



A G.A.T.E.WAYS JOURNEY

for curious gifted Year 3 and 4
children with a love of science

'All Aboard the Magic Shrinking Train!!'

G.A.T.E.WAYS is an independent organization offering challenging and enriching activities and experiences to develop and extend highly able children. This *JOURNEY* for both girls and boys will run over four sessions.

Step right up! Step right up! Board the magic shrinking train for the journey of a lifetime. You will be transported into microscopic worlds so amazing that you won't be able to believe your eyes. Each week of the journey you will stop at a different station and, in your miniature form, take a guided tour inside a different infinitesimal space.

Come look inside a microscopic world. Through viewing, discussing, modelling, drawing, hands-on activities and demonstrations, you will increase your knowledge and understanding of matter too small to be seen with the naked eye. You will increase your vocabulary and extend your skills in scientific research, higher order thinking and experimentation.

Session 1 Atomic Apartments

First stop – the atom, the basic building block of all matter, so tiny that a single atom is about a hundred thousand times thinner than a human hair! Slip inside the nucleus and meet protons and neutrons but watch out for the electrons whizzing past! Mesmerised by attractive forces, you will learn how these subatomic particles are responsible for the unique structure of molecules, the chemical properties of different elements and the reactions that take place between them. One last thing before you leave, take a peek inside the protons and neutrons! Can you see even tinier particles? What do you think of their strange names, quarks and leptons. *This stop is all about particle physics.*

Session 2 Cell Chambers

Second stop – the cell, the building block of all forms of life on earth. Did you know that the adult human body has between 60 and 90 trillion cells? We'll go inside the animal cell but first we need to wait for permission to pass through the plasma membrane. Peep inside and see that the cell is like a factory with many rooms in which different jobs are being done. Come into the nucleus, the control centre of the cell. Meet the DNA and the nucleolus, where ribosomes are being made. Take a peek into other organelles and be introduced to the ER, the Golgi complex and the mitochondria. Next, scale the wall to enter the plant cell. Watch out! The vacuole may appear to be empty space but there is a lot of water inside. You will meet the chloroplast and learn about its very important job of converting sunlight into chemical energy. Phew! The cell is such a busy place! *This stop is all about cell biology.*

Session 3 Bubble Abode

Third Stop – a bubble, a tiny sphere filled with gases essential for life. Tread carefully as you penetrate the filmy layers of soap and water for here the molecules are far apart and the atmosphere is thin. Feel the air pressure increase as you step inside. Look up! Can you identify the molecules flying past? Which ones are nitrogen, oxygen, hydrogen and carbon dioxide! Don't be afraid to ask them: What are you? Where do you come from? What are you doing here? You will see wisps of smoke and tiny dust motes floating in the sunlight! Do you feel damp? There must be water vapour in the air. Now it's time to leave aerology, the study of the atmosphere, and make your way back to the station. Try not to break the surface tension and pop the bubble on your way out.

Session 4 Drop Inn

Fourth Stop – a drop of pond water, teeming with life. Within every drop of pond water lurks an invisible world, alive with an amazing variety of microscopic animals. Put on your wet suit and your scuba gear as you gingerly enter their watery world. Follow the path of a blob-like amoeba as it engulfs and swallows up its prey. See the paramecium spiral through the water as it swims away from its mortal enemy, the pincushion-shaped suctorian. Meet the euglena, with both plant and animal features; the rotifer, a creature that uses two wheels of whirling hairlike projections to move

along and the hydra, a fearsome bully that constantly threatens other small animals with its crown of grasping tentacles. Learn how these strange animals feed and defend themselves. Enter their microscopic domain and see for yourself! This microbiology stop marks the end of our journey. We hope that you have enjoyed your train ride into the realms of diminutive spaces.

Homework Requirements & Assessment

Homework may be set after each session to give students extra time to explore the new concepts. At the end of the program a short, written report will be completed on each student and forwarded home to parents. A copy should be made and forwarded to the school.

What to bring: Please bring a labelled, small photograph of yourself; a snack (no nuts please), and a stamped, self-addressed DL envelope for your report. (write your name on the back.)

About the Presenter

Maureen Frith has a Bachelor of Arts Degree, a Diploma of Teaching and a Graduate Certificate in Gifted and Talented Education. She has taught for many years in both Primary and Secondary schools and has performed the role of Coordinator in Science and Technology, presenting enrichment and extension programs for students and professional development for teachers. She has helped to develop curricula, including VELS Science and Thinking Skills documents. She is an active member of the Science Teachers Association and the Science Talent Search Committee. For many years she has been a club leader for the G.A.T.E.WAYS Brainwaves Club. She encourages students to be active enquirers, develop higher order thinking skills and to share their knowledge and appreciation of the amazing universe in which we live.

This journey was first run in Term 1 of 2019. Below is some parent feedback.

- *Jamie's love of science was multiplied with this program!*
- *My son really enjoyed the program, especially the experiments performed.*
- *The things my child loved best were the experiments, the visual information presented and the passion which the teacher had for the subject matter.*