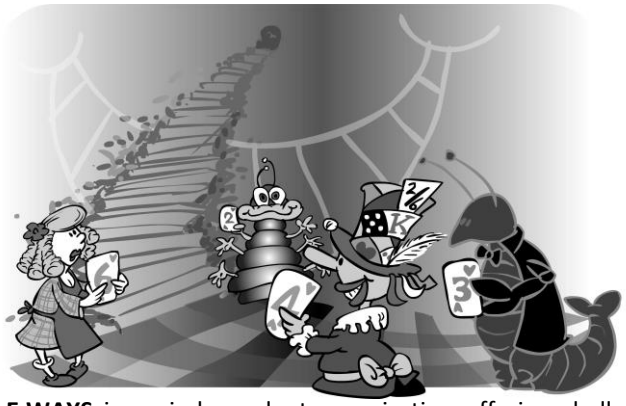

A G.A.T.E.WAYS JOURNEYS PROGRAM

for gifted & talented Year 5 and 6 children

with a love of maths to

'Alice's Adventures in Mathsland'

G.A.T.E.WAYS is an independent organisation 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 half days. Charles Dodgson, who wrote under the pen name of Lewis Carroll, was not only an author, but a mathematician. His well- known story, 'Alice in Wonderland', about the strange adventures of a girl who falls down a rabbit hole, is interwoven with many mathematical concepts including logic, limits, abstract algebra, inverses and number systems with bases other than ten. Throughout this challenging Journey, we accompany Alice as she explores new ideas and ways of thinking, including these exciting areas of mathematics.

Session One: Down the Rabbit Hole, The Pool of Tears, The Caucus Race and a Long Tale.

Alice's adventures begin when she falls down the rabbit hole whilst following the White Rabbit. She shrinks in size, grows too tall, and shrinks again – how small can she shrink before she disappears? Whilst swimming in a flood of her own tears Alice tries to do some multiplication to keep her mind focused. What type of mathematics gives 4x5=12, 4x6=13 and 4x7=14? How can this be? In today's session we investigate limits, finite and infinite sums and addition and multiplication in different number systems.

Session Two: The Rabbit Sends a Little Bill, Advice from a Caterpillar, Pig and Pepper.

Alice's adventures continue as she meets the Cheshire Cat who promptly disappears, leaving only his grin behind. Then, when she runs away with a baby who turns into a pig, she gets mistaken for a serpent. "*If girls eat eggs and serpents eat eggs, surely this means girls are some type of serpent.*" Here, Alice explores some very new realities. "*Would you tell me which way I ought to go from here?" "That depends a good deal on where you want to get to." "I don't much care where." "Then it doesn't matter which way you go*." In today's session we explore the concept of logic (including inductive and deductive reasoning) as well as numbers, proportion and geometry.

Session Three: A Mad Tea-Party, The Queen's Croquet Ground, The Mock Turtle's Story.

At the Mad Hatter's tea-party Alice is regaled with riddles and stories and is challenged to explore the concept of time. Then at the Queen of Hearts' croquet match the concept of reality is raised. "*It's very easy to take more than nothing*." We know 12+5 = 5+12, but is '*I breathe when I sleep*' the same as '*I sleep when I breathe'*? What kind of arithmetic produces 9+4=1 and 6+8=2? "*And then the different branches of Arithmetic – Ambition, Distraction, Uglification, and Derision*." Does this sound confusing? In this session we look at inverse relationships, abstract algebra and the dimensions of space and time.

Session Four: Lobster Quadrille, Who Stole the Tarts? Alice's Evidence.

Alice watches a dance called a quadrille, and is called as a witness in the Knave of Hearts' trial. "*The jury eagerly wrote down all three dates and then added them up, and reduced the answer to shillings and pence*." When does a number become just a number, and not a number of things? "*That proves his guilt*." How do we prove things in mathematics? In this session we explore proofs, sets of numbers and irrational numbers. Finally we overview all the maths we have investigated through the vehicle of this wonderful children's classic

Homework Requirements & Assessment

Homework will 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.

ABOUT THE PRESENTER

Anne Eastaugh is passionate about teaching students the magic and wonders of mathematics. She is currently teaching first and second year maths at Monash University. She has a Bachelor of Science and recently completed her Honours in Mathematics. She has taught G.A.T.E.WAYS programs for many years, focussing on maths and physics. She believes that creativity and imagination are essential tools for learning any subject, especially science and maths. Anne has recently finished writing a book of mathematical adventures for primary aged children, to be published this year.

Requirements: A calculator, a fully stocked pencil case and an exercise book to write in; a morning tea snack (no nuts please), a hat, and most importantly, imagination. Bring a small, labelled photograph of yourself and a stamped, self-addressed DL envelope to the first session (for your report).