

## Questions in science

*Why does the Sun shine?*

### **Narrator:**

A little over four and a half billion years ago the Sun and our solar system did not exist. Instead, there was a huge cloud of gas, mainly hydrogen and helium left over from the big bang.

Then something happened - perhaps a shockwave from an exploding star, that caused some of the gas to be squashed a little closer together. That little patch of denser gas allowed gravity to start pulling in more gas from the cloud to form a giant, swirling ball of gas that was collapsing under its own weight.

Perhaps you have noticed that when you pump up a bicycle tyre the pump gets hotter? Something similar happened in the centre of the ball of gas as the weight of gas above compressed it and it started to get hot.

So hot in fact that it became possible to push the positively charged protons close enough together that they fused. A chain of nuclear reactions was triggered, fusing particles together and making particles that had a little bit less mass.

If you know one equation from physics then there is a good chance it is  $E = mc^2$ .  $C$ , the speed of light, is a big number so that small differences in mass are equivalent to a lot of energy.

That energy pushed back against gravity and the Sun settled down into a balanced state, radiating light out into space, as you can see if you look up into the sky. This is the reason that the Sun shines and has been the situation for the last four billion years.

To discover more about the Solar system, explore our introductory science module Questions in Science.

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