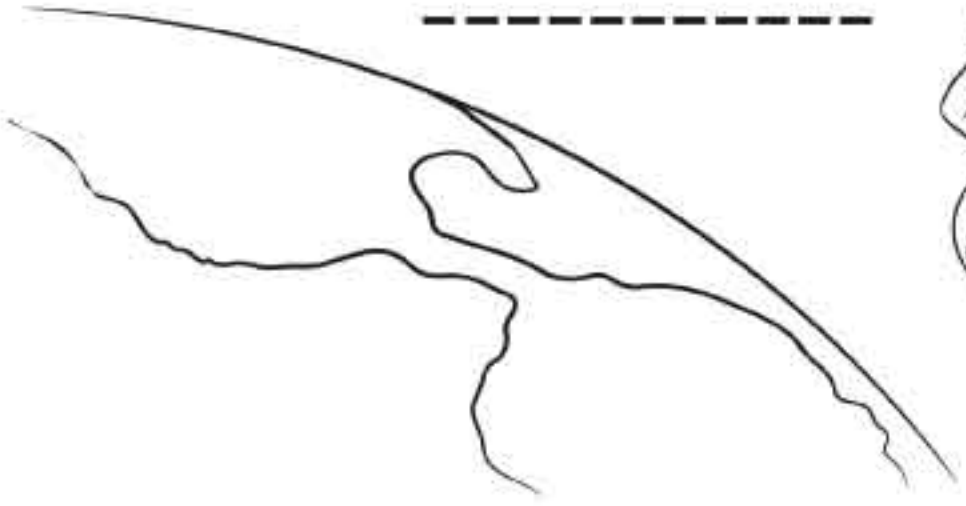
(CLUE: A word for car exhaust.)

_ _ _ _ _ _ _ _ _

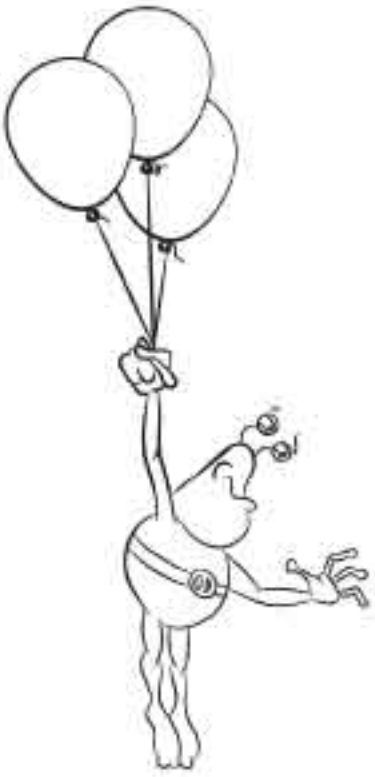
5. VTNEMNROIEN

(CLUE: A scientific word for the surroundings in which we live; something that is important for us to take care of for the kids of the future.)

_ _ _ _ _ _ _ _ _ _



Matching Word Game



Match the word to the correct definition...

A. Air
B. Ozone
C. Carbon Monoxide
D. Air Pollution
E. Particulates
F. Hazardous
G. Atmosphere
H. Conservation
I. Ecology
J. CFC's

_____ The presence of yucky substances in the air that don't disperse properly and interfere with human health.

_____ The layer of air surrounding the earth.

_____ The study of relationships between living things and their surroundings.

_____ Not wasting, and renewing when possible, the human and natural resources of the world.

_____ A colorless, odorless, highly toxic by-product of incomplete burning of a fuel source, such as wood which contains carbon. It is one of the major air pollutants.

_____ Fine materials such as dust, smoke, fumes or smog found in emissions and the air.

_____ Chlorofluorocarbons are man-made chemicals used in freezers, air conditioners and aerosol sprays. Studies have shown these chemicals destroy the Earth's protective ozone.

_____ Very bad for you.

_____ A thin band of gases (mostly nitrogen and oxygen) that forms a blanket around the earth.

_____ Near the ground it is harmful to humans, but in the upper atmosphere, it shields us from the sun's ultraviolet radiation.

Chart Your Way to Clean Air... Ride the Bus!

We can help recude air pollution by cutting back on how much we use our cars. If our friends are going to the same places we are, we should try to share a ride – this is called carpooling. We can also walk or ride our bicycles. Another mode of transportation that is better for the air than driving alone, is taking the bus.

Your Challenge:

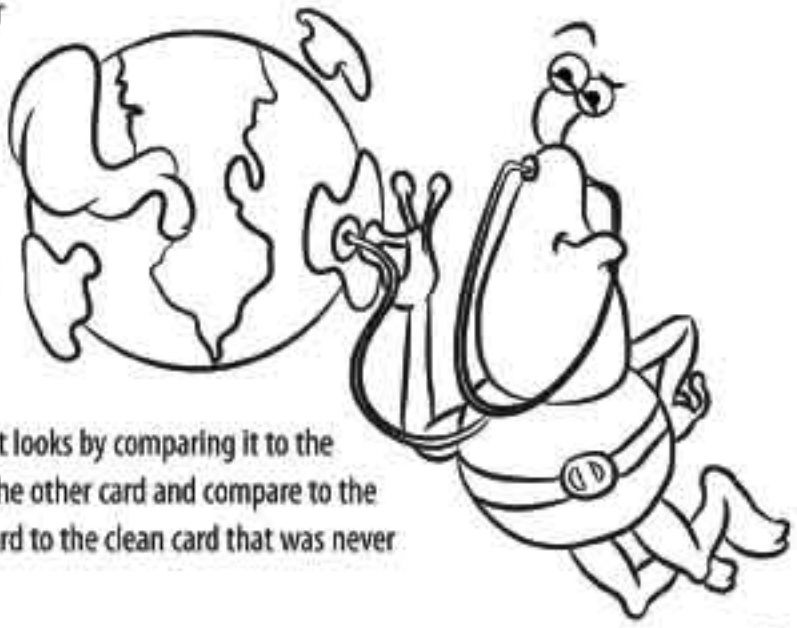
Identify five places that you and your family go to on a regular basis by automobile (work, school, friends, shopping malls, grocery store, etc.) Do you all ride together or alone?

Get a bus schedule and map and chart how you could reach the same destination by taking a bus. Do a chart for each member of your family and show them how they can get there by bus and help reduce air pollution!

Pollution Check-up: What Are We Breathing?

There are particulates in the air that contribute to air pollution and although we may not "see" them all the time, they are there. To find out how much air pollution is around you, here's a simple experiment. You will need 3 index cards, petroleum jelly and tape.

Smear index cards on one side with petroleum jelly. Put 2 cards next to each other, smeared sides out. Tape the cards to the outside of the window. Do this on a day that is not raining. Keep the third index card inside to compare with later.



Bring in one card at the end of the day and see how dirty it looks by comparing it to the clean card. Save the dirty card. In about a week, bring in the other card and compare to the dirty card that was only out one day. Next, compare the card to the clean card that was never outside. How dirty do you think the air is?

Cool Cars Facts

It used to be that cool cars were big, fast, loud hot rods. They still are cool, especially with modern engine technology. But a new kind of cool car is here, one that produces less air pollution. Electric, hybrid and fuel cell vehicles are being built and sold today. In the future we could all be driving some of these cool cars.

Electric Vehicles

No cords attached! And no tail pipe. Electric vehicles produce absolutely no emissions, so they need no tail pipe. Today, electric cars that run on powerful batteries can go up to 100 miles before needing to be recharged. As batteries improve their performance, we'll be able to travel farther.

Hybrid Vehicles

Hybrid vehicles run on a combination electric motor and internal combustion engine. You start the engine with the electric motor and as speed increases, the internal combustion engine automatically turns on and takes over. It charges the batteries as it powers the vehicle. While hybrid vehicles aren't zero emission like electric cars, since they do have an engine that uses gasoline, their emissions are extremely low.

Fuel Cell Vehicles

Fuel cells have been around for more than 100 years and in fact have been used to power spacecraft. But they were always thought of as too expensive, too big and too heavy to use in vehicles. Now that is changing. Fuel cells now power some experimental cars and buses. The fuel cell combines hydrogen and oxygen to produce electricity and powers vehicles with no pollution at all.

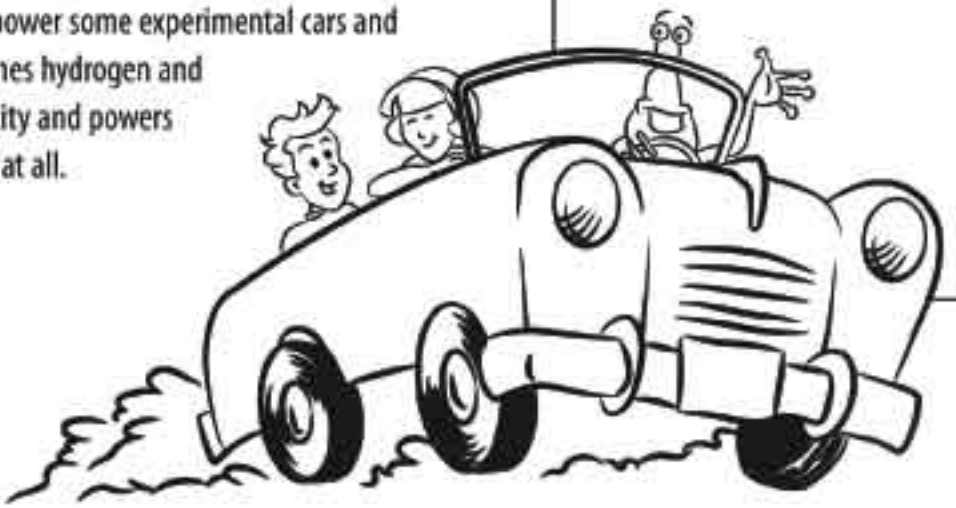
Better ICE

How have ICE (internal combustion engines) been improved?

Through the years, technology has tweaked and toyed with the engine to save gasoline, improve performance, and reduce emissions. Some improvements include:

- **Catalytic Converter** to change polluting emissions into non-polluting emissions.
- **Fuel-Injection** – To mix just the right amount of fuel and air for more complete combustion.
- **Variable Valve Tuning** – To analyze the type of driving condition and adjust how much fuel is needed.
- **Direct Injection** – To deliver the fuel right into the engine cylinders which allows for ultra-lean mixtures of up to 50 parts air to one part fuel.

Each of these technologies -- some used now, some still being worked on -- will cut down on the amount of fuel used and the amount of emissions going into the air.



The Answers!

All About Air - Page 1

1. Atmosphere is a band of air that covers our earth.
2. Air is made up of many gases, including oxygen and nitrogen.
3. The air is made up of 21% oxygen (one-fifth).
4. Plants give off oxygen which humans need to survive.
5. Humans and living things need to breathe oxygen to survive.
6. People give off carbon dioxide which plants need to survive.

How Do I Breathe? - Page 2

Breathing: to draw air into and expel it from the lungs; inhale and exhale.

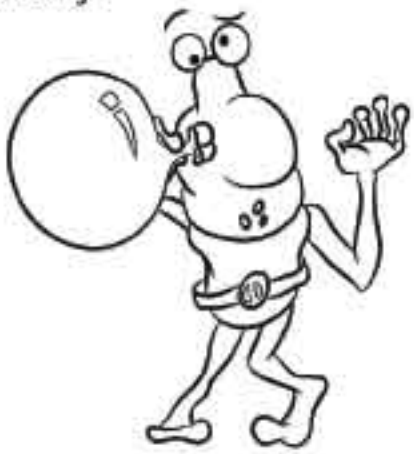
Inhale: to draw in air by breathing.

Exhale: to breathe out.

Windpipe: the passage for air into the lungs.

Diaphragm: a muscle in our chest that helps us breathe.

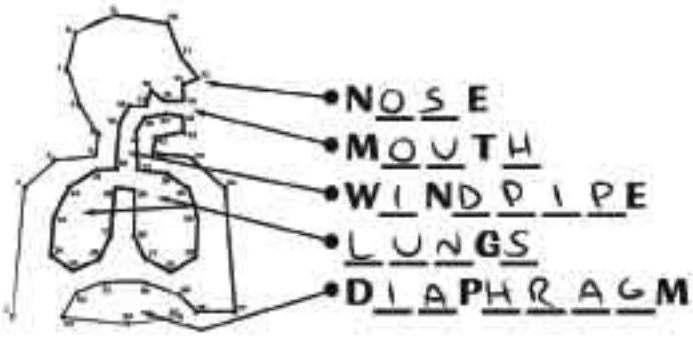
Respiration: the act of breathing.



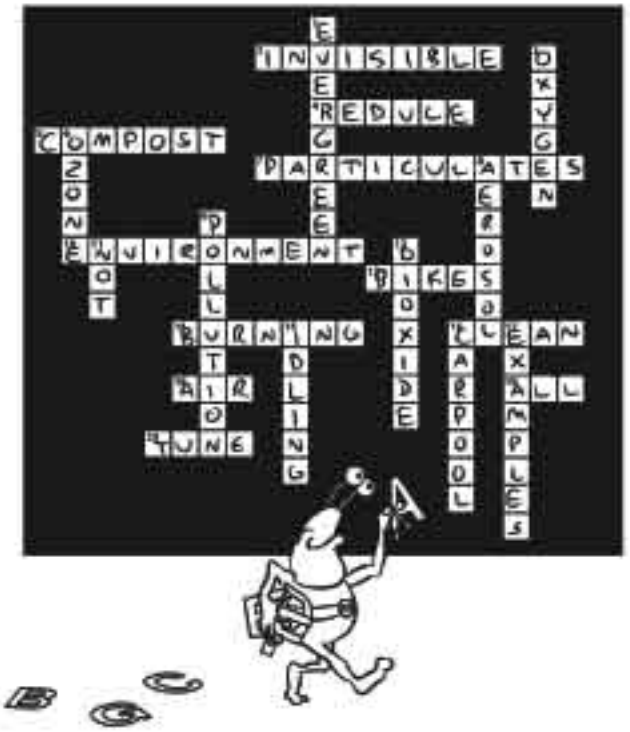
Word Search - Page 5

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

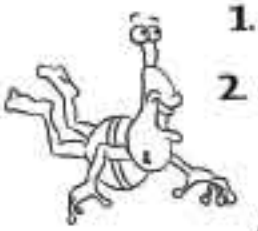
Dot-to-Dot - Page 2



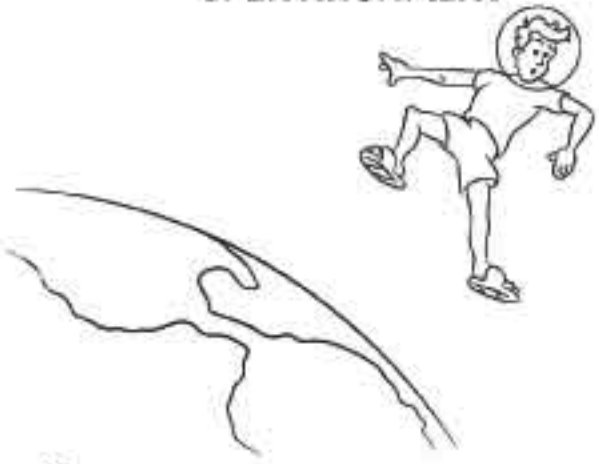
Crossword Puzzle - Page 6



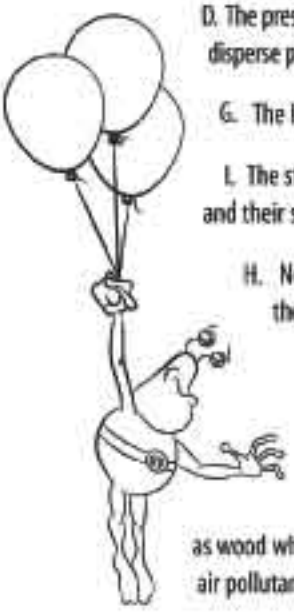
Mixed Up! - Page 8



1. PARTICULATES
2. AIR POLLUTION
3. OZONE
4. EMISSIONS
5. ENVIRONMENT



Matching Word Game - Page 9



D. The presence of yucky substances in the air that don't disperse properly and interfere with human health.

G. The layer of air surrounding the earth.

I. The study of relationships between living things and their surroundings.

H. Not wasting, and renewing when possible, the human and natural resources of the world.

B C

C. A colorless, odorless, by-product of incomplete burning of a fuel source, such as wood which contains carbon. It is one of the major air pollutants.

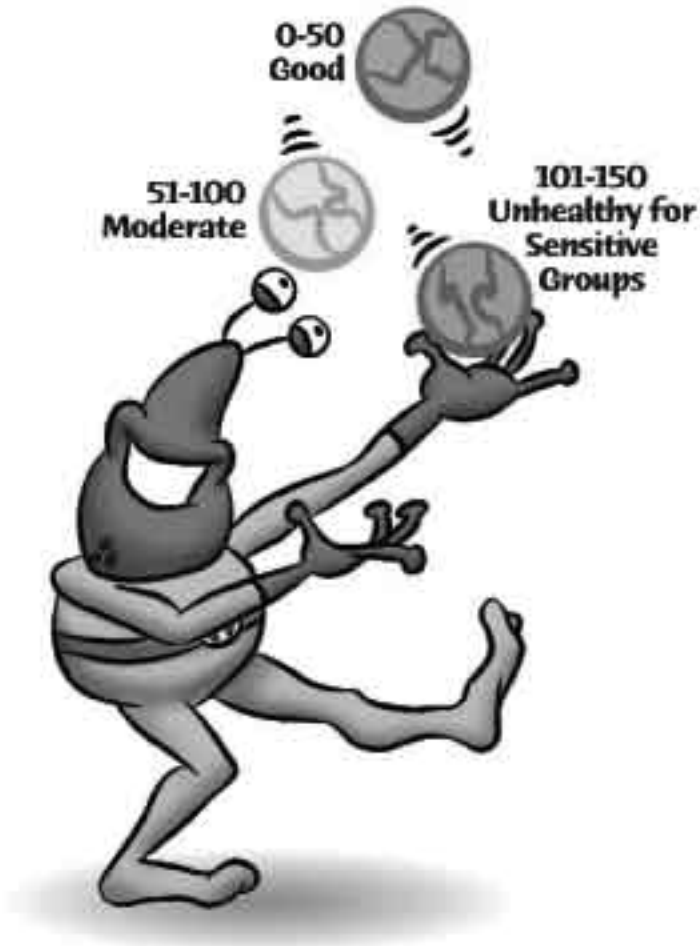
E. Fine materials such as dust, smoke, fumes or smog found in emissions and the air.

J. Chlorofluorocarbons are man-made chemicals used in freezers, air conditioners and aerosol sprays. Studies have shown these chemicals destroy the Earth's protective ozone.

F. Very bad for you.

A. A thin band of gases (mostly nitrogen and oxygen) that forms a blanket around the earth.

B. Near the ground it is harmful to humans, but in the upper atmosphere, it shields us from the sun's ultraviolet radiation.



AQI
AIR QUALITY INDEX

The Air Quality Index (AQI), developed by the U.S. Environmental Protection Agency (EPA), shows air quality in terms of how healthy the air is to breathe for most people. Air quality is measured by a network of monitors that records the concentrations of major pollutants at locations throughout the county each day. These raw measurements are then converted into AQI values, using formulas developed by the EPA. The highest of the AQI values for the individual pollutants becomes the AQI value for that day.

Florida's AQI levels are posted on the DEP Division of Air Resource Management's website:

www.dep.state.fl.us/air/ozonenet.htm

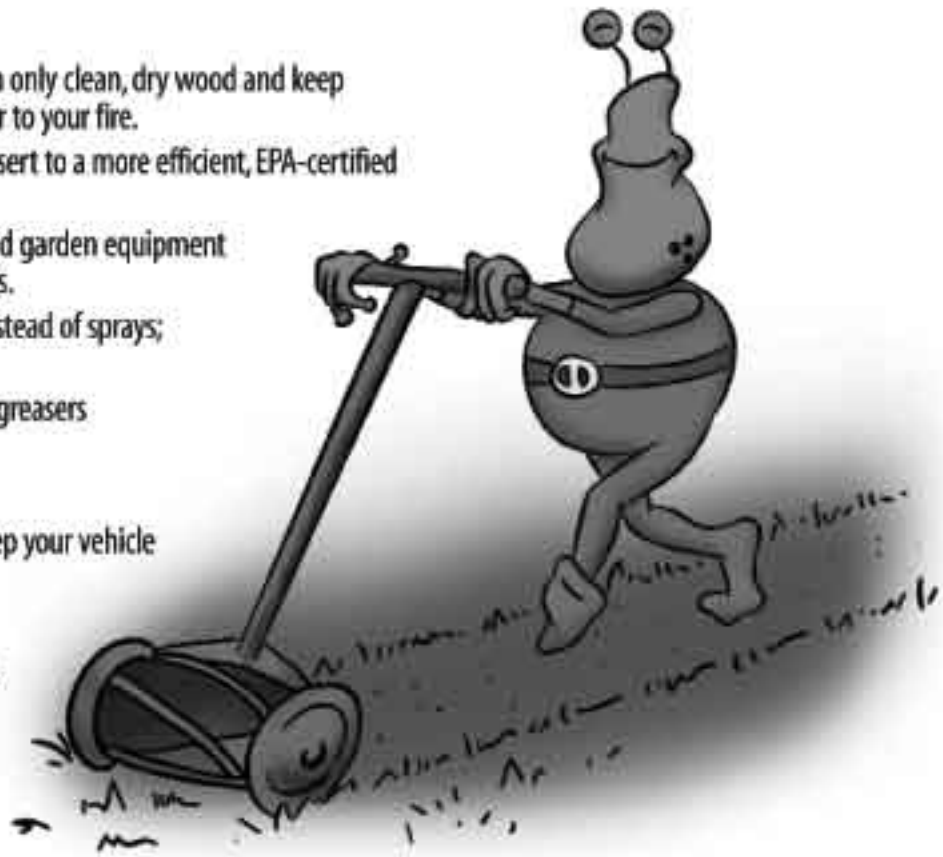
What your family can do to help "keep it in the green!"

At Home

- If you use wood to heat your home, burn only clean, dry wood and keep the damper open to provide plenty of air to your fire.
- Upgrade your wood stove or fireplace insert to a more efficient, EPA-certified device or natural gas appliance.
- Replace your gasoline-powered lawn and garden equipment with manual or electric-powered models.
- Apply paints with rollers and brushes instead of sprays; it cuts down on fumes.
- Avoid using oil/solvent-based paints, degreasers or lighter fluids.

On the Go

- Keep your tires properly inflated and keep your vehicle regularly maintained.
- Carpool to work, school or meetings.
- Combine errands to reduce vehicle trips.
- Don't overfill your car's gas tank.



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