12

TOUCHPAD

Artificial Intelligence

Teacher's Manual

Extended Support for Teachers

ORANGE
www.orangeeducation.in
www.thetouchpad.com

Teacher's Time Table

Periods / Days	0	I	II	III	IV		V	VI	VII	VIII
Monday						B				
Tuesday						R				
Wednesday						E				
Thursday						A				
Friday						K				
Saturday										

Development Milestones in a Child

Development milestones are a set of functional skills or age-specific tasks that most children can do at a certain age. These milestones help the teacher to identify and understand how children differ in different age groups.

Age 5 - 8 Years	
Physical	• First permanent tooth erupts • Shows mature throwing and catching patterns • Writing is now smaller and more readable • Drawings are now more detailed, organised and have a sense of depth
Cognitive	• Attention continues to improve, becomes more selective and adaptable • Recall, scripted memory, and auto-biographical memory improves • Counts on and counts down, engaging in simple addition and subtraction • Thoughts are now more logical
Language	• Vocabulary reaches about 10,000 words • Vocabulary increases rapidly throughout middle childhood
Emotional/Social	• Ability to predict and interpret emotional reactions of others enhances • Relies more on language to express empathy • Self-conscious emotions of pride and guilt are governed by personal responsibility • Attends to facial and situational cues in interpreting another's feelings • Peer interaction is now more prosocial, and physical aggression declines

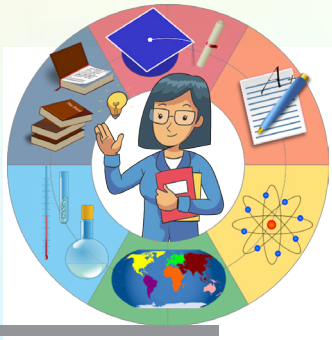
"If you cannot do great things, do small things in a great way."

Age 9 - 11 Years	
Physical	• Motor skills develop resulting enhanced reflexes
Cognitive	• Applies several memory strategies at once • Cognitive self-regulation is now improved
Language	• Ability to use complex grammatical constructions enhances • Conversational strategies are now more refined
Emotional/Social	• Self-esteem tends to rise • Peer groups emerge

Age 11 - 20 Years	
Physical	• If a girl, reaches peak of growth spurt • If a girl, motor performance gradually increases and then levels off • If a boy, reaches peak and then completes growth spurt • If a boy, motor performance increases dramatically
Cognitive	• Is now more self-conscious and self-focused • Becomes a better everyday planner and decision maker
Emotional/Social	• May show increased gender stereotyping of attitudes and behaviour • May have a conventional moral orientation

Managing the children's learning needs according to their developmental milestones is the key to a successful teaching-learning transaction in the classroom.

"Family is the most important thing in the world."



Teaching Pedagogies

Pedagogy is often described as the approach to teaching. It is the study of teaching methods including the aims of education and the ways in which such goals can be achieved.

Lesson Plans

A lesson plan is the instructor's road map which specifies what students needs to learn and how it can be done effectively during the class time. A lesson plan helps teachers in the classroom by providing a detailed outline to follow in each class.

A lesson plan addresses and integrates three key components:

- Learning objectives
- Learning activities
- Assessment to check the student's understanding

A lesson plan provides an outline of the teaching goals:

Before the class:

1. Identify the learning objectives.
2. Plan the lesson in an engaging and meaningful manner.
3. Plan to assess student's understanding.
4. Plan for a lesson closure.

↓

During the class:

Present the lesson plan.

↓

After the class:

Reflect on what worked well and why. If needed, revise the lesson plan.

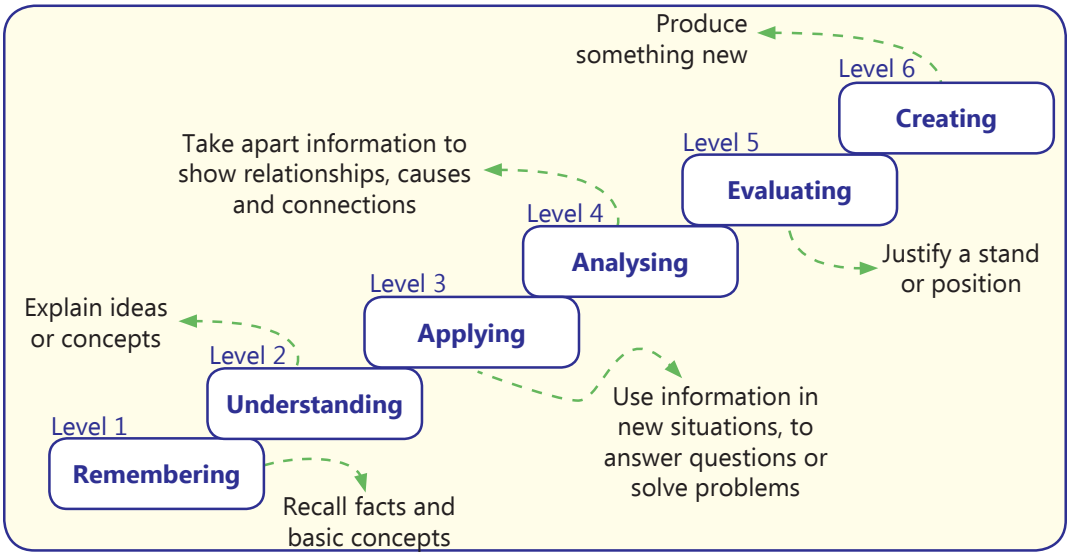
"Knowing yourself is the beginning of all wisdom."

Teaching Strategies

Numerous strategies have evolved over the years to facilitate the teaching-learning process in the classrooms.

Bloom's Taxonomy

Bloom's Taxonomy was created by **Dr Benjamin Bloom** and several of his colleagues, to promote higher forms of thinking in education instead of rote learning. There are three domains of learning: cognitive (mental), affective (emotional), and psychomotor (physical). However, when we refer to Bloom's Taxonomy we speak of the cognitive domain. Bloom's Taxonomy is a list of cognitive skills that is used by teachers to determine the level of thinking their students have achieved. As a teacher, one should attempt to move students up the taxonomy as they progress in their knowledge.



Teachers should focus on helping students remember information before expecting them to understand it, helping them understand it before expecting them to apply it to a new situation, and so on.

"If you have no confidence in self, you are twice defeated in the race of life."

Class 12

LESSON PLAN

Artificial Intelligence

Part-A: Employability Skills

1. Communication Skills-IV

Teaching Objectives

Students will learn about

- ☞ Communication
- ☞ Listening Skills
- ☞ Writing Sentences
- ☞ Effective Communication
- ☞ Parts of Speech

Number of Hours
Theory
10

Teaching Plan

Before starting the chapter, give an introduction of Communication to the students.

Tell the students Communication is a two-way process in which information or messages are communicated between individuals through the use of words, symbols, signs, or behaviour.

Let them know that Effective communication necessitates the ability to communicate messages that are clear, concise and accurate.

Teach the students about Listening skills to the students through a video or an activity.

Also, teach the concept of active listening to the students with the help of examples.

Share with the students about the Parts of Speech in detail by covering the following topics given below:

- Using Capital Letters
- Using Punctuation
- Basic Parts of Speech

Share the meaning and purpose of writing skills with the students that it is an ability to express your meaningful ideas or thoughts.

Also explain the types of **Sentences including all three classifications**.

The different types of sentences are given below:

- Simple Sentence
- Complex Sentence
- Compound Sentence

Tell the students how to construct a paragraph along with the help of examples in brief.

Ask the students to solve the exercise given on page 22 as **AI Reboot**.

Ask the students to solve the task given on page 21 as **AI Task**.

Ask the students to solve the questions given on page 22 as **AI Reboot**.

Extension

Ask the students some oral questions based on this chapter.

Q. What do you mean by effective communication?

Q. What do you understand by active listening?

Q. What are the phases of active listening?

Q. What do you mean by Parts of Speech.

Q. What is a paragraph?

Q. How do you construct a paragraph?

Q. What are the two types of Objects?

Q. What are the benefits of listening skills?

Evaluation

After explaining the chapter, let the students do the exercises given on pages 27 to 32 in the main course book as **AI Quiz** and **Exercise (Solved and Unsolved Questions)**.

Take the students to the computer lab and let them practice the activity given in **Lab Activity** section given on page 32 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to create a PowerPoint Presentation on the topic Types of Communication.

2. Self Management Skills-IV

Teaching Objectives

Students will learn about

- ☞ Optimism (Positive Attitude) and Motivation
- ☞ Stress Management
- ☞ Being Result-oriented
- ☞ Self-Awareness

Number of Hours
Theory
10

Teaching Plan

Before starting the chapter, tell the students Self-management, often known as 'self-control', is the ability to effectively control one's emotions, thoughts, and behaviour in a variety of settings.

Tell the students about the concept of Optimism and Motivation.

Let them know about the type of motion which are Intrinsic and Extrinsic Motivation.

Teach them all the methods for fostering a positive attitude and its additional strategies.

Share with the students about Stress and some methods for dealing with stress.

Also, share other stress management techniques to manage stress with the students. Some of them are:

- Spa
- Exercise
- Hobby
- Meditation
- Yoga
- Nature
- Time Management
- Music
- Therapy

Share with the students about the following in detail:

- Being Result Oriented
- Goal Setting
- Self Awareness

Ask the students to solve the task given on page 37 as **Task**.

Extension

Ask the students some oral questions based on this chapter.

Q. What is self-management?

Q. What are the positive rules of self-management?

Q. Why there is a need of self-management skills?

Q. Explain how to know your strength.

Q. What are the steps to identify your strengths?

Q. What are the stress management techniques?

Q. What do you mean by Stress Management?

Q. Define self awareness.

Q. What do you understand by personality disorders?

Q. What are the methods for overcoming personality disorders?

Q. Name any five sources of motivation.

Q. Name the two personality disorders.

Q. What do understand by SMART goals?

Evaluation

Encourage the students to walk-through the chapter thoroughly. After explaining the chapter, let the students do the exercises given on pages 44 to 46 in the main course book as **Exercise (Solved and Unsolved Questions)**.

Take the students to the computer lab and let them practice the activity given in **Lab Activity** section on page 46 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to create a PowerPoint Presentation on the topic "Stress Management".

3. ICT Skills-IV

Teaching Objectives

Students will learn about

- Introducing Spreadsheet
- Performing Basic Operations in a Spreadsheet
- Creating a New Workbook
- Opening an Existing Workbook
- Data Manipulation
- Presentation Software
- Gettings Started with Impress
- Closing a Presentation
- Printing a Presentation
- Getting Started with Calc
- Saving a Workbook
- Closing a Workbook and Exiting from Calc
- Printing a Worksheet
- Advanced Features in Calc
- Advantages of Presentation Software
- Saving a Presentation
- Opening an Existing Presentation

Number of Hours
Theory
10

Teaching Plan

Before starting the chapter, define the meaning of ICT to the students in detail along with proper examples.

Tell the students that Information Technology is the use of hardware, software and networking technology for accessing, storing, retrieving and transmitting the information.

Tell the students that a spreadsheet is a type of electronic document with rows and columns. It is used to store data and perform calculations in a systematic manner.

Tell the students that numerous spreadsheets available that have been developed by various companies. Some of the most popular ones are as follows:

- OpenOffice Calc
- Microsoft Excel
- Google Sheets
- LibreOffice Calc

Demonstrate about the following to the students in detail:

- How to install OpenOffice
- The components of OpenOffice Calc window
- Performing Basic Operations in a Spreadsheet
- Saving a Workbook
- Creating a New Workbook
- Closing a Workbook and Exiting from Calc
- Opening an Existing Workbook
- Printing a Worksheet
- Data Manipulation
- Advanced Features in Calc
- Presentation Software
- Advantages of Presentation Software
- Getting Started with Impress
- Saving a Presentation
- Closing a Presentation
- Opening an Existing Presentation
- Printing a Presentation

Ask the students to solve the task given on page 62 as **Task**.

Ask the students to solve the questions given on page 62 as **Reboot**.

Extension

Ask the students some oral questions based on this chapter.

Q. What is ICT?

Q. What is a spreadsheet?

Q. Define rows and columns.

Q. Define workbook.

Q. What is an active cell?

Q. What are the purpose of using a spreadsheet?

Q. What do you understand by function?

Q. How will you arrange data in a spreadsheet?

Q. Which software is widely used to create digital presentations?

Evaluation

Encourage the students to walk-through the chapter thoroughly.

After explaining the chapter, let the students do the exercises given on pages 71 to 76 in the main course book as **Exercise (Solved and Unsolved Questions)**.

Take the students to the computer lab and let them practice the activity given in **Lab Activity** section on page 76 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to create a spreadsheet to track and analyze energy consumption in a household. Use a spreadsheet application of your choice (such as Microsoft Excel or Google Sheets

4. Entrepreneurial Skills-IV

Teaching Objectives

Students will learn about

- Entrepreneur and Entrepreneurship
- Functions of an Entrepreneur
- Identifying Possibilities and Taking Risks
- Barriers to Entrepreneurship
- Entrepreneurial Competencies
- Entrepreneurial Competencies in Particular
- Types of Entrepreneurs
- What Drives an Entrepreneur's Motivation?
- Startups
- Entrepreneurial Attitudes

Number of Hours
Theory
15

Teaching Plan

Before starting the chapter, tell the students that the process of boosting entrepreneurial skills and expertise through systematic training and institution-building programmes is called Entrepreneurship Development.

Explain the difference between of the term Entrepreneur **and Entrepreneurship to the students**.

Share the following to the students for a better understanding in details:

- Process of its development
- Characteristics of an Entrepreneur
- Entrepreneurship—Science and Art

Share the qualities of successful entrepreneurs to the students in detail.

Explain the following to the students in detail.

- Types of Entrepreneurs
- Functions of an Entrepreneur
- Entrepreneur's Motivation
- Identifying Possibilities and Taking Risks
- Startups
- Barriers to Entrepreneurship
- Entrepreneurial Attitudes
- Entrepreneurial Competencies
- Entrepreneurial Competencies in Particular

Ask the students to solve the question given on given on page 90 as **Reboot**.

Make sure to ask the students to scan and watch the video given on page 79.

Extension

Ask the students some oral questions based on this chapter.

Q. What are the benefits of entrepreneurship?

Q. What are the two qualities of a successful entrepreneur?

Q. What is meant by goal-setting?

Q. Define the term motivation.

Q. How one can overcome stress?

Q. What communication skills are essential for entrepreneurs?

Q. What ethical considerations should entrepreneurs keep in mind?

Q. What is Entrepreneur?

Q. What is Entrepreneurship?

Q. What is the difference between Businessman and Entrepreneur?

Evaluation

Encourage the students to walk-through the chapter thoroughly.

After explaining the chapter, let the students do the exercises given on pages 91 to 95 in the main course book as **Exercise (Solved and Unsolved Questions)**.

Take the students to the computer lab and let them practice the activity given in **Lab Activity** section on page 95 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to prepare their Resume in MS Word and submit its hardcopy to you.

5. Green Skills-IV

Teaching Objectives

Students will learn about

- ☞ Protecting our Environment
- ☞ Green Jobs
- ☞ Significance of Green Jobs

Number of Hours
Theory
5

Teaching Plan

Before starting the chapter, tell the students that Environment refers to our surrounding consisting of physical, chemical and biological elements that maintain a balance between the living and non-living components.

Tell the students that we are currently facing unpredictable weather patterns as a result of climate shifts and environmental damage. Global environmental degradation is occurring as a result of resource depletion, such as air, water, and soil.

Teach the students how to protect our environment with the help of examples.

Introduce the students with the green jobs, its purpose and advantages of green jobs.

Tell the students about the various sectors fo green jobs. Some of them are:

- Agriculture
- Transportation
- Water Conservation
- Solar and Wind Energy
- Ecotourism
- Building and Construction
- Solid Waste Management
- Appropriate Technology

Also, explain the significance of Green jobs to the students.

Make sure to ask the students to scan and watch the video given on page 98.

Extension

Ask the students some oral questions based on this chapter.

Q. What is environment?

Q. What are two ways in which we can protect our environment?

Q. What are two examples of green jobs?

Q. What is the significance of green jobs in reducing negative environmental impacts?

Q. How can agriculture contribute to green employment?

Q. How can transportation sector promote green jobs?

Q. What are some examples of green occupations in the building and construction industry?

Q. How can appropriate technology be applied in creating green occupations?

Q. What are green skills?

Evaluation

Encourage the students to walk-through the chapter thoroughly.

After explaining the chapter, let the students do the exercises given on pages 104 to 108 in the main course book as **Exercise (Solved and Unsolved Questions)**.

Take the students to the computer lab and let them practice the activity given in **Lab Activity** section on page 108 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to design an eco-friendly community from scratch. They have to consider various aspects of sustainability and incorporate green skills into your design.

Class 12

LESSON PLAN

Artificial Intelligence

Part-B: Subject Specific Skills

1. Capstone Project

Teaching Objectives

Students will learn about

- Understanding the Capstone Project
- Understanding/Defining the Problem
- Problem Decomposing using Design Thinking Framework
- Using an Analytical Approach
- Model Validation
- Metrics of Model Quality—Loss Function

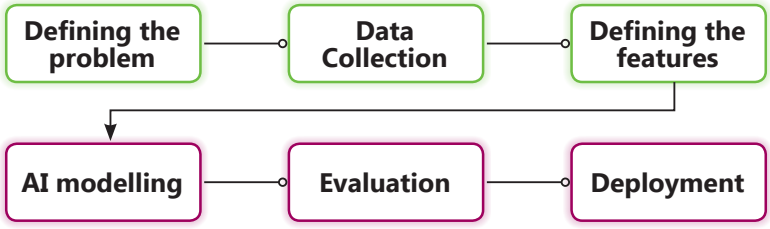
Number of Hours
Theory
30

Teaching Plan

While teaching this chapter, tell the students that A capstone project is a comprehensive, independent, and final project undertaken as a part of the curriculum designed to assess the skills, knowledge, and expertise a student has acquired. Such a project often involves researching a topic, evaluating a new technique or method, developing a health plan, researching a character or event in history, or even the composition of a sketch or play.

Let the students understand and define the problem.

Let them know that every AI project goes through these six steps which are shown below:



Tell them that the Design Thinking methodology provides a solution-based approach to solving problems.

Also, explain Problem Decomposing using Design Thinking Framework.

Demonstrate all five stages of the Design Thinking Process with the help of examples. Those stages are given below:

- Empathize
- Define
- Ideate
- Prototype
- Test

Teach them how to use an Analytical Approach and It consists of 10 stages that form an iterative process using data to discover information. Each step plays an important role in the context of the overall methodology. Those are:

- Stage 1: Business Understanding
- Stage 2: Analytic Approach
- Stage 3: Data Requirements
- Stage 4: Data Collection
- Stage 5: Data Understanding
- Stage 6: Data Preparation
- Stage 7: Modelling
- Stage 8: Evaluation
- Stage 9: Deployment
- Stage 10: Feedback

Explain the two types of validation methods to the students in detail. Those are:

- Train Test Split Evaluation
- Cross-Validation Procedure

Explain the concept of Metrics of Model Quality—Loss Function in detail:

Also, explain the following topics:

- MSE (Mean Squared Error) with its advantages and disadvantages.
- RMSE (Root Mean Square Error)
- Calculating RMSE in Python
- Mean Square Percentage Error (MAPE)
- Hyperparameters

Ask the students to read the **Brainy Fact** given on pages 113 and 117.

Ask the students to solve the task given on page 117 as **AI Reboot**.

Make sure to ask the students to scan and watch the video given on pages 112, 114, 118, 119,120, 122, and 123.

Extension

Ask the students some oral questions based on this chapter.

Q. What do you mean by Capstone Project?

Q. What are the five stages of the Design Thinking Framework?

Q. Give any five examples of a Capstone project.

Q. Define the terms:

- Empathize
- Define
- Ideate
- Prototype
- Test

Q. What is the first stage of an Analytical Approach?

Q. Define feedback.

Q. Why feedback is necessary?

Evaluation

Encourage the students to walk through the chapter

After explaining the chapter, let the students do the exercises given on Pages 125 to 134 of the main course book as **AI Quiz** and **Exercise(Solve and Unsolved)**. Tell them to solve the critical and computational skill-developing exercises as **AI in Life** and **AI Deep Thinking** is given on page 134.

Take the students to the computer lab and let them practice the activity given in the **AI Lab** given on page 135 in the main course book. This will enhance the abilities of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to create an Image project using the Teachable Machine tool. The link is given below:

https://teachablemachine.withgoogle.com/train

2. Model Lifecycle

Teaching Objectives

Students will learn about

☞ Stages of AI Model Life Cycle

Number of Hours
Theory
20

Teaching Plan

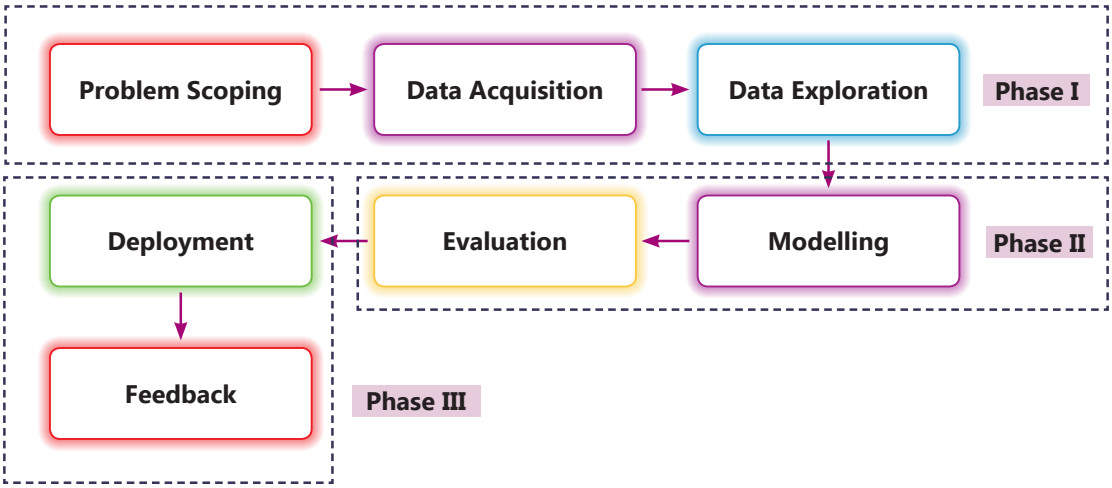
While teaching this chapter, tell the students that there are three phases of the AI Model Lifecycle.

Explain all three phases of the AI Model Lifecycle in detail: Those are:

- **Phase I:** Project planning and data collection

- **Phase II:** Design and Testing the AI Model
- **Phase III:** Deployment and Maintenance at the client site

Each phase is further divided into the following stages:



Also, explain all the stages to the students with the help of examples. Those are:

- Problem Scoping
- Data Acquisition
- Data Exploration
- Deployment
- Evaluation
- Modelling
- Feedback

Tell them that once a model has been created and trained, it must be properly tested to calculate the model's efficiency and performance.

Teach them that deployed model's performance is monitored to ensure that it continues to function at the level required by the business.

Ask the students to read the **Brainy Fact** given on page 141.

Make sure to ask the students to scan and watch the video given on pages 139 and 142.

Extension

Ask the students some oral questions based on this chapter.

Q. Define AI Model Lifecycle.

Q. What is the first stage in AI Model Lifecycle?

Q. Define Data Acquisition.

Q. In which phase we can design the model?

Q. Why feedback is necessary in AI Model Lifecycle?

Q. Define the term Modelling.

Q. What is the last stage in AI Model Lifecycle?

Q. What do you understand by the term Deployment?

Evaluation

Encourage the students to walk through the chapter

After explaining the chapter, let the students do the exercises given on pages 143 to 148 of the main course book as **AI Quiz** and **Exercise (Solve and Unsolved)**. Tell them to solve the critical and computational skill-developing exercises as **AI in Life** and **AI Deep Thinking** is `given on pages 148 and 149.

Take the students to the computer lab and let them practice the activity given in the **AI Lab** given on page 149 in the main course book. This will enhance the abilities of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to create an Audio project using the Teachable Machine tool. The link is given below:

https://teachablemachine.withgoogle.com/train

3. Storytelling Through Data

Teaching Objectives

Students will learn about

- Data Storytelling
- Ethics of Storytelling
- Stories During the Steps of Predictive Modeling
- Types of Charts Suitable for the Data
- How to Create Stories?
- Creating a Story from Data
- Why is Data Storytelling Popular?
- Best Practices for Data Storytelling

Number of Hours
Theory
20

Teaching Plan

While teaching this chapter, tell the students that Storytelling is an essential component of native cultures.

Tell the students that a well-told story with an inspiring narrative will always engage the audience across boundaries and cultures.

Let the students understand Data storytelling and the steps involved in telling an effective data story. Those are:

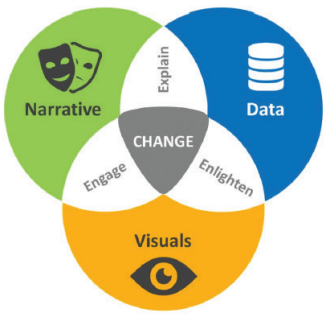
- Recognizing the audience
- Choosing the appropriate data and visualizations
- Highlighting important information
- Creating a narrative
- Keeping your audience interested

Guide the students through the process of creating stories by introducing the following steps to them:

- Begin with a pen-paper approach
- Dig deeper to identify the sole purpose of your story
- Use powerful headings
- Design a Road-Map
- Conclude with brevity

Let them know the Ethics of Storytelling and the following techniques that can be used to gather and share stories of people's influence and successes.

Teach the students how to create effective Storytelling through data. Also, explain the three key elements which are Data, Narratives and Visuals.



Tell the students about the popularity of Data Storytelling and the types of charts suitable for the Data.

Let them know the best practices for Data Storytelling.

Ask the students to read the **Brainy Fact** given on page 156.

Ask the students to solve the questions given on page 157 as **AI Reboot**.

Make sure to ask the students to scan and watch the video given on page 151.

Make sure to ask the students to scan the QR code or visit the following link given on pages 152 and 153 to understand the following examples.

Extension

Ask the students some oral questions based on this chapter.

Q. What is the importance of narratives in storytelling?

Q. What are the steps involved in creating an effective data storytelling?

Q. What do you mean by data storytelling?

Q. Which chart type is good for numeric data visualization?

Q. Name the three key elements of data storytelling.

Q. What is the purpose of visualization in data storytelling?

Q. What is the structure of the story?

Evaluation

After explaining the chapter, let the students do the exercises given on pages 159 to 167 of the main course book as **AI Quiz** and **Exercise (Solve and Unsolved)**. Tell them to solve the critical and computational skill-developing exercises as **AI in Life** and **AI Deep Thinking** is given on pages 168.

Take the students to the computer lab and let them practice the activity given in the **AI Lab** given on page 168 in the main course book. This will enhance the abilities of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to create a text-to-speech bot using the following link:

https://theaiplayground.com/blocks/new