

二零二三年香港學生科學比賽

延伸摘要範本 (發明品)

(字數上限：2,500 字, 頁數上限：3 頁)

隊伍號碼：

作品名稱：

參賽類別：發明品

就我們所知，坊間 有/沒有* 類似的作品；(如有) 相關產品連結如下：

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我們的作品所作出的改良 / 其不同之處為：

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*請刪去不適用。本比賽重視作品的原創性，學生須於開始研究或發明前作足夠的文獻搜索以確保自己的作品具一定獨特性並列出相關參考資料。

I. 前言

- 介紹背景資料，並表述對作品對所關注的受眾的了解
- 概述所參考的文獻及/或相關技術或設備的資料，並列出可靠的資料來源
- 撰寫作品概要，舉出要點以針對受眾的實際需要及關注，並陳述作品 嘗試填補的研究/技術缺口

II. 目標

格式化表格

A

➤ 列出作品的目的

已註解 [1]: @s202210201@skss.edu.hk

➤

已設定格式: 字型: 粗體, 字型色彩: 自動

III. 研究方法

- 概述採用的方案，例如設備、材料、測試及相關的實驗
- 以科學理論支持所選用的實踐方法

IV. 發明品的設計

- 描述發明品的設計和原理（例如：描述項目的意念、並舉出原形及不同的創意方案）
- 展示相關草圖、圖畫或照片

V. 相關應用 / 市場需求

- 解釋發明品的相關應用和功能
- 指出市場的需求和該發明品的效益
- 討論有關限制，並就現有相關研究作對比（如有）

VI. 如發明品將角逐可持續發展大賞，請列明作品與哪一個可持續發展目標有關，並說明參與競逐此獎項的原因。(字數上限 500 字)

VII. 如發明品將角逐社會創新大賞，請列明作品所針對的目標群組或社會議題，並說明參與競逐此獎項的原因。(字數上限：500字)

VIII. 結論

- 撰寫以數據為本的結論及有關發明的後續安排
- 證明作品是否達到研發目標

* 我們的作品是以之前的比賽作品為題進行了持續研習，有關改良如下：

Hong Kong Student Science Project Competition 2023

Template of Extended Abstract (Invention)
(Word Limit: 1,600 words, Pages: 3 pages only)

Team Number:

Project Title:

Project Type: Invention

*To our best knowledge, there are/are no * similar works in the market; (if there are,) related product links are as below:*

<https://bamboahome.com/collections/blanket>
<https://luxome.com/products/bamboo-blanket?variant=39344804757565>
<https://truenorthfurs.com>

The enhancement our project made / the difference with related products are:

We enhanced the concept by combining the bamboo fabric and the fur together into a budget-friendly alternative aimed towards the homeless that is also antimicrobial.

**Please delete if not applicable. The competition values the originality of works. Students must do enough literature research to ensure that their works are unique and list relevant reference materials before starting research or invention.*

I. Background

- Provide background information as to learn about the audience for whom the project is addressing
- Provide highlights of **literature review** and/or related technologies or devices, with the support of pertinent and reliable references
- Provide an overview of work, create a point of view as to define the needs and insights of the audience and mention the **research or technology gap the project is trying to fill**

According to ImpactHK, a Hong-Kong-based NGO, between 2019-2020 there was a 22% increase in the number of registered street sleepers – up to 1,423. But agreement between non-profits serving this community is that the actual number is far higher. Those who are sleeping on the streets often do not have the appropriate blanket for cooling or keeping warmth, hence we decided to create a blanket that would fulfill both of these goals.

There have been multiple studies conducted regarding the anti-microbial and heat-losing properties of bamboo fabric, including a study done by The Textile Institute in 2021 which showed that bamboo fabrics (100%) give better results compared to cotton and viscose fabric in terms of antibacterial property and absorbency [1]. In another research paper completed in January 2020, studies showed that bamboo fabric can protect human skin from the damage of ultraviolet rays due to it naturally possessing anti-UV radiation characteristics [2].

Our project is a blanket that retains heat in the winter and loses heat in the summer, with a detachable layer. Those without homes require a blanket that is adaptable, able to retain warmth in the winter and lose heat in the summer. Our project is trying to fill this gap, providing the homeless with this invention.

II. Objectives

- State the **aim(s)** of project

Our aim is to research and design a blanket able to insulate warmth during winter and have a cooling

effect in summer for those in need, especially street sleepers.

III. Methodology

- Briefly describe the **approaches** used e.g. use of equipment, materials, tests and experiments
- Explain the selected implementation strategies with the **scientific theory**

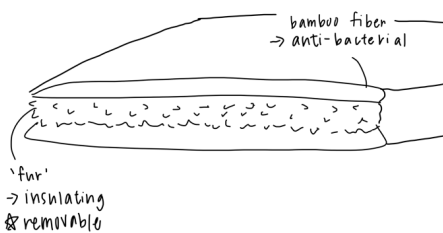
We have conducted an experiment on what kind of material between pure cotton, polyester fur and bamboo fabric best insulates heat. After the materials were wrapped around a cup of hot water for 15 minutes, the heat loss in percentage for unwrapped, wrapped with pure cotton, wrapped with polyester fur and wrapped with bamboo fabric are 23.0%, 20.4%, 20.1% and 15.8% respectively. This matched our hypothesis, as cotton acts as an insulating layer, making the water lose less heat compared to the set-up that wasn't wrapped in anything. As for the set-up wrapped with fur, the spaces between the fur cause the water to lose even less heat. Lastly, microscopic holes are present in bamboo fabric, making it the best heat insulator and thermo-regulator amongst the materials, thus the set-up wrapped with it loses significantly less heat.

IV. Design of Invention

- Describe the **design** and the **principle** of invention (e.g. The ideation of the projects, the prototypes or creative solution as far as applicable)
- Provide sketches / drawings / photos of the invention

Since bamboo fabric is breathable, thermoregulatory and anti-bacterial; polyester fur is insulating and budget-friendly these two fabrics have been chosen to make this blanket for the homeless. Our idea is to insert the polyester fur inside the bamboo fabric layer to keep the street sleepers cool in the summer and warm in winter.

Sketch:



V. Application / Market Need

- Explain the area of **application** and function of invention
- Indicate the market need and impact of invention
- Discuss **limitation** and compare with existing related works (if any)

According to research, bamboo fabric and blankets already exist — however, the prices are high, with some costing over \$900. Therefore, we plan to hand these blankets out to the homeless as an innovative alternative without the cost, with the added benefit of the feature of having a low temperature in the summer and heat insulating in the winter. Furthermore, the bamboo fabric is antimicrobial, lessening the chance of the blanket being infected with bacteria or viruses.

The market will surely be in need of our blanket in order to assist street sleepers in their daily life. The invention will be of assistance in supplying the homeless with a superior blanket in terms of adaptability and heat retention/loss, providing substantial help to them. Since the cold shelters in Hong Kong won't be able to be opened throughout the whole of winter, our blanket will be useful.

The limitations are that since bamboo tends to shrink more than other fabrics after washing, the blanket may decrease in size after a few washes, though not by much. Furthermore, the polyester fur may become clogged with dust or dirt if not washed thoroughly.

Compared with the current products on the market, our invention is much more attainable from the perspective of the homeless. Furthermore, there is no product on the market that is completely similar to ours, only separate elements that we have combined into our blanket.

VI. If your team will compete the Sustainable Development Award, please indicate the specific sustainable development goal the project is related to, and provide justification for competing for this award. (Word limit: 300 words)**VII. If your team will compete the Social Innovation Award, please list the target group or social issue the project focuses on, and provide justification for competing for this award. (Word limit: 300 words)**

The target group is the homeless of Hong Kong. We wished to create a blanket for those without a home in Hong Kong so as to provide them with a cooling blanket in summer and a heat-retaining blanket in the winter. Since the homeless often deal with problems such as not being able to keep warm in cold weather and sweating from the heat in summer, we wanted to mitigate this problem — often, when passing through pedestrian tunnels or bridges, the sight of street sleepers struggling to fall asleep while laying on old newspapers and pieces of cardboard greets our eyes. The problem of the homeless not owning a suitable solution to this problem is undeniably an important social issue in Hong Kong.

Our group wanted to mitigate this issue and provide the homeless with an adaptable blanket. Therefore, our project focuses on this problem and presents those sleeping on the streets a helpful solution that will assist them in both the summer and the winter. Since our blanket will be a lifesaver to many members of the homeless, we believe that our invention is a strong contender for the award.

VIII. Conclusion

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- Make a **data-driven** conclusion of the project and the way forward of the invention process
- Justify if the proposed project meets the objective(s)

In conclusion, according to the data from our experiment, by combining bamboo fabric and fur, a blanket that can keep street sleepers warm in winter and cool in summer can be created. We will make the layer of fur detachable with buttons. We firmly believe that such a blanket can be produced, offering street sleepers what is most close to the feeling of “home”.

*** Our project is developed based on previous project and the enhancement is below:**