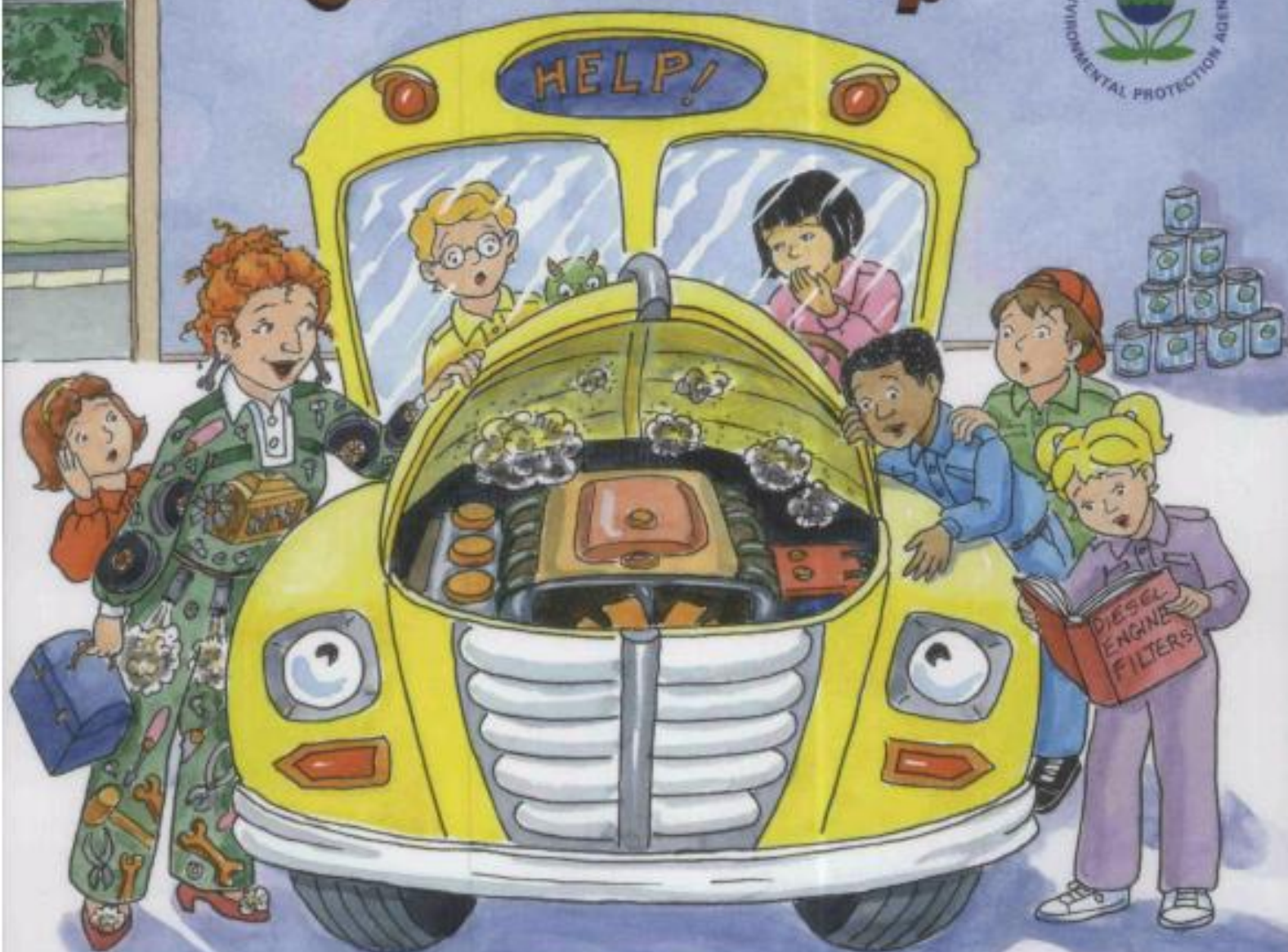





# Magic School Bus<sup>®</sup>

## Gets Cleaned Up

420K07001



 SCHOLASTIC



# The Magic School Bus<sup>®</sup>

## Gets Cleaned Up

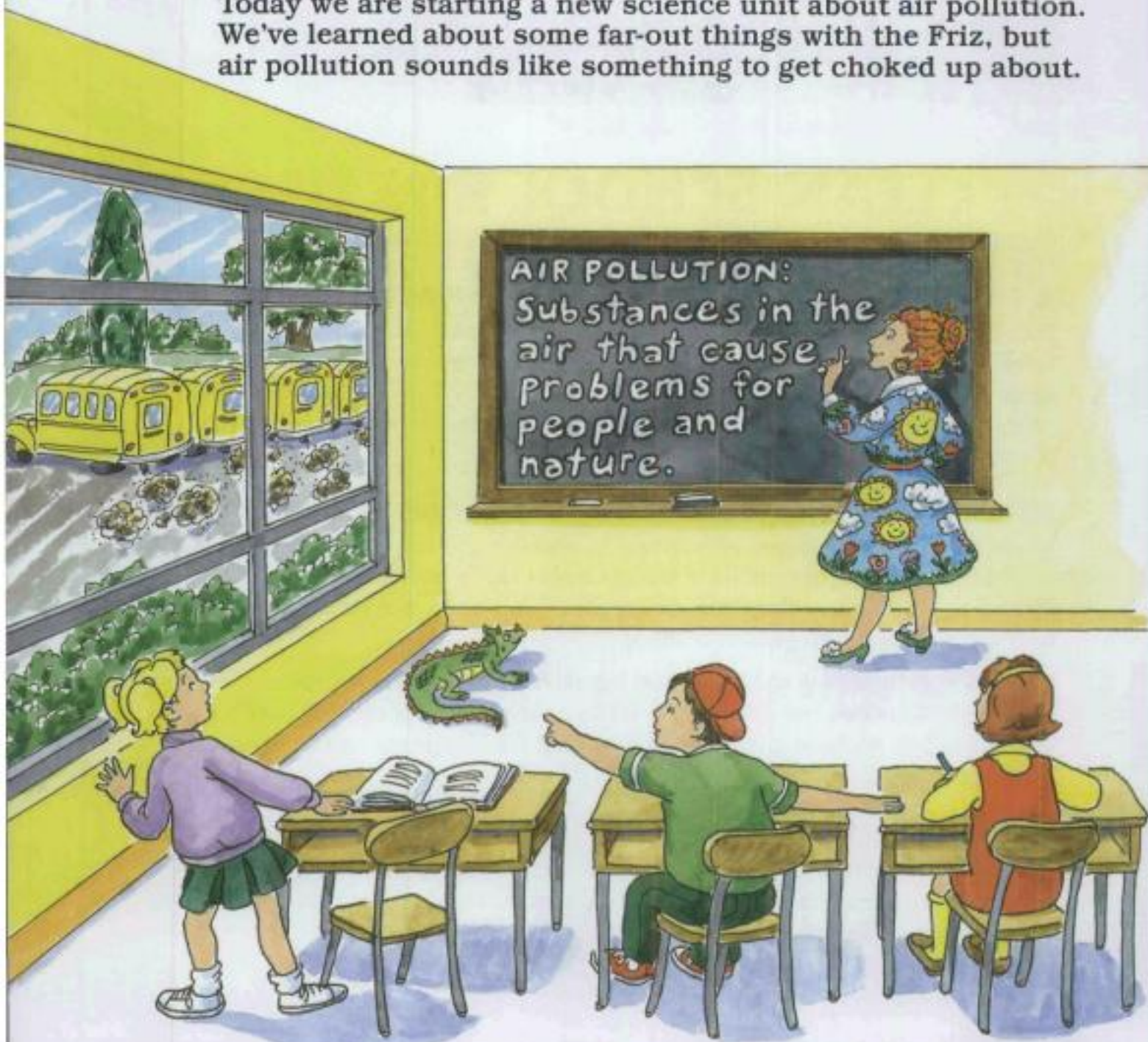
Prepared with the help of the U.S. Environmental Protection Agency



SCHOLASTIC INC.

New York Toronto London Auckland Sydney  
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If we've learned one thing in Ms. Frizzle's class, it is to be ready for anything. Ms. Frizzle is full of surprises. Today we are starting a new science unit about air pollution. We've learned about some far-out things with the Friz, but air pollution sounds like something to get choked up about.





"It's that time again!" Ms. Frizzle announces. When we see the sparkle in her eyes, we all know we're in for a class trip.

"We never go on normal field trips," Arnold groans.

"Yeah, but now we're just studying the air," Tim says.

"What could be more normal than that?" Wanda agrees.



WE COULD BE GOING ANYWHERE. . . .

BECAUSE AIR POLLUTION  
CAN GET EVERYWHERE.



WHEN AIR GETS DIRTY  
by Dorothy Ann

Air is naturally clean but  
pollution can make it dirty.  
Pollution can be gases or  
bits of junk that can harm  
living things.



We were just leaving the **school** when Ms. Frizzle gasped. "I forgot my map!" our teacher exclaimed. "I'll go get it. Stay on the **bus**, kids."

But when Ms. Frizzle left, our **bus** started to shake.





We felt a jolt and heard a cough.  
GASP! HACK! WHEEZE! COUGH!

THE **MAGIC SCHOOL BUS** IS SICK!

LOOK AT ALL THAT SMOKE!

POOR **BUS**!

POOR US!

WHEEZE!  
COUGH!

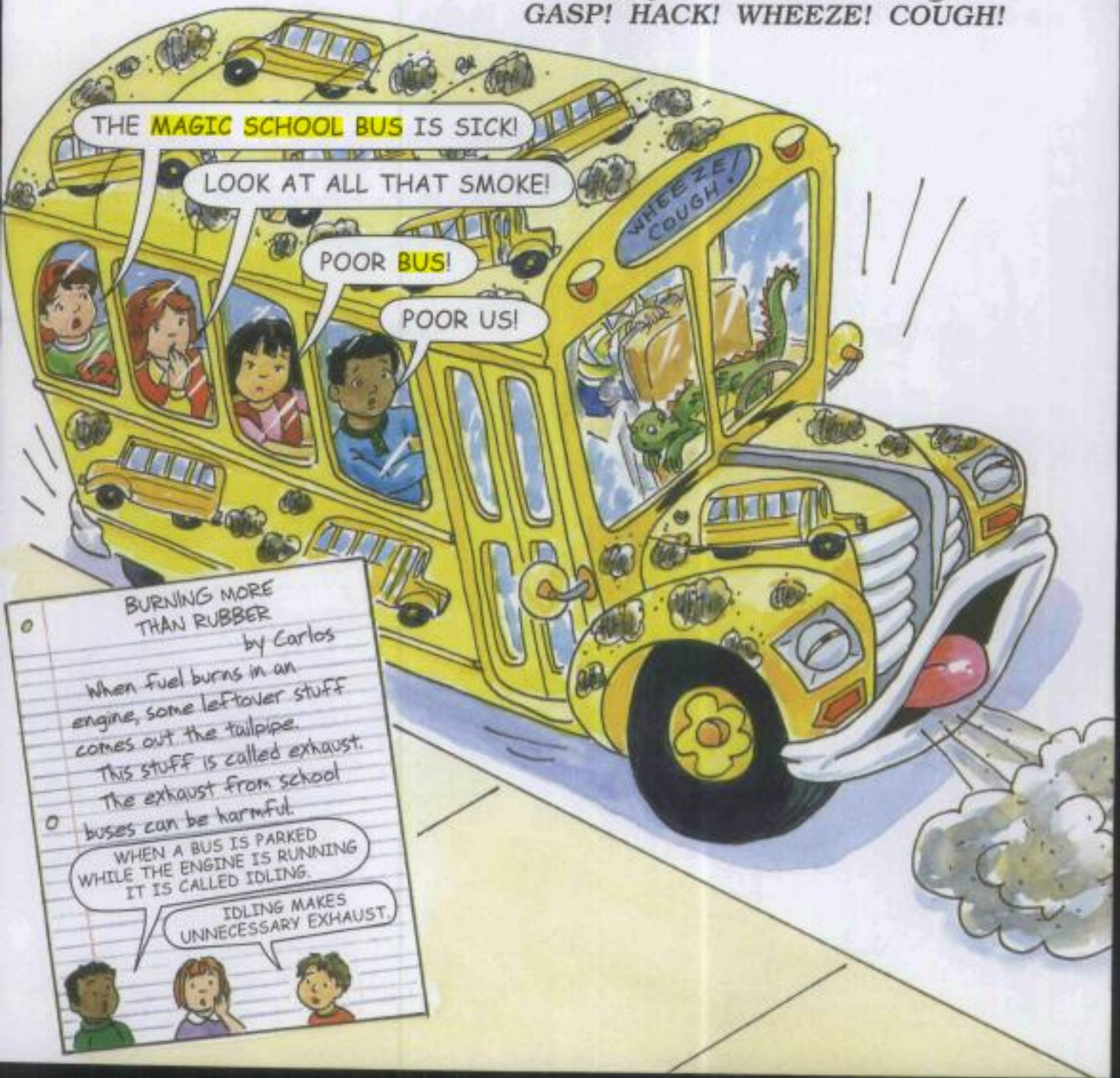
### BURNING MORE THAN RUBBER

by Carlos

When fuel burns in an engine, some leftover stuff comes out the tailpipe. This stuff is called exhaust. The exhaust from school buses can be harmful.

WHEN A BUS IS PARKED WHILE THE ENGINE IS RUNNING IT IS CALLED IDLING.

IDLING MAKES UNNECESSARY EXHAUST.



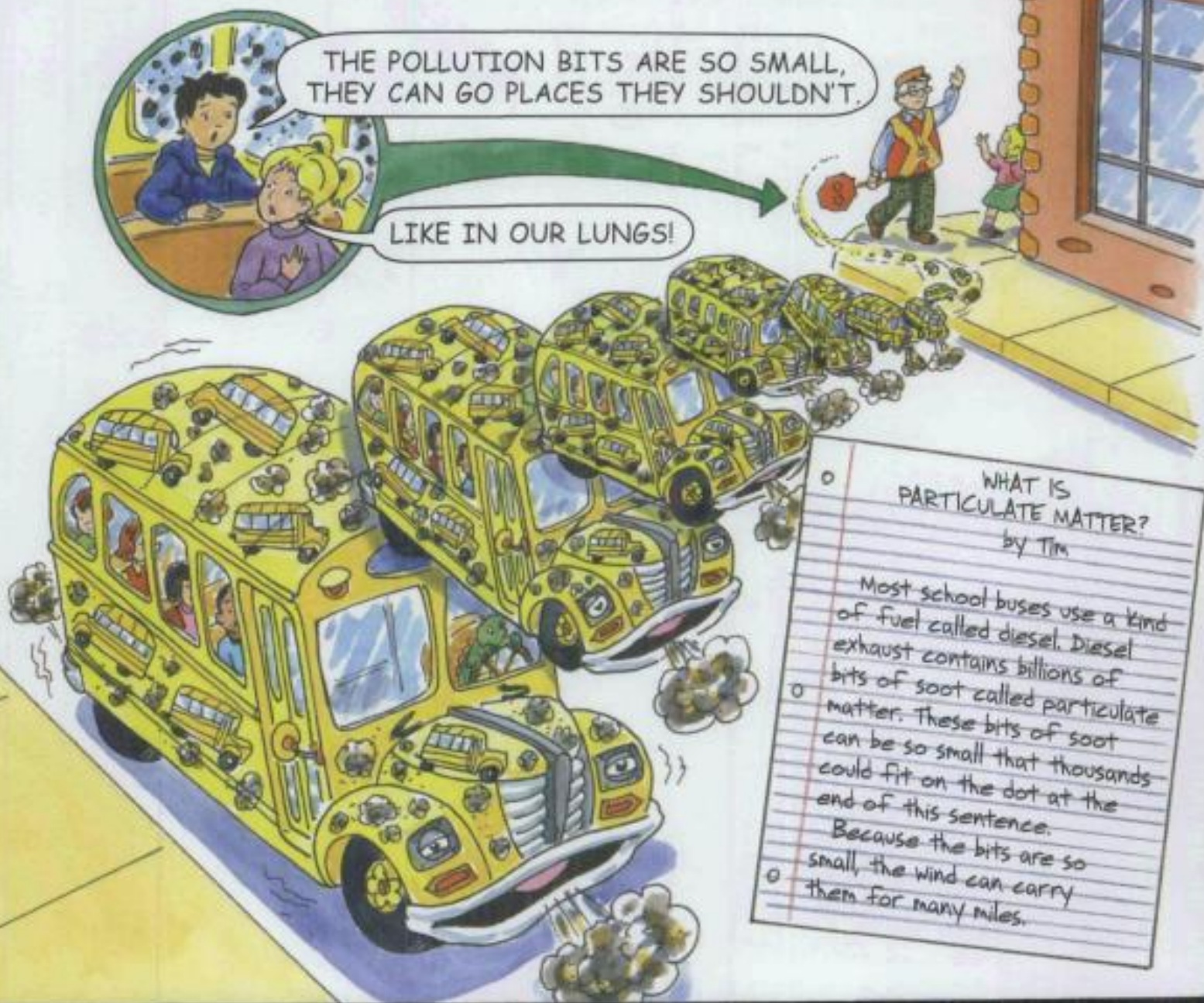


With each cough, the **bus** got smaller. We got as small as a dust particle and we saw lots of stuff in the air.

"Yuck! What is that?" Wanda asked.

"That's particulate matter from the buses," Dorothy Ann said. "It's usually way too small for us to see."

"But it pollutes the air and makes it dirty," Tim said.



### WHAT IS PARTICULATE MATTER? by Tim

Most school buses use a kind of fuel called diesel. Diesel exhaust contains billions of bits of soot called particulate matter. These bits of soot can be so small that thousands could fit on the dot at the end of this sentence.

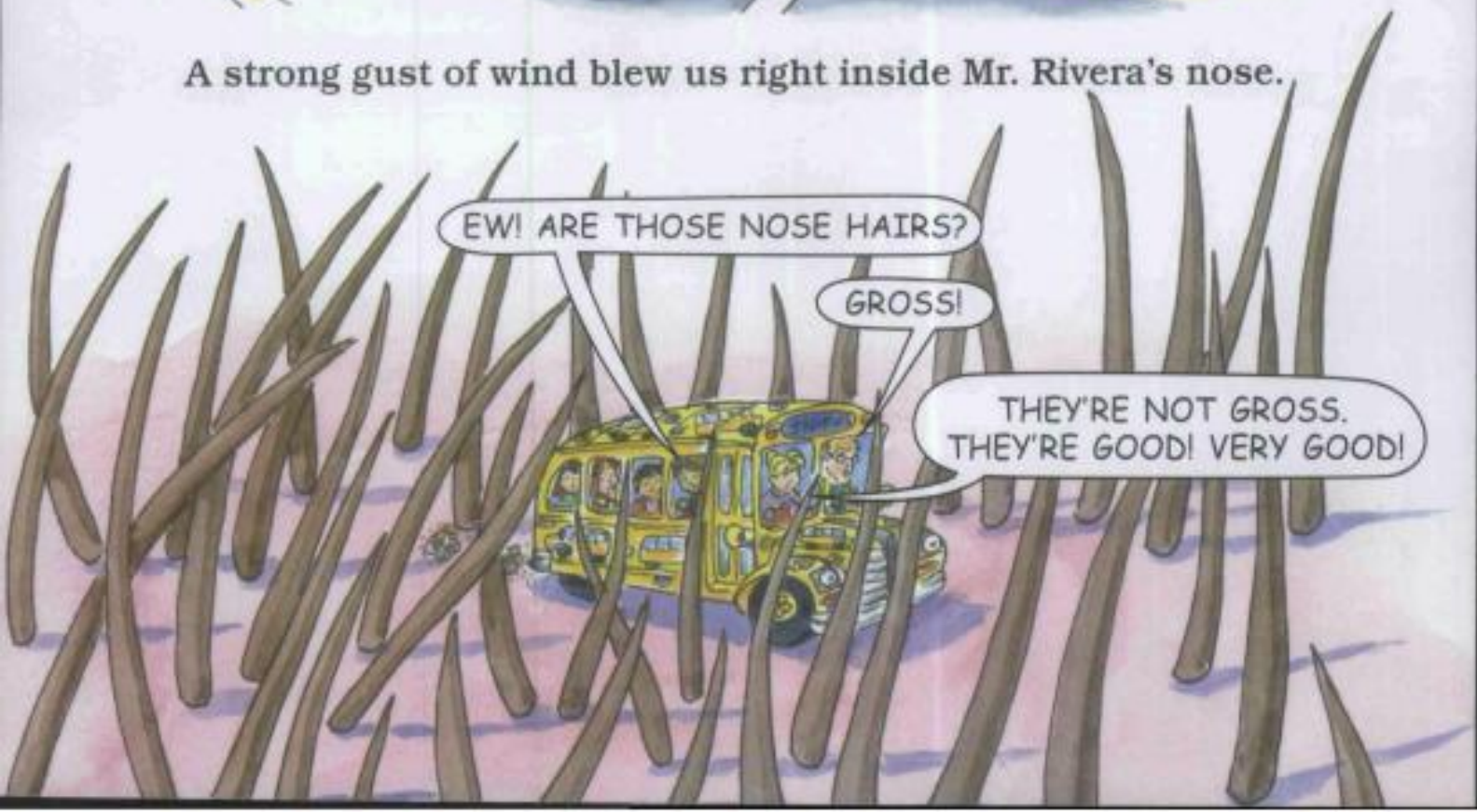
Because the bits are so small, the wind can carry them for many miles.



"Oh, no!" Phoebe called, pointing out the front window.  
The wind blew us straight at Mr. Rivera, the crossing guard.



A strong gust of wind blew us right inside Mr. Rivera's nose.





Mr. Rivera didn't know we were inside him!  
"The nose hairs help filter out big particles from the air, so they don't go into your lungs," D.A. tells us.  
The **bus** was so tiny it slipped right through the hairs.  
We were headed down the windpipe.

WHERE'S YOUR CLASS, MS. FRIZZLE?

STOP

THE CLASS  
STARTED ITS  
TRIP WITHOUT  
ME, MR. RIVERA.  
I'M MEETING  
THEM SOON.

### KIDS AND POLLUTION by Ralphie

Kids can be at great risk  
from pollution.

Kids' bodies are still growing,  
so pollution affects them  
more. Kids breathe faster, so  
they take in more air.

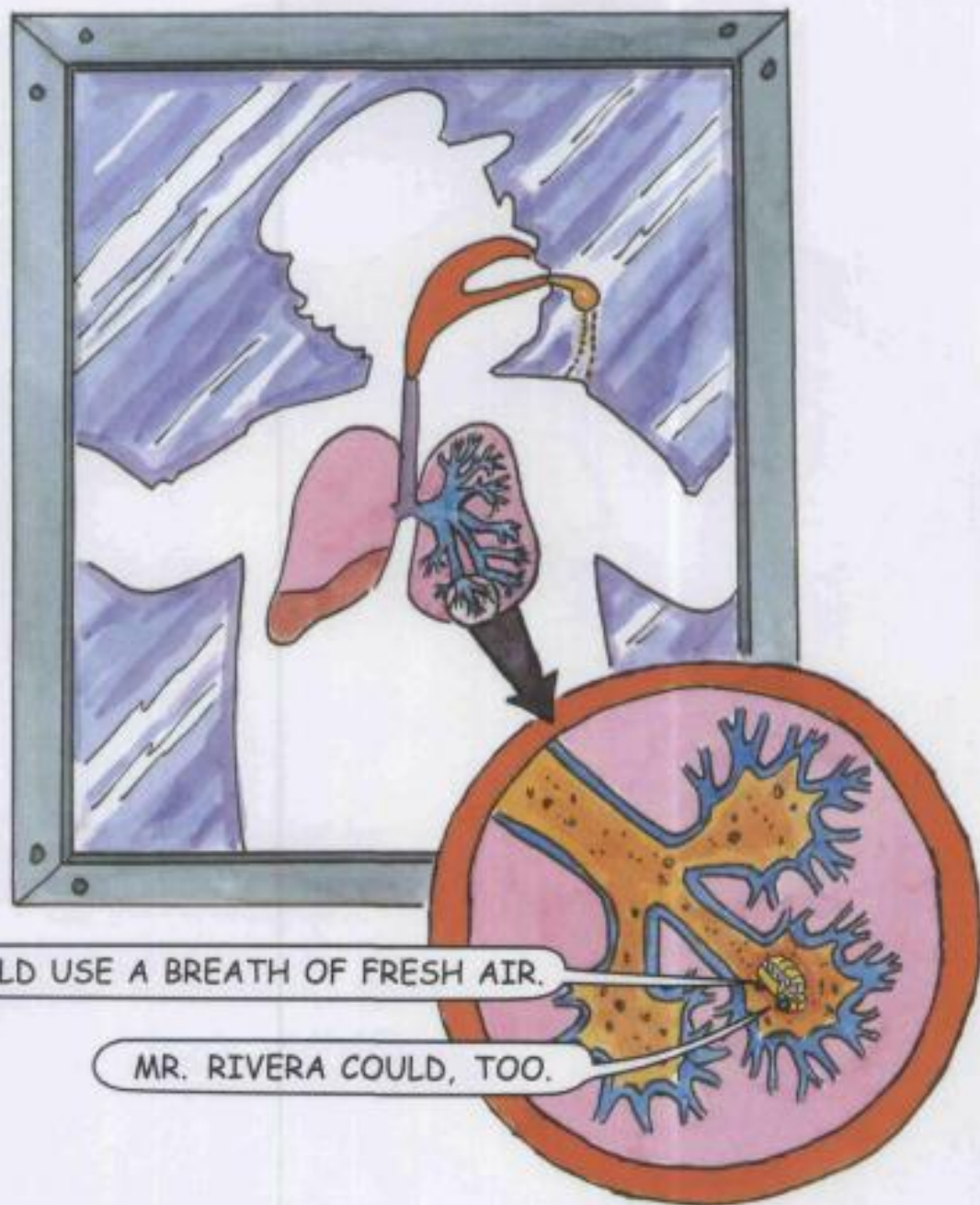
AND WE'RE SHORT,  
SO WE ARE CLOSE TO  
THE EXHAUST.





Once we were in the lungs, we could see that Mr. Rivera had breathed in stuff other than air.

"Smaller particles can go even deeper into the lungs," D.A. told us.

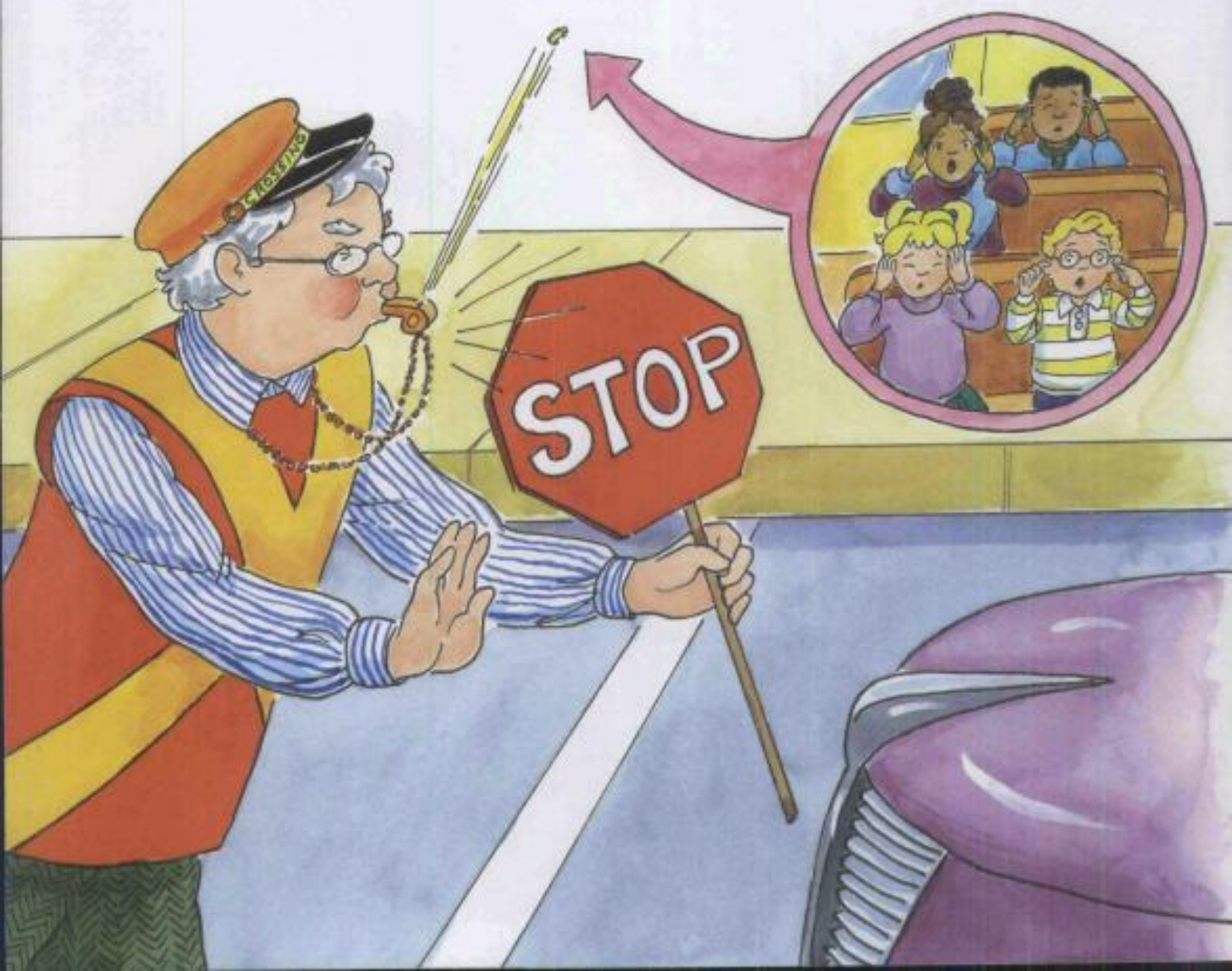




The lungs started to exhale and we began to go faster than ever. A high-pitched sound rang through the **bus**.

"It's a whistle!" Wanda yelled over the noise.

Mr. Rivera had blown his whistle, and we were shooting straight out into the air.





The wind caught our **bus** and blew it into the sky. Our **bus** was still sputtering and wheezing. We went higher and higher with each cough.

"Look!" Tim called. "There's Ms. Frizzle. She's getting on a **bus** with Ms. Berk's class."

THE **BUS** NEEDS OUR HELP.

WE NEED MS. FRIZZLE'S HELP!

MAY I RIDE WITH YOU TO MEET MY CLASS, MS. BERK?



We could see Ms. Berk's **bus** far below. It was leaving the **school** and turning onto the highway.

FOLLOW THAT **BUS!**

TRACTOR

DIESELS POLLUTE...  
SO WHY DO WE USE THEM?  
by Carlos

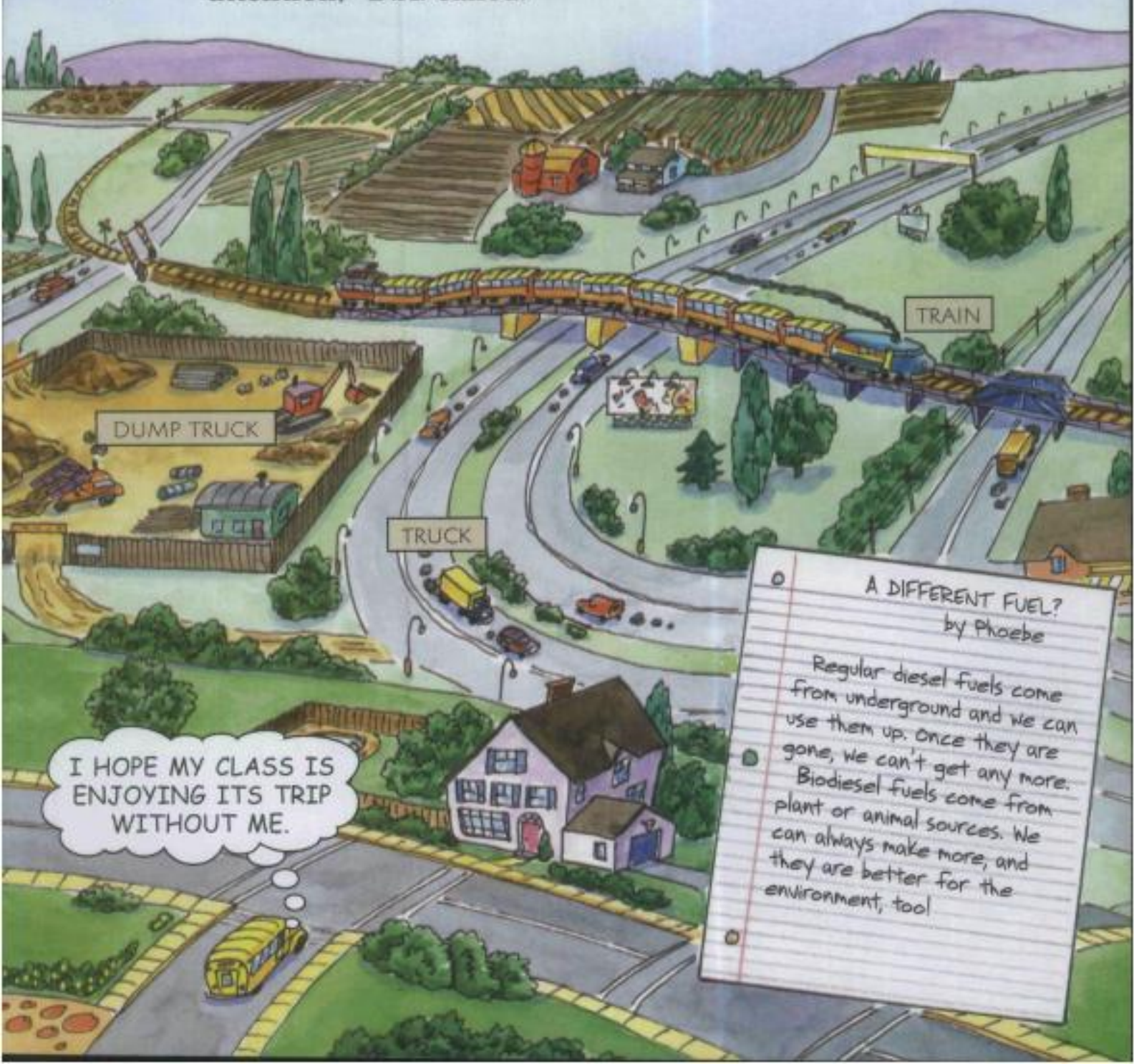
People use diesel-fueled engines because they do important work, are powerful and efficient, and last a long time.

Other things that use diesel include:

- Tractors
- Trucks
- Trains
- Dump trucks
- Ships
- Buses
- Bulldozers



"Now we can glide down and get Ms. Frizzle's attention," D.A. called.





Then the wind blew us right past the Friz's window in Ms. Berk's **bus**. She was busy examining her map. She didn't seem to see us. But when she shook her keys, something funny happened to the **bus**.

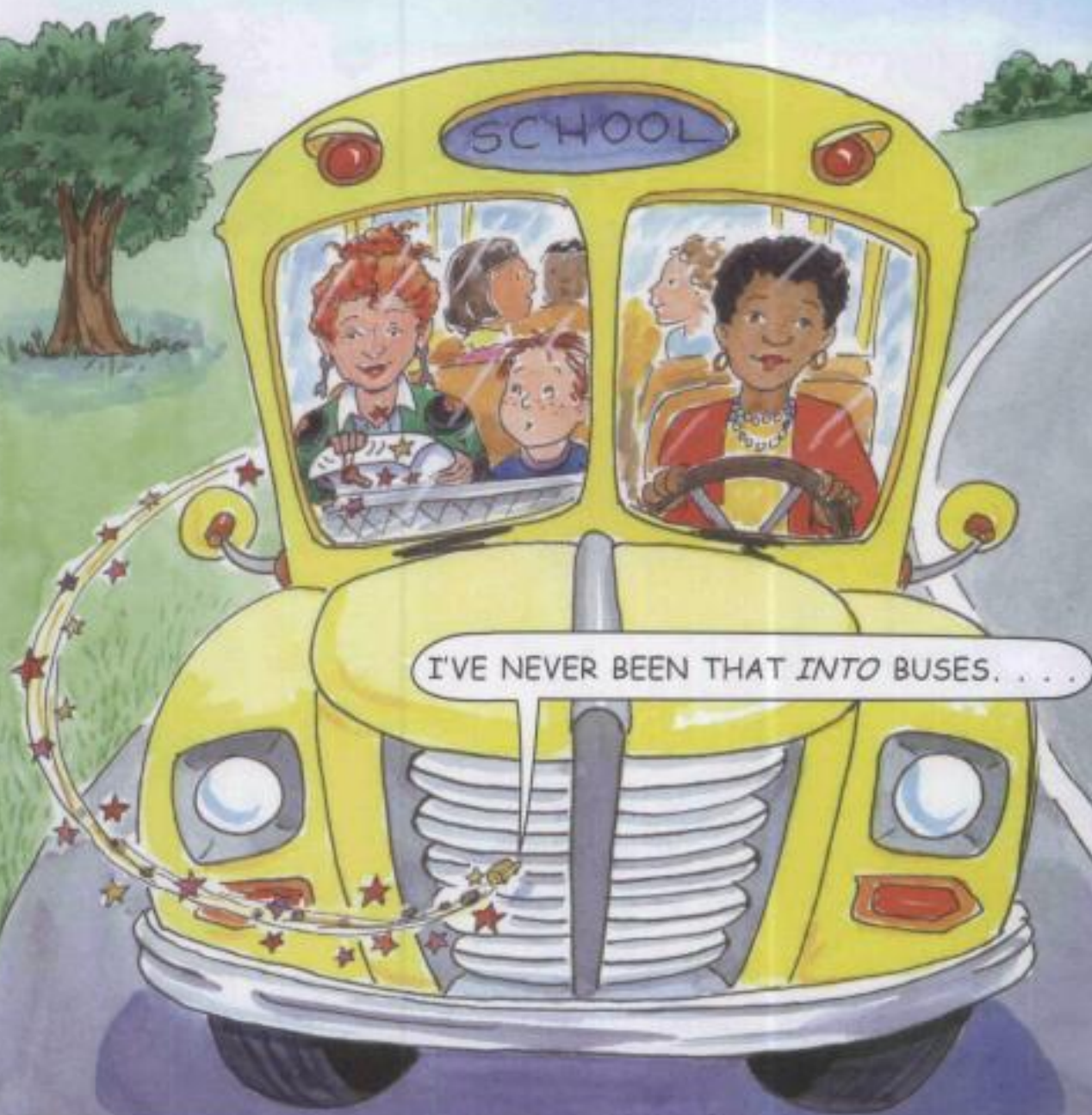




The wind blew us to the front of Ms. Berk's **bus**.

"Where are we going?" Keesha asked.

"According to my research," D.A. said as she looked in her book, "we're moving with the air into the engine of Ms. Berk's **school bus**."





"We're taking a trip through the bus's engine," D.A. told us. "Right now, we're in the engine block," she said and pointed to a picture in her book. "To get out, we need to follow the exhaust to the tailpipe."

IT'S HOT IN HERE!

THAT'S BECAUSE OF  
THE BURNING FUEL.

I KNEW I SHOULD HAVE  
STAYED HOME TODAY.

A TRIP  
THROUGH A  
DIESEL ENGINE

ENGINE  
BLOCK

Fuel is burned in the  
engine block and  
makes exhaust.

EXHAUST →

The exhaust goes  
through a pipe.  
The pipe can have  
things to clean  
the exhaust.






"Look at us!" cried Wanda.

We were covered with bits of soot.

"We've left the engine block. Now we're in the exhaust system," D.A. explained. "Pollution and soot can be left after the fuel burns. We're all covered in particulate matter."

Exhaust was everywhere! It was extremely dirty.

A yellow school bus is shown from a side-on perspective, driving through a dark, smoky exhaust pipe. The bus is covered in black soot. Inside the bus, four children are visible. The exhaust pipe is filled with thick, dark smoke and soot particles. The bus is moving from left to right.

MY MOM'S NEVER GOING  
TO BELIEVE THIS.

MY DAD THINKS  
I'M DIRTY AFTER  
BASEBALL!

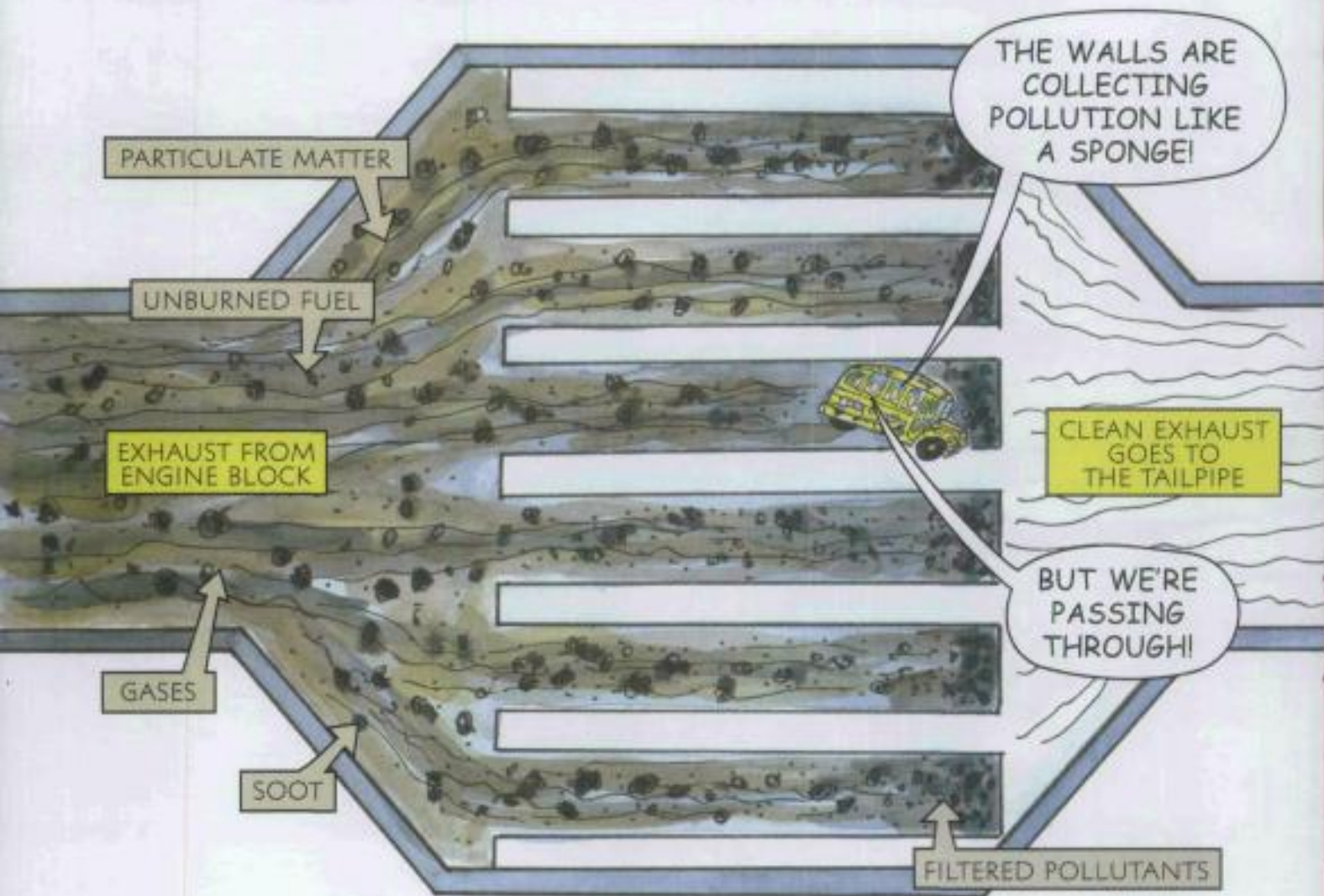


"How will we find Ms. Frizzle?" Phoebe asked.

Then we noticed that the exhaust was going into a special device. And we were going with it!

D.A. looked in her book. "My research shows that this filter traps almost all the particulate matter."

## PARTICULATE MATTER FILTER





After we went through the filter, we were all clean again!

Then we heard a familiar voice. It was Ms. Frizzle.

"It's wonderful that you already had a filter put on your **bus**, Ms. Berk. I'm looking forward to having one put on my **bus** as well," the Friz said.



WE'RE CLEAN!

MY MOM'S  
NEVER GOING  
TO BELIEVE  
THIS!

### CLEAN AS A WHISTLE!

by Phoebe

Old diesel buses can make dirty exhaust. Many of them don't have good filters.

Now new filters can be installed in old buses to reduce up to 90 percent of the particulate matter in their exhaust.

WITH THE FILTER,  
BUS EXHAUST IS  
MUCH LESS HARMFUL!





Suddenly, we were in an auto shop and we had on mechanics' outfits. Ms. Frizzle was there with a mechanic.

"Class, this is Mr. Spencer," said Ms. Frizzle. "He's going to put a filter on our **bus** that will clean the exhaust so the **bus** won't be sick anymore."

We all nodded. After our trip through the engine, we all knew how important Mr. Spencer's work was.



THE FILTER IS GREAT, BUT  
THERE ARE OTHER WAYS TO  
REDUCE **BUS** POLLUTION.

### THE CLEAN AIR CHECKLIST

1. Ask your **bus** driver to turn off the engine when the **bus** is parked.
2. Keep up with **bus** maintenance.
3. Use cleaner fuels, like clean diesel fuel or biodiesel.
4. Line buses up side by side, not front to back at **school**.
5. Get old buses fitted with exhaust cleaning devices like filters and catalysts.
6. Replace really old diesel buses with new clean diesel or compressed natural gas buses.





We helped Mr. Spencer install the particulate filter.  
Then we got ready to head back to **school**.

Vroom, vroom. The **bus** purred to life. We were glad  
the **bus** was healthy again.

## SPENCER'S GARAGE

THERE'S NO MORE SMOKE!

THE **BUS** IS BETTER THAN EVER!

OTHER BUSES CAN GET BETTER, TOO.

BUT OUR **BUS** WILL ALWAYS  
BE THE WEIRDEST **BUS**!



GOOD NEWS: STARTING IN 2007, ALL NEW  
DIESEL **SCHOOL** BUSES WILL HAVE BUILT-IN  
PARTICULATE MATTER FILTERS WITH MORE  
IMPROVEMENTS COMING IN 2010.



# A PHONE CALL TO SPENCER'S



**Telephone:** Ring! Ring!

**Mr. Spencer:** Spencer's! The **bus** mechanic you can trust!

**Caller:** Hello, Mr. Spencer? I'm not so sure people *should* trust you!

**Mr. Spencer:** That's ridiculous!

**Caller:** But you're in this book that says buses can shrink and fly...

**Mr. Spencer:** Okay, but...

**Caller:** And what about saying that kids can pass through a **bus** filter?

**Mr. Spencer:** We all know that can't really happen, but...

**Caller:** And I heard that you wear a wig!

**Mr. Spencer:** Now wait just a minute! My hair is all-natural!

**Caller:** It is? And what about the information in this book?

**Mr. Spencer:** That's all for real, too. Well, except for the shrinking and flying buses and kids passing through filters. Besides, this is a book about a **MAGIC School Bus**.

**Caller:** Huh. I guess you're trustworthy after all.

**Mr. Spencer:** You betcha!





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