

HOW STUFF WORKS

CUCKOO CLOCKS

For nearly 300 years, skilled craftspeople in Germany's Black Forest have been making these very special clocks. They come in many shapes and sizes, but they all feature a carved cuckoo bird that pops out of the clock face every hour. Here's how these bird-brained clocks work...

1

Cuckoo clocks are usually handmade from wood in the shape of an **OLD-FASHIONED GERMAN HOUSE** with a sloping roof and a little door near the top.

2

On the front is the **CLOCK FACE**, which shows the time with an hour and a minute hand.

3

Behind the clock face is the **CLOCK MECHANISM** which has lots of tiny gears that drive the hour and minute hands on the front.

4

The mechanism is driven by a **PENDULUM**, which is a rod hanging below the clock that swings from side to side. The pendulum is carefully designed so that each swing takes exactly one second.

5

Near the bottom of the pendulum rod is a weight called the **PENDULUM BOB** (traditionally shaped like a maple leaf). This helps to keep the pendulum swinging for a long time.

6

Also hanging below the clock are several chains with **WEIGHTS** shaped like pinecones at the ends. These weights power the clock as gravity slowly pulls them down towards the ground.

10

To keep a cuckoo clock running, the weights need to be pulled back up (by winding the clock) either every day or every eight days, depending on the clock.

9

Some clocks also have a third chain and weight which powers a little **MUSIC MECHANISM** that plays a tune as the cuckoo emerges, just like a tiny music box.

8

Another weighted chain provides the energy for a little wooden **CUCKOO** to pop out of the door above the clock face every hour. As well as powering the movement of the door and the cuckoo, it also operates a pair of tiny bellows that make the distinctive 'cu-ckoo' sound as the doors open.

7

One of the chains drives the pendulum via a special **GEAR** that allows the chain to move a tiny amount every time the pendulum swings past, transferring energy from the weighted chain to the swinging pendulum and keeping it running.



A pendulum is constantly switching between two types of energy – **potential** (stored) energy, when the bob is at its highest point, and **kinetic** (movement) energy, as it swings down. If there was no **friction**, the pendulum would keep on swinging forever, but because friction gradually slows it down, it needs to use the potential energy stored in the weights.



A playground swing works like a pendulum too! The time it takes a pendulum to swing back to its original position is called the **period**. Use a timer to measure how long it takes to do 10 swings (starting and finishing at the same point), then divide the number by 10 to get the average period of this pendulum. Do you think someone heavier than you would get the same results? Why not test your hypothesis by doing the experiment again with an adult on the swing. If you're able to adjust the length of the swing's ropes or chains, you could investigate whether that changes the pendulum's period.

