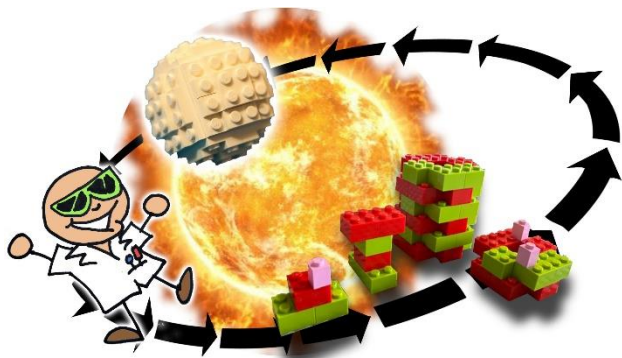




G.A.T.E.WAYS

with a love of science and adventure to,

‘THE ULTIMATE LEGO® TOUR OF THE UNIVERSE’

G.A.T.E.WAYS is an independent organisation offering challenging and enriching activities and experiences to develop and extend highly able children. Established in 1994, G.A.T.E.WAYS runs a range of stimulating school-time programs as well as the Saturday Brainwaves Club.

Welcome to the Ultimate Lego Tour of the Universe! A unique tour designed for all challenge-seeking science enthusiasts who are prepared and willing to take a journey into the mysterious world of particle physics. After meeting your fellow travellers, the tour will begin at the Big Bang and the creation of the heavy elements. From there we'll move on to radioactivity before a whistle stop tour of nuclear fusion and fission. Sound exciting? Well pack your bags, or at least your curiosity and creativity, and join your tour guide as we Lego® around some of the most interesting and hidden secrets of our universe.

Your Travel Itinerary

Day 1: The Big Bang Goes Off!

First up on your travel itinerary is a trip back in time – approximately 14 billion years back! Here you will unpack your Lego® to explore the Big Bang and discover how the basic building blocks of matter were created. You will admire the formation of the first atoms and discover how the heavy elements were born from the heart of stars.

Some of the experiences included today:

- *Meet the fundamental particles of the early universe.*
- *Watch in wonder as fundamental particles called quarks, unite to form protons and neutrons*
- *Feel the force - the electromagnetic force attracting positively charged protons to negatively charged electrons*

Day 2: Exploring an Element of Change

Welcome back adventurers for the second day of our tour which will have you enjoying planet Earth with all its natural beauty. We will admire the diverse lifeforms on this unique planet. Using our Lego® we will learn about the basic elements of life as we consider what the Earth and all living things are made of, where this material comes from and how it reached our tiny little bit of space. To complete our action-packed day, we will journey into the heart of the atom, focusing on the particles that make up the atomic nucleus.

Some of the experiences included today:

- *A death-defying trip to a huge stellar explosion to discover that we are all literally made of stardust*
- *A fascinating stop at the Periodic Table to discover its significance as well as its brilliance.*

Day 3: Discovering Radiation

Are you ready for Day Three, another action-packed day? We will spend the morning being immersed in history and tuning into the expertise of our tour guide as we delve deeper into atomic structure as we use our Lego®. On our

next stop we will get up close and personal with the different types of radiation when we visit some famous unstable nuclei. We'll spend some time with alpha, beta and gamma decay, discovering the impact of these forms of radiation.

Some of the experiences included today:

- *A visit to alpha and beta particles with a chance to investigate half-life and chain reactions.*
- *An encounter with nuclear decay*

Day 4: Fun with Fusion and Fission.

Pack your sunglasses for the last leg of our tour as we travel to the intensely hot core of our beautiful star, the Sun. You will enjoy an unforgettable visual display and marvel at the beautiful light the Sun produces. This light takes 5,000 years to reach the surface from the core and then a further 8 minutes to get to us here on Earth! It's here, at the centre of the sun where it is hot - 20 million Kelvin hot - that we will encounter fusion. Using our Lego® we will discover that fusion is a nuclear reaction in which two or more nuclei of atoms collide at very high speeds to form the nucleus of another element.

It's on this high note that our tour will come to an end. There's sure to be some sadness as you part but don't worry – the memories are sure to bring you smiles for many years to come.

Some of the experiences included today:

- *Witness the production of huge amounts of energy as Helium is produced from fusion.*
- *Witness fission taking place as heavy nuclei split into lighter elements.*

Homework Requirements and Assessment

Homework may be set after some sessions.

Assessment will be based on student's participation in each session. At the end of the program, a short, written report will be sent to parents.

What to bring

Please bring a labelled, small photograph of yourself, a snack (no nuts please), a stamped, self-addressed DL envelope for your report and a well-stocked pencil case, (pencils, eraser, ruler, scissors and a glue stick). If attending the program in Terms 1 or 4, please bring a hat.

Meet Your Tour Guide:

Jacob Pini is a learning and travel enthusiast who has a Bachelor of Aviation and a Master of Teaching from the University of Melbourne. He has a strong passion for mathematics and digital technologies and believes firmly in firing imagination and interest in STEM education with hands-on learning. Jacob considers himself an amateur yogi, and is an avid cyclist, a keen gamer and a lover of new experiences! He is looking forward to sharing his experience and creating exciting new learning opportunities with his fellow adventurers.