



A G.A.T.E.WAYS JOURNEY

for gifted Year 3 and 4 students

with a love of science and technology

'Cool and Creepy Critters!'

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. Do you know some scientists believe that you are never more than a metre away from a spider? Could that be true? What about when we go swimming? Or what about when we are in a big asphalt car park? True or false, the world is teeming with little creatures. Mostly, we go about our business without much direct contact with them. If you are a little curious about insects and spiders, this program will help you safely look for them, understand them and even appreciate them. Many people are horrified by spiders and other 'creepy crawlies'. We have all seen people go crazy when one turns up unexpectedly. However, they can be admired too. Most invertebrates have had a few hundred million years to get their anatomy right. Some of the insect and spider adaptations are exquisite. In this Journey we look at the science behind how some insects walk on water, jump, walk upside down, make music, create honey and even glow in the dark.

Requirements

Each session bring a blank exercise book and a writing pencil, and a snack (no nuts please). In Week:bring a stamped, self-addressed DL envelope for your report and a small, labelled photograph of yourself.

If you wish ,bring along on any week any insect or spider you have collected and can safely carry in your bag, preferably in a container with some moisture available in a sponge and some air holes.

Session one *In the beginning there were insects.*

We have lots of names for invertebrates. Scientists call animals with hard exoskeletons arthropods. We are just as likely to group them all together and call them the creepy crawlies or bugs but that is only partially correct. Bugs are actually only a small part of the largest group of animals found on earth, the insects. Spiders are not insects; they have two extra legs and only two main body parts. It helps to look closely at what is bugging you because it may not be a bug at all. This week we'll do some basic classification. We'll assemble a large insect model and identify the various parts of the body. Perhaps insects are named for the fact that their body is in-sections. Which came first, insects or spiders? How do scientists know? Which one can we do without, which is more important to humankind? What it is that makes these animals so interesting? Should we say that insects and spiders are really animals? Do we have to protect them and what would likely happen if they all disappeared?

Week two *The moment you walk into a spider web, you become a karate master.*

This session we'll take a long look at spiders. They are found every except Antarctica. Spiders appear in the fossil record a little while after insects first appeared and have been in constant competition for over 350 million years. Spiders have some impressive physical skills including the ability to make six different kinds of silk. Spiders' web making is bordering on the artistic, although some spiders use nets to throw and capture their prey. Many spiders can produce poison but not all are lethal to humans. We'll take a close look at spider fangs and how they work. We look at a range of spiders including the peacock spider, wolf spider, the red back, the white tail and the Sydney funnel web. We'll look at the biggest and smallest, which is smaller than the full stop at the end of this sentence. We'll assemble a large model of a spider and finally we'll try our hand at making a spider 'balloon' designed for travelling interstate

Week three *Beautiful butterflies and buzzing bees*

'If the bee disappeared off the surface of the earth, then man would only have four years of life left'. Albert Einstein

Do you know about the butterfly effect? This is the idea that small causes may have large effects.

This week we look at two of the most interesting insects; butterflies and bees. One stands for hard work, energy, cooperation, loyalty and teamwork. The other is a symbol of change, growth, transformation and vulnerability. It is interesting to look at the way these symbols are used to send a message. This week we'll compare the life cycle of these two insects, from egg to grub to adult. We'll use a microscope to view some of their body parts, their mouth parts and their scales. We'll also examine the bee sting and discover why it is such an effective weapon. To help us remember the amazing communication dance of bees, we make a small cardboard model that points the way to the nearest nectar source. Is there a difference between butterflies and moths? Finally we'll take a moment to appreciate the beauty of butterflies and fold up some colourful origami models.

Week four *Insect performers and other amazing insect feats!*

In this session we'll try some experiments to better appreciate the special talents of some insects. The water strider can stand and walk across water, how does it do this? They use water tension and a special adaption to their body. We'll use water tension to float some metal objects. As is well known, if a human could jump like a flea, we could jump into the MCG. We'll make a mechanical flea that stores energy in a rubber band and when released jumps. We'll listen to some beautiful insect songs, from crickets, katydids and the loudest insect in the world, the cicada. How do they do it? We'll create an instrument that makes similar sounds using similar tools to insects. Finally we'll do some research on beetles, the largest order of insects, Charles Darwin's favourite. We find out why one day Darwin put a beetle in his mouth and why beetles are so important to reducing the number of flies that bother us. We complete our study of beetles by making a simple kinetic cardboard facsimile to take home and impress our family.

Homework

Some homework may be set between sessions.

About the Presenter

Tim Byrne has been very interested in insects and spiders all his life mainly because they seem to be attracted to him, especially when he is outside or camping. The first exhibition he worked on at Museum Victoria was called *Skydancers* and was all about butterflies and moths. He has kept bees as well as crickets, mealworms, silkworms and spiders but never fleas. He is aware that could change because fleas have a way of jumping; when fleas jump they accelerate 50 times faster than the space shuttle.

