

O LEVEL COMBINED SCIENCE PROJECT

TITLE: Importance of Clean Drinking Water for Human Health

Stage 1: Problem Identification

Problem Description

At our school and in the surrounding community, some learners and families sometimes rely on untreated water from boreholes, shallow wells, and nearby streams for drinking and cooking. This water may appear clean but can contain harmful microorganisms such as bacteria, viruses, and parasites, as well as chemical impurities. The consumption of contaminated water can lead to diseases such as cholera, typhoid, dysentery, and diarrhoea, which negatively affect human health, school attendance, and overall community development.

Statement of Intent

This project intends to investigate the importance of clean drinking water for human health and to design a practical school-based solution that can help learners understand simple and effective methods of making water safe for drinking. The project also aims to promote awareness among students about water hygiene and sanitation practices in order to reduce water-borne diseases.

Project Specifications

1. The project must demonstrate at least one scientifically proven method of purifying water that can be applied at household or school level.
2. The solution must be affordable, safe, environmentally friendly, and easy for learners to understand and replicate at home.

Stage 2: Investigations of Related Ideas

In order to understand how clean drinking water can be obtained and protected, three existing ideas were investigated.

Idea 1: Boiling Water

Boiling water is one of the oldest and most commonly used methods of water purification. It involves heating water until it reaches its boiling point, which kills most disease-causing microorganisms.

Advantages

1. Boiling water effectively kills bacteria, viruses, and parasites that cause water-borne diseases, thereby significantly reducing the risk of infections.

2. The method is simple and does not require advanced equipment, making it suitable for both rural and urban households.

3. It is a scientifically proven and reliable method recommended by health authorities during outbreaks of diseases such as cholera.

Disadvantages

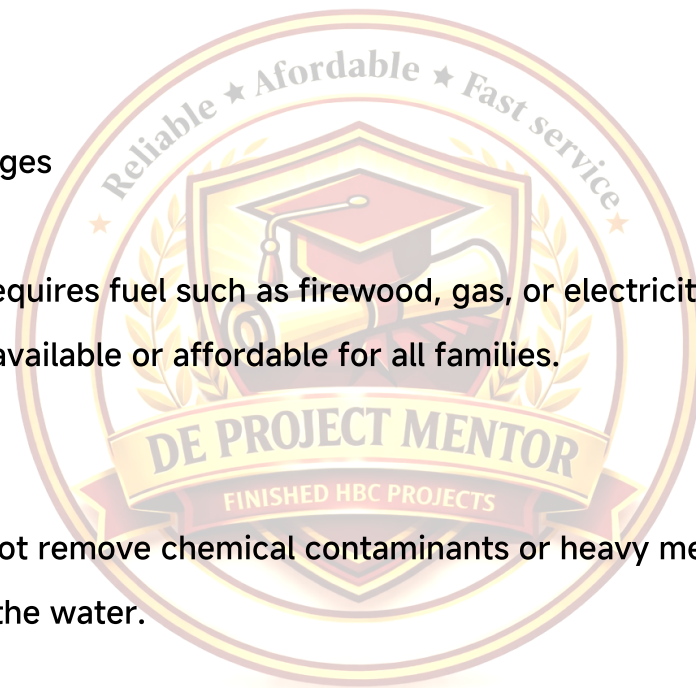
1. Boiling requires fuel such as firewood, gas, or electricity, which may not always be available or affordable for all families.

2. It does not remove chemical contaminants or heavy metals that may be present in the water.

3. If the water is stored in unclean containers after boiling, it can become contaminated again.

Idea 2: Chlorination

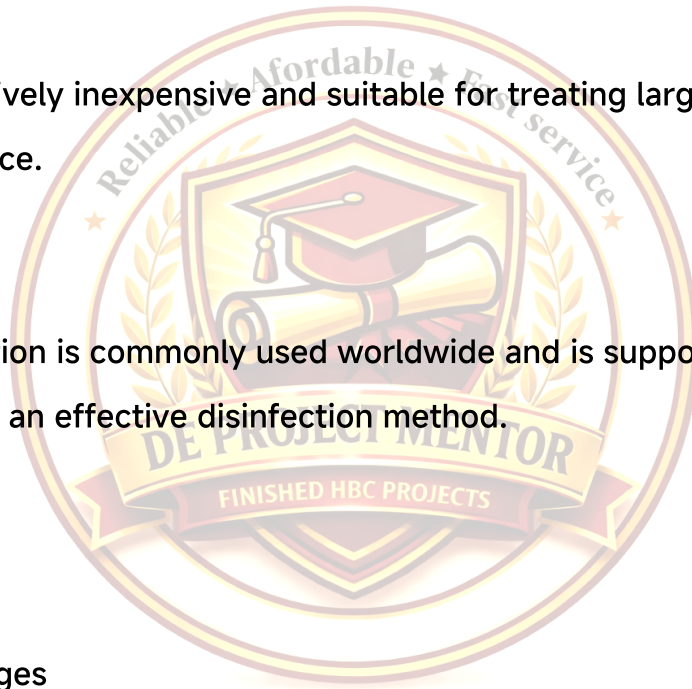
Chlorination involves adding a measured amount of chlorine to water to kill



harmful microorganisms. It is widely used in municipal water treatment systems.

Advantages

1. Chlorine effectively destroys most harmful microorganisms and continues to protect the water from recontamination for some time.
2. It is relatively inexpensive and suitable for treating large volumes of water at once.
3. Chlorination is commonly used worldwide and is supported by scientific research as an effective disinfection method.



Disadvantages

1. If too much chlorine is added, the water may develop an unpleasant taste and smell.
2. Incorrect measurement can either make the water unsafe or ineffective in killing germs.

3. Chlorination does not remove physical dirt or certain chemical pollutants from water.

Idea 3: Filtration Systems

Filtration involves passing water through materials such as sand, gravel, charcoal, or ceramic filters to remove impurities.

Advantages

1. Filtration removes suspended particles, dirt, and some microorganisms from water, improving its clarity and taste.
2. Some filters, such as ceramic filters, can be used repeatedly and last for several months.
3. Filtration can be combined with other methods like boiling for improved effectiveness.

Disadvantages



1. Some simple filters may not remove all harmful microorganisms.
2. Commercial filters can be expensive for some households.
3. Filters require regular cleaning and maintenance to remain effective.

Stage 3: Generation of Ideas/Possible Solutions

After investigating existing methods, three possible school-based solutions were developed.

Solution 1: School Water Boiling Awareness Program

This solution involves organizing demonstrations at school where learners are taught how to boil and safely store drinking water at home.

Advantages

1. It promotes practical knowledge among students, enabling them to apply safe water practices at home.
2. The program is affordable because it mainly requires educational materials and demonstrations.

3. It raises awareness about hygiene and disease prevention within the school community.

Disadvantages

1. It depends on families having access to fuel for boiling water.
2. Some learners may not consistently apply the method at home.
3. It does not directly solve the problem of chemical contamination.

Solution 2: Construction of a Simple Sand and Charcoal Filter Model

This solution involves building a demonstration model using layers of gravel, sand, and charcoal in a transparent container to show how water can be filtered.

Advantages

1. It provides a clear scientific demonstration of how filtration works,

improving learners' understanding.

2. The materials required are affordable and locally available.

3. It encourages creativity and teamwork among students.

Disadvantages

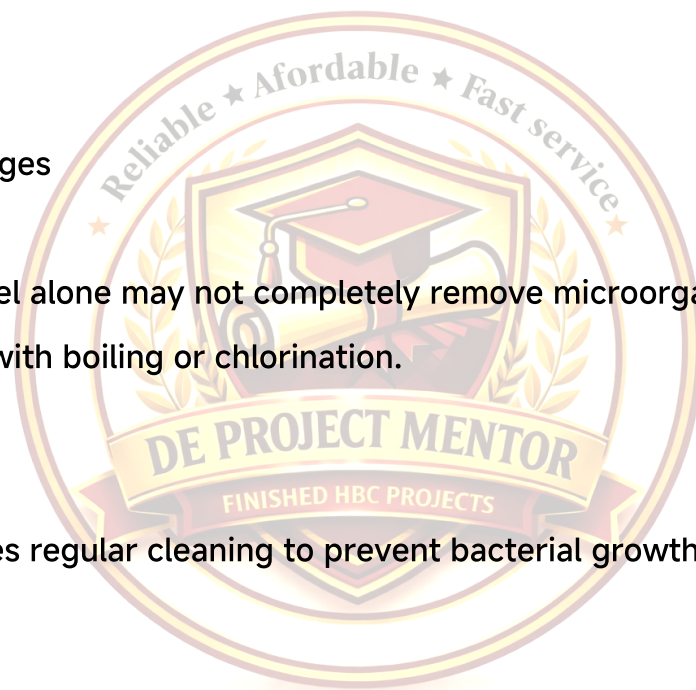
1. The model alone may not completely remove microorganisms unless combined with boiling or chlorination.

2. It requires regular cleaning to prevent bacterial growth.

3. It may not be suitable for treating very large quantities of water.

Solution 3: School Clean Water Awareness Campaign with Posters and Demonstrations

This solution focuses on educating learners through posters, presentations, and health talks about the importance of clean drinking water.



Advantages

1. It spreads information widely within the school and encourages behavioural change.
2. It improves learners' knowledge about diseases related to unsafe water.
3. It is cost-effective and easy to implement.

Disadvantages

1. Awareness alone may not guarantee behaviour change.
2. It does not provide a physical method of purifying water.
3. Its impact may decrease if not continuously reinforced.

Stage 4: Development/Refinement of Chosen Idea



Indication of Choice

The chosen idea is Solution 2: Construction of a Simple Sand and Charcoal Filter Model.

Justification

1. It provides a practical and scientific demonstration that learners can see and understand clearly.

2. It uses locally available materials, making it affordable and sustainable in a school setting.



Refinement

1. The model was improved by adding a cloth layer at the top to remove larger debris before filtration.

2. The charcoal layer was increased in thickness to improve the removal of colour and odour.

3. A tap was added at the bottom of the container to allow safe collection of filtered water without contaminating it.

Final Impression

The refined model is neat, functional, educational, and demonstrates scientific principles of filtration effectively.

Stage 5: Presentation of the Final Solution

The final product is a working model of a simple sand and charcoal water filter presented during a school science exhibition. The model demonstrates how dirty water becomes clearer after passing through different layers.

The presentation includes:

1. A labelled diagram explaining each layer and its function.
2. A live demonstration showing the filtration process.
3. An explanation of how filtration improves water quality but should be combined with boiling for complete safety.



The project meets learning area standards because it applies scientific concepts such as separation techniques, microorganisms, and hygiene. It also aligns with international health recommendations that emphasize safe drinking water as a

basic human need.

Stage 6: Evaluation and Recommendations

Relevance

The solution matches the original intention because it educates learners about the importance of clean drinking water while also demonstrating a practical method of improving water quality at household level. It addresses the identified problem by combining scientific knowledge with practical application in a school-based environment.

Challenges

One of the main challenges faced during the project was ensuring that the filtered water was safe enough, as filtration alone does not remove all microorganisms, which required further explanation during presentation.

Recommendations

1. In the future, the filter model can be combined with solar disinfection or boiling to ensure complete removal of harmful microorganisms.
2. The school can introduce regular health awareness programs to continuously educate learners about safe water practices and sanitation.

Conclusion:

Clean drinking water is essential for human health because it prevents diseases, improves concentration in school, and supports overall community development. Through scientific investigation and practical demonstration, this project highlights the importance of safe water and encourages responsible health practices among learners.

NB: This is just a sample....

***If you want yours (finished project) WhatsApp De Project Mentor 🎓 on
+263774737310***

Not for free!!!

