

PTM COLLEGE OF EDUCATION

Maruthoorkonam, Balaramapuram, Thiruvananthapuram

DOCUMENTARY EVIDENCE OF ACTIVITIES PREPARATORY TO SCHOOL-BASED PRACTICE TEACHING AND INTERNSHIP WHICH ENCOMPASS CERTAIN SIGNIFICANT SKILLS AND COMPETENCIES

1. DISCUSSION, DEMONSTRATION AND CRITICISM CLASSES

Sample Lesson Plan

DISCUSSION AND DEMONSTRATION LESSON PLANS

B.Ed. Course

NAME OF TRAINEE: CHANDANA P.R.

OPTIONAL SUBJECT: Physical Science

CANDIDATE CODE: 13262377010 YEAR: 2022-2024

INQUIRY TRAINING MODEL LESSON PLAN

Name of the teacher: <u>Chandana P.R.</u>	Name of the school: <u>PTM</u>
Subject: <u>Physical Science</u>	Class: <u>V</u>
Topic: <u>Acids, Bases and Salts</u>	Date: <u>10/05/2024</u>

Topic:
 1. Meaning of acid and base
 2. Properties of acids and bases
 3. Neutralization reaction

Objectives:
 1. To understand the concept of acids and bases.
 2. To know the properties of acids and bases.
 3. To understand the neutralization reaction.

Materials:
 1. Dilute hydrochloric acid (HCl)
 2. Dilute sodium hydroxide (NaOH)
 3. Indicator: Litmus paper
 4. Conical flask
 5. Dropper

Procedure:
 1. Introduction of the topic and objectives of the lesson.
 2. Demonstration of the properties of acids and bases.
 3. Group discussion on the properties of acids and bases.
 4. Activity: Preparation of a salt by neutralization reaction.
 5. Conclusion and evaluation.

Phase - I: Introduction

Teacher: Good morning, class. Today we are going to study about acids and bases. What do you know about acids and bases?

Student: Acids are sour and bases are bitter.

Teacher: Yes, that's right. Acids are sour and bases are bitter. What are some examples of acids and bases?

Student: Lemon juice is an acid and soap is a base.

Teacher: Yes, lemon juice is an acid and soap is a base. What are the properties of acids and bases?

Student: Acids turn litmus paper red and bases turn it blue.

Teacher: Yes, that's right. Acids turn litmus paper red and bases turn it blue. What is a neutralization reaction?

Student: It is a reaction between an acid and a base to form a salt and water.

Teacher: Yes, that's right. A neutralization reaction is a reaction between an acid and a base to form a salt and water.

Phase - II: Group discussion

Teacher: Now, let's discuss the properties of acids and bases. What are the properties of acids?

Student: Acids are sour, they turn litmus paper red, and they react with metals to produce hydrogen gas.

Teacher: Yes, that's right. Acids are sour, they turn litmus paper red, and they react with metals to produce hydrogen gas. What are the properties of bases?

Student: Bases are bitter, they turn litmus paper blue, and they react with acids to form salts and water.

Teacher: Yes, that's right. Bases are bitter, they turn litmus paper blue, and they react with acids to form salts and water. What is a neutralization reaction?

Student: It is a reaction between an acid and a base to form a salt and water.

Teacher: Yes, that's right. A neutralization reaction is a reaction between an acid and a base to form a salt and water.

Phase - III: Activity

Teacher: Now, let's perform an activity to demonstrate the neutralization reaction. We will mix dilute hydrochloric acid (HCl) with dilute sodium hydroxide (NaOH) solution. What do you expect to happen?

Student: I expect the solution to become neutral.

Teacher: Yes, that's right. The solution will become neutral. What is the chemical equation for this reaction?

Student: $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$

Teacher: Yes, that's right. The chemical equation for this reaction is $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$.

Phase - IV: Evaluation

Teacher: Now, let's evaluate your understanding of acids and bases. What are the properties of acids?

Student: Acids are sour, they turn litmus paper red, and they react with metals to produce hydrogen gas.

Teacher: Yes, that's right. Acids are sour, they turn litmus paper red, and they react with metals to produce hydrogen gas. What are the properties of bases?

Student: Bases are bitter, they turn litmus paper blue, and they react with acids to form salts and water.

Teacher: Yes, that's right. Bases are bitter, they turn litmus paper blue, and they react with acids to form salts and water. What is a neutralization reaction?

Student: It is a reaction between an acid and a base to form a salt and water.

Teacher: Yes, that's right. A neutralization reaction is a reaction between an acid and a base to form a salt and water.

- 1) Mother appears as a victim of the theory.
2) Not students to make them students of the theory and provide support for their generation of ideas.
3) Encourage interaction among students.

Support System

The main components of this model are a set of works to be done by the students of the theory and various materials related to the process, i.e., magnets, iron, nail, steel pin.

Effects of model

- Instructional effects** → better data in inquiry learning, critical thinking, discussion, science process skills and promote active autonomous learning.
Non-instructional effects → increase creativity, develop learning for self-study, enhance towards intellectual and differentiation, promote independent learning.

CRITICISM LESSON PLANS

B.Ed. Course

NAME OF TRAINEE CHANDANA P.R.

OPTIONAL SUBJECT Physical Science

CANDIDATE CODE 18052877012 YEAR 2022-2024

LESSON PLAN - II

Name of the Teacher: <u>Chandana P.R.</u>	Name of the School: <u>PMES</u>
Subject: <u>Chemistry</u>	Standard: <u>8</u>
Unit: <u>Reactivity Series and Displacement</u>	
Lesson: <u>Reactivity Series and Displacement</u>	
Displacement Reaction Date: <u>20/10/2022</u>	

Learning Statement: Through discussion, discussion, experimentation, pupil will learn the concept behind reactivity series and displacement reactions.

Content Analysis

- Theme:** Reactivity, Displacement Reaction.
Topic: - Different metals possess different reactivities.
- Metals can be arranged in the order of their reactivity.
- A displacement reaction is one in which the metal of a salt is replaced by another metal in a solution.
- A salt of a metal is displaced by another metal in a solution.
- eg: $A + B^{+}C^{-} \rightarrow A^{+}C^{-} + B$
- The blue colour of $CuSO_4$ solution is due to the presence of Cu^{2+} ions.

- When Zn is added to $CuSO_4$ solution, the Cu^{2+} ions in the solution get deposited as the Zn metal as Cu atoms.
- $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
- $Zn \rightarrow Zn^{2+} + 2e^{-}$
- $Cu^{2+} + 2e^{-} \rightarrow Cu$

Concept: - The series obtained by arranging some metals in the decreasing order of their reactivity is called reactivity series. It is also included in the series for the order of comparison of chemical reactivity.
- $K > Na > Ca > Mg > Al > Zn > Fe > Ni > Sn > Pb > H > Cu > Ag > Au$
- Metals having high reactivity displace the metals having less reactivity from their salt solution. Such chemical reactions are called displacement reactions.

Learning Outcomes

- (1) Remembering → Pupil will be able to recall the reactivity series and the concept of displacement reactions.
(2) Understanding → Pupil will be able to explain the concept of reactivity series and displacement reactions.
(3) Applying → Pupil will be able to apply the concept of reactivity series in various chemical reactions such as displacement reactions.
(4) Analysing → Pupil will be able to analyse the reactivity series.

- Enriching:** - Pupil will be able to predict the outcome of a displacement reaction based on reactivity series.
Learning: → Pupil will be able to classify displacement reactions based on reactivity series.

Teaching-Learning Resources: Video, PPT, Images, Models and Models to demonstrate reactivity series, displacement reaction & their inter-relationship, activity and for support demonstration.

Assessment: - Pupil should know about the order of reactivity of metals - metals with air, water and dilute acids.

Classroom Interaction Strategies: Expected Pupil Response

Goal setting: all
How are you feeling? All good?
What are we doing now class?
Introduction:

Teacher reminds students' previous knowledge towards the new action of the topic through discussion.

- The series obtained by arranging of metals in the decreasing order of their reactivity is known as reactivity series.
- $K > Na > Ca > Mg > Al > Zn > Fe > Ni > Sn > Pb > H > Cu > Ag > Au$

Discussion

- How you noticed a new metal in the reactivity series displaced?
- Which one is it?
- What may be the reason for including it in the reactivity series of metals?

Conclusion

- The reactivity series is a list of metals in the order of their reactivity.
- It is included in the series for the comparison of chemical reactivity.
- The metals present above H in the reactivity series displace hydrogen (H_2) in a reaction with dil. acids while those below H do not displace H_2 upon reaction with dil. acids.
→ Let's move on to the reactivity of metals with displacement reactions.

Activity 12

Teacher illustrates displacement reaction through model (using different balls)

Discussion

- What have you observed here?
- What is displacement reaction?

Conclusion

- The red ball is removed and replaced by green ball at the same position then red ball is said to be displaced by the green ball.
- A displacement reaction is the one where in the atom or a set of atoms is displaced by another atom or a molecule.

$A + B \rightarrow A + B$

Let's do an experiment to find the relationship between the reacting mass and displacement reactions.

Activity 13

Teacher shows the reaction of zinc plate with CuSO_4 solution and that of copper plate with zinc solution.

Experiment

Materials required: 2 beakers, filter paper, water

Procedure: Dip a zinc rod in copper sulphate solution in a beaker and a beaker in ZnSO_4 solution taken in another beaker. Wait for sometime and observe the changes in the rods.

Discussion

- What did you observe?
- What may be the reason for this?

Conclusion

- Copper got coated on the zinc plate at the region of contact with CuSO_4 solution.
- The change can be observed in the copper plate dipped in ZnSO_4 solution. There is no visible change.
- Teacher correlated the observations with the help of a PPT including video and images of the experiments, and students are provided with activity card to note their observations.

Now, let's do an experiment to observe the chemical reaction.

Activity 14

Teacher explains the displacement reaction in the form experiment through demonstration with models in an interactive way.

Discussion

- What might be the model related to the reaction in the first beaker?
- Carefully observe the position of these models in the reaction mixture.
- What has to move reaction amongst the two of them?

Conclusion

- Zinc from zinc plate (or zinc rod) and from CuSO_4 solution (or Cu^{2+} ions).
- Zinc is placed above and the copper goes further in the reaction mixture.
- Zinc is more reactive than Cu.

Teacher demonstrates the displacement reaction.

$\text{Zn} + \text{Cu}^{2+} \rightarrow \text{Zn}^{2+} + \text{Cu}$

$\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$

- Model having high reactivity displaces the model having low reactivity from its salt solution.
- Zinc is more reactive than Cu. It will displace Cu from CuSO_4 solution. There is a reaction.

Teacher encourages the students to predict the type of reaction.

- Displacement reaction occurs between zinc and copper.
- The more active metal (zinc) displaces the less active metal (copper) from its salt solution.
- Model having high reactivity displaces the model having low reactivity from its salt solution and a displacement reaction is called displacement reaction.

Brain Exercise

- What is the reactivity order?
- What is a displacement reaction?
- Why is it being a non-spontaneous reaction in the reaction mixture?

- What's the formal equation for the interest reaction between Z_0 and Z_1 rates?

Follow-up Activity

I based on the variability which pointed out among the following undergrowth dependent section under the table.

Metall	Solution	Experiment result
Mg	CuCl_2	white precip
Ag	CuCl_2	—
Mg	ZnCl_2	—
Mg	AgCl_2	—
Cu	MgCl_2	—

Blank Pentel Drawing

Abstract = Polyfluorinated

I took Chemistry class in the top
handlily and Displacement reactions from
the angles. Handlily and Displacement
of class. Part of all I prepared a formal
lesson plan. I also taught the concept to give a
meaning upon it and concluded with a prepared
chart and PPT on my own so that the topic
can be properly & clearly conveyed to the students
through activities.

through activities. On entering the class I noticed and noticed all the students in my class & they noticed me but I tried to make a friendly learning environment and invited questions to the students by giving them light means of questions and answering questions before asking to the topic directly. I asked students previous knowledge by asking questions after listening to their responses. I briefly introduced about the task done so that I indirectly linked their previous knowledge to the new topic to be learned. Then I moved on to the Readability Series with the help of a model and PPTs. Little explaining constantly was through discussion and putting questions. I made the students write their study found topic, explain and illustrate and published the concept through demonstrating it in a funny and interesting way, creating a support with the students.

[illegible]

I got no small portion feedback for my ideas. Both my wife and I could not have required much encouragement toward the other two. Since I have been encouraged and encouraged by all other parties and activities and interesting and my efforts were highly appreciated.

LESSON PLAN - 4

Name of the teacher: Anand Sir Subject: Chemistry Unit: Properties of Matter Lesson: Matter	Name of the school: PPSV College Standard: 7-8 Strength: 1016 Date: 12/11/2023
--	---

Curricular Alignment: Through observation, observation, and experimentation, pupil will learn the concept of matter.

Content Analysis:

Topics: Matter, Mass, Solid, Liquid, Gas

Points:

- 1) Matter has mass
- 2) Solid has definite volume
- 3) Matter occupies space
- 4) Solid has permanent shape
- 5) Liquid has definite volume
- 6) Air occupies space
- 7) Air has mass

Concept: Matter

- Matter is anything that occupies space and has mass

Learning Objectives:

- 1) Understanding: Pupil will be able to recall what matter is
- 2) Understanding: Pupil will be able to compare how matter has mass and occupies space
- 3) Applying: Pupil will be able to apply the concept of matter in daily life
- 4) Analyzing: Pupil will be able to categorize solids, liquids & gases
- 5) Evaluating: Pupil will be able to determine the properties of solids, liquids and gases
- 6) Creating: Pupil will be able to compare the properties of solids, liquids and gases

Thinking & Learning Activities: Categorization, solid, liquid, gas, matter, matter, mass, permeability, etc.

Assessment: Pupil should know about solids, liquids and gases

Classroom Observation: Pupil understanding

Classroom: All

Classroom: All

Introduction:

Matter is made up of different types of matter and matter occupies space.

Learning Objectives:

- What are the states of matter?
- What are the properties of matter?
- What are the different physical states of matter?
- What are the different physical states of matter?

Classroom:

- This is an activity to show that matter has mass.
- Pupil will be able to understand that matter has mass.
- Pupil will be able to understand that matter has mass.

Classroom:

- This is an activity to show that matter has mass.
- Pupil will be able to understand that matter has mass.
- Pupil will be able to understand that matter has mass.

Activity-1

The teacher shows an experiment.

Experiment:

Materials required: Beaker, stone, thread

Procedure: Take a beaker half-filled with water. Place a stone tied with a rope to dip it into the water.

Discussion Points:

- What do you observe?
- What happens to the water level when the stone is dipped in water? Is it the same?

Conclusion:

- This is an activity to show that matter has mass.
- Pupil will be able to understand that matter has mass.
- Pupil will be able to understand that matter has mass.

Activity-2

The teacher shows an experiment.

Experiment:

Materials required: Glass beaker, water, stone

Procedure: Take a large beaker and fill it with water. Place a dry glass beaker inverted vertically in the water.

Discussion Points:

- What happens to the water level?
- Does water enter the beaker?
- What material does the beaker contain?
- Is there any relationship between the volume of the material and difference in water level?

Conclusion:

- The water level in the beaker remains the same.
- Water doesn't enter the beaker as it contains air.
- There is a difference in the water level.
- There is a difference in the water level.

Activity-3

The teacher shows an experiment.

Experiment:

Materials required: 2 hollow cylinders, water, etc.

Procedure: Hang two empty hollow cylinders at the end of a 50 cm long rope. After a time of 10 minutes, on one end of the hollow cylinder, the help of a hand, support the rope in a horizontal position. Then place the hollow cylinder with a needle on the cylinder.

Discussion Points:

- What is your observation?
- What do you infer from this?

Conclusion:

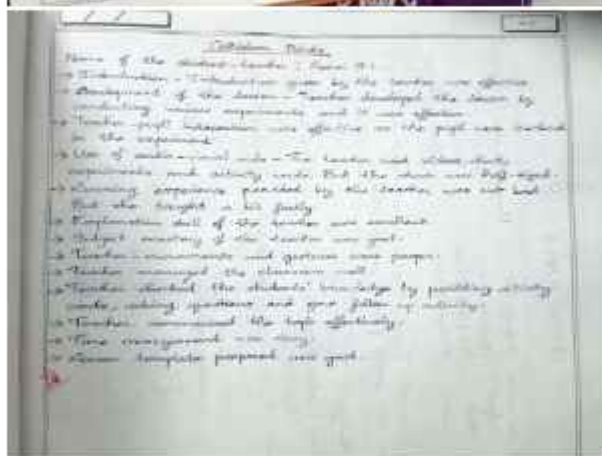
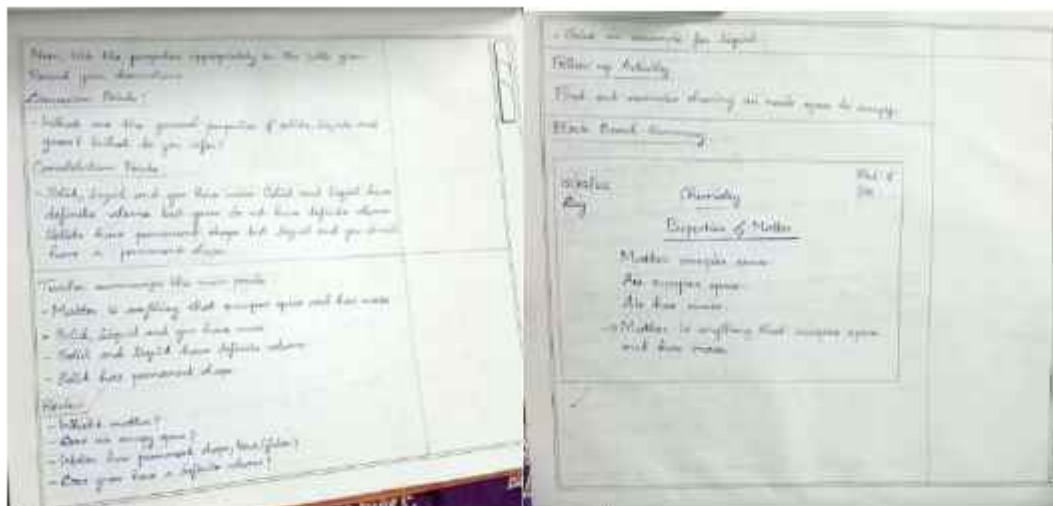
- The hollow cylinder goes up and the other hollow cylinder goes down.
- From this experiment, we can prove that air has mass.

From all these experiments, we can prove that matter is anything that occupies space and has mass.

Activity-4

The teacher gives an activity and

Property	Mass	Volume	Shape
Solid	Yes	Yes	Yes
Liquid	Yes	Yes	No
Gas	Yes	No	No



2. MICROTEACHING SESSIONS

Observation Schedule of Microteaching

MICROTEACHING EVALUATION SHEET

Name of the teacher: _____

Subject: _____

Class: _____

Date: _____

Observer: _____

1. Object of the lesson: _____

2. Objectives: _____

3. Objectives: _____

4. Objectives: _____

5. Objectives: _____

6. Objectives: _____

7. Objectives: _____

8. Objectives: _____

9. Objectives: _____

10. Objectives: _____

11. Objectives: _____

12. Objectives: _____

13. Objectives: _____

14. Objectives: _____

15. Objectives: _____

16. Objectives: _____

17. Objectives: _____

18. Objectives: _____

19. Objectives: _____

20. Objectives: _____

21. Objectives: _____

22. Objectives: _____

23. Objectives: _____

24. Objectives: _____

25. Objectives: _____

26. Objectives: _____

27. Objectives: _____

28. Objectives: _____

29. Objectives: _____

30. Objectives: _____

31. Objectives: _____

32. Objectives: _____

33. Objectives: _____

34. Objectives: _____

35. Objectives: _____

36. Objectives: _____

37. Objectives: _____

38. Objectives: _____

39. Objectives: _____

40. Objectives: _____

41. Objectives: _____

42. Objectives: _____

43. Objectives: _____

44. Objectives: _____

45. Objectives: _____

46. Objectives: _____

47. Objectives: _____

48. Objectives: _____

49. Objectives: _____

50. Objectives: _____

51. Objectives: _____

52. Objectives: _____

53. Objectives: _____

54. Objectives: _____

55. Objectives: _____

56. Objectives: _____

57. Objectives: _____

58. Objectives: _____

59. Objectives: _____

60. Objectives: _____

61. Objectives: _____

62. Objectives: _____

63. Objectives: _____

64. Objectives: _____

65. Objectives: _____

66. Objectives: _____

67. Objectives: _____

68. Objectives: _____

69. Objectives: _____

70. Objectives: _____

71. Objectives: _____

72. Objectives: _____

73. Objectives: _____

74. Objectives: _____

75. Objectives: _____

76. Objectives: _____

77. Objectives: _____

78. Objectives: _____

79. Objectives: _____

80. Objectives: _____

81. Objectives: _____

82. Objectives: _____

83. Objectives: _____

84. Objectives: _____

85. Objectives: _____

86. Objectives: _____

87. Objectives: _____

88. Objectives: _____

89. Objectives: _____

90. Objectives: _____

91. Objectives: _____

92. Objectives: _____

93. Objectives: _____

94. Objectives: _____

95. Objectives: _____

96. Objectives: _____

97. Objectives: _____

98. Objectives: _____

99. Objectives: _____

100. Objectives: _____

MICROTEACHING EVALUATION SHEET

Name of the Skill: Skill of illustrating with examples
 Name of the student teacher: Chandana P.R.
 Subject: Physics
 Lesson: Frictional Forces
 Date: 04/05/2023
 Duration: 3 min. 15 sec.

Sl No	Components	1	2	3	4	5	6	7	8	9	10
1.	Formulating relevant examples										✓
2.	Simple examples										✓
3.	Interesting examples										✓
4.	Using appropriate material for examples									✓	
5.	Making use of the inductive/deductive approach										✓

3. SEMINAR PRESENTATION

PTM COLLEGE OF EDUCATION
MARUTHOORKONAM, BALARAMAPURAM
THIRUVANANTHAPURAM



B.Ed. COURSE
SEMESTER 2

REPORT OF

SEMINAR PRESENTATION

NAME OF TRAINEE.....CHANDANA P.S.....
OPTIONAL SUBJECT.....Physical Science.....
CANDIDATE CODE 18222311019..... YEAR 2022-2024

Certified Bonafide Record

Date: 9/6/2023


Assistant Professor

EDU-09.8: Curriculum and Resources
in Digital Era: Physical Science
Education

Unit 4 - Research in Physical Science
Education

TOPIC :-

Recent research in Physical Science
education - An Overview

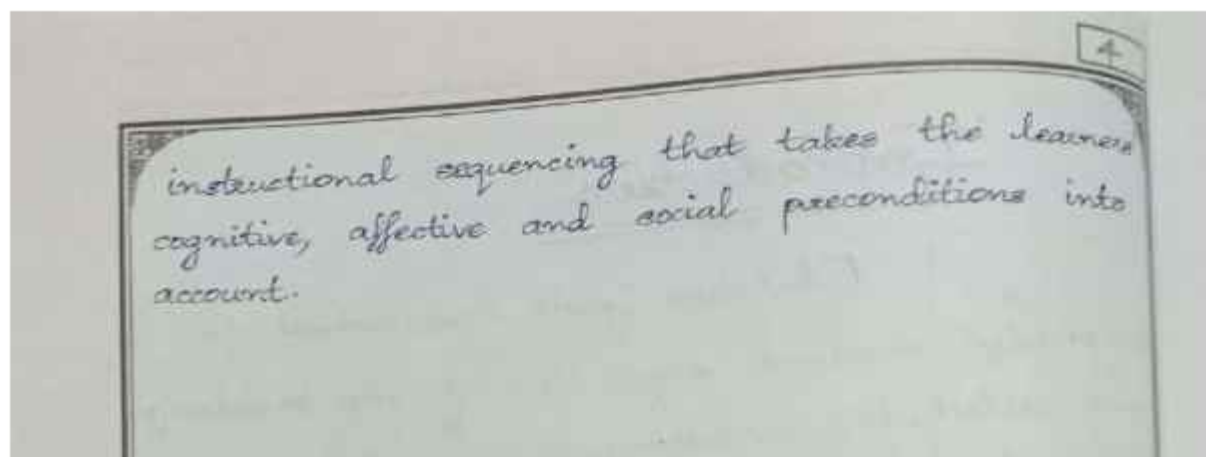
Index

Srl No.	CONTENTS	Page No.
1.	Introduction	3
2.	Recent researches in science learning with special emphasis to instructional strategies and assessment practices.	5
3.	Aware of research in physical science education	6
4.	Review of some research studies in physical science education	8
5.	Conclusion	13
6.	References	15

Introduction

Education goals have evolved to emphasize student acquisition of the knowledge and attributes necessary to successfully contribute to the work force and global economy of the 21st century. The new education standards emphasize higher end skills including reasoning, creativity, and open problem solving. Although there is substantial research evidence and consensus around identifying essential 21st century skills, there is a lack of research that focuses on how the related subskills interact and develop over time.

The interdisciplinary nature of science education is responsible for the particular challenges to carry out science education research and development. Science education is the discipline dealing with teaching and learning science in schools and outside schools. Science education research involves selection, legitimation, and educational reconstruction of topics to be learned, selection and justification of general aims of teaching and learning science, as well as



4
instructional sequencing that takes the learners
cognitive, affective and social preconditions into
account.

Recent researches in Science learning with special emphasis to instructional strategies and assessment practices

Science education is the discipline dealing with teaching and learning science in schools and outside schools. The ultimate purpose of science education is the improvement of science teaching and learning through out the world. For this a global understanding of science education research is crucial.

Jenkins (2001) distinguishes two different traditions in science education which research within the past thirty years; he calls them pedagogical and empirical. "The pedagogical tradition has at its primary focus, the direct improvement of practice, practice here being understood as the teaching of science". The empirical tradition, seeks the 'objective data' to understand and influence an assumed educational reality, close familiarity with which lies at the heart of the pedagogical tradition". The distinction of the two traditions is that one is science-oriented; the other is student-oriented. The importance of science education

at different levels has been stressed by educators and researchers as it plays multiple roles in enhancing citizen's scientific literacy, promoting the scientific and technological capacity of the workforce, and fostering next generation school science educators.

Areas of research in Physical Science Education (Indian context)

The review of researches in science education done in India has been published by the Regional College of Education, Ajmer. The following table gives the status of science education researches done at M.Ed. and Ph.D. levels in India.

	Areas	No. of studies	Percentage
1.	Science Curriculum	36	13.7
2.	Methods of teaching	14	5.3
3.	Instructional materials	41	15.6
4.	Evaluation	156	59.3
5.	Teacher training	16	6.1
	Total	263	100.00

7

The above table shows the areas which have been neglected so far. Most of the research studies have been conducted in the area of evaluation and very few in the areas of methods of teaching and teacher training. Even in the area of evaluation most of the studies done are on achievement tests. Although there is need for more studies in the area of evaluation in science education, more attention is needed in the areas of curriculum development, methods of teaching and instructional materials development. Research is also needed in new innovations in science education which might help improving the quality of science education at different levels of education and making it more relevant of the needs and requirements of the children, the community, and the country.

International Experience

The increased focus on the status of science in primary schools over the last ten to fifteen years has resulted in an increasing number of government agencies and education institutions conducting research and surveys on factors that influence the effectiveness of the teaching of science to primary school students. Findings and

recommendations contained in the subsequent reports, as well as proceedings from key international conferences, demonstrate a number of common concerns with the teaching of science in primary schools. These common concerns that span national and state education systems include the time allocated to science instruction, teacher confidence, teacher knowledge, and understanding of subject matter, competition with literacy and numeracy and the availability and quality of teacher professional development.

Review of some research studies in physical science education

1) Title: Concept Mapping in Science: A case study among students of standard 8th. (Year 2013)

Conducted by: Dr. K. Remadevi, & Vishakh Visakh Kumar, NBSTC, Changanassery

Methodology: Pre test- Post test equivalent group design.

Findings: Concept mapping is more effective than the conventional method of teaching. Concept mapping creates 'mind-on' environment in the classroom and fosters constructivism

in Science learning.

- 2) Title : Effectiveness of constructivist approach on the achievement in science of 9th standard students.
(Year: 2013)

Conducted by : Kadem Sevinas, University of Bursa.

Methodology: Quasi Experimental design.

Findings : The study indicated that constructive approach is more effective than conventional method on the achievement of science.

- 3) Title : Effect of Audio-visual Aids on Achievement in Physics in relation to creativity (Year: 2013)

Conducted by : Dr. Ram Meher & Vipin Kumar, Punjab University

Methodology : Pre test- Post test equivalent group design.

Findings : Audio visual aids were found to attain significantly higher achievement scores as compared to conventional group. Performance of students in terms of creativity was found significant.

- 4) Title : A study of teaching aptitude, social adjustment and job satisfaction on secondary school science teachers. (Year: 2011)

Conducted by : Mallikarjuna Reddy, Acharya Nagarjuna University

Methodology : Survey method

Findings: The secondary school science teachers are having very high teaching aptitude. The rural teachers have a better teaching aptitude than their urban counterparts. The secondary school science teachers have average job satisfaction level.

- 5) Title: A study of the relationship between intelligence, scientific creativity, achievement motivation, home environment and achievement in science of higher secondary school pupils of Kerala. (2008)

Conducted by: Rosamma Philip, Mahatma Gandhi University

Methodology: Survey method

Findings: The study indicates that Intelligence, Scientific Creativity, and Home Environment have close relationship with Achievement in Science. There exist very low relationship between Achievement Motivation and Achievement in Science of Higher Secondary School Students.

- 6) Title: Study habit and interest in science as correlates of achievement in physical science among secondary school pupils. (Year: 2006)

Conducted by: Manjula U, Calicut University

Methodology: Survey method (Correlation study)

11

Findings: There is significant relationship between Study habit and achievement in physics, similarly there exists significant relationship between Interest in science and Achievement in physical science.

7) Title: A formative evaluation of the effectiveness of instruction through Science Club in creating scientific awareness in high school students. (Year: 2002).

Conducted by: N. Hema, Calicut University
Methodology: Experimental study

Findings: The study revealed the effectiveness of instruction through science club to develop scientific awareness in high school students. Educational status and monthly income of parents had no effect on scientific awareness of students instructed through science club.

8) Title: Preparation and validation of multimedia packages in the teaching of science to hearing impaired students of secondary schools (Year: 2001).

Conducted by: Nirmala Susan, Mahatma Gandhi University.

Methodology: Experimental study.

Findings: The study indicated that multimedia packages are more effective than conventional

method to hearing impaired students on the achievement of science.

Research has clearly established that home background is very important for school achievement (Breen & Jonsson, 2005). TIMSS reports a strong relationship between pupils' science achievement and student background, measured by the amount of books at home or speaking the language of the test at home (Martin, Mullis, and Foy, 2008). An analysis of PISA 2006 results showed that home background, measured on an index summarising each student's economic, social and cultural status, remains one of the most powerful factors influencing performance.

On average in the European countries, it explained 16% of the student performance variation in science (EACEA/Eurydice, 2010). However, poor performance in school does not automatically follow from a disadvantaged home background.

Conclusion

Most research in science education is on the practice of teaching and learning, together with assessment, evaluation and teacher education; there is less on philosophical issues. A look at the research literature in science education would indicate that in the past three decades, the work was dominated by research concerned with the following topics flowing topics. I have identified major references or recent reviews for each of these topics and apologies in advance to who may feel that I've overlooked their work.

- Children's understanding and learning of scientific phenomena (Miller, Leach and Osborne, 2000; Wandersee, Mintzes and Novak, 1994).
- Conceptual change research (Quit and Treagust, 2003; Hewson, 1996)
- Constructivist views of learning/teaching (Fensham, Gunstone and White, 1994)
- Nature of science (McComas, 1998)
- Perception studies - classroom environment, attitude (Fraser, 1994).
- Equity and gender issues in science (Baker, 1998; Rennie, Parker and Fraser, 1996).

- Scientific literacy (Yore, Bisanz and Hand, 2003)
- Assessment/ Evaluation (Tamie, 1998)
- Science Teachers Education (Atell, 2000; Anderson and Mitchener, 1994)
- History and philosophy of science (Dushl, 1994)

References

- Osborne, J.F., Simon, S. and Collins, S. (2003) Attitudes towards Science: A Review of the Literature and its Implications, *International Journal of Science Education* 25, 1049-1079.
- Jenkins, E.W. (forthcoming, 2006) The student voice and school science education. *Studies in Science Education*
- Gilbert, J. and Reist, M. (1997) Models and discourse; a primary school science class visit to a museum, *Science Education*, 81, 749-762.
- Beaund, M. and Reiss, M.J. (Eds) (2004) *Learning Science Outside the Classroom*, RoutledgeFalmer, London.
- Anderson, R.D., & Helms, J.V. (2001). The ideal standards and reality of school: Needed research. *Journal of Research in Science Teaching*, 38(1), 3-16.
- Atell, S.K., & Lederman, N.G. (2007a). *Handbook of research on science education*. Mahwah, NJ: Lawrence Erlbaum (in print).
- <https://eakruisheden.blogspot.com/2015/11/review-of-some-research-studies-in.html>
- <https://www.studocu.com/in/document/mahatma-gandhi-university/bed>

4. OBSERVATION OF CLASSES IN VICTERS CHANNEL

Report of Observation of Class in VICTERS Channel

Video Lesson - 1

Name of the teacher : Sajitharaj K.

Std :- VIII

Name of the school : GHS, Edakkachi,
Eenakulam

Date :- 17 Feb
2021

Name of the subject : Chemistry

Name of the lesson : WATER

Observation Notes

I have watched the video lesson of the Chemistry Class conducted by the teacher Sajithamol K., from G.H.S. Edakechi, Eranakulam, through VICTERS YouTube Channel.

The teacher took the 16th chapter named 'WATER'. She pleasantly welcomed all the students to the new chapter, at first. Then she started the class by asking students about the role of water for the existence of life. After an engaging interactive discussion, she assigned an introductory activity to the chapter, to prepare a note on the importance of water and its conservation.

Then she moved on to the characteristics of water that facilitates it for its wide range of uses. She started off from the physical characteristics of water and explained the states of matter in which water exists on earth. Then she invited them to a live experiment to convey the concept of 'Boiling Point' of water and it is found to be 100°C . With the help of this experiment, she effectively conveyed the idea of 'latent heat of vaporization' of water to the students. Further discussion on the topic led to the concept of 'evaporation' of water. Next was an interesting

18
session of interaction leading to the 'heat-capacity of water' and its advantages. Then she moved on to the next characteristic, freezing point of water, and consolidated the discussion at the melting point of ~~water~~ ice. In connection with this solid & liquid forms of water, the teacher guided the students towards the concept of 'anomalous expansion of water' through a live experiment and mentioned the significance of this property in aquatic life in cold countries. Then she revised the theme of the class once again and reminded students about the important physical characteristics of water learnt through the class. Finally, she wound up the class by giving an assignment to the students to write an experiment report and gave the points to be included while writing the report.

Video Lesson - 2

17

Name of the teacher: Jyothis P.S.

Name of the School: Govt H.S.,
Kattachakonam,
Thiruvananthapuram

Std:- IX

Date:- 1st July
2020

Name of the subject: Physics

Name of the lesson:- Forces in Fluids

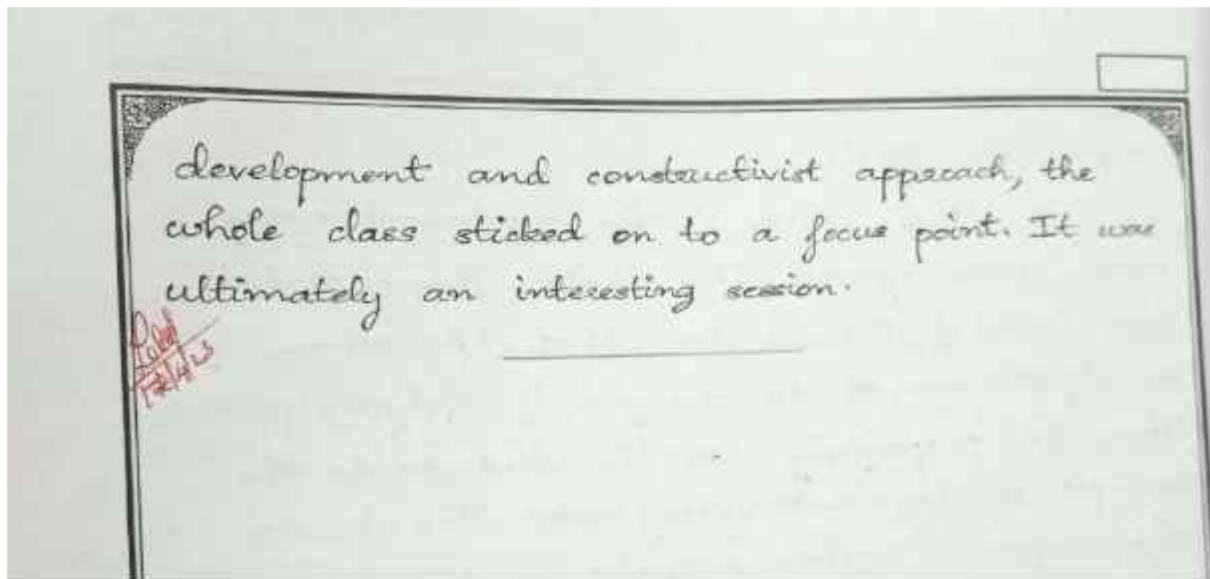
Observation Notes

I've watched the video lesson of the Physics class conducted by the teacher Jyothi P.S., from Govt. H.S. Kattachakom, Thiruvananthapuram, through VICTERS YouTube Channel.

The teacher took the continuation of Chapter-1 named 'Forces in Fluids'. At first, he pleasantly welcomed the students and checked their knowledge in the previous session by discussing the solution of the follow up activity related to relative density of liquids, given in the previous class. The teacher then showed an introductory video to the new session. The video showed an excavator JCB excavating a hill. The teacher discussed with the students the environmental and social aspects related to the video and the use of JCB, finally leading their focus to its working. Then he demonstrated two experiments with toothpaste and water and another experiment that showed equal flow of water through different holes on the same container filled with water, on applying pressure. All the live experiments were interesting to watch and were related to daily-life scenarios. The experiments went along with active student-teacher interaction. The thought-generating discussion was consolidated at the Pascal's law, regarding the pressure

applied on liquids.

Then with another experiment using water in a syringe, the teacher demonstrated the basis of Pascal's law, that the volume of a liquid cannot be changed by applying pressure. Then he purposefully led the students to the example in the introductory video. The teacher also explained other examples for the devices that work on the principle of Pascal's law, including JCB, hydraulic jack, etc. The realistic examples and the science behind them were all curiosity-awakening. Then he taught the working of a hydraulic jack in detail with the help of image displayed at the screen, and along with chalk-board interaction, he led the students through the derivation of the equation for the force needed to lift the heavy items by a hydraulic jack. Then he also worked out a numerical problem using the concept behind the formula. Then he consolidated the working of hydraulic jack and finally gave a follow-up activity which was a numerical problem related to the formula derived. Even though there was no review session of the whole class before summarising all the activities & discussion from the beginning to the end of the class ~~was~~ had inter-related flow of



5. OBSERVATION OF VIDEO LESSONS

Snapshot of Video Lessons



6. MID SEMESTER AND MODEL EXAMINATIONS

[Sample Question Papers](#)

7. DIFFERENT TESTS – ACHIEVEMENT TEST, DIAGNOSTIC TEST, ETC.

[Achievement Test Construction](#)

Achievement Test

Unit : Properties of
Matter

Index

Sl. No.	CONTENT	Page No.
1.	Introduction	3
2.	Planning of the Test	6
3.	Achievement Test Design	7
4.	Preparation of Blueprint	9
5.	Question Paper - writing of items	10
6.	Scoring Key and Marking Scheme	13
7.	Question wise Analysis	16
8.	Marklist	17
9.	Sample of Answer Paper	19
10.	Statistical Analysis	20
11.	Graphical Representation of Data	33
12.	Interpretation of Results	42

Introduction

Every teacher wants to find out the progress made by his pupil in the subject he teaches. Achievement in a subject at a particular stage has to be assessed in terms of his or her ~~memory~~ mastery in the curricular provisions anticipated for that stage, as well as the realization of the desired objectives.

A test designed to assess the achievement in any subject with regards to a set of pre-determined objectives is called an achievement test.

Characteristics of an Achievement Test

- It measures ~~how~~ much the student has achieved.
- It gives due weightage to objectives, content, forms of creations and difficulty level in a general way.

- It gives proportional weightage to every topic in the content area in a broad manner.
- It strictly observes the basic factor that is achievement is assessed through its performance of the student within a span of the time allowed.
- Evaluate not only the students but also the teachers' competence.
- It assess the basic knowledge after the completion of training or teaching has been acquired or not.
- It gives impartial information about an individual.
- Provide guidance to plan for change or in teaching strategies, modifications, methodologies, techniques, etc.

Steps involved in the construction of an Achievement Test

- 1) Planning of the test.
 - 2) Preparation of the design.
 - 3) Preparation of the blueprint.
 - 4) Writing of items.
 - 5) Preparation of the scoring key and marking scheme.
 - 6) Preparation of question wise analysis.
- 

Planning of the Test

General Information

Name of the teacher: Chandana P.R.

Name of the school : PTM High School,
Maruthocchenam

Subject : Chemistry

Standard : 8A

Strength : 28

Maximum Marks : 20

Maximum Time : 35 minutes

Date of Examination: 25/7/2024



Achievement Test Design

(1) Weightage to Objectives

Sl. No.	Instructional Objectives	Marks	Percentage
1.	Remembering	4	20
2.	Understanding	7	35
3.	Applying	3	15
4.	Analysing	6	30
Total		20	100

(2) Weightage to Content

Sl. No.	Content / Subunits	Marks	Percentage
1.	Change of State	5	25
2.	Pure Substances and Mixtures	2	10
3.	Diffusion	4	20
4.	Methods of Separation	9	45
Total		20	100

(3) Weightage to form of Questions

Sl. No.	Form of Questions	Marks	Percentage
1.	Objective type	5	25
2.	Short Answer Type	10	50
3.	Essay type	5	25
Total		20	100

(4) Weightage to difficulty level

Sl. No.	Difficulty level	Marks	Percentage
1.	Easy	6	30
2.	Average	10	50
3.	Difficult	4	20
Total		20	100

Preparation of Blueprint

INSTRUCTIONAL OBJECTIVES Form of Questions → CONTENT ↓	Remembering			Understanding			Applying			Analysing			Total Marks
	O	SA	E	O	SA	E	O	SA	E	O	SA	E	
Change of State	(1)'									(2) ²			5
Pure Substances and Mixtures							(2)'						2
Diffusion		(2)'		(1)'			(1)'						4
Methods of Separation		(1)'		(1)'		(5)				(1)'	(1)'		9
TOTAL	4			7			3			6			20

Note: O → Objective type, SA → Short Answer type, E → Essay type

* The number inside the bracket indicates the marks and those outside indicate the number of questions.

Writing of Items

QUESTION PAPER $\Rightarrow$

P.T.M.H.S. MARUTHOORKONAM

UNIT TEST JULY 2024

CHEMISTRY

Std: 8

Score: 20

Time: 35 min

Instructions

- First 5 minutes is given as cool off time. This time is to be spent for reading and understanding the questions.
- Answer the questions according to the directions.
- Score and time are to be considered while answering the questions.

PART-A

(1×5 = 5)

Each question carries 1 mark.

1. Fill in the blank:

When temperature increases, the rate of diffusion _____.

2. State true or false:

When iodine crystals are heated, they change directly from solid to gas.

Choose the most suitable answer from the options given:

3. What property is used in the method of centrifugation to separate the components of a mixture?
- a) Difference in boiling points
 - b) Difference in solubility
 - c) Difference in mass
 - d) Difference in particle size
4. In which scenario would diffusion not occur?
- a) A perfume bottle being opened in a room
 - b) A sugar cube being placed in water
 - c) Salt being added to a pot of boiling water
 - d) Ice cubes being added to a glass of cold water
5. Which of the following is an example of condensation?
- a) Ice melting
 - b) Dew forming on grass
 - c) Water boiling
 - d) Dry ice turning to gas

PART-B

Each question carries 2 marks.

(2×5 = 10)

6. Classify the given materials into pure substances and mixtures:

Silver, Soil, Water, Sugar, Salt Solution, Ice, Air, Gold

7. What are the changes that happen to the following properties when heat is absorbed?

- Energy of particles:
- Distance between particles:
- Attraction between particles:
- Movement of particles:

8. (a) In order to separate insoluble particles in a liquid mixture on the basis of their mass difference, _____ is used. (1)

(b) On what basis is the method of separating components from a mixture chosen? (1)

9. (a) What is diffusion? (1)

(b) What is the relation between temperature and diffusion? (1)

10. Create a flow chart that illustrates the transitions between states of matter in both directions, and label each type of conversion.

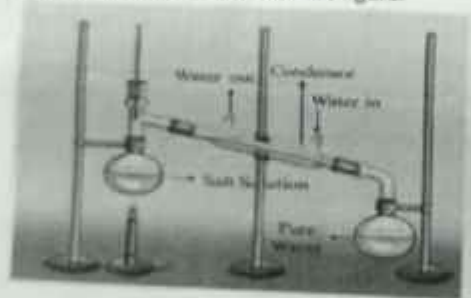
PART-C

Each question carries 5 marks.

(5×1 = 5)

11. (a) Which method is used to separate a mixture of salt and water to obtain both the components? Briefly define this method. (2)

(b) Explain the process shown in the figure: (3)

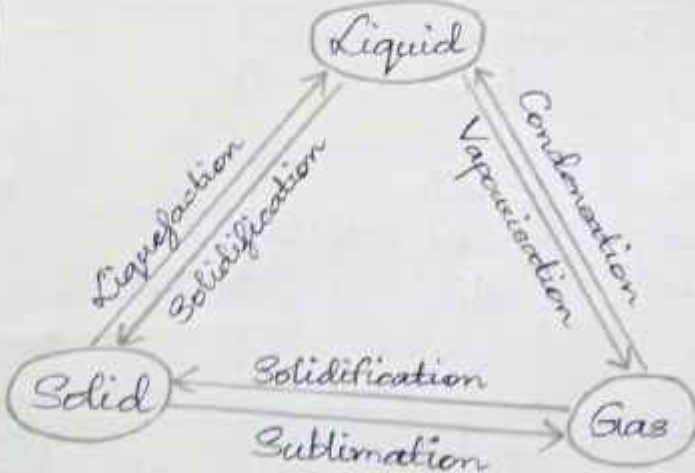


Scoring Key - Part A

Question Number	Correct Answer	Marks
1.	increases	1
2.	true	1
3.	(c) Difference in mass	1
4.	(d) Ice cubes being added to a glass of cold water.	1
5.	(b) Dew forming on grass.	1

Marking Scheme - Part B, Part C

Question Number	Value Points	Marks	Total Marks				
6.	<table><tr><th>Pure substances</th><th>Mixtures</th></tr><tr><td>Silver Water Sugar Ice Gold</td><td>Soil Salt Solution Air</td></tr></table>	Pure substances	Mixtures	Silver Water Sugar Ice Gold	Soil Salt Solution Air	2	2
Pure substances	Mixtures						
Silver Water Sugar Ice Gold	Soil Salt Solution Air						
7.	• Energy of particles: increases • Distance between particles: increases • Attraction between particles: decreases	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2				

	• Movement of particles : increases	$\frac{1}{2}$	
8.	(a) In order to separate insoluble particles in a liquid mixture on the basis of their mass difference, centrifugation/centrifuge is used. (b) The choice of the method of separation of components depends on the properties of the components of a mixture.	1	2
9.	(a) Diffusion is the spontaneous mixing of different particles having freedom of movement. (b) As temperature increases, rate of diffusion also increases.	1	2
10.		2	2
11.	(a) Distillation; When one component of the mixture is volatile and the others do not vapourise under	1	2

the same condition, they can be separated by distillation.

(b) Common salt solution is taken in the round bottomed flask. On heating the solution, water evaporates as it is the volatile component in the solution. Salt remains in the flask itself, as it is non-volatile. The water vapour is then passed through the condenser where it gets liquified and the pure water can be collected in another round bottomed flask. Thus salt and water can be separated from salt solution through distillation.

3

3

Question wise Analysis

Qn No.	Content / Subunit	Instructional Objectives	Type of Question	Difficulty level	Marks	Estimated time (in min)
1.	Diffusion	Understanding	Objective	Easy	1	1
2.	Change of State	Remembering	Objective	Easy	1	1
3.	Methods of Separation	Understanding	Objective	Average	1	1
4.	Diffusion	Applying	Objective	Difficult	1	1
5.	Change of State	Analysing	Objective	Difficult	1	1
6.	Pure substances & Mixtures	Applying	Short answer	Easy	2	3
8a.	Methods of separation	Remembering	Short answer	Average	2	4
8b.	Methods of separation	Analysing	Short answer	Easy	2	3
7.	Change of States	Analysing	Short answer	Average	2	3
9.	Diffusion	Remembering	Short answer	Difficult	2	4
10.	Change of States	Analysing	Essay	Average	5	8
11.	Methods of Separation	Understanding				

Marklist

Roll No.	Name	Marks	Percentage
1.	Abhilash R.	7	35
2.	Abhinav B.	10	50
3.	Adin	10	50
4.	Anandhan S.R.	6	30
5.	Anantharaman	9	45
6.	Ajith Senthil	11	55
7.	Annam A.B.	10	50
8.	Santham A. Nair	11	55
9.	Kashinathan V.M.	13	65
10.	Kashinath P.M.	8	40
11.	Poithvi Vijay B.	6	30
12.	Sanja	10	50
13.	Sidhanth R.	8	40
14.	Shiva S.	12	60
15.	Saravjith	8	40
16.	Vishnu B.S.	6	30
17.	Akhila U.	16	80
18.	Anamika	18	90
19.	Anaswara S. Rajesh	18	90
20.	Benancy S.	13	65
21.	Dayana	19	95

22.	Haashini M.R.	13	65
23.	Irfana R.	19	95
24.	Tafna A. Jose	19	95
25.	Nisanzana Sajith	19	95
26.	Nithya S.	16	80
27.	Saniya Suraj	18	90
28.	Shanifa	17	85
✓			

Sample of
Answer Paper →

Shreya
Tuesday

Good

18 1/2

Chemistry

20

Niranjana Sajith

VIII - A

Roll No. 25

Subject: Chemistry

- 1) increases ✓
- 2) True ✓
- 3) d) Difference in mass ✓
- 4) Salt being added to a pot of boiling water ✓
- 5) Draw from Gases ✓

Pure substances	Mixture
Silver	Soil
Water	Air
Gold	Salt Solution
Sugar	
Ice	

- 7) Energy of particles: Increase ✓
- Distance between particles: decrease ✓
- Attraction between particles: decrease ✓
- Movement of particles: Increase ✓

- 8) a) Centrifugation ✓
- b) based on the particle's nature we would separate ✓

- 9) a) The spontaneous mixing of different particles having freedom of movement is called diffusion ✓
- b) When temperature increase the rate of diffusion also increases ✓

Change of State

10)

Condensation
Liquid ← Gas

Statistical Analysis

The word 'Statistics' appears to have been derived from the Latin word 'status' meaning a (political) state. In its origin, therefore, the word statistics was applied only to such facts and figures as the state required for its official purpose. But now the word has acquired a wider meaning and it embraces any set of quantitative data relating to a particular phenomenon, irrespective of the fact whether the data are of interest to the state or not.

Statistics may be defined as the study of the principles and methods used in the collection, organisation, presentation, analysis and interpretation, of numerical data in any sphere of activity. Thus in recent times the word 'statistics' has come to be used in two senses: as numerical data and as statistical methods.

Frequency Distribution

It is a method of classifying raw data into number of classes or groups. After listing down the class intervals the frequencies of occurrence of the scores within each class is counted and indicated against each. A frequency distribution shows a tallying of the number of times each score occurs in a group of scores.

Scores in the Test

7	10	10	6	9	11	10	11	13	8
6	10	8	12	8	6	16	18	18	13
19	13	19	19	19	16	18	17		

Frequency Distribution Table

Frequency distribution table is an organised plan of arranging the data from which useful information can be obtained at a glance.

22

Class Interval	Tally Marks	Frequency
90-99		7
80-89		3
70-79	—	—
60-69		4
50-59	I	6
40-49		4
30-39		4
TOTAL		<u>28</u>

Measures of Central Tendency

A measure of central tendency may be defined as a single score that represents all scores of a group. It may be also defined as the tendency of the observations to cluster around some central value. This central value gives an idea of the location of the distribution and may be used as typical value or representative value of the distribution.

A measure of central tendency helps in giving a general picture of the distribution of the scores. It is also used to compare two or more sets of scores. There are three averages or measures of central tendency in common use. They are,

- Arithmetic Mean
- Median
- Mode

Arithmetic Mean

The most commonly used and familiar index of central tendency for a set of raw data or distribution is the mean. The mean is simply arithmetic average. The arithmetic mean has most of the desirable properties of a good measure of central tendency. The arithmetic mean is calculated using the formula;

Arithmetic mean,

$$\bar{x} = AM + \left(\frac{\sum f_i x_i'}{N} \right) C;$$

$$i = 1, 2, 3, \dots, n.$$

where, AM $\rightarrow$ Assumed Mean

$f_i \rightarrow$ frequency of the i^{th} class.

$x_i' \rightarrow \left(\frac{x_i - AM}{C} \right)$; which is the deviation

$N \rightarrow$ number of observations

$C \rightarrow$ width of the class interval

Calculation of Arithmetic Mean:

Class Interval	Exact Limits	f_i	Midpoint, x_i	$x_i' = \frac{x_i - AM}{C}$	$f_i x_i'$
90-99	89.5 - 99.5	7	94.5	0	0
80-89	79.5 - 89.5	3	84.5	-1	-3
70-79	69.5 - 79.5	0	74.5	-2	0
60-69	59.5 - 69.5	4	64.5	-3	-12
50-59	49.5 - 59.5	6	54.5	-4	-24
40-49	39.5 - 49.5	4	44.5	-5	-20
30-39	29.5 - 39.5	4	34.5	-6	-24
TOTAL		$N = \underline{28}$			$\sum f_i x_i' = \underline{-89}$

$$\text{Arithmetic mean, } \bar{x} = AM + \left(\frac{\sum f_i x_i'}{N} \right) C$$

$$= 94.5 - \frac{89}{28} \times 10$$

$$= \underline{64.86}$$

Median

The median may be defined as that value which divides a distribution into two parts such that an exactly equal number of scores fall above and below the point. The median is evidently a positional average and it is calculated using the formula;

$$\text{Median, } Md = l + \frac{\left(\frac{N}{2} - F\right)}{f_m} \times C;$$

where, $l \rightarrow$ exact lower limit of the class interval in which median lies.

$F \rightarrow$ cumulative frequency upto the lower limit of the class interval containing median.

$f_m \rightarrow$ frequency of the class interval containing median.

$C \rightarrow$ size of the class interval

$N \rightarrow$ number of observations.

Calculation of Median:

Class Interval	Exact Limits	Frequency, f_i	Cumulative frequency, F
90-99	89.5 - 99.5	7	28
80-89	79.5 - 89.5	3	21
70-79	69.5 - 79.5	0	18
60-69	59.5 - 69.5	4	18
50-59	49.5 - 59.5	6	14
40-49	39.5 - 49.5	4	8
30-39	29.5 - 39.5	4	4
		$N = \underline{28}$	

$$\frac{N}{2} = \frac{28}{2} = \underline{14}$$

$$l = 49.5$$

$$F = 8$$

$$f_m = 6$$

$$\text{Median} = l + \frac{\left(\frac{N}{2} - F\right) \times C}{f_m}$$

$$= 49.5 + \frac{(14 - 8) \times 10}{6}$$

$$= \underline{\underline{59.5}}$$

Mode

The mode is strictly defined as the point on the scale of measurement with maximum frequency in the distribution. It's a point of maximum concentration on a scale of values. Usually it is the item of the variable which occurs the largest number of times. Mode is calculated using the formula;

$$\text{Mode} = l + \left(\frac{f_2}{f_1 + f_2} \right) C;$$

where, $l \rightarrow$ actual lower limit of the modal class.

$f_1 \rightarrow$ frequency of the class interval preceeding the modal class.

$f_2 \rightarrow$ frequency of the class interval succeeding the modal class.

$C \rightarrow$ size of the class interval.

Calculation of Mode:

Class Interval	Exact Limits	Frequency, f_i
90-99	89.5 - 99.5	7
80-89	79.5 - 89.5	3
70-79	69.5 - 79.5	0
60-69	59.5 - 69.5	4
50-59	49.5 - 59.5	6
40-49	39.5 - 49.5	4
30-39	29.5 - 39.5	4

Modal Class = 90-99

$$l = 90$$

$$f_1 = 3$$

$$f_2 = 0$$

$$C = 10$$

$$\text{Mode} = l + \left(\frac{f_2}{f_1 + f_2} \right) \times C$$

$$= 90 + \left(\frac{0}{3+0} \right) \times 10$$

$$= \underline{\underline{90}}$$

Measures of Dispersion

An average or a measure of central tendency does not give a full picture of the data. It is only a representative value. Two sets of observations may have the same average but one set of observation may be much more scattered than the other set and thus substantially different from each other.

The scatter of observations is called dispersion. A measure of dispersion gives an idea of the extent to which the individual items differ on the whole from average calculated. The following are some measures of dispersion in common use:

→ Range

→ Standard Deviation

Range

Range is the indicator of variability that is the easiest and most easily ascertained, but is also the most unreliable. It is defined as the difference between the highest and lowest scores.

Calculation of Range:

Highest Score = 95

Lowest Score = 30

$$\begin{aligned}\text{Range} &= \text{highest score} - \text{lowest score} \\ &= 95 - 30 \\ &= \underline{65}\end{aligned}$$

Standard Deviation

The standard deviation (SD or σ) is the most reliable and stable index of variability. This concept was introduced by Karl Pearson in 1893. Its significance lies in the fact that it is free from those defects which the earlier methods suffer and satisfies most of the properties

of a good measure of dispersion. It is calculated by using the formula;

$$\sigma = C \times \sqrt{\frac{\sum f_i (x_i')^2}{N} - \left(\frac{\sum f_i x_i'}{N}\right)^2};$$

where, $N \rightarrow$ number of observations

$f_i \rightarrow$ frequency of i^{th} class

$C \rightarrow$ size of class interval

$x_i' \rightarrow \frac{x_i - AM}{C}$; deviation.

Calculation of standard deviation:

Class Interval	Exact Limits	f_i	x_i	x_i'	$(x_i')^2$	$f_i x_i'$	$f_i (x_i')^2$
90-99	89.5-99.5	7	94.5	0	0	0	0
80-89	79.5-89.5	3	84.5	-1	1	-3	3
70-79	69.5-79.5	0	74.5	-2	4	0	0
60-69	59.5-69.5	4	64.5	-3	9	-12	36
50-59	49.5-59.5	6	54.5	-4	16	-24	96
40-49	39.5-49.5	4	44.5	-5	25	-20	100
30-39	29.5-39.5	4	34.5	-6	36	-24	144
TOTAL		$N =$ <u>28</u>				$\sum f_i x_i' =$ <u>-83</u>	$\sum f_i (x_i')^2 =$ <u>379</u>

$$\begin{aligned}
 \sigma &= C \sqrt{\frac{\sum f_i (x_i')^2}{N} - \left(\frac{\sum f_i x_i'}{N}\right)^2} \\
 &= 10 \times \sqrt{\frac{379}{28} - \left(\frac{-83}{28}\right)^2} \\
 &= \underline{\underline{21.79}}
 \end{aligned}$$

Results at a glance:

Mean = 64.86

Median = 59.5

Mode = 90

Range = 65

Standard Deviation = 21.79

Performance Level

$$\begin{aligned}
 \text{Above average} &= \bar{x} + \sigma \\
 &= 64.86 + 21.79 \\
 &= \underline{\underline{86.65}}
 \end{aligned}$$

$$\begin{aligned}
 \text{Below average} &= \bar{x} - \sigma \\
 &= 64.86 - 21.79 \\
 &= \underline{\underline{43.07}}
 \end{aligned}$$

Performance Level	No. of students	Percentage
Above average	7	25%
Average	14	50%
Below average	7	25%

Graphical Representation of Data

One of the most convincing and appealing ways in which statistics may be presented is through diagrams and graphs. In representing frequency distribution, diagrams are not used but graphs are used. Frequency distributions are converted into visual models to facilitate understanding. It is easier, more convenient and quicker to draw inferences from graphs than from frequency distributions. Moreover, they

facilitate comparison of data relating to different periods of time or region and so on. The following are the most commonly used graphical methods for the presentation of frequency distributions:

- Histogram
- Frequency Polygon
- Frequency Curve

Data which fall into different categories or qualitative classes is called categorical data. The diagrams that are usually used to represent categorical data are:

- Bar Diagram
- Pie Diagram

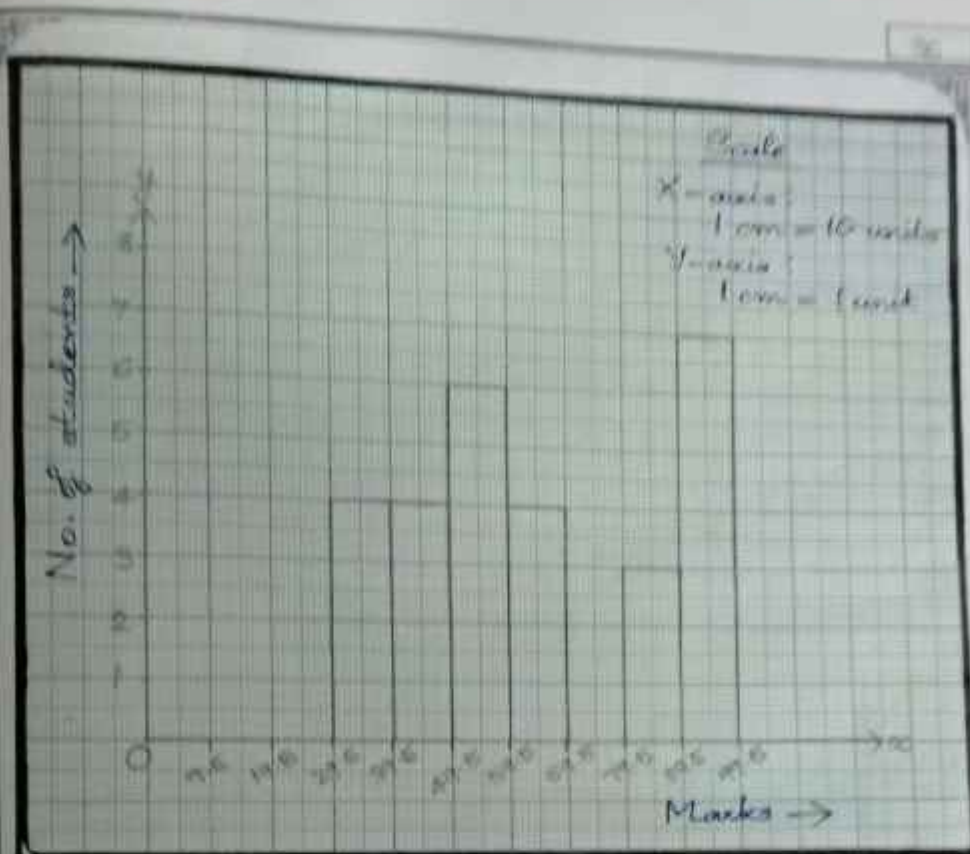
(1) HISTOGRAM

The statistical meaning of histogram is that, it is a graph that represents the class frequencies in a frequency distribution by vertical adjacent rectangles.

In a histogram, the class

intervals are represented along the horizontal axis and their corresponding frequencies are represented by rectangular bars drawn at intervals along vertical axis. The area of the histogram represents the total frequency as distributed through out the classes.

Class Intervals	Exact Limits	Frequency
90-99	89.5 - 99.5	7
80-89	79.5 - 89.5	3
70-79	69.5 - 79.5	0
60-69	59.5 - 69.5	4
50-59	49.5 - 59.5	6
40-49	39.5 - 49.5	4
30-39	29.5 - 39.5	4

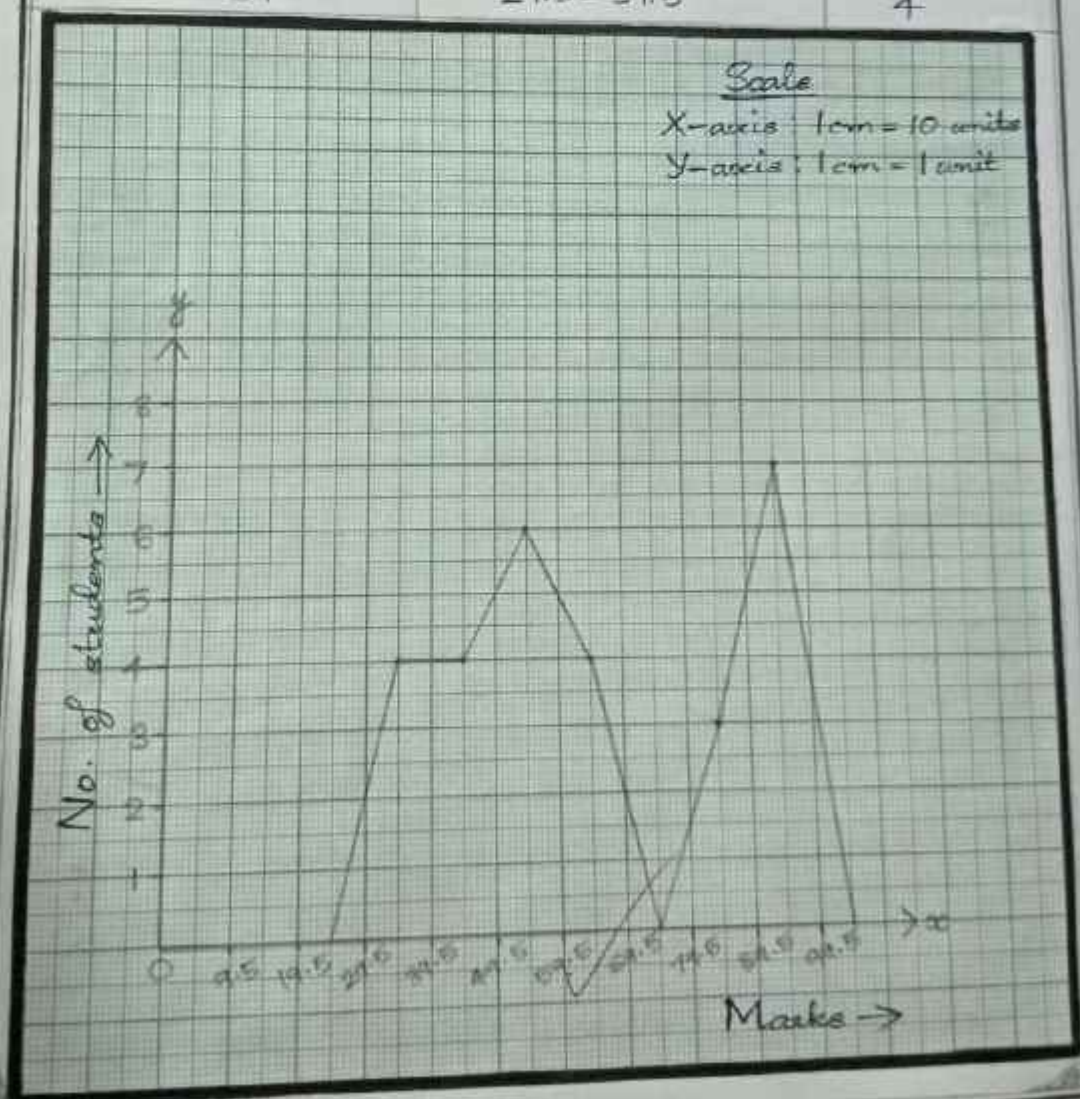


(2) FREQUENCY POLYGON

A polygon is defined as a many sided closed figure. When a many sided figure is drawn on the basis of frequencies given in a frequency distribution, the figure is called a frequency polygon.

37

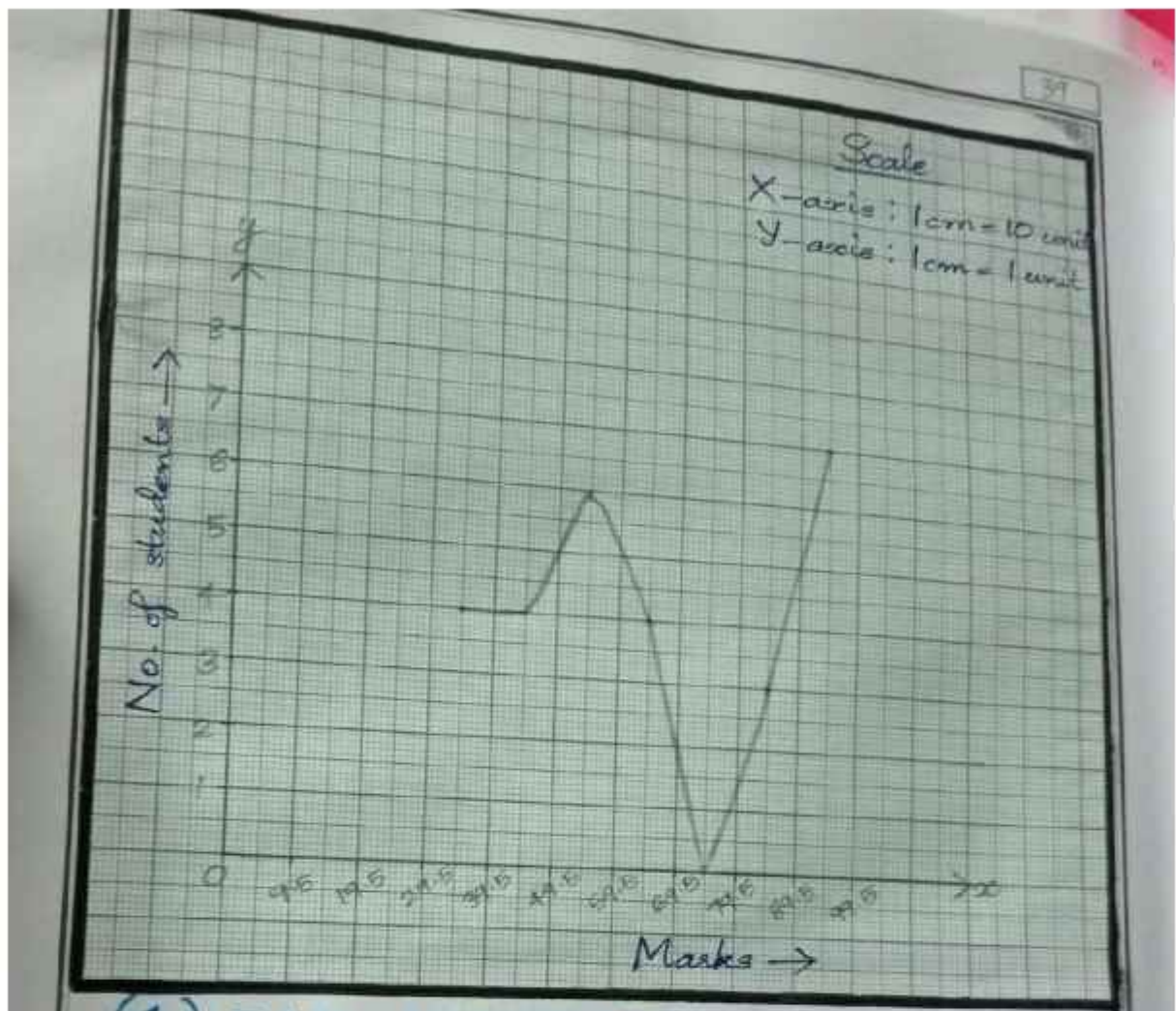
Class Interval	Exact Limits	Frequency
90-99	89.5 - 99.5	7
80-89	79.5 - 89.5	3
70-79	69.5 - 79.5	0
60-69	59.5 - 69.5	4
50-59	49.5 - 59.5	6
40-49	39.5 - 49.5	4
30-39	29.5 - 39.5	4



(3) FREQUENCY CURVE

A smoothed frequency curve can be drawn through the various points of the frequency polygon. The curve is drawn free hand in such a manner that the area included under the curve is approximately the same as that of the polygon. The object of drawing a smoothed frequency curve is to eliminate all accidental variables that might be present in the data. The curve should begin and end at the baseline as a general rule.

Class Interval	Exact Limits	Frequency
90-99	89.5 - 99.5	7
80-89	79.5 - 89.5	3
70-79	69.5 - 79.5	0
60-69	59.5 - 69.5	4
50-59	49.5 - 59.5	6
40-49	39.5 - 49.5	4
30-39	29.5 - 39.5	4

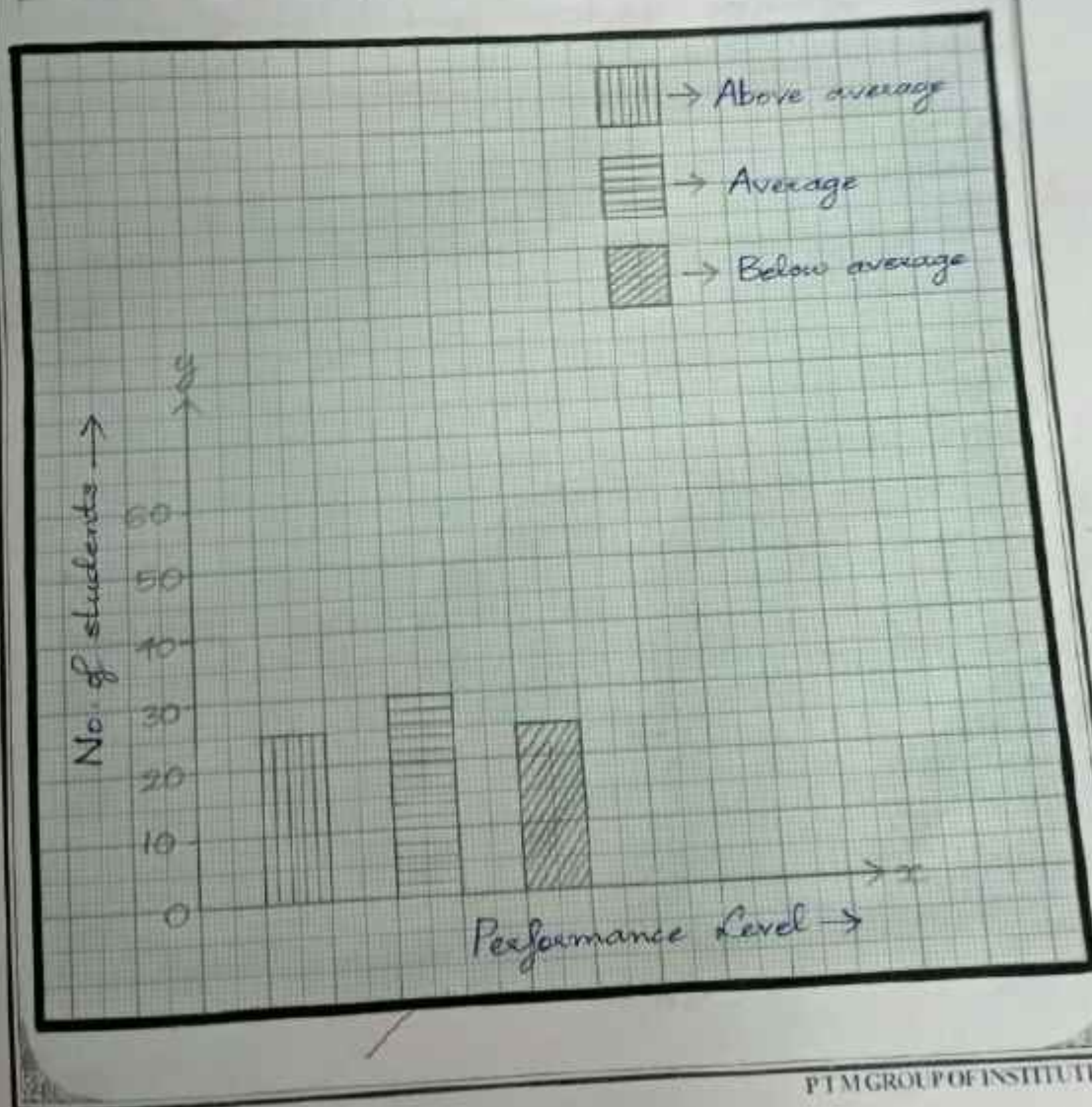


(4) BAR DIAGRAM

Horizontal or vertical bars with the same width, drawn with their base on the same horizontal or vertical line with equal gaps in between and lengths proportional to the magnitudes of observations constitute a bar diagram. This diagram is used when the data is in the form of observations, corresponding

to different categories:

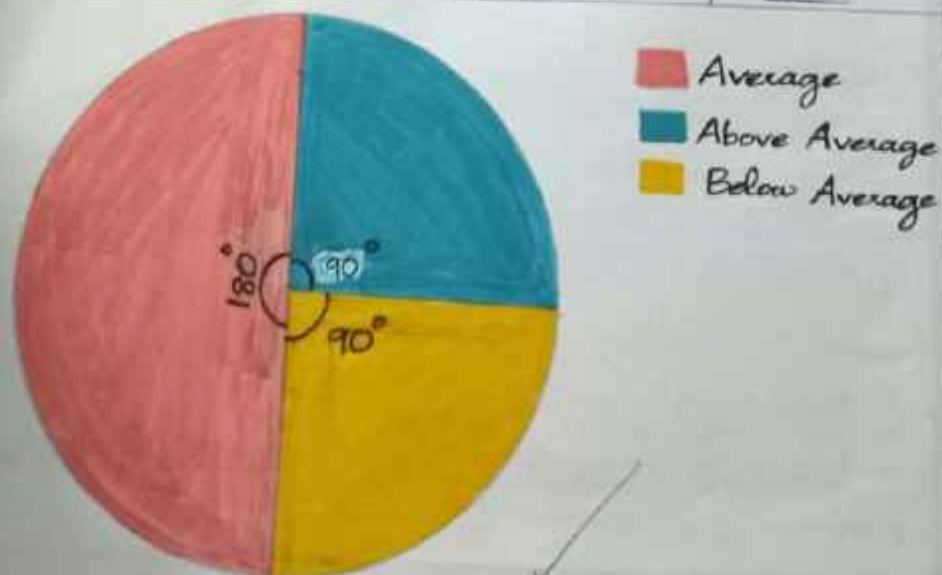
Performance Level	No. of students	Percentage
Above average	7	25
Average	14	50
Below average	7	25



(5) PIE DIAGRAM

Circles drawn with areas proportional to the magnitudes of the observations constitute a pie diagram. Here each circle is divided into sectors with areas proportional to the magnitude of the components. This can be done by dividing 360° in the ratio of the components and drawing sectors containing these angles.

Performance level	No. of students	Percentage	Angle of sector
Above average	7	25	90°
Average	14	50	180°
Below average	7	25	90°
Total	<u>28</u>	<u>100</u>	<u>360°</u>



Interpretation of Results

From the histogram, frequency polygon and frequency curve, it is clear that most of the scores are clustered in the highest class of scores ranging from 90 to 99% and in the median class of 50 to 60%. No students scored between 70 to 80%, hence there is a drop in the graph. As per the analysis and interpretation of the data, 25% of students of 8A were above average students, 50% average, and 25% of the total 28 students were found to be below average.


5/12/24

EDU-402.1:

Diagnostic
Test &
Remediation

Index

Sl. No.	CONTENT	Page No.
1.	Introduction	3
2.	Characteristics of diagnostic test	4
3.	Steps in Educational Diagnosis	5
4.	Purpose of diagnostic test	7
5.	Uses of diagnostic test	8
6.	Question Paper & Sample	9
7.	Diagnostic Chart	12
8.	Analysis and Interpretation	13
9.	Remedial Teaching	18
10.	Conclusion	22

Introduction

A diagnostic test is a tool used to assess an individual's strength, weaknesses, and areas of difficulty in a particular subject or skill. Unlike achievement tests, which measure overall mastery of curriculum content, diagnostic tests provide detailed information about specific concepts or skills that a person may be struggling with. These tests are often administered after achievement tests. This helps the educators to tailor instruction to meet the individual needs of students, enabling targeted remediation and personalised learning experiences. They play a crucial role in guiding instructional planning and improving students outcome by pinpointing areas for focussed attention and support.

Characteristics of Diagnostic test

- Diagnostic tests target specific areas of knowledge or skills to identify strengths and weaknesses.
- They provide detailed feedback to individuals about their performance, highlighting areas for improvement.
- Administered before instruction helps to anticipate potential challenges and tailor teaching strategies accordingly.
- Results guide the development of personalised learning plans and interventions to address identified weaknesses.
- Results inform educators, parents, and learners themselves about specific areas needing improvement and help track progress over time.

Steps in Educational Diagnosis

(1) Identification of learning difficulties:

Identification should be done in two things, i.e.,

(a) identifying the areas of difficulty and identifying the individuals who need diagnosis.

(b) analysing the errors.

(2) Developing test format and layout:

On the basis of analysing, test items are prepared, on the basis of test points selected. The test tryout is administered on a small population and response is analysed. Thus in the light of pilot study the test is made fool proof.

(3) Make the test value based and reliable:

After making test items by pilot study, validity and reliability of the test is assured. The opinions of two or three content experts are also sought.

(4) Selection of test items, inclusion of test:

In the light of above steps, the final version of the test is made. It can be used to find out the difficulties and disabilities by adding adequate questions.

(5) Administration:

While administering the test, the following instructions should be given:

- (a) Pupil should be asked to attend all items.
- (b) Pupil should be asked not to consult with each other during the test.
- (c) The students can seek clarification from the teacher if any doubt arises.

(6) Analysis and Interpretation of the test:

After administration of the test, the answer scripts are scored for interpreting the result. From this we find out the areas of difficulties and its nature using group diagnosis.

7
This helps to locate the general difficulty. Individual analysis is also done to find each individual's difficulties.

Purpose of Diagnostic Test

- It pinpoints specific areas of strengths and weaknesses in learning.
- To tailor teaching strategies to address individual learning needs.
- To develop targeted support for learners struggling in specific areas.
- To track growth and adjust instructions accordingly.
- Assess the effectiveness of curriculum materials and teaching methods.
- To adjust instructions to meet diverse learner needs.
- Provide data for educational decision making and resource allocation.

Uses of Diagnostic Test

- Identifying strengths and weaknesses.
- Tailor made teaching methods based on individual learning needs.
- Develop targetted support strategies for learners struggling in specific areas.
- Track growth and adjust instruction based on ongoing assessment data.
- Assess the effectiveness of curriculum materials and teaching practices/ approaches.
- Adjust instructions to accomodate diverse learner abilities and needs.
- Provide data for educational planning, resource allocation and program evaluation.

PTM HIGH SCHOOL MARUTHOORONAM

DIAGNOSTIC TEST

Name of Student:

Standard: 8 A

Roll No:

Subject: Chemistry

Date:

Unit: Properties of Matter

SUGGESTIONS

- This exam is not meant for analysing your success or failure but to understand your difficulties so that your teacher can help you to solve them.
 - There is no time limit. However, be sure to answer as quickly as possible.
 - Choose the most appropriate answer from the options given for each question.
 - Go to the next question without wasting time for questions you may not know.
-

1. Which of the following is an example of diffusion?
 - a) A drop of ink spreading in water
 - b) Water boiling and turning into steam
 - c) A balloon inflated with air
 - d) Ice melting into water
2. Diffusion occurs fastest in which state of matter?
 - a) Solid
 - b) Liquid
 - c) Gas
 - d) Plasma
3. What is diffusion?
 - a) The movement of particles from an area of lower concentration to an area of higher concentration.
 - b) The movement of particles from an area of higher concentration to an area of lower concentration.
 - c) The process by which plants make their food.
 - d) The process of breaking down food in the stomach.
4. Why does diffusion occur?
 - a) Due to gravitational pull
 - b) Due to differences in concentration
 - c) Due to differences in temperature
 - d) Due to magnetic forces
5. Which of the following statements about diffusion is true?
 - a) Diffusion only occurs in liquids
 - b) Diffusion is faster at higher temperatures
 - c) Diffusion only occurs in gases
 - d) Diffusion does not depend on the concentration gradient

6. What happens to the rate of diffusion if the temperature increases?
 - a) It decreases
 - b) It stays the same
 - c) It increases
 - d) It stops completely
7. In which scenario would diffusion not occur?
 - a) A perfume bottle being opened in a room
 - b) A sugar cube being placed in water
 - c) Salt being added to a pot of boiling water
 - d) Ice cubes being added to a glass of cold water
8. Which of the following is not a factor affecting the rate of diffusion?
 - a) Temperature
 - b) Concentration gradient
 - c) Size of the diffusing particles
 - d) Shape of the container
9. How does the size of particles affect the rate of diffusion?
 - a) Smaller particles diffuse faster
 - b) Larger particles diffuse faster
 - c) Size does not affect diffusion rate
 - d) Both small and large particles diffuse at the same rate
10. Which of the following best describes the diffusion of oxygen in the lungs?
 - a) Oxygen diffuses from the blood into the alveoli
 - b) Oxygen diffuses from the alveoli into the blood
 - c) Oxygen diffuses from the trachea into the alveoli
 - d) Oxygen diffuses from the alveoli into the trachea
11. What property is used in the method of centrifugation to separate components of a mixture?
 - a) Difference in boiling points
 - b) Difference in mass
 - c) Difference in particle size
 - d) Difference in solubility
12. Which of the following substances can be separated by the process of sublimation?
 - a) Sand and salt
 - b) Iron filings and sulfur
 - c) Ammonium chloride and sand
 - d) Sugar and water
13. Chromatography is a method used to separate:
 - a) Solids from liquids
 - b) Immiscible liquids
 - c) Soluble substances in a solvent
 - d) Gases from each other
14. Which method is used to separate immiscible liquids?
 - a) Filtration
 - b) Evaporation
 - c) Separating funnel
 - d) Centrifugation
15. During the process of distillation, which component of the mixture evaporates first?
 - a) The component with the highest boiling point
 - b) The component with the lowest boiling point
 - c) The solid component
 - d) The non-volatile component

16. What is the principle behind the method of filtration?
- a) Difference in boiling points
 - b) Difference in particle size
 - c) Difference in solubility
 - d) Difference in densities
17. Which method would you use to separate a mixture of salt and water to obtain both components?
- a) Centrifugation
 - b) Filtration
 - c) Evaporation
 - d) Distillation
18. Which of the following is NOT a method used for separating components of a mixture?
- a) Sublimation
 - b) Crystallization
 - c) Diffusion
 - d) Centrifugation
19. The process used to separate common salt from sea water is:
- a) Filtration
 - b) Evaporation
 - c) Centrifugation
 - d) Chromatography
20. Which of the following methods is used to separate tea dregs from tea?
- a) Distillation
 - b) Filtration
 - c) Evaporation
 - d) Sublimation
-

Diagnostic Chart

[illegible]

Analysis and Interpretation

Teacher conducted diagnostic test on 12/7/2024 for 8A students of PTMHS, Maruthocconam. It focuses on the unit, 'Properties of Matter' in Chemistry. It includes 20 multiple choice questions that cover key concepts such as diffusion, separation methods, and the principles behind these processes. The test aims to identify students' understanding and misconceptions, providing insights for teachers to tailor their instruction accordingly.

Questions 1 to 10 evaluate students' understanding of diffusion, including its definition, factors affecting its rate, and examples in real-world scenarios. Questions 11 to 20 assess knowledge of various methods used to separate mixtures, such

19
as centrifugation, sublimation, chromatography, filtration, and distillation. A detailed analysis of the questions indicates that the test considers the basic understanding, application, and factors influencing diffusion from questions 1-10, and the conceptual understanding, application, principles and techniques behind the separation methods from questions 11-20.

Most questions in section 1-10 test students' grasp of fundamental diffusion concepts, such as its definition (Q3), reasons for its occurrence (Q4), and its rate in different states of matter (Q2). Students are also required to apply their knowledge to practical examples (Q1, Q7) and understand the effect of temperature on diffusion (Q6). Questions address factors affecting diffusion rates, including temperature (Q5) and particle size (Q9).
This is

The section of Q11-Q20 covers various separation techniques, such as centrifugation (Q11), sublimation (Q12), chromatography (Q13), and the use of a separating funnel for immiscible liquids (Q14). Questions ask students to identify the appropriate method for specific mixtures, such as separating salt from water (Q17), common salt from seawater (Q19), and tea dregs from tea (Q20). Some questions test students' comprehension of the underlying principles behind these methods, such as differences in boiling points, particle size, solubility, and densities (Q16).

High Performing Areas:

Questions 2, 16, 19, and 20 had the highest number of fully correct responses, with 22 to 27 students answering them correctly. These items seem well understood by the majority of students, indicating a solid grasp of the concepts

covered. Questions 3, 4, 6, 11, 12, 14, and 15 also had a high number of correct responses (9-15 students), suggesting a generally good understanding.

Areas of Difficulty:

Questions 1, 7, 9, and 13 had a high number of fully wrong responses (9-24 students). This indicates significant confusion or misunderstanding of the concepts tested by these questions.

Question 3 had a high number of partially correct responses (24 students), indicating partial understanding but also a need for clarification.

Partial Understanding:

Questions 3, 4, and 15 had a mix of fully correct and partially correct responses, indicating that while some students understand the concepts, others only have a partial grasp.

Omitted Responses:

Questions 3, 4, and 14 had some omitted responses, suggesting

possible confusion or a lack of time during the test.

Detailed Analysis per Question:

Question 1 → fully right (9), fully wrong (19).

Question 5 → fully right (16), fully wrong (12).

Question 7 → fully right (7), fully wrong (19),
partially correct (2)

Question 6 → fully right (15), fully wrong (13).

Question 9 → fully right (3), fully wrong (19),
partially correct (6).

Question 13 → fully right (4), fully wrong (24).

Question 3 → fully right (3), partially correct (24),
omitted (1).

Question 4 → fully right (5), partially correct (22),
omitted (1).

Sl. No.	Questions	No. of pupils answered		Nature of Difficulty	Remedial Measures
		Right	Wrong		
1.	Which of the following is an example of diffusion? (a) A drop of ink spreading in water (b) Water boiling and turning into steam (c) A balloon inflated with air (d) Ice melting into water	9	19	Pupils were unfamiliar with more examples of diffusion. They have confusion with the concepts of diffusion and change of state when associated together.	The concept of diffusion is made clear by alternative teaching strategy through inquiry training model. Each of the options of the question is correctly explained and withdrawn the difficulty in comprehension due to language barrier.
5.	Which of the following statements about diffusion is true? (a) Diffusion only occurs in liquids	16	12	The relation of diffusion with various factors like temperature and concentration gradient is not clear to	The relation of diffusion with the concentration gradient, temperature, and different states of matter is properly

Remedial Teaching

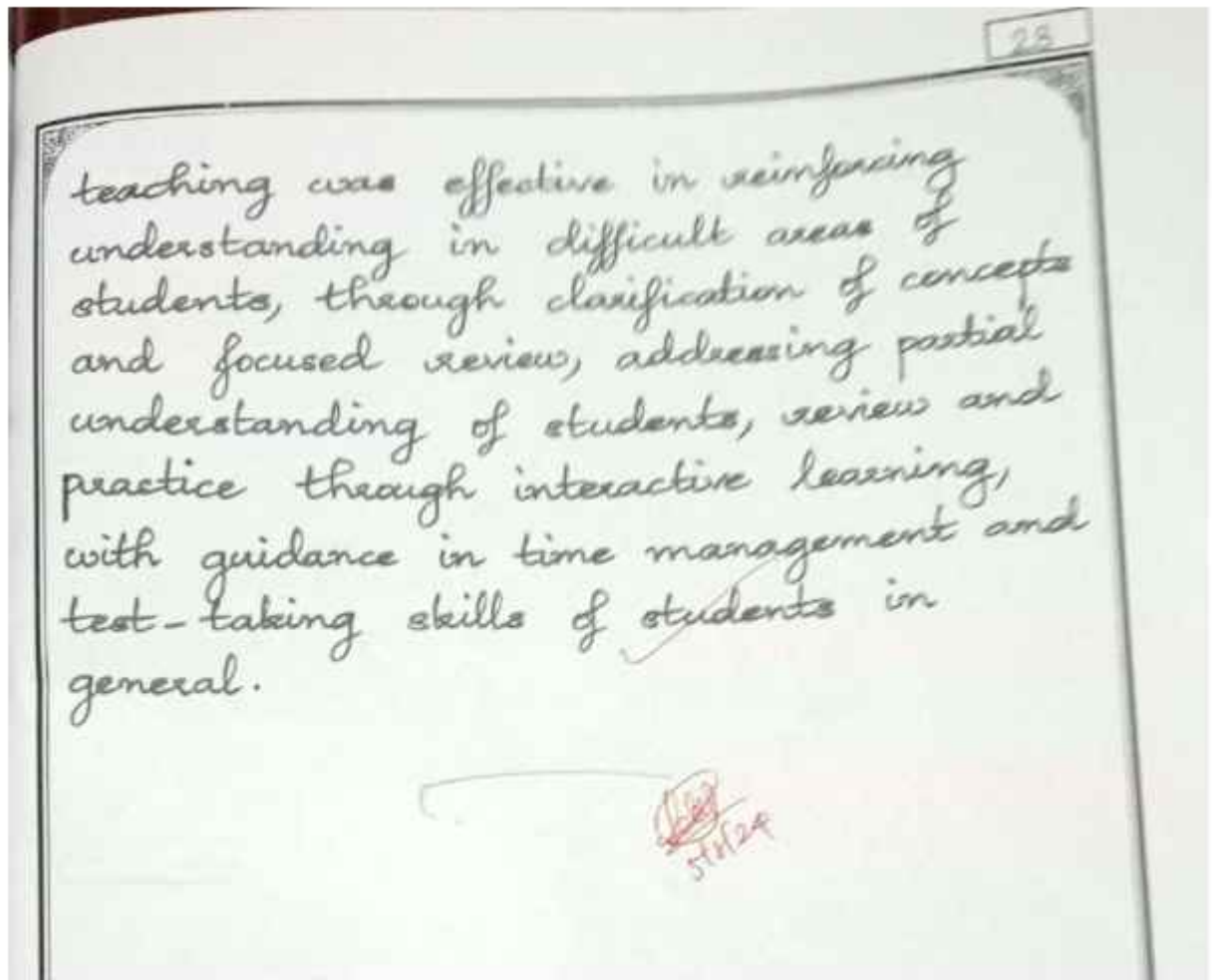
(b) Diffusion is faster at higher temperatures. (c) Diffusion only occurs in gases. (d) Diffusion does not depend on the concentration gradient			the students.	conveyed to the students through demonstrations
6. What happens to the rate of diffusion if the temperature increases? (a) It decreases. (b) It stays the same. (c) It increases. (d) It stops completely.	15	13	Students were unclear about the relationship between temperature and diffusion.	Through re-teaching the concept through inquiry training model the influence of temperature on diffusion is made to be grasped by the learners.
7. In which scenario would diffusion not occur? (a) A perfume bottle being opened in a room.	7	19	The concept of diffusion is not clearly understood by students with	The concept of change of state and applications of diffusion are made clear to students.

(b) A sugar cube being placed in water. (c) Salt being added to a pot of boiling water. (d) Ice cubes being added to a glass of cold water.		respect to its applications in various scenarios.	
9. How does the size of particles affect the rate of diffusion? (a) Smaller particles diffuse faster. (b) Larger particles diffuse faster. (c) Size does not affect diffusion rate. (d) Both small and large particles diffuse at the same rate.	3	19 Pupils lack the understanding of how the size of particles affect the rate of diffusion.	Diffusion of different particles having freedom of movement is demonstrated through role play of students.

10. Which of the following is not a method used for separating components of a mixture? (a) Sublimation. (b) Crystallization. (c) Diffusion. (d) Centrifugation.	4	24 Pupils had difficulty in distinguishing between various methods of separation of components from a mixture and the process of diffusion.	Diffusion as a concept of mixing of components is deluged in the model of learning inquiry by students so that students would be able to grasp the concept with self-autonomy and scientific attitude. Other methods of separation of components from a mixture is redefined to students in a further simplified approach.
--	---	--	--

22

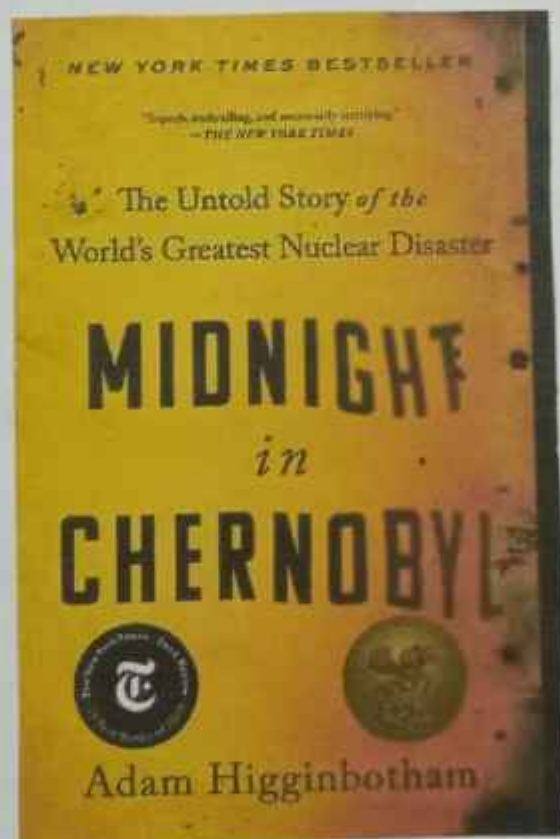
DETAILED INSTRUCTIONS



8. READING AND REFLECTING ON TEXT

Sample Reading and Reflecting on Text

EDU - 402.1



Index

Sl. No.	CONTENT	Page No.
1.	Introduction	3
2.	About the Book	5
3.	About the Author	6
4.	Chapterwise Summary	7
5.	Critical Analysis	17
6.	Benefits derived from the Book.	23
7.	Limitations	26
8.	Conclusion	28

Introduction

Reading is a complex developmental challenge that we know to be intertwined with many other developmental accomplishments: attention, memory, language and others. Reading is typically an individual activity, done silently, although on occasion a person reads out loud, for better comprehension. Reading is a multi-faceted process involving word recognition, comprehension, fluency, and motivation.

Reading is essential and serves as a building block of learning, it makes the readers more knowledgeable, and empathetic, and stimulates your imagination and scientific temper. Reading and reflection not only encourage students to read more regularly, they also promote content

4
mastery and foster development of student development of monitoring, self evaluation and reflection skills. When the words are understood and transcend the pages to become thoughts and ideas that you're truly reading. Comprehension therefore is the capacity for understanding these thoughts and ideas. Student teachers are also expected to enhance their metacognitive awareness to become conscious of their own thinking process as they grapple with diverse texts.

About the Book

Title : Midnight in Chernobyl : The
Untold Story of the World's
Greatest Nuclear Disaster

Publisher : Simon & Schuster

ISBN : 1501134639

Published on : 12th February 2019

Pages : 538; Hardcover

Language : English

Literary Awards : Colby Award (2020),

Los Angeles Times Book Prize Nominee for
Science & Technology (2019), The Royal
Society of Literature Ondaatje Prize
Nominee for Longlist (2020), Andrew
Carnegie Medal for Nonfiction (2020),
Goodreads Choice Award Nominee for History
& Biography (2019).

Setting : Pripyat (Ukraine, 1986),
Moscow (Russian Federation, 1986).

Price : ₹ 466.00

About the Author

Adam Higginbotham (born 1968 in Somerset) is a British journalist who is the former U.S. correspondent for 'The Sunday Telegraph' Magazine and former editor-in-chief of 'The Face'. He has also served as a contributing writer for The New Yorker, Wired, and The New York Times.



Chapter wise Summary

Midnight in Chernobyl is an indelible portrait of history's worst nuclear disaster, of human resilience and ingenuity and the lessons learned when mankind seeks to bend the natural world to his will - lessons which, in the face of climate change and other threats - remain not just vital but necessary. Now, Higginbotham brings us closer to the truth behind this colossal tragedy.

'Midnight in Chernobyl' starts with a short epilogue, written from the point of view of some of the first rescuers of ~~on~~ the scene. Then starts "Part One: The Birth of a City", which recounts the rise and fall of the Chernobyl Atomic Energy Station.

Chapter One, "The Soviet Prometheus" describes the mad-dash way that the Chernobyl nuclear reactor was built, and introduces the reader to plant director Victor Breukhanov, an electrical engineer who was put in charge of building a nuclear power station and its accompanying city because of his rising star in the Communist Party.

Chapter Two, "Alpha, Beta and Gamma," goes over some basic physics that explains why nuclear radiation is dangerous. It also explains a far more dangerous force - the culture of secrecy and speed that built up around nuclear development, especially in the Soviet Union, and how domestic nuclear power has always struggled to escape its military origins.

Chapter Three, "Friday, April 25, 5:00 pm, Pripjat," gives background on some of the people who were present the night of the Chernobyl nuclear explosion. It tells what their lives in Pripjat were like, what it had taken them to get there, and what kind of culture they worked within.

Chapter Four, "Secrets of the Peaceful Atom," talks about the history of the Soviet nuclear energy program, and its origins in secretive military operations. This is compared and contrasted with the West, where nuclear power also struggled to escape the culture of secrecy and experimentation that accompanied its military origins, but where its flaws were publicly discussed.

Chapter Five, "Friday, April 25, 11:55 pm, Unit Control Room

Number Four, covers the hours leading up to the Chernobyl nuclear explosion. It describes the safety tests that had been delayed in order to meet other production quotas, and what had gone wrong with the ones that had been carried out.

Chapter Six, "Saturday, April 26, 1:28 a.m., Paramilitary Fire Station Number Two," lays out the scene of the explosion, which occurred during a safety test gone horribly wrong. It describes the immediate reactions of the plant workers, nearby firefighters, and their party buses.

Chapter Seven, "Saturday, 1:30 a.m., Kiev," details the assembly of panels of experts and government officials who were put in charge of responding to the explosion at the Chernobyl Atomic Energy Station. It shows the spread

of contradictory information and that the main priority was preventing panic.

Chapter Eight, "Saturday, 6:15 am, Pripjat," shows the conflict between those who wanted to make sure that everyone in the city of Pripjat was safe, and those who wanted to maintain a sense of calm and get everyone back to work.

Chapter Nine, "Sunday, April 27, Pripjat," covers the eventually evacuation of the city of Pripjat and the beginnings of the large-scale efforts to put out the fire at Unit Four. "Part Two: Death of an Empire" deals with global fallout, both political fallout, and literal nuclear fallout.

Chapter Ten, "The Cloud" shows how the weather carried nuclear radiation from the explosion across

the Soviet Union and Europe, and how party leaders dealt with that.

Chapter Eleven, "The China Syndrome," describes scientists working to make sure that all nuclear fallout, including the potential molten radioactive sludge that had the potential to burn through the ground into the water supply, were contained, while party leaders made sure to control the release of information.

Chapter Twelve, "The Battle of Chernobyl," details attempts to finish putting out the reactor fire and built something that could capture any materials moving through the ground, with men working as quickly as possible in extremely hazardous conditions.

Chapter Thirteen, "Inside Hospital Number Six," describes the medical conditions that afflicted those

who had been exposed to radiation inside Chernobyl and the lengths some of their loved ones had to go to find them.

Chapter Fourteen, "The Liquidators" follows continued efforts to clean up the radioactive "exclusion zone" surrounding the Chernobyl nuclear plant. Even as hundreds of thousands of were ~~conscripted~~ conscripted and called up to serve, making the area habitable again began to look impossible.

Chapter Fifteen, "The Investigation" actually contains multiple investigations - scientific investigations into the faults of the nuclear reactors that were used to make internal changes but kept classified, and publicized criminal investigations into whom to blame for the explosion in reactor four.

Chapter Sixteen, "The 'Zarcophagus'" describes the efforts

17
to contain the spread of nuclear radiation by building a giant concrete structure around unit four of the Chernobyl reactor. It describes men working in harrowing conditions, and a government that hailed them as heroes, but forced them into harm's way without their consent or full knowledge.

Chapter Seventeen, "The Forbidden Zone", takes a look at the lives of those who survived the explosion and its initial death toll. The firefighters were the greatest heroes, plant workers mainly ignored or blamed. Evacuees of Pripyat experienced great empathy sympathy when people thought they were temporarily displaced, but the resentment and suspicion when the city was abandoned for being too radioactive.

Chapter Eighteen, "The Trial" looks at how the Soviet State decided to blame and punish those it publicly deemed responsible for the Chernobyl nuclear disaster while quietly trying to fix the problems within nuclear reactors they had determined were the real issue.

Chapter Nineteen, "The Elephant's Foot," covers the ongoing investigations into the remains of unit four and the materials left inside it of it.

Chapter Twenty, "A Tomb for Valery Khodemchuk," looks at the legacy of Chernobyl in the post-Soviet era, and the construction of a new facility to house the remains of the disaster lead by international agencies. It also describes the trips Higginbotham took to Russia and Ukraine to research this book.

Epilogue briefly covers the fates of several key players, including some people who played a large part in the book, and some people who played small parts, but are currently more prominent.

Critical Analysis

The definitive, dramatic untold story of the Chernobyl nuclear power plant disaster, based on original reporting and new archival research. April 25, 1986, in Chernobyl, was a turning point in world history. The disaster not only changed the world's perception of nuclear power and the science that spawned it, but also our understanding of the planet's delicate ecology. With the images of the abandoned homes and playgrounds beyond the barbed wire of the 30-kilometer Exclusion zone, the rusting graveyards of contaminated trucks and helicopters, the farmland lashed with black rain, the event fixed for all time the notion of radiation as an invisible killer.

12
Chernobyl was also a key event in the deduction of the Soviet Union and with it, the United States' victory in the Cold War. For Moscow, it was a political and financial catastrophe as much as an environmental and scientific one. With a total cost of 18 billion rubles - at the time equivalent to \$ 18 billion - Chernobyl bankrupted an already teetering economy and revealed to its population a state built upon a pillar of lies.

'Midnight in Chernobyl' by Adam Higginbotham is a gripping account of the 1986 nuclear disaster. It delves into the events leading up to the explosion and the aftermath, offering a compelling narrative and shedding light on the human cost. Through extensive research and interviews, the book delves into the events leading up

19
to the explosion at the Chernobyl power plant, the immediate aftermath, and the long term consequences. It offers a compelling blend of science, history, and human drama, shedding light on one of the most devastating man-made disasters in history.

This book is worth reading for those who want to gain a deeper understanding of the human and environmental impact of nuclear accidents. The story of Chernobyl is more complex, more human, and more terrifying than the Soviet myth. Drawing on hundreds of hours of interviews conducted over the course of more than ten years, as well as letters, unpublished memoirs, and documents from recently-declassified archives, this book makes for a masterful non-fiction thriller.

20
Chernobyl has become lodged in the collective nightmares of the world: shorthand for the spectral horrors of radiation poisoning, for a dangerous technology slipping its leash, for ecological fragility, and for what can happen when a dishonest and careless state endangers not only its own citizens, but all of humanity. It's a story that has long remained in ~~dis~~ dispute, clouded from the beginning in secrecy, propaganda, and misinformation. Through his book, Higginbotham brings us closer to the truth behind this colossal tragedy.

The mode of story telling is wonderful and chilling, with thriller-like flair, written with skill and passion by the author of this book. Higginbotham captures the voices and personalities of so many vivid

characters, from high-ranking party officials to the first responder who was luckily drunk the night he responded to the fire at the plant.

The book ultimately explores the causes and consequences of the 1986 explosion at the Soviet Union's Chernobyl Atomic Energy Station in Ukraine, which killed at least 31 plant workers and firefighters and resulted in the evacuation of over 100,000 people. The radioactive fallout from the disaster ostensibly caused an unknown number of cancers and other serious health problems across the Western Soviet Union and Eastern Europe. There is still no definitive account for how many lives were blighted. Brown estimates 35,000 to 150,000 Chernobyl fatalities. She attributes the rise in thyroid cancers in the US - the numbers tripled between 1974 and 2013 -

22
to half a century of nuclear testing.
All of us have been exposed to low-level
doses.

Whether we read it for the drama,
for the careful and fascinating science
around this tragedy, as a warning
for the future or simply as a horror
study to share with unsuspecting
brunch companions, *Midnight in
Chechnya* is first-rate, funny and
ultimately so very sad. The vivid
recreation of the events and the
human stories make it a chilling
and compelling read.

Benefits derived from the Book

1) Comprehensive insight:

- The book provides detailed and insightful information about the Chernobyl disaster, covering not only the explosion itself but also the events leading up to it.
- Readers gain a deeper understanding of the nuclear ambitions during the communist era in the USSR, the construction process of the reactors, and the lives of employees and their families in the dream-like city built for them.

2) Human Resilience and Ingenuity:

- Through firsthand accounts and interviews, the book portrays the human resilience and ingenuity of those who witnessed the disaster.
- It highlights the bravery of the liquidators - the individuals who

24
risked their lives to contain the fallout and mitigate the catastrophe.

3) Lessons for Today:

- The lessons learned from Chernobyl remains relevant and necessary in the face of modern challenges such as climate change and other threats.
- The book underscores the importance of understanding the consequences of bending the natural world to human will.

4) Detailed Research:

- Higginbotham's extensive research and interviews with individuals closely associated with the Chernobyl accident provide a comprehensive and authentic account.

5) Human Stories:

- The book humanizes the disaster by sharing personal stories of workers,

25
liquidators, and residents. These narratives evoke empathy and highlight the resilience and ingenuity of those affected.

6) Historical Context:

- Higginbotham places the event within the broader context of Soviet nuclear ambitions, reactor design flaws, and the political climate of the time.

7) Relevance:

- The lessons learned from Chernobyl, about the consequences of manipulating the natural world, remain vital and necessary in the face of climate change and other threats.

Limitations

- 1) Focus on specific aspects
 - The book primarily centers around the events leading up to and the immediate aftermath of the Chernobyl disaster.
 - Some readers might wish for a broader context, including the geopolitical implications, long-term environmental impact, and global nuclear safety lessons.
- 2) Complex technical details
 - Given the technical nature of nuclear reactors and ~~radiators~~ radiation, the book delves into intricate details about reactor design, control mechanisms, and radiation effects.
 - For some readers, this level of technicality might be overwhelming or hard to follow.

3) Limited personal stories

- While the book includes personal accounts from workers, liquidators, and residents, it could benefit from more wider perspectives.
- Additional stories from affected families, scientists, and policy makers would provide a more comprehensive view.

4) Omission of post-disaster developments

- The book doesn't extensively cover the long-term consequences, such as the impact on health, the Exclusion zone, or subsequent reactor safety improvements.
- Readers seeking a deeper exploration of these aspects might need to supplement their reading with other sources.

5) Style and narrative choices

- Some readers may find the writing style dense or overly detailed.

- The narrative occasionally jumps between timelines, which can be confusing for those unfamiliar with the events.

Conclusion

Reading and reflecting on science books is a valuable practice. Science books often delve into intricate theories, principles, and phenomena. Reading them helps to grasp complex scientific concepts. Reflecting on what we've read allows us to internalize and connect these ideas leading to better comprehension. Engaging with science literature encourages critical thinking by evaluating evidence, identify biases, and assess the validity of claims. Reflection prompts us to analyze the material, question assumptions, and consider alternative viewpoints. Reflecting on science content cements in the memory and helps to recall key ideas later and

218
apply them in various contexts. These reflections also serve as a resource for generating ideas when working on assignments or projects.

Science books cover diverse topics, from biology and physics to environmental science and astronomy. By reading widely, we gain a broader understanding of the natural world and its interconnectedness. Since science evolves rapidly, regular reading keeps us informed and updated about new discoveries, research, and advancements. Reflection helps to integrate this evolving knowledge into your existing understanding. Reading isn't just about consuming information, it's about actively engaging with the material and allowing it to shape our thinking.

9. PREPARATION OF E-CONTENT MATERIALS

Digital Text



10. CLASSROOM TEACHING WITH ICT

Sample ICT Integrated Lesson Plan

11. COMMUNITY LIVING CAMP

DAY 1 - 21/03/2024 Thursday

8 am: Yoga - National AYUSH Mission

9-10 am: "Electrical Safety and Awareness"
D Rathakrishnan,
Asst. Engineer, KSEB, Kottakkal.

9-11 am: Lunch Preparation time

2 - 4.30 pm: MVD-Class:
Shri. Renujeerson, Asst. Motor Vehicle
Inspector, Sub Regional Transport
Office, Neyyattinkara

4.30 - 5.30 pm: Aerobics Training:
Smt. S Geetha, Assistant Professor
Dept. of Physical Education NSS College
Neeramanikara

5.30-7pm: Break time

7 - 8pm: Meditation: Be the best version of oneself,
Heartfulness Institute, Trivandrum.

8-10 pm: Dinner & Camp Fire

DAY 2 - 22/03/2024 Friday

8 am: Yoga & AYURVEDA MEDICINE:
National AYUSH Mission

7.30 am: Meditation: Heartfulness Institute,
Thiruvananthapuram

10 am -1 pm: Art & Aesthetic Education,
Hasim Amaravilla

2pm - 4 pm: Closing Ceremony and Cultural
Activities

9.00 am: Reporting and Registration.

9.15 am: Flag hoisting:
Manager, PTM College of Education.

9.30 am: Inaugural Session:
Chief Guest - Asst. M Vincent, MLA Kovalam,
Assembly Constituency.

10.30 am: Introduction & Briefing:
Community Living Camp 2024

11.45 am: Campus Cleaning

2- 3.15 pm: Tool Preparation:
Preparation for Socio-Economic Survey.

3.30pm - 5pm: Campus Beautification

DAY 2 - 23/03/2024 Tuesday

9.00am: Reporting

10.00 am: Survey for Data Collection.

2.00pm - 4.00 pm: Leadership Training:
RP - Sri Gireesh Paruthimadam.

4.30 - 5 pm: YOGA & Meditation -
Be the best version of oneself; Heartfulness
Institute Trivandrum

7- 8 pm: Dr. Sajū, Alternative Medicine:
"manjara shiksha manjara
dharma shiksha"

8.30 - 9.30 pm: Cultural Activities

9.30 pm: Review & Reporting

**PTM COLLEGE OF EDUCATION
PRESENTS**

**ARISE
Community Living
Camp- 2k24**

From: 18.03.2024 -22.03.2024
VENUE: PTM College Campus

Objectives

- To promote social accommodation and broaden the mental abilities of the student-teachers.
- To promote the democratic nature and involvement of the student-teacher in planning and implementing educational activities.
- To develop critical thinking about the issues related to the policies/approaches in education.
- To inquire in to the cultural, social, scientific, educational and environmental aspects of a community.
- To develop an interest to train the body and mind for a well balanced personality.

Theme of the camp:

"Education and social change"



About the college

**PTM COLLEGE OF
EDUCATION**



The campus of the college is situated 18 kms south of Thiruvananthapuram, the capital city of Kerala. The campus also accommodates a primary school, high school, a higher secondary school, Vocational higher secondary school and a Teachers Training Institute. It is a vast campus with open grounds and flowering trees. Our vision is to provide teacher education facilities for rural people without much financial burden and to serve as a leader institution among the local educational institutions.

**Data Collection Form of Educational Survey conducted as part of Community Living Camp
on 19/03/2024**

1. കുടുംബാംഗങ്ങൾ കൂടുതൽ തുണയളകളിൽ ഉള്ള ആശയം കൃത്യമെടുക്കുവാൻ
പ്രയത്നിക്കുന്നുണ്ടോ?

ഉണ്ട് ഇല്ല

2. കുടുംബാംഗങ്ങളിൽ ആരാണ് കൂടുതൽ കൃത്യമായ ആശയങ്ങൾ
പ്രയത്നിക്കാൻ ശ്രമിക്കുന്നത്?

ഉണ്ട് ഇല്ല

3. എൻ പിജിഎം-യിലേക്ക് നിങ്ങൾ ചേർന്നിട്ടുണ്ടോ?

അതെല്ലാമി (a) ആശയങ്ങൾ (b) വിജ്ഞാപനം (c) പാർട്ടിപ്പാർട്ടി

4. നമ്മുടെ, ഓരോരുത്തരുടെയും, എൻ പിജിഎം പ്രവർത്തനങ്ങളെ കുറിച്ച്
അറിയാമോ?

ഉണ്ട് ഇല്ല

അതെല്ലാമി ചേർത്ത കൂടുതൽ വിജ്ഞാപനം കൂടുതൽ സംരക്ഷിക്കാൻ

ഉണ്ട് ഇല്ല

5. നിങ്ങളുടെ കുടുംബത്തിന്റെ വാർഷികവരുമാനം

1) 10000-ൽ താഴെ 2) 10000-25000 3) 25000-40000

4) 40000-ൽ കൂടുതൽ

6. നിങ്ങളുടെ അല്ലെങ്കിൽ ആരുമെങ്കിലും നാശനഷ്ടങ്ങൾ നിലനിൽക്കുന്ന വസ്തുക്കൾ
അറിയാമോ?

ഉണ്ട് ഇല്ല

7. ചേർത്ത വർഷത്തിൽ നിങ്ങൾക്ക് എൻ പിജിഎം ആശയങ്ങൾ
ആകൃഷ്ടപ്പെട്ടുണ്ടോ, അല്ലെങ്കിൽ വാർഷികവരുമാനം കൂട്ടിച്ചേർത്തു?

ഉണ്ട് ഇല്ല

8. വാർഷികവരുമാനം കൂട്ടിച്ചേർത്ത ചെലവുകൾ വാർഷികവരുമാനം

ഉണ്ട് ഇല്ല

9. ചേർത്ത വർഷത്തിൽ നിങ്ങളുടെ വാർഷികവരുമാനം കൂട്ടിച്ചേർത്തുണ്ടോ?

ഉണ്ട് ഇല്ല

10. നിങ്ങളുടെ വാർഷികവരുമാനം കൂട്ടിച്ചേർത്ത ചെലവുകൾ വാർഷികവരുമാനം

11. ചേർത്ത വർഷത്തിൽ നിങ്ങളുടെ വാർഷികവരുമാനം കൂട്ടിച്ചേർത്തുണ്ടോ?

ഉണ്ട് ഇല്ല

12. ചേർത്ത വർഷത്തിൽ നിങ്ങളുടെ വാർഷികവരുമാനം കൂട്ടിച്ചേർത്തുണ്ടോ?

1) 10000-ൽ താഴെ 2) 10000-25000 3) 25000-40000

4) 40000-ൽ കൂടുതൽ

13. ചേർത്ത വർഷത്തിൽ നിങ്ങളുടെ വാർഷികവരുമാനം കൂട്ടിച്ചേർത്തുണ്ടോ?

ഉണ്ട് ഇല്ല

14. ചേർത്ത വർഷത്തിൽ നിങ്ങളുടെ വാർഷികവരുമാനം കൂട്ടിച്ചേർത്തുണ്ടോ?

ഉണ്ട് ഇല്ല

15. ചേർത്ത വർഷത്തിൽ നിങ്ങളുടെ വാർഷികവരുമാനം കൂട്ടിച്ചേർത്തുണ്ടോ?

ഉണ്ട് ഇല്ല

16. ചേർത്ത വർഷത്തിൽ നിങ്ങളുടെ വാർഷികവരുമാനം കൂട്ടിച്ചേർത്തുണ്ടോ?

ഉണ്ട് ഇല്ല

ഉത്തരം എന്ത്?

17. ചേർത്ത വർഷത്തിൽ നിങ്ങളുടെ വാർഷികവരുമാനം കൂട്ടിച്ചേർത്തുണ്ടോ?

ഉണ്ട് ഇല്ല

18. ചേർത്ത വർഷത്തിൽ നിങ്ങളുടെ വാർഷികവരുമാനം കൂട്ടിച്ചേർത്തുണ്ടോ?

ഉണ്ട് ഇല്ല

ഉത്തരം എന്ത്?



(Signature)
Dr. Aravindan R
Principal-in-charge,
P.T.M. College of Education,
Kottukal P.O., Maruthamalai,
Balaramapuram, Tirupur - 63531