

Teacher Resource for “Where’s Mike?” Air Quality Education Workbook

Introduction

Purpose

This workbook supplements lessons that meet the Pennsylvania Core aligned standards in the subjects of Environment and Ecology and Health, Safety, and Physical Education for students in the third, fourth, and fifth grades.

The workbook was designed with the input of educators, school district curriculum committee members, and health and planning professionals to introduce students to the concepts of air pollution and how pollution may impact children's health. It also offers suggestions about how students and their families can prevent air pollution and protect their health using air quality forecasts provided by federal, state, and local government resources.

Story

The narrative of the book follows a character named Mike who cannot play at recess because of an asthma attack triggered by poor outdoor air quality. The book teaches students about the causes of air pollution and ways that communities and individuals can reduce air pollution. The book also introduces the concept of the Air Quality Index or AQI. The U.S. Environmental Protection Agency, in cooperation with state departments of environmental protection and local government agencies, provide daily air quality forecasts in the form of a simple green-is-good, red-is-bad scale (the AQI). The scale informs the public when air quality will be poor. On days when air quality is poor, people with breathing problems should limit strenuous activity.

As a result of the lessons Mike and his friends learn, he visits the school nurse less often to treat the symptoms of his asthma. The book ends with worksheets to help students track and graph the daily AQI and weather conditions that may contribute to poor air quality.

Resources

This guide provides solutions to the activities contained in the workbook as well as a list of the Pennsylvania Aligned Core Standards addressed by each activity. A page of additional resources is included at the end of this teacher's guide. Teachers can view the AQI or sign-up to receive air quality advisories via text or email at www.airqualitypartnership.org.

Key Concepts

The following are a list of key concepts introduced in the workbook along with the references to the Pennsylvania State Aligned Standards:

- Air pollution can trigger asthma attacks. Standards: *10.1.3.E and 10.2.3.E*
- Resources are available to alert students to poor air quality. Standards: *10.2.3.B*
- Human activities can cause air pollution. Standards: *4.1.4.A and 4.5.4.C*
- People can take actions or apply technology to reduce air pollution. Standards: *S3.A.1.1.2, 4.5.4.A and 4.5.4.C*
- Weather patterns also impact air quality. Scientists observe the environment to make predictions about when air quality may be poor. *Standard: 4.1.3.F, 3.A.2.1.1*

Suggested Solutions to Activities and Helpful Links

The following pages contain suggested solutions to the activities in the workbook.

For educators looking for more information and resources on outdoor air quality, the following websites are good resources for activities and information on air pollution and steps the public can take to reduce air pollution and protect their health.

Additional Resources

Air Quality forecasts and maps of real-time air quality conditions

- www.airnow.gov
- Airnow also offers an air quality app available for tablets and smartphones

Activities for students

- www.epa.gov/students
- http://www.portal.state.pa.us/portal/server.pt/community/just_for_kids/13936,

Impacts of air quality on children's health

- www.cdc.gov/air/default.htm

Weather records

- www.wunderground.com/history

Try to help Mike and his friends identify the different sources of air pollution by solving the math problem and then put the letter in the blanks below.

$9+8=$ <u>17</u> A	$9\times 3=$ <u>27</u> H	$6+3=$ <u>9</u> O
$5+10=$ <u>15</u> C	$16-5=$ <u>11</u> I	$10\div 2=$ <u>5</u> R
$24\div 3=$ <u>8</u> D	$5\times 4=$ <u>20</u> K	$10-7=$ <u>3</u> S
$3\times 4=$ <u>12</u> E	$2\times 7=$ <u>14</u> L	$8\times 4=$ <u>32</u> T
$17-4=$ <u>13</u> F	$8+8=$ <u>16</u> M	$11-9=$ <u>2</u> U
$5\times 2=$ <u>10</u> G	$25-7=$ <u>22</u> N	$4\times 7=$ <u>28</u> Y

- A) M a k i n g e l e c t r i c i t y
 16 17 20 11 18 10 12 14 12 15 32 5 11 15 11 32 28
- B) C a r s a n d t r u c k s
 15 17 5 3 17 18 8 32 5 2 15 20 3
- C) F a c t o r i e s
 13 17 15 32 9 5 11 12 3
- D) S m o k e
 3 16 9 20 12

Can you match the letter of the sources of pollution above to a **solution** listed below? Place the letter (A, B, C, or D) of the source of pollution next to the solution.

C Reduce, reuse, and recycle. By using less products and materials, factories use less energy and pollute less.

D Don't burn trash or leaves in your yard. Burning trash and leaves gives off smoke that is unhealthy to breathe.

B Bike, walk, or take public transportation.

A Save energy at home. Power plants that make electricity are a big source of air pollution.

Solution: A way to solve a problem

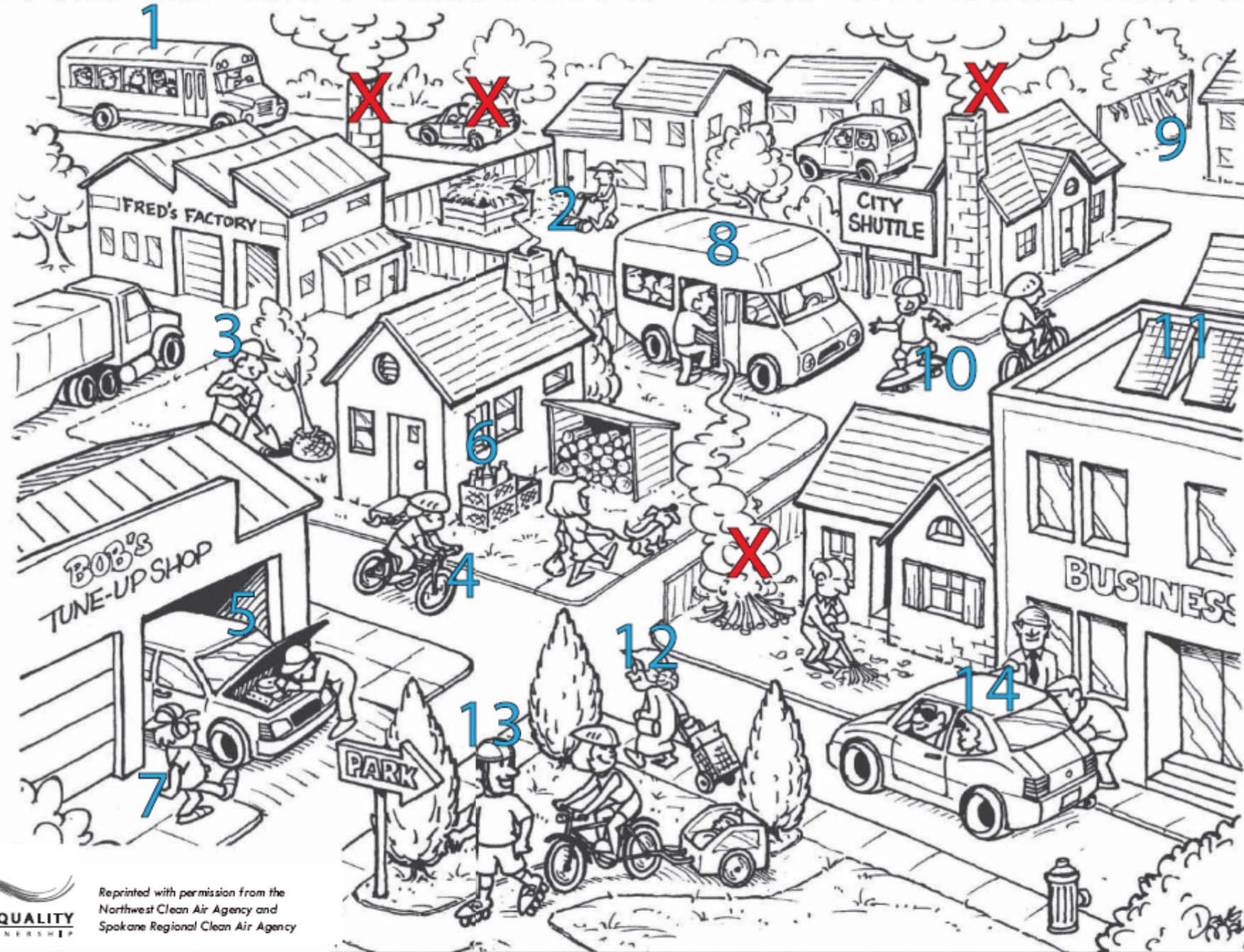
Find the sources of air pollution

- Factory smoke stacks
- Cars with only one passenger
- Smoke from home chimneys
- Burning yard waste

Find the solutions to air pollution

- 1 Taking the bus to school
- 2 Using a push mower
- 3 Planting a tree
- 4 Riding a bike
- 5 Tuning up a car at Bob's Tune-Up Shop
- 6 Recycling bottles and cans
- 7 Going for a walk
- 8 Taking the City Shuttle
- 9 Hanging laundry to dry
- 10 Riding a skateboard
- 11 Using solar panels
- 12 Walking to the grocery store
- 13 Roller skating
- 14 Carpooling

Cross out the POLLUTION. Color the SOLUTIONS!



AIR QUALITY
PARTNERSHIP

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Northwest Clean Air Agency and
Spokane Regional Clean Air Agency

Color the AQI dashboards and draw a line from the AQI to the class's activities for the day.



The air is unhealthy today. Today is a good day to take the train or bus. Everyone should avoid doing heavy exercise in the middle of the day. People with asthma should have their medicine handy.

Air quality is OK today. Go outside and play.

Air quality is very good today. Get some exercise!

The air is unhealthy for people with breathing problems like asthma. Children should not play games that require a lot of running or heavy breathing and should take plenty of breaks.

Mike, I haven't seen you in the nurse's office in a while.

I check the AQI every day. When air pollution levels are high, I take it easy during afternoon activities.



Become an Air Quality Investigator

If we are going to fix some of the problems that pollute our air we will need many smart people like you to work on the problem.

1 Be an air quality scientist

● Go to www.AirQualityPartnership.org and record the AQI each day.

● Observe the weather conditions each day.

● On the calendar, record:

- Temperature
- Is it rainy, cloudy or sunny?

● Example:

AQI: Yellow

Temp: 85°F

Weather: Sunny and calm winds

Month: _____

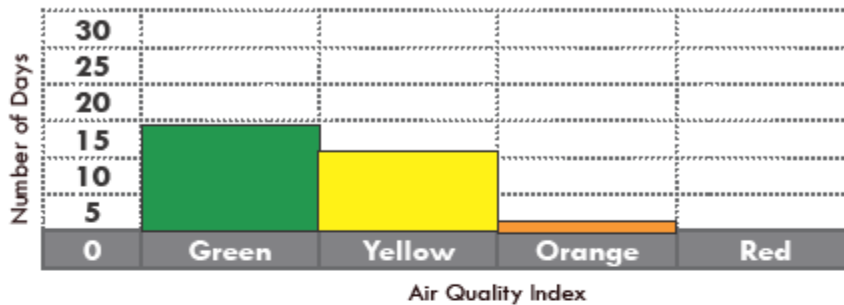
	Sun	Mon	Tues	Wed	Thu	Fri	Sat
AQI:		green	green	green	yellow	yellow	yellow
Temp:		75	75	80	80	85	85
Weather:		cloudy, rainy	cloudy, rainy	cloudy, rainy	cloudy	sunny	sunny
AQI:	green	green	green	green	yellow	yellow	yellow
Temp:	80	75	75	80	85	85	85
Weather:	cloudy	cloudy, windy	cloudy, windy	sunny, windy	sunny, windy	sunny, windy	sunny, windy
AQI:	yellow	green	green	green	yellow	orange	yellow
Temp:	85	80	80	85	85	95	90
Weather:	sunny	cloudy, windy	cloudy, rainy	sunny, windy	sunny	sunny, no wind	sunny, windy
AQI:	yellow	green	green	green	green	yellow	
Temp:	85	80	80	80	80	85	
Weather:	sunny, windy	cloudy, windy	cloudy, windy	sunny, windy	sunny, windy	sunny	

Describe the days that have the worst air quality? What kinds of weather may be happening to make air pollution worse?

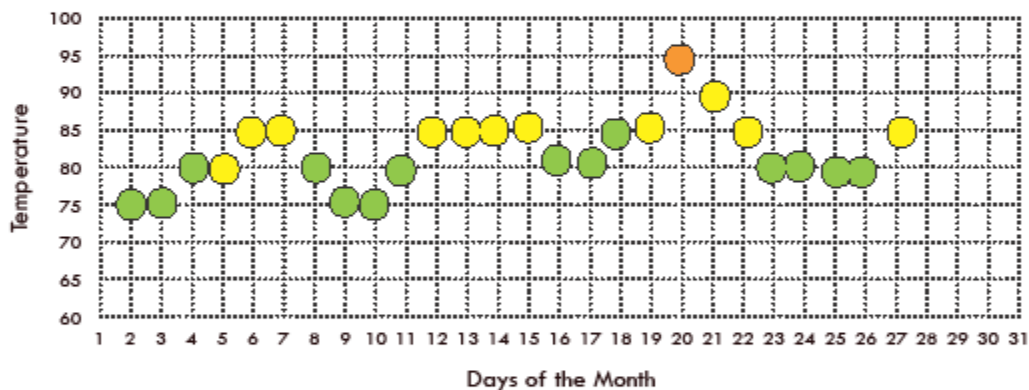
In the spring and summer, bad air quality usually happens on hot, sunny days when there is no wind.

The sun provides energy to power chemical reactions to form ozone. Wind can help to blow pollution away.

- 2 Use your records to create a bar graph to show how many of each kind of day there were in the month.



- 3 Use your records to create a line graph to show what the high temperature was each day of the month.



Was the air quality good this month? Was it a hot month? Were poor air quality days on warmer days or cooler days? Sunny days or rainy days? Breezy days or calm days?

It was a good month for air quality. temperatures were cool. the poor air quality day was when it was hot with no wind or clouds.

Weather can help make air quality better or worse. Rainy and windy days can blow air pollution away. Sunny and warm days, with no wind, can help some kinds of air pollution to form.

Certificate of Completion

A certificate of completion for this workbook is downloadable at www.airqualitypartnership.org/certificate

Survey and suggestions

Please help the Air Quality Partnership improve our education and outreach efforts. Please take the brief survey on your experience with the “Where’s Mike” air quality education workbook at: <https://www.surveymonkey.com/s/wheresmike> or email comments to sgreene@dvrpc.org

SPONSORED BY:

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