

25. The "myth" of the boiling frog

Two frogs are **minding** their own **business** in the **swamp** when WHAM— they're kidnapped.

They come to in a kitchen, **captives** of a menacing chef. He **boils up a pot of water** and **lobs** one of the frogs in. But it's having none of this. The second its **toes** hit the **scalding** water it jumps right out the window. The chef **refills** the pot, but this time he doesn't **turn on the heat**. He **plops** the second frog in, and this frog's okay with that. The chef turns the heat on, very low, and the **temperature** of the water **slowly rises**. So slowly that the frog doesn't **notice**. In fact, it **basks** in the **balmy** water. Only when the surface begins to **bubble** does the frog realize: it's **toast**.

What's funny about this **parable** is that it's not **scientifically true**... for frogs. In reality, a frog will **detect** slowly heating water and **leap to safety**. Humans, on the other hand, are a different story. We're perfectly happy to **sit in the pot** and slowly turn up the heat, all the while **insisting** it isn't our hand **on the dial**, arguing about whether we can trust **thermometers**, and questioning— even if they're right, does it matter?

It does. Since 1850, global **average** temperatures have risen **by 1 degree Celsius**. That may not sound like a lot, but it is. Why? 1 degree is an average. Many places have already gotten much warmer than that. Some places in the **Arctic** have already warmed 4 degrees. If global average temperatures increase 1 more degree, **the coldest nights in the Arctic might get 10 degrees warmer**. The warmest days in Mumbai might **get 5 degrees hotter**.

So how did we get here? Almost everything that makes modern life possible relies on **fossil fuels**: coal, oil, and gas full of **carbon** from **ancient organic matter**. When we burn fossil fuels, we **release carbon dioxide** that **builds up** in our **atmosphere**, where it **remains** for hundreds or even thousands of years, letting heat in, but not out.

The heat comes from **sunlight**, which **passes through** the atmosphere to Earth, where it gets **absorbed** and **warms** everything up. Warm objects **emit infrared radiation**, which

should **pass back** out into space because most **atmospheric** gases don't **absorb** it. But greenhouse gases— **carbon dioxide** and **methane**— do absorb **infrared wavelengths**. So when we add more of those gases to the atmosphere, less heat **makes it back out to space**, and our planet warms up.

If we keep **emitting** greenhouse gases **at our current pace**, scientists **predict** temperatures will rise 4 degrees from their **pre-industrial levels** by 2100. They've **identified** 1.5 degrees of warming— global averages **half a degree warmer** than today's— as a **threshold beyond** which the **negative impacts** of climate change will **become increasingly severe**. To keep from **crossing that threshold**, we need to **get** our greenhouse gas emissions **down to zero as fast as possible**.

Or rather, we have to **get emissions down to** what's called **net zero**, meaning we may still be putting some greenhouse gases into the atmosphere, but we **take out as much as we put in**. This doesn't mean we can just keep **emitting** and **sequestering** all that carbon— we couldn't **keep up with** our emissions **through natural methods**, and technological solutions would be **prohibitively expensive** and **require** huge amounts of **permanent storage**. Instead, while we **switch from** coal, oil, and natural gas **to clean energy and fuels**, which will take time, we can **mitigate** the **damage by removing carbon from the atmosphere**. Jumping out of the **proverbial pot** isn't an **option**, but we can do something the frogs can't: **reach over, and turn down the heat**.