



Dear Jax,

- I hate science.
- I'm never in a laboratory.
- Why do I have to know about it?

Mark Pauly
Dublin, Ireland

Dear Mark,

Nobody says you have to like this stuff. It's just easier to move through life when you understand how the world works. And understanding gives you power.

Science is not just in laboratories. It's everywhere. There's even lots of science in the lowliest thing in your home – the toilet. It's full of science!

You Can take a closer look and see what I mean.

Jax Place
Jax Place

experiment #1

Wad up a piece of paper no bigger than a marble. Drop it into the toilet near the very edge of the bowl. Flush. Watch the path the paper wad takes.

WHAT IS GOING ON:

Your toilet works with a vortex of water. The paper circled the bowl slowly and got faster and faster as it dropped *down*. That's exactly the *opposite* of how a tornado works. It sucks things *up* a vortex, fast at the bottom, powered by slowly circling winds at the top.

experiment #2

Get some help opening the top of the tank. Look inside. All those levers and pipes are the home's first-ever, pioneering *automatic appliance*. Flush the toilet and then lift up the long lever in the tank. Does it shut off?

WHAT IS GOING ON:

The toilet flushes by dumping a tank full of water down through the bowl. It gets ready for the next time automatically. It's a process that's flush with automation.

experiment #3

Drop some food color into the tank. Now leave it alone for a couple hours. Then look into the bowl. Does it have color in it?

WHAT IS GOING ON:

This is a test to see if your toilet's valves are leaking. If the color drips down, then your toilet is wasting hundreds of gallons of water.

just a sink that drains really fast

Your toilet is designed to make sure your bathroom does not explode. Really. We'll get to that in a minute. First, let's look at how it works. When you flush the toilet, lots of water dumps down from the upper tank (A). The water rushes around inside the rim of the bowl (B) and down the front of the bowl (C). That makes a huge vortex – a whirlpool that washes away the waste in the bowl (D). The waste is pushed up and over the trap (E) and then down the sewer pipe (F).

There is always water in the trap (E). The reason it's called a *trap* is that it traps methane gas, which is explosive. Methane gas is made when waste decomposes. The water is a barrier that keeps the methane from coming back up the drain.

Before drains had traps, sewer gas (methane) could leak into a house and blow up. Look at the roof of a house. The black pipes up there are sewer vents safely releasing methane gas into the air.

