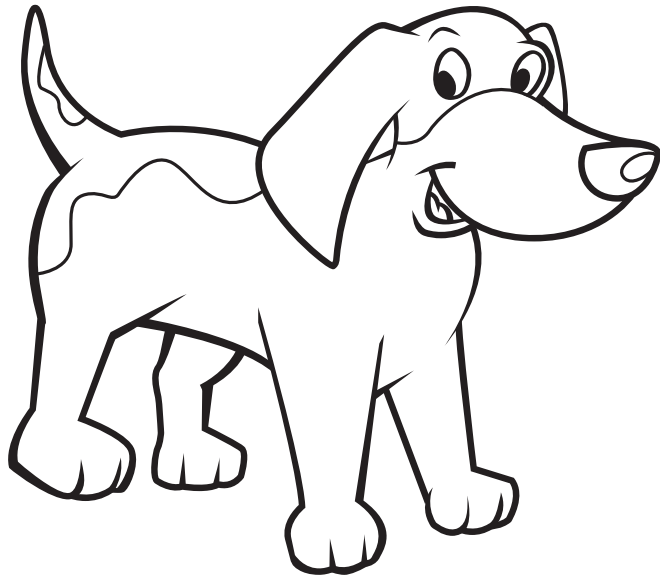


Healthy Air Heroes



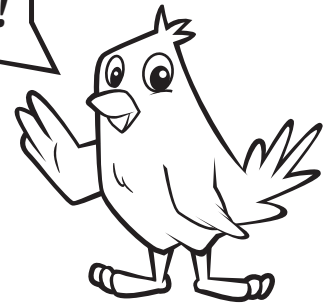
San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT
www.valleyair.org

Healthy Air Heroes



*My name
is Flash!*

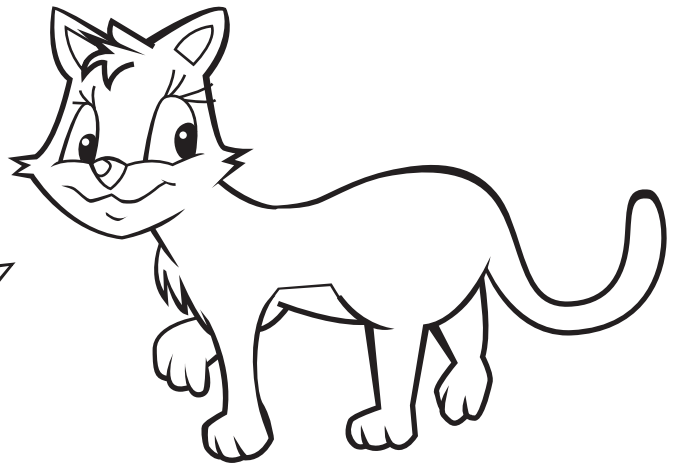
*I'm Pollution
Buster (PB) Jay!*



I'm Chip!

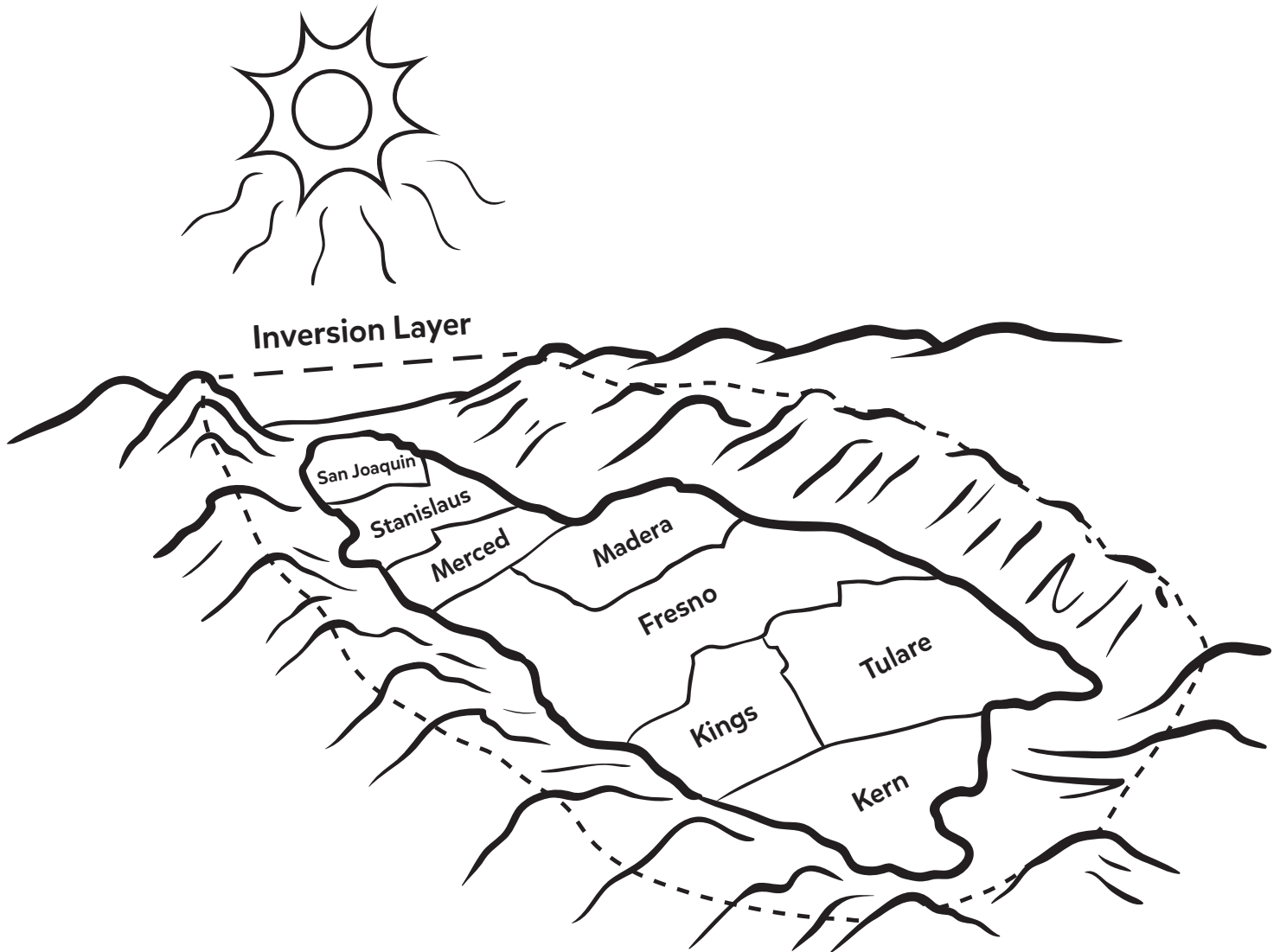


*...and I'm
Sunny!*



We're the Healthy Air Heroes and we're here to talk about how you can help make the air in our Valley healthier!

About the Valley



The San Joaquin Valley Air Pollution Control District

The Valley Air District is a government agency in the San Joaquin Valley. Our job is to clean the Valley's air to protect the health of the people that live here.

It takes a lot of planning, rules, public education, and cooperation from everyone to be successful.

The Valley's bowl shape, weather and high population all contribute to our pollution problem. Mountains surround the Valley and

we often have a strong inversion layer that acts like a lid and traps pollution on the Valley floor.

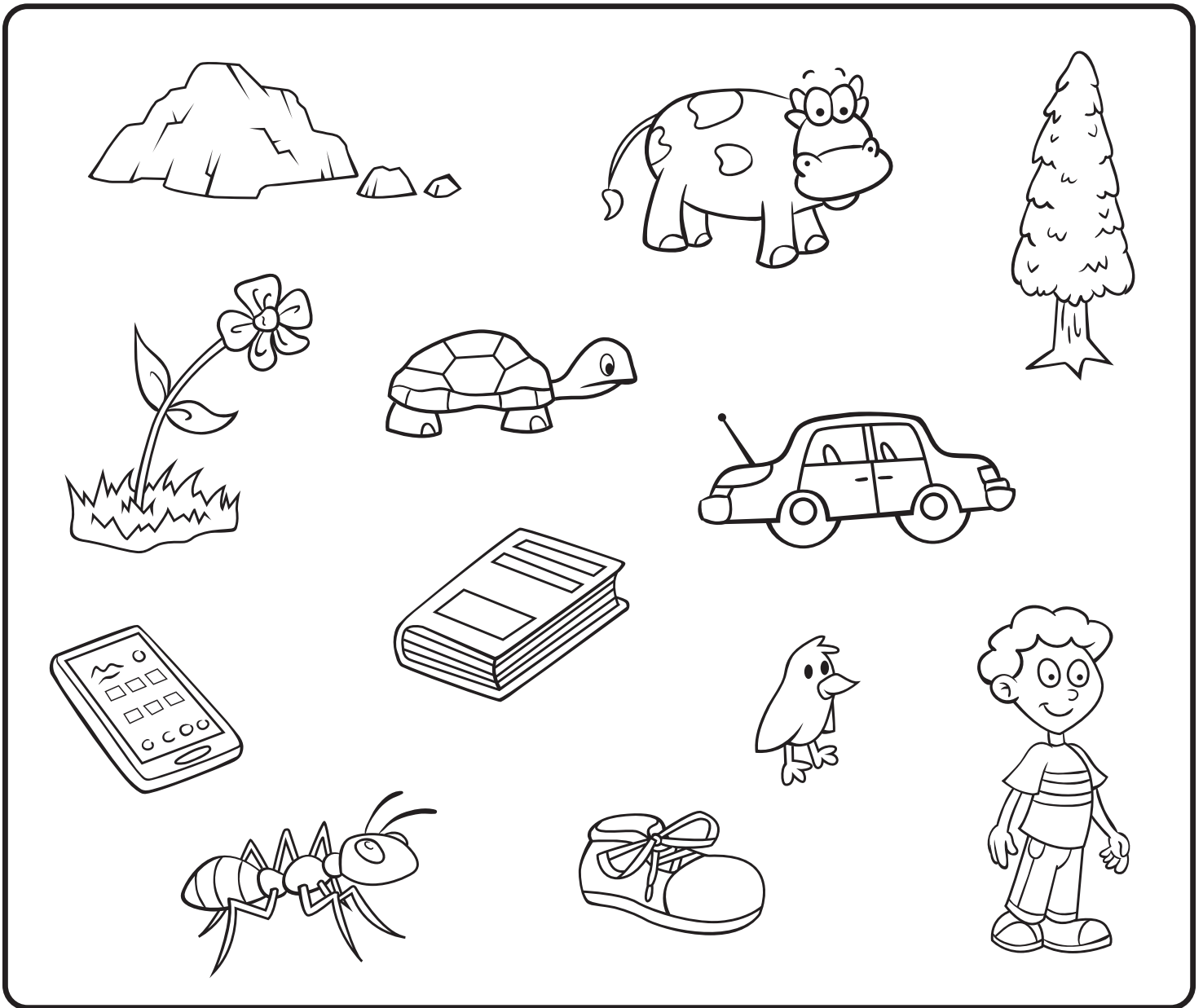
The heat of summer causes more smog to form, and winter weather conditions cause smoke from fireplaces to remain on the Valley floor.

More people in the Valley means more cars, trucks, equipment, and other sources of air pollution.

Air Pollution

What Needs Air?

Directions: Circle the items that need air to live.



What is Air Pollution?

Air pollution is “dirty air.” It can be in many forms like smoke, dust, and exhaust from cars and trucks. Sometimes we cannot see or smell air pollution, but, it can be very harmful to humans, animals and plants.

There are six major pollutants that the District monitors: **Carbon Monoxide, Ozone, Sulfur Dioxide, Particulate Matter, Nitrogen Dioxide and Lead**

The Environmental Protection Agency (EPA) sets limits on how much of these pollutants are safe for outdoor air quality. In the San Joaquin Valley, there are two major pollutants that go over these limits, Particulate Matter (PM2.5) and Ozone (O3).

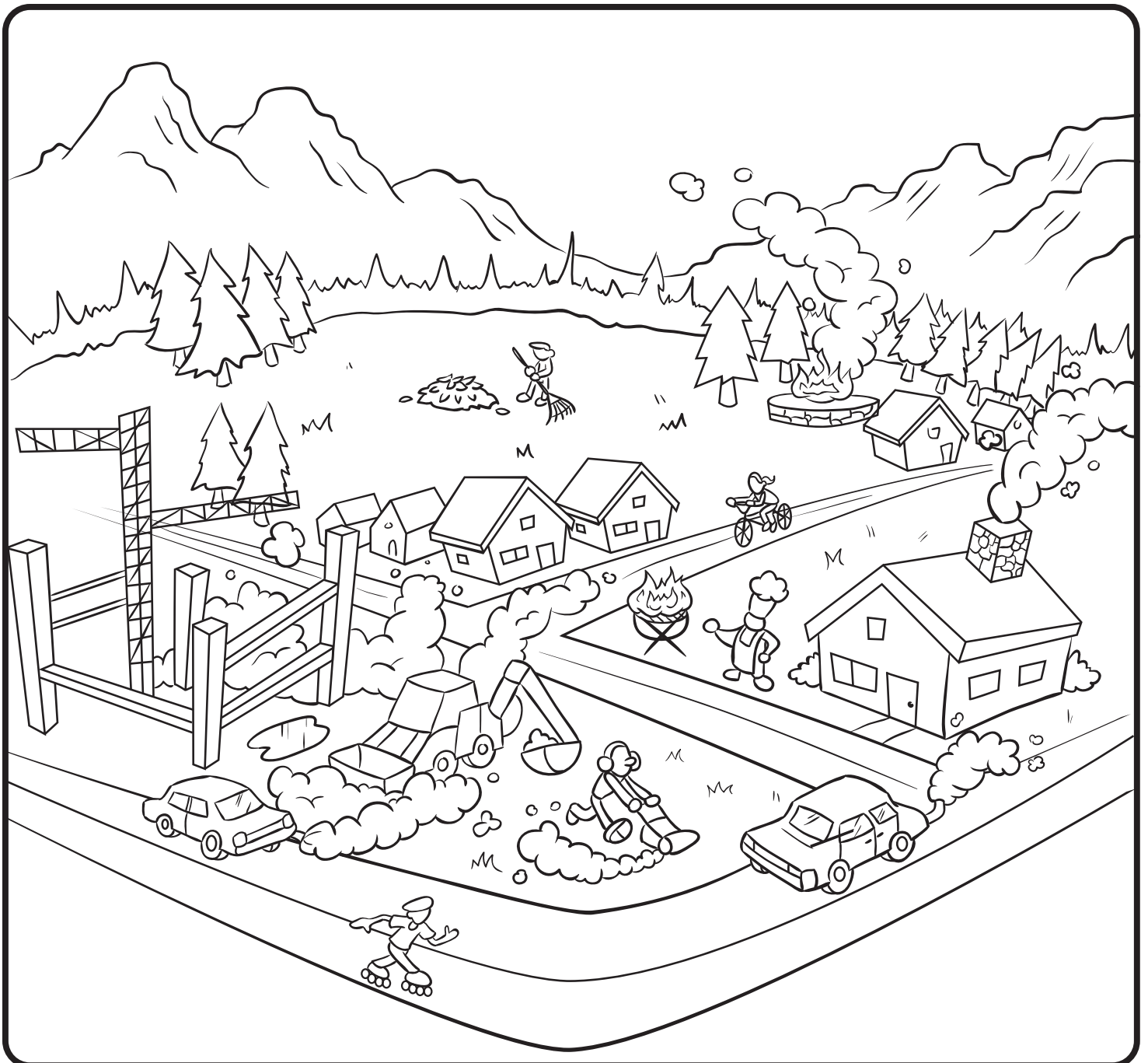
Progress has been made but we still have more work to do to help clean the air in our Valley.

Sources of Air Pollution

Some forms of pollution happen naturally, like forest fires, wind-blown dust and animal waste. But some pollution comes from human activity, like:

- cars, big diesel trucks and other vehicles
- gas-powered equipment, like lawn mowers and leaf blowers
- power plants and factories
- fireplaces, wood stoves, campfires and barbecues
- dust from construction sites, roads and agricultural fields
- household products, such as paints, cleaners and aerosol sprays

The largest source of air pollution in the Valley is the exhaust from cars and other vehicles.



Particulate Matter

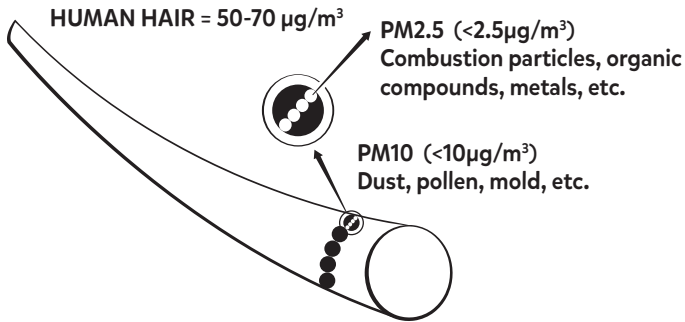
Smoke, dust and ash clouds all contain particulate matter (PM). It's often too small to see, smaller than the width of a human hair. The smaller the particles are, the deeper they can go into your lungs, causing harmful illnesses.

Particulate matter pollution is worst in the winter, when many people are using their fireplaces and wood stoves. If there are no storms with rain and wind to clean the air, all that particulate matter just builds up, causing the air to become very unhealthy.

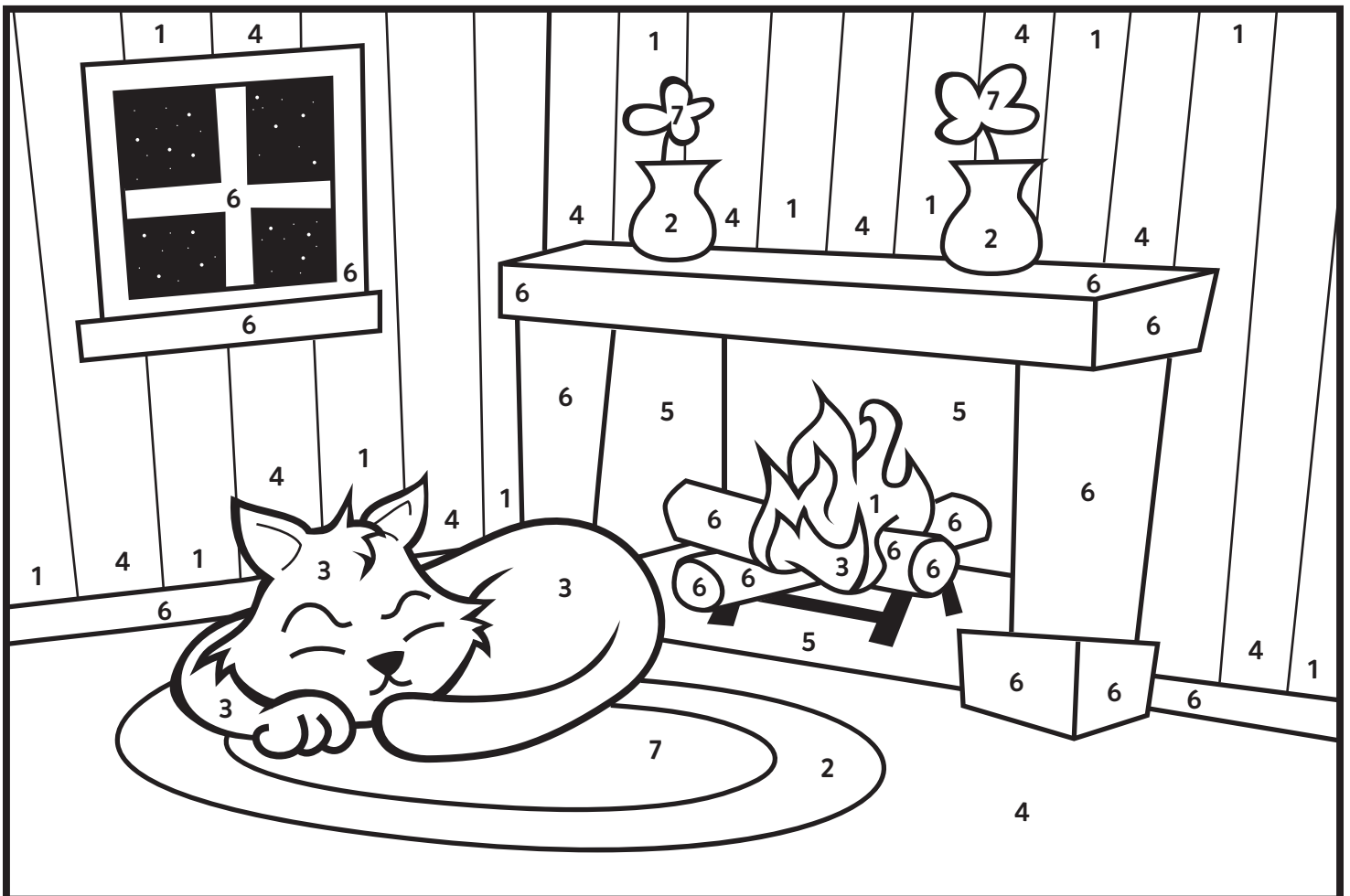
From November through February, residents in the Valley can see if it's okay to burn in their home each day at www.valleyair.org/CBYB.

Particulate matter can occur naturally, or come from human activity, like:

- fireplaces and wood stoves
- outdoor wood burning
- exhaust from engines that burn fuel, like diesel
- dust from construction, mining or agriculture
- rubber from tires
- factories



Color by Number



1- Yellow
2 - Blue

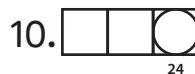
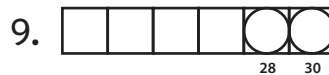
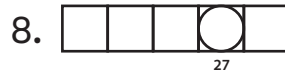
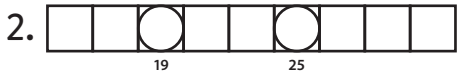
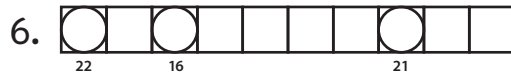
3 - Orange
4 - Green

5 - Red
6 - Brown

7 - Purple

Word Scramble

Unscramble the words below. After you are done, discover the secret message Chip has for you! (Hint: Use the previous page for help)



1. LOPTIOLUN

5. SUTD

8. SEKOM

2. SATICRELP

6. FIECLARPES

9. VAEYLL

3. UGINBRN

7. OOWD

10. SAH

4. XESTUHA

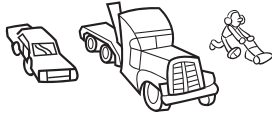
Ozone

Ozone is a gas that you cannot see or smell. It doesn't come directly out of cars, trucks or smokestacks, but, has to be created. Ozone is a summertime problem, here's how it works:

Hot Sunshine + Nitrogen Oxides (NOx) + Volatile Organic Compounds (VOCs)



Valley's very hot and sunny summers



emitted from vehicles, equipment, power plants and factories

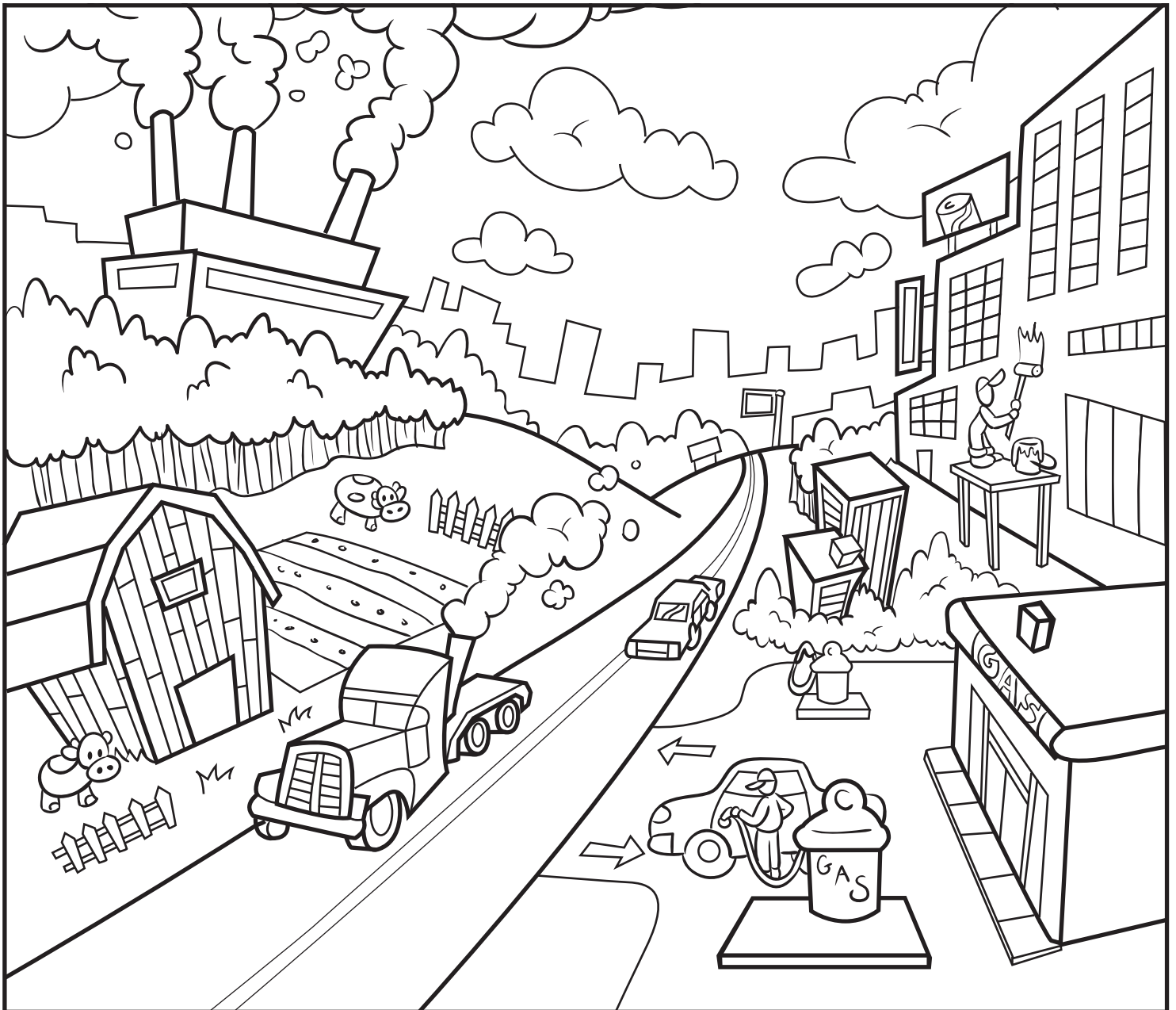


from the vapors of gasoline, paint, cleaners and other chemicals

= Ozone

Ozone occurs naturally, very high in the sky, at around 45,000 feet above the surface of the Earth. There, it protects us from the sun's harmful rays, but, at ground-level, where we can breathe it, it's very harmful to our health.

Directions: Circle things that contribute to Ozone pollution.



Word Search

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

NO IDLING
CARS
OZONE
GAS
TRUCKS
VALLEY
LUNGS
HARMFUL
BREATHE
SUNNY

HOT
FACTORIES
SKY
INVERSION
VAPORS
PB JAY
NITROGEN OXIDES
CHIP
LAWN MOWER
FLASH



How Air Pollution Affects Us

Air pollution can literally make us sick. It makes respiratory diseases worse, decreases lung function and lowers our resistance to infection.

When ozone and PM_{2.5} levels are high, we might experience:

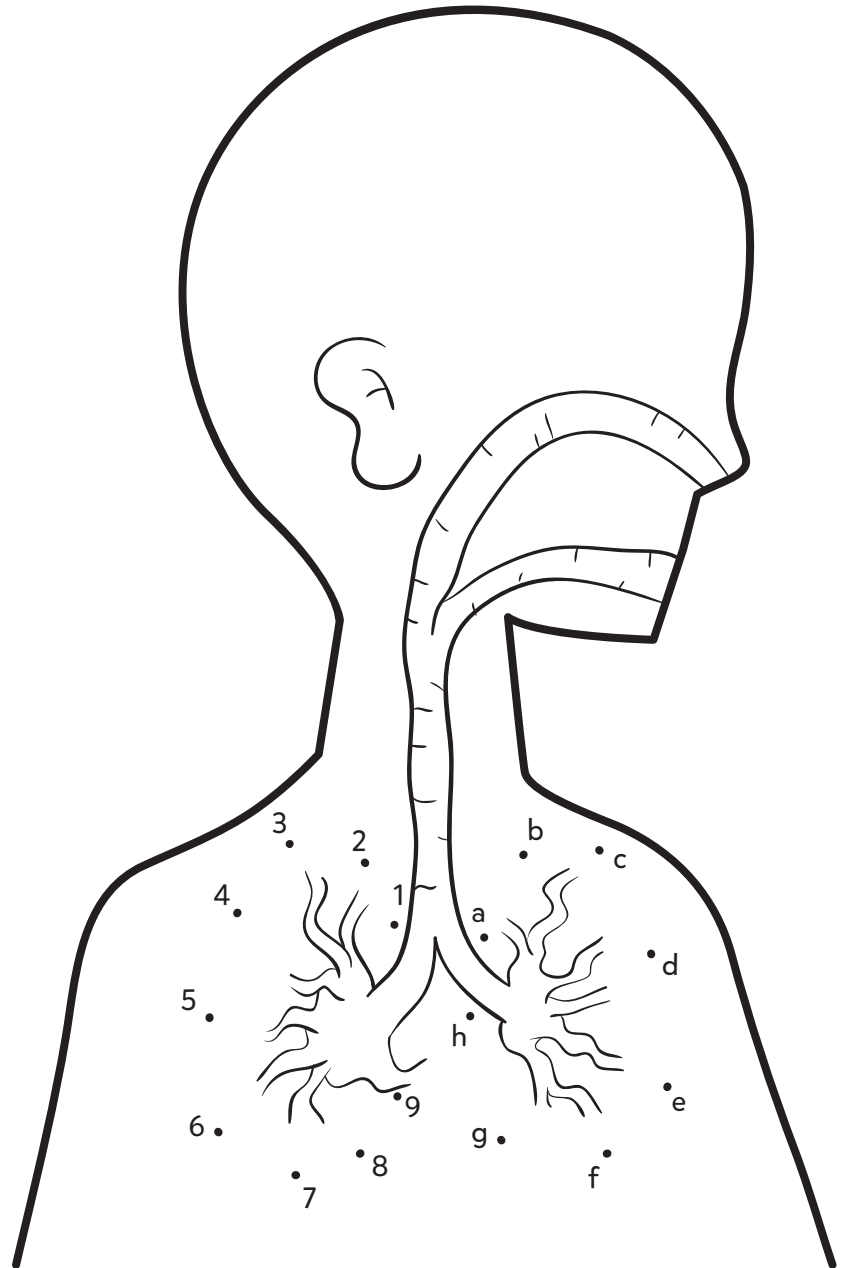
- chest pain or tightness
- shortness of breath
- coughing or wheezing
- dry throat
- headache
- dizziness
- nausea
- watery and burning eyes

PM is so small it passes through the body's natural filtering system and is able to enter into the deepest part of the lungs.

PM is linked to health problems like: asthma, bronchitis, emphysema, pneumonia, lung disease, strokes, heart attacks and even cancer.

Air pollution is particularly harmful to children because:

- their lungs are still developing and can be damaged
- they take more breaths per minute
- they spend more time playing outdoors



Air Pollution Affects Non-living Parts of our Environment as Well

Particulate matter makes our air dirty, reduces visibility and discolors buildings and other structures.

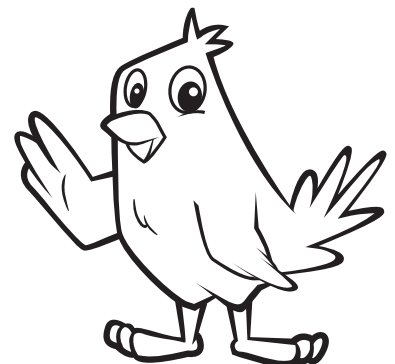
Ozone can fade and peel paint, corrode plaster, damage fabrics, crack rubber, rust iron or steel.

Fill in the Word

Word Bank

NOx	exhaust	VOCs	summer
District	small	respiratory	winter
high	pollution	mountains	bowl

1. When ozone and pm levels are _____ they can make us sick.
2. Particulate matter is so _____ it can bypass the body's natural filtering system.
3. _____ affects non-living parts of our environment as well.
4. Air pollution aggravates chronic _____ diseases.
5. When _____ and _____ mix under the hot sun they create ozone.
6. The _____ is responsible for cleaning the Valley's air to protect the health of the people that live here.
7. The Valley is shaped like a _____. _____ surround the Valley and trap pollution.
8. The largest source of air pollution in the Valley is vehicle _____.
9. PM is more of a problem during the _____.
10. Ozone season is during the _____ months.



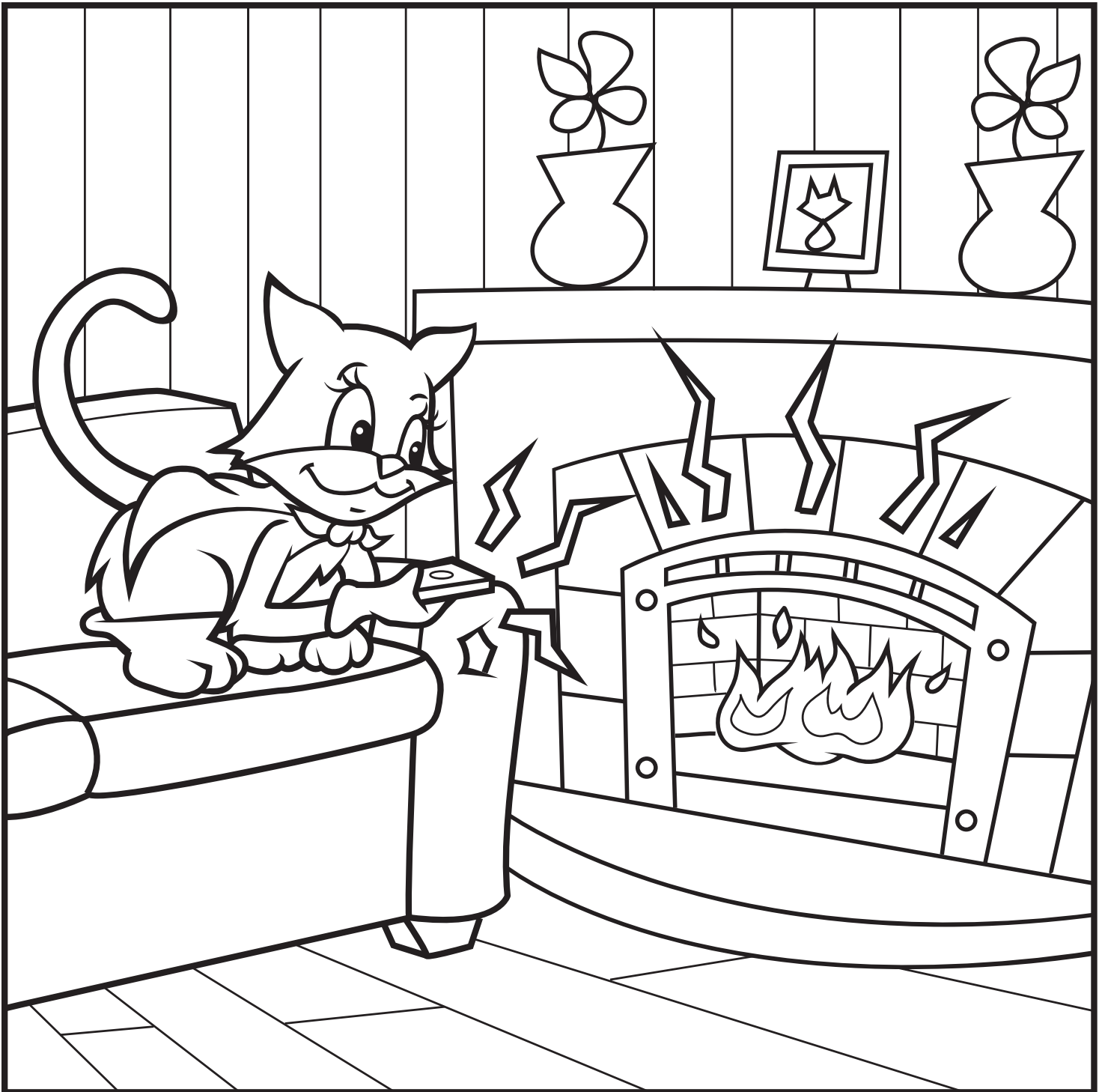
How you can help!



Transportation

Cars and other vehicles in the Valley release more than 200 tons of pollution every day. To help cut down on air pollution from cars, here's what we can do:

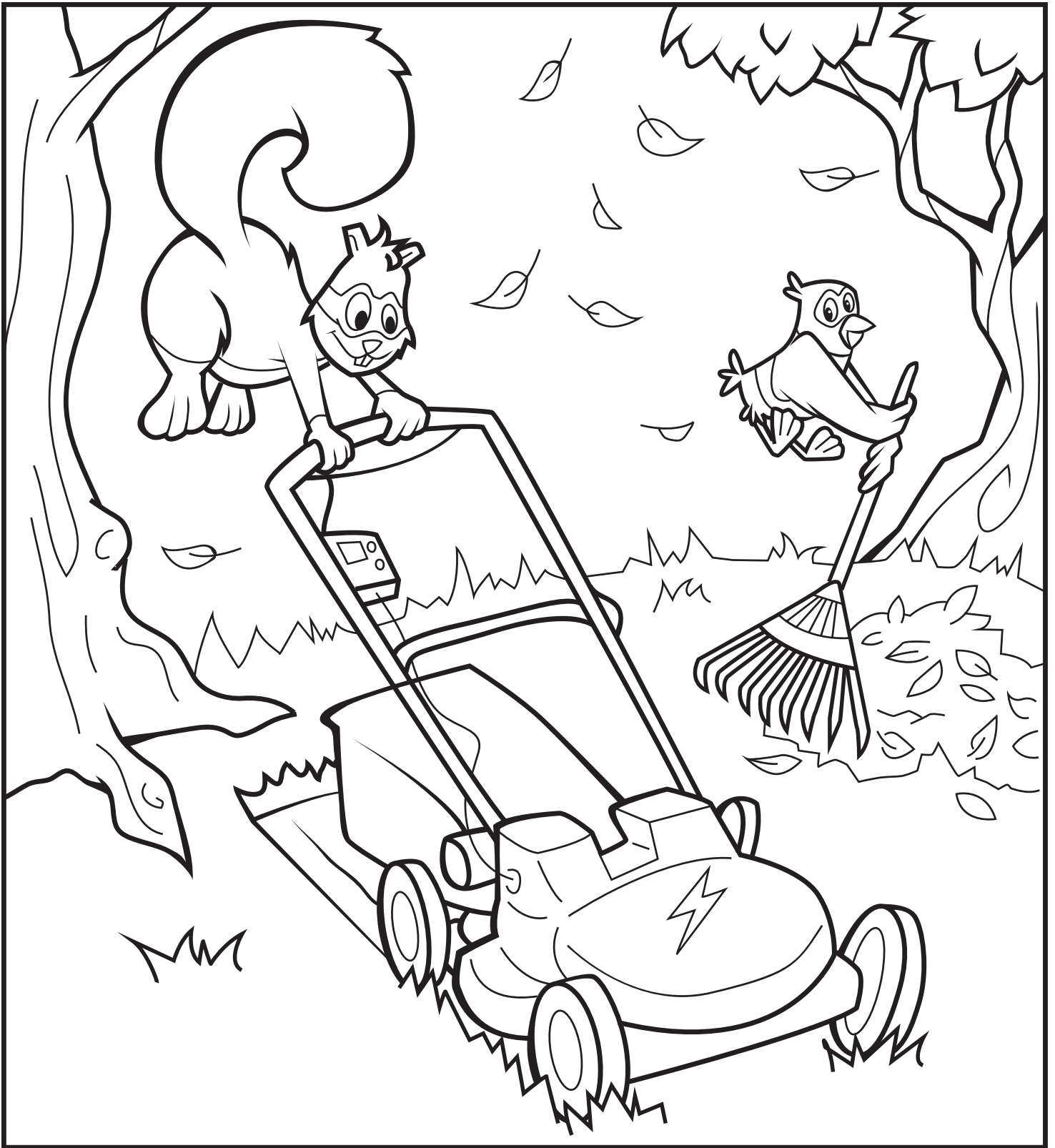
- Carpool or take public transportation instead of driving alone.
- Bicycle, skate or walk instead of using a car.
- Combine errands - that is, "trip link" - so that only one car trip is necessary.
- Avoid idling the car while waiting to pick up students from school.
- Keep cars in good working condition.
- Don't overfill the gas tank when getting gasoline.
- Avoid drive-thrus during summertime.



Heating

One fireplace can emit 20-50 times more particulate matter than a clean certified device. To stay warm and breathe clean air, we can:

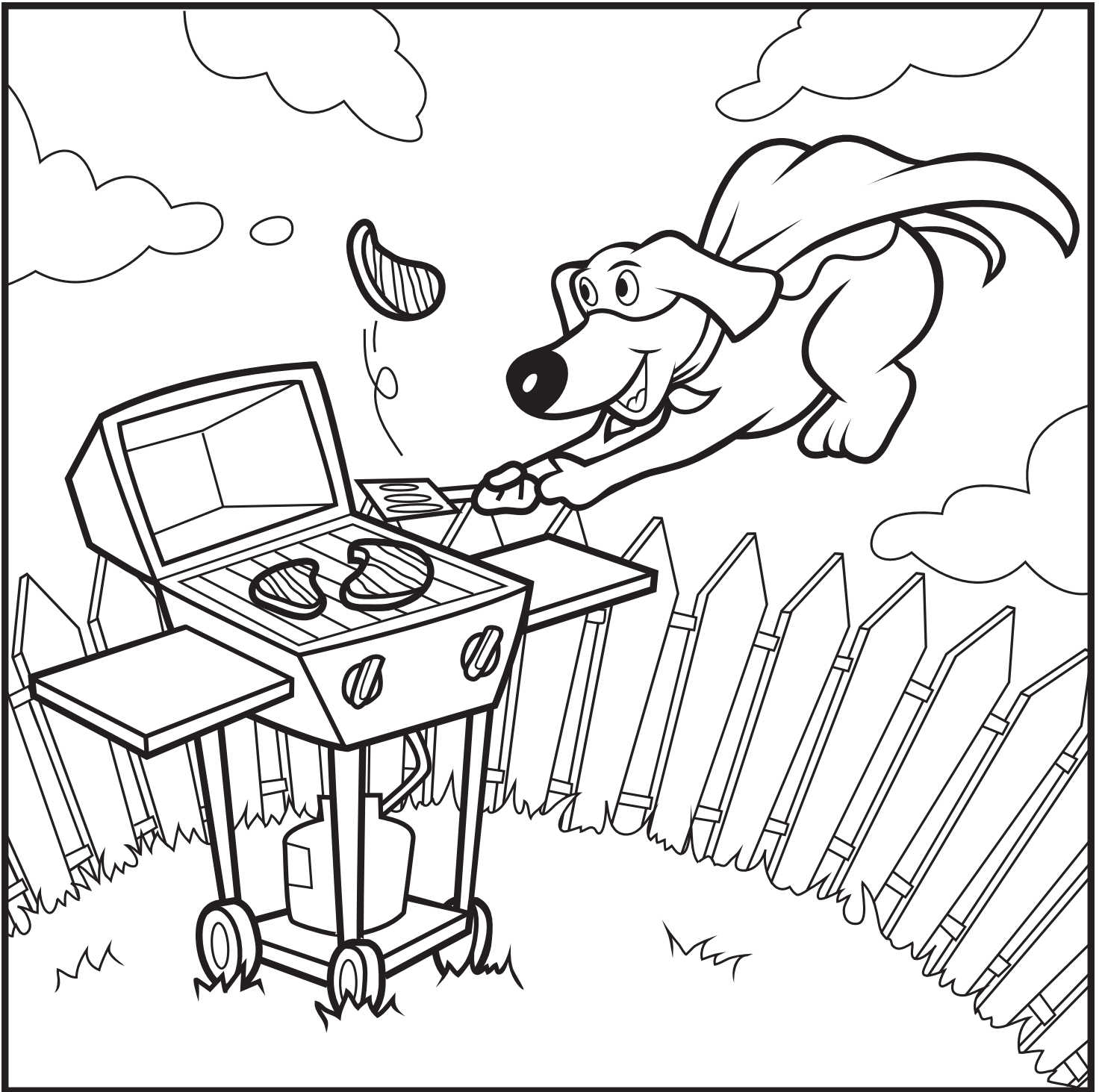
- Replace older wood inserts and stoves with EPA-certified cleaner devices that use wood, pellets or natural gas.*
- Burn cleanly by using manufactured wood logs or dry, seasoned wood.*
- Keep fireplaces, wood stoves, and chimneys clean and have them inspected regularly.*
- Never burn trash, newspapers, magazines, wrapping paper, plastics, or other items not designed for burning in a fireplace. Burning trash is illegal, it creates harmful emissions.*



Yard Work

Gasoline-powered yard equipment contributes to air pollution. We can clean up our yards and keep the air clean if we:

- Use push mowers or electric lawn mowers.*
- Use a broom and rake instead of a leaf blower.*
- Avoid pesticides, especially in sprayers.*

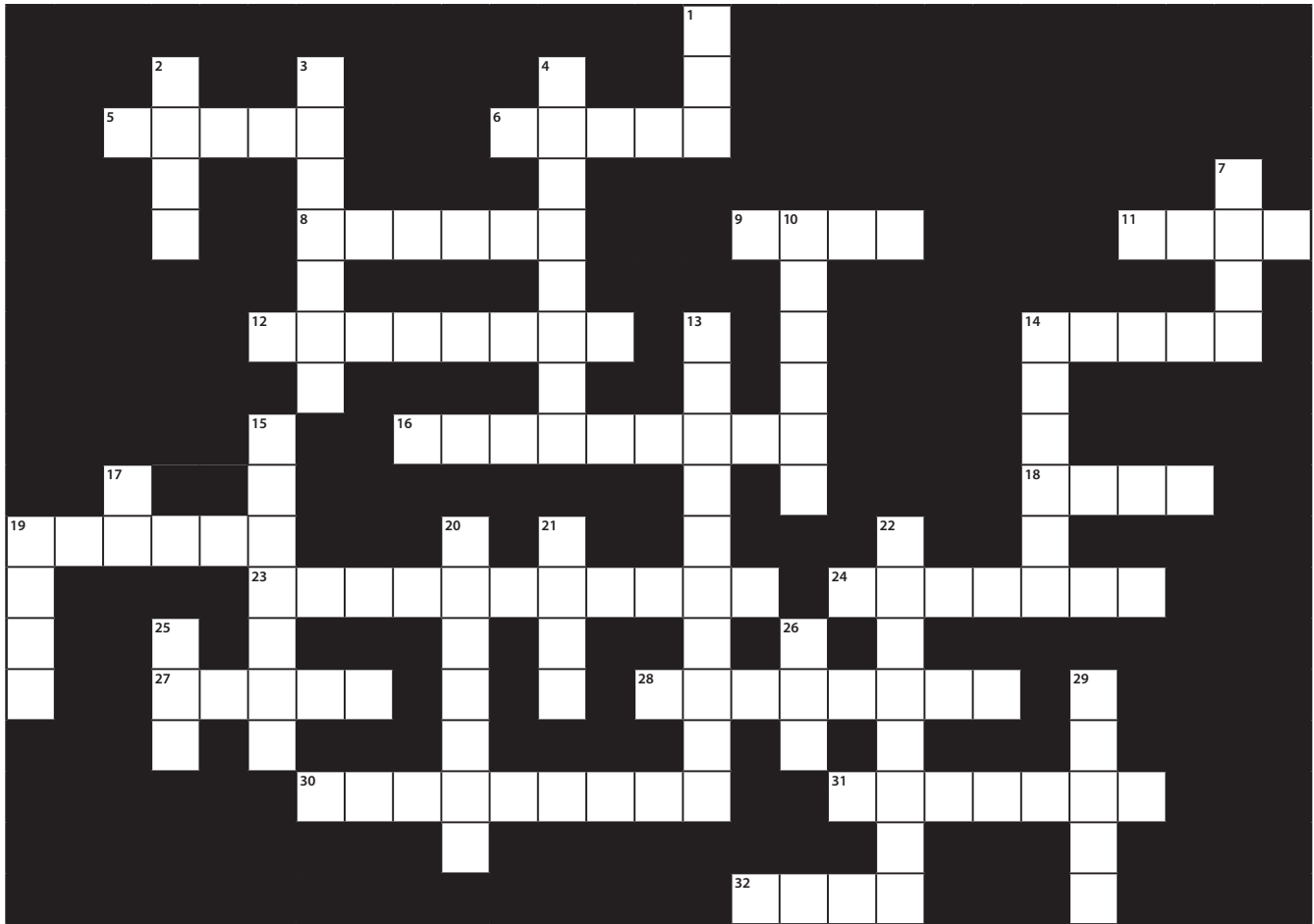


Household Products

A squirt or two of charcoal lighter fluid may not seem like much, but more than four million people live in the San Joaquin Valley and almost all use products that contribute to air pollution. To help reduce that amount, we can:

- Light barbecue briquettes without lighter fluid; use an electric or a chimney briquette starter; or use a propane or natural gas barbecue instead.*
- Paint with water-based paint, and use brushes and rollers, not sprayers.*
- Choose pump sprays, gels, or solids instead of aerosol sprays.*
- Avoid products with labels that have words such as "Hazardous," "Toxic," "Danger," "Caution" or "Warning."*

Crossword Puzzle



Across

5. Some pollution comes from ___ activity.
6. Pollution can come from burning fossil ___.
8. Gas-powered lawn ___ contribute to air pollution.
9. A camp ___ emits PM pollution.
11. Gas-powered ___ blowers contribute to air pollution.
12. Use an ___ starter to light barbecue briquettes without lighter fluid.
14. If you see a ___ or dust cloud you are seeing particulate matter.
16. An ___ layer traps pollution in the Valley.
18. Volatile organic compounds are also called ___.
19. Ozone season happens during the ___.
23. ___ matter is more of a problem during the winter.

24. Avoid using ___ sprays when possible.
27. The San Joaquin Valley goes over the EPA limit for ___.
28. ___ means combining all your errands in only one car trip.
30. PM can be harmful to non-living things like ___.
31. Burning trash is ___.
32. Air pollution can cause watery and burning ___.

Down

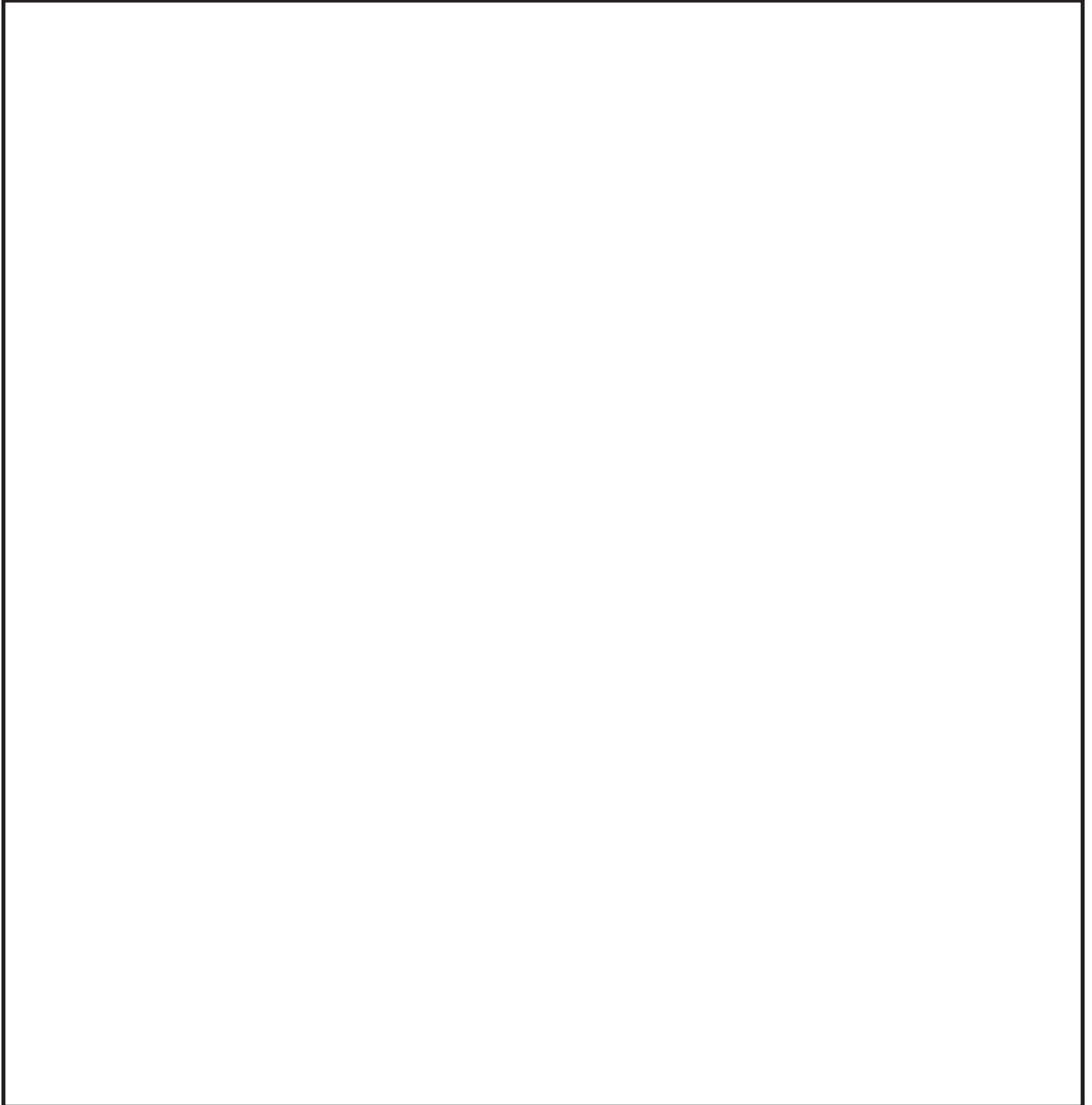
1. Ozone is a ___ that you cannot see or smell.
2. ___ mowers help reduce air pollution.
3. Air pollution harms humans ___ and plants.
4. NOx + VOCs + Hot ___ = Ozone.
7. Use a ___ instead of a leaf blower.

10. Avoid ___ while waiting to pick up students from school.
13. During the summer avoid using ___.
14. Wood ___ are a source of PM pollution.
15. To help cut air pollution from cars, we should ___.
17. ___ means particulate matter.
19. Air pollution can literally make us ___.
20. Use your ___ instead of using your car.
21. Particulate matter can occur when we ___ wood.
22. The largest source of air pollution comes from motor ___.
25. ___ refers to nitrogen oxides.
26. ___ refers to the Environmental Protection Agency.
29. Never burn ___ in a fireplace.

Make One Change

What is one change you and your family can pledge to do for clean air?

Directions: Color a picture of your family's healthy air living pledge.



Glossary

carbon monoxide - a colorless, odorless gas emitted from combustion processes like mobile sources.

carpool - an arrangement between people to make a regular journey in a single vehicle, typically with each person taking turns to drive the others.

dry-seasoned wood - wood that has been dried to reduce the moisture content before its use.

emissions - substances, and especially pollutants, discharged into the air.

EPA - Environmental Protection Agency, federal agency in charge of creating and enforcing regulations to protect human health and the environment.

EPA certified device - wood heaters certified by the US EPA as meeting their emission standards.

exhaust - waste gases or air expelled from an engine, turbine, or other machine in the course of its operation.

idling - keep the engine of a vehicle running while parked.

inversion layer - a layer of the atmosphere in which there is a temperature inversion, with the layer tending to prevent the air below it from rising, thus trapping any pollutants that are present.

lead - it is a soft, malleable metal and is a chemical element in the carbon group.

manufactured wood logs - engineered wood made from the same hardwoods and softwood used to manufacture lumber.

nitrogen dioxide (NO₂) - it is one of a group of highly reactive gases known as "oxides of nitrogen" or "nitrogen oxides (NO_x)."
NO₂ forms quickly from mobile and industrial sources and it contributes to the formation of ground-level ozone, and fine particle pollution.

nitrogen oxides (NO_x) - or "oxides of nitrogen" is a group of gases that are composed of nitrogen and oxygen. Two of the most common nitrogen oxides are nitric oxide (NO) and nitrogen dioxide (NO₂).

ozone (O₃) - ground level or "bad" ozone which is not emitted directly into the air, it is created by chemical reactions between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight.

particulate matter - also known as particle pollution or PM, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles.

PM_{2.5} - is fine particulate matter 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources such as forest fires and wood burning devices.

smog - fog or haze combined with smoke and other atmospheric pollutants.

sulfur dioxide - is a toxic gas with a strong, irritating smell. It is one of a group of highly reactive gases known as "oxides of sulfur."

Volatile Organic Compounds (VOCs) - are a large group of carbon-based chemicals that easily become vapors or gases. They include both human-made and naturally occurring chemical compounds.

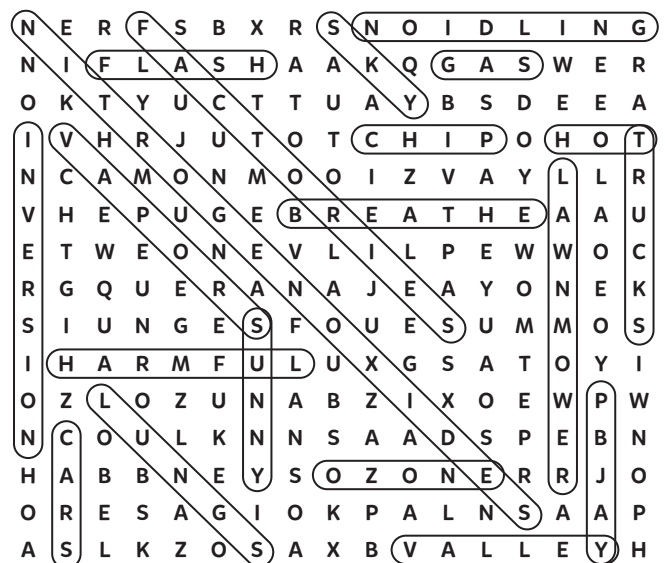
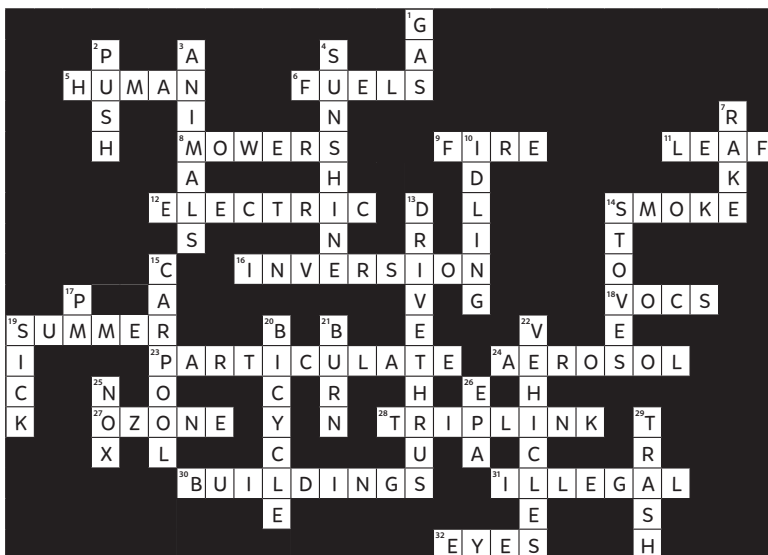
wood pellet - a small capsule compacted with sawdust and other lumber waste. Burned to create a source of heat for residential homes.

Answers

What Needs Air? Cow, Tree, Flower, Turtle, Ant, Boy

Word Scramble 1.Pollution 2.Particles 3.Burning 4.Exhaust 5.Dust 6.Fireplaces 7.Wood 8. Smoke 9.Valley 10.Ash

Fill in the Word 1.High 2.Small 3.Pollution 4.Respiratory 5.NO_x, VOCs 6.District 7.Bowl, Mountains 8.Exhaust 9.Winter 10.Summer



Protect Your Health

The Real-Time Air Advisory Network (RAAN) is a free tool that sends messages to Valley residents through their phone or email to tell them when air quality is getting bad. Residents can choose the air monitor they would like to follow, depending on which one is closest to where they live or go to school. This tool helps you know when it is safe to play outside using a chart called ROAR that provides activity recommendations depending on the level of air quality. As shown below, there are five possible levels of air quality.



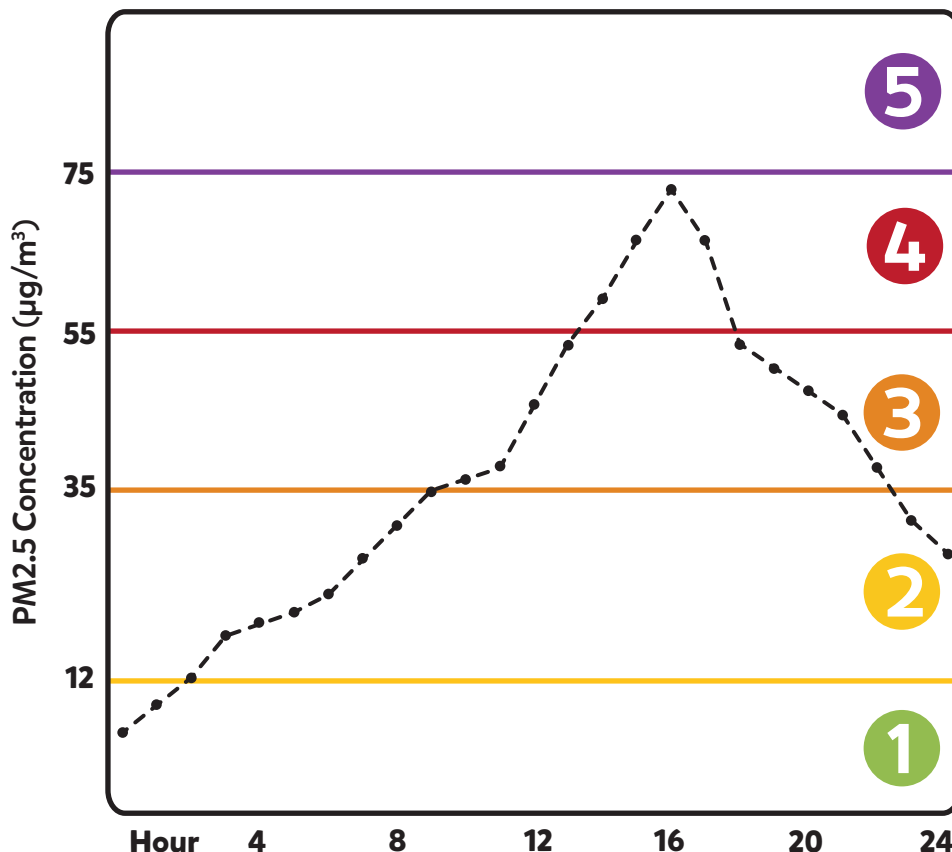
Connect to RAAN

www.valleyair.org/RAAN or through the “Valley Air” app on your iPhone.

RAAN Offers

- *Online or iPhone access to the most up-to-date hourly air quality information for your area, 24 hours a day*
- *Access to actual concentrations of Ozone and Particulate Matter (PM_{2.5}) pollution*
- *Activity recommendations based on the amount of time you are outside, the intensity of your exercise and the current air quality level.*

Sample RAAN Graph and Levels



Guidelines for 1 Hour of Activity

Level 5 Everyone should avoid outdoor activity.

Level 4 Sensitive individuals should exercise indoors. Everyone should avoid prolonged or vigorous outdoor activities.

Level 3 Sensitive individuals should exercise indoors or avoid vigorous outdoor activities.

Level 2 Sensitive individuals should consider reducing prolonged and/or vigorous outdoor activities.

Level 1 No restrictions.

Become a Healthy Air Hero!



Protect Students' Health! Help your school be a Healthy Air Living School! This program provides materials, training and support to help schools make informed decisions about outdoor activities in relation to air quality.
www.healthyairliving.com/schools



Kids' Calendar Contest

Each year the Valley Air District creates a calendar with healthy air living messages and creative artwork from Valley students in kindergarten to 12th grade. We accept entries all year! So get your markers, crayons and paints to start your clean-air masterpiece!
www.valleyair.org/kidscalendar

Contact Us

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209 557 6400 Northern Region Office
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public.education@valleyair.org



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