Q: How did the universe begin?

A: Most of us know that our solar system is comprised of eight planets revolving around the sun, but how did it come to be that way?

The answer to this question has been sought after for centuries and only in the past 100 years has a widely accepted theory been constructed.

Any theory must be able to explain a number of observed phenomena, namely that all of the planets revolve around the sun in an almost perfect plane, all of the planets (with the exception of Venus and Uranus) rotate in the same direction about their axes, and planets closer to the sun tend to have a rocky composition, while the further planets are gaseous in nature.

There is overwhelming evidence to suggest an evolutionary beginning to our solar system and the commonly accepted theory for its origin is the solar nebula hypothesis. This hypothesis supposes that the solar system was formed approximately 4.6 billion years ago from the collapse of a giant low-density cloud of gas and dust called a nebula.

The cloud was initially many light years across, however gravity, the same force that keeps your chair stuck to the floor, caused a small dense region in the cloud to attract surrounding gas, initiating a contraction of the gas cloud much like the formation of a snowball. The rotation speed of the collapsing cloud gradually increased and as the cloud collapsed into a thin, rotating disk and particles got closer and closer together, they began knocking into each other and converting some of their energy into heat.

Eventually the temperature in the centre of the disk became so high that nuclear reactions began and the sun was born.

The huge temperature difference between the centre of the rotating disk and the outskirts determined what particles were available for planet formation in each region. The first particles were microscopic in size and revolved around the sun very close to each other. Very gentle collisions with their surroundings resulted in the particles sticking together. This caused their mass to increase and in turn attracted even more particles. This process is known as accretion. In the warmer inner solar system, planets formed into small, dense terrestrial worlds, while in the cooler outer solar system the huge gaseous jovian planets were formed.

Max Malacari is a Master of Philosophy student at the School of Chemistry and Physics, University of Adelaide. To find out more about the 10 Big Questions, go to http://sa.edu.au/sciences/10bigquestions

**Profile on state’s best schools**

**Sherdyn Holderhead**

Hundreds of outstanding teachers, leaders and school support staff have been recognised with a nomination in this year’s The Advertiser-State Government SA Public Teaching Awards.

And the number of nominations has almost doubled last year’s effort – up to 1700 from 900 last year.

The nominees came from more than 350 schools across the state. Education Department chief executive Keith Bartley said it was thrilling to see nominations for this year’s SA Public Teaching Awards top last year’s tally.

“All of our nominees are truly passionate about teaching and making a positive contribution to the lives and educational journey of our children and young people,” he said. These nominees represent some of the great educators we have in South Australia, and deserve to be recognised for their highly professional work they do at the schools and preschools they work in, as well as the wider community.”

Education Minister Grace Portolesi said these awards provide a great opportunity to support the dedicated educators who make a lasting difference to children and young people, and the preschools and schools they work in.

The SA Public Teaching Awards honour the tremendous efforts of our most passionate educators - those people who have inspired, encouraged and influenced the students they teach and the schools and preschools where they work,” Ms Portolesi said.

“The quality of their work and their commitment to improving the learning experiences of the children and students they work with is something that should never be underestimated. We want to thank and congratulate these passionate educators for their enormous contribution they make to public education, and ultimately, the development of our young people.”

A selection panel will choose regional winners from each of the seven categories to be announced in August, who will then contest for the state awards.

SA Public Teaching Award winners will each receive up to $20,000 to support their professional development, which will in turn, raise the quality of teaching and learning in SA’s public schools and preschools.

**Universities need good teachers**

Academics need to be prepared for teaching if universities are to maintain high standards, according to a new book.

During the expansion of the higher education sector, according to the book to be launched by the Australian Council for Educational Research, the expansion and diversification of the student population added to the teaching workload.

“University students need well-qualified teachers who challenge them to think and understand differently,” said one of the co-editors, University of Western Australia professor Lynne Hunt.

“Universities have a responsibility to facilitate students learning in diverse cultural, political and economic environments,” she said.