

Section 1: Administrative and Core Identity

Project Title

Soot Pencil

Team Members

Name	Role
Kushal R	Team Lead
M. Gnanesh	Designer / Tester
Poorvitha V	Researcher
Keerthana R Shekar	Documentation / Presenter

Academic Details:

Name	Programme	Department	Status
Kushal R	B.E.	Electronics and Communication Engineering	4 th Year
M. Gnanesh	B.E.	Computer Science and Business Systems	4 th Year
Poorvitha V	B.E.	Computer Science and Business Systems	4 th Year
Keerthana R Shekar	B.E.	Electronics and Communication Engineering	4 th Year

Institution

College: Malnad College of Engineering, Hassan

Project Duration

Dates: January 2025 – March 2026

Key Adviser / Mentor

Name: Dr. Geetha Kiran A, Dean (Corporate Affairs), Malnad College of Engineering, Hassan

Funding

Grant Approved: ₹3,00,000

Contact Information

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Section 2: Visual Assets

Student / Team Profile Photo



M. Gnanesh.



Poorvitha V



Keerthana R Shekar

Project and Process Image



Section 3: Narratives

The Hook

“An eco-friendly pencil made from recycled carbon soot that reduces air pollution while providing a sustainable alternative to traditional graphite pencils.”

Problem Statement

At present, soot exists in a motile form as it is mixed with the air. It is present at the height of the average human being in our environment, so it is easily inhaled and our nasal hairs cannot block it. It enters the

body easily, and over time it will surely enter our ecosystem and increase the toxic content — especially the carbon content.

This fine particulate matter poses a serious health risk to communities exposed to combustion sources, and currently there are very limited practical solutions for capturing and reusing this carbon waste in a beneficial manner.

Proposed Solution

The project introduces a Soot Pencil, an eco-friendly alternative to conventional graphite pencils. Instead of using mined graphite, the pencil core is produced using carbon-rich soot collected from combustion sources. The soot is purified and mixed with a binding material such as clay or natural adhesive to form a stable writing core.

This mixture is shaped and dried to create a pencil lead capable of writing smoothly on paper. The lead is then inserted into a wooden or biodegradable casing to complete the pencil structure.

By repurposing soot, the project demonstrates how air pollution byproducts can be converted into useful products. This approach not only reduces environmental waste but also encourages the concept of carbon capture and reuse. The Soot Pencil promotes sustainable innovation by turning a harmful pollutant into a valuable everyday writing tool.

Methodology and Key Technology

The project followed a sustainable material development approach. Carbon soot was collected and filtered to remove impurities. The purified soot was mixed with a binder such as clay or natural adhesive to form a paste-like material. This mixture was moulded into pencil cores and dried to achieve the required hardness.

The core was then placed inside a wooden or biodegradable casing to form the final pencil. The methodology focused on carbon reuse, eco-friendly material processing, and simple manufacturing techniques to create a functional writing product.

Key Findings and Results

The project successfully demonstrated that carbon soot can be reused as a functional writing material. The soot pencil produced clear and smooth writing similar to traditional graphite pencils.

By converting carbon waste into a usable product, the project shows potential for reducing air pollution and promoting sustainable material reuse. The manufacturing process is simple and low-cost, making it suitable for small-scale eco-friendly production.

Additionally, the project highlights the concept of carbon capture and reuse, showing how pollution byproducts can be transformed into useful consumer products. This innovation supports environmental sustainability and encourages greener alternatives to conventional manufacturing.

Future Scope and Next Steps

Future work could focus on improving the strength, durability, and writing quality of soot pencils through better binding materials and purification methods. Large-scale production techniques can also be explored to make soot pencils commercially viable.

The project can expand into other eco-friendly stationery products using recycled carbon materials. Collaboration with environmental organisations and educational institutions could promote awareness of sustainable manufacturing and pollution reduction.