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# ANTENNA



Issue 22 - 2006

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Greetings and Welcome to the first edition of 2006.

During the hot weather recently in Adelaide, I was looking at my water cooler and thought 'This would make a great article' my water cooler is environmentally friendly, because it doesn't use electricity.

Also I was involved with Youth ANZAAS 2006 and will tell some of what happened over the 5 days.

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## Terracotta Water Cooler

You have to marvel at the ingenuity of people. It can be sweltering in the shade Kilometres from anywhere and you can still have a cool drink of water – using nothing more than some terracotta or even a piece of cloth.



Of course said terracotta or cloth will have to be shaped into something that will hold water, and the terracotta has to be unglazed. Let's use terracotta as the pictures are nicer, but the science remains the same.

This is a picture of the type of cooler I have, looks fairly ordinary doesn't it, but it is the terracotta base that is the secret. Some of the water, through capillary action, will make its way to the outside of the container, whereby it will evaporate. The process of evaporation will actually cool the container up to 15 Degrees cooler than ambient temperature around the container.

Evaporative cooling works by evaporating water into the air. When you put water in contact with incoming warm air, the water will evaporate into the air. The heat energy present in the air changes the water to vapour, thus cooling the air.

How much temperature drop you experience depends largely upon how much moisture is already present in the air. Somewhat ironically, if a slight dry hot breeze flows past the container, it will cool faster.

<http://www.jbmailroom.com/swamper>

## DNA

Did you know that DNA is made up of only 4 bits or nucleotides? And those 4 nucleotides form only 2 pairs? The pairs can start with any of the 4 nucleotides but only the corresponding letter in the pair can be connected across the 'rung'.

Consider this, all life on this planet, you, me, and the old oak tree, are made of the same stuff, just put together in different ways

**A** – Adenine and **T** – Thymine

**C** – Cytosine and **G** – Guanine

So part of a strand of DNA might look like this:

A – T  
C – G  
T – A  
G – C  
A – T  
C – G

The beauty of this form is that when DNA splits into 2 individual strands, because only 1 nucleotide can fit next to another, you then get 2 perfect copies of the DNA. It might look a bit like this:

A – T  
C            G  
T – A        T – A  
G – C        G – C  
A – T            A – T  
C – G            C – G

Perhaps it would be easier to understand if you think of A and C as being a key, T and G as being a keyhole. Only A's key fits T's keyhole. So you won't find 2 A's connected as 2 keys cant hook up. You also wont find that's A's key wont fit G's keyhole, and cant hook up either.

We can make strands of DNA in a machine, 'simply' by typing in one side of the strand in the order we want it, and let nature help by putting on the other side of the strand for us. It is truly amazing stuff.

DNA stands for Deoxyribonucleic Acid – try saying that 5 time real fast. In truth I find it hard to say slowly.

<http://www.elmhurst.edu/~chm/vchembook/580DNA.html>

[http://www.eurekascience.com/ICanDoThat/dna\\_structure.htm](http://www.eurekascience.com/ICanDoThat/dna_structure.htm)

There is an underscore '\_' in place of the space above

## Oops

My daughter, not which long ago, made a basic error on a chemistry matter in discussion with me, to which I replied, "Good heavens, you should know that, you learnt it in the lab in your Yr 8 (first year High School) Science class!"

She replied, "No I didn't"

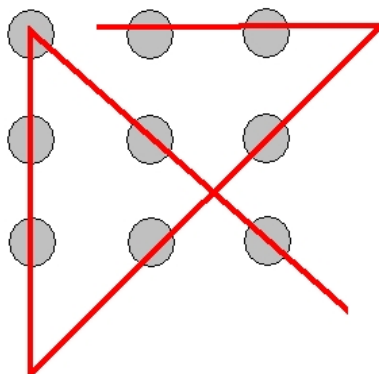
I retorted, "Yes, you did!"

She replied, "No I didn't. How would \*YOU\* know what the dumb Science teacher taught us, anyway?"

I replied, quietly, "Because, if you care to recall, I \*WAS\* your dumb Yr 8 Science teacher"

[http://www.xs4all.nl/~jcdverha/scijokes/3\\_6.html#old.scientists\\_4](http://www.xs4all.nl/~jcdverha/scijokes/3_6.html#old.scientists_4)

## Going Dotty - Part 2



In the last edition, I asked you to try to connect the dots, using only 4 lines and not taking your pen off the paper, here is the answer – I never said anything about staying within the bounds of the 'square' of the dots.

Now connect those same dots in 3 lines – Yes it in theory can be done. Answer next edition.

## A Dozen, a Gross and a Score

This poem was written by John Saxon. Author of math textbooks.

$$((12 + 144 + 20 + (3 * 4^{(1/2)})) / 7) + (5 * 11) = 9^2 + 0$$

Or for those who have trouble with the poem:

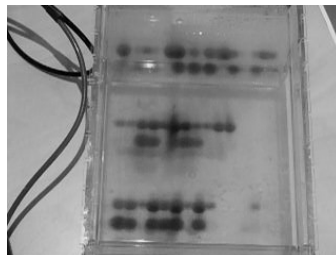
A Dozen, a Gross and a Score,  
plus three times the square root of four,  
divided by seven,  
plus five times eleven,  
equals nine squared and not a bit more.

<http://members.aol.com/Wipeout100/mathjoke.htm>

## Youth ANZAAS 2006

As mentioned earlier Youth ANZAAS 2006 was held in Adelaide, during what can only be described as 'warm' weather – if by warm you mean around 40 Celsius, Phew.

Fortunately we made use of Adelaide lovely beaches on several occasions. Thinking about it, we went to the beach every day as a group, to swim, to learn about Crayfish farming. Then there was the geology lesson – at the beach. All we need now is the Barbie, and she'll be right mate.



During the conference, we learned a bout DNA extraction, and even separated virtual DNA (colored inks) into the 'barcode' pattern as seen here.

We also went to SARDI, and learned about Aquaculture methods, starting with a lecture on Crayfish farming. The caption for this photo read:

Life as a Rock Lobster Scientist !!!  
Or  
(Why Marine Science beats an office job)



We also had lectures on Dental Forensics, Black Holes, and why Frankenstein's monster will not become a reality.

I didn't go on the Geology tour, but I heard it Rocked. The tour was about Glaciers that have long since gone, but the evidence still remains 10's of thousand years later.

<http://www.anzaas.org.au/YA06.html>

Cheers till next time – Peter T

## Submissions

Would you like to be published in an international publication? Send in a joke, a puzzle, a (very) short account of somewhere you visited, even a theory. All it has to be is science related. Please say if you wish you're Name to be added to published article.

Antenna is for you to enjoy, is the format OK, would you like to see a regular section, do you do you want your own column? Just send in your ideas and the Editorial team (me) will consider how to include it in future editions.

Submissions can be sent to: [antenna@anzaas.org.au](mailto:antenna@anzaas.org.au)