

SUBJECT: MATHEMATICS

LESSON PLAN

TOPIC- THREE DIMENSIONAL GEOMETRY

Pre-Content/content Post-Content	Learning Outcome/Objectives	
	General	Specific
<u>PRE-CONTENT</u> Direction cosines, direction ratios of a line in space passing through two points. <u>CONTENT</u> Equation of a line in space, angle between two lines, the concept of skew lines in space and shortest distance between them, distance between two parallel lines. Equation of a plane in various forms, condition for coplanarity of two lines in space, angle between two planes, angle between line and a plane. <u>POST-CONTENT</u> Problem Solving	Students will be able to explore the fundamentals behind D. Rs and D. Cs and able to apply them. visualize lines, skew lines in space and find their equations using given data and transforming them to standard form. appreciate the geometrical formulae for planes, formulae connecting Line and plane etc. And perform them. calculate faster and will be able to solve problems based on it	Students will be able to acquire clear understanding of the difference between D. Cs and D. Rs of a line and link them. analyze and formulate Problems relating to lines in space and be able to solve them. solve various questions In this topic the student will be able to draw a simple figure of the given situation, choose the correct formula to be applied and administer it. acquire problem solving skills and will be able to solve various problems

Home Work /Assignment

- 1) NCERT Exercise questions (Questions from Ex .11.1 to 11.4 and misc. Ex from NCERT book)
- 2) Exemplar problem

MONTH: November

CLASS: XII

Teacher's Activity	Student's Activity	
Teacher will help students in evaluating D. Cs and D. Rs of a line. Ask oral questions based on different 2 –D and 3-D based on their previous knowledge. give various examples to calculate scalar and vector product and connect them to work done and area of triangle. discuss how scalar triple product gives volume of parallelepiped with the help of diagrams and help them visualize. that students handle Instruct them about the activity based on equation of plane ANNEXURE-1 give application-based questions.	Students will distinguish between D. Cs and D. Rs Solve questions from Ex 11.1 and 11.2 describe lines and their equation and solve Questions from EX11.3 solve Questions from Ex.11.4 And misc. Ex on chap.11 perform the activity as per the given instructions and write their observations ANNEXURE-1 simplify and solve application-based problems.	Teacher will write observation and remarks after the class

Teaching Aids: Smart board,

Methodology/Innovative Methods: Discussion, Recall, Explanation, Question-Answer method, problem solving

Interdisciplinary Links: Applied in Engineering, Science and Economics

Co-Ordinator

Vice-Principal

Principal

ANNEXURE-1

Subject	MATHEMATICS
Class	XII
Chapter/Unit	Three - dimensional Geometry
Topic	Vector equation of a plane.
Time	40 min
Nature of Activity	Individual

What will I learn (Learning Outcome)?

To demonstrate the equation of a plane in normal form.

Skills: Logical ability, Analytical thinking, Deductive reasoning, Creativity, Accuracy.

What I have to do?

Find equation of plane

What do I require?

One hardboard of size 10 cm × 12 cm, plastic straws, 3 pieces of wires, pen/pencil, pins

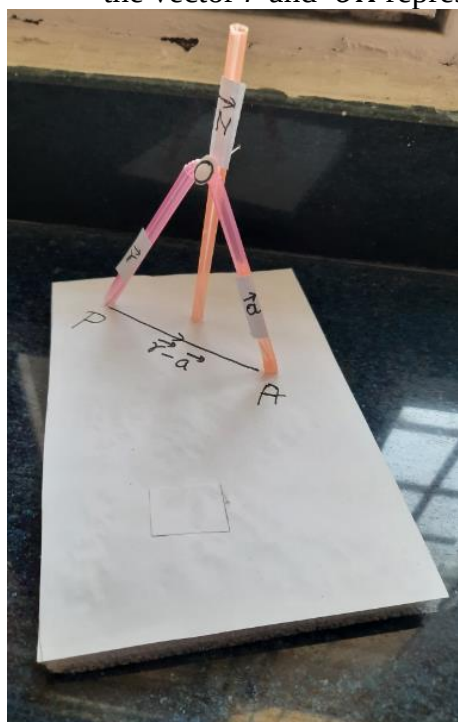
What do I need to know?

Vectors , position vector

➤ Teacher's Activity

Teacher will discuss vectors and will guide them to

Take three straws and fix, them as shown in Fig. 10 so that $\overrightarrow{OP}$ represents the vector $\vec{r}$ and $\overrightarrow{OA}$ represents $\vec{a}$ Then the wire $\overrightarrow{PA}$ represents the vector $\vec{r} - \vec{a}$



How will I proceed?

➤ Student's Activity

Student will take using straws

1. The line PA on the plane i.e., the vector $(\vec{r} - \vec{a})$ lies on plane. On representing $\vec{N}$ normal to plane $\hat{N}$ is perpendicular to $(\vec{r} - \vec{a})$, normal to the plane.
2. Hence $(\vec{r} - \vec{a}) \cdot \vec{N} = 0$ which gives the equation of plane in the normal form.

What have I observed?

<u>1</u>	$\vec{a}$ is the position vector of -----	
<u>2</u>	$\vec{r}$ is the position vector of ----- vector $\vec{N}$ is perpendicular to the vector _-----_.	
<u>3</u>	$(\vec{r} - \vec{a}) \cdot \vec{N} = 0$ is the equation of the plane in _____ form.	

What have I learnt?

The equation of plane can be demonstrated in the above manner.

What am I curious to learn?

This activity can also be utilised to show the position vector of a point in space (i.e., $\vec{a}$ as position vector of A, $\vec{r}$ the position vector of P).

Let me evaluate myself

Find the equation of the plane passing through the points (2, 3, -4) and (1, -1, 3) and parallel to the x - axis.

Q1.

Find the equation of a line passing through (2, 0, 5) and which is parallel to

Q2. line $6x - 2 = 3y + 1 = 2z - 2$

Find the equation of a plane containing the points $(0, -1, -1)$, $(-4, 4, 4)$ and $(4, 5, 1)$. Also show that $(3, 9, 4)$ lies on that plane.

Q3

Find the equation of the plane passing through the point $(3, 4, 2)$ and $(7, 0, 6)$ and is perpendicular to the plane $2x - 5y = 15$.

Q4.

Find the image of point $(3, -2, 1)$ in the plane $3x - y + 4z = 2$.

Q5.
