# [A|I] Artificial Intelligence

| PARAMETERS | DESCRIPTION | AI CONCEPTS INTEGRATED |
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| **Chapter Covered** | **Chapter 4: Linear Equations in Two Variables** | |
| **Name of the book** | **Mathematics, Class 9, NCERT** | |
| **Subject and Artificial Intelligence Integrated** | Understanding the concept of Linear equations in two variables <br> **Introductory video:** <br><br> *(QR code)* <br><br> Geogebra <br> AI Applications <br> How google map and Uber app are interconnected. | |
| **Learning Objectives** | To understand concept of Linear equation of 2 variables <br><br> *(QR code)* <br><br> To understand concept of <br> Framing of equations in two variables <br> To find the solutions <br> Represent graphically linear equation in two variable on graph paper. <br> Students can practice of graph in Geogebra of different equations. | Autodraw <br><br> *(QR code)* |
| **Time Required** | 5 periods of 40 minutes each | |
| **Classroom Arrangement** | Flexible | |
| **Material Required** | Pen, paper, Black Board chalk, Graph paper Laptops and Internet connection | |
| **Pre-Preparation Activities** | Students will asked to arrange graph paper one day prior· | |
| **Previous Knowledge** | Students are given an idea of linear equations in one variable and its graph representation in class VIII | |
| **Methodology** | **Activity 1.** Teacher will assign the task in groups to the students. Each group will create word problems by their own based on Linear equation in two variables and then they will plot the graph on graph paper. <br> **Activity II:** Practice Activity <br> Ask students to apply their understanding of Linear equations in two variables in solving ex 4.1 to ex 4.3. <br> **Activity III** <br> The points of intersection of two graphs represent common solutions to both equations. <br><br> *(QR code)* <br><br> **Activity IV:** <br> At the End of the chapter students were asked to gather a information on Uber or OLA App. How AI works in these apps. How these app calculating Distance And total Fare. | Google map, Uber App <br><br> *(QR code)* |
| **Learning Outcomes** | Students will understand concept of Linear equation of 2 variables <br> Students will able to frame of equations in two variables. <br> They will able to find the solutions. <br> Students will able to Represent linear equation in two variable on graph paper. <br> Students will able to draw graph of different linear equations in two variables in Geogebra | |
| **Follow up Activities** | Students will give the presentation in groups and teacher will give their inputs. In this way teacher will evaluate students' task in groups. | |
| **Reflections** | Ask the students to explore more AI based applications app. Where linear equations has used. <br> Explore different app like Arogya app (predicting infectious people) Swiggy app. Zomato App. | |

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# 🅰️📖 Artificial Intelligence

| PARAMETERS | DESCRIPTION | AI CONCEPTS INTEGRATED |
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| **Chapter Covered** | **Chapter 3: Coordinate Geometry** | |
| **Name of the book** | **Mathematics, Class 9 NCERT** | |
| **Subject and Artificial Intelligence Integrated** | Understanding the concept of Coordinate Geometry. Using Geogebra and Google Maps. | Google Maps |
| **Learning Objectives** | The students will able to<br>● To explore the idea of location of an object with a frame of reference.<br>● Understand the elements of the Cartesian system i.e., x-axis, y-axis, origin, quadrants.<br>● To find a point in any quadrants with reference to x-axis and y-axis.<br>● The students will understand the concept of Coordinate Geometry using the Google AI App.<br>● To solve the real life problems of coordinate geometry. | |
| **Time Required** | 3 period of 40 minutes each | |
| **Classroom Arrangement** | Flexible | |
| **Material Required** | Internet connection, laptop / desktop / smartphone, Graph Paper, Pen, paper. | |
| **Pre-Preparation Activity** | The Students will be asked to locate points on the Number Line on the graph. | |
| **Previous Knowledge** | The students will be made to recall about<br>● Knowledge of how to locate a point on the number line.<br>● Basic knowledge of x-axis and y-axis.<br>● Using (AI) demos basic knowledge of x-axis and y-axis will be checked.<br>● Also knowledge of how to locate a point on the number line will be checked.<br>Students will use the Geogebra to locate points on the Number Line.<br><br>$-4 \ -3 \ -2 \ -1 \ 0 \ 1 \ 2 \ 3 \ 4$<br><br>Geogebra | |
| **Methodology** | Strategy Used:<br>Brainstorming<br>Brainstorming on the previous knowledge would be checked using mentimeter.<br>Motivation:<br>Motivate the students by explaining the importance of Coordinate geometry day to day life.<br>Use of coordinates and coordinate geometry in Google maps to calculate shortest distance between two destination points.<br>Recapitulation: Oral test of basic concepts discussed in the class.<br>Activity-1 Seating Plan given in the NCERT Textbook will be discussed.<br>Discussion of the topic through Collaborative Learning (Inductive Method)<br>Guided Practice: Students will be given questions from the Textbook.<br>Independent Practice: Students would Practice the given questions for Homework<br>Closer: MCQ based test will be taken on Google forms/MS forms.<br>Activity II: Practice Activity students will apply their understanding of Coordinate Geometry to attempt the questions of NCERT Textbook. | Google Maps |

| Learning Outcomes | ● At the end of the topic, students will be able to: | |
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| | ● Demonstrate their knowledge by locating an object with a frame of reference. | |
| | ● Describe the elements of the Cartesian plane | |
| | ● Identify the x-axis and y-axis of any point on | |
| | ● Cartesian plane | |
| | ● Analyze the position of any point on the Cartesian system. | |
| | ● Apply the concept of coordinate geometry in real life situations. | |
| Follow up Activities | Students will find a hidden picture by plotting and joining the various points with given coordinates in a Cartesian plane through an activity in Geogebra.<br><br><br><br>Geogebra<br><br>Home assignment:<br>Crossword puzzles based on discussed topics in the class will be given. | |
| Reflections | ● Ask the students to analyze the real-life problems in their daily life and apply the concept of Coordinate Geometry. | |
| | ● Discussion with Students on the role of AI application: Ask and take feedback on the scope of the AI tools used and any problems they encountered while using the AI tool. | |
| | ● Any other AI application that can be used as an alternative. | |

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# 🅰🅸 Artificial Intelligence

| PARAMETERS | DESCRIPTION | AI CONCEPTS INTEGRATED |
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| **Chapter Covered** | **Chapter 8: Quadrilaterals** | |
| **Name of the book** | **Mathematics, Text book for Class 9** | |
| **Subject and Artificial Intelligence Integrated** | To understand the concept of Quadrilaterals using AI tools. | |
| **Learning Objectives** | ● To understand the concept of Quadrilaterals.<br> - Quadrilaterals<br> - Angle sum property of a quadrilateral<br> - Types of Quadrilaterals<br>● Visualization of Quadrilaterals using AI tool Autodraw. | Autodraw |
| **Time Required** | 2 periods of 40 minutes each. | |
| **Classroom Arrangement** | Flexible | |
| **Material Required** | Scrapbook, paper, pencil, scale, scissor, eraser, White Board. Laptops/ Desktops and Internet connection. | |
| **Pre-Preparation Activities** | **Play the game -**<br>Ask the students to collect the sticks:<br>Thirteen sticks of 6cm, one stick of 8 cm, 7 cm and 12cm each in length.<br>Using the sticks, construct:<br>● Quadrilateral with two pairs of parallel sides.<br>● Quadrilateral with four right angles.<br>● Quadrilateral with four congruent sides.<br>● Quadrilateral with exactly one pair of parallel sides. | |
| **Previous Knowledge** | ● The students are asked to recall the knowledge of parallel lines, perpendicular lines, triangles, rectangle, and square.<br>● List the objects of quadrilateral shapes they faced in daily - life.<br>● Some questions will be asked related to quadrilaterals. | |

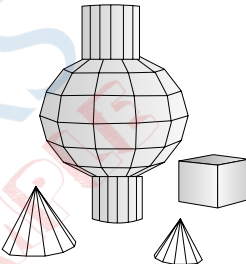| Methodology | ● Ask students to go to www.kahoot.it<br>Teacher will create the quiz on www.create.kahoot.it Ask the students to play the quiz, this will access previous knowledge about the topic. The Teacher would get results instantly and they can assess the students.<br>The students will be divided into four groups.<br>The teacher will provide each group with materials needed, each group will do the activity<br>**Activity 1.**<br>● Ask students to take a scrap book and cut into two congruent triangles and join them in such a way that they form a 4 sided closed figure.<br>● As they got the idea of a four sided closed figure introduced the term quadrilateral.<br>● Make perfect quadrilaterals with the help of AI tool Autodraw and ask students to do the same thing.<br>Activity, ask the students to go to http://autodraw.com. Once they land on this website, ask the students to select the first icon from the left side toolbar. This icon activates the AI element of the tool. Now ask the student to draw any quadrilateral shape<br>● Ask students to go to https://ncase.me/loopy/ once they land on this activity, introduce the concept of similar factors and dissimilar factors of various forms of quadrilateral with the parallelogram .And then explain all properties of parallelogram and interrelation of parallelogram with many forms of quadrilateral.<br>● Ask students to solve the exercises | Autodraw.com |
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| **Learning Outcomes** | Upon completion of the lesson , they are able<br>● To identify the all types of Quadrilateral<br>● To understand angle sum property of Quadrilateral<br>● Properties of parallelogram<br>● Properties of other quadrilaterals<br>● Visualization of interconnection of various quadrilaterals with parallelogram using AI tool loopy.<br>● Visualization of Quadrilaterals using AI tools- Autodraw | |
| **Follow up Activities** | Make a table with the headings - know, want to know and learn about the quadrilaterals using fontjoy- an AI element.<br>● Students will be divided into four groups. Students will construct their own desired structures such as houses, schools and churches applying the idea of quadrilateral around The World.<br>The students output will be assessed using constructed rubrics.<br>● Students would create their own quiz on www.create.kahoot.it and play with their friends. | |

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| PARAMETERS | DESCRIPTION | AI CONCEPTS INTEGRATED |
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| **Chapter Covered** | **Chapter 10: Circles** | |
| **Name of the book** | **Mathematics, Class 9 NCERT** | |
| **Subject and Artificial Intelligence Integrated** | Understanding the concept of Circles and integrating art and math with artificial intelligence | |
| **Learning Objectives** | • To understand the concept of Circles<br>• To discover the relationship between angles subtended by the equal chords at the center.<br>• To prove the theorem using triangle properties.<br>• To apply the theorem in solving problems. | AutoDraw |
| **Time Required** | 2 periods of 40 minutes each | |
| **Classroom Arrangement** | Flexible | |
| **Material Required** | Pen, paper, Black Board chalk, scissors, glue, cardboard, geometry box, Laptops/ desktops and Internet connection. | |
| **Pre-Preparation Activity** | Students will be asked to recall the circle shape, draw it and its related terms radius, diameter, chord etc. using https://www.autodraw.com/ and then see how many objects can you find showing the circle's terms they already know | AutoDraw |
| **Previous knowledge** | Introduce the angle subtended by a chord at a point in a circle. Ask the children to draw a circle and any two chords and measure the angles made by them at the center. | |
| **Methodology** | **Activity 1:**<br>Ask students to paste a white paper on the cardboard and draw a circle with center O on this paper. Now make two equal chords on a circle using compasses. Joining end points of both the chords they will get 2 triangles. Trace one of the triangles on the tracing paper. Place this obtained triangle on the other triangle such that the chords overlap. They will observe that both triangles completely overlap. Thus both triangles are congruent and angle subtended by both angles are equal. Thus equal chords subtend equal angles at the center.<br>**Activity 2:**<br>Proof of theorem will be explained to the students.<br>**Activity 3:**<br>Ask students whether the converse is also true. Find by following the above procedure but this time they will make equal angles not equal chords.<br>**Activity 4:**<br>Ask students to apply their understanding of theorem to attempt questions of Exercise 10.2. | Google Maps |
| **Learning Outcomes** | • The students will understand the concept of Circles.<br>• The students will discover the relationship between angles subtended by the chords at the centre.<br>• The students will be able to prove the theorem using triangle properties.<br>• The students will apply the theorem in solving problems. | |
| **Follow up Activities** | **Activity:** Ask students to go to https://goart.fotor.com/Create a beautiful art by uploading a photo of a circle showing angles made by equal chords at the centre and applying different art styles with this AI image generator. It uses an algorithm inspired by the human brain. It uses the stylistic elements of one image to draw the content of another.<br>**Activity**<br>Ask students to make a model showing the above theorem.<br>Ask them to present to small groups.<br>Let them assess how correct they are in their presentations | Goart |
| **Reflections** | Teacher will see how well the students are able to capture the concept and gain confidence while presenting their model.<br>Teacher will discuss with students-<br>• How do you like the AI tool?<br>• Do you know any other tool that you can use in your concept?<br>• Try using the tools at home. | |

# ⒜Ⓘ Artificial Intelligence

| PARAMETERS | DESCRIPTION | AI CONCEPTS INTEGRATED |
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| Chapter Covered | **Chapter 13: Surface Areas and Volumes** | |
| Name of the book | Mathematics, Class 9 NCERT | |
| Subject and Artificial Intelligence Integrated | Understanding the concept of surface area of solids: cube, cuboid, right circular cylinder and right circular cone using AI. | |
| Objectives | <ul><li>To understand the concept of surface area.</li><li>To derive formulas for calculating surface area of given solids using their nets.</li><li>To calculate the surface area of cube and cuboid using their formula.</li><li>To calculate the curved surface area of cylinder and cone using their formula.</li><li>To calculate the total surface area of cylinder and cone using their formula.</li><li>To estimate the surface area of different prisms.</li></ul> | |
| Time Required | 4 sessions of 40 minutes each | |
| Classroom Arrangement | Flexible | |
| Material Required | Pen, Paper, White Board, Markers, Laptop, Internet Connection. | |
| Pre-Preparation Activity | Students will be asked to recall all 2D shapes using Autodraw and their area and perimeter. Making of 3D shapes with the nets. | Autodraw |
| Previous knowledge | Questioning will be used to check students' previous knowledge in the form of a quiz. | |
| Methodology | Activity-1:<br>Identifying Solids from Their Nets and Finding Their Surface Area: Students will be divided into groups of 4 or 5 and each student will make cube, cuboid, cylinder and cone using paper folding and cutting. They will then open and see the nets of each and find the area of the all 2D shapes obtained. Adding the area of all shapes of a given net of solid, they will arrive at the formula of surface area of that solid under the guidance of their teacher.<br>Exploring Nets of Solids:<br>Cube  Cone  Cylinder<br>Activity-2:<br>Students will be working in pairs with their partners in computer lab and individually at their home to understand the formulae of surface area of solids by using Geogebra tool wherein they can change measurements of the dimensions and explore the corresponding change in their SA. This will help them to understand change in SA in problems related to increase and decrease of dimensions.<br>Activity-3:<br>Model making: Students will be divided into groups of 4 or 5 and they have to create a model which includes all solids discussed USING 3D MODELING APP. It can be a classroom scene, factory model, colony/society model, temple, galaxy model....etc. and will have to explain the need and use of the solids used to create it. | |

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| | Activity-4:<br>Students will be using the formula derived for the SA of solids to find the surface area of objects in the real life problems of NCERT exercises and the assignments given.<br>Activity-5:<br>Research on shapes of beaker, test Tube, conical flask & gas cylinders: Students will do research in the use of various laboratory equipment and their shapes. They will identify the combination of solids used and will research on why beakers and test tubes are generally cylindrical but flasks are conical at the bottom and has cylindrical neck? Also, students will also do research on why gas cylinders and boilers are cylindrical in shape? |
| Discussion on the Text | Open discussion on all new terms related to Surface Area: Lateral/ Curved Surface Area, Total Surface Area, Cuboid, Cube, right circular cylinder, Right circular Cone, Right circular Cone, Slant Height. |
| Learning Outcomes | Students will be able to<br>• Calculate the surface area of given solids.<br>• Solve real life word problems involving finding surface area of the solids done.<br>• Estimate the change in surface area due to change in their dimensions. |
| Self-Evaluation and Follow up | Teacher will observe students work and give individual feedback. Also, models made and research done will be assessed.<br>Peer assessment: Asking questions to each other in pairs and peer tutoring wherever required.<br>Flip teaching<br>Worksheets/Assignments |

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# Artificial Intelligence

| PARAMETERS | DESCRIPTION | AI CONCEPTS INTEGRATED |
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| **Chapter Covered** | **Chapter 14: Statistics - Understanding Frequency Table** | |
| **Name of the book** | **Mathematics, Class 9 NCERT** | |
| **Subject and Artificial Intelligence Integrated** | Analyzing the frequency tables using AI Tools. (Statistical Data). | |

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| **Learning Objectives** | Students will able to<br>● Prepare and use the frequency tables.<br>● Analyze the frequency tables. |
| **Time Required** | 2 periods of 40 minutes each |
| **Classroom Arrangement** | Seating arrangement -In pairs for both the sessions. |
| **Material Required** | Pen, paper, Laptops/ desktops/ Tabs and Internet connection. |
| **Pre-Preparation Activity** | ● Students will be asked to look at some frequency tables in the handouts.<br>● Students will be asked a few questions based on the frequency tables. Like:<br>What is the info given in the table?<br>How many…..<br>What is the Highest/Lowest? |
| **Previous knowledge** | Preparing a frequency table and reading it. |
| **Methodology** | After a preliminary round of pre -knowledge testing, students will be guided to play the Markov Data Game. Students, Play Rock, Paper, Scissors with the evil Dr. Markov to save the dog.<br>A video will be shown for the guidelines.<br><br><br><br>Introduction to Markov - Part I<br>Students will play the game:<br><br><br><br>codap.concord<br>While playing the games the students will be asked to make a list of their moves and the Markov's moves.<br>After round 1, they will be asked to prepare the frequency tables for their moves and try to analyze the same.<br>Video 2 will be shown:<br><br><br><br>Introduction to Markov - Part II, Advanced Gameplay<br>Now the students will be in a better position to win the game and save the dog. |
| **Learning Outcomes** | Students prepared the tables with the data collected while playing the game.<br>They analyzed the data in tables and won the game. |
| **Follow up Activities** | The following worksheet will be shared.<br>Markov Student Worksheet<br>● Students may be asked to search and share more such games either online or offline.<br>● Same tables can be later used to draw bar graphs.<br>● We can collect data of win or loss from all pairs and it can be used to:<br>  - Create discrete or grouped tables.<br>  - Calculate the measures of central tendency: mean/median or mode. |
| **Reflections** | ● Markov uses a different strategy on each new level, but his strategy remains consistent throughout each game played on a single level.<br>● There is increasing variability in Markov's moves as the student progresses through the levels, which makes it more challenging to win.<br>● Discussion of the students' responses in the worksheet. |

| PARAMETERS | DESCRIPTION | AI CONCEPTS INTEGRATED |
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| **Chapter Covered** | **Chapter 14: Statistics - Understanding the Concept of Data Handling** | |
| **Name of the book** | **Mathematics, Class 9 NCERT** | |
| **Subject and Artificial Intelligence Integrated** | Understanding the concept of data handling using AI Experiential applications | |
| **Learning Objectives** | To understand the concept of representing data in the form of various graphs.<br><br>To understand the process of Data Handling:<br>● Sources of data<br>● Data Acquisition<br>● Exploration<br><br>To understand the process of Data Handling in real life situations using AI project cycle process of Data Acquisition. | |
| **Time Required** | 2 periods of 40 minutes each | |
| **Classroom Arrangement** | Flexible | |
| **Material Required** | Pen, paper, black board, chalk, Laptop/Desktop, and internet connections. | |
| **Pre-Preparation Activities** | The students are divided into three groups and asked to collect information on AQI. (pollution level) | |
| **Previous Knowledge** | The students should know the terms like average, range, median, and mode. | |
| **Methodology** | Divide the class into two teams<br>Activity 1- Different types of graphs<br>Ask the students to collect data in different types of graphs.<br>Activity 2- Ask the students to collect and compare data on Fine Particulate Matter PM2.5 across SAFAR cities<br>Ask the students to observe and write the activities that pollute the environment.<br>Activity 3- Ask the students to collect the data on temperature and humidity and deduce the correlation between them.<br>Activity 4- To make a chart on the weather forecast using<br>http://safar.tropmet.res.in/<br>The students would be able to understand that using AI and past data, the weather forecasts are done.<br>Ask the students to draw and compare AQI of various cities of the world.<br>Activity 5: To check which graph is suited for such type of data https://datavizcatalogue.com/ | Data Acquisition<br><br><br><br>Data Exploration |
| **Learning Outcomes** | The students will<br>● Understand the importance of data collection in real life<br>● Appreciate the importance of data analysis and forecasting using AI.<br>● Develop skills of factual representation of data using AI<br>● Be able to interpret various graphs | |
| **Follow up Activities** | Ask students to make a presentation<br>Stating facts and using pictorial representation of Data collected and analyzed. | |
| **Reflections** | Discussion with Students:<br>How do you like the site http://safar.tropmet.res.in/?<br>Try to analyze the data of past 10 years of a place.<br>Observe the climate change.<br>How AI and machine learning are transforming weather forecasting.<br>Do you know of any other tool/app that can help you to access data? | |

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