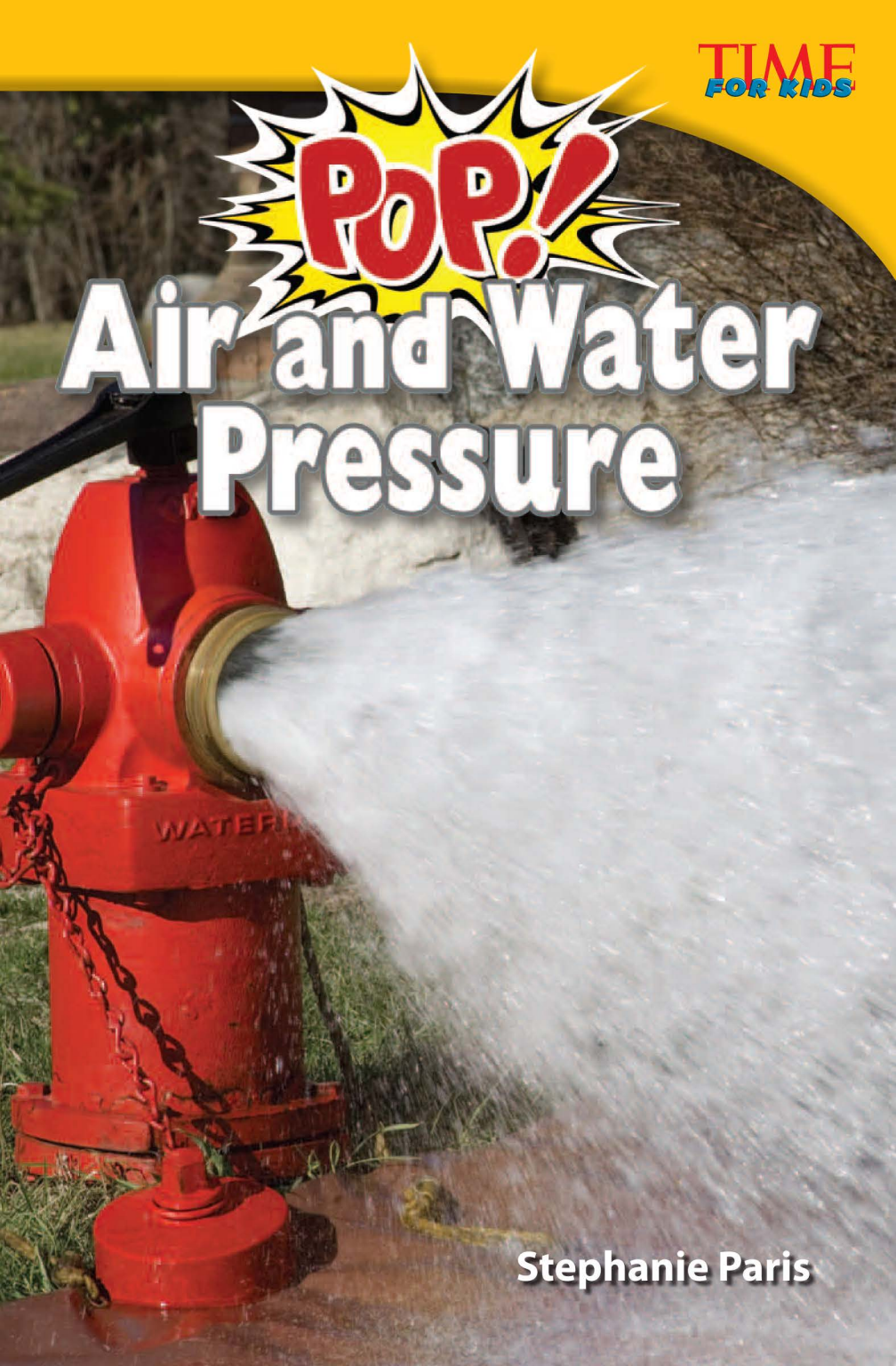
TIME FOR KIDS

POP! Air and Water Pressure



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Table of Contents

The Pressure of the World! 4
Water Pressure 10
Water Pressure in Action 30
Air Pressure 40
Weather 50
The Power of Pressure 56
Glossary 58
Index 60
Bibliography 62
More to Explore 63
About the Author 64

The Pressure of THE WORLD!

Have you ever known someone who had the weight of the world on his or her shoulders? Ancient Greeks believed there was a god named Atlas who actually held up the world by lifting it on his shoulders! But the truth is, we are all under **pressure** every day. In fact, without it, we wouldn't be able to survive!

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Atlas





THINK LINK

- What is pressure?
- Where do we encounter pressure?
- What are some ways we can use pressure to our advantage?

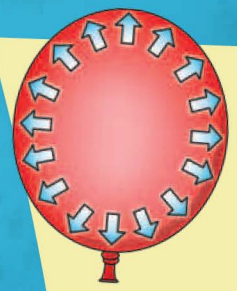
Pressure

Pressure is a force that pushes against something. There is no escaping pressure. No matter where we go or what we do, we are experiencing it. As you sit reading this book, your fingers press into the page and your body presses into the chair. When you write with a pencil, you press down with the graphite. When you erase, you must apply pressure with the eraser. But even if you were floating in a pool of water doing nothing, you would still be under pressure. The water would be pressing in from all sides, and the air would be pressing down from above. Water and air pressure are two essential forces that affect us every day.



When a water balloon pops, the result is dramatic—and wet.

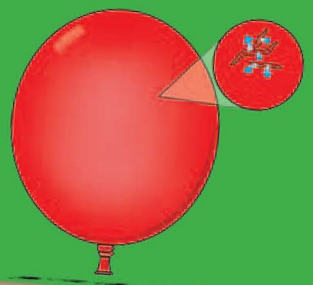
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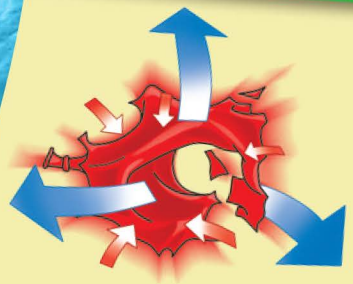


Pop It! Whop It!

Ever wonder why balloons make that loud popping sound? It has to do with the latex they are made from.

The pressure of the gas inside the balloon puts stress on the latex. The stress causes cracks to form in the latex, and the air rushes out. This happens faster than the speed of sound. It causes small sonic booms!





Next, the latex pieces snap back into their original shape. This also happens faster than the speed of sound and causes more sonic booms!

All these little booms occur over such a small amount of time that we hear them as one event: a loud *POP!*



Heavy Hitters

Blaise Pascal and Sir Isaac Newton were gifted mathematicians and scientists. They lived during the seventeenth century. Pascal is best known for studying fluids and creating **barometers**. He also made machines that performed calculations. Newton is best known for creating calculus, an area of math. Calculus is used to study the laws of the universe. With this math, he developed three basic laws of motion that are still studied and used today.

Newtons and Pascals

Because of their work in math and science, the units of measurement used to describe pressure are named after Newton and Pascal.





The **newton** (**N**) is a unit of force. One newton describes the force needed to accelerate one kilogram of **mass** one meter per second squared. Newtons describe weight.

$$N = kg\ \frac{m}{s^2}$$

The **pascal** (**Pa**) is a unit of pressure. One pascal is one newton of force per square meter.

$$Pa = 1\ \frac{n}{m^2}$$

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What Weighs a Newton?

- a medium apple
- a stick of butter
- a quarter-pound hamburger

They all weigh a newton!

A dollar bill lying flat on a surface produces about one pascal of pressure.



