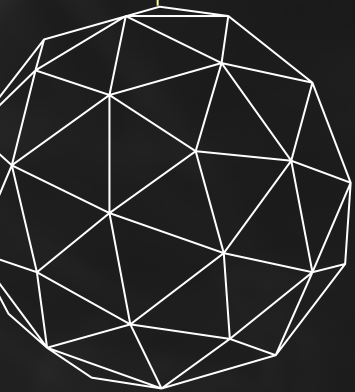




JUNIOR MAKE-A-THON

2022-2023



PROBLEM STATEMENTS

SOLUTION FORMAT

PROBLEM STATEMENTS

- There are 4 problem statements in the following pages. You can choose and solve any one.
- The problem statements have 2 parts:
 - 'The problem' refers to the situation that we have to address and find a solution.
 - 'The challenge' is the actual question which you have to solve and come up with a unique solution. If there are multiple challenges, you can solve any one of them.
- The problem statements are very detailed. Read them carefully and understand each part of the question. You will have to do some research before you begin to solve.

ALL THE BEST!

PROBLEM 1

SUSTAINABLE DISPOSAL OF WET AND DRY WASTES

➤ The problem:

On an average, every single person in India produces about 4.54kg of waste every day. More often than not, it is directly dumped in the dustbin without proper segregation, which makes it difficult to recycle waste properly.

This is because it contains all kinds of waste (wet and dry). Since it is both economically and technically hard to separate wet and dry waste once they are mixed, this waste is deposited in land fills which indirectly decreases the fertility of soil and harms the natural environment.

➤ The challenge:

It is hard to separate wet and dry waste once they are mixed so come up with some innovative ideas to segregate waste in proper way further come up with disposal methods of segregated waste.



PROBLEM 2

SMOKE DETECTION AND FILTRATION

➤ The problem:

As the festive season approaches, the use of firecrackers becomes very common. In recent years environmental concerns have driven people to celebrate Diwali without firecrackers, but changes in centuries-old traditions cannot be brought about in a day. This is why every year on and around Diwali, the streets of most cities are full of smoke. Most houses and apartments on lower floors can do little to avoid it, this causes discomfort to people who have respiratory issues like asthma. It may lead to wheezing, coughing, and extreme discomfort in general, especially during the peak hours of celebration.

➤ The challenge:

Come up with a design for a machine that can gauge and improve the air quality of a small room for a limited period by filtering the harmful components and smoke.



PROBLEM 3

SUSTAINABLE WASTEWATER TREATMENT

➤ The problem:

Wastewater mismanagement poses a threat to economic growth and long term prosperity. Untreated sewage water is one of the major causes of surface and groundwater pollution. This wastewater contaminates freshwater and coastal ecosystems, threatening food security, access to safe drinking and bathing water and providing a major health and environmental management challenge.

➤ The challenge:

The conventional wastewater treatment methods are expensive and require complex operations and maintenance. The challenge is to design a low-cost, user-friendly device that could be used on a small or large scale for sustainable wastewater treatment.



PROBLEM 4

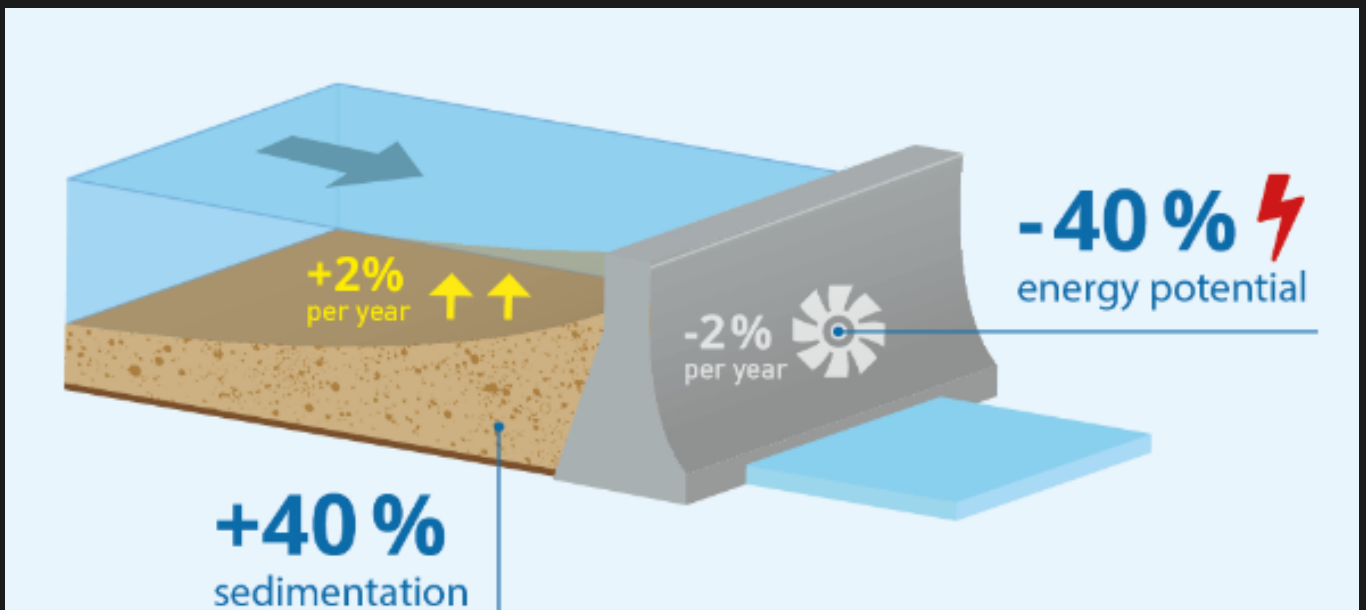
Sedimentation

➤ The problem:

Dams are created to store water so that stored water potential energy can be used to generate electricity, to control flood, and for inland navigation but after many years of usage many problems have been created by dams. One of them is sedimentation, we all know that sediment also flows along with river. When we construct a dam, it basically stops the flow of the river and collects river water and also sediments. So years of accumulation of sediment is known as sedimentation and what sedimentation does is it reduces the water holding capacity, which indirectly increases the chance of flooding in nearby areas.

➤ The challenge:

What precautions could be taken to eliminate the sedimentation process while making new dams? How can we remove accumulated sediments from old dams? Also suggest alternatives of dams



SUBMISSION MUST INCLUDE

1. CHOOSEN PROBLEM

Heading of the document, followed by team name, category (Junior/Senior), team members' name(s) and Shastra Juniors ID.

2. WHY THAT PROBLEM

What motivates you to work towards this problem?
How important do you think this problem is to contemporary society and/or the environment?

3. PROBLEM ANALYSIS

Examine the seriousness of the problem, you may include statistical data surrounding it, understand who/what are affected by it

4. PROPOSED SOLUTION

Summarise what your solution does, in not more than 50 words. Please note that your solution should be a description of a hardware prototype. The first round doesn't require you to build an actual prototype.

5. DETAILED SOLUTION

Comprehensive description and working of the solution (prototype). You may include text, diagrams, illustrations, designs, simulations, and charts.

6. UNIQUENESS

Explain how and why your solution is different from the solutions already existing in the market.

7. FEASIBILITY ANALYSIS

Calculate and write down the approximate cost of making your product. Mention the technical and economic restrictions in making the product.

8. PROS AND CONS

Explain how your solution is unique and better than existing solutions and also what are the shortcomings of your solution.

9. SCOPE

How can you scale up your solution to implement it on a larger scale/real life.

10. REFERENCES

Books, websites, citations for articles, etc. referred (if any) while preparing the solution.

SUBMISSION FORMAT

The submission file should be named 'TeamName_JMT2023'

Only the team leader needs to submit the solution.

Any one of the below mentioned formats should be followed :

- 1.PPT - MS PowerPoint / Google Slides / Canva / Keynote
- 2.DOC - MS Word / Libre Office / Google docs / Pages
- 3.PDF - Canva / LaTeX / Word file converted to PDF

Submit your solution in this link: [JMT 2023 Submission](#)

The deadline for the submission is November 9th 2022