

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



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 will run over four sessions

We have a lot to thank science for, but what is the price of progress? Welcome to *Project Earth 2.0*, a Research Advisory Group set-up to advise organisations on how to conduct ethical research for a sustainable future. As our newest team member, you'll need to hop to it and provide scientists with guidance about ways they can **replace, reduce, or refine** their use of animal subjects – if it creeps, slides, crawls, or glides, we can advise you on it! You will also consider how the science we do today can leave the world in a better place tomorrow, by reducing emissions, lowering water consumption, and maximising animal welfare. On our Journey we will conduct hands-on experiments that prove scientists don't always need feathers, fur or fins to collect data. Can you decide what wouldn't hurt a fly... or the planet?

Parents and caregivers, please note that food products will be used during experiments conducted in this Journey.

Session One. Ruffling Feathers in Arctic Waters

Here's a conundrum to break the ice. A polar research agency has requested special permission to conduct a series of experiments on Arctic animals that test their ability to withstand extreme cold. Included on their wish list are two beluga whales and a walrus, but that's just the tip of the iceberg... they also want a waddle of penguins! Can you recommend an experiment that allows them to collect the data they need without ruffling feathers? Today, we will recreate the cold Arctic conditions, test the insulation ability of lab-made blubber, and compare the water resistance of penguins' feathers. The scientists are keen to proceed before their study freezes in its tracks. Are you up for the challenge?

Session Two. Something Making you Blush?

The quarterly sales report for make-up brand, *Simply Made Up*, is in and it's bad... really bad, which is why they've sent their cosmetic chemists to seek your advice. For years they have tested their products on animals, but their sales have dived - it seems no one wants blush trialled on bunnies. Can you guide them on how to test their newest line of beauty creams and ensure they are safe for human use without the need for animal testing? Today we will design and complete an experiment to do this, and ask ourselves, '*if it's not okay to test cosmetics on animals, when is it okay to test at all?*' These science dilemmas are anything but skin deep!

Session Three. No Time for Monkeying Around

Quit monkeying around! Researchers from a University Hospital must conduct trials to test the quality and safety of a new treatment for an unknown illness that makes people's skin crawl... literally! Before testing on humans, however, they've asked to trial their new medicine on macaques or mice. Can you help them decide which animal is suitable for their study by modelling how different species respond to pathogens? Is it possible to ensure their experiment can proceed safely for all creatures great and small, or will someone or something lose out? There is no time for monkey business – a cure must be found before the mysterious illness spreads even further through the population.

Session Four. Pepperoni in my Petri Dish

Food scientists from a new start-up, *Farm of the Future*, have presented a problem on your plate. They need to collect living muscle cells from cows to produce lab-grown meat. Imagine the possible repercussions: a massive decrease in water use and the release of carbon! But what about farmers' livelihoods? The scientists have also asked for your expertise to house not one, not two, but a few hundred thousand invertebrates to turn into all manner of experimental foods - from cricket kebabs to munchable mealworms! Are all animal lives of equal value? You have their comprehensive plan for ensuring animal welfare and must decide if their farming enterprise will pass muster, or if it's just a cash cow in disguise. Along the way, we will explore how to create our own meat-free burger patties that would cause any carnivore to start salivating!

**Note in this session students will be offered some tasty commercially-made edible bugs to take home and try with their parent or caregiver's permission.*

Assessment and Reporting

Assessment will be based on an evaluation of each student's participation in the lesson activities. A self-assessment will also be completed. At the end of the program, a short written report will be completed on each student and forwarded to parents.

What to bring

Please bring a well-stocked pencil case which includes coloured pencils or textas, scissors and a glue stick. Please wear easily-washed clothes, or bring an old t-shirt/art smock (i.e. lab coat) as some experiments may get messy. Come along with a drink bottle and snack each week (no nuts please). Small homework tasks may be set between sessions.

About the presenter:

Jesse Chambers is a STEM educator with a double degree in science and education with honours from Monash University and a Master of Science Communication Outreach from the Australian National University. During his studies, he presented for the National Science and Technology Centre and has worked in unique education settings, delivering wildlife education programs, as well as many G.A.T.E.WAYS workshops for high-ability students.