# PAPER CHROMATOGRAPHY

# Chromatography

It is a method of separating components of a mixture by differential movement through a two-phase system: the mobile phase and the secondary phase. This movement is effected by the flow of a liquid or a gas ( mobile phase ) which percolates through an adsorbent ( secondary phase ).

# What is Paper Chromatography?

# Paper Chromatography

Paper chromatography was first introduced by the German scientist, Christian Friedrich Schonbein in 1865.

It is a type of a planar chromatography. It is the simplest and widely used type of chromatography procedures which runs on a specialized paper.

# Two principles of Paper Chromatography:

## Paper Partition Chromatography

Paper impregnated with silica or alumina acts as the adsorbent ( stationary phase) and solvent as the mobile phase.

## Paper Adsorption Chromatography

The moisture or water present in the pores of the cellulose fibers present in the filter paper acts as the stationary phase and another solvent as the mobile phase.

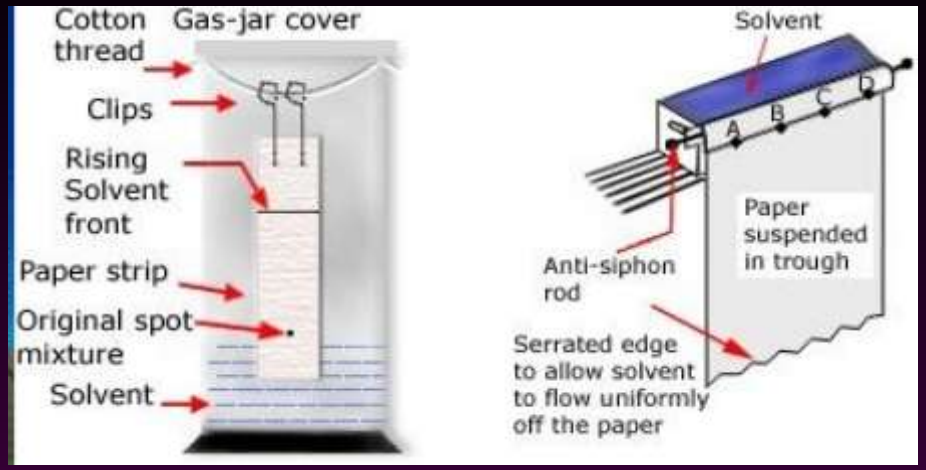
IN GENERAL, PAPER CHROMATOGRAPHY = PAPER PARTITION CHROMATOGRAPHY

# The principle of Separation

The principle of separation is mainly partition rather than adsorption.

## Paper Chromatography has different types or modes:

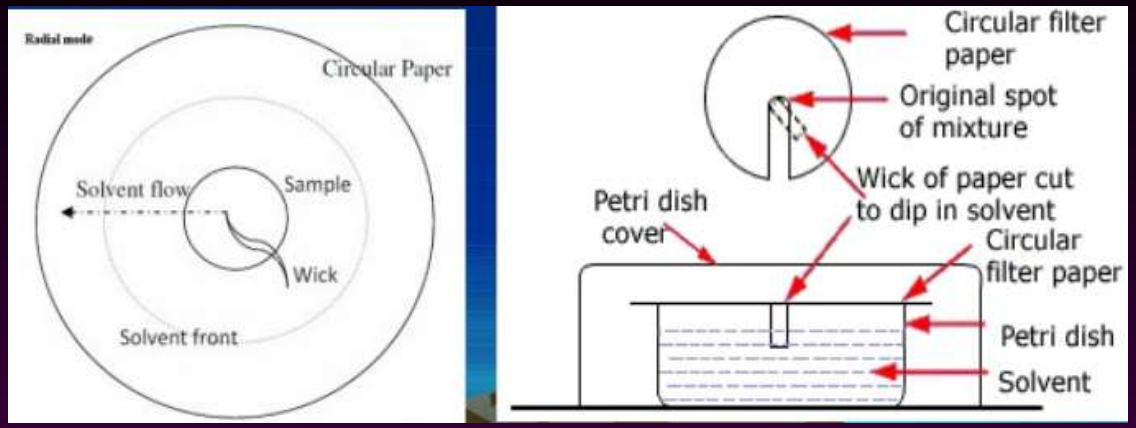
**Ascending chromatography**: As the name indicates, the chromatogram ascends. Here the development of paper occurs due the solvent movement or travel in upward direction on the paper.



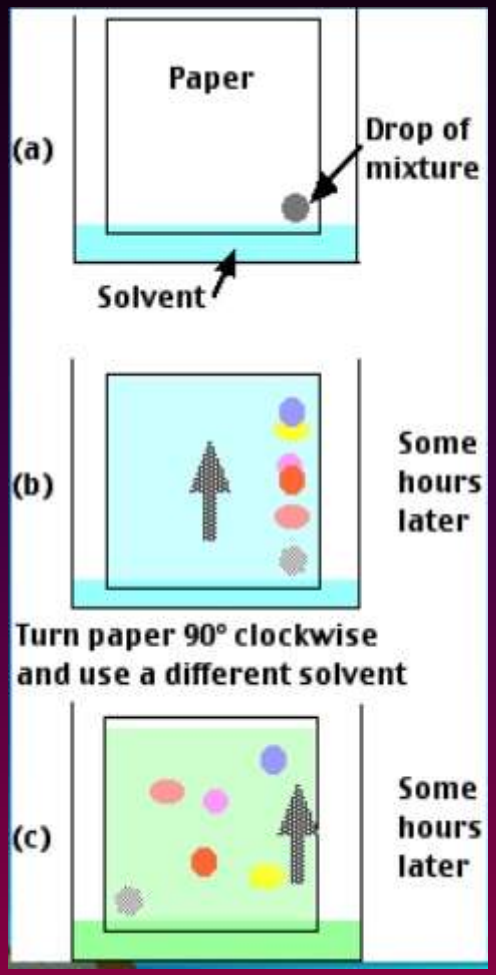

**Descending chromatography**: Here the development of paper occurs due to solvent travel downwards on the paper.

**Ascending- descending mode**: Here solvent first travels upwards and then down wards on the paper.

**Radial mode**: Here the solvent travels from center(mid point) towards periphery of Circular chromatography paper.




**Two dimensional chromatography**: Here the chromatogram development occurs in two directions at right angles.



# Rf ( Retention Factor )Value

$$Rf = \frac{\text{distance traveled by component from application point}}{\text{distance traveled by solvent from application point}}$$

# How to Perform Paper Chromatography?

# 1. Preparing the Paper Strips

- Cut the filter paper into 5 x4 measurement.
- Draw a line 0.5 cm above the bottom edge of the strip with the pencil.
- Label each strip with its corresponding solution.
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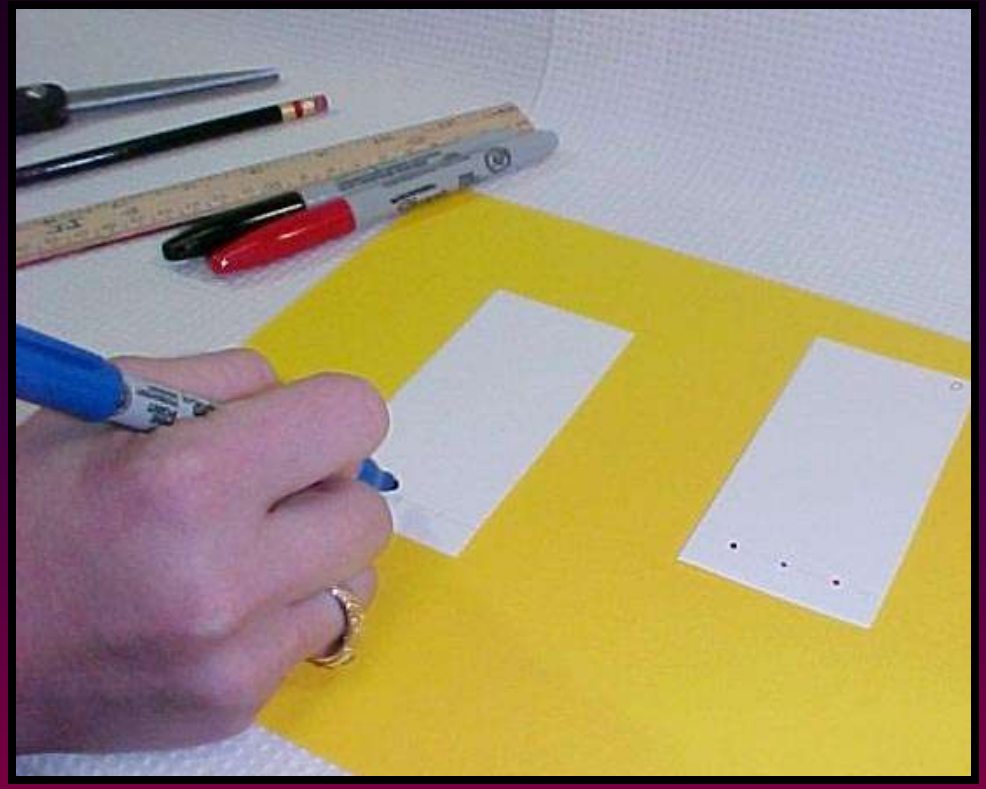
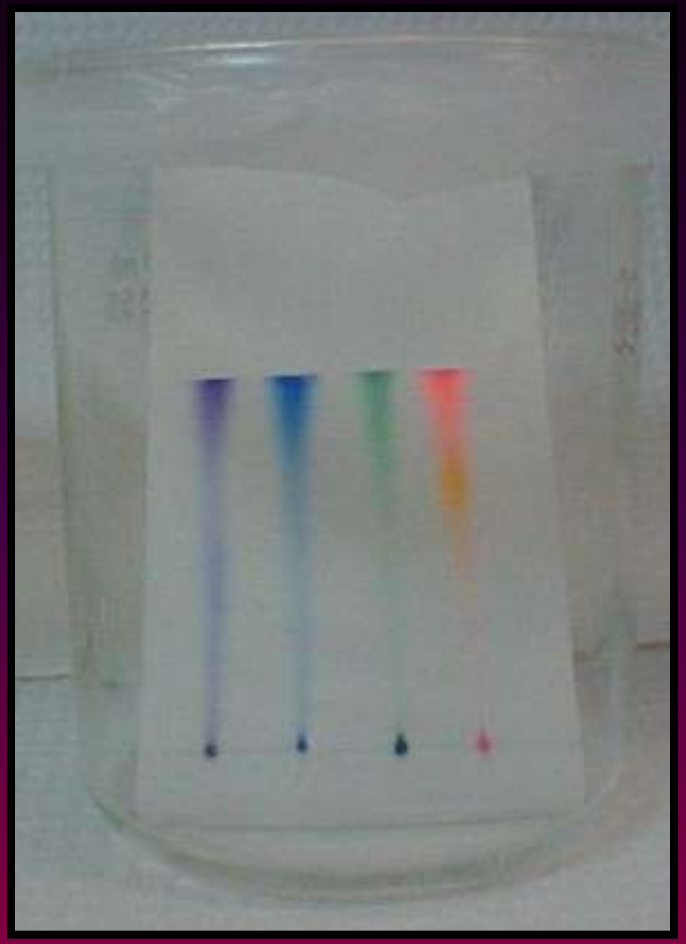
- Place a spot from each pen on your starting line.

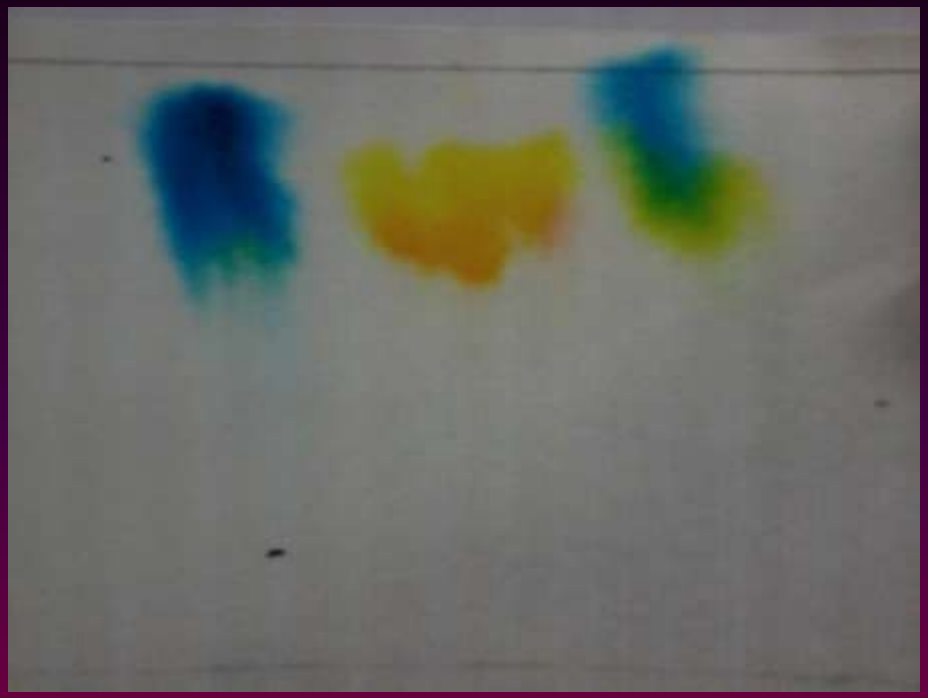


# 2. Developing the Chromatograms

- Place the strips in the beakers.
- Make sure the solution does not come above your start line.
- Keep the beakers covered.
- Let strips develop until the ascending solution front is about 2 cm from the top of the strip.
- Remove the strips and let them dry.

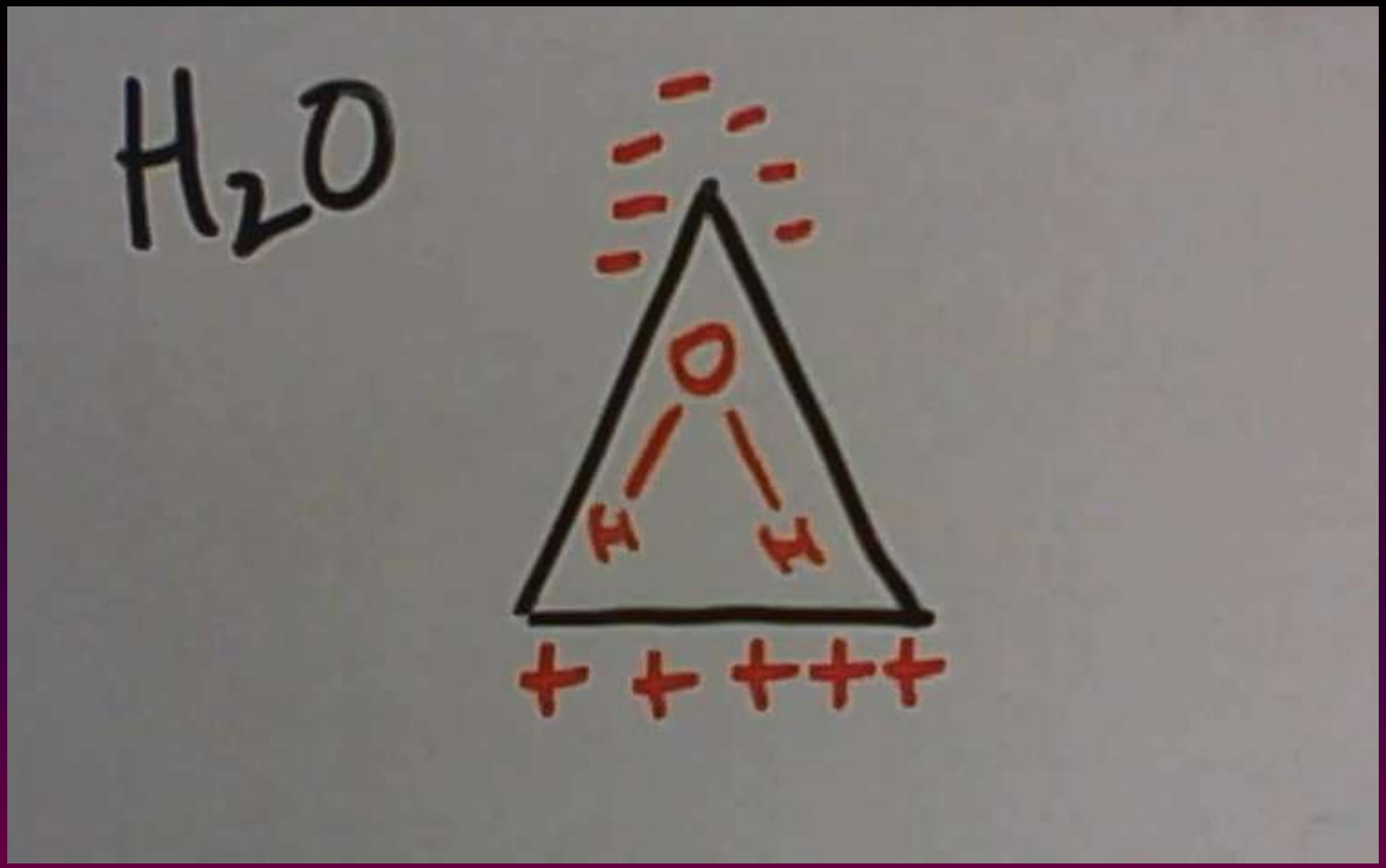


# 3. Calculate the Rf value and make conclusions.

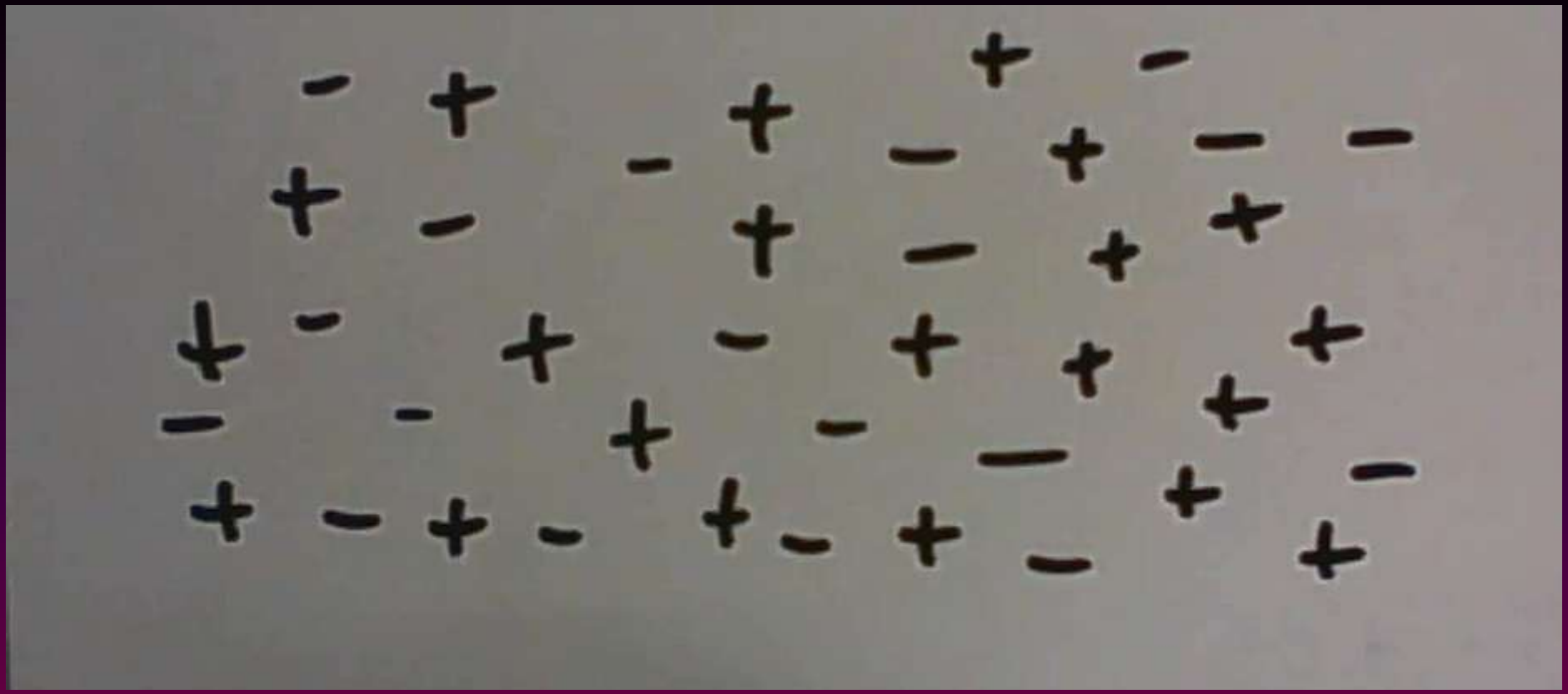


Paper Chromatography result I- Blue II- Yellow III- Green

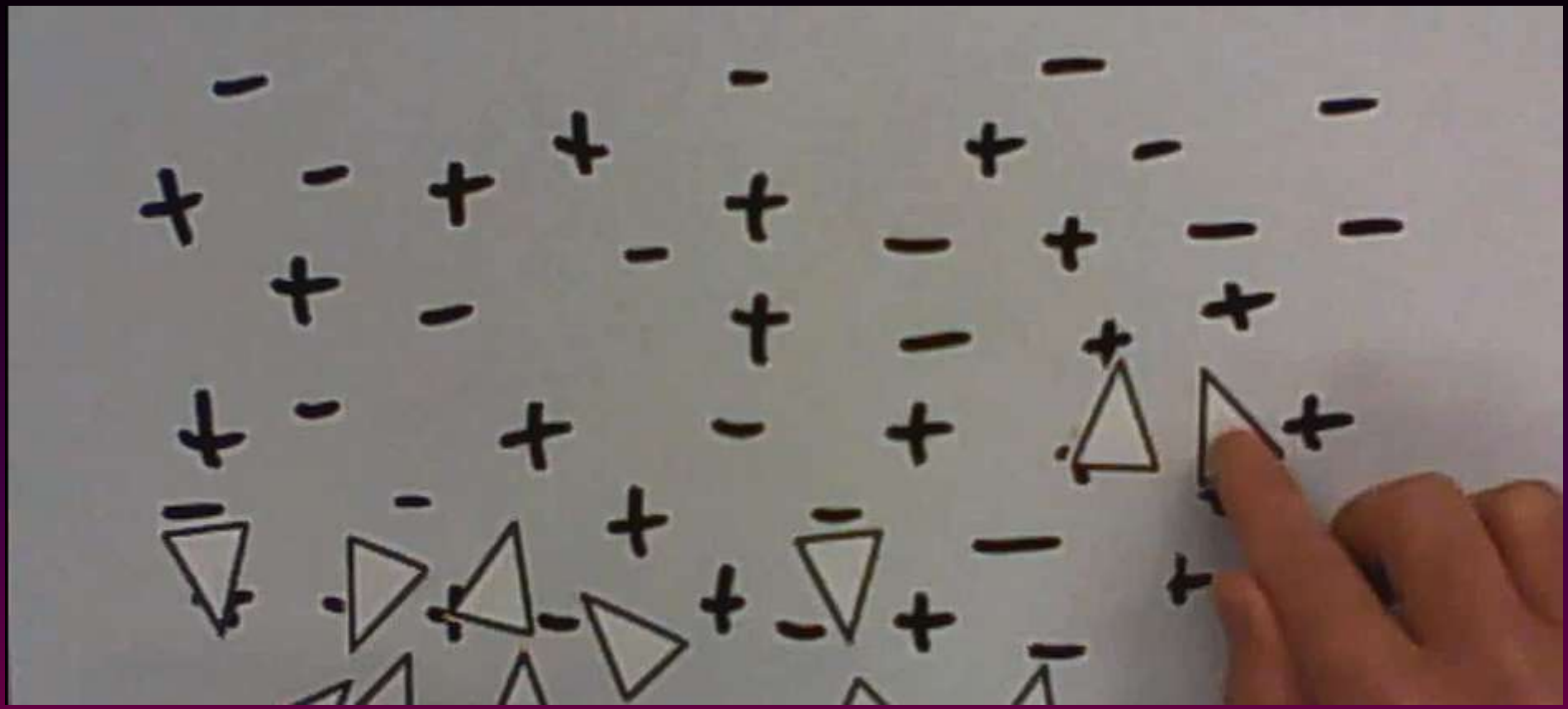
# How does Paper Chromatography work?



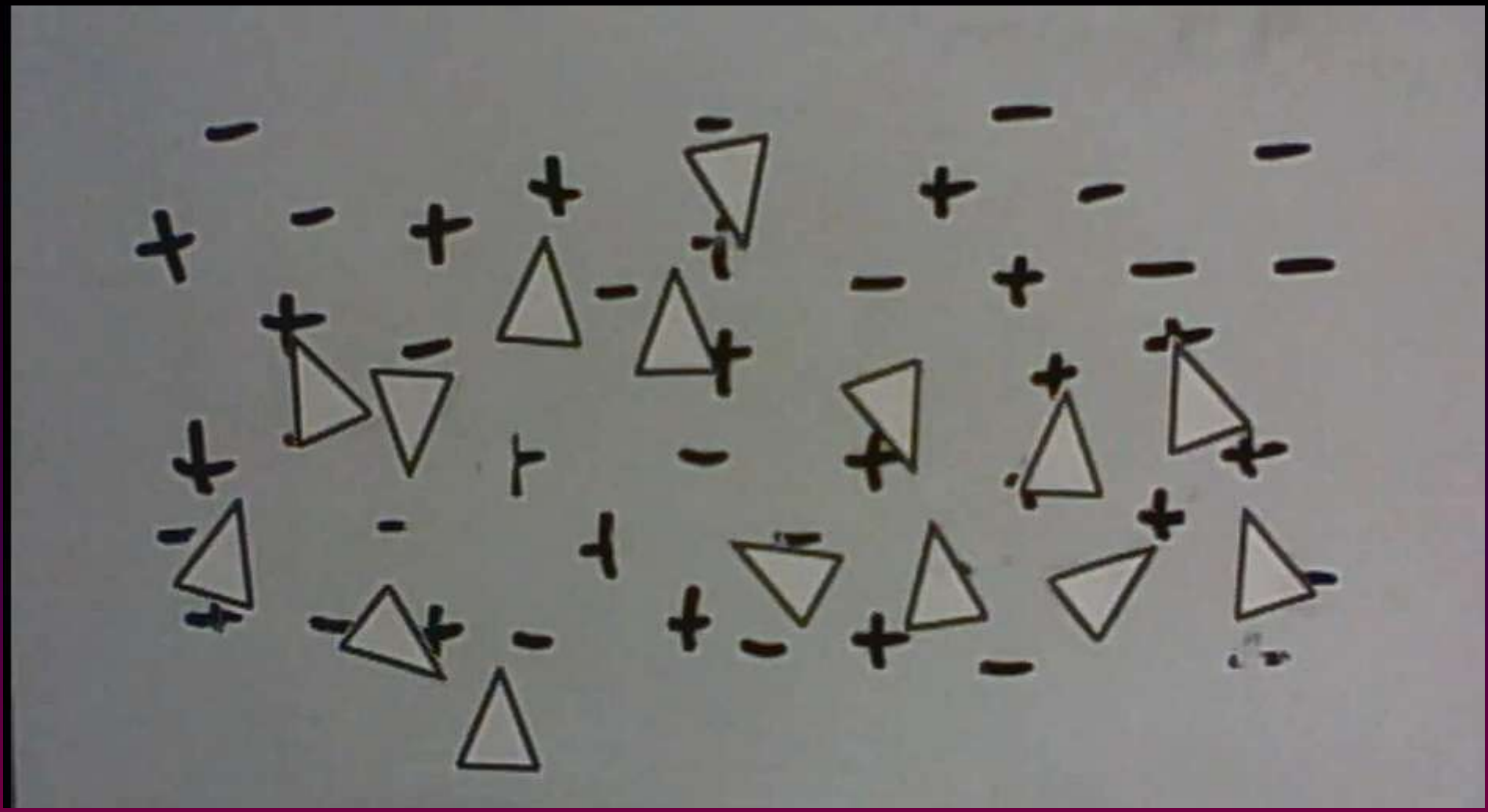

Property of Water



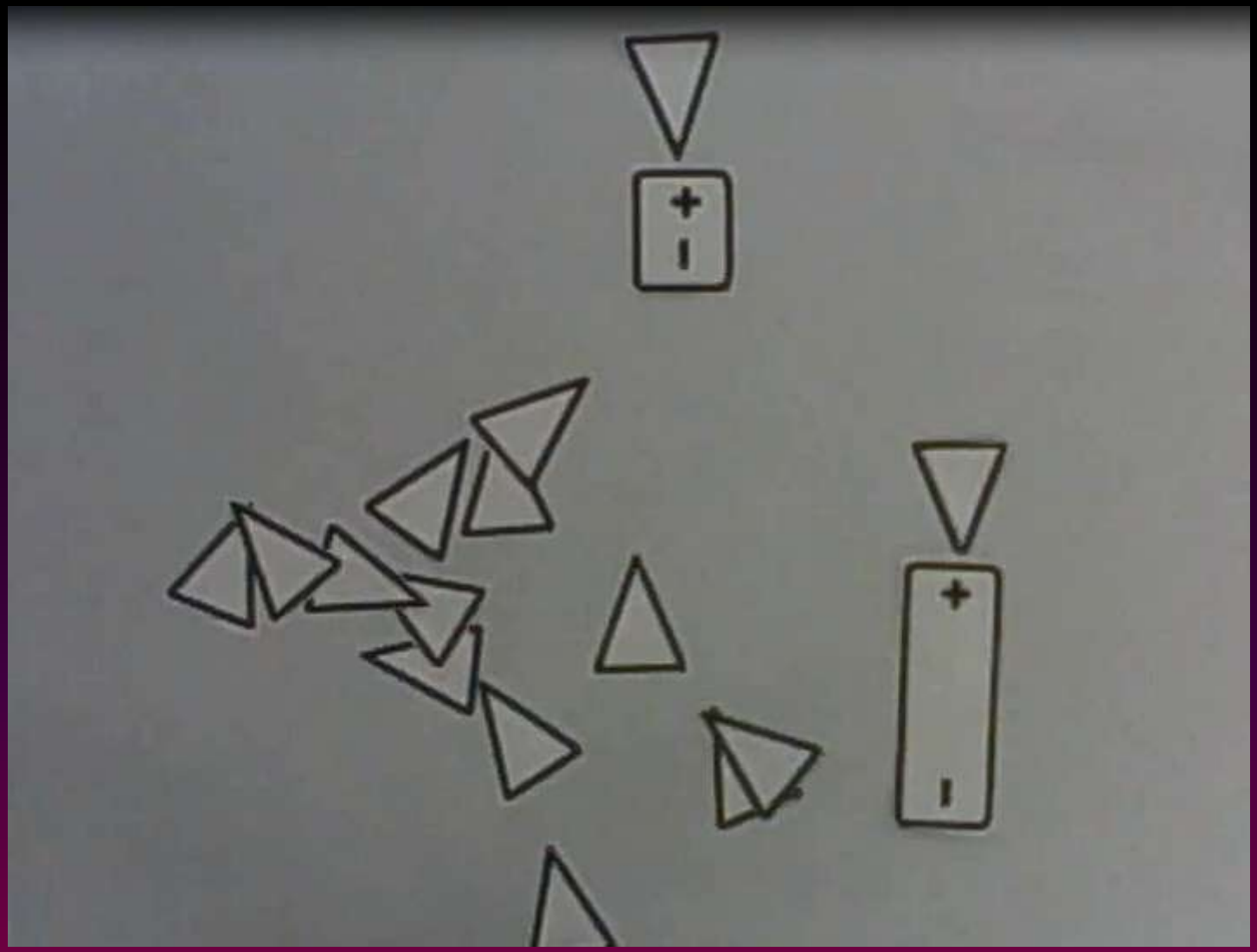
Property of the Paper



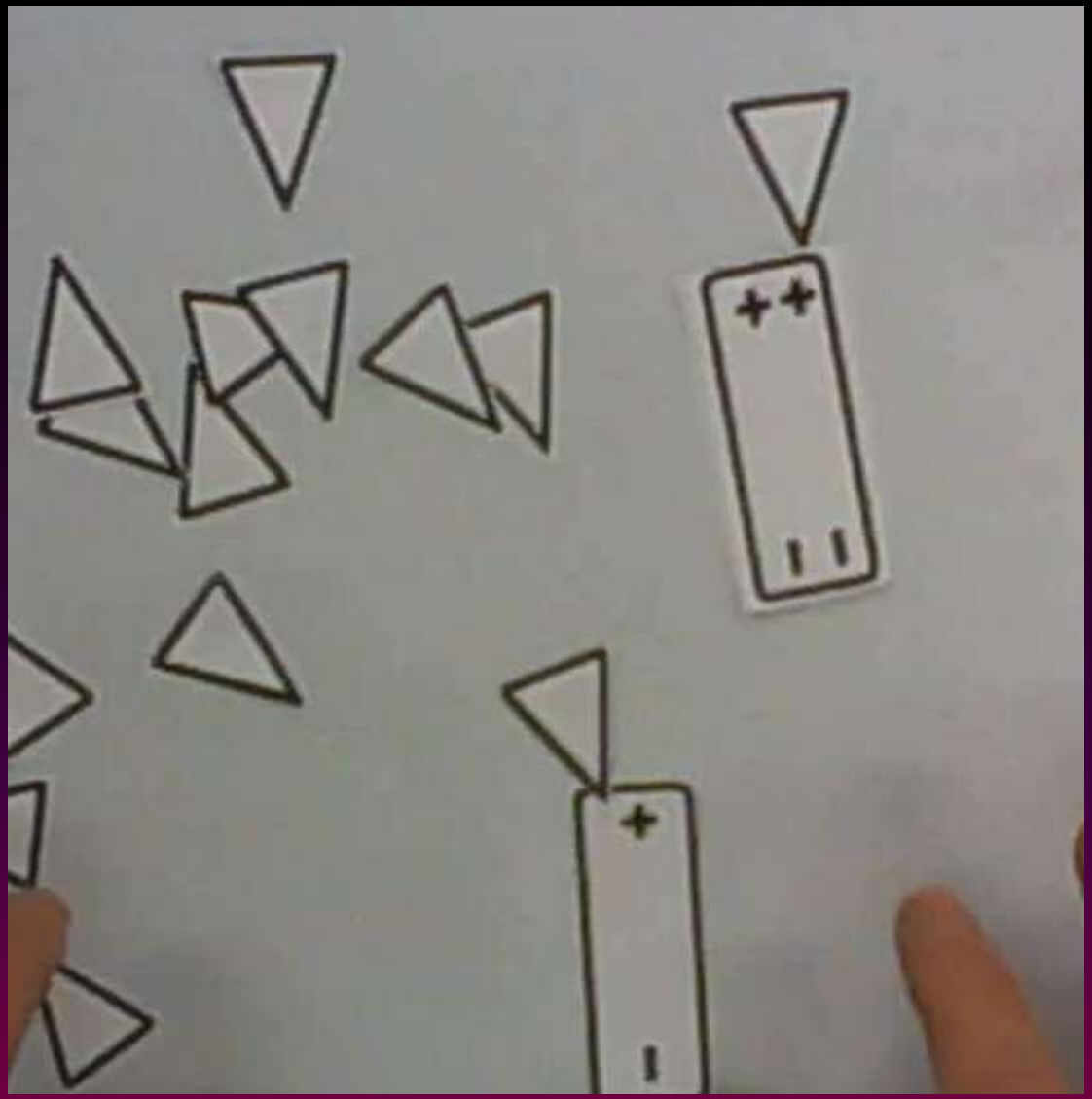
Attraction of the water molecules to the molecules of the glucose in the paper



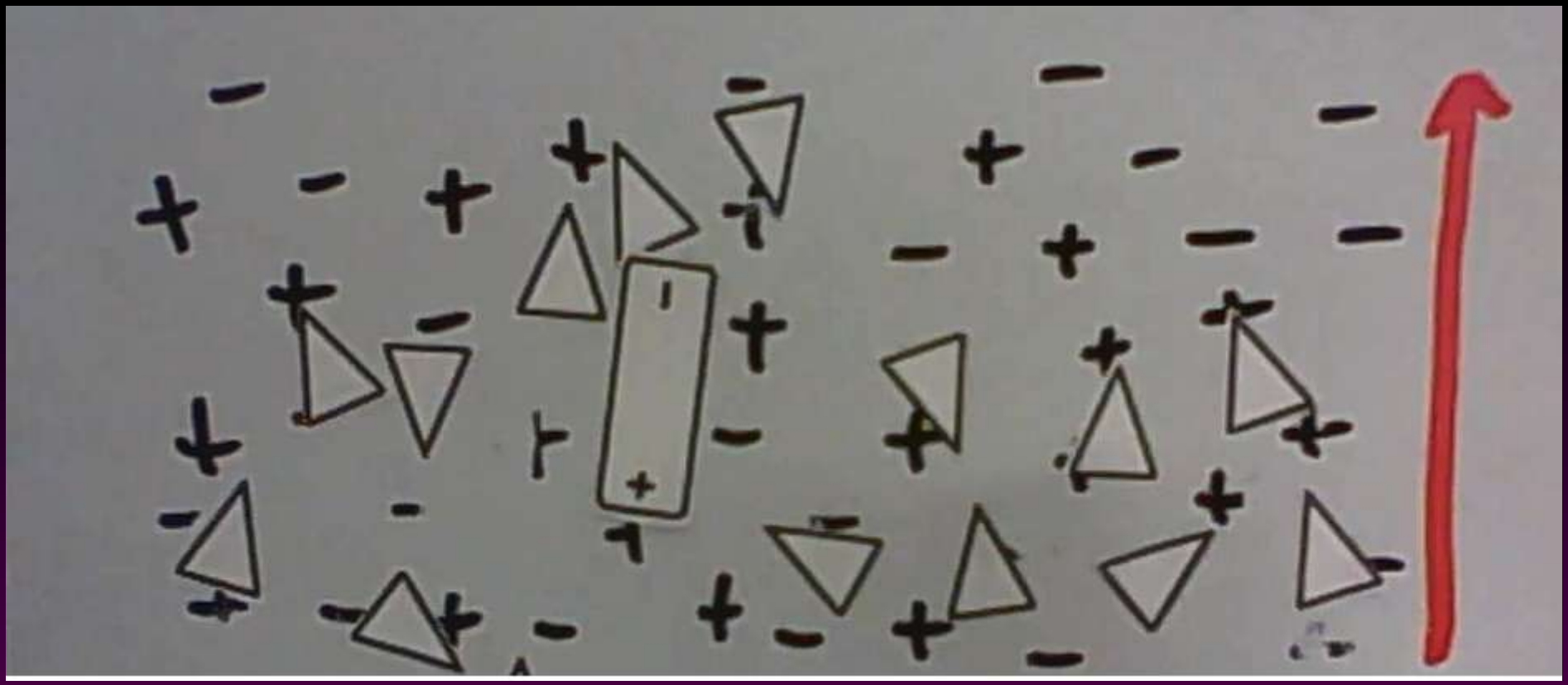
Water molecules thoroughly scattered throughout the paper




Property of dye:
Smaller- rise up faster than the bigger dye molecule



Dye molecules with more amount of charge rise up faster than the other one that did not



Dipole-dipole interaction of water molecules ( polar ) and dye molecules ( polar )

Prepared by:
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