National Aeronautics And
Space Administration
Langley Research Center

Educational Product	
Educators and Students	Grades K-4

EP-2004-03-415-HQ

The Air We Breathe

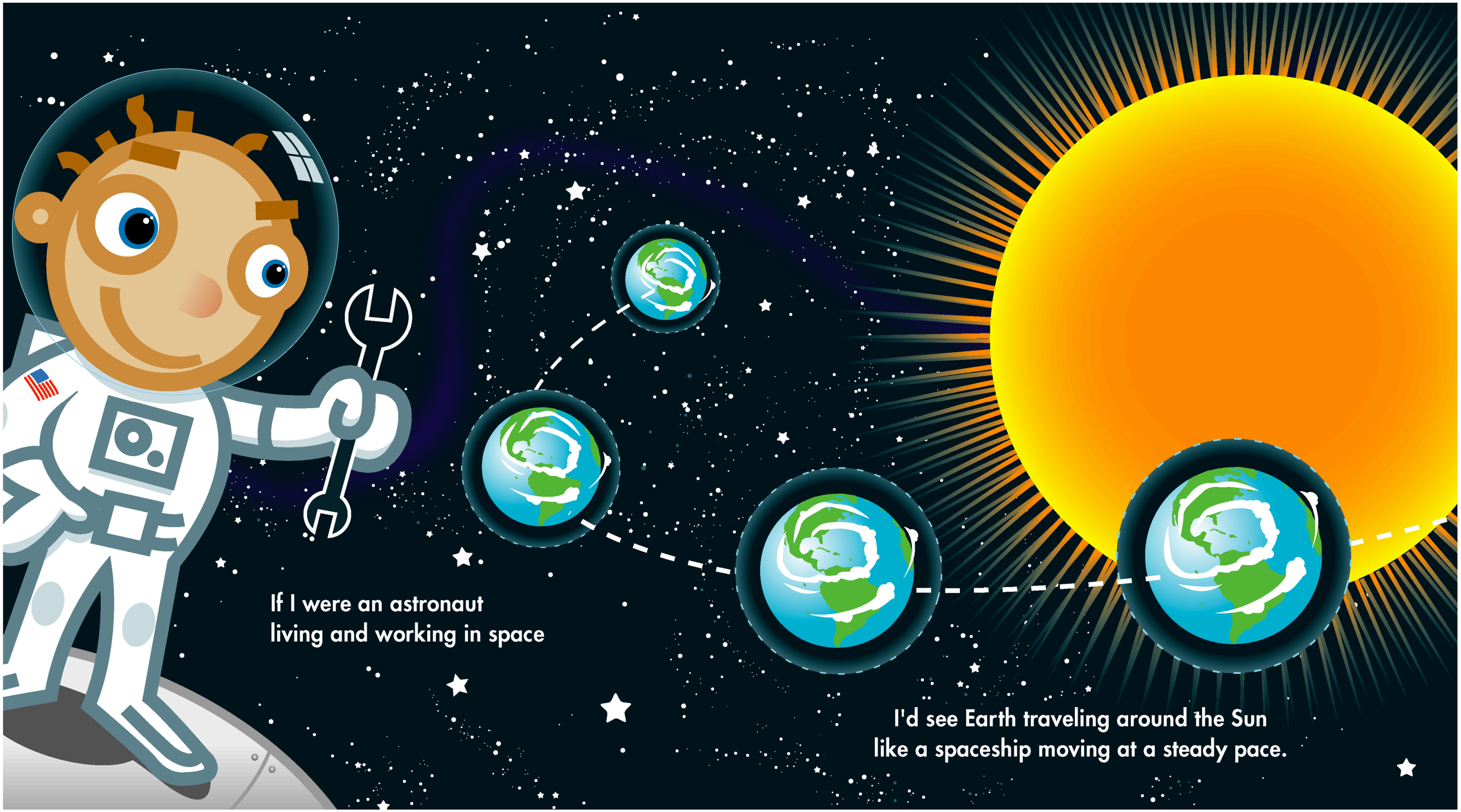
This book belongs to:

_____

The Air We Breathe is a picture book designed to introduce Earth's atmosphere and its importance to life on Earth. It also introduces how the addition of new gases contributes to changing the quality of air we breathe. With an understanding of how our atmosphere works, we will begin to understand how our activities may be contributing to some of those changes in air quality.

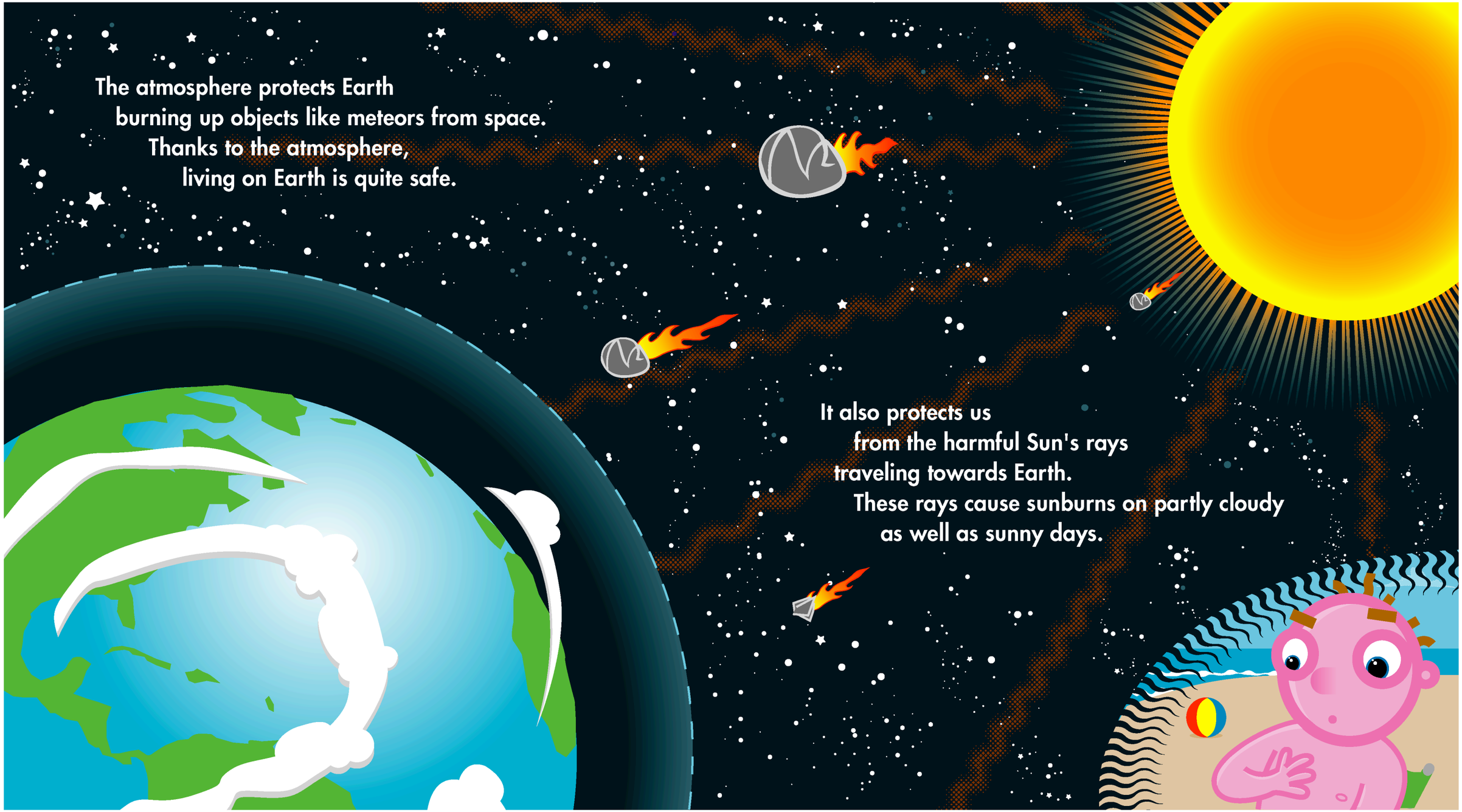
The Air We Breathe

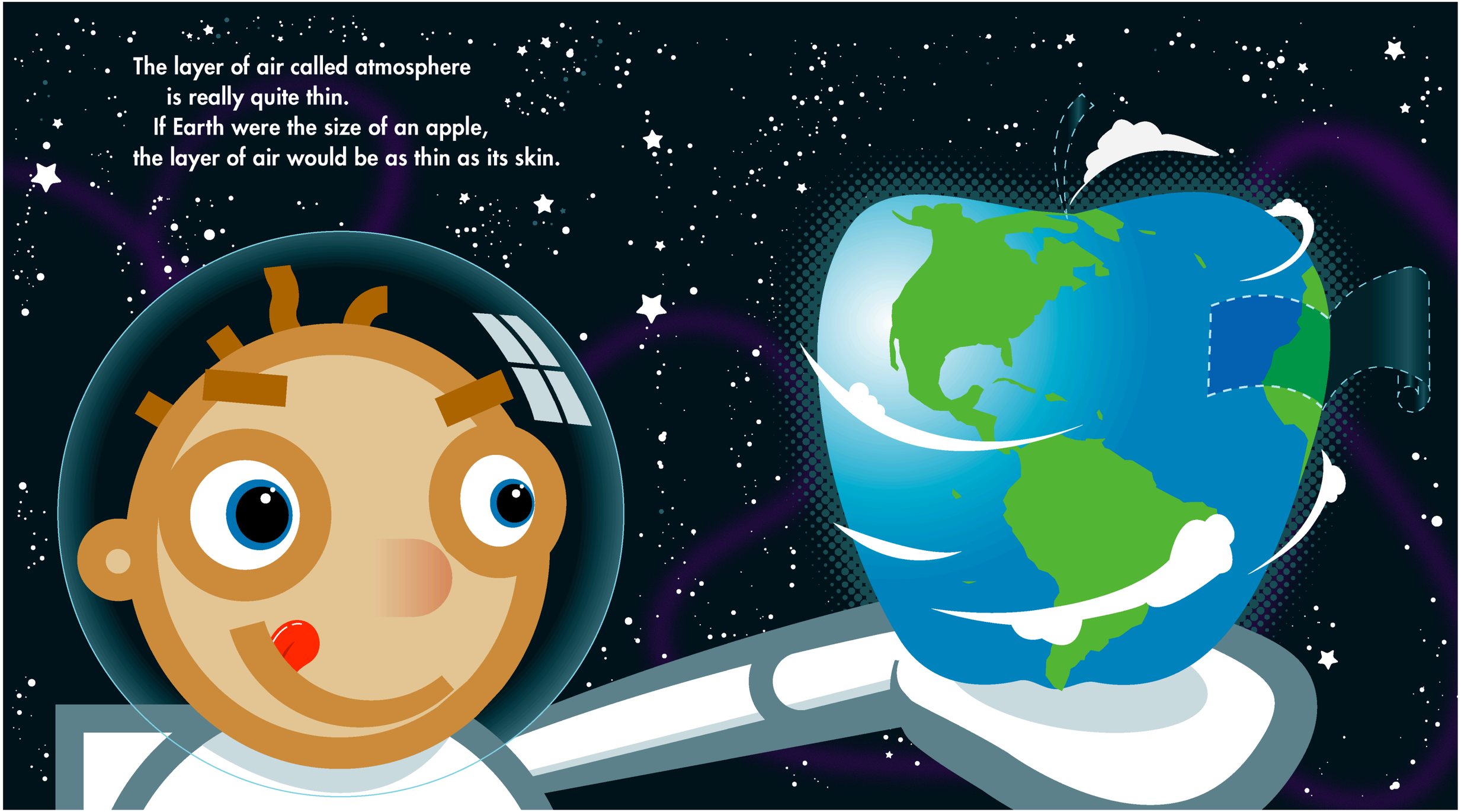
Written by Irene Ladd
Illustrated by Wade Mickley


If I were an astronaut
living and working in space
I'd see Earth traveling around the Sun
like a spaceship moving at a steady pace.

I'd see a thin blanket of air called atmosphere wrapped closely around the Earth

It works like the spacesuit astronauts wear giving Earth protection and lots of air.

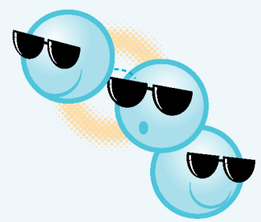

The atmosphere protects Earth
burning up objects like meteors from space.
Thanks to the atmosphere,
living on Earth is quite safe.
It also protects us
from the harmful Sun's rays
traveling towards Earth.
These rays cause sunburns on partly cloudy
as well as sunny days.

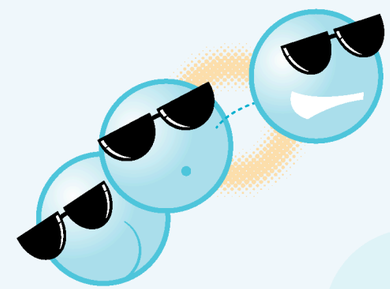

The layer of air called atmosphere
is really quite thin.
If Earth were the size of an apple,
the layer of air would be as thin as its skin.

If I could magnify a piece of Earth I'd see,
the atmosphere touches the water, land, and me.
And it travels way up high spreading far
into space above our blue sky.

The atmosphere is a mixture of gases helping all plants to grow on land or in the sea.
The gases are thickest near the Earth's surface giving animals, and you and me, the oxygen we need to breathe.

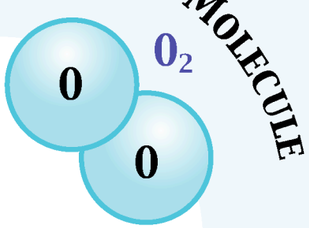
More gases enter the atmosphere over time
from the fuel we use to run our cars
and heat our houses.
Other gases come from a volcano's eruption
or great forest fire,
all giving off unhealthy gases that you
and I don't want, or desire.

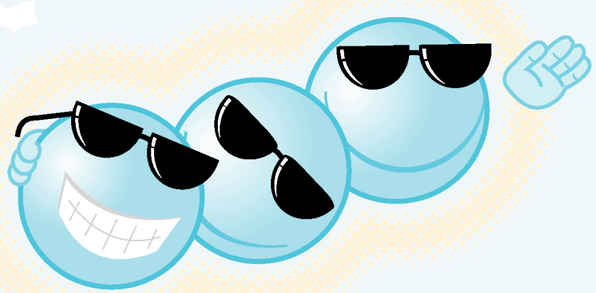


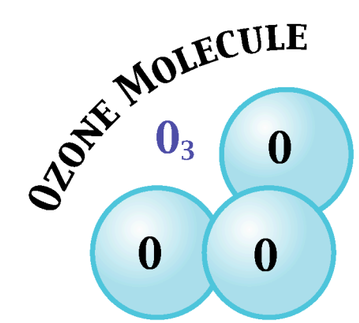


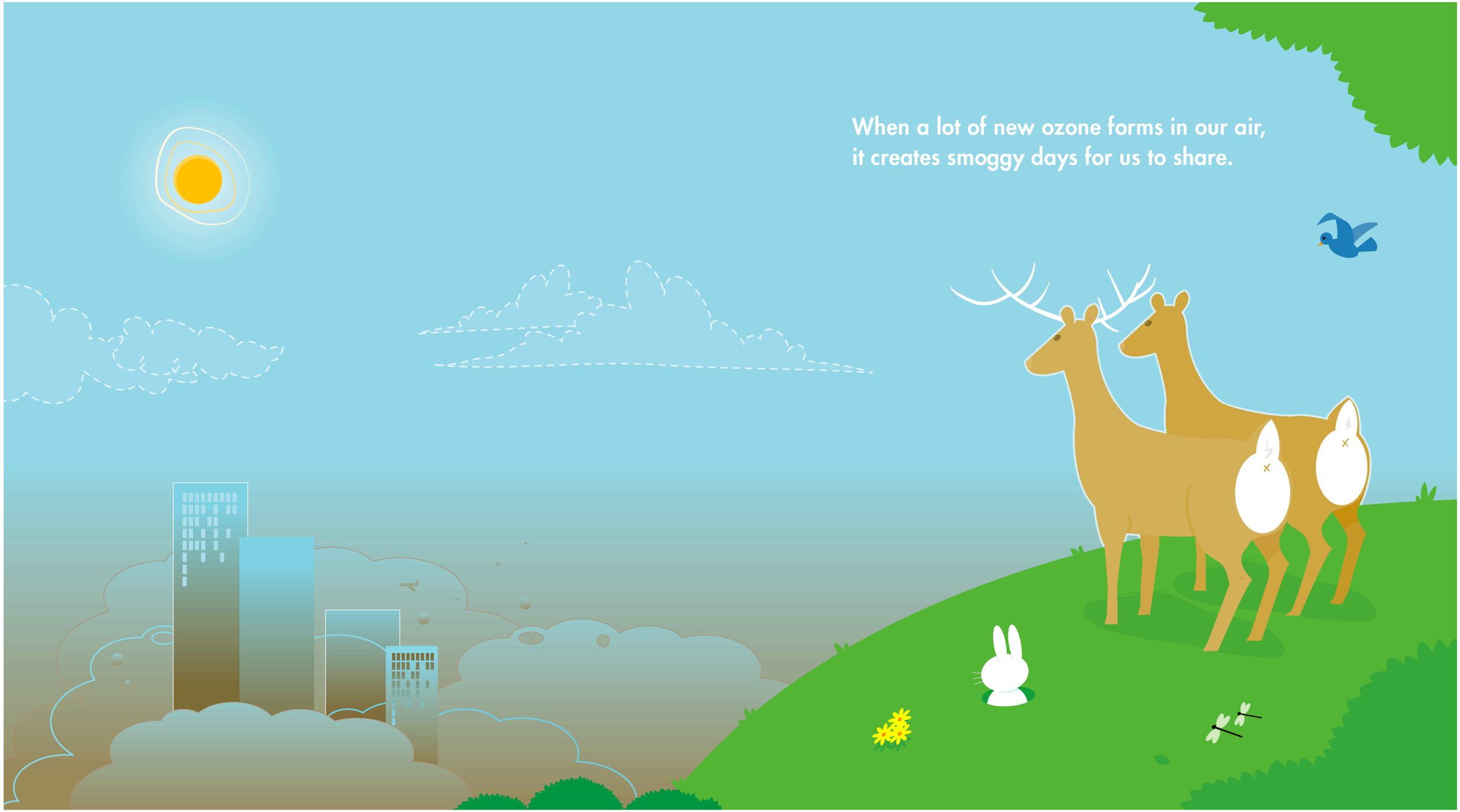
All gases are made of tiny molecules
with small atoms that our eyes can not see,
They move very, very fast
after absorbing the sun's energy.

These molecules get so excited that
they may even split and change.
They may form a new gas called ozone,
because of all the energy they gain.








When a lot of new ozone forms in our air,
it creates smoggy days for us to share.

The more you and I learn about the air,
the more we will understand.
Air gives life to all on land and in the sea,
and that includes, **you and me!**

Making a gas you can't see

Carbon Dioxide (CO_2)

What you need

- 1/4 cup of vinegar *(60 mL)*
- 1 teaspoon baking soda *(5 mL)*
- 1 balloon
- 1 funnel

What to do

1 Pour the vinegar into the bottle

2 Use the paper funnel and fill the balloon with baking soda

3 One person hold the bottle and the second person stretch the neck of the balloon over the bottle

CAUTION: Be sure the balloon is completely attached to the neck of the bottle before you let the baking soda fall into the vinegar, or you will loose your gas and your balloon will not inflate completely.

4 Empty all the baking soda from the balloon into the bottle

Sit back and watch what happens. **You just made a Gas from a liquid (vinegar) and a solid (baking soda)!**

5 Remove your balloon as you hold the neck of it tightly and tie a knot in the neck of the balloon. Label the balloon CO_2.

The author and illustrator wish to thank Dr. Jack Fishman, Atmospheric Division, NASA Langley, for ensuring the scientific soundness of the content of the book, The Air We Breathe. Another group of people who were a valuable resource to the designing of the book were the elementary teachers who voluntarily reviewed and suggested ideas for refining the book to accommodate elementary curriculum integration. The comments from the unknown teachers were extremely helpful. Also, special mention must be made of the valuable input provided by Bridget Fitzimmens, a third grade teacher, who field tested the book and activities with her students.

About the Atmospheric Scientist

Dr. Jack Fishman has a Ph.D. in meteorology and has been a research scientist at the NASA Langley Research Center since 1979 where he was formerly the Head of the Chemistry and Dynamics Branch in the Atmospheric Sciences Division. His research has focused on the composition of the lower atmosphere and he is the Principal Investigator on the Surface Ozone Project.

About the Author

Dr. Irene Ladd has an Ed.D. in program and staff development and more than 30 years experience in early childhood/elementary education. She served on New Hampshire's Science Curriculum Frameworks Committee reviewing the National Science Standards for implementation by local school divisions. She currently serves as the Education Co-Principal Investigator on the Surface Ozone Project where she has been working closely with Dr. Fishman designing curriculum activities that integrate the study of surface ozone with core curriculum.

About the Illustrator

Wade Mickley has a nose and likes to breathe clean air. He also has a pencil and a macintosh computer and enjoys creating pretty pictures with them.