SASTA OLIPHANT SCIENCE AWARDS

Prize Winner

Science Writing

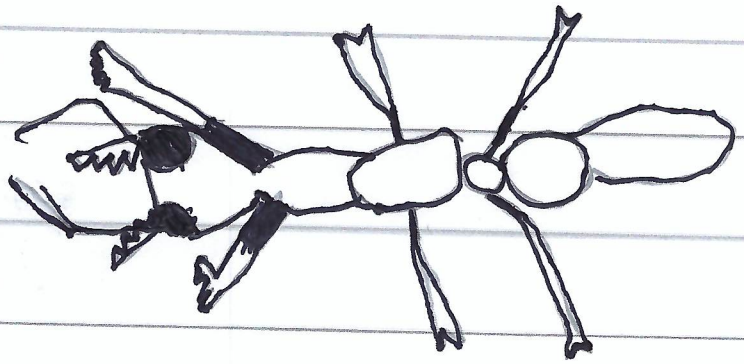
Year 3-4

Eddy Potts

Coromandel Valley Primary School

DIARY of a wimpy ant

dawn of The Pheromone



Ants are so cool!

They have been around for 150 million years. They work together in colonies, they can lift 50 times their own weight and even farm fungi in their nests.

I see them every day but never hear them. So, it got me thinking - how do they communicate? They seem to always be working together but never seem to talk. How do they find food, work together and defend their colonies without shouting out to each other?

Well, you're about to find out! Let me introduce my friend "Jerry". He's a bit of an expert on the subject.

Hi everybody! I'm Eddy's friend, Jerry, and I'm a Myrmecia pilosula, but you might know me as a Jack Jumper ant. I live in Australia and sorry if I've ever bitten you, I know I can make some of you humans very sick. Us ants can't talk, we use pheromones to communicate. We don't have lungs or vocal cords like you do, so we couldn't talk, even if we wanted to.

What! You don't have lungs?! How do you breathe?

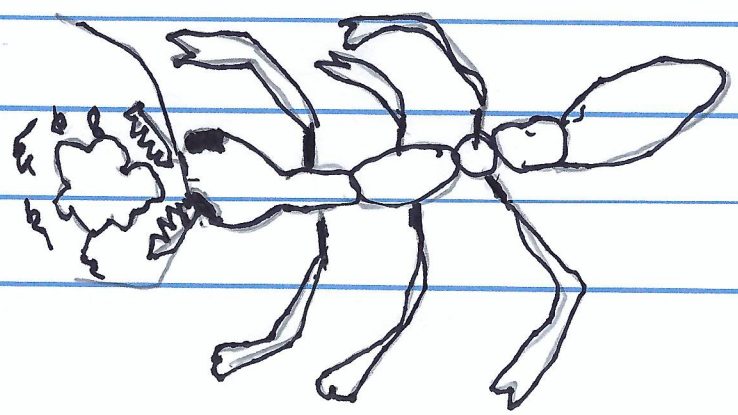
Well, our body is coated in little holes – we breathe through them, its pretty different to how you do it.

But what is a pheromone?

Well a pheromone is a small organic chemical - that's a chemical that has lots of carbon and hydrogen in it - that we, and lots of other insects, use to communicate.

I have a special tissue in my mouth called the mandibular gland and that produces pheromones, it squirts them out when I want to talk to my fellow Jack Jumper Ants.

Us ants really don't think much, we just act on what the pheromones tell us to do. If an attack pheromone is around, we'll keep attacking even if the threat is long gone!



Wait – you talk via bad breath?

I guess you could put it that way! I can detect which pheromone and how much of it there is with my antenna. Making pheromones isn't easy -they have to be just the perfect size. If they are too big, we spend all our energy making and storing them. If they are too small, we can't get our messages across because the chemical structure isn't different enough.

We only store about 3 nanograms at a time. It doesn't sound like much, but if I got my whole colony to release their pheromones, it would be enough to lead us on a trail around the world THREE TIMES! But you humans can't detect them, you don't have antenna.

How long do pheromones last? They can't stay around forever, can they? it would get too confusing if all your messages stayed around forever?

No, a pheromone can't stay around forever. It will go eventually. How long it stays depends on the type of pheromone.

Let's say I have to let off an attack pheromone to get some friends to help me deal with danger. I don't want that to hang around forever, otherwise my friends will keep coming and fighting, even after the threat is long gone.

But say we find a juicy picnic basket full of food that a human has left - well, we want that pheromone to last for a long time so we don't forget where it is.

So what makes some pheromones stick around longer than others? You don't want anyone thinking a picnic basket is dangerous!

Chemistry! It all comes down to chemistry, some pheromones are more volatile than others, which means they evaporate really quickly, just like hand sanitiser does. But others are less volatile which means they hang around longer.

So when I need to send out a quick message I'll squirt a more volatile one, that's how our language has evolved over time. If its windy or rainy, that might also make our pheromones disappear quicker as well. We've been doing this for a long time, a really long time, so we've gotten quite clever with it (even if I do say so myself).

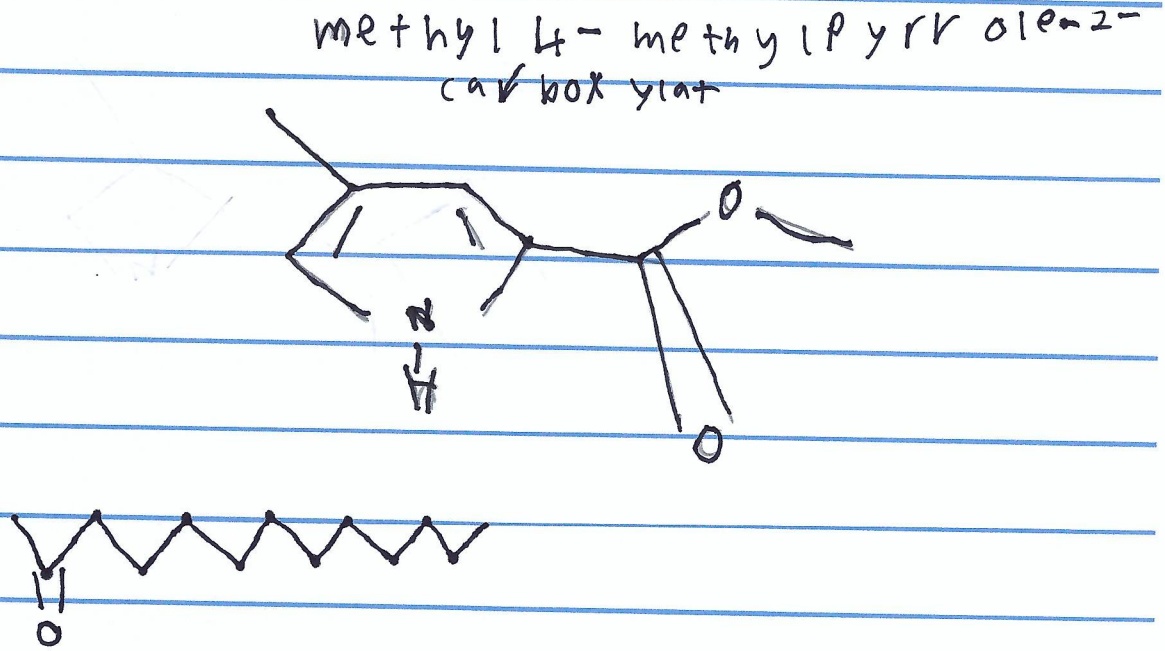
Some of my favourite pheromones are:

- methyl 4-methylpyrrole-2-carboxylate
- 2,5-Dimethyl-3-isopentylpyrazine
- Methyl 6-methylsalicylate

and last but not least

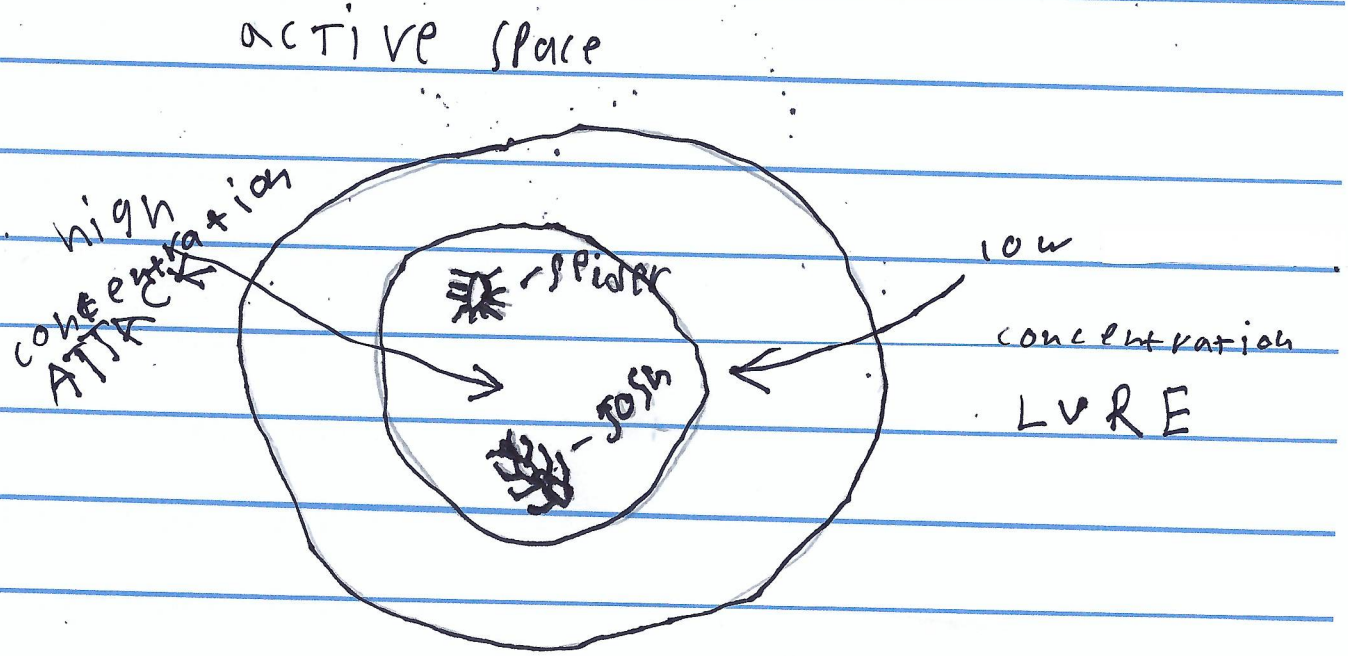
- 2-tridecanonethose

These help me send messages about danger, food and reproducing.



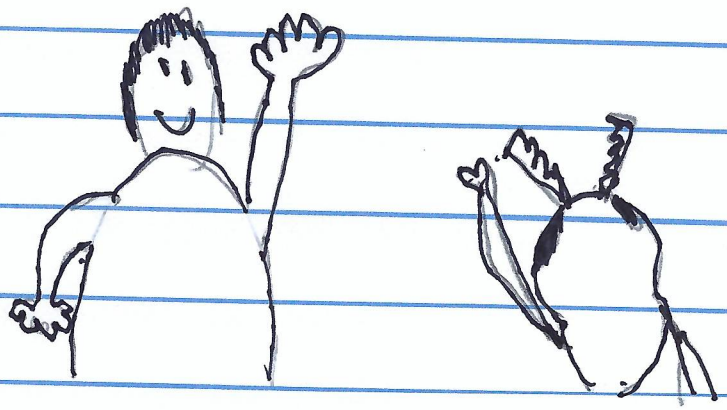
We can also send two messages with a single pheromone - let's say my friend Josh spots a spider and releases an attack pheromone. If I'm not close to him, I'll only detect a little bit of it - a low concentration.

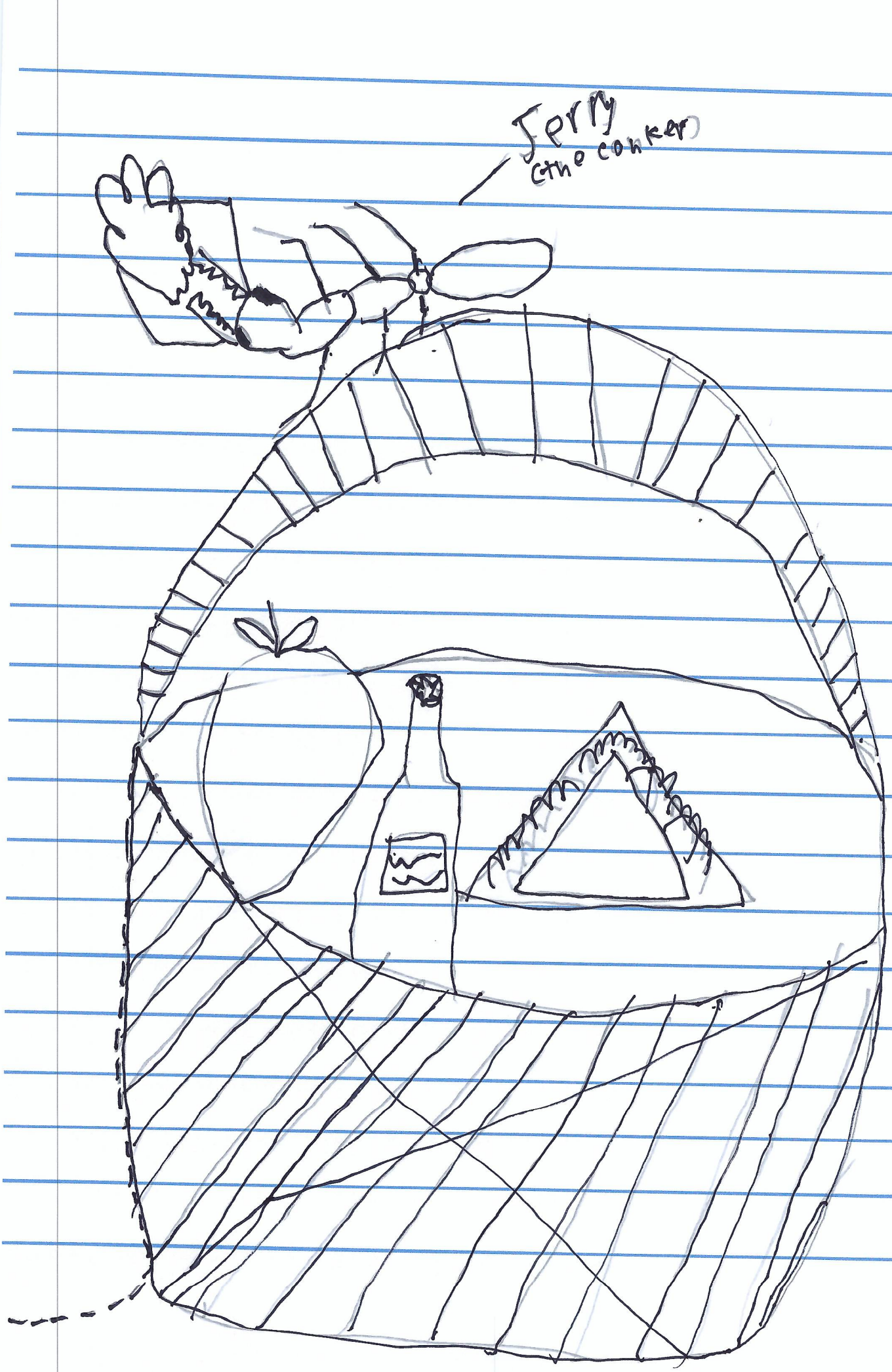
This low concentration, won't make me attack. It will lure me in, towards the higher concentration, closer to Josh and then when I get to the high concentration – that will trigger me to fight.



This is called the active space. The active space uses a lower concentration to attract us to the high concentration, which gives us the actual message.

Thanks for telling me all that stuff Jerry, it was very interesting! I know how ants talk now!
Bye!




Jerry
the conker

References:

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The Science of Ant Communication- A Discussion of How Ants Talk to Each Other – Pamela Paterson

The Ants- Bert Holldobler and Edward O Wilson

Communications in Ants – Duncan E Jackson and Francis LW Ratnieks

My Dad for helping to read and explain the references we used, spelling and helping to get the final design in Canva

Word Count - 800