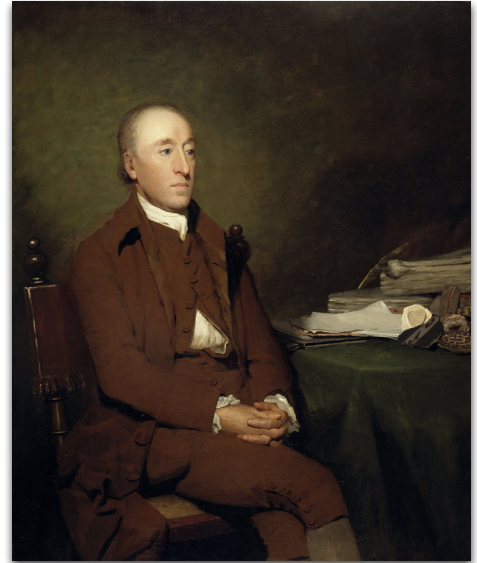


# James Hutton

James Hutton's story begins in 18th Century Edinburgh. At this time, people thought that Planet Earth was just 6000 years old. Archbishop Usher had gone as far as to say that Earth was created on the 23rd of October, 4004 BC.

In 1726 however, James Hutton, who would later go on to challenge this well-established theory, was born in Edinburgh.

Hutton was interested in lots of things – he studied medicine and law, and travelled to France and the Netherlands. But it was when he returned to Scotland to take over a small family farm in Berwickshire that he really started observing the world around him and challenging the well-established theories of how the Earth worked.



During rainstorms, Hutton noticed that the soil on his fields was washed away into rivers.

Hutton was alarmed when he realised that if every year more and more soil was washed away, would it get to a stage where Earth had no soil? We would be left with a completely barren landscape.

But Hutton was convinced that this wasn't the end of the story. It made no sense to him that the Earth would continue wearing away until nothing was left. There must be a way to make new land.

The first clue Hutton found was in the cliffs that surrounded his farm. He noticed patterns and lines – the rock looked like it had layers.



*Layers in the rock on Bressay, Shetland Islands  
Image credit: Anne Burgess via Wikimedia Commons*





Hutton's genius leap was to realise that these layers were made at different times. They were the result of soil and sediment being washed off the land and building up over a long period of time. As years went by, more sediment would be added, pushing the layers below into rock.

This was the solution to Hutton's previous concerns – the soil being washed off his farm didn't disappear for ever. After a great deal of time, it would form new rock and new land. Hutton had convinced himself that the Earth was a system, with rocks being eroded and built up again. But he wasn't finished yet.

He headed out again, this time searching for clues about how long this process of renewal had been going on for. How old must Planet Earth be?



*Siccar Point, Berwickshire*

In the summer of 1788, James Hutton first arrived at Siccar Point, just a few miles from his farm in Berwickshire. What he saw were two very different types of rock. The vertical rock – marine sandstones and slates from the Silurian age. And on top, almost horizontal beds of red sandstone and breccia. Hutton saw a story in these rocks which gave him an unmatched insight into the history of the planet.

The now vertical rock didn't start that way. Instead, it had formed as horizontal layers when soil and sand was washed off the land into an ocean. What Hutton didn't know, but now is common knowledge, is that entire continents move, drifting slowly across the planet. And this helps us understand why this rock is vertical.

Over a vast amount of time, an entire continent crept slowly towards Scotland. As it came closer, the immense forces began to crumple the seabed, pushing the once horizontal rock upwards and creating hills and mountains.

Through the processes Hutton had realised earlier, these hills and mountains were slowly eroded away. And the sediment began building up again, creating new layers of horizontal rock on top of these vertical spikes.

Hutton realised that these processes required incomprehensible amounts of time, far more than the 6000 years previously thought. John Playfair, who had accompanied Hutton on that monumental day, later wrote "The mind seemed to grow giddy by looking so far into the abyss of time".



**Hutton's discovery would eventually lead the world to a new understanding of the history of our home planet.** It revealed a new timeframe – deep time – and his discovery led to the new scientific field of geology. The Earth was a system, immensely old, and, in Hutton's words, it has 'no vestige of a beginning, no prospect of an end'.

## Make your own Siccar Point

You will need:

- Play-Doh, or similar modelling material (two different colours)
- Cheese grater (which you don't mind getting a bit sticky!)
- Blunt knife
- Old newspaper/tablecloth to protect surfaces

**Make sure a grown up helps with the grater and knife.**

Instructions:

1. Choose one colour of Play-Doh and divide it into four pieces. Roll them into balls. These are rocks.
2. The rocks are now subjected to millions of years of erosion by wind, rain and ice. Grate each rock into a small pile.
3. This sediment is now washed away in streams and rivers to the bottom of a sea or ocean where it is compressed into layers of rock. Gently press each pile of gratings into a pancake shape.



4. These layers of rock stack up over millions of years. Place your four rock pancakes in a pile.
5. The continents are now drifting, and the seabed is crumpling and being forced upwards into mountains. Fold your layered pancakes in half and place them upright.
6. Erosion begins again. Use a knife to slice layers off the top of your Play-Doh mountains. You've successfully made the bottom layers of rock at Siccar Point!





7. Repeat steps (1) to (4) with the other colour of Play-Doh. The processes that shape Earth are cyclical – they happen over and over again.
8. Put your new, younger, pile of rock pancakes on top of the eroded mountains. You have successfully made Siccar Point!



9. Share your Play-Doh creations with us using #DynamicEarthOnline
10. Do you think there are any other geological sites or features that could be recreated with Play-Doh?

