

III  IYNT 2015



# **International Young Naturalists' Tournament**

## **6. Disappearing ink**

**Serbian team**

**Regional Center For Talented Youth**

## 6. Disappearing ink

Suggest a chemical formulation for the ink that would disappear after used to write a text. What parameters determine the time when the text becomes invisible? Is it possible to process the paper in such a manner that the text appears again?



# Disappearing Ink Chemistry

- acid-base indicator (pH indicator)
- phenolphthalein



# Experimental part

**No - it's science!**

**It's magic! It's a mystery!**



# Experimental part I

Chemicals:

1. 0,10 g phenolphthalein
2. 10 ml ethanol
3. 90 ml water
4. 20 drops of NaOH



# Video of the process

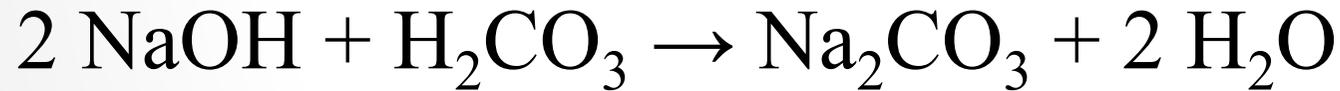


# How Disappearing Ink Works

Carbon dioxide in the air reacts with water to form carbonic acid:



The neutralization reaction is sodium hydroxide + carbonic acid → sodium carbonate + water:



# Materials

1. Cotton bud
2. White paper
3. Lemon juice
4. Small bowl
5. Iron or a candle



# Lemon Juice Invisible Ink



• Add a few drops of lemon juice to the candle.  
Dip a cotton swab in the mixture and write your message on the paper.  
write a message on the paper.  
•

# Materials

1. Milk
2. Paper
3. Iron
4. Cotton swab



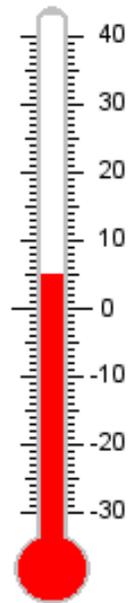
# Milky way Invisible Ink



Also with the milk dot on the paper and  
Put a little milk in a bowl  
use an message on the paper message

# Parameters

- Carbon-dioxide concentration
- Base concentration
- Air temperature



# Conclusion

- phenolphthalein
- lemon juice
- milk
- it is possible to appear again

**THANK YOU FOR YOUR  
ATTENTION!!**



# Materials

1. Baking Soda
2. Paper
3. Water
4. Cup
5. Cotton bud
6. Blueberry Juice



# Baking Soda Invisible Ink



• Dip a cotton swab into the mixture and use it to write your message on a piece of paper.  
• The message will be invisible until you heat it with a hair dryer or iron.

# Why it works

Milk is an organic product which means it comes from a living thing. When it's heated, it burns at a slower rate than the paper. The heat from the iron actually burns the fat in the milk causing the colour of the milk to change. Your **invisible message** shows up brown.



# Why it works

- Grape juice has an **acid** that reacts with the baking soda.
- A different color appears wherever the secret message is **written**.
- Baking soda and grape juice react with each other in an acid-base reaction, producing a color change in the paper.
- The baking soda mixture can also be used more diluted, with one part baking soda to two parts water.
- Grape juice concentrate results in a more visible color change than regular grape juice.
- If you are using the heating method, avoid igniting the paper - don't use a halogen bulb.