9

TOUCHPAD

Artificial Intelligence

Teacher's Manual

Extended Support for Teachers

ORANGE
www.orangeeducation.in
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Teacher's Time Table

Periods / Days	0	I	II	III	IV	BREAK	V	VI	VII	VIII
Monday										
Tuesday										
Wednesday										
Thursday										
Friday										
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.

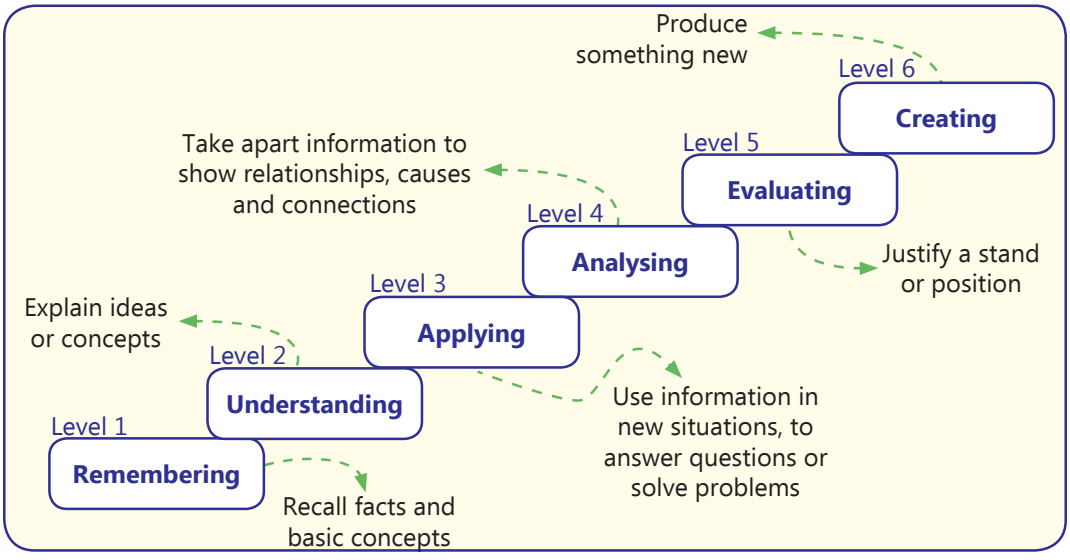
"Knowing yourself is the beginning of all wisdom."

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 9

LESSON PLAN

Artificial Intelligence

Part-A: Employability Skills

1. Communication Skills-I

Teaching Objectives

Students will learn about

- What is Communication?
- Factors Affecting Perspectives in Communication
- Effective ways of Communication
- 3P's of Public Speaking
- Phrases
- Construction of a Paragraph
- Use of Articles
- Perspectives in Communication
- Types of Communication
- Writing Skills
- What is a Sentence?
- Parts of Speech
- When no Articles are used

Number of Hours
Theory
10

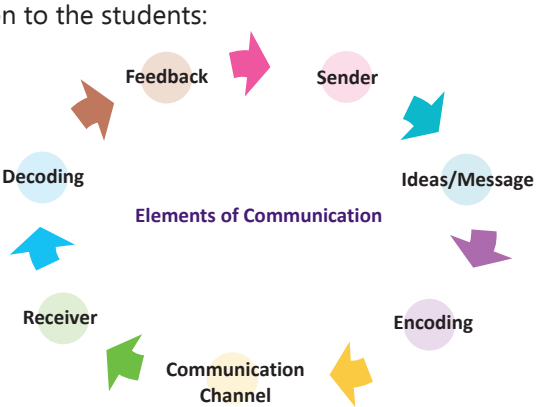
Teaching Plan

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

Tell the students that the word 'communication' is derived from the Latin word communicare, meaning "to share". It is defined as a way of conveying a meaningful message from one entity to another.

Explain the elements of communication to the students:

- Sender
- Ideas/Message
- Encoding
- Communication Channel
- Receiver
- Decoding
- Feedback



Explain the importance of communication to the students and that it is a two way process. It is important for many reasons like:

- Information
- Motivation
- Persuasion
- Brings Clarity

Define the perspective of communication to the students in detail. Tell the students that perspective is the fixed idea or thinking that affects our communication. It can be a sender or a receiver of the message affecting the interpretation of the message thus altering the intended meaning of it.

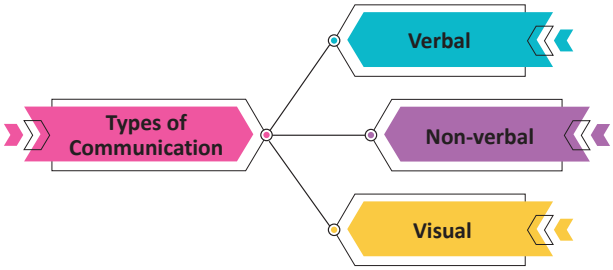
Explain the factors affecting the perspectives in communication which are:

- Language
- Visual Perception
- Past Experience
- Prejudice
- Feelings
- Environment
- Culture

Share to the students that in order to ensure the communication in the most effective and engaging manner we need to have a clear vision of 7 C's:

- Clear
- Concise
- Concrete
- Correct
- Coherent
- Complete
- Courteous

Tell the students about the types of communication in detail:



Also, define the types of Verbal Communication which are Oral and Written Communication. After this, explain the types of Non-Verbal communication which are hand movement, body language, facial expression, eye contact, touch, and body posture.

Share the 3P's of Public Speaking in detail for better understanding:

- Prepare
- Practice
- Perform

Share the meaning and purpose of writing skills with the students that it is an ability to express your ideas or thoughts. A good writing skill uses perfect words to express the accurate meaning of the message with more clarity. Also explain the types:

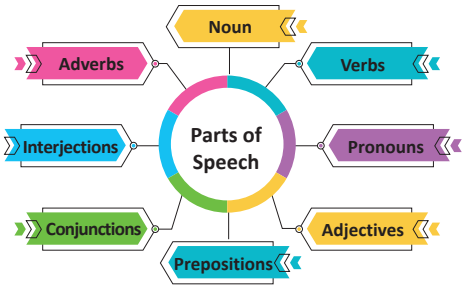
- Capitalization
- Punctuation Marks

Define the meaning of Phrase and Sentence with the students for better clarity. Also, define:

- Rules for writing a sentence
- Parts of a sentence
- Types of sentences

Tell the students about the Construction of a Paragraph along with the rules for writing a paragraph in detail.

Share with the students about the Parts of Speech in detail:



Define the use of articles which are Definite- The and Indefinite- A & An to the students. Also, explain When no Articles are used to the students.

Ask the students to read the **Brainy Fact** given on page 25.

Extension

Ask the students some oral questions based on this chapter.

Q. What is communication?
Q. What are the elements of communication?
Q. What is the importance of communication skills?
Q. What is the perspective of communication?
Q. What are effective ways of communication?
Q. Define the types of communication.
Q. What is verbal communication?
Q. What is non-verbal communication?
Q. What are 3P's of public speaking?
Q. Define writing skills.
Q. What is a phrase?
Q. What is a sentence?
Q. How we can construct a paragraph?
Q. Define parts of speech.
Q. What is the use of Articles?

Encourage the students to walk through the chapter and ask them to solve the questions given on page 23 and 28 on their own under the name **Task**.

Evaluation

After explaining the chapter, let the students do the exercises given on pages 30 to 36 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 given on page 37 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

Ask the students to practice the activity in class given in **Class Activity** section given on page 37 in the main coursebook. This will help the students to understand the importance of all components of Communication.

Suggested Activity

Ask the students to search about more Communication Activities that can be performed in class.

2. Self Management Skills-I

Teaching Objectives

Students will learn about

- ☞ Self-Management
- ☞ Who am I?
- ☞ Steps for Building Self-Confidence
- ☞ Factors That Help in Building Self-Confidence
- ☞ Self-Management Skills
- ☞ Self-Confidence
- ☞ Qualities of Self-Confident Person
- ☞ Self-Confidence Building Tips

Number of Hours
Theory
10

Teaching Plan

Before starting the chapter, tell the students self-management means managing yourself. It's taking the responsibility of managing our own behaviour and actions.

Tell the students that self-management helps you to have a good control on your strength and weakness. Nothing can make you sad or unhappy unless you allow your emotions to flow in that direction.

Explain the students that self-management skills is the ability to regulate your feelings and actions to achieve your goals independently and helps in the development of a strong personality. Some of the important self-management skills are:

- Self-Awareness
- Self-Confidence
- Self-Motivation
- Self-Control
- Self-Commitment
- Problem Solving
- Positive Thinking
- Stress Management
- Time Management
- Organisational Skills

Share with the students that when you have a better understanding of yourself, you learn to manage with good self-management skills and then it becomes easy to find out your strong and weak points. Also, make sure to cover the following topics:

- Knowing Yourself
- Knowing Your Strengths
- Knowing Your Weaknesses

Share with the students about the following in detail:

- Self Confidence
- Steps for building Self-Confidence
- Qualities of Self-Confident Person
- Factors that help in building Self-Confidence
- Self-Confidence Building Tips

Ask the students to solve the task given on pages 43 and 45 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. Explain how to know your weakness.
Q. What are the steps to identify your weakness?
Q. What is self-confidence?
Q. What are the steps of building self-confidence?
Q. Define qualities of self-confident person.
Q. What are the factors that help in building self-confidence?
Q. Give any four self-confidence building tips.

Evaluation

Encourage the students to walk-through the chapter thoroughly. After explaining the chapter, let the students do the exercises given on pages 46 to 52 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 53 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Ask the students to practice the activity in class given in **Class Activity** section given on page 53 in the main coursebook. This will help the students to understand the importance of all Self Management.

Suggested Activity

Ask the students to use the internet and download some images of the icons of facial expressions. Take a print out and paste them in their project file with their meaning.

3. ICT Skills-I

Teaching Objectives

Students will learn about

- ICT
- Input Devices
- Output Devices
- Measuring Unit for Memory
- Motherboard
- Types of Operating Systems
- Booting
- Windows 10—An Operating System
- Files and Folders in Windows 10
- Managing Files and Folders in Windows 10
- Keyboard Operations in Windows 10
- Brief History of the Internet
- Terminologies of the Internet
- Applications of Internet
- Microsoft Edge
- Creating an Email Account
- Introduction to Social Media
- What is a Computer?
- Processing Device— (CPU)
- Computer Memory
- Peripheral Device Ports
- Understanding Operating System
- Functions of an Operating System
- Procedure for Starting a Computer
- Common Desktop Operations
- Mouse Operations in Windows 10
- Shutting down the Computer
- How does Internet Work
- Protocols
- Components of Internet
- Email
- Composing an Email
- Digital India

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.

Explain the role of ICT to the students:

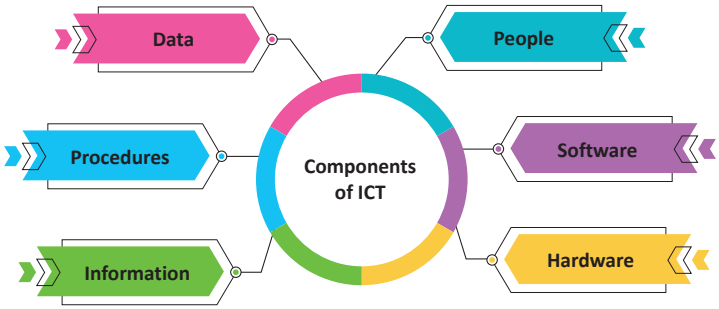
1. In Personal life
   - Shopping
   - Communication
   - Entertainment
   - Education
   - Healthcare
   - Socializing
   - Source of Information

2 In Professional life
   - Maintenance of Records
   - E-Commerce
   - Handling of Accounts
   - E-Banking

Define the different ICT tools to the students in detail:

- Computers
- Radio and Television
- Internet and Emails
- Smartphones and Tablets

Share the components of ICT with the students in details:



Define what is a computer to the students and the basic operations of a computer which are Input, Process, Output and Storage. Also, share the IPO Cycle with example to the students.

Share the characteristics of a computer with the students which are:

- Speed
- Accuracy
- Reliability
- Storage
- Versatile

Explain to the students all the input devices in detail along with the brief working of these devices:

- Keyboard
- Mouse
- Scanner
- Light Pen
- Touchscreen
- Microphone
- Barcode Reader
- MICR

Tell the students that after taking the input from the input devices, the information is sent for processing. The computer uses its brain to process the information. The computer's brain is called the CPU or Central Processing Unit.

Explain to the students all the output devices in detail along with the brief working of these devices:

- Monitor
- Printer
- Plotter
- Speakers
- Projector

Explain the computer memory to the students in detail and also share that measuring unit for memory:

- Primary Memory
- Secondary Memory

Explain the following to the students in detail with proper example:

- Peripheral device ports
- Motherboard
- Operating System (UNIX, DOS, Windows, Linux and Mobile Operating System)
- Types of OS

Tell the functions of OS to the students along with booting and procedure for starting a computer. Also, share that Windows 10 is an operating system designed by Microsoft and released in 2015. It supports graphical user interface where work can be done easily by using simple mouse clicks.

Demonstrate to the students with the labelled steps for each action:

- Changing wallpaper
- Setting Screensaver
- Changing system time/date
- Controlling Speaker volume

Share the information about files and folders in Windows 10 with the students. Also, demonstrate to the students with the labelled steps for each action:

- Creating a file
- Creating a folder
- Rename a file/folder
- Deleting a file/folder
- Moving a file/folder
- Copy and Paste a file/folder
- Searching a file/folder

Share the mouse operations in Windows 10 with the students:

- Single-click
- Double-click
- Right-click
- Drag and drop
- Hovering

Tell the keyboard operations in Windows 10 to the students:

Shortcut keys	Task to be performed
Ctrl+N	Creating a new file
Ctrl+O	Open a file
Ctrl+S	Save a file
Ctrl+P	Print
Ctrl+X	Cut
Ctrl+V	Paste
Ctrl+F	Find option
Ctrl+C	Copy

Define the following to the students:

- Shutting down the computer
- Brief history of Internet
- How does Internet work
- Terminologies of Internet
- Protocols
- Applications of Internet
- Components of Internet
- Microsoft Edge
- Email
- Creating an Email Account
- Composing an Email
- Introduction to Social Media
- Digital India

Ask the students to solve the task given on pages 79, 81 and 85 as **Task**.

Ask the students to read the **Brainy Fact** given on page 66, 67, 77, 80, 86 and 91.

Extension

Ask the students some oral questions based on this chapter.

Q. What is ICT?

Q. Define the following:

a. Title Bar
b. Communication
c. Entertainment

d. Education e. Healthcare f. Socializing
g. Internet Service Provider h. E-Commerce i. E-Banking

Q. Define different ICT tools.

Q. Define characteristics of ICT tools.

Q. Define about different devices of the following:

a. Input devices b. Processing device c. Output device
d. Storage device

Evaluation

Encourage the students to walk-through the chapter thoroughly.

After explaining the chapter, let the students do the exercises given on pages 92 to 100 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 100 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Ask the students to practice the activity in class given in **Class Activity** section given on page 101 in the main course book. This will help the students to know the uses of ICT and able to connect devices to a computer.

Suggested Activity

Ask the students to prepare a collage to show the tools used in ICT.

4. Entrepreneurial Skills-I

Teaching Objectives

Students will learn about

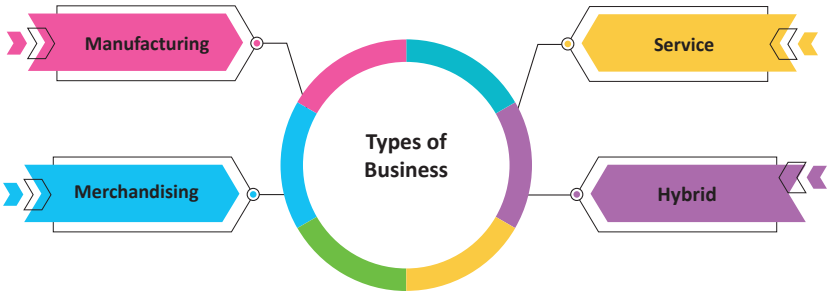
- Definition of Business
- Types of Business
- Important Features of Different Types of Business
- Forms of Business Organisations
- Steps of Starting a Business
- Who is an Entrepreneur?
- What is Entrepreneurship?
- Entrepreneurship Development
- Characteristics of an Entrepreneur
- Role of an Entrepreneur
- Core Skills of a Successful Entrepreneur
- Challenges of an Entrepreneurship
- Rewards of an Entrepreneurship
- Difference between Businessman and Entrepreneur

Number of Hours
Theory
15

Teaching Plan

Before starting the chapter, tell the students that a business is a state of being busy as an individual or as an organization in a profit earning economic activity.

Share the types of business in detail with the students:



Explain the important features of different types of business in detail to the students:

- Manufacturing
- Service
- Merchandising
- Hybrid

Share the forms of business organizations with the students in details along with the advantages and disadvantages:

- Sole Proprietorship
- Partnership
- Corporation
- Limited Liability Company (LLC)

Define the steps for starting a business to the students. Also, explain the meaning of Entrepreneur along with the Entrepreneurship and its development.

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

- Process of its development
- Characteristics of an Entrepreneur
- Role of an Entrepreneur
- Core Skills of a successful Entrepreneur
- Challenges of an Entrepreneurship
- Rewards of Entrepreneurship

Demonstrate the difference between Businessman and Entrepreneur.

Ask the students to solve the task given on pages 104 and 106 as **Task**.

Extension

Ask the students some oral questions based on this chapter.

Q. What is business?

Q. What are the types of business?

Q. Explain the different forms of business.

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 112 to 118 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 119 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Ask the students to practice the activity in class given in **Class Activity** section given on page 119 in the main course book. This will help the students to know the world of Entrepreneurship and how to give a successful interview.

Suggested Activity

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

5. Green Skills-I

Teaching Objectives

Students will learn about

- ☞ Environment
- ☞ Relationship Between Society and Environment
- ☞ Natural Resources
- ☞ Saving Environment using 3R's
- ☞ Green Economy
- ☞ Green Projects in India
- ☞ Ecosystem
- ☞ Natural Resources Conservation
- ☞ Factors Causing Environment Imbalance
- ☞ Green Skills

Number of Hours
Theory
5

Teaching Plan

Before starting the chapter, tell the students that 'Environment' word is derived from the French word 'Environia' which means "to surround". In simple terms, it refers to our surrounding consisting of physical, chemical and biological elements that maintain a balance between the living and non-living components.

Explain the difference between the natural and man-made environment to the students.

Tell the students that an ecosystem is defined as a community where living and non-living things interact with each other and their surrounding environment to form a balanced system. Also, tell them about the two components and two types of ecosystem:

Share the relationship between society and environment with the students in detail.

Tell the students about natural resources and natural resources conservation. Also, tell them about the need to conserve our national resources.

Share with the students about how to conserve our natural resources:

- Water Conservation
- Soil Conservation
- Energy Conservation
- Food Conservation
- Forest Conservation

Explain the 3R's used for saving environment to the students which are:

- Reduce
- Reuse
- Recycle

Demonstrate the factors that causes environment imbalance to the students in details:

- Population Explosion
- Pollution
- Global Warming
- Mining Activity

Explain to the students about green economy and the characteristics of it. Also, share the components and importance of green economy.

Show the students about purpose of Green Skills in details along with the green jobs and green projects in India.

Ask the students to solve the task given on page 132 as **Task**.

Ask the students to read the **Brainy Fact** given on pages 121, 122, 126 and 129.

Extension

Ask the students some oral questions based on this chapter.

Q. What is environment?
Q. What is ecosystem?
Q. Differentiate between society and environment.
Q. What are natural resources?
Q. Define natural resource conservation.
Q. Define the 3R's used for saving environment.
Q. Name the factors causing environment imbalance.
Q. What is global warming?
Q. Define mining activity.
Q. What is green economy?
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 134 to 139 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 140 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Ask the students to practice the activity in class given in **Class Activity** section given on page 140 in the main course book. This will help the students to know about the Hazards of Deteriorating environment, factors affecting environment and factors influencing the same.

Suggested Activity

Ask the students to educate the residents of their society to Save Fuel by car pooling.

Class 9

LESSON PLAN

Artificial Intelligence

Part-B: Subject Specific Skills

1. Introduction to AI

Teaching Objectives

Students will learn about

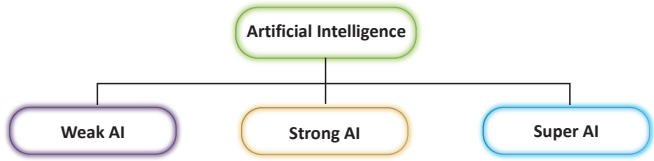
- What is Intelligence?
- Types of AI
- AI Around Us
- History of AI
- Importance of AI
- Future of AI
- Domains of AI
- What are Sustainable Development Goals (SDGs)?
- Role of AI to Achieve SDGs
- Dynamic Waves in AI Research
- Case Study of AI Start-ups in India
- AI Bias & AI Access
- Advantages of AI
- Conclusion
- Introducing AI
- How do Machines Become Intelligent?
- What is Not AI?
- World Famous AI Machines
- AI in India
- Human-Machine Interaction
- The Concept of Smart Living
- Applications of AI in Real-Life
- Careers in AI
- AI Ethical Issues and Concerns
- AI Access
- Disadvantages of AI

Number of Hours	
Theory	Practical
10	8

Teaching Plan

Before starting the chapter, tell the students that Intelligence is the ability to learn from experience, to recognize problems and to solve problems. According to **Sternberg** and **Sternberg**— "Intelligence is the capacity to learn from experience, using metacognitive processes to enhance learning, and the ability to adapt to the surrounding environment."

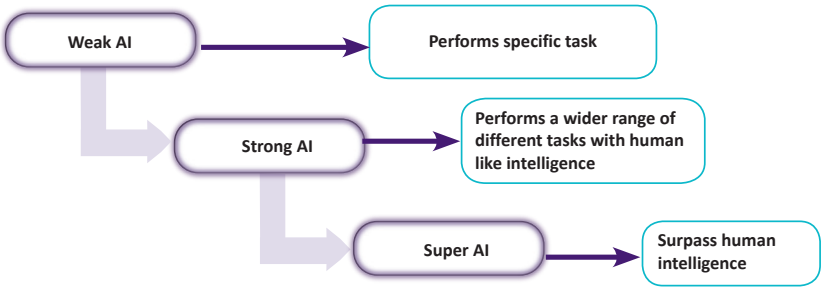
Introduce the student with AI and tell them that **Artificial Intelligence (AI)** is a branch of computer science that simulate human intelligence into machines, especially in computer systems, so that they can think and perform actions similar to humans.



Explain the types of AI to the students with the help of proper examples:

Define the meaning and purpose of following AI to the students.

- Weak AI
- Strong AI
- Super AI



Explain the students about how machines became intelligent to the students.

Share the details about AI around us in detail with the students:

- Smartphones
- Email Spam Filters
- Virtual Assistants
- Social Media
- Music and Media Streaming Services
- Video Games
- Navigation
- Security and Safety
- Social Media Filters

Explain to the students about what is not AI in detail with proper examples:

Share the history of AI with the students.

Tell the students about some World-Famous AI Machines with detail and purpose:

- IBM Watson
- Sophia
- Chatbots
- Honda Asimo
- Boston Dynamics AI Robot

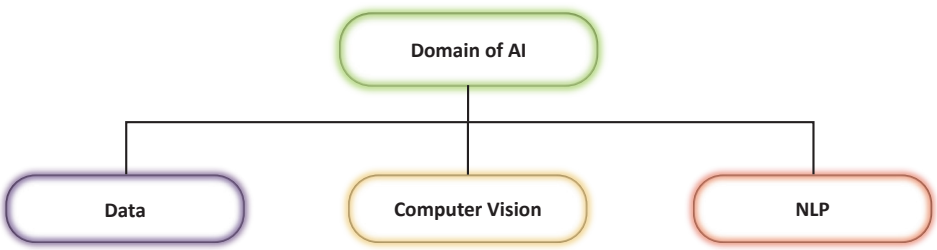
Explain the students that AI has impacted all the fields and sectors. It has changed the conventional functioning of machines. AI means equipping the machines with the power to think and make decisions just like human beings.

Tell them that AI as a technology has evolved in every field. It is the fastest growing sector with India having a biggest stake in AI development. This technology has its roots from our country's leading technology institutes. These institutes have initiated and encouraged AI researchers and start-ups.

Explain the Future of AI to the students with the concept that is being planned in fields.

Explain the meaning of Human-Machine Interaction and also tell the brief history of HMI to the students in details.

Explain the Domains of AI to the students in details along with the usage/ application of the same.



Explain Natural Language Processing (NLP) to the students and tell the usage of the same.

Tell the students about Data and explain the usage of the same in the field of AI.

Share the information with the students about Computer Vision along with the applications of Computer Vision.

Explain the meaning and advantages of Smart Cities and Smart Schools.

Explain the meaning and purpose of Smart Homes to the students. Also, tell them how these devices are beneficial like:

- Power Saver
- Increased energy Efficient
- Protect Home and its Belongings
- Interactive Home
- One Point Access
- Flexibility
- Remote Control
- Climate Control
- Protection

Share the devices which are used in smart homes to the students:

- Smart Hubs
- Video Doorbells
- Smart Cameras
- Smart Smoke Detectors
- Smart Lighting
- Smart Thermostats
- Smart Speakers
- Ego Lawnmower and Eve Aqua
- Smart Remote Controllers

Briefly explain all the SDGs in detail along with their motives and purpose:

Explain the applications of AI in real-life to the students in details.

Share the following in details with the students:

- Dynamic Waves in AI Research
- Careers in AI
- Case Study of AI Start-ups of India
- AI Ethical issues and concerns
- AI Bias
- AI Access
- Advantages of AI
- Disadvantages of AI
- Conclusion

Ask the student to solve the exercise given on pages 149, 158 and 177 as **AI Reboot**.

Ask the students to solve the task given on pages 146, 147, 151, 159, 162, 163, 168, 174, 179, 181 and 182 as **AI Task**.

Make sure to ask the students to scan and watch the video given on pages 150, 151, 154, 157, 159, 161, 164, 168 and 177. Encourage the students to make presentation on the topic learned and discuss in class.

Encourage the students to complete the Ice Breaker Activity given on pages 160 and 183 for learning by doing.

Ask the students to read the **Brainy Fact** given on pages 144,149 and 152.

Extension

Ask the students some oral questions based on this chapter.

Q. What is intelligence?

Q. What is AI?

Q. Explain the types of AI.

Q. How do machines become intelligent?

Q. What is not AI?

Q. What is the future of AI?

Q. What is HMI?

Q. What is the importance of AI?

Q. Define domains of AI.

Evaluation

Encourage the students to walk-through the chapter and ask them to play the games given on pages 154, 156 and 168 on their own under the name **AI Game** after learning about the rules and basics.

After explaining the chapter, let the students do the exercises given on pages 184 to 194 in the main course book as **Exercise (Solved and Unsolved Questions)**. Tell them to solve the critical and computational skill developing exercises as **AI in Life** and **AI Deep Thinking** given on pages 194 and 196.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on pages 196 to 199 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity. Ask the students to think and answer the exercise as **AI Ready 1** given on page number 200.

Ask the students to practice the activity in Class given in **Class Activity** section given on Page 195 in the main coursebook. This will help the students to know how AI help them in their daily life and they can generate ideas about Smart Homes.

Suggested Activity

Ask the students to describe their dream smart home.

2. AI Project Cycle

Teaching Objectives

Students will learn about

- AI Project Cycle Framework
- AI Ethics Practiced while Designing AI Projects
- Summary—AI Project Cycle
- Identifying the Stakeholders
- Problem Statement Template
- What is Data?
- Data Visualisation
- Different Ways to Visualise Data
- What is Modelling?
- Difference between AI, Machine Learning and Deep Learning
- Data Modelling Techniques
- Iterative Nature of Problem Scoping
- Setting Goals for an AI Project
- 4W's Problem Canvas
- Data Acquisition
- System Maps
- Data Visualisation Tools
- Visualise Data using Visualisation Tools
- Decision Tree—Rule Based Approach

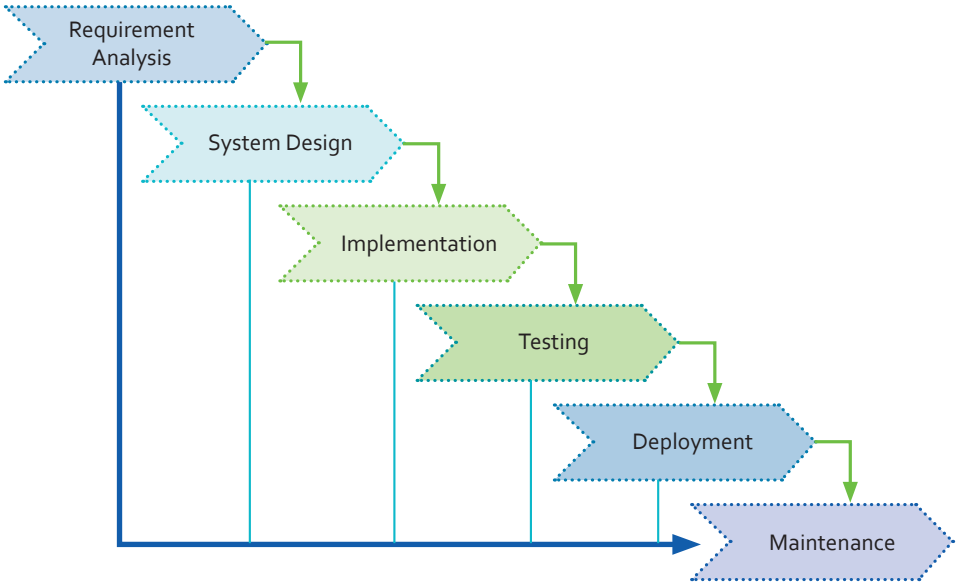
- ☞ Pixel It—Learning Based Approach
- ☞ AI Project Deployment
- ☞ AI Project Evaluation

Number of Hours	
Theory	Practical
20	19

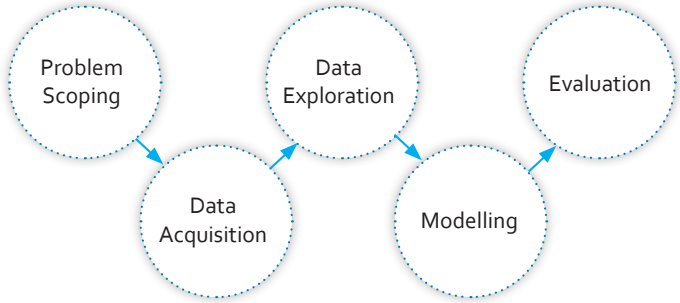
Teaching Plan

Before starting the chapter, tell the students AI is the top trending technology of this digital era. Most of the companies use AI to accomplish their mundane tasks and achieve their company's long-term goals.

Before learning about AI project cycle framework, first make sure that students learn about traditional software development cycle. Traditional software development follows the Software Development Life Cycle (SDLC). SDLC has the following stages:



Tell the students that the AI project cycle provides us with an appropriate framework which can lead us towards our goal. The following are the stages in an AI project cycle:



Explain the students about the iterative process is an important approach of problem scoping that helps in continually improving a design or product using an AI model. It involves creating a prototype and testing it, and repeating this cycle until you reach a desired AI model.

Share with the students the AI Ethics practiced while designing AI Projects along with the summary of AI Project cycle.

Tell the students that problem scoping is the term used to define the process of selecting a problem which we might want to solve using AI knowledge.

Make sure and let the students know how to identify the stakeholders.

Make sure that they can understand all the steps of problem scoping. We we use another method here, known as 4Ws Problem Canvas. This canvas helps us in identifying 4 crucial parameters we need to know for solving a problem. The 4Ws here are listed as Who?, What?, When? and Why?

Tell the students that Problem Statement Template helps us to put together all the key points into a single template.

Define Data Acquisition and what is Data along with other facts to the students:

- NTypes of Data
- Data Features
- Reliable Sources of Relevant Data

Tell the students that a system map is a diagrammatic representation of a set of things working together. It focuses on the components and boundaries of a system. System map helps us to find relationships between different elements of the problem which we have scoped.

Explain to the students about the following in details and labelled steps:

- Data Visualisation
- Need of Visualising Data
- Data Visualisation Tools
- Different Ways to Visualise Data
- Visualise Data using Visualisation Tools

Share with the students about the following in details and labelled steps:

- What is Modelling?
- Difference Between AI, ML and DL
- Data Modelling Techniques
- Rule Based Approach
- Learning Based Approach
- Decision Tree
- Pixel It
- AI Project Evaluation
- AI Project Deployment

Ask the student to solve the exercise given on pages number 204 and 213 as **AI Reboot**.

Ask the students to solve the task given on pages number 204, 227, 228 and 229 as **AI Task**.

Make sure to ask the students to scan and watch the video given on page 230. Encourage the students to make an AI Project Cycle Framework on an A-3 size sheet.

Extension

Ask the students some oral questions based on this chapter.

Q. What is 4Ws of Problem Canvas?

Q. Define the following:

- Data Visualisation
- Need of Visualising Data
- Data Visualisation Tools
- Different Ways to Visualise Data

- Visualise Data using Visualisation Tools
- Data Modelling Techniques
- Rule Based Approach
- Learning Based Approach
- Decision Tree
- Pixel It
- AI Project Evaluation
- AI Project Deployment

Q. What is Data Modelling?

Q. What is the difference between AI, ML and DL?

Evaluation

After explaining the chapter, let the students do the exercises given on pages 231 to 241 in the main course book as **Exercise (Solved and Unsolved Questions)**. Tell them to solve the critical and computational skill developing exercises as **AI in Life** and **AI Deep Thinking** given on pages 241 and 242.

Take the students to the computer lab and let them practice the activities given in **AI Lab** section on Pages 242 to 244 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity. Ask the students to think and answer the exercise as **AI Ready** 2 given on page 245.

Suggested Activity

Ask the students to learn more about Data Modelling and prepare a presentation on this topic.

3. Neural Networks

Teaching Objectives

Students will learn about

- ☞ Why do we use Neural Networks?
- ☞ Advantages of Neural Network
- ☞ Human Nervous System
- ☞ Relation between the Neural Network and Nervous System
- ☞ Working of Neural Networks
- ☞ Applications of Neural Networks
- ☞ AI Models
- ☞ Types of Neural Networks

Number of Hours	
Theory	Practical
4	2

Teaching Plan

Before starting the chapter, explain to the students about why do we use Neural Networks. Neural networks form a base of deep learning, a subfield of machine learning where algorithms are inspired by the structure of the human brain.

Tell them that the Neural networks are a series of algorithms used to recognise hidden patterns in raw data, cluster and classify it, continuously learn and improve. They are used in a variety of applications in stock markets, sales and marketing trends, risk assessment and fraud detection.

Explain the applications of Neural Networks in detail with proper examples to the students:

- Facial Recognition
- Forecasting
- Music Composition

Share the advantages of Neural Network to the students in detail:

- Parallel processing capability
- Data is stored on the entire network
- Capable of learning from non-linear and complex data

Tell the students about the AI Models to the students:

- Regression
- Classification
- Clustering

Tell them about Human Nervous System which is made up of a complex network of specialised nerve cells known as neurons. Neurons are the building blocks of the nervous system and are responsible for communicating messages throughout the body.

Tell the students about the Relation between the Neural Network and Nervous System as its just like the human brain where all neurons are interconnected to one another, artificial neural networks also have a large number of artificial neurons(nodes) that are interconnected to one another in a sequence of layers of the networks.

Share the working of Neural Networks and tell them the Neural networks are made up of layers of neurons, just like the human brain that consists of millions of neurons. These neurons are the core processing units of the network.

Define the types of Neural Networks which are mainly two types of Neural Networks:

- Artificial Neural Network
- Biological Neural Network

Make sure to ask the students to scan and watch the video given on page 250. Encourage the students to make a presentation given on the topic "Neural Networks".

Extension

Ask the students some oral questions based on this chapter.

Q. What is neural network?

Q. What are the applications of neural network?

Q. What is facial recognition?

Q. Define forecasting from the point of neural network.

Q Define music composition from the point of neural network.

Q. Define the following:

a. Regression
b. Classification
c. Clustering

Evaluation

Encourage the students to walk-through the chapter and ask them to play the game given on pages 251 and 252 on their own under the name **AI Game** after learning about the rules and basics.

After explaining the chapter, let the students do the exercises given on pages 253 to 259 in the main course book as **Exercise (Solved and Unsolved Questions)**. Tell them to solve the critical and computational skill developing exercises as **AI in Life** and **AI Deep Thinking** given on page 260 .

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on pages 260 to 263 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity. Ask the students to think and answer the exercise as **AI Ready 3** given on page number 264.

Suggested Activity

Ask the students to research more about Neural Networks and play more similar game taught in this chapter.

4. Introduction to Python

Teaching Objectives

Students will learn about

- Steps Involved in Computer Problem Solving
- Control Structures
- Flowcharts
- Difference between Algorithm and Flowchart
- What is CodeCombat?
- Important Features of Python
- Important uses of Python
- Working in Python
- Statements in Python
- Operator Precedence
- The print() Function
- Errors in Python
- Sequential Statements
- Iterative Statements
- Algorithm
- What is Python?
- Role of Python in Artificial Intelligence
- Installing Python
- Python Character Set
- Tokens
- Comments in Python
- The input() Function
- Control Statements
- Selection Statements
- Lists in Python

Number of Hours	
Theory	Practical
30	75

Teaching Plan

Before starting the chapter, tell the students that a computer is just a machine that gives the result based on the instructions or inputs given to it. In order to get a problem solved by a computer, we need to give step-by-step instructions to the computer.

Also, teach the students that these step-by-step instructions written in any programming language to do a specific task is known as a program.

Share with the students that to solve this problem of writing a program we follow some steps as given below:

1. Understanding the Problem
2. Analysing the Problem
3. Developing the Solution
4. Coding and Implementation

Explain the students that Control structures are a set of instructions that controls the flow of instructions in a program. It is a programming tool that determines the order of execution of the statements in any programming language. Also, explain:

- Sequential Flow
- Selection Flow
- Repetition Flow

Tell the students that an algorithm is a step-by-step approach to identify and solve a problem in a finite time. It is used in a problem-solving phase of any programming task and helps in defining the clear instructions in sequence.

Also, teach them how to write an algorithm.

Also tell them the following:

- Advantages of Algorithm
- Disadvantages of Algorithm

Share with the students that a flowchart is a graphical representation of an algorithm. It makes use of symbols which are connected through arrows to show the direction of flow of information.

Also, explain the following:

- Drawing a Flowchart
- Advantages of Flowchart
- Disadvantages of Flowchart

Explain the difference between Algorithm and Flowchart to the students in detail:

Tell the students what is CodeCombat and explain the following in detail with detailed steps:

- Using CodeCombat

Explain the following to the students:

- What is Python?
- Important Features of Python
- Role of Python in AI
- Importance uses of Python
- Installing Python
- Working in Python
- Python Character Set
- Statements in Python
- Tokens
- Operator Precedence
- Comments in Python
- The print( ) Function
- The input( ) Function
- Errors in Python
- Control Statements
- Sequential Statements
- Selection Statements
- Iterative Statements
- Lists in Python

Ask the student to solve the exercise given on page 291 as **AI Reboot**.

Ask the students to solve the task given on pages 268, 270, 272, 283, 292, 297 and 314 as **AI Task**.

Ask the students to read the **Brainy Fact** given on pages 267, 281, 285, 288,289, 290, 305 and 307.

Extension

Ask the students some oral questions based on this chapter.

Q. What is algorithm?

Q. What is Flowchart?

Q. What is Python?

Q. What are the features of Python?

Q. Explain the importance uses of Python.

Q. Define the following:

- Role of Python in AI
- Statements in Python
- Comments in Python
- Errors in Python
- Selection Statements
- Working in Python
- Tokens
- The print( ) Function
- Control Statements
- Iterative Statements
- Python Character Set
- Operator Precedence
- The input( ) Function
- Sequential Statements
- Lists in Python

Evaluation

Encourage the students to walk-through the chapter.

After explaining the chapter, let the students do the exercises given on pages 319 to 333 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 **AI Lab** section on pages 333 and 334 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 simple programs in Python using the features, tokens, variables and keywords.