🧠 Chapter: Data Literacy – Class 9 AI

🔹 1. Introduction to Data Literacy

Meaning:
Data literacy means understanding data — how to **read**, **work with**, **analyze**, and **communicate** using data.

In simple words:
👉 Data literacy is the ability to **understand and use data** to make good decisions.

Example:
When you check your phone's screen time report to decide if you need to use your phone less — you are using *data literacy*.

📊 2. Data and Information

Concept	Meaning	Example
Data	Raw facts and figures	36°C, 34°C, 33°C
Information	Processed or organized data that gives meaning	"The temperature is falling each day"

In short:
➡️ Data = Input
➡️ Information = Meaningful Output

🗂️ 3. Types of Data

Type	Description	Example
Structured Data	Data arranged in rows and columns	Excel sheets, databases
Unstructured Data	Data not in fixed format	Images, videos, social media posts
Semi-Structured	Partially organized	Emails, JSON files

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Type	Description	Example
Data		

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4. Data Collection

Definition:
Collecting data means gathering facts or figures from various sources.

Sources of Data:

1. **Primary Data** – Collected directly by you.
   Example: A survey you conduct in school.
2. **Secondary Data** – Collected by someone else earlier.
   Example: Census report, newspaper articles.

Methods of Collection:

- Observation
- Surveys or Questionnaires
- Interviews
- Online forms

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5. Data Organization

After collection, data should be **organized** for easy understanding.

Tools:

- Tables
- Charts
- Graphs
- Spreadsheets (like Excel or Google Sheets)

Example:
List students' marks in a table to compare performance.

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6. Data Representation

We can represent data visually for better understanding.

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Types of Data Representation:

Type	Description	Example
Bar Graph	Shows comparison between items	Marks in different subjects
Pie Chart	Shows parts of a whole	Percentage of students using different social media apps
Line Graph	Shows change over time	Temperature during a week
Histogram	Shows frequency of data	Age distribution in a class

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7. Data Analysis

Meaning:
Analyzing data means studying it to find patterns, trends, or useful information.

Steps in Data Analysis:

1. **Collect** – Gather data.
2. **Clean** – Remove errors or duplicates.
3. **Analyze** – Use charts, graphs, averages, etc.
4. **Interpret** – Draw conclusions.

Example:
If you record daily water usage, analysis can tell you on which day you used the most water.

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8. Data Privacy and Ethics

Data Privacy:
Keeping data safe from unauthorized access.

Example:
Not sharing your school ID password or personal info online.

Data Ethics:
Using data in a fair, honest, and responsible way.

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Example:
Do not change survey results to get a desired outcome.

Principles of Data Ethics:

1. Be **honest** with data.
2. Respect **privacy**.
3. Avoid **bias**.
4. Ensure **transparency**.

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9. Real-Life Applications of Data Literacy

Field	How Data is Used
Education	Track student progress
Health	Monitor patient recovery
Business	Know customer preferences
Sports	Analyze player performance
Environment	Study pollution levels

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10. Keywords / Important Terms

Term	Meaning
Data	Raw facts
Information	Organized data
Dataset	Collection of related data
Data Visualization	Showing data in visual form
Data Privacy	Keeping personal data safe
Ethics	Moral principles of right and wrong

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11. Quick Revision Summary

- Data = Facts
- Information = Organized data
- Data can be **structured**, **unstructured**, or **semi-structured**.
- Data is collected → organized → analyzed → interpreted.
- Use graphs and charts for easy understanding.
- Always use data **ethically** and **protect privacy**.

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12. Classroom Example Activity

Activity:
Ask students to collect data about "Favourite Sport in the Class."
Steps:

1. Create a simple Google Form.
2. Collect responses.
3. Represent data using a bar graph.
4. Discuss the results.

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13. Tools for Data Literacy

- Google Sheets / MS Excel
- Datawrapper / Canva Charts
- Google Forms
- Tableau (for advanced visualization)

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14. Competencies Developed

- **Critical Thinking:** Analyze data.
- **Digital Citizenship:** Handle data responsibly.
- **ICT Skills:** Use digital tools.
- **Collaboration:** Work in teams for data collection.

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15. Link with SDGs (Sustainable Development Goals)

- **Quality Education (Goal 4)**
- **Industry, Innovation, and Infrastructure (Goal 9)**

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- **Responsible Consumption and Production (Goal 12)**

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Class 9 Artificial Intelligence – Math for AI (Statistics and Probability)

1. Introduction

Mathematics is the **backbone of Artificial Intelligence**.
AI systems use numbers, data, and logic to make decisions.
The main mathematical concepts used in AI are **Statistics** and **Probability**.

In simple words:
➡ Statistics helps AI to **analyze data**.
➡ Probability helps AI to **predict outcomes**.

Example:

- When YouTube recommends a video, it uses probability.
- When AI studies your activity pattern, it uses statistics.

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2. What is Statistics?

Definition:
Statistics is the branch of mathematics that deals with **collecting, organizing, analyzing, and interpreting data**.

In short:
Statistics = Study of Data

Example:
A teacher wants to find the *average marks* of students in a test — this is a statistical calculation.

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3. Basic Terms in Statistics

Term	Meaning	Example
Data	Facts or numbers collected	Marks of students
Observation	Each individual value	45, 67, 89
Frequency	Number of times a value occurs	5 students scored 80 marks → frequency = 5

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Term	Meaning	Example
Class Interval	Grouping data in ranges	0–10, 10–20, 20–30
Midpoint (Class Mark)	(Upper limit + Lower limit) ÷ 2	For 10–20 → (10+20)/2 = 15

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4. Types of Statistical Data

Type	Description	Example
Ungrouped Data	Individual observations	12, 15, 20, 25
Grouped Data	Data organized in intervals	0–10, 10–20, 20–30

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5. Measures of Central Tendency

These help to find the **central value** of a dataset.

a) Mean (Average)

Mean=Sum of all valuesTotal number of values\text{Mean} = \frac{\text{Sum of all values}}{\text{Total number of values}}Mean=Total number of valuesSum of all values

Example:
Marks: 10, 20, 30 → Mean = (10+20+30)/3 = 20

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b) Median

The **middle value** when data is arranged in order.
Example:
3, 5, 7 → Median = 5
If even number of terms → average of two middle values.

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c) Mode

The **value that occurs most often**.
Example:
2, 4, 4, 5, 6 → Mode = 4

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6. Representation of Data

Visual representation helps in easy understanding.

Type	Description	Example
Bar Graph	Compare different categories	Marks in subjects
Histogram	Show frequency distribution	Age of students
Pie Chart	Show proportion of data	Share of expenses
Line Graph	Show trends over time	Temperature change in a week

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7. Introduction to Probability

Definition:
Probability is the **chance of something happening**.

Formula:

P(E)=Number of favourable outcomesTotal outcomesP(E) = \frac{\text{Number of favourable outcomes}}{\text{Total outcomes}}P(E)=Total outcomesNumber of favourable outcomes

Example:
If a coin is tossed —
Total outcomes = 2 (Head, Tail)
Favourable outcome (Head) = 1
So, Probability of Head = 1/2 = 0.5

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8. Key Terms in Probability

Term	Meaning	Example
Experiment	Action which gives outcomes	Tossing a coin
Outcome	Result of an experiment	Getting a head
Sample Space	All possible outcomes	{Head, Tail}

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Term	Meaning	Example
Event	One or more outcomes	Getting Head
Favourable Outcome	Desired result	Head when coin is tossed

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9. Real-Life Applications of Statistics & Probability in AI

Field	How it Uses Math
Weather Forecasting	Predict rain using probability
Medical Diagnosis	Analyze patient data
Sports Analytics	Compare player performance
Education	Track student progress
Recommendation Systems	Predict what user may like

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10. Connection Between Statistics and AI

AI Function	Math Concept Used
Data Collection	Statistics
Data Analysis	Mean, Median, Mode
Prediction	Probability
Decision Making	Probability + Statistics

Example:
AI voice assistant predicts your next command based on probability from previous data.

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11. Formula Summary

Concept	Formula
Mean	Sum of values ÷ Number of values

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Concept	Formula
Median	Middle value of arranged data
Mode	Value with highest frequency
Probability	Favourable outcomes ÷ Total outcomes

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12. Quick Revision Notes

- **Statistics** → Study of Data
- **Probability** → Study of Chances
- **Mean, Median, Mode** → Central tendency
- **Probability Value Range:** $0 \leq P(E) \leq 1$
- **Used in AI** for predictions, analysis, and decision-making.

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13. Classroom Activity

Activity:
Students roll a dice 20 times and record outcomes.
Then calculate:

- Frequency of each number
- Mean and Mode
- Probability of getting an even number

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14. Tools for Practice

- MS Excel or Google Sheets
- GeoGebra (for graphs)
- AI Simulation Tools (for probability experiments)

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15. Keywords

Statistics, Probability, Data, Mean, Median, Mode, Event, Experiment, Outcome, Frequency

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