

# Report for project work

**Group ID:03-14**

**Invention name:Survival Clean-water bottle**

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**Class:1O2(all members)**

When we first chose the category of inventions for our project, we had 2 ideas in mind.

One of which was to invent something that helps the elderly to move with ease, or just to make their lives more convenient. The other was to invent something that would encourage people to exercise more regularly. After serious consideration, we realized that most of our ideas for the previous two purposes were mostly taken up. If we wanted to remain making an invention that helps the elderly or urges people to exercise regularly, we would have to come up with something more complicated but that would be too hard to make. Thus, we decided to brainstorm about other ideas and also research about the needs of our current society... We thought of 3 problems that people faced. Firstly, many people are eating unhealthily nowadays. Secondly, some campers do not have enough access to clean and drinkable water in the wild. Last of all, a large population of people are not exercising enough and thus causing them to be obese.

We then made a decision making chart to decide on the possible problem that we would hope to solve through our invention. We considered the ideas that we had for solving each problem, the possibility and how realistic it would be for us to make a certain invention to solve the problems, and last but not least, whether the idea of our invention was catchy or interesting. Since the problem of "lack of clean drinkable water for adventurers in the wild" was the most interesting, and not to mention the fact that there were not many straightforward solutions to the problem yet, our team decided to develop our invention based on this problem.

Our idea for the invention was to use the science concepts of evaporation and condensation. We wanted to use dirty water, and after it evaporates, it will condense and form clean water droplets for the user of our invention to drink. We considered that our invention had to be portable and conducts heat well to increase the rate of obtaining clean drinkable water. Thus we specially considered that we had to make our invention with a good conductor of heat,

so as to make the product more efficient. We went on to do further research on similar, existing products, so that we could widen our insight towards the current solutions to our decided problem. We found that there were 2 products that currently existed to help the problem we had brought up. One of which is Lifestraw, designed to be used by one to filter water for consumption. The other was an OKO water filtration bottle. We decided to compare the current existing products to our design and idea, hoping that it would spark new ideas or allow us to understand the key points that we needed for our design.

Firstly, water filters are not exactly very reliable in 2 ways. One of which is just the sheer fact that the filter may drop off the bottle, contaminating the clean water, and thus ruining the dreams of clean and drinkable water. Second of all, water filters do not completely filter only clean water.

After browsing through the flaws of the current products, we thought of ways to improve our bottle from the current products. Our bottle uses scientific processes such as evaporation and condensation, ensuring that 100% of the “clean” water obtained, is completely clean and drinkable. Thus the problem of unreliability of water was solved. We also noted that our bottle had to be portable and reliable for no contamination due to the fact that our target audience for our invention is campers. One’s lack of clean and drinkable water can make it or break it for a camper in the wild.

We then moved on to thinking of a design for our bottle. After thinking through, we came up with a design. However, a problem came up; contamination. We considered that the dirty water collected by the user may contaminate with the clean water obtained through our bottle. Our first design was not appropriate as if the bottle was tilted, all the clean water would roll down and contaminate with the dirty water. Not only did we think of this as a simple problem, but we knew that it would be extremely difficult to solve it. We thought for months but to no avail. We thought that we could only minimize the amount of water being contaminated. However, we came up with a second design where no water would be contaminated! We added a ball to block the opening when tilted, so as to prevent the clean water from coming into contact with the dirty water. We then started to make a cardboard prototype to test out whether our idea was feasible.

Afterwards, we realised that not all the water would stay away from contamination despite the ballblocking. This was due to the fact that the ball did not manage to get to the hole and cover it up in time before the clean water rushes out and contaminates with the dirty water. Our project mentor pointed out that we had to ensure that the ball would be able to stick perfectly on the gap and also be able to move to the gap quicker. Thus we continued to brainstorm. We then thought of another plan. This time, instead of leaving the ball suspended in the water, we decided to put a mesh close to the opening and the ball on top of the mesh, so that in any case

of the bottle being turned, the ball would immediately fall into place, blocking the water from contamination. We also purchased a ball which fits perfectly, thus ensuring that there is no space that any of the clean water could flow through and be wasted. Last but not least, we kept in mind the importance of creating a bottle that is tight and sealed well. In any case, with our final design, we managed to ensure the security of the water and solve the problem of contamination. Unfortunately, we realised that placing the ball so close to the evaporation point greatly affected the efficiency rate of our bottle as there is not as much water collected compared to the other designs. Furthermore, we also realized that our prototype was way too sketchy and it is not very durable and hence deforms easily, we decided to change the entire model, making it into one that looks like a bottle with better quality of plastic. After solving all the problems that we have identified for the prototype, we moved on to making the actual product. We have improved the durability of our product and we have also improved on the leakage of water of our product.

Despite the setback of the little water obtained, we still felt that the importance of no contamination and secure water was more than the amount of water collected. We made our prototype and tested it over and over again. We recorded the results on a timelapse video that shows the evaporation taking place and the amount of clean water obtained.

To sum up, our product is one that would allow users to retrieve pure safe drinking water in the wild where sources of drinkable water are scarce. Our water bottle is one that would allow users to be able to collect clean water but in the meantime continue with their adventure.