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SUSTAINABLE INKS



Junta de
Castilla y León

Consejería de Educación



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1. Who are we?



We are a group of 3rd grade ESO students from the IESO Arroyo de la Encomienda: Irati González, Javier Morán, Darío Otero and Dorian Ruiz.

Our teacher, Consuelo Merchán, guides us in this project.





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2. Research's introduction

The aim of the project is to find sustainable inks with ingredients that do not harm the environment or our health. The proposed solution is to use alternative inks that do not create these problems, namely vegetable inks. But what do we mean by vegetable inks? Inks that are made of natural pigments extracted from plant sources, such as walnut ink and soy ink.





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2. Research's introduction

This project is part of a bigger project carried out in our school. It is the "Environmental Project", in which our goal is to reduce the amount of plastic waste in the students' pencil cases.





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2. Research's introduction

Most items that students carry in their pencil cases are made of plastic and, therefore, harmful to our planet. Most of the items are pens with ink in them, which pollutes the environment. In order to solve this problem, we started research to find environmentally friendly inks.





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2. Research's introduction

Traditional ink is highly polluting and relies on a non-renewable resource, petroleum. The extraction of petroleum, necessary for ink production, emits large amounts of carbon dioxide and other greenhouse gases to the atmosphere, contributing to global warming.



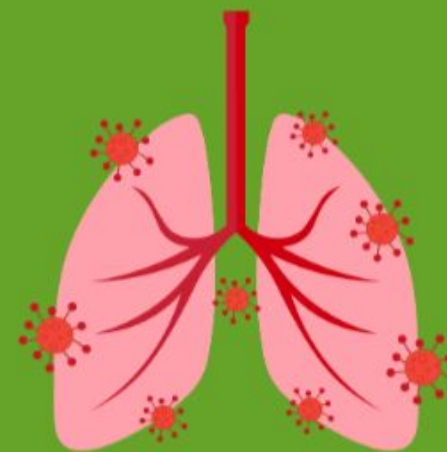


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2. Research's introduction

In addition, conventional inks can cause intolerances and allergies since they are harmful to living beings. Not only are they poisonous if ingested, but they can also be toxic to the skin, due to the chemical compounds that they contain. One compound found in these inks is carbitol, which can cause respiratory and renal disorders.





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2. Research's introduction

However, vegetable inks, such as soy or walnut inks, are not harmful to the environment or living beings. Soy ink began to be used on a large scale by print media in North America due to the oil crisis of the 1970s. It achieved great results as it was more economical, efficient, and ecological, being 90% less polluting than conventional inks while maintaining quality standards.





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2. Research's introduction



Walnut ink is a natural dye derived from the outer part of the walnut once it has matured. It has been used since medieval times. Due to its color, it is used for calligraphy, illustrations, and crafts. It is a natural, non-corrosive, translucent ink, resistant to light and flows very well, although unfortunately it is not water-resistant.



INK #1



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PowerPoint by Dorian Ruiz





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4. Advantages of our inks

Eco-friendly inks have several advantages for people with allergies. They are composed of 50 to 90% natural ingredients and are free of allergens, making them safer for sensitive individuals or those with allergies.

Moreover, they emit fewer volatile organic compounds (VOCs), reducing the environmental impact and potentially benefiting overall health.





4. Advantages of our inks

- Lower environmental impact than conventional inks
- Greater water and sun resistance
- They are compatible with a wide variety of papers and materials
- Absence of polluting solvents
- Components sourced from renewable sources.





4. Advantages of our inks

- Their residues are less dangerous.
- Residual sludges from vegetable inks are biodegradable.
- They do not generate VOCs (Volatile Organic Compounds).
- Reduction of waste generated during elaboration.
- Reduction of carbon footprint: They are made from renewable vegetable oils, such as soy, which reduces the carbon footprint.





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4. Advantages of our inks

Pica Disorder is characterized by the ingestion of substances that are not nutritious or food-related for a minimum period of one month and with a prolonged period of time



What to Know About Pica

Pica is an eating disorder marked by eating non-food items

It's most commonly seen in childhood but can occur in adulthood

Can cause stomach upset, teeth injury, and lead poisoning

Children under two are not diagnosed with pica

People with pica often experience malnutrition

verywell





4. Advantages of our inks

Pica disorder can occur at any age, although its beginning is more common during childhood. People who suffer from it may eat paper, soap, clothing, hair, ice, mud, ashes, wool, soil, coal, metal or clay.

If a person ingests conventional inks or paints, their particles may contain lead or other toxic substances, which can be very harmful to their health. In case of ingesting an eco-ink, which is mainly composed of a water base and natural pigments, the result would be much less harmful to the body.





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5. Final conclusions

After this research, we were able to see how sustainable inks are necessary to take care of the environment and also of those who live on it, as it would bring significant improvements for people with certain disorders, such as children with PICA syndrome.





5. Final conclusions

Although we attempted to create several inks, we finally managed to develop two sustainable inks that could potentially be used. This work led us to the following conclusions:

- Walnut ink is polar. This is evident when we try to dissolve it with soybean and sunflower oil.
- Talc powder does not provide enough consistency to the water to be used as ink.





5. Final conclusions

We still have challenges ahead, which involve improving inks we have work with. We can do this by:

- Lightening the ink with better results than what we have so far. It was the one made with water and walnut ink and it may be improved by adding some kind of food coloring that gives it colour.
- Improving the consistency and texture of the ink based on different binders.





5. Final conclusions

In addition, we have learned some important facts, such as:

- It is possible to use natural resources close to our environment to create alternative, much more sustainable inks to conventional ones.
- The integration of different areas such as Art, History and Chemistry.



SCIENCE
ciencia



TECHNOLOGY
tecnología



ENGINEERING
ingeniería



ARTS
artes



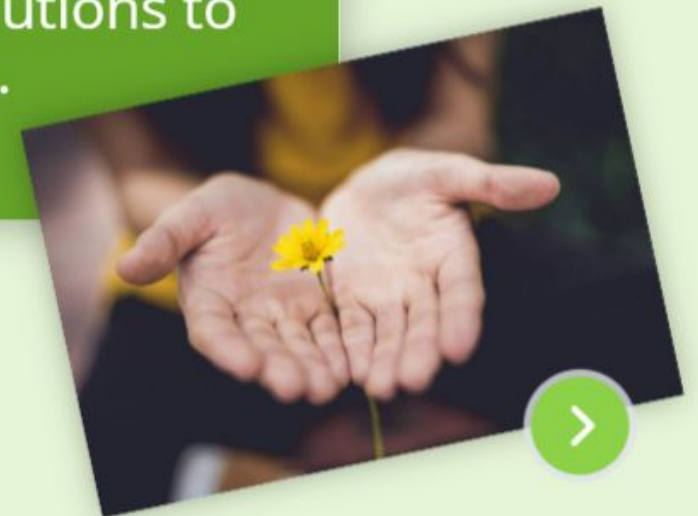
MATHEMATICS
matemáticas





5. Final conclusions

- The ability to find solutions to the various difficulties and problems that arise in research and project development.
- The personal development of values such as empathy and solidarity towards social minorities.
- The importance of entrepreneurship in seeking solutions to the new problems that arise in the society we live in.





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Qia

A

B



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Tools we have used...

- Genially
- Canva
- Powerpoint
- Word
- Stop Motion Studio
- Clipchamp
- Laboratory and its supplies
- Computer room





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Our bibliography...

- Make homemade ink using walnut ink:

<https://youtu.be/fvAz479R3KM>

- Soy ink recipe: <https://www.usroasterie.com/como-hacer-tinta-de-soya.html>

- Soy ink: <https://agood.com/es/blogs/stories/how-to-make-soy-ink>



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- Saúl (sign language interpreter)





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THINK

EXPERIMENT

SHARE

To be continued...

What will be the future inks?

SEARCH

IMAGINE

CREATE

