



LESSON PLAN [2019 - 2020]

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Chemistry	35 Min Pd 1	July	Is Matter Around us Pure?	Physical & chemical changes

Expected Learning Outcome: Students will be able to

- 1) Define a physical changes
- 2) Define a chemical change
- 3) Differentiate between a physical and chemical change.

Expected skill development:

- Observation skill
- Critical thinking and communication

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction-

Q.1 What is the chemical formula of steam?

Q.2 Write the chemical equation for the following change (on black board)

Water, heat, steam

Q.3 Do you see any change in the chemical composition?

Q.4 Do you see any change in the physical state? (10 min)

Content

What is a physical change? [A change in which only the physical properties of the substance get changed, while its chemical composition remains unchanged] + Examples.

Q.5 Have you ever seen a rusted piece of iron? (5 min)

Q.6 Can you get the wasted metal back?

Q.7 What is the chemical formula of rust?

Q.8 Is it different from the chemical symbol of metal?

Explanation- What is a chemical change? (A change is which chemical composition & chemical properties of the reacting substances undergo a change)+examples (10min)

Differentiate between a physical and chemical change on the basis of: (5 min)

- Change in properties
- Formation of new substance.
- Reversible / irreversible.
- Obtaining of original substances.

Closure

Teaching Methodology

- Activity
- Questionnaire
- Discussion

Think Line : (C.W)

LPG is stored in a cylinder as a liquid. When you burn it in a stove, it is in gaseous form? What kind of changes occurs during the use of LPG? (5 min)

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

Q.1 What is the chemical formula of steam?

Q.2 Write the chemical equation for the following change (on black board)

Water, heat, steam

Q.3 Do you see any change in the chemical composition?

Q.4 Do you see any change in the physical state?

Q.5 Have you ever seen a rusted piece of iron?

Q.6 Can you get the wasted metal back?

Q.7 What is the chemical formula of rust?

Q.8 Is it different from the chemical symbol of metal?

- Evaluation/Assessment:
 - Classroom Discussion
 - Oral Questionnaire,

Learners on the way
Direct questions will be asked

- 1) How can you convert water to ice?
- 2) Does the ice melt into water ?
- 3) Can the digested food be turned into

Advanced Learners
The ' Sea-water' can be classified as a homogeneous as well as heterogeneous mixture. Comment.

its original form?	
Materials needed/Resources: NCERT Text Book, Notebook, chalk, duster, pencil, eraser.	
Common Misconceptions: Burning of candle is a chemical change	Addressing the misconceptions: Explanation through a lighted candle- Melting of wax (physical) Burning of candle involves- Burning of wax vapours (chemical)

Home Assignment: Classify the following as chemical or physical changes:

- (a) Cutting of trees,
- (b) Melting of butter in a pan,
- (c) Rusting of almirah,
- (d) Boiling of water to form steam,
- (e) Passing of electric current, through water and the water breaking down into hydrogen and oxygen gases,
- (f) Dissolving common salt in water,
- (g) Making a fruit salad with raw fruits,
- (h) Burning of paper and wood.

(5 min)

**LESSON PLAN [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Chemistry	35 Min Pd 2	July	Is Matter Around Us Pure	Classification of Matter

Expected Learning Outcome: Students will be able to

- 1) Classify matter on the basis of chemical composition.
- 2) Define – ‘Element’ ‘Compound’ & ‘Mixture’ + ‘Homogeneous’ & ‘Heterogeneous mixture’
- 3) Identify and distinguish between the different types of mixtures.

Expected skill development:

- Observation skill
- Analytical skill
- Critical thinking and communication

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

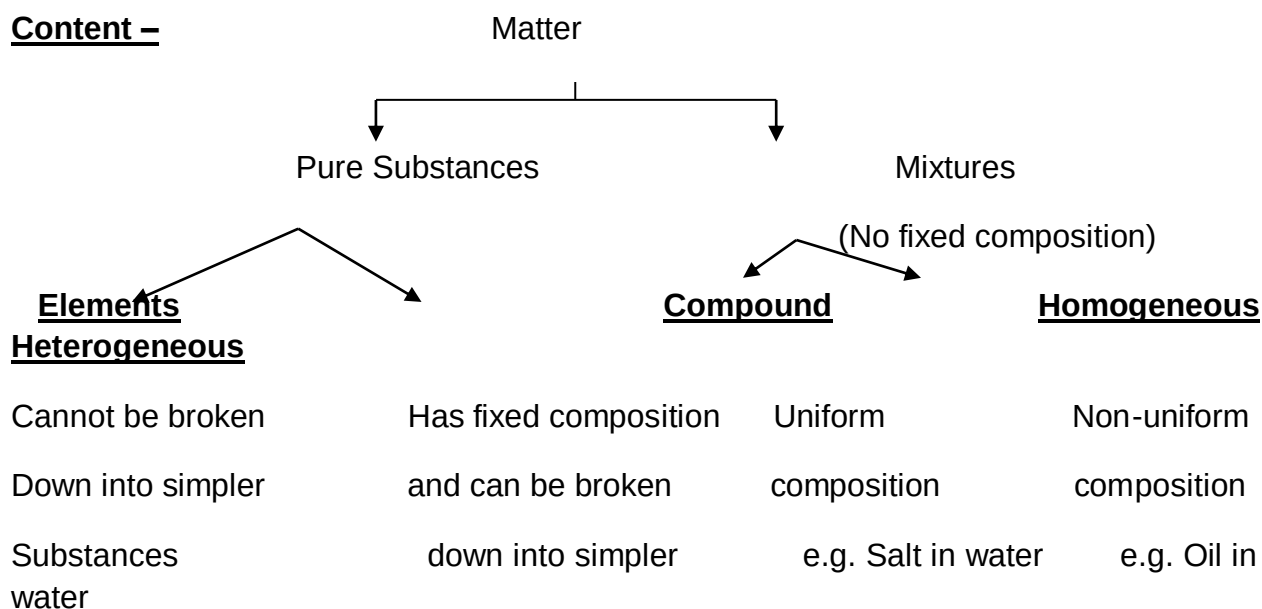
Introduction : Q.1 Can love, hate humanity be considered as matter?

Q.2 How can you classify matter on the basis of physical nature?

Q.3 Name the 4th state of matter. [5 min]

Matter can also be classified on the basis of chemical composition as – 15min

Content –



Eg. Copper

substances

e.g. Water

Samples of Iron Filings and sulphur would be shown, salt will be dissolved in water .

Teaching Methodology

- Activity
- Questionnaire
- Discussion
- Demonstration

Think Line

Water contains hydrogen, a highly inflammable gas and oxygen

Which is a supporter of combustion yet, water is used to extinguish fire. Justify?

Closure

Oral recapitulation will be done through the following questions:

Q.1 What is element?

Q.2 List 2 points of difference between homogeneous and heterogeneous mixtures.

Q.3 Differentiate between a compound and mixture (10 min)

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

Q.1 What is the chemical formula of steam?

Q.2 Write the chemical equation for the following change (on black board)

Water, heat, steam

Q.3 Do you see any change in the chemical composition?

Q.4 Do you see any change in the physical state?

Q.5 Have you ever seen a rusted piece of iron? [5 min]

Q.6 Can you get the wasted metal back?

Q.7 What is the chemical formula of rust?

Q.8 Is it different from the chemical symbol of metal?

• Evaluation/Assessment: ➤ Classroom Discussion ➤ Oral Questionnaire,	
Learners on the way Q.1 Is milk a pure substance Q.2 Is air a matter? Q.3 Why is CO ₂ regarded as a compound and not a mixture?	Advanced Learners Explore on the purity of a) 24 carat gold. b) 22 carat gold
Materials needed/Resources: NCERT Text Book, Notebook, chalk, duster, pencil, eraser.	
Common Misconceptions: Students might misunderstand pure and impure substances in terms of adulterated and non – adulterated substances	Addressing the misconceptions:

Home Assignment:

(5 min)

Q1. What is meant by a pure substance?

Q2. List the points of differences between homogeneous and heterogeneous mixtures.

Q3. Classify each of the following as a homogeneous or heterogeneous mixture. soda water, wood, air, soil, vinegar, filtered tea.

Q4. How would you confirm that a colourless liquid given to you is pure water?

Q5. Classify the following into elements, compounds and mixtures.

(a) Sodium (b) Soil (c) Sugar solution (d) Silver (e) Calcium carbonate (f) Tin (g) Silicon



LESSON PLAN [2019 - 2020]

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Chemistry	35 min Pd 3	July	Is Matter Around Us Pure?	Elements compounds and mixtures
Expected Learning Outcome: Students will be able to - Distinguish between an element and compound using iron filings and sulphur powder. - Distinguish between the mixture and compound.						
Expected skill development: - Observation skill - Analytical skill - Critical thinking and communication						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction

Q1- Segregate the elements and compounds on the basis of the list given below :

Silver, limestone, sodium, baking soda, carbon. (10 min)

Content Demonstration of an activity

a) To prepare

(i) Mixture and (ii) a compound using iron filings and sulphur powder.

(b) To distinguish between mixture and compound on the basis of

- (i) Appearance (ii) behavior towards a magnet
- (c) Behavior towards carbon disulphide as a solvent

(d) Effect of heat (15 min)

China dish (1)

China dish+ Sulphur powder
+iron filings

China dish (2)

China dish+ sulphur powder
+iron filings + heat-> black mass

Q.1 How does it appear?

Q.2 Roll the magnet over china dish (1) and (2) and record your observations.

Q.3 Take a pinch from (1) and add to the test tube containing carbon disulphide solution.

Q.4 Heat the china dish (1) and (2) over the flame and note down the effect of heat in both the cases.

Q.5 Mixture (1)+ dil HCl + Heat $\rightarrow$ H₂ gas

Mixture (2)+ dil HCl + heat $\rightarrow$ H₂S gas.

Closure

Oral recapitulation of discussed topic by a group of 4 students

Think line:

(5 min)

An element is sonorous and highly ductile. Under which category would you classify this element? What other characteristics do you expect the element to possess?

Teaching Methodology

- Activity/Demonstration
- Questionnaire

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

Q1. What is a mixture?

Q2. How is a mixture different from a compound?

- Evaluation/Assessment:
 - Classroom Discussion
 - Oral Questionnaire,
 - Evaluation on the basis of answers in group discussion
 - Observing the facial expressions and body language.

Learners on the way
Will you classify the following substances as mixture or compound ?

CaCO₃ , salt solution , air , soil , NaOH

Advanced Learners
Sucrose (sugar) crystals obtained from sugarcane and beet root are mixed together. Will it be a pure substance or a mixture? Give reason for the same.

Materials needed/Resources:

China dish, iron filings, sulphur, burner, magnet, carbon disulphide, dil HCl.

Common Misconceptions: Students might face difficulty in understanding the solubility of sulphur in CS_2 solvent and not in water.	Addressing the misconceptions: Practical demonstration of solubility of sulphur in carbon disulphide will be done in class.
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Home Assignment:

Q1 Classify the following into elements, compounds and mixtures:

(a) Sodium (b) Soil (c) Sugar solution (d) Silver (e) Calcium carbonate (f) Tin (g) Silicon
(h) Coal (i) Air (j) Soap (k) Methane (l) Carbon dioxide (m) Blood

Q2 Classify the substances given in figure into elements and compounds:

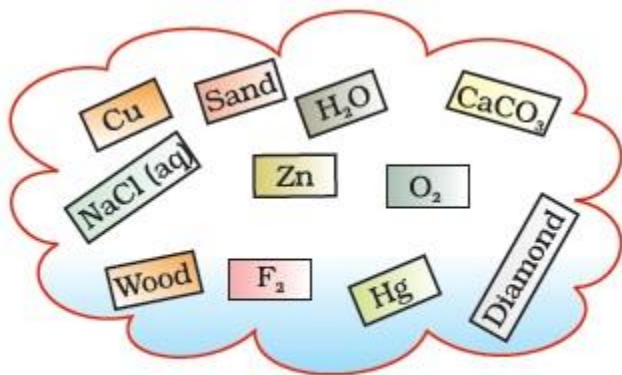


Fig. 2.2

(5 mins)



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LESSON PLAN [2019 - 2020]

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Chemistry	35 min Pd 4	July	Is Matter Around Us Pure?	Colloids
Expected Learning Outcome: Students will be able to 1. Enlist the characteristics of colloids 2. Name the dispersed phase and dispersion medium of different types of colloidal dispersions						
Expected skill development: • Observation skill • Analytical skill • Critical thinking and communication						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Warm Up

Recapitulation of the previous topic through the following questions:

Q.1 Name the type of solution formed when

- a) Salt is dissolved in water
- b) Flour is mixed in water
- c) Egg albumin is dissolved in water

Exp. Ans. A) True solution (b) Suspension (c) Colloid

Q.2 Enlist at least 3 characteristics of colloids

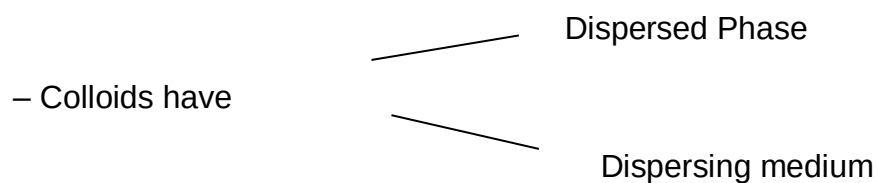
(5min)

Exp. Ans. :

- 1) Particles are not visible to the naked eye
- 2) Homogeneous looking but actually heterogeneous
- 3) Stable.

Teaching Methodology

- Activity
- Questionnaire
- Discussion



<u>Dispersed</u> <u>Phase</u>	<u>Dispersing</u> <u>Medium</u>	<u>Type</u>	<u>Example</u>
Liquid	Gas	aerosol	Fog, cloud, mist
Solid	Gas	aerosol	Smoke
Gas	Liquid	foam	Shaving cream
Liquid	Liquid	emulsion	Milk, face cream
Solid	Liquid	Sol	Mud
Gas	Solid	foam	Foam, Sponge
Liquid	Solid	Gel	Jelly, cheese
Solid	Solid	Solid Sol	Coloured gemstone

Closure

Think Line

Smoke and fog both are aerosols. In what way are they different? (5 min)

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)
Questions asked in the class.
- Evaluation/Assessment:
 - Classroom Discussion
 - Oral Questionnaire,
 - Observing the facial expressions and body language.

Learners on the way Q.1 Give an example of a homogeneous mixture. Q.2 Name the solute and solvent in a salt solution.	Advanced Learners Explore on – Role of colloidal stabilizers in the medicinal industry.
Materials needed/Resources: Blackboard, chalk, copper sulphate salt, sand, starch powder, breaker, water, stirrer.	
Common Misconceptions: Milk forms a true solution on dissolving in water	Addressing the misconceptions: Particles of milk scatter light (Tyndall effect)

Home Assignment: Q1 Write dispersed phase , dispersion medium and two examples for each type of following colloids :

Aerosol , Foam , Emulsion , Sol , Gel , Solid sol

(5 min)

**LESSON PLAN [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Chemistry	35 min Pd 5	July	Is Matter Around us Pure?	Separating the components of a mixture
Expected Learning Outcome: Students will be able to 1. Explain the scientific principle, procedure and applications of methods involved to separate a) A solid from another solid by winnowing, handpicking, sieving, sublimation and magnetic separation method. b) Insoluble solids from liquids via sedimentation, decantation and filtration c) Pure solid from impure solid sample via crystallization.						
Expected skill development: • Observation skill • Analytical skill • Critical thinking and communication						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Warm Up

Student will be able to recall the previous knowledge through questionnaire-5 min

1. What are aerosols?
2. How are emulsions different from aerosols?
3. What is a gel?

Content

20 min

Q.1 How does your mother separate pebbles from rice while cooking?

Exp. Ans. By hands [Mentor – Handpicking]

Q.2 How is the chaff from the grain removed?

Ex. Ans. Winnowing

Q.3 If you are given a mixture of sand & pebbles, how would you separate them?

Exp. Ans. : By using a sieve.

Q.4 I have mixed salt and ammonium chloride by mistake, how can I recover ammonium chloride back?

Exp Ans. By Sublimation.

Q.5 The electromagnetic crane removes iron from junkyard through magnetic separation method. [10min]

Explanation – The above methods are used to separate a solid from another solid.

Demonstration : Sand + Water

Sedimentation	process of settling or being deposited as a sediment
Decantation	To separate insoluble solid from liquid
Filtration	Filtering tea by using Strainer

Explanation – To separate pure solid from impure solid sample, crystallization technique is used.

Procedure will be explained

Applications 1) Purification of salt that we get from sea water.

Separation of alum crystals from impure sample.

Teaching Methodology

- Activity/Demonstration
- Questionnaire

Closure

Think Line – Explain why filter papers cannot be used to separate colloids?

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)
How does your mother separate pebbles from rice while cooking?
How is the chaff from the grain removed?

If you are given a mixture of sand & pebbles, how would you separate them?

- Evaluation/Assessment:
Oral/ Written Questionnaire,

Learners on the way
Direct question will be asked to assess their observation and understanding –

Q.1 Suggest a method to separate chalk powder from water.

Advanced Learners
Q. You are provided with a mixture containing sand, iron fillings, ammonium chloride and sodium chloride. Describe the procedure you would use to separate these constituents from the mixture.

Q.2 Give an example of a sublimable substance.	
Materials needed/Resources: Black board, chalk, 2 beakers, sand, water, funnel, filter paper.	
Common Misconceptions: The salt obtained from sea water via evaporation is pure.	Addressing the misconceptions: Explanation will be given: Volatile impurities are removed but non- volatile impurities can only be removed by crystallization.

Home Assignment: Prepare the crystals of sugar at home via crystallization technique.
(5 min)



LESSON PLAN [2019 - 2020]

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Chemistry	35 min Pd 6	August	Is Matter Around Us Pure?	Separating the components of a mixture
Expected Learning Outcome: Students will be able to Explain the scientific principle, procedure and applications of methods involved to separate a) Soluble solid from its solution by evaporation. b) Pure solvent from the solution of a soluble salt by distillation c) The components of a mixture containing two miscible liquids having boiling point differing by 25K or more						
Expected skill development: • Observation skill • Analytical skill • Critical thinking and communication						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Warm Up

5 min

Calibration of the previous knowledge on Evaporation will be done through the following questions-

Q.1 What is evaporation?

Q2 List 2 points of difference between boiling and evaporation.

Content-

(15 min)

Q.3 How do we obtain salt from sea water?

Exp. Ans. Evaporation.

Q.4 Why does the salt not vapourise?

Exp. Ans: It does not vapourise on heating

Explanation by mentor : 1. Scientific Principle

2.Eg. Evaporation of ink

3. Applications

Discussion on the process of distillation by showing the apparatus (non-working)

Ex(1) acetone and water B.P. difference is more than 20°C so, simple distillation technique so. Principle/procedure/applications will be discussed.

Ex (2) Ethyl alcohol and water (boiling point difference is less than 25°C)

(78°C) (100°C)

Fractional distillation

(Same apparatus with additional fractionating column)

Closure

Think Line – While diluting a solution of salt in water, a student by mistake added acetone (boiling point 56°C). What technique can be employed to get back action? Justify your choice. (10 min)

Teaching Methodology

- Activity
- Questionnaire
- Discussion

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

Q.1 What is evaporation?

Q.2 List 2 points of difference between boiling and evaporation [5min]

Q.3 How do we obtain salt from sea water?

Exp. Ans. Evaporation.

Q.4 Why does the salt not vaporize?

- Evaluation/Assessment:
 - Classroom Discussion
 - Oral Questionnaire,
 -

Learners on the way
Q1 Write the difference between simple distillation and fractional distillation?

Advanced Learners
Higher order thinking skill questions will be asked .
Q.1 Why is a fractionating column used during the process of fractional distillation.

Materials needed/Resources:
Blackboard, chalk, distillation flask, condenser.

Common Misconceptions: Any two miscible liquids can be separated by simple distillation technique.	Addressing the misconceptions: Fractional distillation is used to separate the components of air as there, boiling point difference is less than 25K Oxygen = - 183°C Argon = - 186°C
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Home Assignment-

Complete the table :

(5 min)

<u>Mixture</u>	Separation Technique	Principle
1. Acetone+ Water		
2. Chalk powder + Water		
3. Components of Ink		

Q.2 Why is fractionating column with beads used for fractional distillation process ?

**LESSON PLAN [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Chemistry	35 min Pd 7	August	Is Matter Around Us Pure?	Separating the components of a mixture
Expected Learning Outcome: Students will be able to Explain the scientific principle, procedure and applications of methods involved to separate 1) Two immiscible liquids using a separating funnel. 2) Particles present in a liquid via centrifugation. The coloured components of a mixture by chromatography.						
Expected skill development: • Observation skill • Analytical skill • Critical thinking and communication						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Warm Up

5 min

Oral assessment of the previous topics will be done through the following questions.

Q.1 How can you separate acetone from water?

Q.2 What are the advantages of crystallization over evaporation ?

Q.3 How you separate tea leaves from tea ?

Content:

Q.4 How can you separate oil from water? (15 min)

Exp .Ans. Separating funnel [The apparatus will be shown]

Explanation (mentor) – (Sc. Principle) Immiscible liquids separate out in layers depending on their densities + Procedure and application will be discussed.

Q.5 What do you observe on churning the milk ?

Exp .Ans. – Cream is obtained.

[Explanation – Due to rapid churning the denser particles are forced to the bottom and the lighter particles stay at the top].

Applications – Blood/urine test/ separate butter from milk / in washing machines to squeeze out water from wet clothes

Q.6 How is the presence of drugs detected in blood ?

Ex. Ans. : Blood test.

Explanation (Mentor)

- Through chromatography, chromatographic paper will be shown and the procedure will be discussed.

Q.7 How do the components of the ink get separated.

Exp. Ans :- The coloured component which is more soluble in water, rises faster.

Q.8 What can be the applications of this technique.

Exp. Ans. Colors in a dye/pigments from natural colour.

Closure

Think Line :

Q1 Is whipped cream a colloid? If yes, what type? (5 min)

Teaching Methodology

- Activity
- Questionnaire

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

Q.1 How can you separate acetone from water?

Q.2 What are the advantages of crystallization over evaporation?

Q.3 How you separate tea leaves from tea.

- Evaluation/Assessment:
 - Classroom Discussion
 - Oral Questionnaire,

Learners on the way
Q1 Identify elements compounds and mixtures you find in and around your have (10 each)

Advanced Learners
Q1-Identify the areas of application of chromatography in your day to day life?

Materials needed/Resources:
Separating funnel, chromatographic paper, black ink, pencil ruler, blackboard, chalk.

Common Misconceptions:
There is no difference between ordinary

Addressing the misconceptions:
The two different types of paper will be shown and pore

filter paper and chromatography paper	size will be discussed.
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Home Assignment

Q1-What type of mixtures are separated by the technique of crystallization?

Q2 A mixture of salt and sugar is prepared by grinding them together do the molecules of salt and sugar undergo any change?

**LESSON PLAN [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Chemistry	35 min Pd 8	August	Is Matter Around Us Pure?	Separation of components of a mixture
Expected Learning Outcome: Students will be able to 1) Separate a pure substance from a mixture by using a combination of various methods. 2) Outline the steps to separate the constituents of air.						
Expected skill development: • Observation skill • Analytical skill • Critical thinking and communication						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Warm Up

5 min

To recall the previous topics discussed in class, following questions will be asked-(5min)

Q.1 Name the separation technique involved in the separation of :

- a) Butter from curd b) Salt from sea water c) Camphor from salt
d) Iron pins from sand e) Wheat grains from husk

Contents-

(15min)

1. How can you separate the constituents of mixture containing ammonium chloride sand and iron filings?

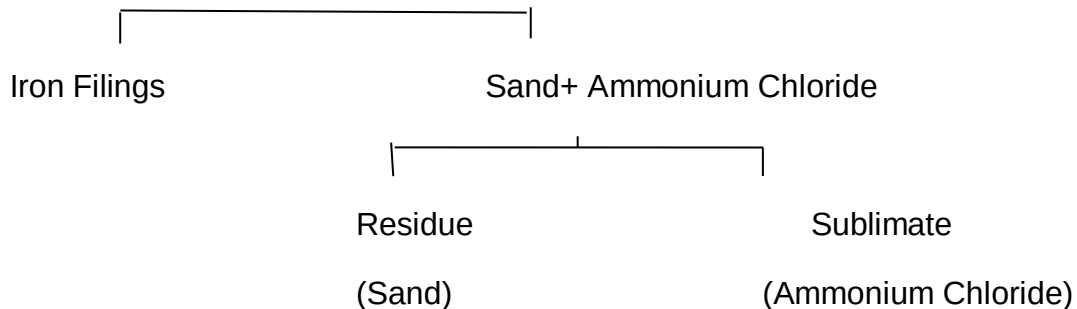
The Scheme of separation will be drawn on the board

Mixture

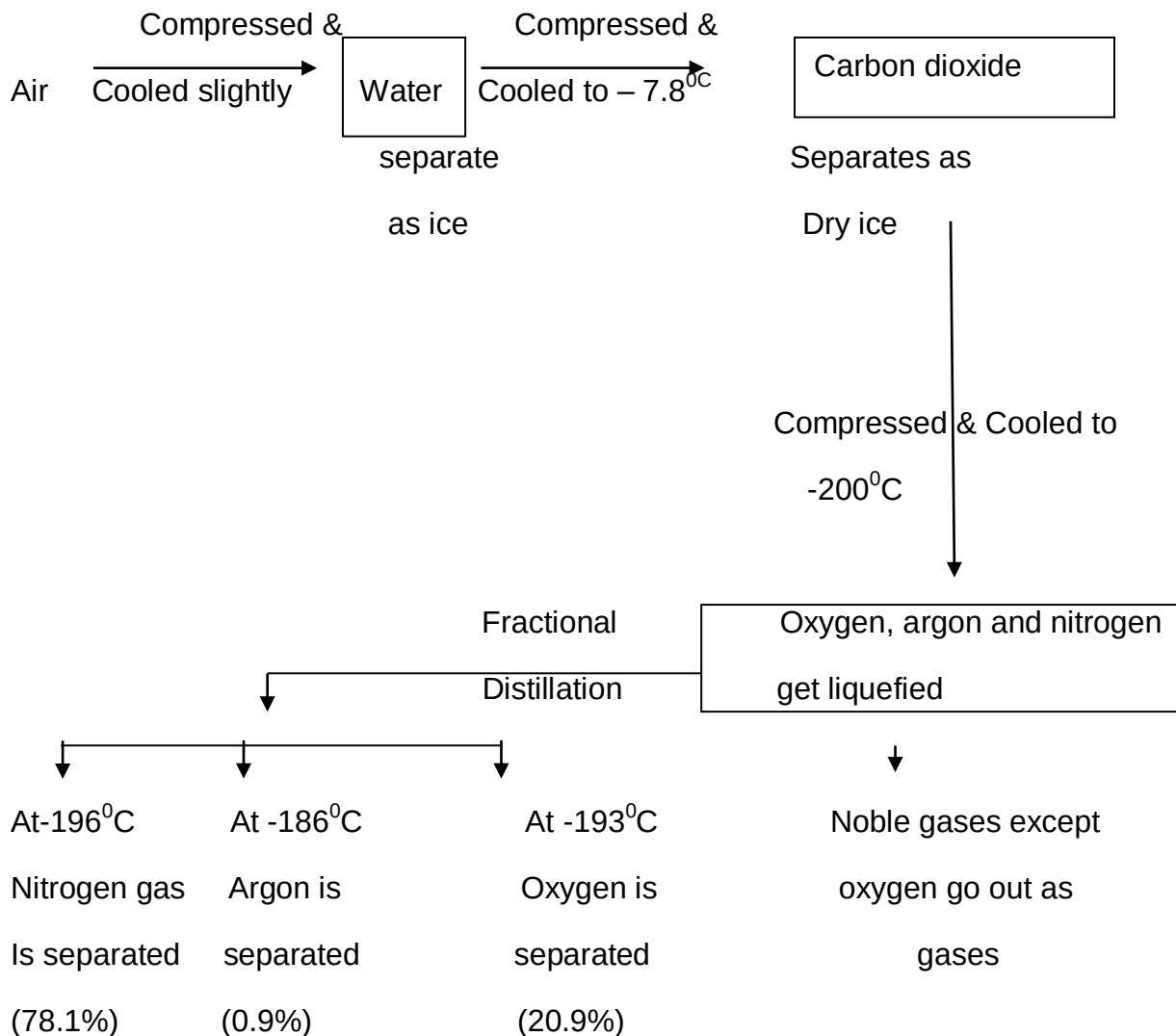
(Ammonium Chloride + sand + iron filings)

|

Magnetic separation



2. How to separate the components of air
[15min]



Closure

5 min

Q.How can you separate the constituents of a mixture containing sugar, water and kerosene?

Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) Q.1 Name the separation technique involved in the separation of : a) Butter from curd b) Salt from sea water c) Camphor from salt d) Iron pins from sand e) Wheat grains from husk	
- Evaluation/Assessment: ➤ Mind map	
Learners on the way Q1 Create a mindmap of different separation techniques you have studied so far ?	Advanced Learners You are given a mixture of sand , water and mustard oil . How will you separate the components of this mixture ?
Materials needed/Resources: Blackboard, chalk, Science NCERT book	
Common Misconceptions: Common salt can be dissolved in oils also	Addressing the misconceptions: Common salt is ionic in nature while oil is organic in nature so the salt will not dissolve in oil.

Home Assignment-

(5 min)

Q1 . Which separation techniques will you apply for the separation of the following?

- (a) Sodium chloride from its solution in water.
- (b) Ammonium chloride from a mixture containing sodium chloride and ammonium chloride.
- (c) Small pieces of metal in the engine oil of a car.
- (d) Different pigments from an extract of flower petals.
- (e) Butter from curd.
- (f) Oil from water.
- (g) Tea leaves from tea.
- (h) Iron pins from sand.
- (i) Wheat grains from husk.
- (j) Fine mud particles suspended in water.

Teaching
Methodology

- Activity
- Questionnaire