THE SOLAR SYSTEM · PART 5 OF 9 · AGES 11–16

How the Solar System Formed

Seven steps from a cold cloud of gas and dust to the Sun, eight planets and the leftovers we still find today.

1

A cloud of gas and dust

About 4.6 billion years ago, a cold cloud of hydrogen, helium and dust began to collapse under its own gravity, possibly squeezed by shock waves from a nearby exploding star.

2

Collapse and spin

As the cloud shrank, it heated up and spun faster, like a skater pulling in their arms. The spinning cloud flattened into a disc called the solar nebula.

3

The Sun switches on

Most of the material fell to the centre. When its core became hot and dense enough, hydrogen began to fuse into helium and the Sun started to shine.

4

Dust sticks together

In the disc, grains of dust collided and stuck, growing into pebbles, boulders and planetesimals kilometres wide. This building-up is called accretion.

5

Rock inside, ice outside the frost line

Near the hot Sun only rock and metal stayed solid, building small rocky planets. Beyond the frost line ice froze too, so cores grew big enough to pull in gas: the giants.

6

The gas is cleared away

After a few million years, radiation from the young Sun and nearby stars blew the remaining gas out of the disc. Solid bodies kept colliding and merging into planets.

7

Leftovers remain

Pieces that never became planets survive as asteroids, comets and Kuiper Belt objects. Many are almost unchanged, so they show what the early Solar System was like.

We can watch it happen elsewhere

Telescopes see discs of gas and dust around very young stars. In the youngest star clusters, 80% or more of the stars have them, and the discs fade within a few million years, just as ours did.

NEXT IN THE SERIES

6. Exploring the Solar System: A Timeline

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