2003 TAIWAN INTERNATIONAL SCIENCE FAIR

CATEGORY：Physics

PROJECT TITLE ：Keeping Cool

AWARD：Second Award

SCHOOL：St.Pauls College

FINALISTS：David Roberts

COUNTRY：Namibia

ABSTRACT

"KEEPING COOL"

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My aim was to test the effectiveness of coolboxes under different conditions, to use this information to do comparisons using commercially available coolboxes and finally to build an effective and cheaper coolbox appropriate to Namibia

The general method used to compare different coolboxes involved measuring the rate at which ice melted inside the cool boxes under different conditions.

I did experiments to answer the following questions:

- Do my methods work?
- Can I accurately test coolboxes of different sizes?
- Does more ice in a coolbox take longer to melt?
- Are there different temperature layers inside a coolbox?
- Can I use weight of ice instead of temperature?
- Which insulator is better? Polystyrene or Polyethylene?
- Should one through melt-water out of one's coolbox?
- Does ice melt more quickly in a larger coolbox?
- Will equal ice to air ratios make ice melt in the same time?
- Does ice melt faster in a coolbox when surrounded by melt-water?
- Can I make and effective coolbox?
- Can I make a coolbox from recycled materials?
- Is it as effective as a commercial coolbox?
- What happens if the insulation is twice as thick?

I found a method that I could use to compare coolboxes accurately. I also found a way to compare coolboxes of different volumes accurately. I discovered that:

- More ice in a coolbox takes longer to melt.
- There are different temperature layers inside a coolbox.
- I can use weight of ice instead of temperature but it is not practical.
- One should through melt-water out of one's coolbox to keep it cool longer
- Ice melts more quickly in a larger coolbox.
- Equal ice to air ratios will not make ice melt in the same time.
- Ice does not melt faster in a coolbox when surrounded by its melt-water
- I can make an effective coolbox.
- I can make a coolbox from recycled materials, which is as effective as a commercial coolbox.
- The ice will not take twice as long to melt in a coolbox with insulation twice as thick

I did a variety of experiments with coolboxes and ice and learnt more about the effective use of and the science behind coolboxes. I built and tested two prototype cheaper coolboxes made out of recycled material. Both proved to be as effective as commercial coolboxes.

I very much appreciated the opportunity of participating in the Science Fairs both in Namibia and in Taiwan.

David Gordon Roberts

評 語

探討如何改進保溫箱，同時探討保溫的因素。