

# GATEWAYS JOURNEYS

G.A.T.E.WAYS invites high-ability Year 5 & 6 students with a love of science and problem solving to ...

## Who Let the Monsters Out?



The security system in Dr Jekyll's laboratory has malfunctioned; the safety doors have mysteriously opened, and now Frankenstein, Dracula, and a mob of zombies are on the loose. Sorry, tricked you! These monsters are just figments of some writers' literary imagination. But what chance is there that they could *actually* exist in the real world, as opposed to in the pages of a book? Our team of intrepid scientists (including you!) will find out. Could Frankenstein really endure so many organ transplants and blood transfusions? Did Dracula suffer from a rare genetic disease, and how much blood would he need to drink to survive? If we had an epidemic of zombies how quickly could they take over the world? We will use cutting edge forensic science as we search for the answers. Come along for a scientific challenge as we try to pin down these monsters... fictitious, or otherwise!

### Requirements:

- Writing paper (an exercise book would be ideal); well stocked pencil case which includes coloured pencils or textas, scissors and a glue stick.
- In **Sessions 2 and 3** you will require an old t-shirt/art smock (ie. lab coat). Come along with a snack each week (no nuts please). Small homework tasks may be set between sessions.

### Session 1: The Science That Made Frankenstein

In the original story Victor Frankenstein builds and brings to life a hideously ugly, but sensitive creature in his laboratory using chemistry and alchemy. The monster attempts to fit into human society, but is shunned, which leads him to seek revenge against his creator. We start our journey by learning about the "spark of life" that helped bring Frankenstein to life. Was it purely electricity as Victor Frankenstein believed, or could DNA have provided the spark? Our intrepid team of forensic scientists gets onto the case by purifying DNA, and learning that there is over 100 trillion metres of DNA in a single human being! In our quest to revive Frankenstein we will need a lot of blood, so we will learn about the science behind blood transfusions and discover which blood type we will need to create in order to revive him. Roll up your sleeves, this could get messy!

### Session 2: Staying alive.. surviving the onslaught of rejection and infection

In our second session we continue our quest to see if Frankenstein could live as a re-animated construction of different body parts and organs from different people and/or species! We will investigate how far organ transplantation has come since the book was written by Mary Shelley two hundred years ago - from skin grafts and hand transplants, to the future of transplant science. Is cryopreservation and revival of humans possible at this stage or in the near future, and if so, is it ethical? Given that Frankenstein will need to be on a high dose of anti-rejection drugs to suppress his immune system in order to survive, we will also learn about different virus strains, and design a virus structure that could infect him.

### Session 3: Vampires – simply misunderstood!

Vampires in the literary world have been regarded as horrible monsters for hundreds of years because of their weird appearance (very light skin, red eyes and sensitivity to light) and their terrible habits (urgh..they love to drink blood!!) But perhaps they suffered from a rare genetic disease (*albinism – spoiler alert!*). Our scientific team will learn about the genetics of inheritance, and do some DNA sequencing to solve the puzzle about why vampires are really afraid of the light. We will also design and perform experiments to elucidate how quickly blood could be drawn out by vampire fangs, and exactly how much blood Dracula would need to survive. How many people a day would Dracula need to feed from, and is human blood the new “superfood”?

### Session 4: It’s a Zombie pandemic

In our final session, we investigate the zombie, a fictional mindless, unthinking monster created through the reanimation of a human corpse. Along the way we’ll learn how eating infected flesh could lead to a brain disease resulting in zombie-like symptoms! We’ll find out about the importance of different parts of the brain, and how brain damage in certain parts could result in zombie traits. We will perform some mathematical modelling to determine how quickly a zombie pandemic could occur if the disease was spread, depending on the level of infectiousness. Our scientists will also test the pH of ‘zombie’ blood to see if we could find a cure for this disease! Our journey will culminate in a debate to decide who would take over the world, given a chance – Frankenstein, vampires or zombies?

### About the presenter:

Joanne Davis developed a fascination for science at a young age, getting her first microscope at 6 years old! As a research scientist with a PhD in Immunology and over 15 years’ experience in the lab, Joanne is devoted to looking for a cure for cancer, and teaching. Joanne has participated in the Scientist in Schools program (CSIRO), and run the Eureka “curious science” program for G.A.T.E.WAYS. She has a passion for experimenting daily, whether it’s in the lab, or in the backyard creating potions!

