CHAPTER 2 EXPERIMENTAL TECHNIQUES

11C UNDARGA

MEASUREMENT

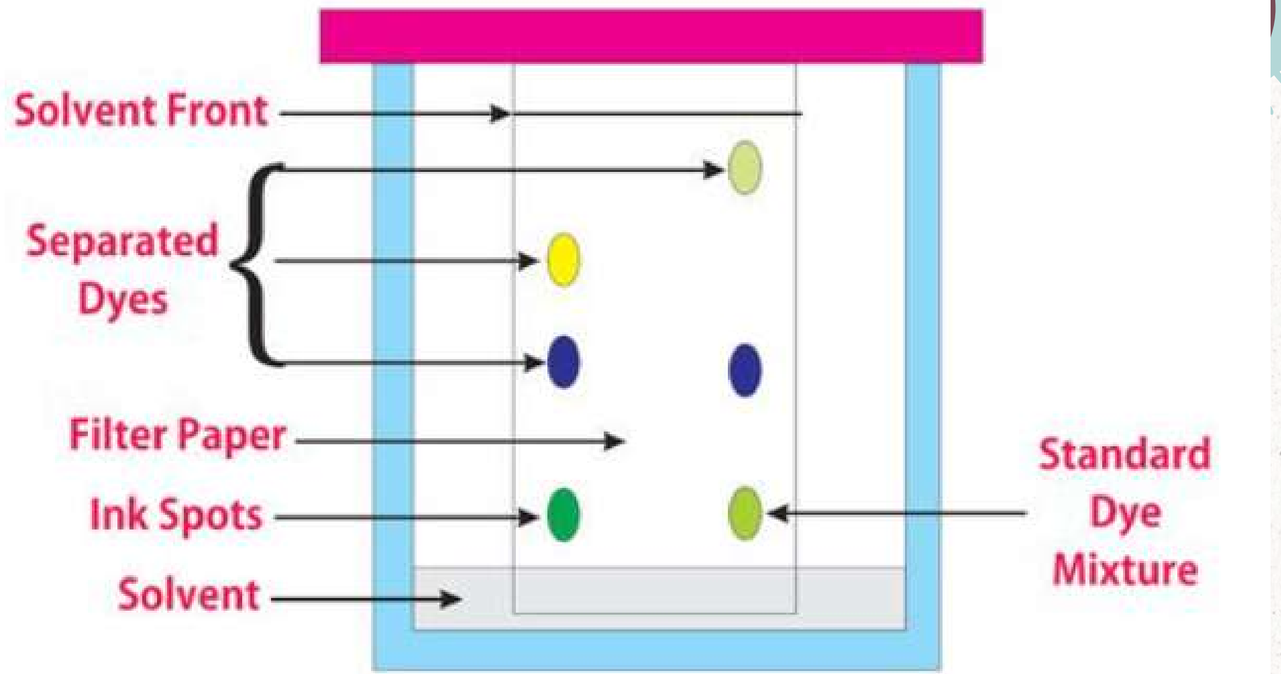
VARIABLE	APPARATUS
• Time	• Stopwatch or Clock
• Temperature	• Thermomemeter (liquid in glass, thermistor or thermocouple)
• Mass	• Balance

MEASURING VOLUME: BEAKER , BURETTE, PIPETTE , MEASURING CYLINDER , GAS SYRINGE

PURITY

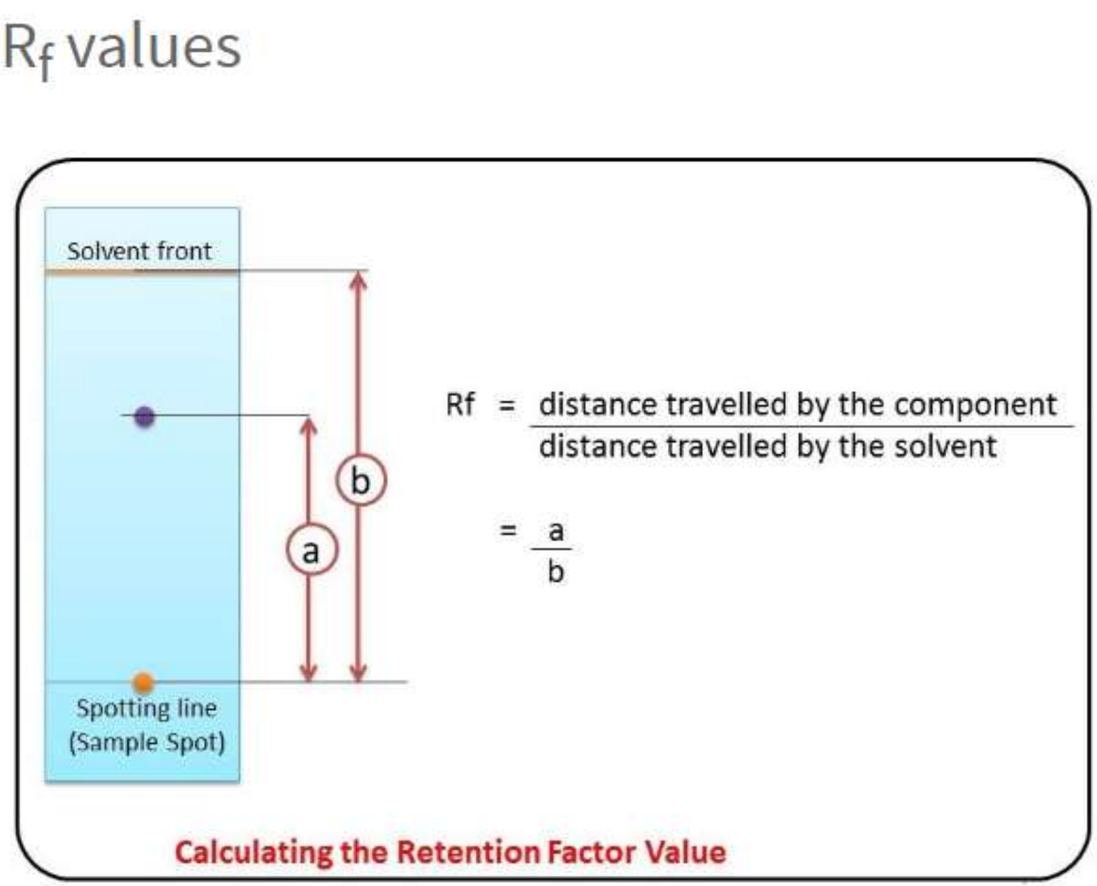
PAPER CHROMATOGRAPHY IS USED TO SEPARATE MIXTURES OF SOLUBLE SUBSTANCES. THESE ARE OFTEN COLOURED SUBSTANCES SUCH AS FOOD COLOURINGS , INKS, DYES OR PLANT PIGMENTS. PAPER CHROMATOGRAPHY:

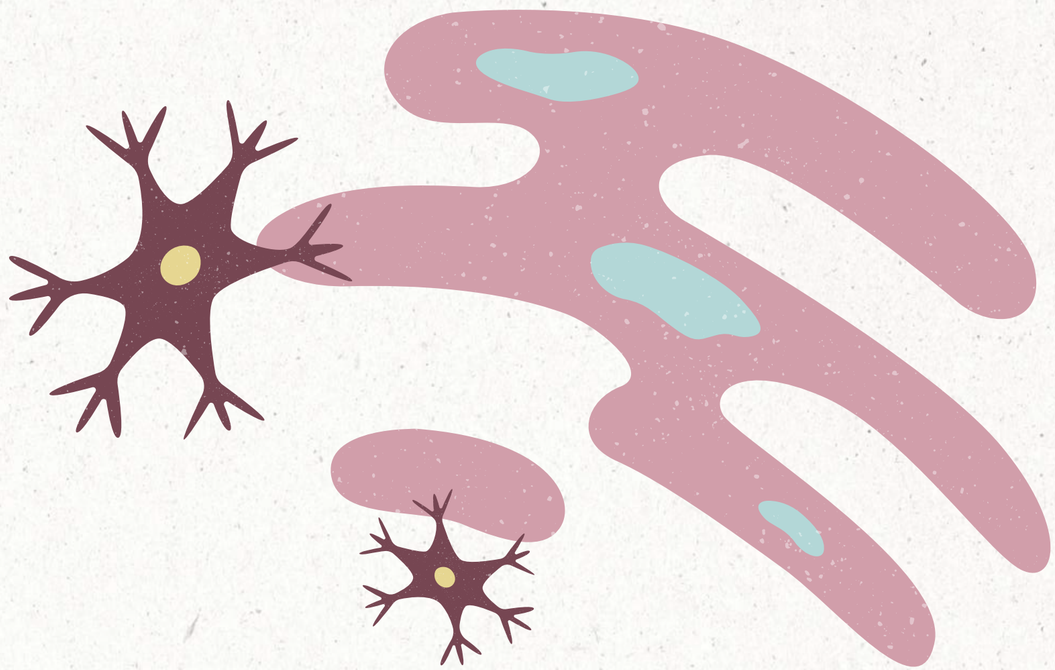
DROP SUBSTANCE TO CENTER OF FILTER PAPER AND ALLOW IT TO DRY
DROP WATER ON SUBSTANCE, ONE DROP AT A TIME
PAPER + RINGS = CHROMATOGRAM.
SUBSTANCES TRAVEL ACROSS PAPER AT DIFFERENT RATES WHICH IS WHY THEY SEPARATE INTO RINGS
METHOD WORKS BECAUSE DIFFERENT SUBSTANCES TRAVEL AT DIFFERENT LEVELS OF ATTRACTION TO IT



- STATIONARY PHASE IS MATERIAL ON WHICH SEPARATION TAKES PLACE
- MOBILE PHASE CONSISTS OF THE MIXTURE YOU WANT TO SEPARATE, DISSOLVED IN A SOLVENT.

RF VALUES

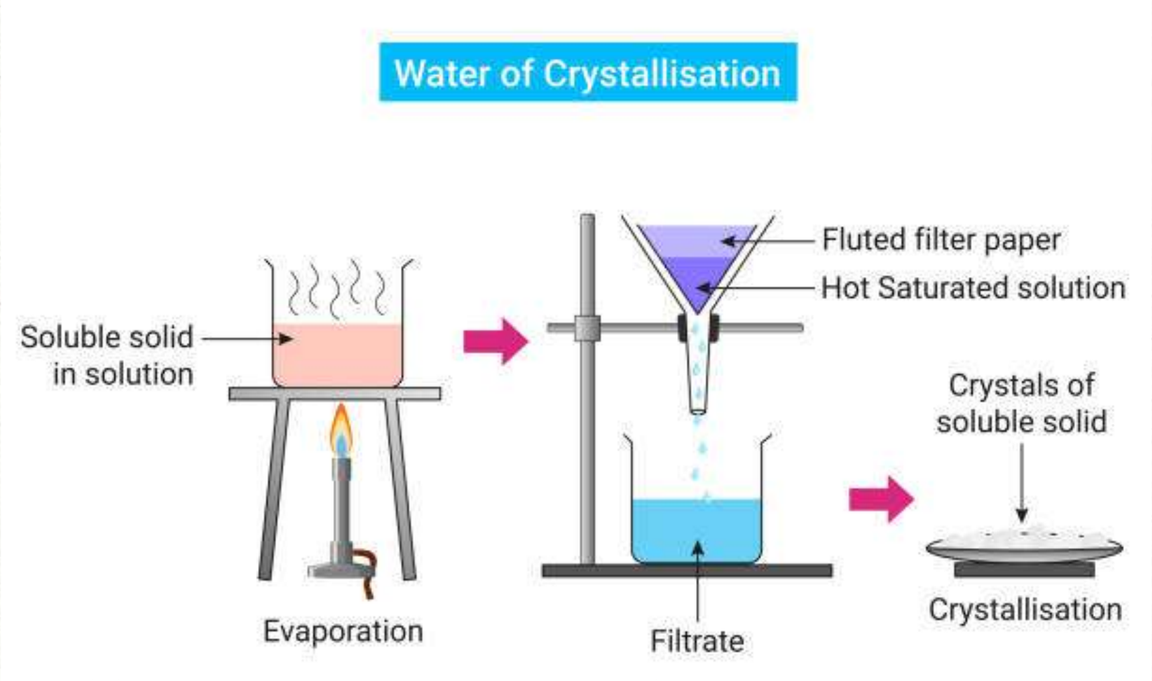




CHROMATOGRAMS OF PURE AND IMPURE SUBSTANCES

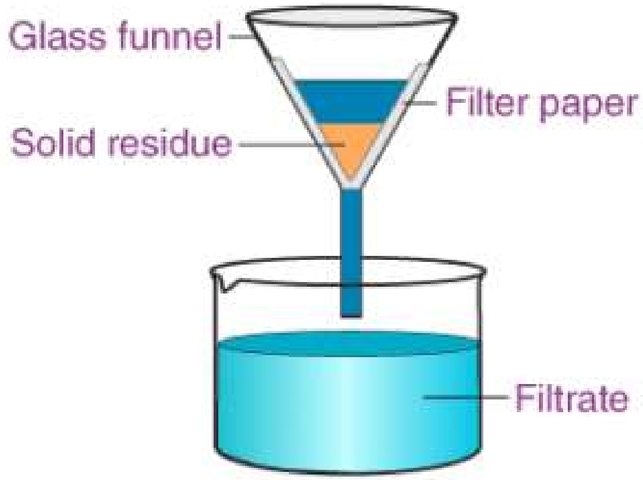
A PAPER CHROMATOGRAM CAN BE USED TO DISTINGUISH BETWEEN PURE AND IMPURE SUBSTANCES:

- A PURE SUBSTANCE PRODUCES ONE SPOT ON THE CHROMATOGRAM
- AN IMPURE SUBSTANCE PRODUCES TWO OR MORE SPOTS



01 FILTRATION

- MIXTURE GOES IN A FUNNEL WITH FILTER PAPER, INTO A FLASK.
- RESIDUE IS INSOLUBLE AND STAYS AT TOP.
- FILTRATE GOES THROUGH



Filtration process

02 CRYSTALLISATION

- SOME WATER IN THE SOLUTION IS EVAPORATED SO SOLUTION BECOMES MORE CONCENTRATED.
- A DROP IS PLACED ON A SLIDE TO CHECK IF CRYSTALS ARE FORMING.
- SOLUTION IS LEFT TO COOL AND CRYSTALLISE.
- CRYSTALS ARE FILTERED TO REMOVE SOLVENT.

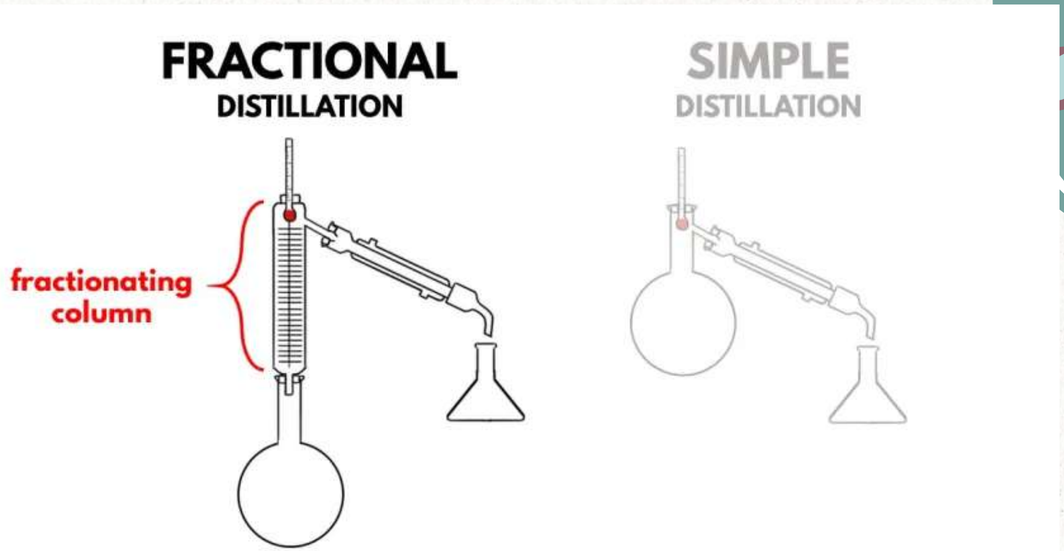
03 FRACTIONAL DISTILLATION

- REMOVES A LIQUID FROM A MIXTURE OF LIQUIDS, BECAUSE
LIQUIDS HAVE DIFFERENT B.P.S
- MIXTURE IS HEATED TO EVAPORATE SUBSTANCE WITH LOWEST
B.P.
- SOME OF THE OTHER LIQUID(S) WILL EVAPORATE TOO.
- A MIXTURE OF GASES CONDENSE ON THE BEADS IN THE FRACTIONAL COLUMN.
- SO THE BEADS ARE HEATED TO THE BOILING POINT OF THE
LOWEST SUBSTANCE, SO THAT SUBSTANCE BEING REMOVED CANNOT CONDENSE ON THE BEADS.
- THE OTHER SUBSTANCES CONTINUE TO CONDENSE AND WILL DRIP
BACK INTO THE FLASK.

04 SIMPLE DISTILLATION

- IMPURE LIQUID IS HEATED
- IT BOILS, AND STEAM RISES INTO THE CONDENSER
- IMPURITIES ARE LEFT BEHIND.

CONDENSER IS COLD SO STEAM CONDENSES TO THE PURE LIQUID AND IT DROPS INTO THE BEAKER



METHODS

Separation Techniques

Method of Separation	What to Separate?
Magnetic Attraction	Magnetic materials from non-magnetic materials
Filtration	A solid from a liquid
Crystallization	A solid from a solution
Simple Distillation	A solvent from a solution
Fractional Distillation	Liquids from each other
Chromatography	Different substances from a solution
Solvent Extraction	A component from a mixture with a suitable solvent **Water** dissolves some salts, sugar **White spirit** dissolves paint **Propanone** dissolves grease, nail polish **Ethanol** dissolves glues, printing inks, scented substances

SOLVENT	IT DISSOLVES...
Water	Some salts, sugar
White spirit	Gloss paint
Propanone	Grease, nail polish
Ethanol	Glues, printing inks, scented substances